METHODOLOGICAL DOCUMENT

Sustainable Management and Conservation of Water Resources

BWS0004

Water Quality Improvement and Functional Restoration of Surface Water Bodies

BIOCARBON CERT©

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1 Introduction

Freshwater quality is fundamental to human well-being, ecosystem functioning, productive activities, and the sustainable management of water resources. The degradation of freshwater quality constitutes a major pressure on water security and aquatic ecosystems and may result from multiple sources, including nutrient enrichment, organic and chemical pollution, sediment inputs, wastewater discharges, and other anthropogenic pressures (UNEP, 2016; WRI, 2025a).

Surface water bodies, including rivers, lakes, reservoirs, lagoons, wetlands, estuaries, bays, and other connected aquatic systems, may experience progressive degradation as a result of pollutant discharges, excessive nutrient inputs, sediment loads, organic matter accumulation, eutrophication, oxygen depletion, contamination, and other pressures. Nutrient enrichment, particularly by nitrogen and phosphorus, can contribute to eutrophication and associated responses such as excessive algal growth, increased turbidity, oxygen depletion, and changes in aquatic ecosystem condition (US EPA, 2021).

The deterioration of water quality can reduce the effective availability and usability of water even where the physical volume of the resource remains unchanged. Consequently, water stewardship interventions may address not only water quantity but also water-quality challenges that constrain human uses, productive activities, ecosystem functions, or other locally relevant water needs. Water Quality Benefit Accounting provides a framework for identifying, quantifying, tracking, and communicating the water-quality benefits associated with such interventions, complementing approaches developed for volumetric water benefits (WRI, 2025a; WRI, 2025b).

Interventions aimed at improving water quality and restoring the functional condition of surface water bodies may reduce pollutant loads, improve dissolved oxygen conditions, control eutrophication, remediate contaminated water or sediments, restore natural treatment and self-purification processes, and recover conditions necessary to support defined water uses or ecological functions. The appropriate indicators and assessment methods depend on the water-quality challenge, characteristics of the water body, intervention implemented, and intended environmental outcome (WRI, 2025a).

Such interventions may include physical, chemical, biological, ecological, nature-based, technological, or hybrid approaches. The environmental outcome generated by an intervention depends on the measurable change achieved in the affected water system rather than solely on the technology or treatment process used.

Within the framework of the BioCarbon Water Standard (BWS), water-quality improvement and functional restoration activities may generate quantifiable water benefits where they produce an additional, measurable, attributable, and verifiable improvement in the condition of a defined volume of surface water compared to a baseline scenario.

This methodology establishes the technical requirements and procedures for identifying, quantifying, monitoring, and reporting volumetric water benefits resulting from water-quality improvement and the functional restoration of surface water bodies. The approach is consistent with the broader principles of volumetric water benefit accounting, under which water stewardship outcomes are quantified relative to defined baseline conditions and expressed through measurable water-related benefits (Reig et al., 2019; WRI, 2025b).

The methodology distinguishes between the physical volume of water treated or influenced by an intervention, changes in water-quality parameters, reductions in pollutant loads, and the volume of water for which an additional improvement in quality or functional condition can be demonstrated. This distinction is particularly relevant where pollution is expressed through volumetric indicators. For example, the grey water footprint represents the volume of freshwater required to assimilate a pollutant load based on the difference between the applicable maximum and natural background concentrations (Franke et al., 2013). Such an indicator does not, by itself, establish that an equivalent physical volume of water has been restored.

Accordingly, a reduction in pollutant concentration, pollutant load, or grey water footprint does not, by itself, constitute an equivalent volume of improved water unless the relationship with the quantified volumetric water benefit is demonstrated in accordance with this methodology.

The methodology is technology-neutral and has global scope. It may be applied to interventions implemented in different hydrological, climatic, ecological, and socioeconomic contexts, provided that the applicability, baseline, additionality,

quantification, monitoring, uncertainty, and other requirements established in this document and in the BioCarbon Water Standard are met.

The results are expressed as net volumetric water benefits in cubic meters (m^3) over the corresponding monitoring period and constitute the basis for the issuance of Verified Water Credits (VWC) under the BioCarbon Water Standard.

2 Objectives

The objective of this methodology is to establish the technical requirements for the quantification, monitoring, and reporting of volumetric water benefits resulting from activities that improve water quality or restore the functional condition of degraded surface water bodies, within the framework of the BioCarbon Water Standard.

This methodology establishes:

(a) the criteria for identifying and characterizing eligible water-quality improvement and functional restoration activities within the project area;

(b) the applicability conditions for interventions implemented in degraded or impaired surface water bodies;

(c) the requirements for defining the surface water body, project area, area of influence, and spatial and temporal boundaries within which the water benefit is assessed;

(d) the procedures for establishing the baseline condition, including the characterization of relevant water-quality, hydrological, pollutant-load, ecological, and operational variables;

(e) the requirements for demonstrating additionality and causal attribution of the observed water-quality or functional improvement to the project activities;

(f) the criteria for selecting the water-quality parameters, functional indicators, reference conditions, and thresholds applicable to the quantified water benefit;

(g) the procedures for determining the volume of water for which an additional and verifiable improvement in water quality or functional condition can be demonstrated;

(h) the requirements for distinguishing treated or influenced water volume, pollutant-load reduction, water-quality improvement, and the water volume associated with the demonstrated benefit;

(i) the requirements for determining the net volumetric water benefit attributable to the project after considering the baseline, leakage or displacement effects, uncertainty, and other applicable conservative adjustments;

(j) the requirements for preventing overlapping quantification and double counting with other methodologies of the BioCarbon Water Standard;

(k) the requirements for monitoring the continued existence and performance of the water-quality or functional benefit during the corresponding monitoring period; and

(l) the requirements for the quantification of net water benefits eligible for issuance as Verified Water Credits under the BioCarbon Water Standard.

3 Version

This document corresponds to version 1.0 of methodology BWS0004 – Water Quality Improvement and Functional Restoration of Surface Water Bodies, published by BioCarbon Cert on October 29, 2026.

Project holders, Conformity Assessment Bodies (CABs), and other users shall ensure that they apply the current version of this methodology published by BioCarbon Cert at the time of the relevant process.

BioCarbon Cert may periodically update this methodology to reflect scientific advances, technical developments, methodological improvements, regulatory changes, lessons learned from project implementation, or adjustments arising from technical review and conformity assessment processes.

4 Scope

This methodology establishes the technical requirements and procedures for the quantification, monitoring, and reporting of volumetric water benefits derived from activities that improve water quality or restore the functional condition of surface water bodies within the framework of the BioCarbon Water Standard.

The methodology is applicable to projects that implement, rehabilitate, recover, expand, optimize, or operate interventions intended to improve the physical, chemical, biological, or ecological condition of a defined surface water body, provided that the resulting water benefit can be quantified in volumetric terms and attributed to the project relative to a baseline scenario.

The methodology has global scope and may be applied in any country or geographic region, provided that the project meets the applicability conditions established in this document and the applicable requirements of the BioCarbon Water Standard.

4.1 Technical scope

This methodology covers activities whose principal water benefit is associated with one or more of the following outcomes:

(a) improvement of the quality condition of surface water;

(b) reduction of pollutant loads affecting a defined surface water body;

(c) remediation of contaminated surface water or sediments where such remediation results in a demonstrable improvement in water quality;

(d) reduction or control of eutrophication;

(e) improvement or restoration of dissolved oxygen conditions;

(f) reduction of persistent hypoxic or anoxic conditions;

(g) restoration or improvement of natural water-treatment, assimilation, or self-purification functions;

(h) recovery of water conditions necessary to support a defined human, productive, environmental, or ecological use or function;

(i) functional restoration of degraded lakes, rivers, streams, reservoirs, lagoons, wetlands, estuaries, bays, or other surface water systems; and

(j) other measurable improvements in the physical, chemical, biological, or ecological condition of a surface water body that result in a quantifiable volumetric water benefit.

Water benefits shall be expressed as net volumetric water benefits in cubic meters (m^3) over the corresponding monitoring period.

The physical volume of water treated, circulated, pumped, oxygenated, filtered, or otherwise exposed to an intervention shall not, by itself, constitute the volumetric water benefit.

4.2 Scope boundaries

This methodology does not cover activities whose principal water benefit corresponds to:

(a) increased infiltration into soil or the soil profile, where the quantified outcome is additional infiltrated water;

(b) rainwater harvesting, collection, storage, and use;

(c) managed aquifer recharge, underground storage, or temporal regulation of water flows;

(d) reductions in water withdrawal, consumption, or distribution losses resulting from water-use efficiency or loss-reduction activities; or

(e) the transfer, substitution, or redistribution of water without a demonstrable improvement in the quality or functional condition of the relevant surface water body.

The methodology shall not quantify water-quality improvements that occur solely as incidental co-benefits of activities whose principal quantified water benefit is accounted for under another BioCarbon Water Standard methodology.

Dilution alone shall not constitute an eligible water-quality improvement. A reduction in pollutant concentration resulting solely from an increase in water volume, without a corresponding demonstrable improvement in the relevant water-quality or functional condition attributable to the project, shall not be quantified as a water benefit under this methodology.

Likewise, the transfer of pollutants, contaminated sediments, nutrients, organic matter, or other sources of degradation from the quantification boundary to another water body, downstream area, environmental compartment, or location shall not constitute pollutant removal or restoration unless the transferred material is

appropriately managed and no material displacement of the water-quality impact occurs.

This methodology does not apply to wastewater collection, conveyance, treatment, or sanitation infrastructure, including the construction, expansion, rehabilitation, optimization, or operation of wastewater treatment plants. The volume of wastewater treated and reductions in pollutant concentrations or loads achieved through wastewater treatment shall not constitute volumetric water benefits under this methodology.

This exclusion does not preclude the application of this methodology to eligible activities implemented to improve the water-quality or functional condition of a surface water body affected by historical or ongoing wastewater discharges, provided that the quantified benefit results from the eligible restoration activity and not from wastewater treatment itself.

4.3 Relationship with other methodologies

Where an intervention could fall within more than one methodology of the BioCarbon Water Standard, the applicable methodology shall be determined by the principal mechanism through which the quantified water benefit is generated.

The same physical intervention may generate different water-related outcomes. However, each quantified water benefit shall be assigned to the methodology corresponding to the mechanism and outcome being quantified, and the same water volume or causal water benefit shall not be accounted for more than once.

Activities that increase surface infiltration shall be quantified under BWS0001 where the credited outcome is additional infiltrated water. Activities involving rainwater harvesting, storage, and use shall be quantified under BWS0002. Activities whose quantified outcome is managed aquifer recharge, underground storage, or temporal water regulation shall be quantified under BWS0003. Activities whose quantified outcome is a reduction in water withdrawal, consumption, or distribution losses shall be quantified under BWS0005, where applicable.

An activity physically eligible under another BioCarbon Water Standard methodology may also contribute to water-quality improvement. Such improvement may be quantified under this methodology only where it constitutes a distinct, additional,

independently quantifiable, and non-overlapping water-quality or functional outcome, and where the corresponding volumetric water benefit has not been quantified under another methodology.

Where the separation of the respective water benefits cannot be robustly demonstrated, the project holder shall apply the methodology corresponding to the principal water benefit and shall treat the remaining effects as co-benefits.

4.4 Scale of application

This methodology does not establish a minimum project scale.

It may be applied to interventions affecting an entire surface water body or a clearly delimited portion thereof, including local treatment zones, river reaches, lake or reservoir sectors, wetlands, lagoons, estuarine areas, bays, or other hydrologically and functionally identifiable units.

The project holder shall demonstrate that the spatial and temporal boundaries used for quantification are appropriate to the hydrodynamic behavior of the water body and allow the water-quality or functional improvement to be delimited, monitored, quantified, and robustly attributed to the project activities.

Where the effects of an intervention extend beyond the immediate intervention area, the project holder shall define an area of influence sufficient to identify material upstream, downstream, lateral, vertical, or connected effects relevant to the quantification of the water benefit.

5 Assumptions and limitations of the methodology

This methodology is based on technical, environmental, hydrological, and operational assumptions necessary to quantify volumetric water benefits derived from water-quality improvement and the functional restoration of surface water bodies. Water-quality benefit assessment requires consideration of the local water-quality challenge, the characteristics of the water body, the intervention implemented, the relevant indicators, and the spatial and temporal conditions under which the resulting benefit is measured (WRI, 2025a).

These assumptions shall be assessed, documented, and justified by the project holder according to the characteristics of the water body, the type and scale of the

intervention, the relevant water-quality pressures, the hydrological and hydrodynamic conditions, the availability and quality of data, and the quantification approach applied.

The methodology recognizes that water-quality improvement may manifest through changes in physical, chemical, biological, or ecological conditions and that these changes do not necessarily correspond directly or proportionally to a volume of improved water. Water Quality Benefit Accounting distinguishes the quantification of water-quality benefits from volumetric water benefit accounting, while recognizing that some water stewardship activities may generate both types of outcomes (WRI, 2025a; WRI, 2025b).

Accordingly, the project holder shall demonstrate the relationship between the observed water-quality or functional change and the volumetric water benefit quantified under this methodology.

Where an assumption, relationship, parameter, or quantified effect cannot be demonstrated with sufficient evidence, the project holder shall apply a conservative approach, limit the volume considered for quantification, account for the associated uncertainty through an appropriate conservative treatment, or exclude the affected component from the calculation of water benefits. This approach is consistent with the principles of conservative and transparent water-benefit accounting, particularly where data limitations or uncertainty may affect the reliability of quantified outcomes (Reig et al., 2019; WRI, 2025b).

5.1 General assumptions of application

The application of this methodology rests on the following assumptions:

(a) a reasonable and demonstrable causal relationship exists between the project activities and the expected water-quality or functional benefit;

(b) the surface water body, or the portion thereof relevant to the project, can be spatially and temporally delimited to a degree sufficient to establish the baseline and quantify the water benefit;

(c) the baseline scenario reasonably represents the water-quality and functional conditions that would have occurred in the absence of the project;

(d) the with-project scenario represents the changes attributable to the activities implemented, after accounting for relevant natural, hydrological, climatic, operational, and anthropogenic factors;

(e) the relevant water-quality parameters, pollutant loads, functional indicators, and hydrological variables can be measured, estimated, or modeled through technically justified and independently verifiable methods;

(f) the data used are representative of the spatial and temporal variability of the water body and of the corresponding monitoring period;

(g) the water-quality or functional condition used as the basis for quantification can be defined through measurable criteria, reference conditions, thresholds, or equivalent technically justified benchmarks;

(h) the volume associated with the quantified water benefit can be determined or estimated through direct measurement, hydrological or hydrodynamic information, bathymetric data, flow records, spatial modeling, or other technically appropriate methods;

(i) changes in water quality resulting solely from dilution, temporary redistribution, sampling variability, or changes unrelated to the project are distinguishable from project-attributable improvements;

(j) potential displacement of pollutants or water-quality impacts outside the quantification boundary can be identified and, where material, quantified or conservatively accounted for;

(k) the monitoring system is capable of detecting material deterioration, interruption, or reversal of the water-quality or functional benefit during the corresponding monitoring period; and

(l) accounting for leakage, uncertainty, and other applicable conservative adjustments prevents the overestimation of the net water benefit.

Water-quality assessment generally requires consideration of both pollutant concentrations and the hydrological conditions that determine pollutant transport and loading. Pollutant load and pollutant concentration represent different

quantities, and changes in concentration may result from changes in water volume or flow rather than from an equivalent change in pollutant mass (Franke et al., 2013).

The methodology therefore recognizes that the physical volume of water exposed to, circulated through, or otherwise influenced by a treatment or restoration activity may differ from the volume for which an additional water-quality or functional benefit can be demonstrated. Likewise, a measured percentage change in a pollutant concentration or individual water-quality parameter shall not, by itself, be interpreted as an equivalent percentage change in water volume.

