
SCIENCE BASED TARGETS NETWORK
GLOBAL COMMONS ALLIANCE
SBTN Train-the-Trainer Program
Module 5: Step 3 Measure, Set & Disclose
Freshwater

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1. Overview of Curriculum and Module Introduction

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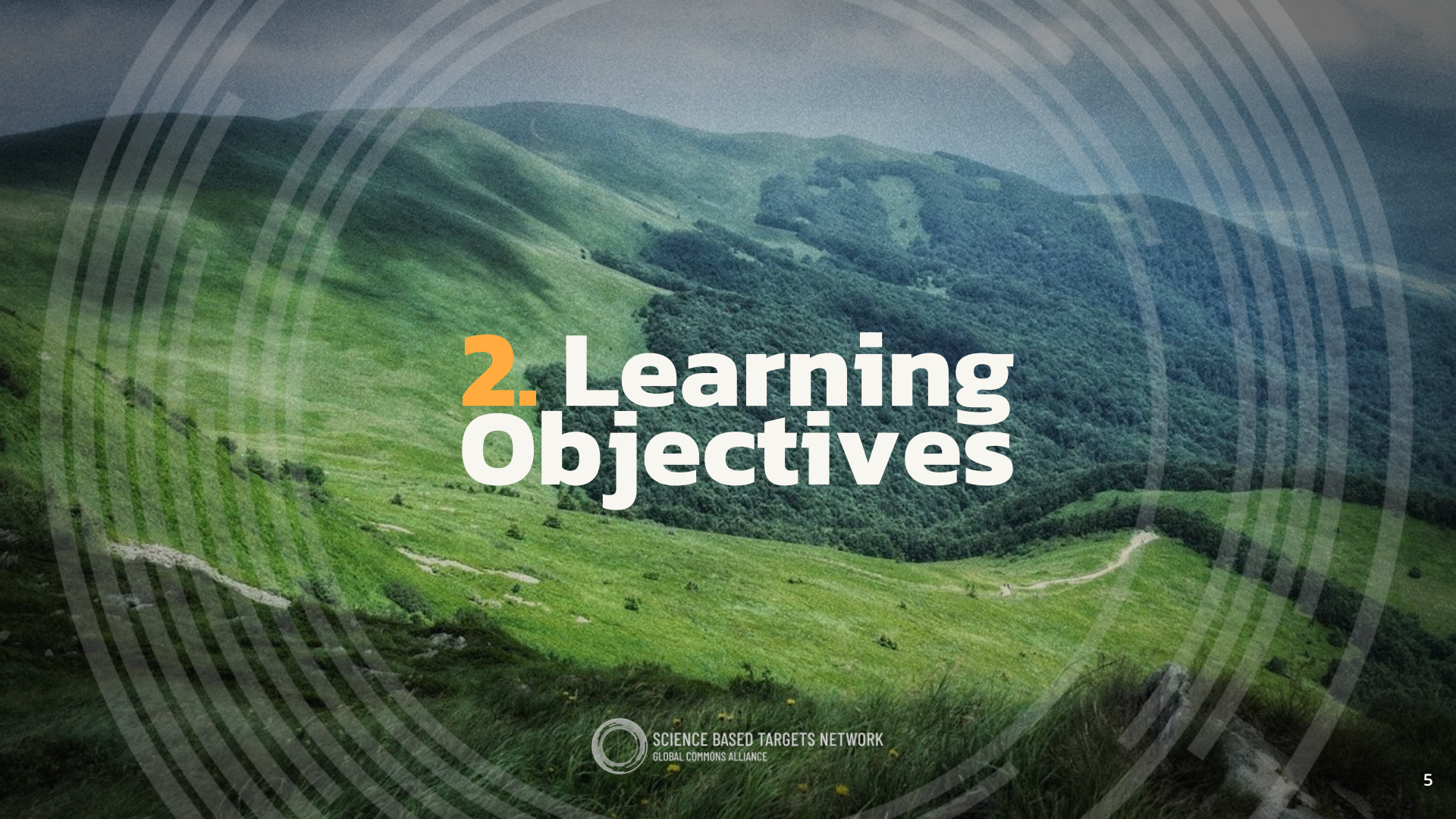
Where are we in the curriculum?

This is the fifth and final of the train-the-trainer program.

Module 1	General Overview	• Introduction to the Train-the-Trainer program and curriculum • Overview of SBTN and SBTs for Nature, key concepts and the business case
Module 2	Step 1: Assess	• Detailed guidance on conducting a materiality screening and value chain assessment with companies
Module 3	Step 2: Interpret & Prioritize	• Detailed guidance on determining target boundaries, ranking locations, prioritizing and evaluating feasibility
Module 4	Step 3: Land	• Detailed guidance on measuring & setting land targets; target validation and disclosure
Module 5	**Step 3: Freshwater**	• Detailed guidance on measuring & setting freshwater targets; target validation and disclosure


2. Learning Objectives
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Objectives of this fifth module

1. **Master the basics**

   Step 3: Freshwater foundations and how it fits in the five-step framework

   - Why measure, set and disclose freshwater targets?
   - What are the objectives and outcomes of Step 3: Freshwater and each sub-step?
   - Main requirements & considerations for supporting companies in conducting Step 3
   - Where to find key tools and resources to support companies and perform Step 3

2. **How to conduct Step 3a**

3. **How to conduct Step 3b**

4. **How to conduct Steps 3c & 3d**

   - How to check data readiness for Step 3
   - How to identify the basin of activity or location
   - How to consult hydrological model database for local models
   - How to consult local stakeholders
   - How to select a global model
   - How to identify additional activities in the basin
   - How to calculate baselines
   - How to gather hydrological data for the basin
   - How to calculate required, basin-wide pressure reductions
   - How to set water quantity and quality targets
   - How to prepare for target validation

