SCIENCE BASED TARGETS NETWORK
GLOBAL COMMONS ALLIANCE

Illustrative case study – Ursus Nourishment

Step 1: Assess

Date last updated: July 2024

STEP
1
ASSESS

Version History

Version	Update description	Release Date	Effective Dates
1.1	Update in alignment with v1.1 of methods	July 2024	July 2024 - indefinite

Contents

This example was initially compiled by Daniela Palma Munguia (Metabolic) and Leen Felix (Metabolic) for Steps 1 & 2. Step 3: Freshwater was written by Naabia Ofosu-Amaah (The Nature Conservancy), with support from Dave Dilks (LimnoTech). Step 3: Land was written by Amelia Meyer (World Wide Fund for Nature), Alessandro Passaro (Systemiq), and Nicole Flores (Conservation International). Richard Waite (World Resources Institute) provided support for the calculation of land and climate pressures. Final writing and editing was done by Samantha McCraine (Science Based Targets Network (SBTN) and Amanda Hyman (SBTN).

Disclaimer: This case study is based on a real company, but uses extrapolated data, anonymizes key features of the corporation, and uses the fictional name of Ursus Nourishment. The complexity of this example may not depict the full complexity of a real company. The information shown in this case is intended to illustrate what the data collection and analysis process looks like for companies. Some of this information will need to be submitted for validation but, per SBTN guidance, does not need to be publicly disclosed. Most data collected for Step 1 and Step 2 will be used to inform corporate decision-making related to the company's target-setting strategy.

This case study is based on v1.1 of the Step 1 and 2 methods, v1.1 of the Step 3 Freshwater methods and v1.0 of the Step 3 Land methods (released in July 2024).

Reading note: In the sections below, "tasks" are specified within each step to highlight what the company does in order to gather and analyze data as it applies the methods. This task language is used in the technical methods, Corporate Manual and in other future resources from SBTN.

Illustrative example overview

Ursus Nourishment is a food and beverage producer. The company specializes in plant-based drinks and food and reaches a global market of consumers, through third-party retailers. Its directly owned and operated manufacturing facilities are clustered in Belgium, France, Germany, Spain, and the United Kingdom. The company performs many activities required for producing and finishing products within its direct operations: crop production, processing of raw commodities, and packaging of finished goods. In addition to these activities, it also has upstream and downstream activities dispersed around the globe. It purchases major commodities including almonds, cocoa, corn/maize, soybeans, and timber (in the form of paperboard), as well as other ingredients, such as sugar (from sugarcane) and additives.

The company has been eager to get started with setting science-based targets for nature. Corporate leadership tasked a small team of people across different departments to trial SBTN's methods.

Step 1a: Materiality Screening

Because targets are fundamentally an impact management tool—either to control "negative" impacts or increase "positive" impacts—the first step in the process to setting science-based targets is understanding what needs to be managed. The Ursus team had done environmental impact assessments in the past, but reviewed the SBTN methods and checked its existing information against the SBTN data requirements.

Task 1: Define your organizational boundary

The Ursus team's first task was to define the scope of the assessment. Using SBTN's Greenhouse Gas Protocol (GHGP)-aligned terminology, this required defining the company's organizational boundary. The organizational boundary established the scope of activities included in the Step 1 materiality screening and value chain assessment, by selecting what was included within the company's direct operations, and therefore what would be included within its upstream. This step was key as it determined the broadest potential scope of activities included in target setting. Ursus had already set targets using the Science Based Targets initiative (SBTi) methods for climate, so the team used the same organizational boundary approach applied for that exercise, which depended on operational control.[1] The company thereby defined its direct operations (or "organization") based on all sites and activities over which it had full operational control.[2] For the v1.1 Step 1 method, the company defined its corresponding upstream activities according to all purchased goods needed to run its direct operations and bring its products to market.

Task 2: Identify your direct operations and upstream activities

For the Step 1a materiality screening, the team used the SBTN Materiality Screening Tool (MST)[3] to quickly gather a holistic view of the company's primary impacts on nature. To use the tool, the team first needed to classify its business activities using the International Standard Industry Classification (ISIC) from the United Nations, which provides the data structure for the SBTN tool. The team decided that three categories summarized the core of the business (direct operations):

- Group 107: Manufacture of other food products
- Group 011: Growing of non-perennial crops
- Group 829: Business support service activities not elsewhere classified (for Class 8292: Packaging).

[1] For this part of the method, companies could alternatively use the "financial control" approach, or the equity control approach, if already using this to set science-based targets for climate or other reporting.

[2] GHGP (2004), Corporate Standard Chapter 3: Setting Organizational Boundaries.

[3] https://sciencebasedtargetsnetwork.org/resources/.

Icons from the Noun Project[4]

Finding the correct ISIC group to describe the company's packaging activities was challenging; it took a while to find the direct operations activity focused on the packaging of products for distribution and sale rather than the generation of packaging materials. To find the right ISIC identifiers to use in the MST, the Ursus team used a keyword search to identify activities in the "ISIC Detail" and "Crosswalk ISIC-NACE-GICS" sheets included in the MST. To check whether the ISIC groups selected adequately described the company's activities, the team then reviewed the ISIC Rev.4 documentation.[5]

To get started with screening its upstream activities, the team reviewed its procurement sheet for high-impact commodities[6], recorded as volumes on raw materials/commodities, as well as ingredients, semi-finished, and finished goods made by processing/transforming of raw commodities. Beyond the volume, the team noted the state of the high-impact commodities: raw, embedded (in the case of commodities included in EUDR), or highly transformed. Gathering this information required some coordination between the company's sustainability, procurement, and finance teams. The team also used the upstream MST to quickly screen for materiality in the company's upstream sourcing by refining the automated suggestion of upstream activities associated with its direct operations activities.

Because SBTN methods only require companies to focus on purchased goods material to the production of goods that they then sell on the market, the team did not include any inputs or activities outside that category, e.g., inputs to capital goods such as machinery used to package goods before distribution, or everyday inputs to office operations (e.g., paper for printing, coffee for worker consumption).

[4] Image credits: "Factory" by DinosoftLabs from [the Noun Project](); "Farm" by Symbolon from the Noun Project; and "Milk" by Hilmy Abiyyu Asad from the Noun Project.

[5] https://unstats.un.org/unsd/classifications/Econ/Download/In%20Text/ISIC_Rev_4_publication_English.pdf.

[6] https://sciencebasedtargetsnetwork.org/resources/.

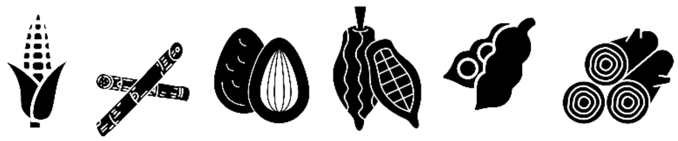
Task 3: Identify high-impact commodities and threatened and trade-regulated species in your activities

When looking at the High-Impact Commodity List (HICL) published by SBTN, [7] Ursus found that six of its core inputs were included in the list:

- Cocoa—imported as both powder and butter
- Corn/maize—imported as oil and syrup
- Soybeans—used for beverages
- Sugarcane—used as a sweetener
- Timber—used for packaging
- Tree nuts (almonds)—used for beverages, desserts, powders, oil, and yogurt.