5.2 Applicability limitations

This methodology shall not be applicable where:

(a) no reasonable causal relationship can be demonstrated between the intervention and the claimed water-quality or functional benefit;

(b) the water body or relevant assessment unit cannot be sufficiently delimited to support robust quantification;

(c) the baseline water-quality or functional condition cannot be established with sufficient reliability;

(d) the observed improvement cannot be distinguished from natural variability, dilution, hydrological changes, changes in pollutant inputs, or other factors not attributable to the project;

(e) the principal quantified water benefit corresponds to infiltration, rainwater harvesting, managed aquifer recharge, underground storage, water regulation, water-use efficiency, or loss reduction covered by another BioCarbon Water Standard methodology;

(f) the intervention merely transfers pollutants, contaminated water, sediments, nutrients, organic matter, or other sources of degradation to another location or environmental compartment without demonstrating a net improvement in the relevant water system;

(g) the claimed benefit results solely from dilution without a demonstrable project-attributable improvement in the relevant water-quality or functional condition;

(h) the intervention causes significant unmitigated deterioration of another water body, groundwater system, aquatic ecosystem, downstream area, or water use;

(i) the water-quality or functional benefit cannot be quantified, monitored, and assessed through an independent audit in a robust and conservative manner; or

(j) the project relies solely on the nominal capacity, design performance, manufacturer specifications, or modeled treatment capacity of a technology without sufficient evidence of the water-quality or functional benefit actually generated during the monitoring period.

The distinction between pollutant load and concentration is particularly relevant when assessing dilution. Because grey water footprint accounting relates pollutant load to defined water-quality concentrations, changes in concentration that arise solely from changes in the receiving water volume do not demonstrate an equivalent reduction in pollutant load (Franke et al., 2013).

Accordingly, the quantity of water pumped, circulated, treated, oxygenated, filtered, processed, or otherwise handled by an intervention shall not constitute, by itself, evidence of a volumetric water benefit. Similarly, percentage improvements in individual water-quality parameters shall not be directly applied as percentage factors to a water volume unless the project holder demonstrates that such a relationship is scientifically valid for the relevant water body, parameter, and restoration objective.

5.3 Quantification limitations

The quantification of water benefits under this methodology may be limited by:

(a) insufficient spatial or temporal coverage of water-quality monitoring data;

(b) short, incomplete, or non-representative baseline datasets;

(c) natural seasonal and interannual variability in water quality;

(d) changes in precipitation, inflows, outflows, water levels, residence time, temperature, stratification, mixing, or other hydrological or hydrodynamic conditions;

(e) changes in pollutant sources or loads occurring independently of the project;

(f) uncertainty in pollutant concentrations, flow measurements, pollutant loads, sediment-water interactions, or other variables used to characterize the water body;

(g) spatial heterogeneity of water-quality conditions within the water body;

(h) difficulty in determining the three-dimensional extent of the water volume affected by the intervention;

(i) difficulty in distinguishing pollutant removal from dilution, redistribution, transformation, sedimentation, volatilization, or transfer to another environmental compartment;

(j) uncertainty regarding the relationship between individual water-quality parameters and the overall functional condition of the water body;

(k) the presence of multiple pollutants or stressors for which different thresholds, reference conditions, or response functions apply;

(l) uncertainty in identifying the parameter or condition limiting the relevant water use or ecological function;

(m) limitations of hydrodynamic, water-quality, pollutant-transport, or ecological models, including their spatial resolution, calibration, validation, parameterization, and representation of the actual system;

(n) uncertainty regarding the persistence of the observed improvement following changes in project operation or external conditions;

(o) difficulty in distinguishing the project effect from other concurrent water-quality improvement or restoration activities; and

(p) uncertainty in the spatial or temporal manifestation of downstream, connected, or indirect effects.

Water-quality conditions can vary substantially across space and time as a result of hydrological, climatic, chemical, and biological processes. Monitoring and assessment approaches therefore need to reflect the characteristics of the water body, the relevant pollution pressures, and the temporal and spatial scales at which changes occur (UNEP, 2016; WRI, 2025a).

Where these limitations exist, the project holder shall apply conservative assumptions, appropriate treatment of uncertainty, additional monitoring, alternative measurement or modeling approaches, or the exclusion of non-demonstrable volumes.

Where models are used, their results shall be conditioned by the quality of the input data, model structure, parameterization, calibration, validation, and representation of the relevant physical processes. Models shall be calibrated and validated with site-specific measured data wherever technically feasible.

Model outputs shall not constitute sufficient evidence for issuance in the absence of monitoring data capable of demonstrating the occurrence and magnitude of the claimed water-quality or functional improvement during the monitoring period.

5.4 Relationship between water-quality indicators and volumetric water benefits

Water-quality parameters and pollutant-load indicators are necessary for characterizing the condition of the water body and evaluating changes attributable to project activities. However, these indicators represent different physical quantities and shall not be considered interchangeable without technical justification.

Grey water footprint accounting provides a method for expressing water pollution in volumetric terms by relating pollutant load to the difference between the maximum acceptable concentration and the natural background concentration of the relevant pollutant (Franke et al., 2013). This volume represents the freshwater volume required to assimilate the pollutant load under the defined conditions and shall be distinguished from the physical volume of water treated or restored.

Accordingly, a reduction in grey water footprint shall not, by itself, be considered equivalent to an equal physical volume of improved water or to an equal number of Verified Water Credits.

Where pollutant concentration, pollutant-load reduction, grey water footprint reduction, treated water volume, or other water-quality indicators are used as inputs to the quantification of the volumetric water benefit, the project holder shall demonstrate the physical and mathematical relationship between the indicator and the resulting water volume.

No conversion factor between a water-quality indicator and a volumetric water benefit shall be applied solely on the basis of an assumed proportional relationship.

5.5 Multiple parameters and limiting conditions

Surface water degradation may result from multiple pollutants, water-quality parameters, or interacting environmental conditions. Nutrient enrichment, for example, may produce interacting responses involving nutrient concentrations, algal biomass, turbidity, dissolved oxygen, and biological condition, and the parameters relevant to assessment may vary according to the characteristics of the water body (US EPA, 2021).

The project holder shall identify the parameters and conditions that are material to the water-quality or functional objective selected for the project.

Where multiple parameters determine the relevant condition, the project holder shall evaluate them jointly and shall identify any parameter or condition that prevents the corresponding water volume from meeting the applicable water-quality or functional criteria.

The improvement of a non-limiting parameter shall not be used to represent full restoration of a water volume where another material parameter remains outside the applicable condition or threshold.

Grey water footprint accounting also addresses multiple pollutants by calculating the grey water footprint separately for individual pollutants and identifying the pollutant resulting in the largest grey water footprint, rather than adding equivalent volumes for pollutants affecting the same receiving system (Franke et al., 2013).

Accordingly, where different pollutants or parameters generate separate quantitative indicators, such indicators shall not be summed unless the project holder demonstrates that they represent distinct and non-overlapping water benefits.

5.6 Permanence of the benefit and conservative approach

This methodology does not assume that a water-quality or functional improvement persists indefinitely. Water-quality restoration outcomes may depend on continued operation, maintenance, pollution-source control, ecological processes, and the hydrological and environmental conditions of the receiving system (WRI, 2025a).

The water benefit may depend on the continued operation and maintenance of treatment infrastructure, restoration measures, pollution-control systems, ecological interventions, or other project activities. Alternatively, an intervention may generate a condition that persists wholly or partially after active operation has ceased.

The permanence of the water benefit shall therefore be assessed based on the demonstrable existence of the water-quality or functional improvement during the monitoring period for which the benefit is quantified.

Where the benefit depends on continued project operation, only the periods during which the intervention is operational and the corresponding water-quality or functional improvement is demonstrated shall be eligible for quantification.

Temporary interruption of project operation shall not automatically constitute loss of the entire benefit where monitoring demonstrates that the improved condition persists. Conversely, continued operation of the project activity shall not, by itself, demonstrate continued water benefit where monitoring indicates deterioration or loss of the relevant water-quality or functional condition.

Where the water body returns wholly or partially toward the baseline condition, the quantified benefit shall be adjusted to reflect the condition actually demonstrated during the affected monitoring period.

Where uncertainty, insufficient information, spatial heterogeneity, temporal variability, or technical limitations may result in overestimation of the water benefit, the project holder shall apply a conservative approach, consistent with the principles used for volumetric water benefit accounting (Reig et al., 2019; WRI, 2025b).

Conservative treatment may include:

(a) use of lower-bound estimates of the affected or improved water volume;

(b) use of conservative pollutant-load estimates;

(c) application of the most restrictive relevant condition where multiple parameters determine eligibility;

(d) exclusion of water volumes for which the required condition cannot be demonstrated;

(e) appropriate treatment of uncertainty;

(f) exclusion of periods affected by insufficient monitoring data or unresolved anomalous conditions;

(g) conservative treatment of model extrapolation beyond monitored areas or periods;

(h) deduction of material leakage or indirect negative effects; and

(i) use of the lower water-benefit estimate where multiple technically acceptable approaches produce materially different results.

All conservative assumptions and adjustments shall be documented, justified, and applied consistently throughout the corresponding monitoring period.

6 Applicability conditions

The applicability conditions establish the minimum requirements that shall be met for a project to apply this methodology. These conditions ensure that the project addresses a demonstrable water-quality or functional challenge, that the relevant surface water system can be adequately characterized, and that the resulting water benefit can be quantified, monitored, and attributed to the project activities.

Consistent with Water Quality Benefit Accounting, project activities shall address a water-quality challenge relevant to the local water context, have an established pathway to a quantifiable water-quality benefit, generate a change beyond the without-project condition, and allow the resulting water-quality outputs to be tracked and confirmed (WRI, 2025a).

Project holders shall comply with the following conditions.

6.1 Water-quality and functional context

The project activities shall address a demonstrable deterioration, impairment, or limitation in the water-quality or functional condition of a surface water body.

The relevant condition may be associated with one or more physical, chemical, biological, or ecological pressures, including nutrient enrichment, organic pollution, sediment loads, pathogens, toxic substances, eutrophication, oxygen depletion, salinization, or other water-quality pressures relevant to the surface water body.

The project holder shall characterize the local water context and identify the water-quality challenge addressed by the project. The assessment shall consider the characteristics of the water body, the principal sources and drivers of degradation, relevant water uses or ecological functions, and existing water-management or restoration measures. This approach is consistent with Water Quality Benefit Accounting (WQBA), which establishes understanding of the local catchment context and the relevant shared water-quality challenge as the starting point for selecting and evaluating water stewardship activities (WRI, 2025a).

Evidence of the relevant water-quality or functional condition may be based on:

(a) official water-quality assessments or classifications;

(b) watershed, basin, or water-body management plans;

(c) monitoring records from competent authorities or recognized monitoring programs;

(d) field measurements and laboratory analyses;

(e) scientific or technical studies representative of the relevant water body;

(f) historical water-quality records;

(g) documented evidence of eutrophication, hypoxia, contamination, sedimentation, or other relevant degradation processes; or

(h) other technically reliable and verifiable information.

The project holder shall demonstrate that the project activities are designed to address the identified water-quality or functional challenge and that the expected benefit is relevant to the condition of the water body.

6.2 Defined surface water system

The project shall be implemented in relation to a clearly identifiable surface water body or hydrologically connected surface water system.

The project holder shall delimit, as applicable:

(a) the surface water body or relevant portion thereof;

(b) the project area;

(c) the area of influence;

(d) relevant inflows and outflows;

(e) upstream and downstream connections;

(f) tributaries, discharge points, drainage areas, or other relevant hydrological connections; and

(g) the areas or water volumes where the effects of the project activities are expected to occur.

The project holder shall establish a spatial and temporal quantification boundary defining the area, depth, water volume, and monitoring period to which the quantified benefit is assigned. The quantification boundary may differ from the project area and shall be distinguished from the area of influence.

The spatial delimitation shall be appropriate to the characteristics and scale of the water body and shall allow the project activities, relevant pollution sources, monitoring locations, and expected water-quality or functional effects to be identified and assessed.

Where water-quality conditions vary materially within the water body, the project holder shall account for such spatial variability in the design of the baseline, monitoring system, and quantification approach.

6.3 Identifiable sources and drivers of degradation

The project holder shall identify and characterize the principal sources and drivers contributing to the water-quality or functional condition addressed by the project.

These may include point sources, diffuse sources, historical or legacy contamination, internal pollutant loads, sediment-related processes, hydromorphological conditions, or other relevant pressures.

The assessment shall be sufficient to determine whether the project activity can reasonably influence the identified water-quality challenge and to distinguish, where relevant, between external pollutant inputs and pollutant loads or degradation processes occurring within the water body.

Where the relevant sources or drivers continue during project implementation, the project holder shall demonstrate that the intervention can generate and maintain a measurable water-quality or functional benefit under those conditions.

6.4 Defined water-quality or functional objective

The project holder shall establish a clearly defined water-quality or functional objective for the project.

The objective shall be consistent with the water-quality challenge identified under Section 6.1 and shall provide the basis for selecting the parameters, indicators, monitoring methods, and quantification approach applicable to the project.

Where applicable, the objective shall consider:

(a) relevant legal or regulatory water-quality requirements;

(b) official classifications or designated uses of the water body;

(c) scientifically established water-quality criteria;

(d) reference conditions appropriate to the type and characteristics of the water body;

(e) ecological or functional conditions relevant to the project; and

(f) other technically justified water-management objectives.

The criteria used shall be appropriate to the specific type and condition of the water body. Water-quality criteria and reference conditions may vary according to water-body type, geographical context, designated use, and relevant ecological characteristics. For example, US EPA guidance for nutrient criteria recognizes that scientifically defensible criteria should account for differences among water-body types and local or regional conditions and may use reference conditions, stressor-response relationships, or other appropriate approaches (US EPA, 2000; US EPA, 2021).

Where several water uses or functions are relevant, the project holder shall identify the criteria applicable to the water benefit being quantified and shall justify their selection.

The project holder shall not select or modify a water-quality criterion, reference condition, or threshold for the purpose of maximizing the quantified water benefit.

Where multiple technically applicable criteria exist, the selected criterion shall be justified based on the characteristics of the water body, the relevant use or function, applicable regulatory requirements, and the environmental objective of the project.

6.5 Demonstrable relationship between the activity and the water benefit

The project holder shall demonstrate a reasonable and technically supported relationship between the project activities and the expected water-quality or functional benefit.

The causal pathway shall identify, as applicable:

(a) the water-quality pressure or degradation process addressed;

(b) the activity implemented;

(c) the physical, chemical, biological, or ecological mechanism through which the activity acts on the water system;

(d) the parameters or indicators expected to respond to the intervention;

(e) the spatial and temporal scale at which the response is expected to occur; and

(f) the resulting water-quality or functional outcome.

Consistent with WQBA, the project shall have an established pathway from the implemented activity to a quantifiable and trackable water-quality output (WRI, 2025a).

The existence or operation of a treatment, restoration technology, infrastructure, or management activity shall not, by itself, demonstrate the occurrence or magnitude of the water benefit.

6.6 Measurable and verifiable water benefit

The water-quality or functional benefit shall be measurable and verifiable using data and methods appropriate to the characteristics of the project and the water body.

The project holder shall demonstrate that sufficient information can be obtained to:

(a) establish the baseline scenario;

(b) characterize relevant spatial and temporal variability;

(c) monitor the parameters or indicators associated with the project objective;

(d) distinguish project-attributable changes from material external influences;

(e) determine the water volume associated with the quantified benefit;

(f) assess uncertainty; and

(g) support independent conformity assessment.

Quantification methods shall be scientifically defensible, transparent, reproducible, and appropriate to the temporal scale of the expected water-quality response. WQBA similarly establishes the use of practical and scientifically defensible methods, conservative assumptions, appropriate temporal scales, and avoidance of double counting as principles for quantifying water-quality benefits (WRI, 2025a).

Where sufficient monitoring or other evidence cannot be obtained to establish the occurrence and magnitude of the water benefit, the affected benefit shall not be quantified under this methodology.

6.7 Environmental compatibility and adverse effects

The project activities shall not generate significant unmitigated adverse effects on surface water, groundwater, aquatic or riparian ecosystems, downstream users, or other water-dependent systems.

The project holder shall identify material environmental trade-offs associated with the intervention and demonstrate that they are prevented, minimized, mitigated, or otherwise appropriately managed.