3. Content Deep Dive

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Objective 1

Step 3 – Freshwater: Master the basics

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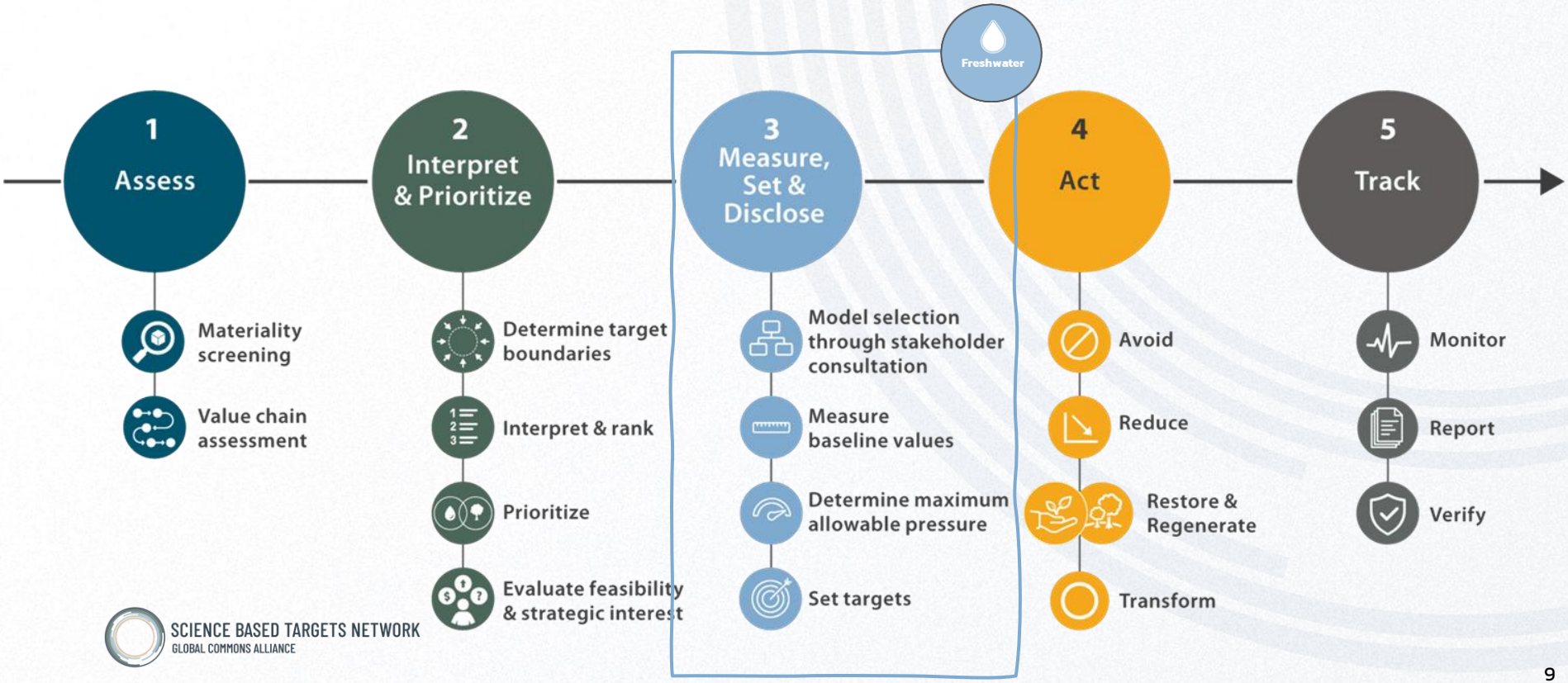
Where are we in the five-step framework?



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Why do we measure, set and disclose freshwater targets? What is the importance of this step?

In Step 3, freshwater methods for **freshwater quantity** (water withdrawals) and **water quality** (nutrient loading) help companies define targets to reduce their environmental pressures on freshwater systems in accordance with the capacity of the environment and the current realities of human pressures on these systems.

This approach results in specific targets with the right ambition levels, rooted in science.

What's in scope here?

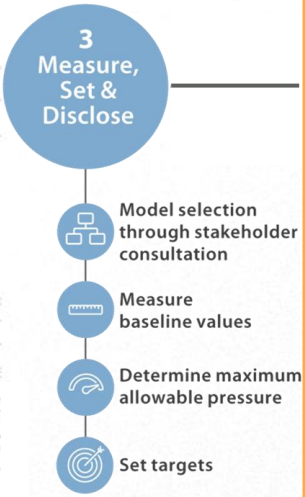
What's covered in this version of the freshwater guidance?
This version focuses on setting targets for **direct operations** and **upstream activities** related **to freshwater quantity** (**surface water flows** and **groundwater levels** for which local models and thresholds exist) and **freshwater quality** (**nutrient pollution**).

What is not covered?
Groundwater levels where local models do not exist, targets for toxic chemicals and other freshwater quality parameters, and downstream are currently not included and may be developed in future iterations.

Is biodiversity in scope?
While biodiversity does not appear explicitly as part of the Step 3 Freshwater methods, it is embedded implicitly within them. In Steps 1 and 2, companies incorporate biodiversity metrics to prioritize action in basins critical for mitigating biodiversity loss.

Find more information on what is currently in scope for freshwater in Table 1 of the Freshwater Guidance

Step 3: Freshwater Objectives and outcomes



Objectives

Step 3a: Select Local or Global Model through consultation with stakeholders

Step 3b: Calculate baseline values on relevant pressures using data acquired in Step 1

Step 3c: Identify environmental thresholds using selected model to understand basin conditions

Step 3d: Set freshwater quality and quantity targets by applying basin-wide reductions to baseline pressures

Inputs

- Inputs across different value chain segments differ depending on the target a company will set
- Primary and/or secondary data on water withdrawals or nutrient loads, depending on the target being set

Outputs

- Water quantity or water quality models needed to set targets are identified;
- Baseline water withdrawals or nutrient pollutant loading at basin levels are calculated;
- Targets for water quantity or water quality are defined

Find more information on what data is required for this Step in Table 2 of the Freshwater Guidance

Before you begin: key considerations

Considerations

- ✓ **Data Availability and Accuracy:** Companies must evaluate the availability and quality of their data for both direct operations and upstream activities and **prioritize primary data whenever possible**. When relying on secondary data like blue-water footprints, there may be potential inaccuracies and the need for future refinements.
- ✓ **Selecting a hydrological model:** It will be crucial to **prioritize locally developed modeling approaches when available**, as they are specifically tailored to the unique characteristics of a given basin, leading to more accurate and relevant results. Globally developed models, while offering a valuable resource in data-scarce regions, come with inherent limitations.
- ✓ **Transparency and Documentation:** Companies will have to clearly document data sources, methodologies, model choices, and any limitations encountered. This will be **key for target validation.**

Find key terms for Freshwater methods & their definitions in the glossary section of the Appendix and in the SBTN Glossary

Objective 2

How to conduct Step 3a

Hydrological model selection

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What actions will you take?

Keep in mind:

- Companies may need to revise their data readiness to be able to set freshwater targets in this step.

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MAIN TASKS:

1 **IDENTIFY THE BASIN OF ACTIVITY OR LOCATION**

For each activity or location, identify the river basin (Pfastetter Level 4 or 5) where the company's prioritized site is located.

2 **CONSULT HYDROLOGICAL MODEL DATABASE FOR LOCAL MODELS**

Check SBTN's model database to see if a locally-developed hydrological model is available for that river basin.

