State of our Trails Report 2023

TRASH FREE TRAILS

BOSCH
Invented for life

TREK · THE NORTH FACE x eoca · Red Bull · komoot · Prifysgol Bangor University · ORBEA

Acknowledgements

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Contents

Our Mission

Our mission is to create a sustained reduction in single-use pollution on our trails and wild places and a causatory increase in nature connection amongst those who visit them by 2030. We firmly believe that we can achieve this, but we must hold ourselves accountable with scientific rigour and accuracy. Put simply, the State of Our Trails Report is how we will measure whether we are an effective organisation.

Dom Ferris, Trash Free Trails CEO.

Foreword

Once a problem is identified, the first step towards addressing it is to understand its scale and nature. Fact-finding is good policy-making, because without data we're simply fumbling in the dark.

Plastic pollution is everywhere, from the deepest ocean to the highest mountain peaks; it's in our food, our water, even in our blood. We are wearing, breathing and birthing plastics. More than half of all plastics ever made have been created since 2002, with single-use plastics accounting for 35-40 percent of current production. Whether it's a cigarette butt or a discarded plastic bottle, it's all-but-impossible to visit a natural space without seeing the evidence.

Faced with such widespread pollution, it can feel hard to know where we as citizens have agency. Certainly, we need to turn off the tap of plastic production and re-design products to make them safe and sustainable, but how do we protect the places we love in the meantime?

It may have gone unnoticed by some, but the world of plastic pollution policy changed dramatically in 2022 when countries adopted a landmark resolution at the UN Environment Assembly with the express aim of uniting as a global community to tackle the issue. Within the agreed text, there was a subtle but seismic shift in narrative, reflecting the change in how we see plastic pollution, not just as something in the ocean, but in the air we breathe, the soil where our food is grown and the trails where we go walking. But despite a growing body of evidence, we're still largely filling in the blanks – we know it's bad, but just how bad and how do we stem the flow?

It all starts with an idea and the State of our Trails is a simple, compelling one. We're learning more about plastic pollution in the ocean all the time, yet know very little about the state of our forests, parks and trails, despite huge numbers of us using these spaces every day. The collection of data allowing comparison and analysis across different locations is a key piece of the puzzle. Gathering consistent, independent data, as well as auditing common brands and materials, can help create corporate accountability, drive meaningful change and, ultimately, reclaim the natural spaces we love from pollution.

To effectively craft policy to phase out single-use plastics, prioritise solutions such as reuse and refill and to improve access to responsible disposal where it's most needed, we need to unite as champions of nature to put evidence on the desks of decision-makers. The Trash Free Trails community are leading the way and have already collected more than 200,000 pieces of plastic pollution and recorded more than 1,000 individual data sets, the findings of which are presented here.

While a global plastics treaty presents an opportunity for international collaboration to address this problem, it also signals a changing mindset. We are no longer accepting the glut of single-use plastics flooding our shops and our parks. We are calling for evidence-led solutions to rid our bodies and natural spaces of this pollution. We know the time to act is now.

> ***As citizen scientists and allies of the natural world, we can be pioneers in this struggle for a solution.***

Christina Dixon
Ocean Campaign Leader
Environmental Investigation Agency

The Infographic

The aim of this report is to provide evidence of the effects of single-use pollution on our trails and wild places.

As such this report is full of data. Here are some of our highlights.

FOR EVERY 100 ITEMS YOU REMOVE

28 pieces will be within 300m² of a summit

81 pieces will be single-use pollution

10 pieces would not exist if we had a DRS

FOR EVERY 100 TRAIL CLEANS

18 will have lucozade as its most found brand

32 will show signs of animal interactions

21 interactions will show signs of animal death

50 will have disposable vapes along the trails

90 people will feel more connected to nature

Executive Summary

At Trash Free Trails (TFT), we have always had conviction in our beliefs. We believed that we could make a positive impact on the trails and wild places that we love – so we went out and did exactly that. We will continue to conduct and champion trail cleans for as long as we need to.

We also believed that the 'litter problem' was far bigger and more complex than anyone had yet acknowledged. We believed that single-use pollution was damaging our environment; we saw the results with our own eyes.

We also knew that for some things, 'belief' isn't enough. We needed to demonstrate the scale of the problem, and the real impact that single-use pollution is having on our forests, moors, mountains, trails and on us.

The State of our Trails Report (SoOT) 2023 is our most comprehensive representation of what we can now say we know. This document outlines the causes, prevalence composition and impacts of single-use pollution on recreational trails and their users. It represents thousands of hours of citizen science, ground breaking experimental methodologies and over three years of data. The result is the most in-depth and scientifically rigorous analysis of what is commonly known as 'litter' in recreational trail ecosystems ever.

Prevalence

A ubiquitous sight

We've estimated that there might be as many as 9.1 million items of SUP on the UK's recreational trails. This means that a walker, runner or rider could, on average, encounter a piece of SUP every 24 metres

We can now estimate the prevalence of single-use pollution (SUP) on our trails and the result is frightening. If you live in the UK, you are statistically certain to encounter SUP every time you go for a walk, run or bike ride on our trails and in our green spaces. Discarded crisp packets, drinks bottles and cans are so ingrained into our environment that they are effectively impossible to escape. We are truly living in the age of the Anthropocene.

