

WP1 | R potential, waste generation and waste management of outdoor products in the Alpine region (D1.3.1)

MAPPING THE STATE OF ALPINE SOLUTIONS FOR CIRCULAR PRODUCTS

PART 5

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1 Introduction

The Outdoor Consumer Report 2021 across 19 European countries finds that 81% of respondents engaged in at least one outdoor activity in the past 12 months, with hiking, running, and cycling among the most common activities. Additionally, 55% purchased at least one outdoor product during that period, most frequently apparel (38%), footwear (37%), and equipment (12%). (Deloitte & Outdoor by ISPO, 2021)

At the same time, the Alpine region is home to well-known outdoor brands (Table 1). These brands develop and sell footwear, equipment, and apparel for all kinds of outdoor activities (e.g. biking, hiking, running).

Table 1: Examples of outdoor companies and their brands in the Alpine region - sorted alphabetically

Company	Brand (s)	Headquarter	Type of products	Outdoor sports	Link
Calzaturificio S.C.A.R.P.A. S.P.A	Scarpa	Asolo, Italy	Footwear	Hiking, trail running, climbing, ski touring, lifestyle	www.scarpa.com
Fischer Sports GmbH	Fischer, Löffler	Ried im Innkreis, Austria	apparel, footwear, equipment	Skiing, ski touring, Nordic walking, cross country skiing, running, biking	www.loeffler.at www.fischersports.com
Maloja Clothing GmbH	maloja	Rimsting, Germany	Apparel	Biking, running, cross country skiing, skiing, ski touring	www.maloja.com
Mammut Sports Group AG	Mammut	Seon, Switzerland	apparel, footwear, equipment	Hiking, climbing, trail running, lifestyle, biking	www.mammut.com
Martini Sportswear GmbH	Martini Sportswear	Annaberg, Austria	Apparel	Ski touring, cross country skiing, hiking, biking, (trail) running	www.martini-sportswear.com
Oberalp AG	Salewa, Dynafit, Pomoca, Wild	Bolzano, Italy	apparel, footwear, equipment	Hiking, ski touring, lifestyle, biking, trail	www.oberalp.com

	Country, Evolv, LaMunt			running, climbing	
SAS Picture Organic Clothing	Picture	Cebazat, France	apparel, equipment	Ski & snowboard, hiking, lifestyle, surfing, mountain biking	www.picture-organic-clothing.com
Schöffel Sportbekleidung GmbH	Schöffel	Schwabmünchen, Germany	apparel	Hiking, biking, lifestyle, skiing, ski touring	www.schoeffel.com
Schwanhäuser Industrie Holding GMBH & CO. KG	Deuter, Ortovox, Maier Sports, Gonso	Heroldsberg, Germany	Apparel, equipment	Hiking, Biking, Ski touring, skiing, climbing, camping, lifestyle	www.schwanstabilo.com
VAUDE Sport GmbH & Co. KG	VAUDE	Tettnang, Germany	apparel, footwear, equipment	Biking, hiking, ski touring, camping, lifestyle	www.vaude.com

Outdoor products are mainly composed of various types of plastic and textiles. Due to the concentration of outdoor manufacturers and the use of such products in the Alpine region, establishing a circular economy for such products is a high priority. This is particularly important in terms of reducing greenhouse gas emissions and resource consumption. So-called R strategies are often used to implement a circular economy and to put appropriate measures in place:

- R0 Refuse
- R1 Rethink
- R2 Reduce
- R3 Reuse
- R4 Repair
- R5 Refurbish
- R6 Remanufacture
- R7 Repurpose
- R8 Recycle
- R9 Recover

The ASTER project seeks to analyse and highlight effective strategies to enhance the circularity of outdoor products. As part of this effort, a comprehensive background paper was developed outlining the “R-Strategies” and explaining how they are applied within the project framework. The paper is available at the following link: <https://doi.org/10.13140/RG.2.2.22431.21920>

The aim of this report and Activity 1.3 in Work Package 1 is to provide the subsequent ASTER project work packages with essential background information. Specifically, it aims to analyse the outdoor market and the types and compositions of outdoor products, and to derive possibilities for recycling from this analysis. Furthermore, the current situation of waste management for outdoor products in alpine regions

is examined. Additionally, the implementation of R-Strategies and the obstacles to their implementation are examined. This report does not cover the topic of laws or legislation, as a separate deliverable (D 1.2.1) is allocated for that.

Activity 1.3 of Work Package 1 has two deliverables (D). D1.3.1 provides an introduction to the methodological framework used to analyse the outdoor product sector. D1.3.2 builds on this methodology and presents comprehensive findings on waste generation, the outdoor market, material use, recyclability and existing waste management approaches in the outdoor industry. It also evaluates the potential of R-strategies to minimise waste and improve circularity in the sector. This report outlines the methodology that will underpin further analyses.

2 Methods

Extensive research was conducted to provide a comprehensive overview of waste generation, waste management practices, and R-Strategies related to outdoor products in the Alpine region. This chapter outlines the general methodology applied to achieve the report's objectives. The legal framework governing waste management for outdoor products in the Alpine region is covered in Deliverable 1.2.1 of the ASTER project.