This assessment shall consider, as applicable:

(a) displacement of pollutants or contaminated materials;

(b) generation or disposal of treatment residues;

(c) disturbance or resuspension of contaminated sediments;

(d) changes in downstream water quality;

(e) impacts on groundwater or connected water bodies;

(f) changes in ecological or hydrological conditions;

(g) introduction of chemical, biological, or other treatment agents;

(h) impacts associated with removal or management of aquatic vegetation, algae, sediments, or other materials; and

(i) other material adverse effects associated with the project activities.

The consideration and minimization of trade-offs is also included among the project-selection principles of WQBA (WRI, 2025a).

An intervention that improves water quality within the project area by materially transferring the corresponding degradation or pollution pressure to another location shall not be considered to generate an equivalent net water benefit.

6.8 Regulatory compliance and additionality eligibility

Project activities shall comply with applicable legal, environmental, water-quality, discharge, treatment, restoration, permitting, and other regulatory requirements.

The existence of a regulatory obligation shall be considered in accordance with the additionality requirements of Section 9. Activities implemented solely to comply with applicable legal or regulatory obligations shall not be considered additional, in accordance with Section 9.4.1.

Where the project generates improvements beyond applicable mandatory requirements, only the portion demonstrated to be additional to the regulatory

baseline may be considered for quantification, subject to the requirements of Section 9.

6.9 Relationship with other BioCarbon Water Standard methodologies

Where the project includes activities or outcomes potentially covered by another BioCarbon Water Standard methodology, the project holder shall demonstrate compliance with the methodological boundaries established in Section 4.3.

The same water benefit shall not be quantified under more than one BioCarbon Water Standard methodology.

Where an intervention generates both a water-quality benefit and another water benefit, such as increased infiltration, rainwater harvesting, managed recharge, water regulation, or reduced water withdrawal or consumption, each benefit shall be independently attributable, quantifiable, and non-overlapping.

Where such separation cannot be robustly demonstrated, the corresponding water volume shall be assigned to a single methodology using a conservative approach.

7 Terms and definitions

For the purposes of this methodology, the following definitions apply:

Additionality

The requirement that the water benefit would not have occurred in the absence of the project activity, relative to the baseline scenario.

Area of influence

The spatial extent where the hydrological effects associated with the project activities may occur or manifest, including the connections, sites, users, and downstream or upstream areas that may be affected by the project.

Baseline scenario

The situation that would occur in the absence of the project activities, against which the water benefit is measured.

Conservative approach

The consistent selection, where uncertainty exists, of assumptions, values, and methods that tend to under-estimate rather than over-estimate the water benefit, in order to avoid over-crediting.

Double counting

The situation in which the same volume of water benefit is counted more than once, whether across metrics, periods, participants, or programs; the project holder shall avoid double counting in all quantification and issuance.

Functional restoration

The measurable recovery or improvement of the functions of a degraded surface water body resulting from project activities, relative to the baseline scenario.

Leakage

Negative effects on water quality or water availability occurring outside the quantification boundary as a consequence of the project activities, which may reduce, displace, or nullify part of the reported water benefit.

Net water benefit

The net, additional, and verifiable water benefit attributable to the project activities compared to a baseline scenario, expressed in cubic meters (m^3) over a given monitoring period, after accounting for leakage, uncertainty, and other applicable conservative adjustments.

Permanence

The requirement that the water benefit be demonstrated for the monitoring period in which it is quantified, with any subsequent loss or deterioration identified, monitored, and reflected in subsequent quantification or in the applicable correction procedures.

Surface Water

Water present on the earth's surface, including rivers, lakes, streams, ponds, reservoirs, and other surface water bodies.

Volumetric water benefit

The volume of surface water associated with a demonstrated project-attributable improvement in water quality or functional condition relative to the baseline scenario, quantified in cubic meters (m^3) over a defined monitoring period.

Verified Water Credit (VWC)

The unit of issuance under the BioCarbon Water Standard, where one VWC represents one cubic meter (m^3) of verified net water benefit.

Water quality improvement

A measurable positive change in the physical, chemical, biological, or ecological condition of surface water resulting from project activities, relative to the baseline scenario.

8 Eligible activities

Eligible activities under this methodology correspond to interventions aimed at improving water quality or restoring the functional condition of degraded surface water bodies.

Activities shall generate a measurable, additional, attributable, and verifiable water benefit relative to the baseline scenario and shall meet the applicability conditions established in Section 6.

Consistent with Water Quality Benefit Accounting, eligible interventions may address different water-quality challenges and may include technological, infrastructure-based, nature-based, management, or combined approaches, provided that an established pathway exists between the activity implemented and the resulting measurable water-quality benefit (WRI, 2025a).

Eligibility under this methodology shall be determined by the principal mechanism through which the quantified water benefit is generated and not solely by the physical activity, infrastructure, or technology implemented.

The activities may include new interventions, the rehabilitation or optimization of existing systems, and the recovery or improvement of degraded natural or managed

processes, provided that the resulting water benefit is additional to the baseline scenario.

8.1 In situ water-quality improvement activities

Activities implemented directly within a surface water body to improve its physical, chemical, biological, or ecological condition may be eligible.

These activities may include, among others:

(a) aeration or oxygenation;

(b) water circulation, mixing, or destratification;

(c) advanced oxidation or other in situ treatment processes;

(d) nutrient removal, immobilization, or management within the water body;

(e) treatment or removal of excessive organic loads;

(f) treatment or removal of contaminants present in the water column;

(g) interventions aimed at reducing persistent hypoxic or anoxic conditions; and

(h) other in situ treatment or restoration processes that generate a measurable improvement in water quality or functional condition.

Aeration, oxygenation, circulation, and other in-lake or in-reservoir management techniques have been applied to address water-quality conditions associated with oxygen depletion, stratification, nutrient cycling, and eutrophication. Their effectiveness depends on the characteristics of the water body, the mechanism addressed, and the design and operation of the intervention (Olem & Flock, 1990; Cooke et al., 2005).

The amount of water circulated, pumped, oxygenated, contacted, or otherwise treated by the intervention shall not, by itself, constitute the water benefit. The quantified benefit shall be based on the water-quality or functional improvement demonstrated in accordance with Section 10.

8.2 Pollutant-load reduction activities

Activities that reduce pollutant loads affecting a defined surface water body may be eligible where the reduction generates a demonstrable improvement in the condition of the receiving water system.

Activities under this subsection shall not include wastewater collection, conveyance, treatment, sanitation infrastructure, or wastewater treatment plants.

These activities may include, among others:

(a) interception and management of pollutant inflows through eligible measures other than wastewater treatment;

(b) reduction of nutrient loads entering the water body;

(c) reduction of organic pollutant loads;

(d) reduction of sediment or suspended-solid loads where these materially affect water quality;

(e) control or removal of pollutants from identified point or diffuse pathways; and

(f) other interventions that reduce pollutant loads reaching or affecting the relevant surface water body.

Pollutant-load reduction shall be distinguished from changes in concentration resulting solely from dilution or changes in water flow. Where pollutant loads are used to demonstrate the project effect, the relevant mass, concentration, flow, and temporal information shall be considered as appropriate to the pollutant source and receiving system (Franke et al., 2013).

Activities implemented outside the immediate surface water body may therefore be eligible under this methodology where a demonstrable causal relationship exists between the intervention, the reduction of pollutant load, and the resulting water-quality benefit within the relevant surface water system.

8.3 Remediation of contaminated surface water bodies

Activities aimed at removing, treating, isolating, or otherwise managing accumulated contamination within a surface water body may be eligible where they generate a measurable improvement in water quality or functional condition.

These activities may include, among others:

(a) remediation or removal of contaminated sediments;

(b) treatment of pollutant hotspots;

(c) removal or treatment of accumulated contaminant masses;

(d) remediation of legacy contamination;

(e) management of internal pollutant sources associated with sediments or accumulated organic matter; and

(f) equivalent remediation measures appropriate to the characteristics of the water body and contaminant concerned.

Where sediments or other contaminated materials are removed from the water body, the project holder shall document their management, treatment, transport, final disposal, or beneficial use, as applicable.

The relocation of contaminated material from the project area without adequate management of the associated environmental risk shall not constitute an eligible pollutant reduction.

8.4 Eutrophication control and restoration

Activities aimed at reducing or reversing eutrophication and its associated effects may be eligible.

These activities may include, among others:

(a) reduction or control of nitrogen or phosphorus loads;

(b) management of internal nutrient loading;

(c) control or reduction of excessive algal or cyanobacterial proliferation;

(d) restoration of dissolved oxygen conditions;

(e) reduction of persistent hypoxia or anoxia;

(f) interventions aimed at improving trophic condition; and

(g) combined measures addressing the causes and responses associated with eutrophication.

Nutrient enrichment can produce interacting responses involving algal biomass, water clarity, dissolved oxygen, and biological condition. Accordingly, nutrient-related restoration should consider both the relevant causal variables and the responses of the receiving water body, as appropriate to the characteristics and objectives of the intervention (US EPA, 2021).

A reduction in a single nutrient or response parameter shall not, by itself, demonstrate the full magnitude of the water benefit where other material conditions continue to constrain the relevant water-quality or functional objective.

8.5 Biological, ecological, and nature-based water-quality improvement activities

Biological, ecological, and nature-based interventions may be eligible where their principal quantified water benefit under this methodology results from water-quality improvement or functional restoration.

Activities under this subsection shall not include biological systems, constructed wetlands, or other nature-based systems whose principal function is wastewater treatment or sanitation.

These activities may include, among others:

(a) bioremediation;

(b) phytoremediation;

(c) biological treatment processes;

(d) constructed or restored wetlands designed to improve the water-quality or functional condition of a defined surface water body, excluding wastewater treatment or sanitation systems;

(e) restoration or establishment of riparian or vegetative systems specifically designed to reduce pollutant loads entering surface waters;

(f) ecological interventions aimed at restoring natural water-treatment or self-purification processes; and

(g) hybrid interventions combining ecological processes with treatment infrastructure.

Nature-based interventions can contribute to water-quality improvement through processes such as nutrient retention, sediment trapping, contaminant transformation, biological uptake, and other physical, chemical, and biological mechanisms. The relevant benefit shall be determined from the demonstrated water-quality outcome rather than from the area restored or the presence of the nature-based intervention itself.

Where an activity involving wetlands, riparian vegetation, revegetation, vegetative buffers, or other nature-based interventions generates increased infiltration, managed recharge, underground storage, or water regulation, such benefits shall be quantified under the corresponding BioCarbon Water Standard methodology.

The same physical intervention may support application of this methodology only for a distinct water-quality or functional outcome that is independently quantified and does not overlap with the water volume recognized under another methodology.

8.6 Rehabilitation, recovery, or optimization of existing water-quality improvement systems

Activities aimed at rehabilitating, recovering, expanding, or optimizing existing eligible water-quality improvement or restoration systems may be eligible where they generate a measurable improvement relative to the baseline performance of the existing system.

These activities may include, among others:

(a) rehabilitation of deteriorated or partially operational treatment or restoration infrastructure;

(b) recovery of systems that have lost treatment or restoration capacity;

(c) expansion of the effective capacity of an eligible in situ, ecological, or hybrid water-quality restoration system;

(d) optimization of operational parameters;

(e) improvement of water-quality or restoration performance;

(f) restoration of degraded biological or ecological treatment processes; and

(g) incorporation of control or monitoring systems that enable improved operational performance.

For existing systems, the baseline shall represent the actual or reasonably expected performance of the system in the absence of the project intervention.

The original, nominal, design, or theoretical capacity of the system shall not be used as evidence of the baseline or additional benefit where it does not represent actual without-project performance.

8.7 Hybrid interventions

Projects may combine technological, infrastructure-based, biological, ecological, nature-based, or management interventions where the combined system is designed to address the identified water-quality or functional challenge.

Where several activities operate together as an integrated treatment or restoration system, the project holder shall describe the causal relationship between the individual components and the resulting water benefit.

Where separate components generate independently quantifiable benefits, the project holder shall demonstrate that the corresponding volumes do not overlap.

8.8 Eligible complementary activities

Activities necessary to implement, operate, maintain, monitor, or improve the performance of an eligible water-quality or functional restoration intervention may be considered complementary activities.

These may include:

(a) installation of water-quality monitoring instruments, sensors, sondes, or monitoring stations;

(b) installation of flow, water-level, or other hydrological measurement equipment;

(c) bathymetric, hydrodynamic, or water-quality surveys;

(d) laboratory analyses and sampling systems;

(e) implementation of data management, telemetry, or monitoring platforms;

(f) operation and maintenance activities necessary to maintain project performance;

(g) monitoring of pollutant sources, inflows, outflows, or receiving-water conditions; and

(h) training, governance, or operational activities directly necessary for the continuity of the intervention.

Complementary activities shall not generate water benefits in themselves unless they produce a separately demonstrable water-quality or functional improvement that meets the requirements of this methodology.

8.9 Activities not covered by this methodology

The following activities shall not be covered by this methodology where they constitute the principal mechanism or outcome being quantified:

(a) activities whose quantified benefit is increased infiltration into soil or the soil profile;

(b) rainwater harvesting, collection, storage, and use;

(c) managed aquifer recharge, underground storage, or temporal water regulation;

(d) water-use efficiency or reduction of distribution or end-use losses;

(e) water reuse or recycling where the quantified benefit is the reduction of freshwater withdrawal or consumption;

(f) water transfers or source substitution without a demonstrable additional water-quality or functional benefit;

(g) dilution undertaken solely to reduce pollutant concentrations;

(h) treatment or management activities for which only nominal treatment capacity, volume processed, or technology performance is demonstrated without a corresponding measurable improvement in the relevant surface water system;

(i) activities that merely transfer pollutants or contaminated materials to another location or environmental compartment without adequate management of the associated impact;

(j) monitoring, characterization, research, planning, or assessment activities that do not themselves generate an additional water-quality or functional benefit;

(k) wastewater collection, conveyance, treatment, or sanitation infrastructure, including wastewater treatment plants and related facilities, regardless of whether the activity is new, expanded, rehabilitated, optimized, or operated beyond applicable discharge requirements; and

(l) sargassum management as a principal project activity.

Where an activity generates environmental outcomes related to biodiversity, greenhouse gas mitigation or removals, soil improvement, ecosystem conservation, or other environmental outcomes, such outcomes shall not increase the volumetric water benefit quantified under this methodology. Such outcomes may be reported as co-benefits or, where applicable, may be independently quantified and credited under another BioCarbon Program, provided that the applicable program and methodology requirements are met and that the respective environmental outcomes are distinct, independently attributable and quantifiable, and not subject to double counting.

The quantification or crediting of such outcomes under another BioCarbon Program shall not modify the quantification procedures, increase the number of Verified Water Credits, or alter the water-quality or functional benefit determined under this methodology.

9 Baseline scenario and additionality

The project holder shall establish a baseline scenario that represents the water-quality, hydrological, environmental, and operational conditions that would reasonably have occurred in the absence of the project activities.

The baseline shall provide the reference against which the additional water-quality or functional improvement attributable to the project is determined. It shall reflect the relevant water-quality challenge, the principal sources and drivers of degradation, the characteristics of the surface water system, and the natural and anthropogenic factors that may materially influence the parameters used for quantification.

Consistent with Water Quality Benefit Accounting, the assessment of water-quality benefits shall distinguish the change attributable to the project activity from the condition that would occur without the project and shall use indicators appropriate to the water-quality challenge and the expected project outcome (WRI, 2025a).

The demonstration of additionality shall be based on the comparison between:

(a) the baseline scenario, representing the without-project condition; and

(b) the with-project scenario, representing the condition resulting from implementation, rehabilitation, recovery, expansion, optimization, or operation of the eligible project activities.

Only water benefits that are additional to the baseline scenario, attributable to the project activities, and supported by measurable and verifiable information may be quantified under this methodology.

9.1 Identification of the baseline scenario

The baseline scenario shall describe the condition and expected evolution of the relevant surface water system in the absence of the project activities.