Composition

Single-use, a long legacy

Over 10% of SUP that we discover on our trails would fall under the items collected in an "all in" Deposit Return Scheme (DRS).

We also have the best ever view of the makeup of 'litter' blighting our recreational trails. Virtually every item of 'trash' is single-use pollution in some form or another. Items that by their very nature are designed to be used and discarded within moments. Their useful life may be short, but make no mistake, they are going nowhere fast.

Impact

So much more than an eyesore

32% of respondents to the questions on faunal interaction confirmed signs of interaction with SUP. Of those, 21% reported animal deaths.

When it comes to new knowledge, we are most proud of our work looking at the impact that single-use pollution has on both the environment and on us – trail users. Our work is now beginning to reveal the bleak reality. We can say that our early findings point towards a potential direct negative impact on flora and fauna when single-use pollution is introduced to the environment. We can also say that if you decide to embark on a trail clean you will almost certainly discover some form of animal interaction. This is often in the form of bite marks, but we are now regularly recording animal mortality as a direct result of 'litter'.

We can also now state that based on our research, single-use pollution breaks down over time and significantly increases the amount of microplastics found in our soil.
And finally, single-use pollution is directly impacting our enjoyment of the outdoors. Time outside is repeatedly shown to be beneficial to our mental and physical health; single-use pollution is taking that away from us. We notice the visual interference and mourn the perceived (and real) impact on the places we love.

Knowledge is power

But only if we act upon it

We know more than ever before. Now it is our collective responsibility to do something about it. Trash Free Trails was founded on action but here we're striving to go a step further. If we are to truly manage and mitigate the impact of single-use pollution, we need to tackle the source. That's why we have laid out a 'Trash Free Manifesto' made up of five Areas For Change, detailing just how we intend to drive meaningful action.

1

Single-use Pollution; Call It What It Is

You might have already noted our terminology. 'Litter' is neither a suitable, nor accurate, term for the harmful single-use products entering our environment

2

Connection First

We strongly believe that the dropping of single-use pollution is a symptom of disconnection with the world around us. We want to do something about that.

3

No-Brainer Policy Change NOW

So much of the single-use pollution we encounter wouldn't be there at all if the UK were to introduce proven, effective legislation. What are we waiting for?

4

*Shared Responsibility: Own Your Sh*t*

For too long the narrative around 'litter' has focused solely on the consumer, but we are only one part of the problem.. What responsibility are the manufacturers of plastic bottles, cans and wrappers taking for their role?

5

Supporting the UN Plastics Treaty 2025

The Treaty provides structure and shared methodologies for more comprehensive and cohesive scientific research across all ecosystems.
By dedicating ourselves to its aims, we will be able to contribute to the international effort to end plastic pollution by 2040.

Making a small-normous impact

We have often said that we are small-normous. Trash Free Trails is a small core with a wide and passionate team of volunteers, friends, allies and collaborators. We would not have achieved what we have without them. And to keep making progress we will need even more help; from legislators to scientists, educators to performers and always riders, runners and roamers. The time to act is now. What will you do?

Actions To Take Right Now

As you are reading this, consider what you, and your own community, may be able to contribute. Here a few suggestions to get the ball rolling...

> *Stop saying 'litter'; tell your friends why.*
>
> *Send the State of Our Trails Report to your MP, telling them why this matters.*
>
> *Share the Report in your workplace; organise a team trail clean.*

Research

Introduction

In 2018 the Collins Dictionary named "single-use" as their word of the year. This was a reflection of a huge increase in awareness of ocean plastic pollution since 2010. It broke into global public knowledge with the release of the BBC's Blue Planet II in October 2017.

> ***In 2018, Collins Dictionary named "single-use" as their word of the year.***

David Attenborough's narration alerted the wider population to the environmental threats that discarded plastic items posed to marine environments. The television programme sent the message home with raw, heartbreaking footage of a pilot whale carrying her dead calf through plastic-polluted waters, and such was the resulting ground-swell increase in awareness, the term "Attenborough Effect" was coined to reflect the presenter's influence.

The infamy of marine plastic pollution led to the quadrupling of the number of academic studies on the issue from 50 in 2013 to 200 in 2017, a growth that has continued, with a 2021 review, finding 1765 publications on the subject of "marine beach litter". With this has come an improved understanding and international effort; including the United Nations announcing a "Decade of Ocean Science for Sustainable Development" in 2020.

Terrestrial pollution:

We are the tide but how big is the wave?

As riders, runners and roamers, we at Trash Free Trails have always been painfully aware that plastic pollution is by no means limited to marine ecosystems. Our trails, woods, parks, mountains and green spaces are literally littered with plastic drink bottles and crisp packets, sweet wrappers and dog-poo bags to name just a few.

However, there are two important, defining, differences between terrestrial and marine environments. Firstly, we – the very users of the terrestrial environments – are the tide. It's a depressing revelation but, other than wind borne items, almost every piece of single-use pollution found along a trail has been left by a user. More concerningly, it is estimated that the annual plastic release to terrestrial ecosystems is between 4 and 23 times greater than that which escapes into the marine environment. Secondly, there is nowhere near the level of awareness, understanding or societal call to action in response. There has been no equivalent *Attenborough Effect* for our terrestrial environment.

It was this revelation that led Trash Free Trails to conduct the State of Our Trails Report Baseline Study in 2021.