The team noted that one of the commodities it was sourcing showed up in the HICL twice: once as "Timber," and once as "Pulp, cellulosics, paper, paperboard, cardboard, tissue." Because SBTN methods require tracing high-impact commodities to the highest-impact node per pressure in a commodity's supply chain, this meant that there could be multiple high-impact nodes in a given commodity's supply chain. For processed commodities such as "Pulp, cellulosics, paper, paperboard, cardboard, tissue," the company had to determine whether there were different stages of production, such as processing vs. raw extraction phases, that have the highest level of impact for different material pressures. This means that the company had to list both production stages in its record for validation, and quantify different locations and stages of production for timber and pulp in the Step 1b value chain assessment.

One of these inputs also happened to be commodities the company was not only sourcing, but also growing directly: soybeans.



Icons from the Noun Project[8]

In addition to screening both the company's direct operations and upstream activities for high-impact commodities, the team also checked whether the business involved any species listed as vulnerable by the International Union for Conservation of Nature (IUCN) or listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). In this step (Step 1a), the team prepared an account of all applicable plant and animal species, for which it would provide volumetric and location data in the value chain assessment (Step 1b).

7 https://sciencebasedtargetsnetwork.org/resources/.

8 Image credits: "Cacao" by rdesign from the Noun Project; "Corn" by Nikita Kozin from the Noun Project; "Soybean" by Aficons from the Noun Project; "Sugarcane" by Amethyst Studio from the Noun Project; "Timbers" by Lars Meiertoberens from the Noun Project; and "Almond" by VectorsLab from the Noun Project.

Task 4: Screen for materiality

Using the MST, the Ursus team was then able to define the materiality of each direct operations activity and associated pressures shown in Table 1. In this example, the Ursus team knew that of the four applicable production processes for crop-growing, both the large-scale irrigated crop and the small-scale irrigated crop processes were accurate descriptions of the company's activities. The team recorded its logic for excluding production processes where this was the case for validation.

The tables below summarize Ursus's results for the pressures included in the MST; this included the five pressure categories in focus for the current science-based targets for nature methods, as well as the company's score for Freshwater ecosystem use. All other pressure categories were shown automatically even if they were immaterial for all of the company's activities for validation purposes. If there are no data (ND), the pressure category was not shown. The team noted, however, that ND does not imply immateriality.

Table 1: Snapshot of Ursus Nourishment's results for direct operations using the Materiality Screening Tool to generate sector-level scores. Scores in the tool can range from 3 to 9 in the raw dataset. ND signifies No Data and is recorded for that pressure in the tool, but does not mean that there is not a pressure associated with that activity. In such instances, SBTN recommends companies use alternative sources that meet the SBTN Data and Tool Criteria to assess these potential impacts. All scores are indicative of a typical company in that sector, and may not accurately represent the materiality of a given company's specific activities. For more information on materiality scores, please refer to the "Overview" and "Interpretation guidance" tabs in the SBTN's MST.

		Land/Water/Sea use change				Resource Use		Climate change		Pollution			
		Terrestrial use		Freshwater use		Water use		GHG emissions		Water pollutants		Soil pollutants	
ISIC Group (Alphabetical)	Production process (associated with each 'group')	Indexed pressure score	Materiality rating (0 or 1)	Indexed pressure score	Materiality rating (0 or 1)	Indexed pressure score	Materiality rating (0 or 1)	Indexed pressure score	Materiality rating (0 or 1)	Indexed pressure score	Materiality rating (0 or 1)	Indexed pressure score	Materiality rating (0 or 1)
Business support service activities n.e.c.	Infrastructure holdings	ND	ND	ND	ND	8.0	1	ND	ND	7.0	1	7.0	1
Growing of non-perennial crops	Large-scale irrigated arable crops	9.0	1	9.0	1	9.0	1	ND	ND	8.0	1	7.0	1
	Large-scale rainfed arable crops	9.0	1	ND	ND	ND	ND	ND	ND	7.0	1	7.0	1
	Small-scale irrigated arable crops	9.0	1	8.0	1	8.0	1	ND	ND	7.0	1	6.0	1
	Small-scale rainfed arable crops	9.0	1	ND	ND	ND	ND	ND	ND	6.0	0	6.0	1
Manufacture of other food products	Processed food and drink production	ND	ND	ND	ND	8.0	1	9.0	1	6.0	0	6.0	1

Table 2: Final scores recorded for Ursus based on the Materiality Screening Tool and reinterpretation of production processes to reflect the company's actual operations. Company scores reflect the value given for the applicable production processes for each activity. All cells with red text are over the threshold for materiality in that pressure category (meaning that sector's activities have a highly material contribution to that pressure category). All cells with yellow text are below the threshold for that category. Cells marked "ND" reflect where the tool has insufficient data to provide a materiality score.

		PRESSURE CATEGORY					
		Ecosystem use and use change		Resource use	Climate change	Pollution	
Activities screened	**# of production processes**	**Land use and land use change**	**Freshwater ecosystem use and use change**	**Water use**	**GHG emissions**	**Water pollutants**	**Soil pollutants**
Manufacture of other food products (ISIC Group 107)	1 applicable	ND	ND	8	9	7	7
Growing of non-perennial crops (ISIC Group 011)	2 applicable	9	8.5	8.5	ND	7	6.5
Business support activities (packaging) (ISIC Group 829)	1 applicable	ND	ND	8	9	6	6

The Ursus team then carried out the screening exercise for the company's upstream activities using both the MST and the HICL. The HICL incorporates information from the screening tool, and complements this with insights from additional research.

In its documentation of the method, Ursus recorded both the commodities sourced and the upstream activities associated with them.

Table 3: Materiality screening results for upstream activities, in this case for agricultural crops.

			Ecosystem use and use change				Resource Use		Pollution			
			Land use and land use change		Freshwater ecosystem use and use change		Water use		Water pollutants		Soil pollutants	
Associated commodity	ISIC Group	Production process	Indexed pressure score	Materiality rating	Indexed pressure score	Materiality rating	Indexed pressure score	Materiality rating	Indexed pressure score	Materiality rating	Indexed pressure score	Materiality rating
Cocoa, sugarcane, almonds	Growing of perennial crops	Small-scale irrigated arable crops	9.0	1	8.0	1	8.0	1	7.0	1	6.0	1
Corn, soybeans	Growing of non-perennial crops	Large-scale irrigated arable crops	9.0	1	9.0	1	9.0	1	8.0	1	7.0	1

Table 4: Materiality of key commodities, based on SBTN's High Impact Commodity List.

An "X" signifies sufficient evidence to indicate materiality of that pressure in the processing or initial production stage for that commodity.