3 **CONSULT NATIONAL STAKEHOLDERS**

Ask governmental offices and NGO stakeholders in the country for potential local modules that could be used to set targets with.

4 **CONSULT LOCAL STAKEHOLDERS**

Ask local communities and experts in the region for potential local models that could be used to set targets with.

5 **SELECT GLOBAL MODEL**

If no local model was found in the previous tasks, use the globally developed hydrological models to set targets with.

Before getting started: check data readiness

A key element of Step 3 involves collecting data to establish baseline levels of pressure on freshwater resources. Before getting started, check that you have the minimum required data for completing Step 3 for both water quantity and water quality based on the information gathered in Steps 1 and 2. **The more spatially specific and more primary data that can be collected, the better.**

Data Requirements for Each Target:

Water Quantity

- **Direct Operations:** Water quantity pressures from direct operations must be calculated **from primary data**, i.e., direct site-specific measurements from water meters.
  Required units: average withdrawal volumes over the course of each month.
- **Upstream**: Water quantity pressures from upstream activities can be calculated **either from primary data** (direct measurement data - preferred, if available) **or from secondary data** using modeled estimates, such as blue-water footprint(s).

  Required units for primary data: average withdrawal volumes over the course of each month.

  Required units for secondary data sources: annual average water consumption.

Companies must use the **last five full years of operation** to calculate baseline freshwater quantity and quality pressures.

What is the difference between primary and secondary data?

Primary data refers to direct measurements taken by the company itself, providing the most accurate and site-specific information about its impacts on freshwater quantity and quality.

Secondary data relies on modeled estimates or information derived from other sources, providing a broader perspective but potentially introducing more uncertainties.

Before getting started: check data readiness

A key element of Step 3 involves collecting data to establish baseline levels of pressure on freshwater resources. Before getting started, a company should check that they have the minimum required data for completing step 3 for both water quantity and water quality based on the information gathered in steps 1 and 2. **The more spatially specific and more primary data that can be collected, the better.**

Data Requirements for Each Target:

Water Quality

Direct Operations and Upstream

- **For point sources** (i.e., discharges from a single identifiable conduit, such as a discharge pipe from a wastewater treatment facility): **primary data must be used,** consisting of monthly average discharge flow and nutrient concentration.
- **For nonpoint sources:** Pressures for nonpoint sources may be estimated from **secondary data**, either from the results of the locally developed model used for target-setting or from gray-water footprint(s).

  Required units for primary data (locally developed model): average nutrient load over the course of each month.

  Required units for secondary data: kg N or P per year if using modeled results of nutrient load; annual average water volume required to assimilate the nutrient load if using gray-water footprints.

Companies must use the **last five full years of operation** to calculate baseline freshwater quantity and quality pressures.

Refer to Table 2 in the Technical Guidance for a full view od the minimum data requirements for pressure baseline measurements

How to select a hydrological model for the basin

Use hydrological models (either global or local) **to understand the unique context of each basin, within each pressure category.** Step 3 includes a multi-staged search process for identifying an appropriate hydrological model to set targets.

Considerations & Checklist

- ✓ SBTN requires companies to identify appropriate models **using a structured decision-tree process**
- ✓ Companies must **use local models for top-priority basins**
- ✓ SBTN provides examples of global models for water quantity and water quality that can be used in **locations that are ranked lower in priority and/or do not have local models available**
- ✓ Companies **must consult national and local stakeholders to identify models most suitable to their needs**
- ✓ **The basin level used by companies will be determined by the modeling approach they select and the pressure targeted** (i.e., withdrawals and/or pollution), and may be a finer scale than used for the Step 1 and 2 methods

Did you know?

Global models allow greater spatial coverage as they leverage global datasets, enabling wider application of the method

Local models provide better accuracy when setting targets as they are tailored to the unique hydrological conditions of a particular basin, but their availability and thresholds are sparser

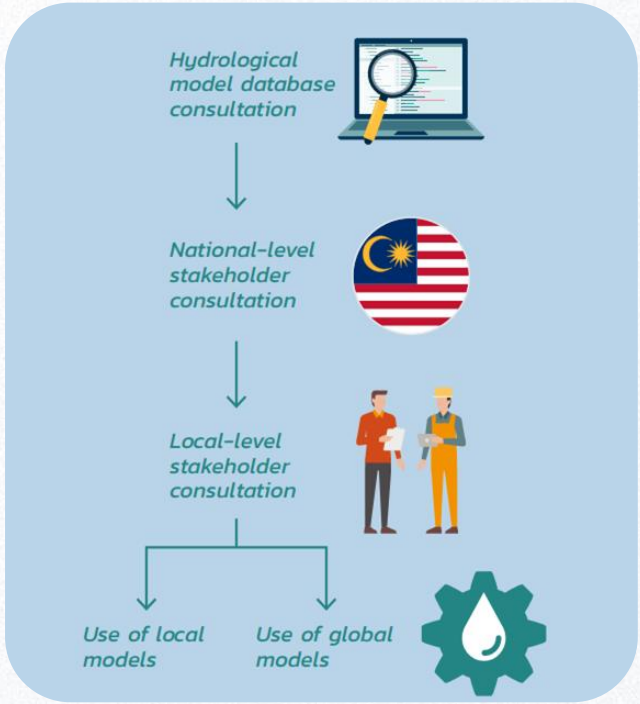
How to select a hydrological model: Decision Tree

Considerations & Checklist

1. Consult SBTN's hydrological model database when it becomes available to check whether there are known local models and locally accepted thresholds for the basin
2. Consult national-level stakeholders using the requirements of the guidance
3. For all basins considered top-priority basins, companies must identify relevant local-level stakeholders and consult them on the existence of appropriate local models

✓ For all other basins in the target boundary, companies may use global models

Find the full decision tree in the Appendix and further details in this video demo of Step 3.