> ***Trash Free Trails engaged a huge volunteer community, activated by the desire to take positive action in caring for the places they love.***

That Report was the first of its kind; with a major focus on the data collected in our Trash Surveys. As such its main focus was on the prevalence and composition of single-use pollution.

From 2021 to 2023:

Refining our methodology and defining how we fit into the world

The SoOT Baseline study was a huge leap forward and remains extremely important to us. It will always be our line in the sand. We always knew that we wanted to do more though. Most importantly, we wanted to apply more scientific rigour to our research. Since then, we have sought to both broaden and deepen our understanding through data. We have closely worked with Bangor University to take leading methodologies from the marine conservation field and adapt it to terrestrial ecosystems; our trails. We have sought to both broaden and deepen our understanding through data. We have conducted repeated Trash Counts at the same locations throughout the year. We have worked with our partner komoot to develop digital methods of recording Trash Counts. We are now working to the Rapid Assessment Survey guidelines issued by the UN Environment Programme, and continue

to develop our approach, working with our own “ecosystem” of organisations, charities and campaign bodies across the spectrum of terrestrial and marine environmental protection to enhance our methods.

Since 2021 we have also further developed our research to begin to look at not only the prevalence and composition of SUP, but its impact too. We are gathering data that investigates ecological damage, including in-situ monitoring, as well as qualitative research into the human impact.

This is not research for research’s sake

It is as a direct result of this innovative research, the hard work of our volunteer citizen scientists, support of our partners, guidance from Bangor University and the dedication of our team that we are able to communicate not just our biggest ever data set, but confidently make recommendations and targets based on our findings that will set the direction for our future efforts and hold ourselves to account.

For the purpose of scientific rigour, this report focuses purely on the prevalence, composition and impacts of trash reported through our survey. This amounts to 207,948 items.

And although our surveys are conducted worldwide, the majority are based in the UK. So for the purpose of this report, we will use information analysed from our worldwide database of 700 trail cleans but focus purely on policies and interventions at a UK level.

Further Reading

Trash Free Trails, 2020 - 2022
State of Our Trails Reports

Schnurr et al., 2018
Blue Planet effect

Rogers., 2007
Gone Tomorrow, The Hidden Life of Garbage

United Nations, 2020
Decade of Ocean Science for Sustainable Development, UN

Horton et al., 2017
Microplastics in freshwater and terrestrial environments: Evaluating the current understanding to identify the knowledge gaps and future research priorities

Malizia et al., 2019
Terrestrial ecologists should stop ignoring plastic pollution in the Anthropocene time,

Hatzonikolakis et al., 2022
Quantifying Transboundary Plastic Pollution in Marine Protected Areas Across the Mediterranean Sea

Volunteer Focus

CITIZEN SCIENTISTS

OUR VOLUNTEERS

Throughout this Report we'll be profiling the people that made this possible.

Our volunteers.

Without them, we'd have no data. And without data we'd have no evidence to support the positive changes that we establish throughout this report.

Not only are they vital in understanding the state of our trails. They are also vital in leaving them in a better place than they found them.

A-TEAMER

KYLE HARVEY

LOCATION

LLANDEGLA

TRAIL CLEANS

14

ITEMS REMOVED

680

TIME SPENT

15 HOURS

We are the tide.

What do we mean by the cause?
You could be forgiven for thinking that the simple act of littering is the problem. But we believe the problem, and therefore the solution, is far more complex.

We are interested in the variety of mechanisms by which single-use pollution ends up on recreational trails and in our wild places. The consequences are hugely important, but if we don't understand the means by which pollution finds its way onto trails, the flow of SUP will inevitably continue.

To steal an analogy from global warming, we don't just want to be a thermometer recording a steady rise in temperatures. We want to understand the underlying causes, and just as importantly, how to tackle them in the most comprehensive way possible.

Why do we care? Giving context.
This Report and the accompanying research conducted by TFT will document the prevalence, composition and impacts of single-use pollution. These are the visible (and not so visible) consequences of 'littering'. They are the reason we first initiated trail cleans, and were our first call to action.

Those consequences are hugely important and our research is only just beginning to shed light on the scale and impact of the problem. But… and this is one of those really big BUTs… if we don't understand the mechanisms by which said pollution finds its way onto trails, the flow of SUP to these places will inevitably continue.

Our belief
Why does single-use pollution exist? Why do some people choose to drop single-use pollution? And more importantly, how can we affect change to prevent it from occurring in the first place.

At TFT, the biggest problem we are trying to tackle isn't the 'litter louts'. It's the disconnection that people who feel able to leave SUP, itself. 'Litter' is simultaneously a symptom of societal disconnection with nature, our fellow humans and perhaps even ourselves. Secondly, and just as importantly, it is an active shift of corporate burden onto the individual.

> ***Companies churn out billions of items of single-use packaging every year, with a useful lifetime that maybe only extends to weeks, but an afterlife that stretches to thousands of years.***

Yet there is a mismatched balance of responsibility between them and the consumers (and disposers) of those products.

Our methodology
Building a comprehensive scientific view of the causes of single-use pollution is an ongoing project. Here we have considered the potential causes of single-use pollution on recreational trails by way of meta analysis of academic literature, anecdotal observation and findings from similar studies, determining three distinct causes of SUP from the human perspective. Through academic literature review, anecdotal observation and collation of similar studies findings, we explored the very nature of the disconnection we believe to be at the root of all of this.