	PRESSURE CATEGORIES				
Commodity	Land use and land use change	Water use	Climate change	Soil pollutants	Water pollutants
Cocoa	x	x	x	x	x
Maize/corn	x	x	x	x	x
Paperboard, cardboard		x	x	x	x
Soybeans	x	x	x	x	x
Sugarcane	x	x	x	x	x
Timber	x	x	x	x	x
Tree nuts (almonds)	x	x	x	x	x

*As above, because the company is sourcing paperboard, it also includes timber in its record of high-impact commodities. It knows that for that commodity, the material pressures are not only those listed for paperboard itself (which reflect the processes associated with pulp and paper processing), but also those pressures listed for timber (which reflects the process of cultivating and harvesting timber for commercial use).

Based on this initial screening of both value chain segments using SBTN tools, the Ursus team determined that the following pressures had to be included in its value chain assessment (Step 1b), for upstream and direct operations:

- Land use and land use change
- Water use
- Other resource use[9]
- Climate change
- Soil pollution
- Freshwater pollution.

Task 5: Refine the results to reflect your company's activities

Because the team found that the results of the MST and HICL broadly corresponded to what it expected to find for materiality of the company's activities, it decided to skip the optional refinement step before moving on to the value chain assessment.[10]

[9] Companies are not required to provide metrics on resource use in Step 1, other than reporting against the use of species listed by IUCN and CITES, as noted above.

[10] If the company had found a need to revise its expected materiality values, it would have needed to provide evidence from research conducted on the company's operations or from an alternative study on typical companies in its sector. The preference is for evidence that has been peer-reviewed.

Step 1b: Value Chain Assessment

Task 6: Select business units for target setting

Although the SBTN methods include an option for starting target setting by focusing on just one business unit, the Ursus team chose not to use this. Instead, it chose to tackle all activities associated with the company's organizational boundary (direct operations and upstream) in its initial value chain assessment.

Task 7: Identify volumes and locations in your operations

The Ursus team began its value chain assessment by collecting data for the company's full direct operations (all directly owned and operated sites and activities associated with crop production, manufacturing, and packaging) and the upstream value chains for the purchased commodities identified in the HICL.

For direct operations, the team knew that it needed to provide estimates for 100% of the activities. To begin this, the team compiled a list of operational sites associated with different activities and specific locations (see Table 5). While collecting this information on direct operations, the team was able to gather primary data on water use and GHG emissions per production facility by using its existing environmental management system, which tracked those metrics for compliance with regulation and corporate goals on water and climate. Land use measures were gathered by the sustainability team through questionnaires to the facility managers to provide the size of the company's factories, farms, and surrounding land included in the estimate as an environmental buffer. All direct operations data were available for the previous year (2022) and the data recorded were intended to reflect the company's pressures for that full year (i.e., 12 months). Looking ahead at the value chain assessment method as well as the methods for Step 2 and Step 3, the team took the time to record the basins and ecoregions in which Ursus was operating, knowing these data would be needed. To identify the basins and ecoregions, the team used the tools used to complete the state of nature assessment: the SBTN Unified Water Layers[11] and the Resolve database.[12]

For the company's upstream, the team knew that it needed to provide estimates for at least 67% of the activities, including at least 90% of the high-impact commodities and 100% of volumes of commodities that fall under EU Deforestation Regulation. To do this, the team compiled a list of commodities, associated volume, and respective sourcing locations (see Table 6). To ensure it linked its pressure estimates to the right locations, the team first consulted its procurement sheets to see from where these commodities were grown,[13] and then did a quick review of the scientific literature and databases[14] focused on the high-impact commodities to ensure that sourcing was indeed the highest impact node[15] for all pressures

[11] SBTN State of Nature Water Layers (2023).

[12] Resolve (2017), Ecoregions.

[13] Because SBTN Step 3 methods are place-based, companies are required to be certain of the locations where they are operating and generating upstream impacts before using these methods. Uncertainty about locations can otherwise lead companies to investing in and setting targets in the wrong locations.

[14] For instance, the Water Footprint Network's product database: https://www.waterfootprint.org/resources/interactive-tools/product-gallery/.

[15] SBTN Step 1 guidance requires that companies use the location associated with their highest impacts

in its upstream value chains. The team was able to confirm this to be the case for all commodities and pressures other than the production of paperboard/cardboard from timber, which entailed additional significant water pollution impacts beyond the production of timber. The team was able to pinpoint locations based on supplier information in most instances, and where this was not available, it selected countries to include in the assessment that were the most likely origin sites for the commodities purchased (based on economic trade data).[16] At this point, the team recorded which locations it was certain of and those that required confirmation by direct suppliers.

Because of previous work done on its supply chains, the team was also able to record estimates for three of the key pressures requiring assessment—land use, land use change, and water use—for most of its high-impact commodity supply chains. As done for its direct operations, each of the values recorded reflected the pressures generated at that location during a full year. To ensure consistency and comparability among its data, the team only took data from the previous year (2022, 12 months inclusive).[17] For this part of the Step 1 method, Ursus recorded the volume of its purchased goods, the high-impact commodity used to produce that product, and then estimated the raw metric tons for the commodity in cases where the raw production phase was the activity of highest impact (e.g., for paperboard, it recorded the metric tons both for timber and paperboard, because both nodes of the supply chain appear on the HICL; for sugarcane and granulated sugar, it recorded its volumes for sugar as a basis of back-calculation to sugarcane, but noted it would not use the purchased sugar volumes for any further parts of the method).

for each pressure to estimate impacts to nature. For many commodities, this can be assumed to be the raw production or extraction phase. For other commodities, this may be a later value chain stage, such as processing and transformation into a refined or finished good. When companies have multiple high-impact nodes, they must estimate pressures and provide locations for each of these.

[16] In this case, the company used the statistical database of the Food and Agriculture Organization (FAOSTAT).

[17] Note that accounting for land use change requires a separate time period. See description below.

Table 5: Direct operations data collected by Ursus Nourishment to use in the value chain pressure assessment.

			GEOGRAPHIC LOCATION		
	Operational site	**List of activities occurring at each site**	**Country**	**Basin**	**Ecoregion**
Direct operations	Facility #1	Manufacture of products; packaging	Belgium	*Meuse basin*	*Western European broadleaf forests* *(Ecoregion 686)*
	Facility #2	Manufacture of products; packaging	France	*Seine basin*	*European Atlantic mixed forests (Ecoregion 664)*
	Facility #3	Manufacture of products	United Kingdom	*North West basin*	*Celtic broadleaf forests (Ecoregion 651)*
	Facility #4	Manufacture of products	Spain	*Tajo basin*	*Iberian sclerophyllous and semi-deciduous forests (Ecoregion 793)*
	Farm #1	Growing of non-perennial crops	Germany	*Rhine basin*	*Western European broadleaf forests (Ecoregion 686)*

Table 6: Upstream data collected by Ursus Nourishment to use in the value chain pressure assessment.