The baseline shall consider, as applicable:

(a) the physical, chemical, biological, and ecological condition of the surface water body;

(b) the water-quality parameters relevant to the project objective;

(c) pollutant concentrations and loads;

(d) the principal point, diffuse, internal, or legacy sources of pollution or degradation;

(e) inflows, outflows, water levels, flows, residence time, and other relevant hydrological or hydrodynamic conditions;

(f) seasonal and interannual variability;

(g) existing water-quality management, treatment, remediation, or restoration activities;

(h) the actual performance of existing systems or interventions;

(i) applicable water-quality requirements, classifications, reference conditions, or other criteria relevant to the project objective; and

(j) other material factors that may affect the water-quality or functional condition of the water body.

The baseline shall not assume that existing degradation remains constant where available evidence indicates that water quality would reasonably improve or deteriorate in the absence of the project.

Where a trend can be demonstrated, the baseline shall incorporate the expected without-project trend using a technically justified and conservative approach.

9.2 Baseline assessment and reference period

The baseline assessment shall include sufficient information to characterize the relevant water-quality, hydrological, environmental, and operational conditions and their variability before the implementation of the project activities.

The project holder shall collect and assess, as applicable:

(a) historical water-quality monitoring data;

(b) pollutant concentrations and, where relevant, pollutant loads;

(c) flow, water-level, inflow, outflow, precipitation, temperature, and other hydrological or climatic variables that materially affect water quality;

(d) bathymetric, morphometric, hydrodynamic, or water-residence information where relevant to the quantification approach;

(e) information on the spatial distribution of water-quality conditions;

(f) seasonal patterns, including periods of stratification, mixing, high or low flow, wet and dry seasons, or other relevant cycles;

(g) the location, magnitude, and temporal behavior of relevant pollution sources;

(h) existing water-quality management, remediation, restoration, or pollution-control measures;

(i) historical events or disturbances that materially affected the condition of the water body; and

(j) other information necessary to distinguish the expected project effect from natural variability and external influences.

Water-quality conditions may vary substantially over time and space as a consequence of hydrological, climatic, physical, chemical, and biological processes. Baseline characterization shall therefore use a temporal and spatial resolution appropriate to the water body, the water-quality challenge, and the expected project response (UNEP, 2016; WRI, 2025a).

9.2.1 Reference period

The baseline reference period shall be sufficiently representative to characterize the normal variability of the water-quality parameters and hydrological conditions relevant to the project.

The duration and temporal resolution of the reference period shall be justified based on:

(a) the type of surface water body;

(b) the relevant water-quality challenge;

(c) seasonal and interannual variability;

(d) the frequency and reliability of available historical monitoring;

(e) the expected response time of the water body; and

(f) the quantification approach applied.

Where reliable historical information is available, the longest representative and consistent dataset shall be prioritized.

Where historical data are insufficient, the project holder shall generate baseline monitoring data for a period sufficient to characterize the relevant variability before the quantified project benefit is determined.

Short-term measurements that do not adequately represent seasonal or other material variability shall not be used as the sole basis for establishing the baseline.

9.3 Baseline by type of intervention

The baseline shall be established according to the type and condition of the intervention existing before the project.

9.3.1 New interventions

Where the project implements a new eligible water-quality improvement or functional restoration activity, the baseline shall represent the expected condition of the surface water system in the absence of that intervention.

The absence of the project activity shall not imply that the water-quality condition would remain unchanged or that no improvement would occur under the baseline scenario.

The project holder shall account for existing natural processes, ongoing pollution-control or restoration measures, expected changes in pollutant sources, and other factors that would reasonably affect the condition of the water body without the project.

The additional benefit shall be limited to the improvement attributable to the project relative to that without-project condition.

9.3.2 Rehabilitation, recovery, expansion, or optimization of existing systems

Where the project rehabilitates, recovers, expands, or optimizes an existing eligible water-quality improvement or restoration system, the baseline shall represent the actual or reasonably expected performance of the existing system in the absence of the project intervention.

The original design capacity, nominal treatment capacity, historical maximum performance, or theoretical potential of the system shall not be used as the baseline unless it demonstrably represents the performance that would reasonably have occurred without the project.

The baseline shall consider, as applicable:

(a) the physical and operational condition of the existing system;

(b) its actual level and frequency of operation;

(c) historical treatment or restoration performance;

(d) existing maintenance practices;

(e) deterioration, failures, or operational limitations;

(f) water-quality outcomes actually generated before the project; and

(g) the expected evolution of the system without the proposed intervention.

Only the verifiable improvement beyond the baseline performance of the existing system may be considered additional.

9.3.3 Existing natural or ecological restoration processes

Where the project strengthens, restores, or recovers an existing natural or ecological process that contributes to water-quality improvement, the baseline shall represent the actual condition and functioning of that process before the project intervention.

The historical, potential, or presumed capacity of an ecosystem to improve water quality shall not be considered a project benefit unless the project holder demonstrates the additional improvement generated by the project activities.

For example, the presence of a wetland, riparian system, aquatic vegetation, or other natural treatment process within the project area shall not, by itself, establish an additional water benefit.

Only the measurable improvement attributable to restoration, rehabilitation, management, or other eligible project activities relative to the without-project condition may be quantified.

9.4 Demonstration of additionality

The project holder shall demonstrate that the quantified water benefit is additional, attributable to the project activities, and would not have occurred in the absence of the project.

The demonstration of additionality shall include, at a minimum:

(a) comparison between the baseline scenario and the with-project scenario;

(b) evidence that the project activities generate a measurable improvement in the relevant water-quality or functional condition;

(c) demonstration of the causal relationship between the activities implemented and the observed improvement;

(d) assessment of applicable legal, regulatory, permitting, licensing, discharge-control, restoration, or other mandatory requirements;

(e) assessment of whether the project activities constitute common practice in comparable contexts;

(f) identification of other ongoing or planned activities that may independently affect the relevant water-quality condition; and

(g) demonstration that the quantified benefit has not been attributed to changes that would reasonably have occurred without the project.

The existence of a measurable improvement after project implementation shall not, by itself, establish additionality. The project holder shall demonstrate that the observed change exceeds the improvement that would reasonably have occurred under the baseline scenario.

9.4.1 Regulatory additionality

Project activities implemented solely to comply with applicable legal or regulatory obligations shall not be considered additional.

Where an eligible project activity is subject to a mandatory minimum performance requirement, only the improvement demonstrated beyond the level that would reasonably occur through compliance with that requirement may be considered additional, provided that all other requirements of this methodology are met.

Compliance with wastewater discharge limits, effluent standards, sanitation obligations, environmental permits, remediation orders, or other mandatory pollution-control requirements shall not, by itself, establish eligibility or additionality under this methodology.

This provision shall not be interpreted as making eligible any activity excluded under Section 8.9. Wastewater treatment and sanitation infrastructure remain outside the scope of this methodology even where their performance exceeds applicable legal or regulatory requirements.

9.4.2 Common practice

The project holder shall assess whether the eligible project activity or equivalent water-quality improvement practice is already routinely implemented under comparable environmental, technological, regulatory, and socioeconomic conditions.

An activity that constitutes common practice may be considered additional only where the project holder demonstrates a measurable and material improvement beyond the performance normally achieved through such practice and demonstrates compliance with the other additionality requirements of this methodology.

9.5 Attribution of observed changes

The project holder shall demonstrate that the water-quality or functional change used for quantification is attributable to the project activities.

Where water quality may be materially influenced by external factors, the project holder shall identify and account for such factors using an appropriate combination of monitoring, reference locations, statistical analysis, mass balance, hydrological or hydrodynamic modeling, or other scientifically defensible methods.

External factors may include, as applicable:

(a) changes in pollutant discharges or upstream loads;

(b) implementation of other pollution-control or restoration measures;

(c) changes in precipitation, inflows, outflows, or water levels;

(d) changes in temperature, stratification, mixing, or residence time;

(e) extreme hydrological or climatic events;

(f) changes in land use or watershed management;

(g) natural ecological changes;

(h) accidental pollution events; and

(i) other factors capable of materially influencing the monitored parameters.

Where the effects of the project cannot be adequately separated from material external influences, the project holder shall apply a conservative attribution approach, limit the quantified benefit to the portion that can be demonstrated, or exclude the affected period or water volume from quantification.

WQBA emphasizes the need for credible methods and sufficient evidence to link project activities to reported water-quality outputs, while recognizing that project-level water-quality outcomes occur within complex catchment systems influenced by multiple factors (WRI, 2025a).

9.6 Confirmation of additionality

Only water-quality or functional benefits that meet all applicable additionality and attribution requirements established in this Section may be considered for quantification under Section 10.

The project holder shall document the baseline scenario, the basis for additionality, the causal pathway between the project activities and the observed water-quality or functional improvement, and the treatment of material external influences.

Where additionality or attribution cannot be demonstrated with sufficient evidence, the corresponding water benefit shall not be quantified as Verified Water Credits.

10 Quantification of volumetric water benefits

10.1 General quantification principle

Volumetric water benefits under this methodology shall be quantified based on the volume of surface water for which an additional, attributable, measurable, and verifiable improvement in water quality or functional condition is demonstrated relative to the baseline scenario during the corresponding monitoring period.

The quantified benefit shall represent a physical water volume associated with the demonstrated improvement. The quantity of water pumped, circulated, treated, contacted, oxygenated, filtered, processed, or otherwise influenced by a project activity shall not, by itself, constitute a volumetric water benefit.

For each quantified water benefit, the project holder shall demonstrate:

(a) the baseline water-quality or functional condition;

(b) the with-project water-quality or functional condition;

(c) the water-quality parameters, functional indicators, criteria, thresholds, reference conditions, or other technically justified benchmarks used to determine the improvement;

(d) the spatial and temporal extent of the water volume to which the demonstrated improvement applies;

(e) the causal relationship between the project activities and the demonstrated improvement;

(f) the method used to determine the corresponding water volume; and

(g) the deductions or conservative adjustments applicable to leakage, uncertainty, performance limitations, or other factors affecting the net water benefit.

The quantification approach shall be selected according to the characteristics of the surface water system, the water-quality or functional challenge addressed, the mechanism through which the project generates the benefit, and the available monitoring evidence.

No single method for determining the improved water volume is prescribed for all eligible project activities. The selected method shall be scientifically defensible, transparent, reproducible, appropriate to the spatial and temporal behavior of the relevant water system, and capable of independent conformity assessment.

Where more than one technically valid quantification approach is applicable and the resulting estimates differ materially, the project holder shall investigate and document the cause of the difference. Where the difference cannot be resolved through additional evidence or technical justification, the lower result shall be used.

Pollutant concentration, pollutant-load reduction, grey water footprint reduction, treatment efficiency, percentage improvement, nominal treatment capacity, or other water-quality or operational indicators shall not be converted into a volumetric water benefit unless the physical and mathematical relationship between the indicator and the corresponding improved water volume is demonstrated in accordance with this Section.

Only water volumes for which the applicable improvement can be demonstrated with sufficient evidence shall be included in the gross volumetric water benefit.

10.2 Assessment units and quantification boundary

Quantification shall be performed within the spatial and temporal quantification boundary established in accordance with Section 6.2.

Where necessary to account for material spatial, vertical, hydrological, hydrodynamic, water-quality, or functional differences, the relevant surface water system shall be divided into assessment units.

An assessment unit shall represent a portion of the surface water system for which the conditions relevant to quantification can be characterized with sufficient

homogeneity and confidence to determine whether the applicable water-quality or functional improvement has occurred and to determine the corresponding water volume.

Assessment units may be defined based on, as applicable:

(a) water-body geometry and bathymetry;

(b) water depth or vertical layers;

(c) hydrological or hydrodynamic conditions;

(d) inflows, outflows, tributaries, discharge zones, or circulation patterns;

(e) pollutant distribution or water-quality gradients;

(f) stratification, mixing, or residence-time characteristics;

(g) ecological or functional zones;

(h) project intervention areas and demonstrated zones of influence; or

(i) other scientifically justified characteristics relevant to the quantified benefit.

The spatial extent and water volume of each assessment unit shall be determined using direct measurement, bathymetric or morphometric information, hydrological or hydrodynamic data, geospatial analysis, calibrated and validated models, or other technically appropriate methods.

Monitoring data used to characterize an assessment unit shall be representative of the water volume assigned to that unit. Measurements obtained at individual locations shall not be extrapolated to an entire assessment unit unless the spatial and, where relevant, vertical representativeness of such extrapolation is demonstrated.

Where conditions within an assessment unit are materially heterogeneous and such heterogeneity affects whether the applicable water-quality or functional condition is demonstrated, the assessment unit shall be further stratified or quantification shall be limited to the portion for which sufficient evidence exists.

Assessment units shall not be defined, combined, subdivided, or modified for the purpose of selectively maximizing the quantified water benefit.

10.3 Water-quality or functional condition for quantification

For each assessment unit, the project holder shall define the water-quality or functional condition against which the occurrence and magnitude of the volumetric water benefit will be determined.

The condition shall be consistent with the project objective established under Section 6.4 and shall be based on one or more measurable parameters, indicators, criteria, thresholds, reference conditions, or equivalent technically justified benchmarks appropriate to the relevant surface water system.

The applicable condition may represent:

(a) achievement of a defined water-quality threshold, classification, reference condition, designated use, or functional condition; or

(b) a measurable partial improvement relative to the baseline condition where the applicable threshold or reference condition has not yet been fully achieved.

Where the quantified benefit is based on achievement of a defined condition under item (a), only the water volume for which compliance with that condition is demonstrated during the applicable monitoring period shall be included.

Where a partial improvement under item (b) is used as the basis for volumetric quantification, the project holder shall demonstrate a scientifically valid quantitative relationship between the magnitude of the observed improvement and the corresponding volumetric water benefit.

The quantitative relationship shall be documented in the Project Document and assessed during the Project Registration Audit. The documentation shall specify the equation or calculation procedure, the physical meaning and units of its output, the empirical or mechanistic basis, input variables, applicability limits, validation evidence, and treatment of uncertainty. The relationship shall determine the additional physical water volume associated with the defined partial improvement and shall not merely express a dimensionless water-quality score as cubic meters.

A parameter describing the magnitude or intensity of water-quality improvement shall not be substituted for the physical volume fraction F_j in Equation 1 unless the relationship with that physical fraction is demonstrated.

A linear or proportional relationship shall not be assumed solely because a parameter has improved by a given percentage.

Where no scientifically defensible relationship can be established between the partial improvement and a corresponding water volume, the partial improvement may be reported as a water-quality or functional outcome but shall not be converted into Verified Water Credits under this methodology.

The criteria used to determine the applicable condition shall be established before the corresponding monitoring results are evaluated for issuance and shall not be modified retrospectively for the purpose of increasing the quantified water benefit.

For each applicable condition, the project holder shall specify the decision rule used to demonstrate achievement, including the relevant assessment statistic, averaging period, required duration, permissible frequency of exceedance where applicable, and treatment of measurement and sampling uncertainty. These elements shall be appropriate to the stated water-quality or functional objective and shall be documented in the Project Document and monitoring plan.

The Conformity Assessment Body shall assess, during the Project Registration Audit, the applicable water-quality or functional criteria, thresholds, reference conditions, and decision rules documented in the Project Document and monitoring plan. This assessment shall confirm that they are technically justified, consistent with the project objective, and appropriate to the quantification approach.

Where multiple parameters or conditions jointly determine achievement of the relevant water-quality or functional objective, the requirements of Section 10.5 shall apply.

10.4 Determination of gross improved water volume

The gross improved water volume shall represent the physical water volume for which the water-quality or functional improvement established under Section 10.3 is demonstrated before deduction of leakage, uncertainty, and other applicable adjustments.

For all quantification approaches under this subsection, the improved water volume shall be limited to the incremental volume associated with the project-attributable improvement relative to the baseline scenario established under Section 9. Baseline and with-project conditions shall be assessed using the same applicable water-quality or functional criteria and comparable spatial and temporal boundaries.

Under the condition-achievement approach in Section 10.3(a), water that would meet the applicable condition under the baseline scenario shall not be included solely because it also meets that condition with the project. The eligible fractions, flows, and unique water volumes used in Equations 1 to 5 shall incorporate this baseline exclusion before aggregation under Section 10.7.

The method used to determine the gross improved water volume shall correspond to the physical characteristics and behavior of the relevant surface water system and to the mechanism through which the water-quality or functional benefit occurs.