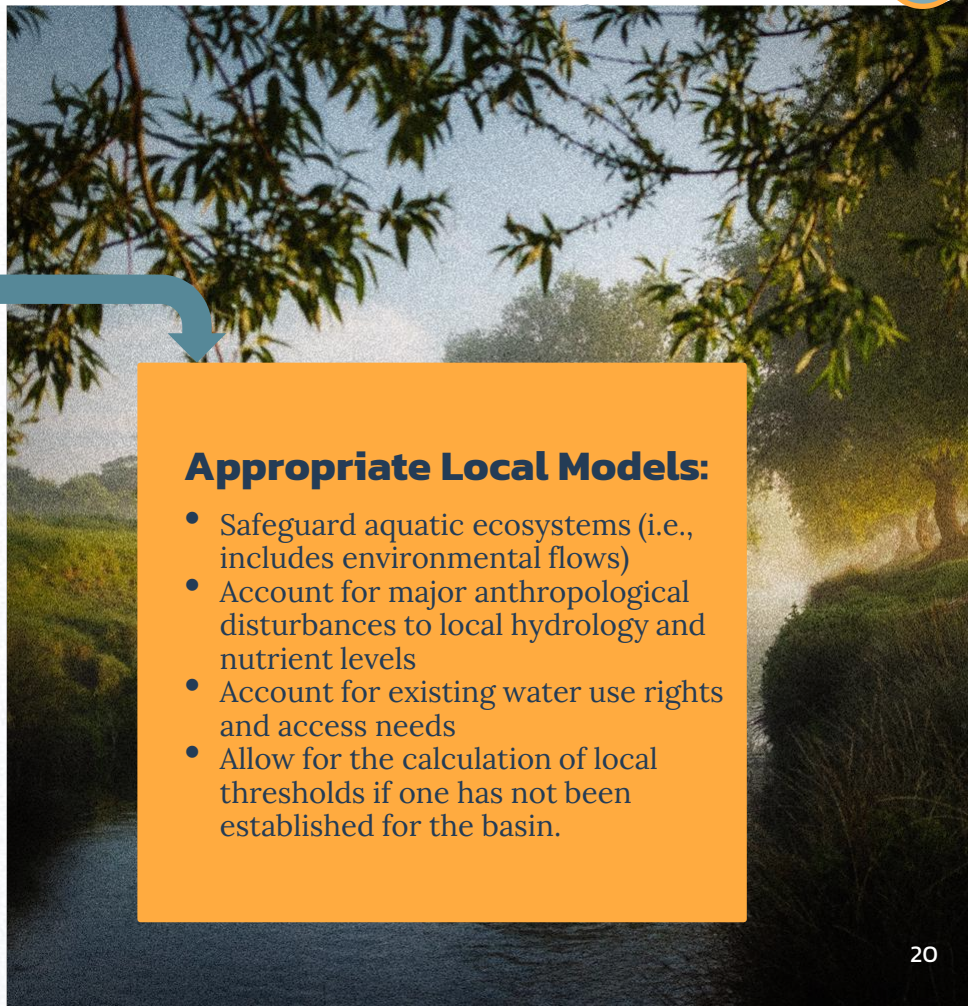


1. Consult the hydrological model database for local models

What's the ask?
Check the SBTN basin threshold tool (under development) for available local models and thresholds.

What does the tool entail?
It will contain local models and thresholds that have either been used by other companies with validated science-based targets in the basin or have been identified and approved through research efforts by the SBTN Freshwater Hub.

What to do while its released?
While the tool is in development, companies can skip this first node in the decision-tree and proceed to the national-level consultation.



Appropriate Local Models:

- Safeguard aquatic ecosystems (i.e., includes environmental flows)
- Account for major anthropological disturbances to local hydrology and nutrient levels
- Account for existing water use rights and access needs
- Allow for the calculation of local thresholds if one has not been established for the basin.

2. Consult national stakeholders

Considerations & Checklist

- ✓ Identify and reach out to experts and other stakeholders based in the basin's country to ask them **if they know of appropriate local hydrological models for the basin of interest**
- ✓ No minimum number of stakeholders required
- ✓ Recommendation: **Identify all basins in the country for which targets will be set**

Did you know?
SBTN is creating a template for documenting all of this information that should be ready by early 2025.

Validation Criteria for Consultation Process

Core documentation for the Consultation Process

- ✓ **The stakeholder mapping exercise** within the basin of interest, prioritizing stakeholders who are knowledgeable about existing models and thresholds in the given basin.

If relevant local stakeholders are identified

- ✓ **Documentation** summarizing whether relevant local stakeholders are able to support:
  (i) the identification of existing local thresholds/targets,
  (ii) the identification of a scientific model/approach, and
  (iii) the provision/sharing of local models, thresholds, and/or data
- ✓ **A record of the person(s) contacted** at the basin management authority (or water resources agency) **and their response.**

3. Consult local stakeholders

Considerations & Checklist

1. Identify and reach out to local experts and other stakeholders operating in the basin
2. Ask if any appropriate local hydrological model is known
   - ✓ If a local model is recommended by > 3 different stakeholder types, **use model to set targets**
   - ✓ If 1 stakeholder can demonstrate a local model as appropriate, with supporting evidence of being protective of nature, **use model to set targets**

Reminder: Only required for **10% of top priority basins**

See "Stakeholder Consultation for Model Selection Recommendation" and Appendix for more guidance

And if no appropriate local models are known?

- ❑ **Ask these same stakeholders if they would consider the global water quantity and water quality models** (Hogeboom (2020) and McDowell (2020)) appropriate to use in the local conditions.
  - If they do, **use the global model to set targets.**
  - Otherwise, you may conclude it's not possible to set targets in this basin as there are no appropriate local or global models.

Important!

The global model cannot be used if the basin has:

- ✓ Major inter-basin transfers, flow disruptions, or disturbances to nutrient flows
- ✓ Major water rights or water access disputes
- ✓ Threatened species or ecosystems highly sensitive to nutrient or oxygen concentrations

See Appendix for more information on Global Models

What do to when ...
targets cannot be set in a given basin

Guidance and alternative pathways

Considerations

- ✓ Record information from consultation process

Available Options

- ✓ Consider temporarily out of scope
- ✓ Fund or contribute to the development of a local model for the basin
- ✓ Reach out external initiatives

Implications

- ✓ For short-term
- ✓ For mid term
- ✓ Target-submissions

Selecting a local model: the Ursus Case

Because the SBTN Basin Threshold Tool is still in development, the Ursus team skipped this first node in the model selection decision-tree and **proceeded to national-level consultation to determine if models were available** for two of its top-priority basins within its direct operations (Meuse Basin in Belgium) and upstream target boundary (Middle San Joaquin basin in the US).

Stakeholder Mapping & Consultation Process (Meuse Basin in Belgium):

Ursus started with a **stakeholder mapping** exercise listing all the local and national stakeholders identified in the SBTN guidance

Ursus then reached out to the stakeholders it identified, beginning at **national** level

One of their contacts, which oversees water management in Belgium, confirmed **the water quantity model developed by the local basin authority is appropriate** to use for Ursus's target-setting process

For water quality, national-level consultation did not yield an appropriate model, so Ursus **proceeded to consultation with three local stakeholders**

The Ursus team asked them the questions outlined in the Step 3 Freshwater methods, after which **one local stakeholder pointed to an appropriate local model for water quality**

- "Are there local modeling approaches used by the local water authority to manage water quality in the basin?"
- "Are these local water models appropriate for target-setting?"

Read the full case study here.