	Commodity	Quantity sourced (metric tons)	Sourcing location	Supply chain nodes to include in assessment	Certainty of activity location
Upstream	Cocoa	4,500	Côte d'Ivoire, Ecuador, Ghana	Raw production	Sourcing countries known and verified
	Corn/ maize	30,000	United States	Raw production	Sourcing countries known and verified
	Soybeans	45,000	Argentina, Brazil, India	Raw production	Sourcing countries known and verified
	Sugarcane	10,000	Brazil, India	Raw production	Sourcing countries known and verified
	Timber/ paperboard	28,000 (timber) 17,500 (paperboard)	Brazil, Canada, United States (raw production—timber); United States (processing / transformation—paperboard)	Raw production (timber) and processing/ transformation (paperboard)	Sourcing countries (raw production of timber) unknown; estimated through EXIOBASE. Direct source (processing/transformation of paperboard from pulp) known through procurement relationships
	Tree nuts (almonds)	48,000	Côte d'Ivoire, India, Spain, United States	Raw production	Sourcing countries known and verified

*Sourcing locations and quantity sourced (in volume) are taken from the same year. As described above, volumes recorded are reflective of the volume of the goods purchased directly by Ursus, rather than the raw commodity required to create the purchased input.

**Supply chain nodes in focus based on SBTN's HICL and literature review.

In terms of upstream data availability, Ursus is a somewhat unique case. Because of the work the company has previously done on traceability, the team conducting this assessment was able to match most commodities with known sourcing locations, provided either by the procurement team, or by the company's upstream suppliers (e.g., "first point" aggregators, such as mills, and more distal aggregators, such as exporters). The team was therefore able to use an approach that mixed supplier-specific information and average data from global datasets.[18]

Task 8: Quantify the environmental pressures of your activities

After compiling these data points, the team discussed best methods for estimating the remaining pressures. To fill in gaps for Ursus's direct operations and upstream activities, the team used a mix of resources:

- FAOSTAT and US Environmentally Extended Input Output database for land use/land use change,[19]
- Poore and Nemecek, 2018[20] for climate,
- Mekonnen & Hoekstra, 2012 and other US facilities' data[21] for water use and water pollution for all agricultural commodities, and
- Schyns et al., 2017[22] for water pressures from timber.

All of the water use values were based on country-specific factors. The final output was estimates per pressure category for the commodities (upstream) as well as facilities (direct operations). Tables 7 and 8 present the results per value chain segment.[23, 24]

For some of the upstream pressures, the team used information about one pressure to calculate another. For instance, water use and water pollution (nutrients) pressures were based on the amount and area of crop production in a given location. In this way, the company's estimates of its land use pressure informed the calculation of its pollution pressure. Volumes were the key input to calculate land use change and water use.

A few notes on the Ursus team's calculation approach:

- Not all of the resources that the team used for upstream gave pressure estimates specific to given locations—instead they gave the team figures that reflected the

18 This aligns with the "hybrid approach" to upstream impact calculation in the GHGP Scope 3 standard for Category 1: Purchased goods and services. See https://ghgprotocol.org/sites/default/files/2022-12/Chapter1.pdf.

19 FAOSTAT, Crops and livestock products (Accessed: August 2023).US Environmentally Extended Input Output database: https://www.epa.gov/land-research/us-environmentally-extended-input-output-useeio-technical-content

20 Poore & Nemecek (2018), Reducing food's environmental impacts through producers and consumers.

21 Mekonnen & Hoekstra (2010), The green, blue and grey water footprint of farm animals and animal products, see Appendix II. For tree nut calculations, impact values used to estimate pressures were for almonds. For packaging materials: https://www.graphicpkg.com/documents/2020/11/life-cycle-assessment-2020.pdf/

22 Schyns, Booij, & Hoekstra (2017). The water footprint of wood for lumber, pulp, paper, fuel and firewood.

23 After Step 1a, companies should begin to use resources from the GHGP and SBTi to manage climate impacts associated with their activities. For this example, climate data are included to give readers an idea of how to approach data collection to enable gathering and ordering of data for all material pressures and locations.

24 Note that soil pollution—though indicated as material in Step 1a—is excluded from the remainder of this illustrative example for simplicity.

global average impact of that commodity's production (e.g., for water pollution).

- To simplify estimation of upstream impacts, the team used raw tonnage (even when the company purchased a processed version, e.g., for cocoa and timber),[25] rather than attempting to break down the splits in by-products and co-products to calculate impact, because the impacts of processing did not exceed raw extraction phases.
- For whole commodities sourced, such as soybeans, the volume sourced and location of origin were sufficient to quantify the remaining pressures. These upstream estimates were therefore calculated on a unit per unit basis. Changes in the quantity sourced (in metric tons), as well as the locations associated with volume sourced, could change the estimated pressure total for a given category.
- For timber, the team researched sources for approximating metric tons of timber required to produce the amount of paperboard purchased, and used this as its approximated raw volumes.[26]
- For upstream economic activities requiring modeled pressure estimates (rather than primary data) companies may use commodity volumes to estimate relevant pressures for land and freshwater systems (e.g., using life cycle assessment approaches). In some cases, companies may be able to introduce additional data such as location and production approaches to improve modeled estimates.

The data in the tables are *illustrative values* for a one-year period (12 months inclusive).[27] Following the SBTN Step 1 Technical Guidance, the Ursus team knew that the data *must* retain links between unique sites, activities, and locations, and provide estimates for each pressure, but that it could structure the data in a way that made most sense for the company.

After this point in the method, companies should pair upstream pressure data with locations associated with the production stages of highest impact for high-impact commodities (e.g., land use for paperboard must be estimated for the timber production phase).

Additionally, the company needed to include its data on species as part of its validation submission for Step 1. For both direct operations and upstream activities, the team recorded whether any IUCN-threatened or CITES-listed species were used or exploited in any way. For all such species, the team should record the species' scientific name, threat status (IUCN and CITES), sourcing quantity, and location. This information on use of species (as a form of "other resource use") will be provided to SBTN validators as part of the requirements in Step 1.

When the company reviewed it procurement, it did not find any species listed on the IUCN threatened list nor CITES Appendix II or III[28].

---

[25] Note for readers: companies applying the methods can use resources from the Food and Agriculture Organization or life cycle inventory databases such as ecoinvent to gather impact factors specified for by-products and co-products of given commodities and economic processes.

[26] In this case, the team used figures from the US-based Sierra Club, given this is where it was sourcing from.

[27] This period applies to all indicators other than land use change, which was calculated using a five-year period. This is consistent with the Step 3: Land guidance on calculating conversion baseline values, which requires companies to use a date of 2020 or earlier when accounting for land use change (SBTN 2023, Step 3: Measure, Set, Disclose - Land, page 32). Note that for SBTi Land targets, companies are required to use a period of 20 years or greater (WRI and WBCSD, 2022; GHG Protocol Land Sector and Removals Guidance: Draft for Pilot Testing and Review, Chapter 7).

[28] CITES Appendices (Accessed: October 2023).

Table 7: Illustrative data for Ursus case—Direct operations' pressure estimates.