Depending on the characteristics of the project, the gross improved water volume may be determined using:

(a) spatial and volumetric determination for standing or slowly moving surface water bodies;

(b) flow-based determination for flowing water systems;

(c) treated-volume determination for systems with a defined and measurable flow through the intervention; or

(d) another scientifically defensible approach capable of determining the physical water volume associated with the demonstrated improvement.

Pollutant-load reduction may support any of these approaches where it contributes to demonstrating the project effect, but shall not constitute a volumetric water benefit unless its relationship with the corresponding improved water volume is established in accordance with Section 10.4.4.

The same physical water volume shall not be counted more than once within and across monitoring periods solely because it is affected by multiple project activities, treatment cycles, pollutants, parameters, or monitoring observations.

10.4.1 Spatial and volumetric determination for standing or slowly moving surface water bodies

For standing or slowly moving surface water bodies, including lakes, reservoirs, lagoons, wetlands, bays, and other systems for which a water volume can be spatially delimited, the gross improved water volume may be determined from the physical volume of the assessment units for which the applicable water-quality or functional improvement is demonstrated.

For each assessment unit j:

$$V_{imp,j} = A_j \times \bar{d}_j \times F_j \qquad \text{Equation 1}$$

where:

$V_{imp,j}$	gross improved water volume of assessment unit j during the applicable assessment interval (m^3);
A_j	surface area represented by assessment unit j(m^2);
$\bar{d}_j$	representative water depth of assessment unit j(m); and
F_j	eligible fraction of the physical volume of assessment unit j for which the applicable water-quality or functional improvement is demonstrated (dimensionless, $0 \leq F_j \leq 1$).

Where the entire assessment unit satisfies the applicable condition under Section 10.3(a), F_j may equal 1 only where the project holder also demonstrates that the entire volume qualifies as additional relative to the baseline scenario. Where this demonstration applies only to part of the assessment unit, F_j shall be limited to that part.

Where only a spatially or vertically identifiable portion of the assessment unit satisfies the applicable condition, $F_j$shall represent only that demonstrated portion and shall be determined from representative monitoring, spatial analysis, depth profiles, interpolation, calibrated and validated modeling, or another scientifically defensible method.

F_j shall not be derived directly from the percentage change of an individual water-quality parameter unless the project holder demonstrates that such percentage represents the physical fraction of the assessment-unit volume for which the applicable improvement has occurred.

Where water depth varies materially within the assessment unit, the project holder shall use bathymetric integration, depth-area relationships, three-dimensional spatial analysis, or another appropriate method instead of a simple mean-depth approximation where the latter would materially affect the quantified result.

The gross improved water volume across n non-overlapping assessment units shall be:

$$V_{imp} = \sum_{j=1}^{n} V_{imp,j} \qquad \text{Equation 2}$$

where:

V_{imp}	gross improved water volume during the applicable assessment interval (m^3); and
n	number of non-overlapping assessment units included in the quantification.

Assessment units or portions thereof shall not overlap volumetrically. Where overlap occurs, the overlapping water volume shall be counted only once.

10.4.2 Flow-based determination for flowing water systems

For rivers, streams, or other flowing surface water systems, the gross improved water volume may be determined from the flow for which the applicable water-quality or functional improvement is demonstrated over the corresponding time interval.

Where flow can be represented by discrete intervals:

$$V_{imp} = \sum_{k=1}^{m} Q_{imp,k} \times \Delta t_k \qquad \text{Equation 3}$$

where:

V_{imp}	gross improved water volume during the monitoring period (m³);
$Q_{imp,k}$	water flow for which the applicable improvement is demonstrated during interval k(m³/s);
Δt_k	duration of interval k(s); and
m	number of assessment intervals.

Where continuous data are available, the equivalent continuous formulation may be applied:

$$V_{imp} = \int_{t_1}^{t_2} Q_{imp}\,(t)dt \qquad \text{Equation 4}$$

Where:

V_{imp}	gross volume of improved water during the monitoring period (m³);
$Q_{imp}(t)$	water flow rate for which the applicable improvement is demonstrated at time t (m³/s);
t_1, t_2	start and end times of the monitoring period (s).

The project holder shall demonstrate that the monitored water-quality or functional condition is representative of the flow included in the calculation.

Where only a fraction of the measured flow satisfies the applicable condition, only that fraction shall be included.

Flow occurring during periods for which the applicable improvement cannot be demonstrated shall not be included solely on the basis that the project activity remained operational.

Where the same water volume may pass repeatedly through the quantification boundary as a result of recirculation, backwater effects, managed circulation, tidal movement, or other hydrodynamic processes, the project holder shall demonstrate how repeated counting is prevented. Where repeated passage cannot be reliably

distinguished, a conservative method shall be applied and the affected volume shall not be counted more than once.

10.4.3 Treated-volume determination for defined flow-through systems

A treated-volume approach may be applied where the project activity operates on a defined water flow and the physical volume passing through the intervention can be directly measured or otherwise reliably determined.

This quantification approach applies only to eligible surface-water restoration activities and shall not override the exclusions in Sections 4.2 and 8.9. Compliance at an equipment outlet shall not, by itself, establish the benefit in the relevant surface water system; the project holder shall demonstrate the relationship between the outlet measurements and the water-quality or functional condition of the volume being quantified.

This approach shall only be applied where:

(a) the water entering and leaving the relevant intervention or treatment boundary can be identified;

(b) the corresponding water flow or volume can be measured or reliably determined;

(c) the without-project condition established under Section 9 and the with-project condition can be characterized using comparable water-quality information. Inlet and outlet measurements may support that assessment but shall not automatically be treated as equivalent to the baseline and with-project scenarios;

(d) the project holder demonstrates that the applicable water-quality or functional improvement results from the project activity;

(e) recirculation, repeated treatment, bypass flows, internal recycling, or other processes capable of causing repeated counting are measured, excluded, or conservatively accounted for; and

(f) the resulting volume is not already included under another quantification approach.

Where the applicable condition established under Section 10.3(a) is achieved for the treated water:

$$V_{imp} = V_{uniq}$$ Equation 5

where:

V_{imp}	gross improved water volume (m^3); and
V_{uniq}	unique physical water volume passing through the intervention for which the applicable improvement is demonstrated (m^3).

Where the same physical water volume passes through the intervention more than once, subsequent passages shall not, by themselves, generate additional volumetric water benefits. Any additional volume included in quantification shall comply with the cumulative accounting and non-duplication requirements of Section 10.6.

Nominal treatment capacity, design flow, operating hours, pumping capacity, or manufacturer specifications shall not substitute for measurement or reliable determination of the unique physical water volume actually associated with the demonstrated benefit.

10.4.4 Use of pollutant-load reduction in volumetric quantification

Pollutant-load reduction may be used to demonstrate the magnitude, attribution, or spatial and temporal extent of a project effect where pollutant mass is relevant to the water-quality or functional objective.

Pollutant load shall be determined, as applicable, from measured or otherwise technically justified concentration and flow or volume information:

$$M_{p,t} = 10^{-3} \sum_{k=1}^{m_t} C_{p,k} Q_k \Delta\tau_k$$ Equation 6

where:

$M_{p,t}$	mass of pollutant p transported across the specified monitoring section during monitoring period t (kg);

$C_{p,k}$	flow-weighted mean concentration of pollutant p during interval k (mg/L);
Q_k	mean water flow during interval k (m^3/s);
$\Delta\tau_k$	duration of interval k (s);
m_t	number of non-overlapping calculation intervals in monitoring period t; and
10^{-3}	conversion factor from the stated concentration and volume units to kilograms.

Concentration and flow data shall represent the same calculation intervals and monitoring section. The interval length and averaging procedure shall account for material variation in concentration and flow. Equivalent integration procedures or other consistent units may be used where the calculation and conversion factors are documented.

Equation 6 determines transported pollutant mass; it does not, by itself, determine net pollutant removal. Where removal or retention is used to demonstrate the project effect, the assessment shall account for relevant inflows, outflows, changes in stored mass, and internal sources or transfers through a mass balance appropriate to the water system.

The project-attributable pollutant-load reduction may be determined as the difference between the baseline pollutant load and the corresponding with-project pollutant load, after accounting for material changes in flow, pollutant inputs, external interventions, and other relevant factors.

A reduction in pollutant load shall not, by itself, be converted into an equivalent number of cubic meters of improved water.

Where pollutant-load reduction is used to determine or support a volumetric water benefit, the project holder shall demonstrate how the reduction results in a defined physical water volume meeting the applicable water-quality or functional condition under Section 10.3.

Grey water footprint or another pollution-related equivalent-volume indicator may be used as supporting information where technically relevant. Such equivalent volumes

shall not be treated as physical improved water volumes or directly converted into Verified Water Credits unless an independent physical and mathematical relationship with the improved water volume is demonstrated.

Where several pollutants affect the same water volume, pollutant-load reductions or equivalent volumes shall not be summed to increase the volumetric water benefit unless they demonstrably correspond to distinct and non-overlapping physical water volumes.

10.5 Multiple parameters and limiting conditions

Where the water-quality or functional condition applicable to an assessment unit is determined by more than one parameter, indicator, pollutant, or environmental condition, the project holder shall evaluate the relevant parameters jointly.

The project holder shall identify the parameters or conditions that are material to the water-quality or functional objective and shall determine whether any of them limits achievement of the applicable condition established under Section 10.3.

Where achievement of the applicable condition requires simultaneous compliance with multiple parameters or criteria, the corresponding water volume shall be considered to meet that condition only where all material requirements are satisfied. The limiting parameter or condition shall govern the determination of whether the applicable condition has been achieved.

Improvement in one or more non-limiting parameters shall not compensate for failure to meet another material parameter or condition. Accordingly, improvement in one or more parameters shall not be used to classify the entire water volume as having achieved the applicable condition where another material parameter or condition remains limiting.

Where different parameters, pollutants, or indicators are used to demonstrate improvement in the same physical water volume, the resulting volumes shall not be added. The physical water volume shall be counted only once for the applicable assessment interval.

Where different parameters demonstrate improvements affecting distinct and non-overlapping physical water volumes, those volumes may be quantified separately, provided that their spatial and temporal separation is demonstrated.

Where partial improvement is quantified in accordance with Section 10.3(b) and multiple parameters jointly determine the applicable water-quality or functional condition, the project holder shall demonstrate a scientifically defensible quantitative relationship between the relevant parameters and the resulting volumetric water benefit.

Parameter-specific improvement fractions shall not be averaged, added, multiplied, or otherwise combined solely on the basis of their relative percentage improvement. Likewise, the lowest parameter-specific improvement fraction shall not automatically be applied as a fractional volumetric benefit.

A limiting-parameter approach may be used to determine a fractional volumetric benefit only where the project holder demonstrates that the parameter-specific fractions are scientifically comparable and that the limiting fraction has a valid quantitative relationship with the corresponding volumetric water benefit.

In the absence of such a demonstrated relationship, parameter-specific improvements may be used as evidence of water-quality or functional improvement but shall not be converted into a fractional volumetric water benefit.

Where interactions among parameters are material to the relevant water-quality or functional outcome, such interactions shall be considered in determining whether the applicable condition has been achieved and, where applicable, in determining the magnitude of the eligible volumetric water benefit.

10.6 Temporal quantification and prevention of repeated counting

The temporal basis of quantification shall reflect the physical behavior of the surface water system and the manner in which the water-quality or functional benefit is generated.

The project holder shall define assessment intervals appropriate to the temporal variability of the relevant water-quality parameters, hydrological or hydrodynamic conditions, project operation, water residence time, and expected persistence of the benefit.

A physical water volume shall not generate repeated volumetric water benefits within and across monitoring periods solely because:

(a) the same water remains in an improved condition over successive observations;

(b) the same water is sampled or monitored more than once;

(c) the same water passes repeatedly through, or is repeatedly contacted by, the project intervention;

(d) several project activities act on the same water volume;

(e) several parameters, pollutants, or indicators demonstrate improvement in the same water volume; or

(f) the project activity continues to operate after the corresponding water volume has already been included in the quantified benefit.

For standing or slowly moving surface water bodies, a physical water volume shall be counted only once for the same eligible water benefit, including across successive monitoring periods. Continued persistence of the previously quantified condition shall demonstrate maintenance of that benefit and shall not, by itself, generate additional volumetric water benefits.

Additional water volumes may be quantified where the project holder demonstrates that they have not previously been included in the accounting of the same water benefit and that an additional, project-attributable improvement has occurred for those volumes. Movement of previously quantified water between assessment units, treatment components, or monitoring locations shall not establish a new eligible volume. Exit from and subsequent re-entry into the quantification boundary shall not, by itself, reset the accounting history.

For flowing water systems, successive physical water volumes passing through the relevant assessment boundary may be quantified over time where the applicable improvement is demonstrated and the requirements of Section 10.4.2 are met.

For defined flow-through systems, successive water volumes may be quantified where they represent distinct physical water volumes and the requirements of Section 10.4.3 are met.

Where water exchange, residence time, circulation, recirculation, mixing, tidal movement, or other hydrodynamic processes may result in repeated accounting of the

same physical water volume, the project holder shall use water balance, residence-time analysis, hydrological or hydrodynamic information, tracers, calibrated and validated modeling, or another technically justified method to distinguish unique eligible water volumes.

Where the unique physical water volume cannot be determined with sufficient reliability, repeated treatment, circulation, contact, or observation shall not generate additional volumetric water benefits.

The project holder shall maintain a cumulative volumetric accounting record that identifies previously quantified benefits, newly eligible volumes, relevant water exchanges, and exclusions for overlap. The accounting approach shall prevent repeated counting across assessment units, quantification approaches, and monitoring periods. Dividing or combining monitoring periods shall not increase the cumulative eligible water benefit.

10.7 Determination of the gross volumetric water benefit

The gross volumetric water benefit for monitoring period (t) shall correspond to the sum of the eligible improved water volumes determined in accordance with Sections 10.3 to 10.6, before application of performance adjustments, leakage deductions, and uncertainty treatment.

The gross volumetric water benefit shall be calculated as:

$$VWB_{gross,t} = \sum_{j=1}^{n} V_{imp,j,t} \qquad \text{Equation 7}$$

where:

$VWB_{gross,t}$	gross volumetric water benefit during monitoring period t (m^3);
$V_{imp,j,t}$	eligible improved water volume associated with assessment unit, flow interval, or other non-overlapping quantification unit j during monitoring period t (m^3); and

n	number of non-overlapping eligible quantification units included in monitoring period t.

Before aggregation, the project holder shall demonstrate that the individual volumes included in the calculation do not represent overlapping physical water volumes or repeated accounting of the same water benefit.

Project-induced losses of water-quality or functional benefits within the quantification boundary shall be accounted for in the gross result or through the applicable performance adjustment, including where the affected water volume is not otherwise included as a positive contribution. Assessment units shall not be omitted or boundaries modified to exclude such losses. The same effect shall not be deducted more than once.

Where overlap cannot be excluded with sufficient reliability, the overlapping portion shall be counted only once or shall be conservatively excluded.

The gross volumetric water benefit shall not include:

(a) water volumes for which the applicable improvement has not been demonstrated;

(b) volumes representing only nominal, theoretical, modeled, or design treatment capacity without monitoring evidence of the corresponding water-quality or functional improvement;

(c) equivalent pollution volumes that do not represent demonstrated physical improved water;

(d) repeated passages, treatment cycles, or observations of the same physical water volume, except where a distinct additional water benefit is demonstrated in accordance with Section 10.6;

(e) water volumes attributable to the baseline scenario or to material external influences rather than to the project;

(f) volumes for which additionality or attribution has not been demonstrated in accordance with Section 9; or

(g) volumes already quantified under another BioCarbon Water Standard methodology for the same causal water benefit.

10.8 Performance adjustments

Where the gross volumetric water benefit determined under Section 10.7 is affected by partial loss, deterioration, interruption, or reduced performance during the monitoring period, the corresponding performance adjustment shall be determined in accordance with Section 11.