Waste potential of outdoor products

The study aims to quantify the waste generated by outdoor products and to categorize this waste by product type and material. Outdoor products are not recorded as a distinct waste fraction in official waste statistics, as they are typically disposed of through residual waste, bulky waste or separate textile waste streams. As a result, official statistics (e.g. BMUV Department T II 1 (2023); Environment Agency Austria (2025)) do not provide specific data on waste quantities from outdoor products. Activity 1.3 tested this hypothesis by examining how outdoor products are managed in the Alpine region, as outlined below.

To address this lack of data, an alternative approach was adopted: sales data for outdoor sports equipment was analysed to estimate future waste generation. To obtain sales figures, representatives from the outdoor sector were contacted. The challenge lay in obtaining specific figures for the Alpine region. As Chapter 3 shows, data was only available at a national level or for Europe as a whole. An evaluation of the available sales figures revealed the most relevant product categories. These categories and their material composition are examined in more detail in the third chapter. Information on typical material compositions in outdoor products were obtained from internet searches, and a review of the scientific literature was performed on potential for fibre-to-fibre recycling. Based on this research, the relevant material compositions of outdoor products are described along with options for separating and recycling them. Additionally, the relevance and current status of the presented technologies are assessed.

Waste management practices of outdoor products

To assess how waste from outdoor products is currently managed in the Alpine region, a questionnaire was developed. The questionnaire, which is provided in Annex 2, consisted of 16 questions grouped into the following sections:

- waste fractions in which outdoor product waste is collected in the alpine countries,
- waste quantities collected in these fractions,
- waste collection systems relevant for outdoor product waste,
- treatment, recycling and reuse of these fractions in the relevant countries, and
- specifically, the treatment and reuse of separately collected used clothing.

The questionnaire was distributed in July 2025 to all project partners in Austria, Italy, Germany, Slovenia, and France to gather insights into existing waste management practices for outdoor products in the Alpine region. The questionnaire responses were supplemented with literature research on this specific topic, as well as information on the European perspective.

R-potentials of outdoor products

To provide an overview of R-Strategies applied in the outdoor sector, a comprehensive desk research was carried out using online sources, industry and sector reports, and scientific literature. In addition, three interviews with outdoor brands and one interview with a sustainability expert in the outdoor market were conducted.

The interviews addressed topics such as sustainability in the outdoor market, circular economy approaches, and challenges related to implementing sustainability measures. The interview guide

consisted of 15 questions and is included in Annex 2. All interviews were conducted via the online video conferencing system BigBlueButton, recorded, and subsequently analysed using the software Read AI.

The aim of the research was to establish which of the 10 R-Strategies (R0 - refuse, R1 - rethink, R2 - reduce, R3 - reuse, R4 - repair, R5 - refurbish, R6 - remanufacture, R7 - repurpose, R8 - recycling and R9 – recovery, see chapter 1) are already being applied in practice in the outdoor industry, and if so, to what extent. The research also aimed to investigate which strategies have the potential to make the industry more sustainable in the future. Additionally, successful implementations by companies are presented as examples of innovative practices. The challenges that the industry is facing when implementing R-Strategies are also discussed.

This methodology provides a structured approach to estimating waste potential, analysing current waste management practices and evaluating the implementation of R-strategies in the outdoor sector. The key components (Table 2) of the methodology are applied in the following analysis, the findings of which are presented in the report of Deliverable 1.3.2.

Table 2: Summary of research methods to analyze waste potential, waste management and R-strategies of outdoor products in the Alpine Region

Research Area	Methodology & Tools	Key Objectives
Waste Potential	Analysis of country-level sales data & material composition research.	Quantify potential waste volumes and identify material-specific recycling barriers (e.g., fiber-to-fiber).
Waste Management	16-point questionnaire (Annex 2) distributed to Alpine project partners & literature review.	Identify current collection systems, waste fractions, and regional treatment practices (Austria, Italy, Germany, Slovenia, France).
R-Strategies	Desk research & expert interviews (BigBlueButton/Read AI analysis).	Assess the implementation of 10 R-strategies (R0 to R9) and highlight innovative industry practices.

Reference to other Deliverables

This work package consists, beside this report, of six other reports that provide additional information and deeper insights into the ASTER project:

- **Input paper on R-strategies | Definitions and Understanding. A guideline through the Activities:**
https://www.alpine-space.eu/wp-content/uploads/2026/02/R-strategies-and-their-use-in-ASTER_V3.pdf
- **Deliverable 1.1.1 | Mapping circular & textile actors in the Alps:**
<https://www.alpine-space.eu/wp-content/uploads/2026/04/D111-Mapping-circular-and-textile-actors-in-the-Alps.pdf>
- **Deliverable 1.1.2 | Mapping economic flows & gaps in the Alps:**
<https://www.alpine-space.eu/wp-content/uploads/2026/04/D112-Mapping-economic-flows-and-gaps-in-the-Alps.pdf>
- **Deliverable 1.2.1 | Regulations and economic policies for waste prevention and management in the Alps:**
<https://www.alpine-space.eu/wp-content/uploads/2026/04/D121-Regulations-and-economic-policies-for-waste-prevention-and-management-in-the-Alps.pdf>
- **Deliverable 1.2.2 | Mapping institutional dynamics in the Alps:**
<https://www.alpine-space.eu/wp-content/uploads/2026/04/D122-Mapping-institutional-dynamics-in-the-Alps.pdf>
- **Deliverable 1.3.2 | R-potential, waste generation and waste management of outdoor products in the Alpine region:**
<https://www.alpine-space.eu/wp-content/uploads/2026/05/D132-R-potential-waste-generation-and-waste-management-of-outdoor-products.pdf>

SOURCES

BMUV Department T II 1. (2023). *Waste Management in Germany 2023 | Facts, Data, Graphics (in German)*. N. C. Federal Ministry for the Environment, Nuclear Safety and Consumer Protection (BMUV).

Deloitte & Outdoor by ISPO. (2021). *Outdoor Consumer Report 2021*. <https://www.across-magazine.com/wp-content/uploads/2023/02/Deloitte-Outdoor-Consumer-Report-2021.pdf>

Environment Agency Austria. (2025). *The inventory of waste management in Austria - Status report 2025 for the reference year 2023 (in German)*. F. Federal Ministry of Agriculture, Climate and Environmental Protection, Regions and Water Management, Republic of Austria.

Use of artificial intelligence (AI) tools

AI tools (ChatGpt, DeepI, Notebook LM, Read AI) were used to a limited extent in the preparation of the report, after which the content was reviewed and corrected as required. Full responsibility for the content lies with the authors.

ANNEX 1

Questionnaire to survey the management of outdoor products in the Alpine region

1. Waste categories in which outdoor product waste is collected and waste quantities

Which waste categories in your country contain outdoor product waste (apparel, footwear, equipment)?

How much textile waste is collected annually in your country? And in which waste categories is it collected?

How much mixed municipal waste (residual waste) is collected annually in your country? What percentage of the residual waste is textile waste?

How much bulky waste is collected annually in your country? What percentage of the bulky waste is textile waste? Bulky waste is defined as non-hazardous material not able to fit in regular waste bin containers (e.g., mattresses, sporting goods).

How much used clothing is collected separately in your country annually?

Is it possible to quantify the amount of outdoor product waste (apparel, footwear, equipment) collected annually? If so, how much is collected? If not, why not?

2. Waste collection

How is textile waste in mixed waste (residual and bulky waste) currently collected in your country?

Are there separate collection systems for used clothing for re-use in your country?

Are there any specific collection schemes in place to collect outdoor product waste (apparel, footwear, equipment) for reuse (e.g., take back systems or collection systems of specific companies)?

3. Waste treatment, recycling and reuse

How is textile waste, that is collected within the mixed waste categories (residual and bulky waste), currently treated in your country?

Are there any treatment or recycling facilities or reuse initiatives for non-textile waste from the outdoor industry (e.g., take-back systems for equipment, etc.)?

How is the waste that is not reused or recycled disposed in your country? Is it incinerated (technology? energy recovery?) or landfilled (type of landfill?)?

3.1 Treatment and reuse of separately collected used clothing

How is separately collected used clothing currently treated in your country? Are there recycling/sorting facilities for this type of waste in your country? Or is the waste exported for recycling (if so, where and for what treatment?)

If applicable, how is separately collected clothing currently sorted in your country, by machine and/or by hand? Is it sorted by fibre type or by resale value or by other means?

Where does the sorting take place (in your country, in the EU, outside the EU)?

What proportion of separately collected used clothing is actually reused in your country? What proportion is reused in other EU countries and what proportion is reused outside the EU?

ANNEX 2

Questionnaire for outdoor brands

1. Could you please briefly introduce yourself and describe your role in your company?
2. What specific goals is your company currently pursuing in the area of circular economy and carbon neutrality?
3. Are there any products or product lines that have been specifically designed for recyclability, durability or multifunctional use? If so, what characterises these products?
4. What standards or certifications do your products meet in terms of sustainability?
5. How do you ensure that your supply chain is environmentally and socially responsible?
6. Do you offer second-hand products or rental models? Are there take-back systems or recycling programmes? How do your customers respond to these?
7. What options do you offer for repairing products?
8. What measures do you take to reduce production waste and emissions during manufacturing?
9. Are you currently working on developing new, environmentally friendly materials or manufacturing processes? Do you avoid using harmful substances (PFAS/PFC)?
10. What technologies or innovations do you see as key to the circular economy in your industry?
11. What specific impact do current or planned EU regulations have on your product development and choice of materials? (e.g. digital product passport or extended producer responsibility)
12. What experience have you had with the cost-effectiveness of sustainability measures?
13. What internal or external obstacles do you encounter when implementing sustainable concepts?
14. What trends or developments do you expect to see in the next 5–10 years in the field of sustainable outdoor products?
15. Is there anything else you would like to add on the subject of sustainability or 5R?



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