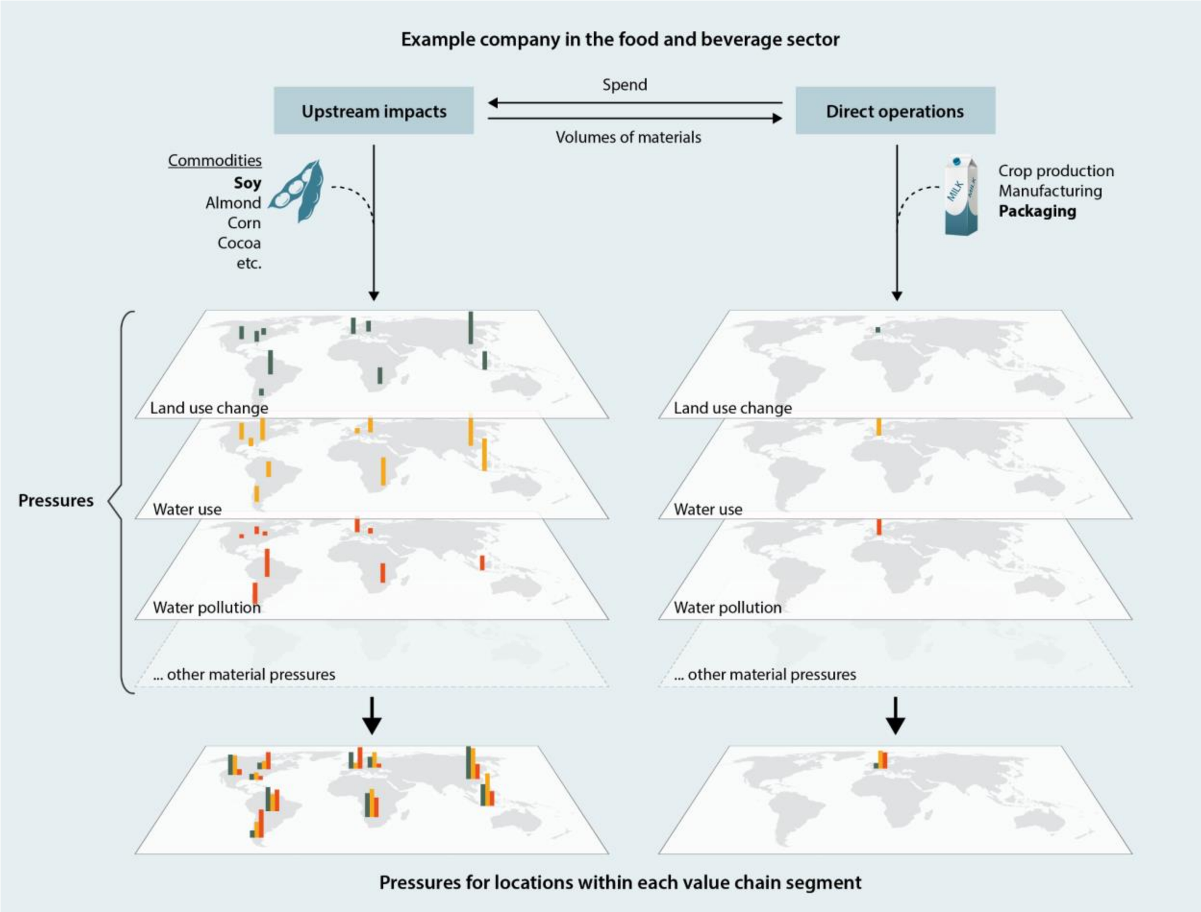
	Site ID	Activities at site	Location	Land use (km^2)	Land use change (km^2)	Water use (m^3)	Climate change (tCO_2)	Water pollution (kg P)[29]
Direct operations	DO #1	Manufacture of other food products; packaging	Belgium	5	0	10,000	6,000 *industrial emissions*	5,000
	DO #2	Manufacture of other food products; packaging	France	5.5	2	7,000	3,000 *industrial emissions*	1,150
	DO #3	Manufacture of other food products n.e.c.	United Kingdom	3	0	3,000	2,800 *industrial emissions*	2,000
	DO #4	Manufacture of other food products n.e.c.	Spain	4	0	2,500	4,200 *industrial emissions*	1,600
	DO #5	Growing of non-perennials (soybeans)	Germany	45	23	10,000	8,000 *LULUC emissions*	12,000

[29] Note that following the Step 1 guidance, companies can estimate pollution as kg N, P eq; total or concentration (%) in discharged water (and volume of these discharges). For this case study, estimates are given of kg P per activity.

Table 8: Illustrative data for Ursus case—Upstream pressure estimates.

	Commodity	Quantity sourced (metric tons)	Sourcing location	Land use (km^2)	Land use change (km^2)	Water use (m^3)	Climate change (tCO_2-eq) *All are from LULUC unless specified*	Water pollution (kg P)
Upstream	Cocoa	1,500	Côte d'Ivoire	29	1	6,000	15,690	11,600
		1,000	Ecuador	18	0.24	4,000	5,560	7,200
		2,000	Ghana	35	0.38	8,000	20,290	14,000
	Corn/maize	30,000	United States	27	0.38	1,890,000	29,100	10,800
	Paperboard *(pressure estimates do not include timber production, which is recorded separately below)*	17,500	United States	4	0	154,000	23,931	299
	Soybeans	10,000	Argentina	36	4	50,000	18,400	14,400
		25,000	Brazil	73	5	25,000	46,000	29,200
		10,000	India	96	3	230,000	28,700	38,400
	Sugarcane	5,000	Brazil	0.80	0.03	85,000	10,000	400
		5,000	India	0.87	0.01	620,000	10,000	400
	Timber *(all volumes purchased are used for paperboard, recorded above)*	*28,000 (split unknown—allocations reflect company's best guess)*	Brazil, Canada, United States	197	0.01	1,500,000	235	43.75
	Tree nuts (almonds)	5,000	Côte d'Ivoire	118	24.4	9,539,922	100,000	35,400
		18,000	India	283	19.15	34,343,718	362,400	75,360
		15,000	Spain	218	7.37	15,000,000	181,500	65,640
		10,000	United States	29	0.79	20,380,000	429,000	17,700

Figure 1: Spatial representation of the company's pressure data after using estimation tools. Figure 1 shows how companies generate estimates for each material pressure using information on their different activities (direct operations) and the commodities they source (upstream). The activity and commodity (in bold) are intended to show that the estimates generated should correspond to each aspect of the business included in the scope of the assessment. Companies generate pressure estimates specific to each activity and commodity.



Task 9: Assess the state of nature in each geographic location

For the ***state of nature assessment***, the Ursus team used the data on activities and locations collected for the pressure assessment and extracted the list of locations for use in spatial tools. Before beginning this part of the method, the team brought in support from a consultancy with spatial data expertise to assist in gathering the data and interpreting the datasets.