Where the performance adjustment is expressed as a volumetric deduction:

$$VWB_{adj,t} = max(0, VWB_{gross,t} - PA_t) \quad \text{Equation 8}$$

where:

$VWB_{adj,t}$	volumetric water benefit after performance adjustment during monitoring period t (m^3);
$VWB_{gross,t}$	gross volumetric water benefit during monitoring period t (m^3); and
PA_t	volumetric deduction corresponding to performance loss, deterioration, interruption, or other applicable adjustment determined under Section 11 during monitoring period t (m^3).

Where reduced performance has already been reflected directly in the determination of $VWB_{gross,t}$, no additional deduction shall be applied for the same effect.

Performance adjustments shall not result in $VWB_{adj,t}$ being less than zero.

Explicit performance deductions shall be non-negative. Applying the zero lower bound shall not eliminate the obligation to document and address project-induced adverse effects.

10.9 Leakage and uncertainty

The determination of the net volumetric water benefit shall account for material leakage and uncertainty in accordance with Sections 12 and 13.

Where material leakage and uncertainty are expressed as explicit volumetric deductions, the net volumetric water benefit shall be calculated as:

$$VWB_{net,t} = max\left[0, VWB_{adj,t} - L_t - U_t\right] \quad \text{Equation 9}$$

where:

$VWB_{net,t}$	net volumetric water benefit during monitoring period t (m^3);
$VWB_{adj,t}$	volumetric water benefit after applicable performance adjustments during monitoring period t (m^3);
L_t	volumetric deduction for material leakage attributable to the project during monitoring period t (m^3); and
U_t	explicit volumetric uncertainty deduction, where applicable, during monitoring period t(m^3).

Explicit deductions shall be non-negative and expressed on the same volumetric accounting basis as the benefit being adjusted. Pollutant mass, concentration changes, or equivalent pollution volumes shall not be entered directly as volumetric leakage deductions. The relationship between an adverse effect and the corresponding deducted water volume shall be documented.

A deduction term may be zero where the relevant effect is not applicable, is demonstrated to be immaterial, or has already been fully incorporated into the quantified result. Lack of evidence shall not, by itself, justify a zero deduction. Application of a deduction shall not make eligible an activity prohibited under Sections 6.7 or 12.8.

Where leakage or uncertainty has already been incorporated into the determination of $VWB_{gross,t}$ or $VWB_{adj,t}$ through exclusion of affected volumes, a lower confidence bound, conservative estimator, reduced eligible volume, or equivalent treatment, an additional deduction shall not be applied for the same effect.

Where material leakage is demonstrated but cannot be quantified with sufficient reliability, the affected water volume shall be conservatively reduced or excluded in accordance with Section 12.

Where material uncertainty cannot be reliably quantified, the project holder shall apply the conservative treatment established in Section 13.

The treatment of leakage and uncertainty shall demonstrate that no material effect has been omitted or accounted for more than once.

10.10 Net volumetric water benefit

The net volumetric water benefit shall represent the additional, attributable, measurable, and verifiable physical water benefit generated by the project during the corresponding monitoring period after application of all relevant performance adjustments, leakage accounting, uncertainty treatment, and other applicable conservative adjustments.

The net volumetric water benefit shall not exceed the cumulative unique physical water volume for which an additional, project-attributable improvement has been demonstrated during the monitoring period. For flowing and flow-through systems, this limit shall refer to the eligible cumulative throughput, not the instantaneous water volume present in the system, and shall remain subject to Section 10.6.

Where the resulting $VWB_{net,t}$ is zero, no Verified Water Credits shall be issued for the corresponding monitoring period.

A negative water benefit shall not generate a negative number of Verified Water Credits. Material adverse effects attributable to the project shall nevertheless be documented and addressed in accordance with Sections 11 and 12 and other applicable requirements of the BioCarbon Water Standard.

10.11 Determination of Verified Water Credits

Verified Water Credits shall be determined from the verified net volumetric water benefit generated during the corresponding monitoring period.

One Verified Water Credit (VWC) represents one cubic meter (1 m^3) of verified net water benefit in accordance with the BioCarbon Water Standard.

Unless otherwise established by the applicable BioCarbon Water Standard registry rules, the number of whole Verified Water Credits corresponding to the verified net volumetric water benefit shall be calculated as follows:

$$VWC_t = \left\lfloor \frac{VWB_{net,t}}{1\ m^3} \right\rfloor$$ Equation 10

where:

VWC_t	number of Verified Water Credits eligible for issuance for monitoring period t; and
$VWB_{net,t}$	verified net volumetric water benefit during monitoring period t (m^3).

The operator $\lfloor x \rfloor$ denotes rounding down to the greatest integer less than or equal to x.

Only water benefits generated and demonstrated ex post during the corresponding monitoring period shall be eligible for issuance.

Forecast, expected, modeled, design, or nominal future water benefits shall not be issued as Verified Water Credits.

Where the calculated net volumetric water benefit includes a fractional cubic meter, the quantity eligible for issuance shall be rounded down to the nearest whole cubic meter unless otherwise established by the applicable BioCarbon Water Standard registry rules.

Issuance shall be subject to an audit of the results and to BioCarbon's determination of conformity and authorization of issuance.

10.12 Non-permissible quantification approaches

The following practices are prohibited in the quantification of volumetric water benefits under this methodology:

(a) equating nominal, design, maximum, or manufacturer-reported treatment capacity with improved water volume;

(b) equating the volume pumped, circulated, oxygenated, filtered, contacted, processed, or otherwise handled by an intervention with improved water volume without demonstrating the corresponding water-quality or functional improvement;

(c) applying a percentage reduction or improvement in an individual pollutant concentration, load, water-quality parameter, or indicator directly to a physical water volume without demonstrating the applicable quantitative relationship;

(d) treating a reduction in grey water footprint or another equivalent pollution-volume indicator as an equal physical volume of improved water;

(e) adding parameter-specific, pollutant-specific, or indicator-specific equivalent volumes where they relate to the same physical water volume;

(f) averaging, adding, multiplying, or otherwise combining parameter-specific improvement fractions without a scientifically defensible basis for doing so;

(g) repeatedly counting the same physical water volume because it undergoes multiple treatment cycles, circulation events, monitoring observations, or project activities;

(h) extrapolating monitoring results to unmonitored areas, depths, periods, or water volumes without demonstrating spatial and temporal representativeness;

(i) relying exclusively on unvalidated model outputs to demonstrate the occurrence or magnitude of the water benefit;

(j) quantifying improvements resulting solely from dilution, redistribution, or transfer of pollutants;

(k) quantifying water volumes for which project attribution or additionality has not been demonstrated; or

(l) quantifying the same causal water benefit under more than one BioCarbon Water Standard methodology.

Operational data, design information, pollutant-load estimates, and equivalent-volume indicators may be retained as supporting information where permitted by this methodology. Their use shall not authorize any prohibited practice listed above or substitute for demonstration of the eligible physical water volume.

10.13 Documentation and reproducibility

The project holder shall document the quantification of volumetric water benefits in sufficient detail to allow independent review and reproduction of the material calculation steps.

The documentation shall include, as applicable:

(a) the quantification boundary and assessment units;

(b) the water-quality or functional condition used for quantification;

(c) the parameters, indicators, criteria, thresholds, reference conditions, or benchmarks applied;

(d) the method used to determine physical water volumes;

(e) monitoring data used to demonstrate the applicable improvement;

(f) hydrological, hydrodynamic, bathymetric, geospatial, or other supporting information;

(g) treatment of multiple parameters and limiting conditions;

(h) temporal accounting and procedures used to prevent repeated counting;

(i) equations, variables, units, input data, assumptions, and calculation steps;

(j) model specifications, calibration, validation, and performance information, where models are used;

(k) determination of the gross volumetric water benefit;

(l) performance adjustments;

(m) leakage accounting;

(n) uncertainty treatment and conservative adjustments;

(o) determination of the net volumetric water benefit;

(p) determination of Verified Water Credits; and

(q) evidence demonstrating that overlapping or duplicate water benefits have not been quantified.

All data, assumptions, calculations, models, adjustments, and exclusions used in quantification shall be traceable to their source and retained in accordance with Section 15.

Calculation procedures shall be applied consistently within each monitoring period. Any material change in the quantification method between monitoring periods shall be documented and technically justified, and its effect on comparability and the quantified water benefit shall be assessed.

Changes in quantification methods shall not be applied retrospectively for the purpose of increasing previously quantified or issued water benefits.

11 Permanence of the water benefit and performance adjustments

The permanence of water benefits under this methodology shall be understood as the continued existence of the water-quality or functional improvement during the monitoring period for which the benefit is quantified.

Water-quality and functional restoration outcomes may depend on the continued operation and maintenance of treatment or restoration measures, the persistence of ecological or biogeochemical processes, the management of pollution sources, and the hydrological and environmental conditions of the surface water system. Consequently, the duration of a water-quality benefit may differ according to the type of intervention, the characteristics of the water body, and the pressures affecting the system (WRI, 2025a).

This methodology does not assume that a water-quality or functional improvement persists indefinitely. Only benefits demonstrated during the corresponding monitoring period may be quantified.

Where the benefit depends on continued operation, maintenance, or management of the project activities, the project holder shall demonstrate that the relevant measures remained functional and that the corresponding water-quality or functional improvement occurred during the period for which the benefit is quantified.

Continued operation of an intervention shall not, by itself, demonstrate permanence of the water benefit. The continued existence of the relevant water-quality or functional improvement shall be supported by monitoring evidence in accordance with Section 14.

11.1 Demonstration of permanence

The project holder shall demonstrate the permanence of the quantified water benefit through monitoring of the parameters and conditions relevant to the project objective.

The demonstration shall consider, as applicable:

(a) the duration of the demonstrated water-quality or functional improvement;

(b) the operational status of the project activities;

(c) the persistence of the relevant water-quality conditions;

(d) changes in pollutant sources or loads that may affect the benefit;

(e) hydrological, climatic, or environmental conditions capable of materially affecting project performance;

(f) deterioration, interruption, or failure of treatment or restoration measures; and

(g) other factors that may materially affect the continued existence of the quantified benefit.

The monitoring period and frequency shall be appropriate to the temporal behavior of the relevant water-quality parameters and to the expected response of the surface water system.

Where water-quality conditions exhibit significant seasonal variability, permanence shall not be demonstrated solely on the basis of measurements taken during periods that systematically represent more favorable conditions.

11.2 Operation and maintenance

Where continued operation or maintenance is necessary to sustain the water benefit, the project holder shall implement and maintain an operation and maintenance plan appropriate to the intervention.

The plan shall identify, as applicable:

(a) the components or activities necessary to maintain project performance;

(b) operational requirements and performance parameters;

(c) inspection and maintenance procedures;

(d) responsibilities for operation and maintenance;

(e) procedures for detecting and addressing failures or deterioration;

(f) monitoring and record-keeping requirements; and

(g) contingency measures applicable in the event of interruption or reduced performance.

Operation and maintenance records shall be retained and made available for conformity assessment.

For interventions that depend on active treatment, circulation, aeration, oxygenation, dosing, pumping, biological management, or other recurring operations, operational records may be used as supporting evidence of project implementation but shall not replace monitoring of the resulting water-quality or functional condition.

11.3 Failures, deterioration, or interruptions

Where project activities are interrupted, degraded, partially operational, or otherwise unable to perform as intended, the project holder shall assess the effect on the water benefit.

An interruption of project operation shall not automatically be considered a complete loss of the water benefit where monitoring demonstrates that the improved water-quality or functional condition persists.

Conversely, where monitoring demonstrates that the water body has wholly or partially returned toward the baseline condition, the quantified benefit shall be adjusted accordingly, irrespective of whether the project infrastructure remains operational.

Periods during which the water benefit cannot be demonstrated with sufficient evidence shall not be included in the quantified net water benefit.

The project holder shall document material failures, interruptions, deterioration, corrective actions, and the corresponding effects on project performance.

11.4 Changes in pollution pressures and external conditions

The continued existence of a water-quality benefit may be affected by changes in pollutant loads, hydrological conditions, climatic conditions, land use, external restoration measures, or other factors outside the direct control of the project.

Where such changes materially affect the water-quality or functional condition used for quantification, the project holder shall assess whether the previously established relationship between the project activities and the water benefit remains valid.

An increase in external pollution pressure shall not justify increasing the quantified water benefit solely because the project treats, removes, or manages a greater pollutant load. The quantified benefit shall continue to be determined from the water-quality or functional outcome demonstrated under the applicable quantification approach.

Likewise, a reduction in external pollution pressure that would independently improve the water body shall be considered when determining the benefit attributable to the project.

11.5 Reversals

A reversal occurs where a water-quality or functional improvement previously demonstrated during a monitoring period is subsequently reduced or lost and the relevant water volume no longer exhibits the condition upon which the water benefit was based.

Potential causes of reversal may include:

(a) interruption or failure of project activities;

(b) inadequate operation or maintenance;

(c) renewed or increased pollution pressures;

(d) remobilization or release of previously controlled pollutants;

(e) deterioration of restored ecological or treatment processes;

(f) extreme hydrological or climatic events; or

(g) other material changes affecting the water-quality or functional condition of the surface water system.

Because Verified Water Credits are issued ex post for demonstrated water benefits, a subsequent deterioration shall not automatically invalidate a benefit that was demonstrably generated during an earlier monitoring period.

However, no further water benefit shall be quantified for the affected volume or period unless the applicable water-quality or functional condition is again demonstrated.

Re-establishment of a previously credited condition shall not, by itself, create a new eligible water benefit or reset the volumetric accounting history. Any subsequent quantification shall comply with Section 10.6.

Where a reversal indicates that information used in an earlier monitoring period was materially incorrect or that the corresponding benefit had not actually been generated during that period, the project holder shall apply the applicable correction provisions of the BioCarbon Water Standard.

11.6 Performance adjustments

Where monitoring identifies a partial loss, deterioration, or reduction in the water-quality or functional benefit during the monitoring period, the quantified water benefit shall be adjusted to reflect only the benefit actually demonstrated.

Performance adjustments shall account for, as applicable:

(a) the affected water volume;

(b) the duration of the reduced performance;

(c) the magnitude of the deterioration relative to the applicable condition used for quantification;

(d) periods during which monitoring evidence is insufficient to demonstrate the benefit; and

(e) other material factors affecting the quantified result.

Adjustments shall be applied conservatively and shall not result in the recognition of water benefits that were not demonstrated during the corresponding monitoring period.

11.7 Documentation

The project holder shall document and retain sufficient information to demonstrate the permanence and performance of the water benefit, including, as applicable:

(a) monitoring records;

(b) operation and maintenance records;

(c) records of failures, interruptions, and corrective actions;

(d) information on material changes in pollutant sources or environmental conditions;

(e) assessments of reversals or performance deterioration;

(f) calculations of performance adjustments; and

(g) the assumptions and evidence used to determine the duration of the quantified benefit.

All information shall be traceable and available for independent conformity assessment.

12 Leakage

Leakage under this methodology refers to negative effects on water quality or water availability occurring outside the quantification boundary as a consequence of the project activities, which may reduce, displace, or nullify part of the reported water benefit.

Water-quality improvement activities may alter the location, transport, storage, transformation, or fate of pollutants without necessarily eliminating the associated environmental pressure. Accordingly, the project holder shall assess whether the intervention generates material adverse effects outside the quantification boundary or transfers pollution or degradation pressures to another water body, downstream area, groundwater system, ecosystem, or environmental compartment.

Consistent with Water Quality Benefit Accounting, potential trade-offs and unintended consequences associated with water-quality interventions shall be considered when evaluating project outcomes (WRI, 2025a).

Only the net water benefit remaining after accounting for material leakage may be considered for the issuance of Verified Water Credits.

12.1 Difference between project effects and leakage

Changes occurring within the quantification boundary that are directly incorporated into the determination of the water benefit shall not be considered leakage.

Leakage refers to material negative effects occurring outside that boundary as a consequence of the project activities.

For example, the removal of pollutants from a water body constitutes part of the project effect within the quantification boundary. However, where the removed pollutants or contaminated materials are subsequently released or inadequately managed in a manner that causes deterioration of another water body or connected water system, the resulting effect may constitute leakage.

Similarly, the redistribution of pollution within the same assessed water system shall not be interpreted as pollutant removal where the corresponding pressure has merely shifted from one portion of the system to another.