Selecting a global model: the Ursus Case

Because the SBTN Basin Threshold Tool is still in development, the Ursus team skipped this first node in the model selection decision-tree and **proceeded to national-level consultation to determine if models were available** for two its top-priority basins within its direct operations (Meuse Basin in Belgium) and upstream target boundary (Middle San Joaquin basin in the US).

Stakeholder Mapping & Consultation Process *(Middle San Joaquin basin in the U.S.):*

For national-level consultation, the Ursus team consulted WWF-US on the existence of any appropriate local models for water quantity and water quality, as well as other local stakeholders.

None of the contacted stakeholders were aware of any local models for water quality or quantity for the basin.

This indicated that **Ursus would need to use a global model** to complete its target setting for both water quality and water quantity in the Middle San Joaquin basin.

Ursus completed the consultation process for validation **by documenting and submitting a list of the stakeholders it contacted**, all the email exchanges with identified national- and local-level stakeholders in Belgium and the United States

As a result of this process, the Ursus team will use the locally developed modeling approach for water use and water pollution in the Meuse basin in Belgium and the globally developed modeling approach for water use and water pollution in the Middle San Joaquin basin in the United States.

Read the full case study here.

How to Conduct Step 3b

Baseline pressure calculation

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What actions will you take?

KEY TASKS:

6 **IDENTIFY ADDITIONAL ACTIVITIES IN THE BASIN**

Check the spatial coverage of the model and aggregate the pressures from all sites in that area.

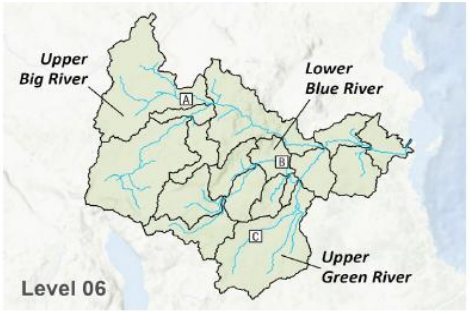
7 **CALCULATE BASELINES**

Aggregate the pressures from all those sites to a total for the area covered by the model.

Keep in mind:

- Step 3b focuses on calculating baseline pressure values for both freshwater quantity (water withdrawals) and freshwater quality (nutrient pollution)

How to identify additional activities in the basin



Basin by Pfafstetter Level			
Operation	6	5	4
Site A	Upper Big River	Upper Big River	Big River
Site B	Lower Blue River	Green River	Big River
Site C	Upper Green River	Green River	Big River

Considerations & Checklist

- ✓ Companies will need to compile their sites by the basin level used in the model to ensure targets consider all sites at the selected spatial scale
- ✓ If a company uses the globally developed modeling approach at a larger spatial resolution than the aggregated pressure data, it should clearly state the model's scale in comparison to the target-setting basin boundary

Did you know?

Freshwater Quantity
Hogeboom's water quantity global model requires the use of Pfafstetter Level 5

Freshwater Quality
McDowell et. al (2020), water quality global model requires the use of Pfafstetter Level 4, with targets for all three priority sites set uniquely to their individual basin

Calculating baseline water quantity pressures

Freshwater Quantity requires data on water withdrawals from both surface water and groundwater sources.

Considerations & Checklist

- ✓ The aggregation of total water withdrawals from all the company's activities within a specified basin level and time period is recorded as its "**water quantity baseline value**" for that basin. The company must define its freshwater quantity baseline value for each of the basins within the target boundary.
- ✓ The output of this step in the target-setting process is a **measurement of a company's baseline withdrawals** as an indication of its overall water use, for each basin.

Did you know?

Companies must use the average aggregate withdrawals over the last five full years of operation to represent the baseline, unless this time period is not representative of their operations or typical environmental conditions.

Data requirements per value chain segment:

Scope	Data Requirements	Data Sources	Unit of Measurement
Direct Operations	Primary	Water meter	Volume/month (e.g., ML/month) or volume/year (e.g. ML/year)
Upstream Activities	Primary (preferred) OR Secondary (using modeled estimates such as blue-water footprints)	Water meter or water diversion or model results	Volume/month (e.g., ML/month) or volume/year (e.g. ML/year)

Calculating baseline water quality pressures

Freshwater Quality requires data on nutrient loads (nitrogen and phosphorus) entering surface water bodies.

Considerations & Checklist

- ✓ The aggregation of the total present-day load of nutrients from all the company's facilities and/or sourcing locations within a specified basin and time period is recorded as its "**freshwater quality baseline value**".
- ✓ The output of this section is a measurement of a company's baseline nutrient loads or gray-water footprint as an indication of its overall freshwater pollution (for nitrogen (N) and phosphorus (P)), for each basin.

Data requirements per value chain segment:

Scope	Data Requirements	Data Sources	Unit of Measurement
Direct Operations & Upstream Activities	Primary (point sources)	Discharge flow & nutrient concentrations	Volume/month (for discharge) Nutrient mass/volume (mg P/L)
	Secondary (nonpoint sources)	Locally developed model results OR Grey water footprint	Mass of nutrient load/month OR Volume/year

How to Conduct Steps 3c & 3d

Baseline pressure reduction calculation & target-setting

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What actions will you take?

KEY TASKS, STEP 3c:

8 **APPLY HYDROLOGICAL DATA FOR THE BASIN**

Use the model to obtain information on the current and desired state of nature for the basin in terms of water quantity or water quality.

9 **CALCULATE REQUIRED, BASIN-WIDE PRESSURE REDUCTIONS**

Use the data to estimate the required reduction percentage for water pressures in the whole basin.

KEY TASKS, STEP 3d:

10 **SET COMPANY WATER QUALITY AND QUANTITY TARGETS**

Apply the reduction percentage to the company's baseline of water withdrawals or nutrient pollutant loading to set water quantity and water quality targets.

Keep in mind:

- Now that you have calculated freshwater quantity & quality baseline values for all priority sites in a given basin, you can begin to define freshwater targets for direct operations and upstream activities

Gathering hydrological data

Now that you have recorded the total baseline for each basin, **it is time to use the model selected in Step 3a to understand the hydrology of the region. The data points that a company must gather differ for water quantity and water quality.**

Water Quantity

Freshwater Quantity Data Points

- ✓ **Present-day stream flows:** the observed volumes of water in the basin. They indicate how much water is carried by a river or held in an aquifer or lake.
- ✓ **Natural stream flows:** modeled on account of unaltered flow regimes. They reflect the theoretical flow of water that would be found in the basin in an average year and in a natural state where no water was withdrawn for human uses.
  - ❑ *Note: From the two points above, it is possible to infer the amount of water that is removed from the basin by human uses*
- ✓ **Environmental flow:** the amount of water that should be in the stream to maintain adequate ecological conditions.