Overall, our volunteers have monitored, removed and reported over 216,466 items of trash. We know this is vastly under recorded as this is only based on survey responses and information that we have gleaned through social media. What is not included are the countless cleans people do for the love of their wild places or the countless trash that is discarded but never cleaned, reported or even found.

Disconnection
Disconnection can stem from a variety of factors, including political relations, sociocultural norms and institutional arrangements. This disconnection can be produced and experienced from an individual level to a societal one. We believe that single-use pollution is a symptom of a particular sense of disconnection from society and nature.

As an example, loss of wildlife is contributing

to an 'extinction of experience', resulting in lower levels of connection with nature. Put simply, if we don't see or experience nature, we are less aware of it, and inevitably feel less 'connected' to it. In a recent study, the UK ranked lowest out of 14 European nations for nature connectedness and is currently classified as one of the world's most nature depleted countries.

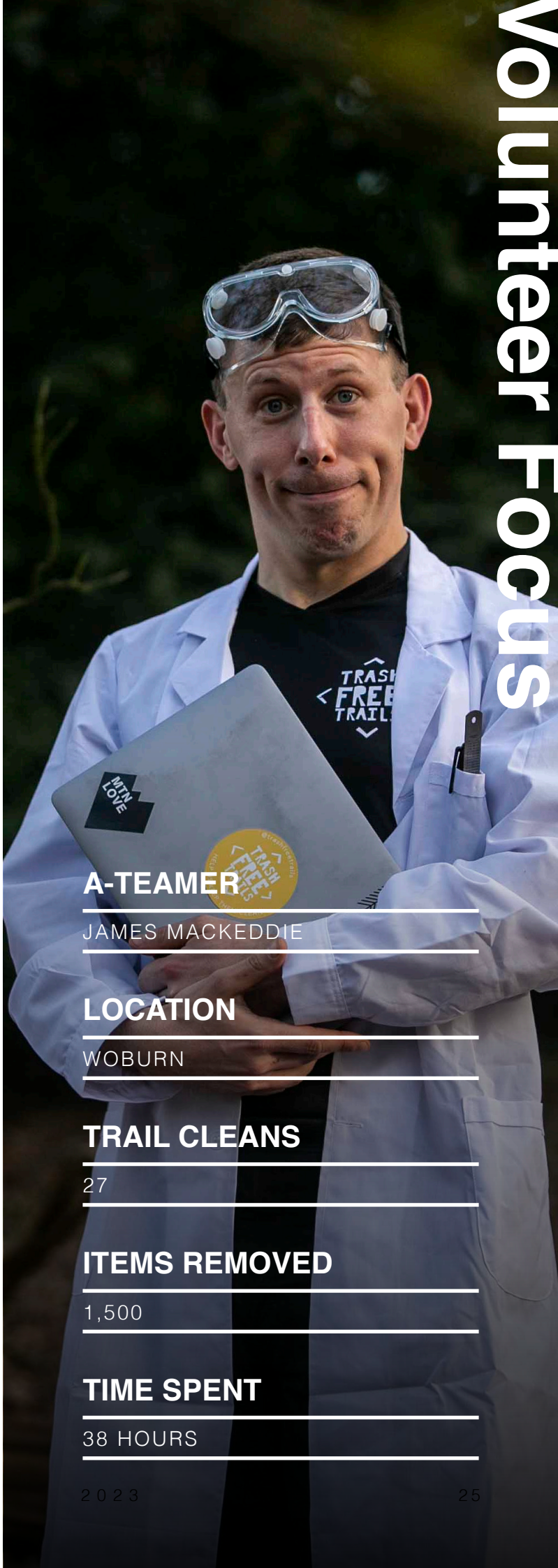
Disgust

The emotion of disgust coupled with a person's sense of autonomy can interact with properties of the environment to predict littering behaviour.

The emotion of disgust in connection with waste is universally felt and evolutionary advantageous. A powerful dislike of something that is unpleasant, unwanted or might make us ill is hard-wired into our system. The question is, when does single-use packaging become an object of disgust? For many it is as soon as that packaging has served its useful purpose, or is assumed to have become 'contaminated' by opening or use. Humans have always disposed of waste well away from the places they sleep and eat. The 'land of away', especially when on holiday or far from 'home' offers greater opportunity to do that anonymously.
People vary in their ability to overcome disgust. As such, 'littering' is automatic, impulsive and heuristic. It is often a mental short cut that simplifies decision-making and problem-solving. It is a natural response to what to do with waste that makes us feel emotionally uncomfortable. We want to put as much distance – proximally and temporally – between us and the thing making us feel disgusted, as soon as possible. This is one of the reasons why 'please take your litter home' appeals don't work.