12.2 Identification of potential leakage sources

The project holder shall identify potential sources of leakage associated with the project activities.

Potential leakage may include, as applicable:

(a) displacement of pollutants to downstream or hydrologically connected surface waters;

(b) transfer of contaminants to groundwater;

(c) relocation or disposal of contaminated sediments or other materials in a manner that causes water-quality deterioration elsewhere;

(d) mobilization or resuspension of contaminants outside the assessed area;

(e) transfer of nutrient, organic, chemical, or biological pollution to another portion of the water system;

(f) changes in flow, circulation, or water management that improve conditions within the project area while causing material deterioration elsewhere;

(g) generation, storage, transport, treatment, or disposal of residues associated with the project activity that adversely affect water resources;

(h) unintended adverse effects resulting from chemical, biological, physical, or ecological treatment processes; and

(i) other project-induced effects outside the quantification boundary that materially reduce the net water benefit.

The project holder shall identify the relevant pathways through which such effects may occur and determine whether they are reasonably attributable to the project activities.

12.3 Spatial boundary for leakage assessment

The spatial boundary for leakage assessment shall extend beyond the quantification boundary where necessary to identify material project-induced effects.

The assessment shall consider, as applicable:

(a) downstream reaches or receiving water bodies;

(b) connected lakes, reservoirs, wetlands, lagoons, estuaries, or other surface waters;

(c) groundwater systems that may receive pollutants or contaminated seepage;

(d) disposal, treatment, or storage locations for materials removed from the water body; and

(e) other areas where material adverse effects associated with the project activities may occur.

The extent of the leakage assessment shall be justified based on the characteristics of the intervention, the hydrological connectivity of the system, pollutant pathways, and the nature and persistence of the relevant contaminants.

12.4 Materiality assessment

The project holder shall assess whether identified leakage effects are material to the quantified water benefit.

The assessment shall consider, as applicable:

(a) the magnitude of the adverse effect;

(b) the affected water volume or water system;

(c) the pollutant or pressure involved;

(d) the duration and reversibility of the effect;

(e) the sensitivity of the affected receiving system;

(f) the relationship between the adverse effect and the water benefit generated within the quantification boundary; and

(g) the level of uncertainty associated with the effect.

Potential leakage that is demonstrated to be immaterial may be excluded from quantitative deduction, provided that the basis for the determination is documented and justified.

Where materiality cannot be reasonably established because of insufficient information, the project holder shall apply a conservative approach.

12.5 Quantification and deduction of leakage

Material leakage shall be quantified, where technically feasible, using methods appropriate to the type of effect and the available evidence.

The project holder shall use direct measurement, mass balance, water-quality monitoring, hydrological or pollutant-transport modeling, documented material flows, or other technically justified approaches, as applicable.

The net water benefit shall account for quantified leakage in accordance with the general quantification procedure established in Section 10.

Where a material leakage effect can be demonstrated but cannot be quantified with sufficient precision, the project holder shall apply a conservative deduction or exclude the affected portion of the water benefit.

Leakage deductions shall not result in a negative net water benefit. Where material negative effects attributable to the project are equal to or greater than the gross water benefit for the corresponding monitoring period, no Verified Water Credits shall be issued for that period.

12.6 Leakage prevention and mitigation measures

The project holder shall implement reasonable measures to prevent or minimize material leakage associated with the project activities.

Measures may include, as applicable:

(a) appropriate handling, treatment, containment, transport, or disposal of contaminated materials;

(b) control of downstream releases;

(c) prevention of contaminant transfer to groundwater;

(d) management of residues generated by treatment or restoration processes;

(e) operational controls designed to prevent pollutant mobilization or redistribution;

(f) modification of project activities where monitoring identifies material adverse effects; and

(g) other measures appropriate to the identified leakage pathway.

Leakage prevention or mitigation measures shall not themselves generate additional water benefits unless they independently meet the eligibility and quantification requirements of this methodology.

12.7 Leakage monitoring and reassessment

Potential leakage sources identified during project design shall be monitored at a frequency appropriate to the nature, magnitude, and expected temporal behavior of the relevant effect.

The leakage assessment shall be updated where:

(a) project activities or operating conditions materially change;

(b) new pollutant pathways are identified;

(c) monitoring indicates unexpected downstream or connected effects;

(d) the management or disposal of removed materials changes;

(e) the quantification boundary or area of influence changes; or

(f) other circumstances arise that may materially alter the leakage assessment.

Where monitoring identifies previously unaccounted material leakage, the project holder shall incorporate the corresponding effect into the quantification of the net water benefit for the affected monitoring period.

12.8 Non-permissible conditions

No water benefit shall be quantified where the project activity:

(a) materially transfers the water-quality degradation addressed by the project to another surface water body or groundwater system without adequate mitigation and accounting;

(b) achieves the reported improvement primarily through the relocation of pollutants or contaminated materials without appropriate management of the resulting environmental risk;

(c) causes material deterioration of downstream or hydrologically connected waters that is not accounted for in determining the net water benefit;

(d) generates significant unmitigated water-quality impacts outside the quantification boundary; or

(e) prevents the reliable determination of a net positive water benefit after accounting for project-induced adverse effects.

13 Uncertainty management

The project holder shall identify, assess, and account for the sources of uncertainty that may affect the quantification of water benefits under this methodology.

Uncertainty may arise from measurement error, sampling design, spatial and temporal variability, baseline estimation, pollutant-load calculations, hydrological or hydrodynamic conditions, model structure and parameters, attribution of observed changes, and the determination of the water volume associated with the demonstrated water-quality or functional improvement.

Water-quality conditions may exhibit substantial spatial and temporal variability, and the reliability of quantified outcomes depends on the representativeness of monitoring data, the appropriateness of the selected indicators, and the methods used to relate measured changes to the relevant water system (UNEP, 2016; WRI, 2025a).

Uncertainty shall be managed in a manner that avoids overestimation of the net water benefit. Where uncertainty cannot be reduced through improved data, monitoring,

sampling, or modeling, the project holder shall apply conservative assumptions, deductions, or exclusion of the affected component from quantification.

13.1 Sources of uncertainty

The project holder shall identify the material sources of uncertainty associated with the project and the quantification approach applied.

Sources of uncertainty may include, as applicable:

(a) measurement uncertainty, including the accuracy, precision, calibration, detection limits, and performance of field and laboratory measurement methods;

(b) sampling uncertainty, including the number, location, depth, timing, and representativeness of sampling or monitoring points;

(c) spatial uncertainty, associated with heterogeneity in water-quality conditions and the extrapolation of measured conditions to unmonitored portions of the water body;

(d) temporal uncertainty, associated with seasonal, daily, event-driven, or interannual variability in water-quality and hydrological conditions;

(e) baseline uncertainty, including limitations in historical data, reference conditions, trends, or the estimation of the without-project scenario;

(f) pollutant-load uncertainty, including uncertainty in pollutant concentrations, flows, loads, transport pathways, transformations, or mass-balance components;

(g) hydrological and hydrodynamic uncertainty, including uncertainty in inflows, outflows, water levels, residence time, mixing, stratification, circulation, and other variables affecting the distribution and behavior of water-quality parameters;

(h) model uncertainty, including model structure, parameterization, calibration, validation, spatial or temporal resolution, and extrapolation;

(i) attribution uncertainty, associated with distinguishing the effect of the project from natural variability, external pollution-control measures, changes in pollutant inputs, or other concurrent factors;

(j) operational uncertainty, associated with variation in the performance or continuity of the project activities; and

(k) other sources that may materially affect the quantified water benefit.

The project holder shall distinguish, where practicable, between uncertainties that can be reduced through additional information or monitoring and uncertainties that remain inherent to the system or quantification approach.

13.2 Uncertainty assessment

The uncertainty assessment shall be appropriate to the data, variables, models, and quantification methods applied by the project.

Where uncertainty can be quantified statistically, the project holder shall use recognized statistical methods and document the confidence level, assumptions, data distribution, sample size, and calculation procedure applied.

Where direct measurements are used, measurement uncertainty shall consider the documented accuracy and precision of the relevant instruments and analytical methods.

Where sampling is used to characterize a larger water volume or area, the project holder shall assess whether the sampling design adequately represents the spatial and temporal variability of the relevant water-quality conditions.

Where pollutant loads are estimated, uncertainty shall account for the relevant uncertainties in concentration and flow or volume measurements and in any assumptions used to determine the corresponding mass balance.

Where models are used, uncertainty assessment shall consider model performance, calibration and validation results, sensitivity to relevant parameters, and the uncertainty associated with extrapolation beyond monitored conditions.

Where uncertainty cannot reasonably be expressed through a statistical confidence interval or other quantitative measure, a qualitative or semi-quantitative assessment may be used, provided that the basis for the assessment is transparent, technically justified, and applied conservatively.

13.3 Spatial and temporal representativeness

Monitoring data used for quantification shall be representative of the spatial and temporal conditions of the water volume to which the quantified benefit is assigned.

Measurements obtained at individual monitoring points shall not be extrapolated to a larger area or water volume unless the project holder demonstrates that such extrapolation is technically justified.

The demonstration may be based, as appropriate, on:

(a) statistically representative sampling;

(b) stratification of the water body into sufficiently homogeneous assessment units;

(c) bathymetric or hydrodynamic information;

(d) spatial interpolation supported by an adequate monitoring network;

(e) calibrated and validated water-quality or hydrodynamic models;

(f) continuous or high-frequency monitoring; or

(g) other scientifically defensible methods appropriate to the water body and project.

Where material vertical variation occurs, including stratification, hypolimnetic oxygen depletion, salinity gradients, or other depth-dependent conditions, surface measurements alone shall not be assumed to represent the entire water column.

Likewise, measurements taken during a limited seasonal or hydrological condition shall not be extrapolated to periods with materially different conditions unless the relationship is demonstrated.

This approach reflects the broader principle that water-quality monitoring and assessment shall account for the spatial and temporal variability of aquatic systems and use monitoring designs appropriate to the environmental condition being evaluated (UNEP, 2016).

13.4 Attribution uncertainty

Where the observed water-quality or functional change may result from both project activities and external factors, the project holder shall assess the uncertainty associated with attribution.

The assessment shall consider the external factors identified under Section 9.5 and the extent to which their effects can be distinguished from the project effect.

Approaches to reduce attribution uncertainty may include, as appropriate:

(a) reference or control locations;

(b) before-and-after monitoring;

(c) upstream and downstream comparisons;

(d) mass-balance approaches;

(e) statistical models incorporating relevant explanatory variables;

(f) hydrological, hydrodynamic, or water-quality modeling;

(g) comparison with independent monitoring datasets; or

(h) other scientifically defensible approaches.

The selection of the attribution approach shall reflect the characteristics and scale of the project and the complexity of the relevant water system.

Where the project contribution cannot be distinguished with sufficient confidence from material external influences, the project holder shall quantify only the portion that can be conservatively attributed to the project or exclude the affected benefit from quantification.

13.5 Quantification and treatment of uncertainty

The net water benefit shall account for material uncertainty in accordance with the general quantification procedure established in Section 10.

Where uncertainty can be quantified, the project holder shall incorporate it into the quantified water benefit using a statistically and technically justified approach appropriate to the variables and quantification method applied. This may include the use of a lower confidence bound, a conservative estimator, or an explicit uncertainty deduction.

An additional uncertainty deduction shall not be applied where uncertainty has already been incorporated into the quantified result through a lower confidence bound, conservative estimator, or equivalent method.

Where multiple sources of quantitative uncertainty affect the same result, they shall be combined using an appropriate method that avoids both omission and double counting of uncertainty.

Where a material source of uncertainty cannot be reliably quantified, the project holder shall apply a conservative adjustment, use a lower-bound estimate, limit the affected water volume, or exclude the corresponding component from quantification.

Where an explicit uncertainty deduction is applied, it shall reflect the uncertainty of the quantified water benefit rather than simply the uncertainty of an individual monitoring parameter.

13.6 Conservative approach and data treatment

Where uncertainty may result in overestimation of the water benefit, conservative assumptions shall be applied.

Conservative treatment may include:

(a) use of lower-bound estimates for the water volume associated with the demonstrated benefit;

(b) use of conservative baseline values or trends;

(c) use of conservative estimates of pollutant-load reduction;

(d) exclusion of monitoring points, periods, or areas where the evidence is insufficient, provided that such exclusion is not used selectively to increase the quantified benefit;

(e) limitation of spatial extrapolation;

(f) limitation of temporal extrapolation;

(g) use of the lower result where multiple technically valid quantification approaches produce materially different estimates;

(h) incorporation of uncertainty through the applicable method; and

(i) exclusion of benefits that cannot be demonstrated with sufficient reliability.

Data shall not be selectively excluded solely because they reduce the quantified water benefit.

Outliers, anomalous observations, missing data, values below analytical detection or quantification limits, and other data-quality issues shall be treated using documented and technically justified procedures.

The project holder shall retain the original data and document all adjustments, exclusions, substitutions, or transformations applied.

13.7 Missing data

In the event of missing monitoring data, the project holder shall determine whether the remaining information is sufficient to demonstrate the water benefit for the affected period, area, or water volume.

Missing data shall not be replaced using assumptions or interpolation methods that result in an unjustified increase in the quantified benefit.

Where data substitution or interpolation is technically justified, the method shall be documented, reproducible, and conservative.

Where the missing data materially affect the ability to demonstrate the water-quality or functional condition or the corresponding water volume, the affected period, area, or volume shall be excluded from quantification.

No default assumption of continued project performance shall be applied solely because the intervention remained operational during a period for which water-quality monitoring data are unavailable.

13.8 Documentation and updating of uncertainty

The project holder shall document the uncertainty assessment and retain sufficient information to enable independent review and reproduction of the relevant calculations.

The documentation shall include, as applicable:

(a) identified sources of uncertainty;

(b) measurement and analytical uncertainty;

(c) sampling design and representativeness;

(d) statistical methods and confidence levels;

(e) model calibration, validation, and performance information;

(f) assumptions and parameter values;

(g) uncertainty propagation or combination methods;

(h) uncertainty deductions and conservative adjustments;

(i) treatment of missing or anomalous data; and

(j) justification for any source of uncertainty considered immaterial.

The uncertainty assessment shall be reviewed and updated for each monitoring period where new data, changes in project operation, modifications to the monitoring system, changes in the water body, or other circumstances materially affect the uncertainty of the quantified water benefit.

Where improved information reduces uncertainty in subsequent monitoring periods, the updated uncertainty assessment may be applied prospectively. It shall not be used to increase retrospectively the number of Verified Water Credits already issued for previous monitoring periods.

14 Monitoring of project activities

Monitoring shall provide the information necessary to demonstrate the implementation and performance of the project activities, characterize the relevant water-quality and hydrological conditions, quantify the water benefit, assess permanence and leakage, and support the independent audit of project results.

The monitoring system shall be designed according to the characteristics of the surface water body, the water-quality or functional challenge addressed, the project activities, the expected spatial and temporal response, and the quantification approach applied.

Consistent with Water Quality Benefit Accounting, monitoring shall focus on indicators that are relevant to the identified water-quality challenge and capable of demonstrating the outputs associated with the project activities (WRI, 2025a). Monitoring shall not be limited to demonstrating that an intervention was implemented or remained operational.

The monitoring plan shall provide sufficient spatial and temporal information to distinguish project-attributable changes from natural variability and other material influences and to determine the water volume associated with the quantified benefit.

14.1 Monitoring plan

The project holder shall develop and implement a monitoring plan covering each monitoring period.

The monitoring plan shall describe, at a minimum:

(a) the project activities and the water-quality or functional objective being monitored;

(b) the surface water system, project area, quantification boundary, and area of influence;

(c) the parameters and indicators to be monitored;

(d) the hydrological, hydrodynamic, climatic, operational, or other variables necessary to interpret the monitored water-quality conditions;

(e) monitoring locations, depths, and assessment units, as applicable;

(f) monitoring frequency and timing;

(g) sampling, field measurement, laboratory analysis, remote sensing, modeling, or other methods applied;

(h) equipment, instruments, and analytical methods;

(i) quality assurance and quality control procedures;

(j) procedures for calibration, maintenance, and verification of monitoring equipment;

(k) procedures for data validation, treatment of missing data, and anomalous observations;

(l) responsibilities for data collection, analysis, review, and management; and

(m) records and information required for independent conformity assessment.