Water Quality

Freshwater Quality Data Points

- ✓ **Maximum allowable nutrient**: maximum amount of nutrient concentration, for Nitrogen and Phosphorus, that could be present in the ecosystem before they cause eutrophication or other ecosystem health problems.
- ✓ **Current nutrient concentrations:** observed concentration of Nitrogen and Phosphorus in the ecosystem. The methods only require identifying the concentration of one of the two nutrients, whichever is scarce relative to the other, and which is called the limiting nutrient.
  - ❑ *Note: The McDowell (2020) model will indicate for each basin which is the limiting nutrient.*

    Local models may calculate the limiting nutrient differently on account of local conditions.

Calculating basin-wide pressure reductions: Water quantity

Water Quantity

Key Steps:

- ✓ **If using the global quantity model by Hogeboom (2020)** the online tool will **automatically provide** the required basin-wide reductions in water withdrawals
- ✓ **If not using the global model:**
  1. First, calculate the excess withdrawals in the basin as the environmental flow requirements minus the present-day stream flows.
  2. Then, calculate the present-day withdrawals as the natural stream flows minus the present-day flows.
  3. Finally, calculate the required basin-wide reduction as the excess withdrawals divided by present-day withdrawals (expressed as a percentage). This should be done on a monthly basis.

Key Calculations:

Excess withdrawals= Environmental flow requirements - Present day stream flow

Present day withdrawals= Natural stream flows -Present day stream flow

Equation 1:

Required basin wide reduction = excess withdrawals / present day withdrawals * 100

Calculating basin-wide pressure reductions for Water quantity: The Ursus Case

To set a Freshwater Quantity target, the team chose to use local e-flow requirements and results from the locally developed model they identified during the stakeholder consultation process.

Calculating reduction percentages using local modeling *(Meuse Basin in Belgium)*:

The team began by **specifying the cumulative pressures** of the company's operations using existing e-flow requirements that had been specified in the local model

Hydrologic model results were available for river flows in the Meuse basin, representing the natural stream flow regime and the present-day stream flow regime, and were **compiled into monthly averages**

Using this data, Ursus **calculated the required reduction percentage for each month.** No reductions were required for 10 months of the year because present-day stream flows exceeded e-flow requirements for those months

The team then repeated the flow calculations (environmental, natural and present-day) from Table 1 for each year **in a 40-year period of simulation and ranked the required reduction percentage by month and year in Table 2**

See Table 1

See Table 2

Read the full case study here.

Calculating basin-wide pressure reductions for Water quantity: The Ursus Case

Table 1

Local environmental flow requirements and model-predicted flows in the Meuse River by month for a single hypothetical example year.

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Direct Operations	Environmental flow requirement (ML/month)	64	146	152	136	120	104	75	54	42	49	58	65
	Natural stream flow (ML/month)	80	183	190	170	150	130	93	67	52	61	72	81
	Present-day stream flow (ML/month)	70	173	180	160	140	115	78	52	37	51	62	71
	Required reduction in withdrawal (%)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**11%**	**31%**	N/A	N/A	N/A

Calculating basin-wide pressure reductions for Water quantity: The Ursus Case

Table 2

		Required Reduction in Withdrawal (%)											
	Rank	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Direct Operations	1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2	0%	0%	0%	0%	0%	0%	0%	3%	5%	0%	0%	0%
	…												
	31	0%	0%	0%	0%	0%	0%	5%	20%	39%	8%	0%	0%
	…												
	39	2%	5%	9%	13%	16%	21%	26%	31%	59%	27%	9%	1%
	40	3%	6%	11%	15%	18%	24%	29%	54%	68%	35%	14%	2%

Calculating basin-wide pressure reductions: Water quality

Water Quality

Key Steps:

1. Calculate the excess nutrient concentration as the current nutrient concentration minus the maximum allowable nutrient concentration.
2. Then, calculate the required basin-wide reduction by dividing the excess nutrient concentration by the current nutrient concentration (and express this as a percentage). Recall that a company will only do this for the limiting nutrient.

Key Calculations:

Excess nutrient concentration = Current nutrient concentration – maximum allowable nutrient concentration

Equation 3:

Required basin wide reduction = Excess nutrient concentration / Current nutrient concentration * 100

Calculating basin-wide pressure reductions for Water quality: The Ursus Case

For the Middle San Joaquin basin where Ursus grows tree nuts in the United States, following stakeholder consultation, no site-specific water quality model or nutrient concentration threshold were found to have been developed, so the team had to use a **global model** to set a Freshwater Quality target.

Calculating reduction percentages using global modeling *(Middle San Joaquin Basin in the U.S.)*:

Ursus determined that its suppliers are located in a single level 6 basin, **consistent with reprocessed McDowell et al. (2020) results in the SBTN State of Nature Water Layers app**

Baseline
The team went back to Step 2, where they had **calculated a phosphorus load of 28,800 kg P/year** *(corn/maize = 10,800 kg P/year, paperboard = 299 kg P/year, and tree nuts = 17,700 kg P/year)*

The SBTN State of Nature Water Layers app was used to **define the median growing season nutrient concentrations and the limiting nutrient** (phosphorus)

Because P is the limiting nutrient, the company calculated the required reduction percentage using the site-specific predicted median growing season **total P concentration (0.17mg/L) and the global P threshold (0.046 mg/L.)** provided by McDowell et al. (2020)

See Table 8 in Step 2 Case Study

Required reduction percentage =
([0.17−0.046] ÷ 0.17) = 73%

Read the full case study here.