The team began connecting the company's material pressures to state of nature (SoN) indicators,[30] working on one pressure at a time and covering all locations for that pressure at once. This approach fitted the methods (which require pressure-specific analysis), and the limitations of the tools the company used (each of which covered just one pressure-sensitive state indicator recommended by SBTN). When selecting datasets for use, the team

[30] See section 3.6 of the Step 1 Technical Guidance for details on how to connect pressure and state indicators.

tried to give priority to those with the most recent data (and therefore best temporal alignment with its pressure data). Once all tools were selected, the team then needed to ensure that it used the same logic to interpret the values (i.e., that all data across indicators had the same directionality and, in turn, could be interpreted as low values = action less urgent, lower priority, whereas high values = action more urgent, higher priority).

The team used the percentage of the landscape that remained intact[31] as the pressure-sensitive state indicator, SoN_P, linked to land use change (conversion)[32] and the Ecoregion Integrity Index as the SoN_P linked to land use.[33] For water, the team used the unified water availability layer required by SBTN as the SoN_P linked to water withdrawals, and the unified water pollution layer required by SBTN as the SoN_P for water pollution.[34]

For the required biodiversity metric, SoN_B, the team used the $STAR_{(T)}$ layer within the Integrated Biodiversity Assessment Tool (IBAT) to assess species extinction risk.[35] As the team selected tools, it was careful to verify that each layer used to assess the state of nature was capturing the current state or changes in state, and not pressures or some combination of pressures and states.

For each dataset, values were taken for the most granular scale possible, depending on their starting data for that activity. As an example, for land use the team aggregated or summarized values (i.e., took the mean, median, or other appropriate summary statistic) from a given ecoregion when locations were known. The team used summary statistics for ecoregions in this case to give the most accurate representation of the current state of nature. For timber, because the sub-national origin was unknown, the team used country-level averages for the expected sourcing locations.

Using these resources, the company generated SoN estimates for each of the locations associated with its direct operations and upstream value chains.

- **Land use:** To use the Ecoregion Integrity Index to gather state data,[36] and also provide a bit more information to use for Step 2, the team conducted a rapid review of likely sourcing regions (for the company's upstream activities) within each of the countries where it knew its goods to be derived and used these to select appropriate locations within the index. Once the team had this information, it was then ready to match the ecoregions in which it knew it was operating (direct operations) and its assumed sourcing activities (upstream) to the unique ecoregion ID used in the Ecoregion Integrity Index. To do this, the team consulted the map of ecoregions provided by Resolve.[37] To use the Ecoregion Integrity Index, the team had to rescale

[31] Defined as the percentage of land that is not cropland or built-up/urban. To use these data, the team used the statistical software R, specifically MODIS::runGdal. Access data here: https://modis.gsfc.nasa.gov/data/dataprod/mod12.php.

[32] To extract these data, the team used the Global Forest Watch tool from WRI. Access the tool here: https://www.globalforestwatch.org/.

[33] To extract these data, the team used Intactness Ecoregion metrics. Access the data here: https://espace.library.uq.edu.au/view/UQ:f51cace.

[34] To combine the data layers required by SBTN with ease, the team used the new tool created by SBTN that summarizes the layers and allows for rapid identification of summary value to use for either state variable. Access the tool here: https://www.arcgis.com/apps/webappviewer/index.html?id=99f1db636a7843e48044216068e1ff32&extent=-20208273.3369%2C-8958553.5361%2C21530013.0842%2C11333337.2369%2C102100.

[35] To extract these data on species threats, the company used the Integrated Biodiversity Assessment Tool. Access the tool here: https://www.ibat-alliance.org/star.

[36] Beyer et al., (2019). Global assessment of ecoregion intactness. The University of Queensland. Data Collection. https://doi.org/10.14264/uql.2019.773.

[37] Ecoregions, 2017. https://ecoregions.appspot.com/. The Resolve map was published in 2017, but

the data such that the least-intact landscapes had higher values so that the logic of interpretation was consistent with the other SoN tools. To do this, it subtracted the index value for each location from 1, such that 0 = a landscape with full integrity and 1 = a landscape that was fully degraded.

- **Land use change:** To estimate the SoN_P for land use change, the team similarly aggregated scores by ecoregion where specific basins or locations were known. It then looked at changes in land use cover in each ecoregion for the most recent year with available data; in this example, the team used land cover data from 2021. For the percentage of the landscape that was not intact, the team calculated the percentage of land that was cropland or built-up/urban.
- **Water use and water pollution:** For the Unified Water Layers Tool, the team took average values for the set of basins used in the tool that matched the level of granularity it had on hand. For the UK North West basin where the company operates, the team took the average value of all the smaller basins shown in the tool. For upstream locations, the team took the average value for all basins in that country for its upstream estimates. This process was repeated for each SoN_P category (water use/water availability and water pollution). For upstream, this basin information matched the sourcing region research that the team conducted for land.
- **Biodiversity:** For the $STAR_{(T)}$ dataset, the team took the median score of all species $STAR_{(T)}$ scores within each country to determine upstream states.

uses data from 2009.

Figure 2: Snapshot of SBTN's Unified Water Layers Tool as used by Ursus. Filters shown for water availability (SoNP associated with water use).