Control? Or lack thereof…

For many who have rarely, if ever, engaged in the act of littering, they carry various assumptions in their minds about those who do. A question asked often is what limits the ability of an individual 'litterer' to self-regulate their behaviour? A person's general 'sense of control' over their life – their perceived autonomy – could be the answer. Autonomy refers to the experience of acting from choice rather than feeling pressured to act. It is considered a fundamental



Volunteer Focus

A-TEAMER

JAMES MACKEDDIE

LOCATION

WOBURN

TRAIL CLEANS

27

ITEMS REMOVED

1,500

TIME SPENT

38 HOURS

Volunteer Focus

A-TEAMER

CHLOE PARKER

LOCATION

LAKE DISTRICT

TRAIL CLEANS

15

ITEMS REMOVED

710

TIME SPENT

12 HOURS

psychological need that predicts well-being. Our sense of control waxes and wanes with age, socio-economic status, our social standing with societal events and changes. The pandemic for instance, where rules, regulations, limitations, and laws were imposed on us, over which we had little or no control as individuals. It is no accident that litter incidences rose exponentially in the Covid-19 pandemic, particularly of PPE (personal protective equipment).

> ***'Littering', like incidences of other anti-social behaviours, is correlated with poverty, powerlessness and hopelessness, as well as with rebellion.***

Reactance is a psychological defence mechanism that we utilise subconsciously, or consciously and deliberately, to try to reclaim our freedom. We become 'motivationally aroused', flooded with an excess of righteous motivation that leads us to fight for those freedoms. It is at least as compelling as disgust. Adults are not susceptible to reverse psychology. It is why message framing and who is doing the commanding or making the appeal matters.

Social Proof

The third potential cause that predicates single-use pollution is the degree to which the environment facilitates or deters 'littering'. 'Littering' is a shameful thing to be caught doing. It is an anonymous crime, occurring in places where observation is unlikely or low. Moreover, when committed as a social norm – when in a large crowd for instance – it happens because we are provided with cues that it must be acceptable as others are doing it.

A Negative Feedback Loop?

"Nature Deficit Disorder" is becoming a widely accepted concept. It formalises the idea that a lack of contact with nature has a causal impact on health and behaviour related problems in humans – particularly children. Recent studies have echoed the notion that a negative human-to-nature relationship has significant association with mental ill health, environmental destruction and ecological neglect.

Whilst long term implications are yet to be seen, it is likely that the COVID-19 lockdowns have compounded these issues. It is now well established that elements of the human psyche – attention and focus in particular – have been depleted substantially as a result of the restrictions imposed upon us all throughout the pandemic. The reliance on screens in substitute for our preferred activities in nature have all taken away our ability to concentrate on what is right in front of us.

The combination of TFT's internal research, previous studies of nature connection and anecdotal information gleaned from our community dictates the importance of addressing this relationship in an effort to improve nature connection is paramount.

The Role of Organisations

Having attended to the end user of single-use packaging, it's vital we also turn our attention the other way; What about the producers? Many, from Coca Cola to Lucozade, rely on business models founded on selling cheap and quick to make, quick to consume, quick to dispose of products. The business model then also relies on shifting the cost burden of responsible disposal on to consumers and society as a whole.

> ***And yet, who pays the end price when it comes to the damage that single use pollution does to the environment? We shoulder that burden. All of us.***

The 'litterbug' is a convenient concept for these businesses (so much so that they helped coin the term as part of a Keep

Volunteer Focus

A-TEAMER

RAM GURUNG

LOCATION

NEPAL

TRAIL CLEANS

7

ITEMS REMOVED

3,030

TIME SPENT

21 HOURS

Volunteer Focus

A-TEAMER

MARK WILSON

LOCATION

ST ASAPH

TRAIL CLEANS

22

ITEMS REMOVED

1,700

TIME SPENT

18 HOURS

America Beautiful campaign in the 1960s). But, returning to the emotions we discussed above, does a 'Please Don't Litter' message on a chocolate bar wrapper absolve the company of any responsibility for what happens to the product they manufactured? We believe that it doesn't.

Any genuinely sustainable change in the prevalence, composition and impact of single-use pollution must involve those who manufacture it as well as the end user. We believe this is where government intervention is vital to coordinate industry change through legislation.

Solution-mode

It is easy to try and find answers at this stage; but rather than leap straight to solutions, it is important to consider what these causes mean in the real world. What are the results that we are seeing in terms of prevalence, composition and the impacts of single-use pollution? Only then can we build actions based on the most comprehensive view of the state of our trails.

Further Reading

Beery et al. 2023
Disconnection from nature: Expanding our understanding of human–nature relations.

Richardson et al. 2022.
Country-level factors in a failing relationship with nature: Nature connectedness as a key metric for a sustainable future

Pyle., 2003
Nature Matrix : Reconnecting people with Nature

Soga et al., 2016

Extinction of Experience: The Loss of Human - Nature Interactions

Richardson et al., 2020
Applying the pathways to nature connectedness at a societal scale: a leverage points perspective

Gilbert., 2016
Green Space: A Natural High

Kettner et al., 2019
From Egoism to Ecoism: Psychedelics Increase Nature Relatedness in a State Mediated and Context - Dependent Manner

Prevalence

How widespread is the disease of SUP?

Context and hypothesis

In ecological terms the definition of prevalence is; "a measure of how widespread an infection or disease in a host population is". In this context, we define prevalence as; "the abundance and distribution of single-use pollution on recreational trails". In the simplest terms, we care enormously about how much SUP there is out there and where it is found along any given trail.

There is a distinct lack of peer reviewed research on the prevalence of SUP on recreational trails. It is a paucity which TFT has sought to address. This section documents our work to date.