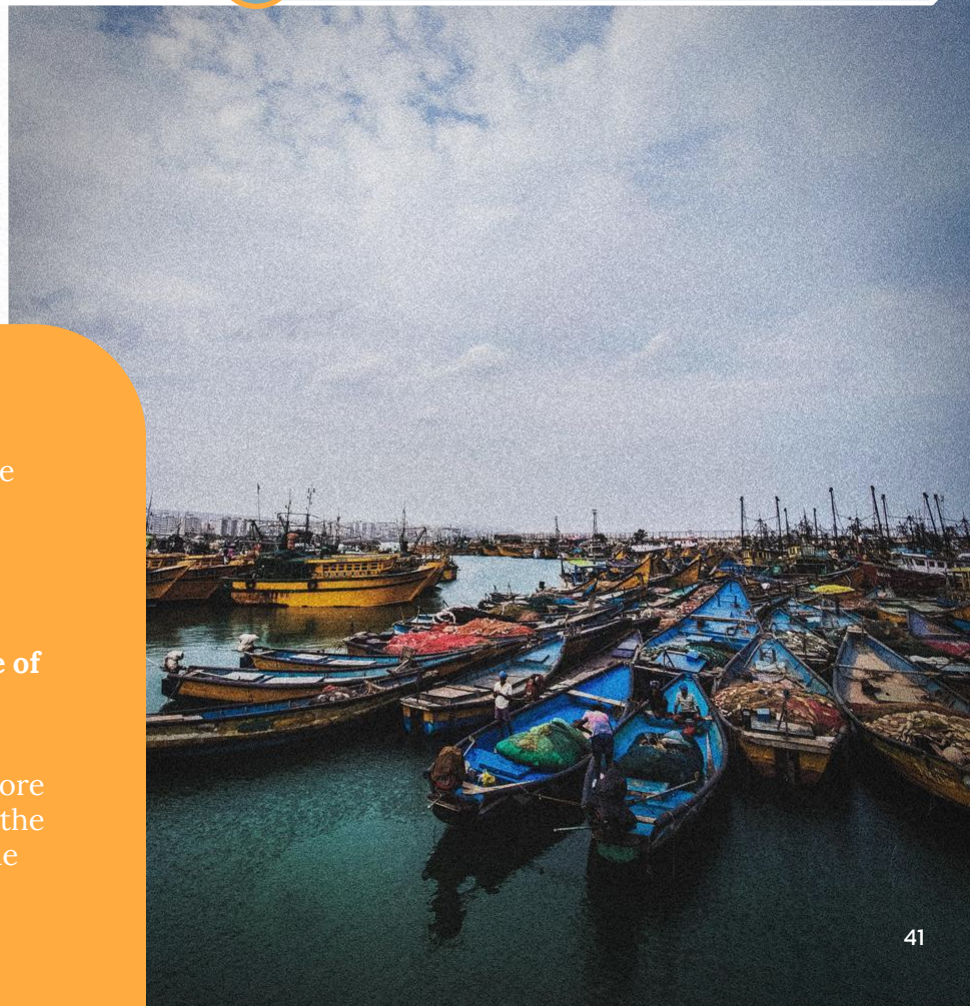
What if global models show acceptable limits for N or P?

Guidance:

- ✓ For **Top Priority basins**, if McDowell results show "acceptable" levels, that indicates thresholds are being met, set a target at the site's current baseline levels and follow SBTN's mitigation hierarchy (Avoid, Reduce, Regenerate, Restore, Transform - Step 4).

- ✓ SBTN recommends companies continue to search for appropriate local water models.

What to do if the models show a zero or negative reduction for withdrawal targets?



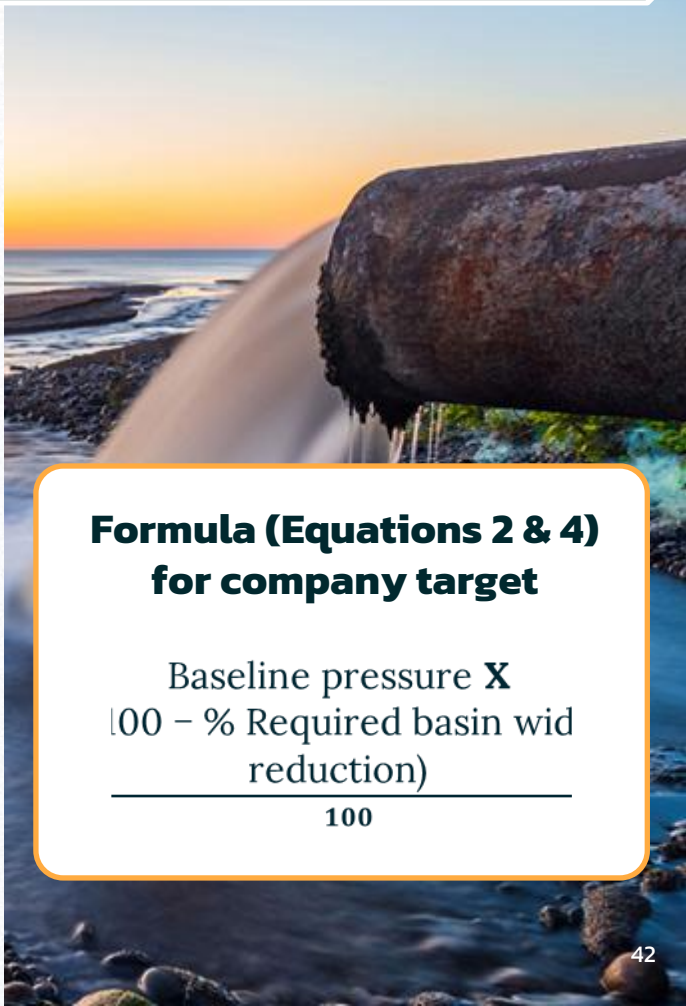
Guidance:

- ✓ If it can be demonstrated that the existing basin-wide threshold **is protective of nature**, set a target at the site's current baseline levels and follow SBTN's mitigation hierarchy (Avoid, Reduce, Regenerate, Restore, Transform - Step 4).
- ✓ If the existing basin-wide threshold **is not protective of nature**, use calculated SBTs following the model selection decision tree.
- ✓ In future versions (V2), the Freshwater Hub may explore setting an allowable growth target (%) not to exceed the basin-wide percentage increase that would satisfy the basin threshold determined by a local model.

How to set freshwater targets

Considerations & Checklist

- ✓ Calculate the share of the basin-wide reductions that will be borne by the company using **allocation.** The first release of SBTN methods use only the **equal contraction of efforts approach**.
- ✓ With this approach, one assumes that the company and every other stakeholder withdrawing water or loading nutrient pollutants in the basin **will reduce their pressures by the same percentage**.
- ✓ To calculate the company's targets, **multiply the aggregated baseline for the basin by the basin-wide required reduction percentage**.



Formula (Equations 2 & 4) for company target

$$\frac{\text{Baseline pressure } \mathbf{X} \text{ (100 – \% Required basin wid reduction)}}{100}$$

Setting the Freshwater Quantity target: The Ursus Case

As shown in Table 2 (slide 42), Ursus used results from Equation 1 to **calculate a 75th percentile reduction percentage** and set **Freshwater Quantity targets for the Meuse Basin in Belgium**.

Setting Freshwater Quantity Target using local modeling *(Meuse basin in Belgium)*:

		Required Reduction in Withdrawal (%)											
Direct Operations	Rank	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	…												
	31	0%	0%	0%	0%	0%	0%	5%	20%	**39%**	8%	0%	0%
	40	3%	6%	11%	15%	18%	24%	29%	54%	68%	35%	14%	2%

75th percentile **rank**: 0.75 × (Number of years evaluated + 1) = 0.75 x 41 = **31**

Company target withdrawal:

= [(100-%reduction)/100 x present-day withdrawal

= [(100 – 39)/100] x 0.83 = 0.51 ML/month

Freshwater Quantity Target:

Ursus will reduce its water withdrawals in the Meuse basin to 0.51 ML/month by the year 2030

Most stringent 75th **percentile monthly reduction**

What is needed for validation – water quantity?