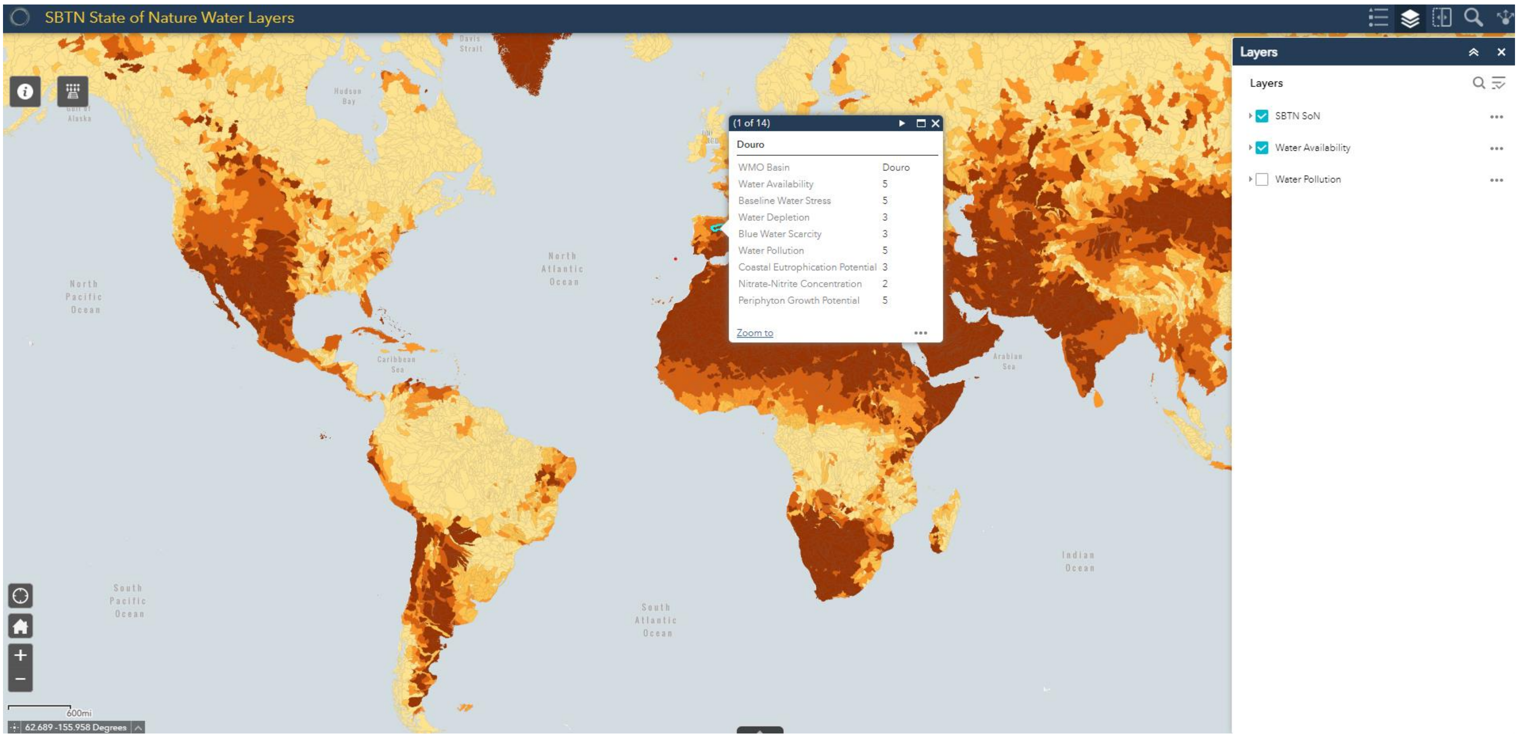
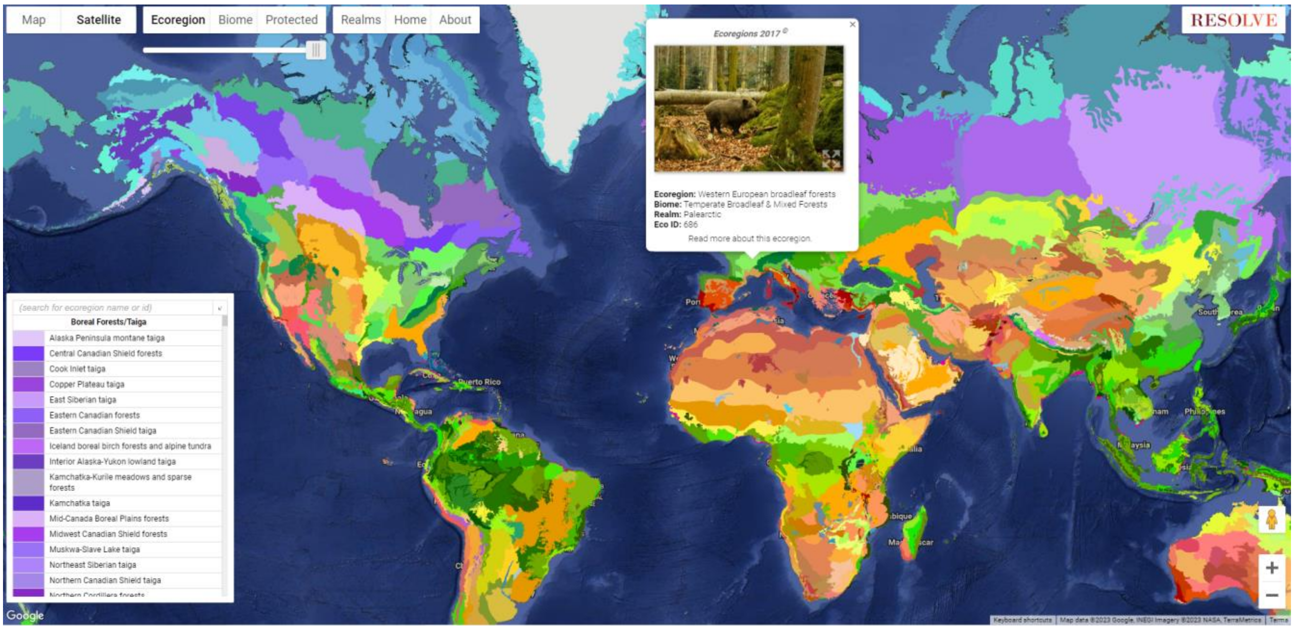


Figure 3: Snapshot of the Ecoregions 2017 database. This tool was used to extract information about which ecoregions Ursus was operating within, and was then plugged into the Ecoregion Integrity Index to gather values for land use SoN_P.



For the water tools, the team found it more appropriate to use average values because the categorical scores in those tools provide a certain degree of uniformity in the distribution of values. For the STAR dataset, however, there is a skewed distribution that is better described through a median value. This reinterpretation of the tools' outputs was necessary in order for the company to match the state data with its existing pressure data for upstream(i.e., to enable "spatial harmonization" of its data).[38]

Note on alignment with the Taskforce on Nature-related Financial Disclosures (TNFD): TNFD recommendations refer companies to guidance on biomes to understand the materiality of their activities. If companies gather ecoregion information as done in this example, they can easily map these ecoregions to biomes as classified in the additional guidance from TNFD.[39] Biome information is provided alongside ecoregion classifications in the Ecoregions appspot tool provided by Resolve, as cited above.

[38] This process can be referred to as "harmonization" of scales between pressure and state data. Further detail on this can be found in section 3.6 of the Step 1 method. https://sciencebasedtargetsnetwork.org/wp-content/uploads/2023/05/Technical-Guidance-2023-Step1-Assess-v1.pdf.

[39] TNFD, 2023. Guidance on biomes.

Table 9: State of Nature assessment results for direct operations. Note that the data in the tables are *illustrative values* for a one-year period (12 months inclusive),[40] though state of nature data often reflect multiple years in their estimate (see the SBTN Data and Tool Criteria).

	BASIC INFORMATION			SON_P				SON_B
	Site code	**Activities occurring at location**	**Location[41]**	**Ecoregion integrity[42] (land use)**	**Percentage of landscape not intact[43] (land use change)**	**Water availability[44] (water use)**	**Water pollution[45] (water pollutants)**	**Species [45] $STAR_{(T)}$**
Direct operations	DO #1	Manufacture of products; packaging	Belgium: *Meuse basin,* *Ecoregion: Western European broadleaf forests (686)*	0.980	31.77	4	5	11.78
	DO #2	Manufacture of products; packaging	France: *Seine basin,* *Ecoregion: European Atlantic mixed forests (664)*	0.988	49.35	4	5	24.13
	DO #3	Manufacture of products	United Kingdom: *North West basin,* *Ecoregion: Celtic broadleaf forests (651)*	0.985	19.68	2.5	5	2.56
	DO #4	Manufacture of products	Spain: *Tajo basin,* *Ecoregion: Iberian sclerophyllous and semi-deciduous forests (793)*	0.941	34.70	4.5	5	18.9
	DO #5	Growing of crops	Germany: *Rhine basin,* *Ecoregion: Western European broadleaf forests (686)*	0.980	31.77	3	4	22.67