> ***"Without knowledge of exposure, one cannot determine risk"***
> *Law (2017)*

Establishing an understanding of prevalence has become one of the foundations to the work of Trash Free Trails. We quickly understood that it is a vital first step towards establishing the potential impacts and threats posed by plastic pollution to ecosystems. Understanding and communicating the scale and severity of the problem is instrumental to the development and delivery of effective management strategies. To hark back to the analogy of a disease, we need to establish a diagnosis and prognosis before we can truly treat the illness with any confidence of success.

Setting the structure for the future

We believed there were varying amounts of SUP on trails depending on; trail type, trail zones, visitor numbers and types, season, weather and location. Furthermore, the distribution of SUP along a trail is influenced by zone type. There will be points at which littering behaviour is consistently pronounced.

We therefore needed to develop a methodology that allowed for sufficient granularity in recording to test that hypothesis. We also required a "Trash

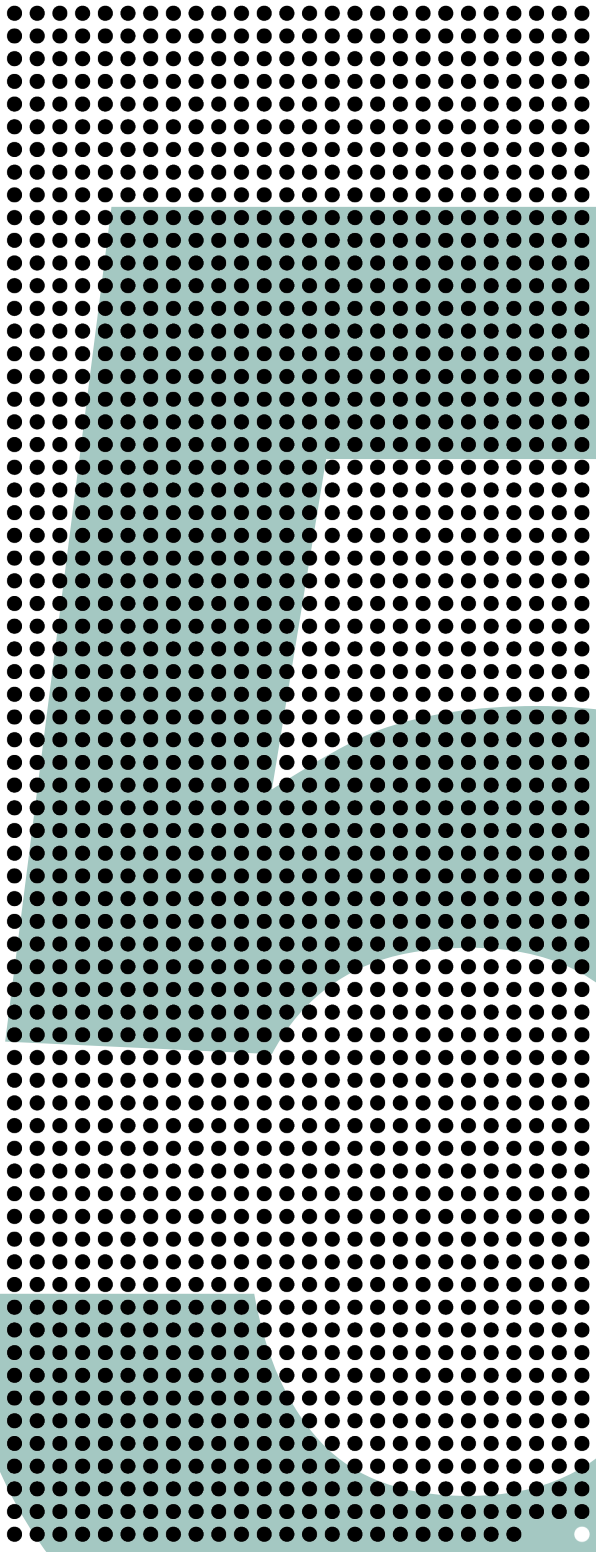
LITERATURE REVIEW

BREAKDOWN: PAPERS IN 2021

Each dot represents research focusing on the effects of plastic pollution. Black represents marine and white is terrestrial.*

Our work was the first of its kind. Worldwide.

In 2021, there were 1,765 papers on marine plastic pollution and zero on the effects of prevalence and impacts of plastic pollution on recreational trails.



Count" framework that could be consistently and effectively be used by our volunteer citizen scientists. The data would be used to compare across sites, establish "global" figures, but also to establish trends at specific individual sites.

> ***We hoped this would enable is to demonstrate the positive impacts of trail cleans over the long term***

Finally, it was vital that our approach was compatible with global aims and objectives of the 2022 - 2025 Plastics Treaty resolution to enable us to contribute to the wider understanding of plastics pollution across all ecosystems.

Tallying up

The aim of the Trash Count is to provide a 'snap-shot' of SUP prevalence, by counting the items of SUP that they see along a defined section of recreational trail. It has been designed to be conducted by volunteers swiftly, with no more equipment than a phone and / or a hand-held tally counter.

Although it may seem counter-intuitive to our mission, it is important to remember that a Trash Count is not about removing SUP. Removal massively increases the time needed to cover ground, which reduces overall survey efficacy and accuracy and increases the rate of 'drop-outs' from a long term monitoring programme. In short, you can do a Trash Count whilst you ride, run or roam and it has little to no impact upon how enjoyable it is.