Checklist & Considerations

- ✓ **Documentation of stakeholder mapping and engagement** and that local stakeholders agree the model meets the criteria and that they approve its use for target setting
- ✓ **Show that spatial resolution of target is compatible with / consistent** with that of the local model (if using) or Pfafstetter Level 5 (for global model)
- ✓ **Baseline water withdrawals** (direct & upstream) within the spatial scope of the target
- ✓ Demonstrate that the basin-wide reduction percentage was calculated **using the specified approaches for local or global models**
- ✓ **Final company target using Equation 2** and specified according to maximum water extraction in terms of volume of water per time within a specified time frame
- ✓ **Evidence to support the selection of a target timeframe**

Validation Criteria

Model selection process:
Models and thresholds are required to be developed by an authorized basin agency or otherwise, following the criteria in the model selection process laid out in section 3.1.1:

- Are there appropriate local water models and thresholds that, in the opinion of at least three different types of stakeholders, meet most of model criteria?, or
- Does one stakeholder point to appropriate local water models and thresholds, along with supporting evidence that they are protective of nature? Consulting with more than one stakeholder is recommended.

Baseline data:

- Must be aggregated across all company operations, using the last five years (or period of existence, if less than five years) of data.
- Baseline values must be calculated and recorded separately for direct operations and upstream activities.
- Baseline values based on primary data must be calculated and recorded separately from those based on secondary data.

Target timeframe should be based on:

- Alignment with the timeframe of global societal or policy goals (e.g., GBF or UN SDGs)
- Timeframe of local or regional policy or voluntary goals, or documentation on stakeholder engagement or other tangible actions critical for implementing actions to achieve their target.

Setting the Freshwater Quality target: The Ursus Case

As shown before (slide 44), the required reduction percentage for the **Middle San Joaquin** basin is 73% and the baseline pressure is 28,800 kg P/year. **Using the target-setting formula provided by the technical guidance, Ursus was able to calculate its target.**

Setting Freshwater Quality Target using global modeling

(Middle San Joaquin basin in the U.S):

Formula:

Company target =

Baseline pressure **X** (100-Required basin wide reduction) / 100

Ursus FW Quality Target

28,800kg/year

X (100-73) / 100

= 7,800kg P/year

By 2034

Read the full case study here.

What is needed for validation – water quality?

Checklist & Considerations

- ✓ **Documentation that local stakeholders agree the model meets the criteria** and that they approve its use for target setting
- ✓ **Show that spatial resolution of target is compatible with / consistent with that of the local model** (if used) or Pfafstetter Level 6 (global model)
- ✓ **Baseline nutrient loads** provided for each operation (direct & upstream) within the spatial scope of the target
- ✓ **Demonstrate that the basin-wide reduction percentage was calculated using the specified approaches**
- ✓ **Final company target using Equation 4** and specified as a maximum nutrient load in terms of mass of nutrient per year, within a specified time frame
- ✓ **Evidence to support the selection of a target timeframe**

Validation Criteria

Model selection process:
Models and thresholds are required to be developed by an authorized basin agency or otherwise, following the criteria in the model selection process laid out in section 3.1.1:

- Are there appropriate local water models and thresholds that, in the opinion of at least three different types of stakeholders, meet most of model criteria?, or
- Does one stakeholder point to appropriate local water models and thresholds, along with supporting evidence that they are protective of nature? Consulting with more than one stakeholder is recommended.

Baseline data:

- Must be aggregated across all company operations, using the last five years (or period of existence, if less than five years) of data.
- Baseline values must be calculated and recorded separately for direct operations and upstream activities.
- Baseline values based on primary data must be calculated and recorded separately from those based on secondary data.

Target timeframe should be based on:

- Alignment with the timeframe of global societal or policy goals (e.g., GBF or UN SDGs)
- Timeframe of local or regional policy or voluntary goals, or Documentation on stakeholder engagement or other tangible actions critical for implementing action to achieve their target.

Freshwater science-based targets

Freshwater SBTs are basin (location) specific.

Companies will need to set one in each location where they have material impacts.

Company X will reduce its water withdrawals in the _____ basin to ___ ML/year by the year _____.

Company X will reduce its nutrient load in the _____ **basin** to __ kg P or N/year by the year _____ .

Preparing for the target validation process

Checklist & Considerations

WHY IS VALIDATION NEEDED?

- ✓ Safeguard of credibility
- ✓ Standardization
- ✓ Fair comparison

WHAT DOES IT ENTAIL?

- ✓ Independent process and expert review
- ✓ Data confidentiality
- ✓ Limitations to process and difference with audit/ certification
- ✓ Comparison with SBTi process
- ✓ Note: 2 tries included.

HOW TO PREPARE :

- ✓ Apply for validation and be mindful of associated costs
- ✓ Complete submissions forms and supporting data templates
- ✓ Be ready to provide supporting evidence to validators if requested
- ✓ Note on claims guidance
- ✓ Note on required action after targets are validated
- ✓ Note on target validity and recalculation

4. Takeaways and Next Steps

SCIENCE BASED TARGETS NETWORK
GLOBAL COMMONS ALLIANCE

Outcomes of Step 3: Freshwater

Water Quantity Target

Water Quality Target

Outputs:

Companies have science-based reduction baselines to ensure sustainable **water use** and a pathway to avoid the over-extraction or depletion of water resources, which could lead to significant changes in the availability, distribution, or function of freshwater ecosystems.

Companies will have science-based milestones to ensure the protection of water quality and a pathway to avoid the **pollution, contamination and degradation of water resources**, which could lead to significant changes in the health, composition, or function of freshwater ecosystems.

Referral Program Knowledge Test

The Train the Trainer Curriculum will be accessible through SBTN's Partner Portal. Members of the referral program will have to take a knowledge test in order to progress to the next step.

What's next?

This marks the end of our train-the-trainer curriculum. Now that you've learnt how to set science-based targets for land and freshwater, the next step will be to take action to meet these targets.

While detailed guidance on target implementation (Step 4: Act) and measurement (Step 5: Track) are still in development, SBTN has provided a Response Options Database with initial resources for companies to take actions that make a difference for nature on the ground.

As more comprehensive guidance is released in 2025, SBTN will be working on expanding this train-the-training curriculum to ensure a full uptake of our methods!

SBTN's Action Framework (AR3T) provides an initial, general framework for company action

SCIENCE BASED TARGETS NETWORK
GLOBAL COMMONS ALLIANCE