[40] For the estimation of state values, years of assessment are pertinent for upstream in particular, as locations sourced from may vary on an annual basis.
[41] Ecoregion codes taken from Resolve.
[42] Values for the dataset range from 0.0 (full integrity) to 1.0 (fully degraded). The team recorded values for the sites using at least three digits. This was done to ensure that it had values that would support prioritization in Step 2. In this interpretation of the dataset, lower values indicate less urgency of action and a better state of nature. Higher values indicate a higher urgency of action.
[43] Values range from 0–100%, accounting for the percentage of the landscape that is built-up, cropland, or urban land (i.e., converted from natural). In this interpretation of the dataset, lower values indicate less urgency of action and a better state of nature. Higher values indicate a higher urgency of action.
[44] Values are categorical and range from (1) to (5). Lower values indicate less urgency of action. Higher values indicate a higher urgency of action.
[45] See more on STAR on the IBAT website.

Table 10: State of Nature assessment results for upstream. Interpretation guidance is provided in the footnotes for Table 9, above. Values are calculated for the locations associated with timber so that these can be used to prioritize traceability efforts; see more on this in Step 2a.

	BASIC INFORMATION			SON_P				SON_B
	Commodity	**Quantity sourced (metric tons)**	**Sourcing location**	**Ecosystem integrity (land use)**	**Percentage of landscape not intact (2021) (land use change)**	**Water availability (water use)**	**Water pollution (water pollutants)**	**Species $STAR_{(T)}$**
Upstream	Cocoa	*1,500*	Côte d'Ivoire *Africa, West Coast basin* *Ecoregion: Eastern Guinean forests (11)*	0.953	2.24	1	2.5	836.54
		1,000	Ecuador *Babahoyo basin* *Ecoregion: Western Ecuador moist forests (516)*	0.948	5.11	1.5	3	720.14
		2,000	Ghana *Africa, West Coast basin* *Ecoregion: Eastern Guinean forests (11)*	0.953	2.24	1.5	2.5	600.36
	Corn/ maize	*30,000*	United States *Upper Mississippi basin* *Ecoregion: Central Tallgrass prairie (388)*	0.894	78.26	3.5	4.5	1035.98
	Paperboard	*28,000*	United States *Lower Mississippi basin* *Ecoregion: Interior Plateau US Hardwood Forests (336)*	0.677	11.63	3.5	4	1035.98

Commodity	Quantity sourced (metric tons)	Sourcing location	**Ecosystem integrity** (land use)	**Percentage of landscape not intact (2021)** (land use change)	**Water availability** (water use)	**Water pollution** (water pollutants)	Species STAR(T)
Soybeans	*10,000*	Argentina *Negro basin* *Ecoregion: Humid Pampas (576)*	0.942	49.45	3	4	860.33
	25,000	Brazil *Tocantins basin* *Ecoregion: Cerrado (567)*	0.813	10.18	2	3	1405.56
	10,000	India *Ganges—Brahmaputra basin* *Ecoregion: Narmada Valley dry deciduous forests (296)*	0.998	80.12	5	3.5	1259.47
Sugarcane	*5,000*	Brazil	0.934	10.66	1	2.5	897.62
	5,000	India	0.999	95.25	1	3.5	637.28
Timber	*28,000 (split unknown)*	Brazil	0.597	9.0	2	3	1405.56
		Canada	0.246	2.62	1	2	940.89
		United States	0.677	12.95	3.5	4	1035.98

	Commodity	Quantity sourced (metric tons)	Sourcing location	Ecosystem integrity (land use)	Percentage of landscape not intact (2021) (land use change)	Water availability (water use)	Water pollution (water pollutants)	Species STAR(T)
	Tree nuts	*5,000*	Côte d'Ivoire *Africa, West Coast basin* *Ecoregion: Eastern Guinean forests (11)*	0.953	2.24	1	2.5	836.54
		18,000	India *Ganges—Brahmaputra basin* *Ecoregion: Narmada Valley dry deciduous forests (296)*	0.998	80.12	5	3.5	1259.47
		15,000	Spain *Segura basin* *Ecoregion: Northeast Spain and Southern France Mediterranean forests (799)*	0.928	13.08	4.5	5	18.9
		10,000	United States *Middle San Joaquin basin* *Ecoregion: California Central Valley grasslands (385)*	0.676	69.23	3.5	4.5	1035.98

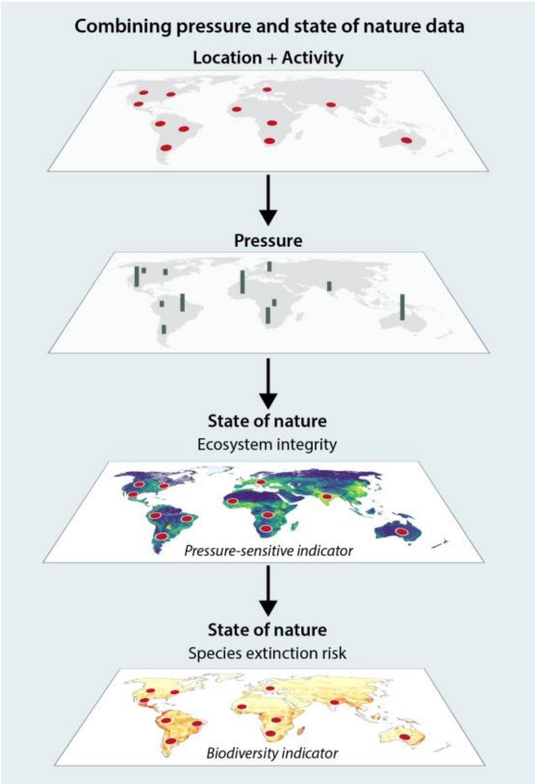


Figure 4: Compiling spatial data to contextualize information on pressures.

Figure 4 depicts a simplified process of taking locations identified in the pressure assessment and generating information on the state of nature for the indicators required by the SBTN method. The first map layer shows the locations of Ursus's activities around the world (upstream and direct operations) with red dots. The second layer shows the quantitative estimates of the company's pressures in these locations as bars. The third layer shows these pressures in the locations where they occur, within the content of a state of nature variable that is sensitive to those pressures (SoN_P). The fourth layer shows these pressures in the locations where they occur within the context of a state of nature variable that captures elements of biodiversity (SoN_B). Note that the state of nature layers included in the graphic are examples, and not the only way of applying the SBTN guidance.

After compiling these data on states, in addition to the data on pressures, the Ursus team now has a good idea of the relative contributions of the company's different activities toward the different areas on which it will set targets, as well as the relative health of nature in the places where it has impacts. To focus on the locations that are most important to act in for each pressure, the team will use the method for the next step of the target-setting process, Step 2: Interpret & Prioritize.

SCIENCE BASED TARGETS NETWORK
GLOBAL COMMONS ALLIANCE