The monitoring plan shall be consistent with the baseline assessment and shall allow comparable evaluation of baseline and with-project conditions.

Where monitoring methods, locations, instruments, laboratories, analytical procedures, or other material elements change between the baseline and monitoring periods, the project holder shall assess and document whether the resulting datasets remain comparable.

14.2 Monitoring variables

The project holder shall monitor the variables necessary to demonstrate the water-quality or functional benefit and support its quantification.

The selection of variables shall be based on:

(a) the water-quality challenge identified under Section 6;

(b) the project objective;

(c) the causal pathway between the project activity and the expected benefit;

(d) the characteristics of the relevant surface water body;

(e) the parameters used to establish the baseline;

(f) the requirements of the applicable quantification approach; and

(g) variables necessary to identify material external influences, leakage, reversals, or uncertainty.

Water-quality monitoring may include physical, chemical, biological, microbiological, or ecological parameters, as appropriate to the project. The relevant variables shall be selected according to the specific water-quality challenge rather than through a universal list applicable to all projects (WRI, 2025a).

For eutrophication-related interventions, for example, monitoring may require consideration of causal variables such as nitrogen and phosphorus and response variables such as chlorophyll-a, water clarity, dissolved oxygen, or other indicators appropriate to the relevant water body and project objective (US EPA, 2021).

The monitoring of a single parameter shall be sufficient only where the project holder demonstrates that the parameter adequately represents the water-quality or functional condition relevant to the quantified benefit.

14.3 Hydrological and environmental variables

Where hydrological, hydrodynamic, climatic, or environmental conditions materially affect the interpretation or quantification of the water-quality benefit, the relevant variables shall be monitored or obtained from representative and verifiable sources.

These variables may include, as applicable:

(a) inflows and outflows;

(b) streamflow or discharge;

(c) water level;

(d) water volume;

(e) precipitation;

(f) temperature;

(g) evaporation or evapotranspiration where relevant;

(h) residence time;

(i) circulation and mixing conditions;

(j) stratification;

(k) sediment-water interactions; and

(l) other variables that materially affect the monitored water-quality conditions.

The project holder shall identify which variables are necessary to distinguish project-attributable improvements from changes resulting from dilution, hydrological variability, seasonal processes, or other external factors.

No hydrological or environmental variable shall be required solely because it appears in this list. The project holder shall justify the variables selected according to the characteristics of the project and quantification approach.

14.4 Monitoring locations and spatial representativeness

Monitoring locations shall be selected to provide representative information on the water-quality and functional conditions relevant to the quantified water benefit.

The monitoring design shall consider, as applicable:

(a) the spatial extent and geometry of the surface water body;

(b) the location of project activities;

(c) relevant inflows and outflows;

(d) pollutant sources and transport pathways;

(e) upstream and downstream conditions;

(f) areas expected to respond differently to the project activities;

(g) water depth and vertical variability;

(h) hydrodynamic conditions;

(i) reference or comparison locations, where used; and

(j) areas where leakage or indirect effects may occur.

Where the water body exhibits material spatial heterogeneity, monitoring shall be designed to characterize that heterogeneity or the water body shall be divided into appropriate assessment units.

Monitoring points shall not be selected solely on the basis of accessibility or expected favorable project performance.

Measurements obtained at individual monitoring locations shall not be extrapolated to unmonitored areas, depths, or water volumes unless the project holder demonstrates that the extrapolation is technically justified and accounts for the associated uncertainty.

Where material vertical gradients occur, including stratification, oxygen gradients, salinity gradients, temperature gradients, or other depth-dependent water-quality conditions, monitoring shall include sufficient depth resolution to characterize the relevant water column.

Surface measurements shall not be assumed to represent the full water column where material vertical variability exists.

14.5 Monitoring frequency and temporal representativeness

Monitoring frequency shall be sufficient to characterize the temporal behavior of the parameters relevant to the project and to demonstrate the water benefit during the corresponding monitoring period.

The monitoring schedule shall consider, as applicable:

(a) seasonal variability;

(b) wet and dry periods;

(c) high-flow and low-flow conditions;

(d) stratification and mixing cycles;

(e) operational cycles of the project activity;

(f) expected response time of the water body;

(g) episodic pollutant inputs;

(h) extreme events; and

(i) other temporal factors that may materially affect the monitored condition.

Monitoring shall not be scheduled or limited in a manner that systematically favors periods of better water quality or higher project performance.

Where continuous or high-frequency monitoring is technically appropriate, automated sensors or equivalent monitoring systems may be used.

Where periodic sampling is appropriate, the project holder shall demonstrate that the selected frequency is representative of the conditions relevant to the quantified benefit.

No minimum universal monitoring frequency is established by this methodology. The frequency shall be justified according to the behavior of the relevant parameters, the characteristics of the water body, and the quantification approach.

14.6 Measurement and analytical methods

Field measurements, sampling procedures, laboratory analyses, remote sensing, and other monitoring methods shall use recognized and technically appropriate procedures.

Where applicable, methods established or recognized by competent national authorities, international organizations, standard-setting bodies, or scientifically recognized technical protocols shall be used.

The project holder shall document:

(a) the method used;

(b) sampling and preservation procedures;

(c) analytical laboratory and accreditation status, where applicable;

(d) analytical detection and quantification limits;

(e) instrument specifications;

(f) calibration and maintenance requirements;

(g) units of measurement; and

(h) changes in methods occurring during the project.

Where different methods are used to generate comparable data, the project holder shall demonstrate that methodological differences do not materially bias the quantified water benefit.

14.7 Automated and continuous monitoring

Automated monitoring systems, including multiparameter sondes, sensors, telemetry, data loggers, remote monitoring systems, or equivalent technologies, may be used where appropriate.

Automated monitoring data shall be subject to documented procedures for:

(a) instrument calibration;

(b) sensor maintenance;

(c) detection of drift or fouling;

(d) validation of anomalous readings;

(e) management of data gaps;

(f) synchronization and timestamp integrity; and

(g) quality control against independent or reference measurements where appropriate.

The availability of high-frequency monitoring data shall not, by itself, demonstrate spatial representativeness of the monitored water body.

14.8 Remote sensing and spatial monitoring

Remote sensing, satellite observations, aerial imagery, drones, or other spatial monitoring technologies may be used where the monitored parameter or proxy can be reliably related to the water-quality or functional condition relevant to the project.

Where remote sensing or proxy variables are used for quantification, the relationship between the remotely observed variable and the relevant water-quality condition shall be validated using representative field data.

The spatial and temporal resolution of the remote sensing product shall be appropriate to the scale and dynamics of the relevant water body.

Remote sensing shall not replace field or laboratory measurements where the parameter necessary to demonstrate the water benefit cannot be reliably determined through the remote observation.

14.9 Models used in monitoring

Where hydrodynamic, water-quality, pollutant-transport, ecological, or other models are used to interpolate, extrapolate, or interpret monitoring results, the project holder shall document the model, input data, assumptions, parameterization, calibration, validation, and performance.

Models shall be calibrated and validated using site-specific monitoring data wherever technically feasible.

Model outputs shall not substitute for monitoring evidence where the occurrence of the water-quality or functional improvement can reasonably be directly monitored.

Where models are used to extend measured conditions to unmonitored areas, depths, or periods, the associated uncertainty shall be assessed in accordance with Section 13.

14.10 Monitoring of project operation

Where project performance depends on active operation or maintenance, the project holder shall maintain records sufficient to demonstrate the operational status of the intervention during the monitoring period.

Operational monitoring may include, as applicable:

(a) operating hours;

(b) flow or circulation rates;

(c) treatment capacity;

(d) energy consumption;

(e) dosage or application rates;

(f) maintenance activities;

(g) equipment failures or interruptions; and

(h) other operational parameters relevant to project performance.

Operational data shall be used to support interpretation of project performance but shall not replace monitoring of the resulting water-quality or functional condition.

14.11 Data quality control and assurance

Monitoring data shall be subject to documented quality control and quality assurance procedures.

These procedures shall include, as applicable:

(a) verification of data completeness;

(b) review of internal consistency;

(c) identification and evaluation of anomalous observations;

(d) verification of instrument calibration and maintenance;

(e) review of laboratory quality-control information;

(f) comparison with independent or reference datasets where appropriate;

(g) verification of spatial and temporal consistency;

(h) documented treatment of missing data; and

(i) review of calculations and data transformations.

Data shall not be removed or modified without documented technical justification.

Original monitoring records shall be retained and remain traceable to the data used for quantification.

14.12 Monitoring report and records

For each monitoring period, the project holder shall prepare a monitoring report documenting the implementation and performance of the project activities and the information used to quantify the water benefit.

The monitoring report shall include, as applicable:

(a) monitoring period;

(b) project activities implemented and operational status;

(c) monitoring locations and methods;

(d) monitored parameters and variables;

(e) monitoring frequency;

(f) results and relevant spatial and temporal patterns;

(g) material changes relative to the baseline or previous monitoring period;

(h) external factors affecting water quality;

(i) leakage and reversal observations;

(j) missing data, anomalies, and corrective actions;

(k) uncertainty assessment;

(l) changes to monitoring methods or equipment; and

(m) the data and calculations supporting the quantified water benefit.

Monitoring records shall be maintained in a form that allows traceability from the original measurement or observation through data processing and analysis to the final quantified result.

The information shall be sufficient to enable independent review and reproduction of the quantification by the Conformity Assessment Body.

15 Document management, quality control, and information assurance

The project holder shall establish and maintain a document and information management system sufficient to ensure the completeness, consistency, traceability, reproducibility, and availability of the information used for project design, baseline establishment, monitoring, quantification, and conformity assessment.

The system shall cover the technical, environmental, hydrological, water-quality, operational, spatial, analytical, and calculation records relevant to the project.

Information used to quantify water benefits shall be maintained in a manner that allows the data to be traced from the original measurement, observation, analytical result, or other source through the corresponding processing, analysis, modeling, and calculation steps to the final quantified net water benefit.

Consistent with the principles of transparent and scientifically defensible water-benefit accounting, the project holder shall document the data sources, methods, assumptions, and limitations relevant to the reported water-quality outcomes (WRI, 2025a; WRI, 2025b).

15.1 Document management system

The project holder shall maintain a structured document management system covering the project documentation throughout the applicable project period.

The system shall include, as applicable:

(a) project design and technical documentation;

(b) baseline data and supporting evidence;

(c) monitoring plans and monitoring reports;

(d) field measurement and sampling records;

(e) laboratory reports and analytical results;

(f) hydrological, hydrodynamic, climatic, and environmental data;

(g) operational and maintenance records;

(h) geospatial information;

(i) models, model input and output files, and supporting documentation;

(j) calculations and calculation tools;

(k) uncertainty assessments;

(l) leakage assessments;

(m) records of reversals, interruptions, or performance adjustments;

(n) quality assurance and quality control records; and

(o) other information used to demonstrate or quantify the water benefit.

Documents and datasets shall be clearly identified and organized so that the information corresponding to the baseline and monitoring periods, as well as the period covered by each audit, can be distinguished.

15.2 Minimum technical information

The project holder shall maintain sufficient technical information to demonstrate the basis and reproducibility of the quantified water benefit.

The information shall include, as applicable:

(a) description and delimitation of the relevant surface water system;

(b) description of the water-quality or functional challenge addressed;

(c) identification of relevant sources and drivers of degradation;

(d) baseline scenario and supporting data;

(e) description of the project activities and causal pathway;

(f) water-quality and other monitoring data;

(g) information used to characterize spatial and temporal variability;

(h) information used to determine the water volume associated with the quantified benefit;

(i) pollutant-load data and calculations, where applicable;

(j) hydrological or hydrodynamic information used in the assessment;

(k) assumptions, parameters, reference conditions, or criteria used;

(l) calculations supporting the gross and net water benefit;

(m) deductions and conservative adjustments;

(n) uncertainty assessment; and

(o) evidence supporting additionality and attribution.

The information shall be sufficient for an independent reviewer to understand the methodological approach applied and reproduce the material steps of the quantification.

15.3 Geospatial information

The project holder shall maintain geospatial information sufficient to identify and assess the spatial components relevant to the project.

Geospatial information shall include, as applicable:

(a) the project area and quantification boundary;

(b) the relevant surface water body or system;

(c) project intervention locations;

(d) monitoring and sampling locations;

(e) relevant inflows and outflows;

(f) pollutant sources or discharge locations relevant to the assessment;

(g) upstream and downstream connections;

(h) areas or assessment units used for quantification;

(i) bathymetric or depth information where relevant;

(j) reference or comparison locations; and

(k) areas relevant to leakage assessment.

Geospatial datasets shall use a documented coordinate reference system and shall contain sufficient metadata to identify their source, date, spatial resolution, processing history, and other information necessary to assess their suitability for the project.

Where spatial interpolation, remote sensing, hydrodynamic modeling, or other geospatial methods are used to extend monitored conditions to unmonitored areas or water volumes, the corresponding input data, processing methods, and outputs shall be retained.

15.4 Quality control of data, calculations, and models

The project holder shall implement quality-control procedures appropriate to the information and methods used for quantification.

Quality control shall include, as applicable:

(a) verification of data completeness and consistency;

(b) review of units, conversions, and calculation periods;

(c) verification of formulas and calculation procedures;

(d) cross-checking of intermediate and final results;

(e) review of assumptions and parameter values;

(f) verification that baseline and project data are comparable;

(g) review of spatial and temporal extrapolations;

(h) verification of uncertainty and leakage calculations;

(i) review of model input and output data; and

(j) confirmation that conservative adjustments have been applied consistently.

Calculation tools, spreadsheets, scripts, databases, or other systems used to determine water benefits shall be documented and maintained in a manner that permits independent review.

Where models are used, the project holder shall retain the model version, input datasets, parameter values, calibration and validation information, relevant output files, and sufficient documentation to reproduce the results used for quantification.

Changes to calculation methods or models shall be documented and their effect on the quantified water benefit assessed.

15.5 Traceability, version control, and backup

All information used for project assessment and quantification shall be traceable to its original source.

The project holder shall maintain appropriate version control for documents, datasets, calculation tools, models, and monitoring information.

Version control shall allow identification of:

(a) the applicable version;

(b) the date of creation or modification;

(c) material changes made;

(d) the person or entity responsible for the change; and

(e) the relationship between the version and the corresponding monitoring period or period covered by the audit.

Original data shall be preserved. Adjusted, processed, corrected, interpolated, or otherwise transformed data shall remain traceable to the corresponding original records.

The project holder shall implement appropriate backup and data-protection procedures to prevent material loss, corruption, or unauthorized modification of project information.

15.6 Personnel competence and internal review

Personnel responsible for water-quality monitoring, sampling, laboratory analysis, hydrological or hydrodynamic assessment, modeling, data analysis, and quantification shall have competencies appropriate to the activities performed.

Where specialized technical activities are required, the project holder shall use qualified personnel, laboratories, or service providers appropriate to the relevant method and applicable requirements.

Before submission for conformity assessment, the project holder shall conduct an internal review of the information and calculations supporting the quantified water benefit.

The internal review shall verify, at a minimum:

(a) consistency with the applicable methodology;

(b) completeness of the required information;

(c) consistency between baseline, monitoring, and quantification data;

(d) correct application of calculation procedures;

(e) treatment of uncertainty, leakage, and performance adjustments;

(f) traceability of material data and assumptions; and

(g) consistency between the reported results and the supporting evidence.

15.7 Availability for conformity assessment

The project holder shall make available to the Conformity Assessment Body the information necessary to independently assess the project and reproduce the material elements of the quantified water benefit.

The information shall include original or traceable source data and shall not be limited to summaries, processed datasets, dashboards, model outputs, or final calculation results.

Where information is subject to legitimate confidentiality restrictions, the project holder shall ensure that such restrictions do not prevent the Conformity Assessment Body or BioCarbon Cert from accessing the information necessary to assess conformity with the BioCarbon Water Standard and this methodology.

Failure to provide sufficient, traceable, and verifiable information may result in the exclusion of the affected data, period, area, or water volume from quantification.

16 References

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