We have developed two methodologies; both complementary and comparable. One was developed with our Strategic Partner, komoot, and harnesses the power of their navigation app to geotag specific locations of SUP. We have also developed an "analogue" equivalent.

Methodology Summary

STEP ONE.

COUNT TRASH

STEP TWO.

RECORD TRASH

STEP THREE.

REPORT TRASH

Yr Wyddfa (Snowdonia) Pilot

Yr Wyddfa was chosen as the pilot location for our Trash Count methodology development for a number of reasons. We conducted four repeat Trash Counts between December 21st 2021 and April 22nd 2023.

We chose Yr Wyddfa because it is an iconic, universally recognised and loved mountain that is popular with recreational trail users of all types (including mountain bikers and wild swimming as well as hikers and climbers), abilities and experience. It is the most visited / climbed mountain in the UK with approximately 687,000 people hiking, running or riding (including 100,000 reaching by train) to the summit in 2021.

The individual trails/paths on the mountain are well defined. We chose to use a point to point route on the two most accessible paths. Ascending via the Miners Path from Pen y Pas to the Summit and descending via the Llanberis (or Tourists) Path, for a total distance of 13.4 km.

There is clear seasonality to volume and type of visitors and subsequent SUP deposition. This can be broken down in three ways:

a) Standard seasons.

For example there are, on average, significantly more visitors to Yr Wyddfa in summer as there are in winter.

b) Specific date / moment related.

For example Easter sees a significant influx of visitors as do the May and August Bank Holidays. This effect was magnified hugely during the first Covid-19 lockdown easing in July 2020.

c) The weather at any moment.

It may seem obvious, but it is important to recognise the huge influence that good weather, particularly prolonged periods in the build up to bank holidays, can have on visitor numbers and subsequent SUP deposition. The converse can be observed in 'poor' weather, such as that seen in July and August 2023. All three factors can influence each other positively or negatively.

Yr Wyddfa Focus

LOCATIONS

MINERS, SUMMIT & LLANBERIS

KMS CLEANED

16

ITEMS RECORDED

42

MOST LITTERED AREA

SUMMIT

DISTRIBUTION OF SUP

28% FOUND 300M^2 OF SUMMIT

Findings/results

Yr Wyddfa data demonstrates the value of:

Long term quarterly seasonal surveying

The fact that the April 2023 count of the Miners, Summit and Llanberis paths, of 1653 items, was approximately more than double that of any of the three preceding surveys is telling as it came just a week after the end of the Easter Holidays. During this time North Wales experienced its first extended period of dry, warm weather after a predominantly unsettled March and early April. In short, Yr Wyddfa had recently experienced its first busy period of 2023 and that was reflected in the abundance of SUP. This observation is even more striking when considering that there had been a number of volunteer trail cleans – of the surveyed trails – on Yr Wyddfa on both April 3rd and April 9th, led by the Snowdonia Society/Cymdeithas Eryri and Snowdonia National Park/Cenedlaethol Eryri as part of Keep Wales Tidy's Spring Clean Cymru.

Recording the distribution of SUP

The Yr Wyddfa data perfectly demonstrates the need to collect data on the distribution of SUP. For example, 747 items were recorded along the 16km Miners, Summit and Llanberis paths (the easiest and more accessible paths on Yr Wyddfa) on 21/12/21. Of those, 210 were recorded just on the summit platform within an area of approximately 300m^2.

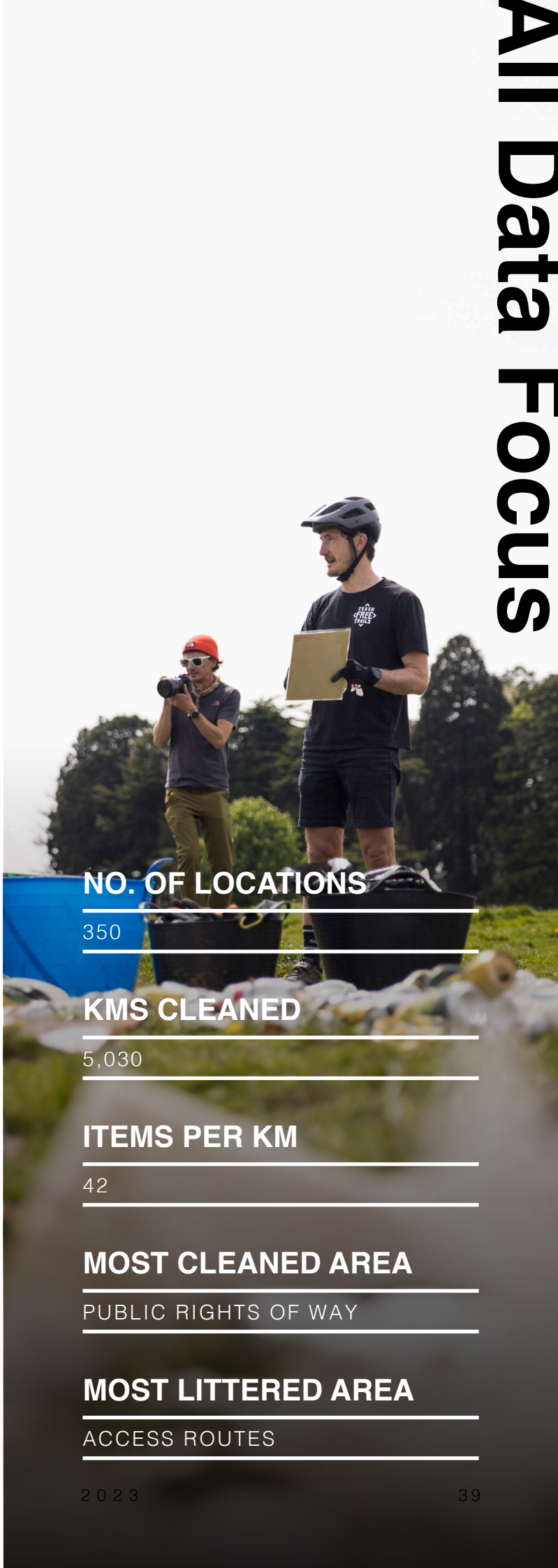
> ***This means that 28% of the SUP on Yr Wyddfa at that moment, had been dropped within a 300m radius of the summit.***

Furthermore, a similar proportion of SUP was observed on the summit. When considering prevention and mitigation strategies, this granularity of data offers a number of opportunities, from targeted SUP removal to focused behaviour change interventions.

All data

Trash Count specific data can be supplemented with data from Trash Surveys (SUP Composition) that have been recorded by TFT volunteers since 2021. Specifically

All Data Focus



NO. OF LOCATIONS

350

KMS CLEANED

5,030

ITEMS PER KM

42

MOST CLEANED AREA

PUBLIC RIGHTS OF WAY

MOST LITTERED AREA

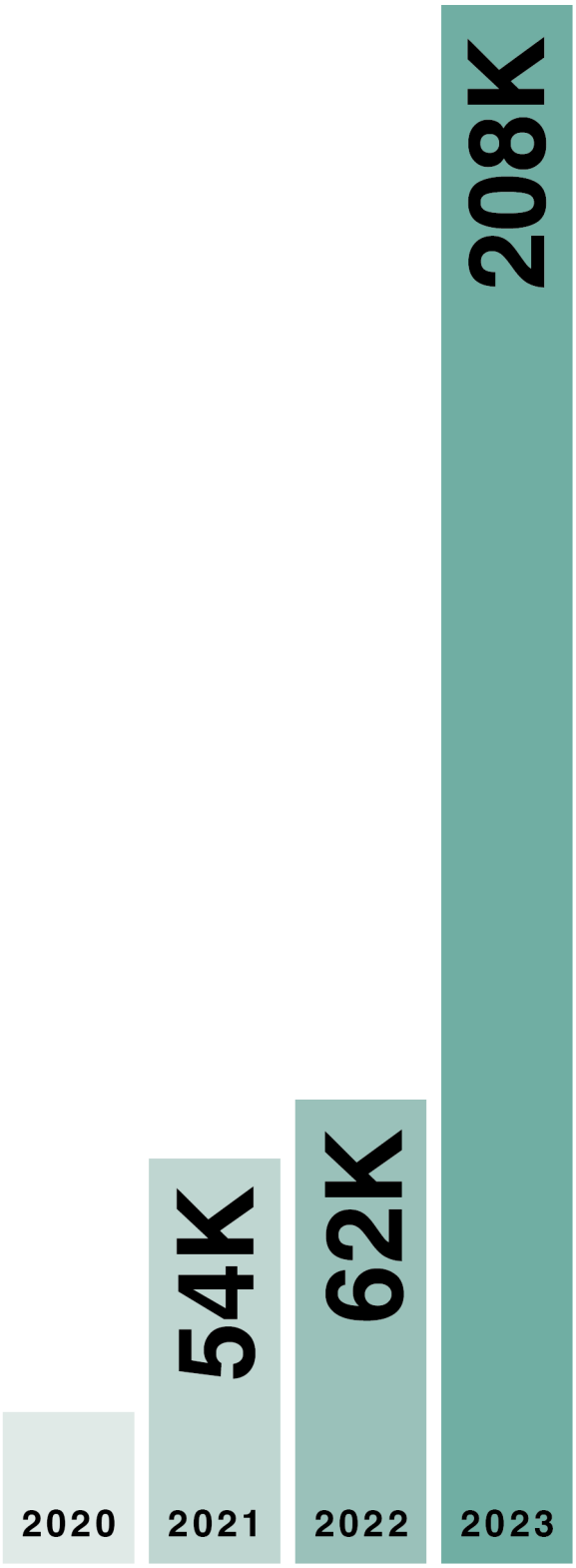
ACCESS ROUTES

CUMULATIVE TRASH

BREAKDOWN:YEAR

The amount of trash removed from our trails has significantly increased in the most recent year. And we're not finished.

Since 2020 we've removed and recorded 207,948 pieces of trash from our trails.



data on: location, distance travelled, total SUP items and most littered trail zones. In the context of this Report the value of this data is also magnified by the fact that we have looked at 1,661 data sets, including; 700 Trash Survey data sets, 961 social media harvested data sets, alongside the 30 Trash Count sets.

A Good News Story

What's exciting about our multi-year data set is that we will now be able to look for patterns and trends. This could be across the data set as whole, or by zooming all the way into an individual trail and assessing whether the local community have been able to create a sustained reduction in SUP on their favourite trail.

We're delighted to say that we have already observed this at the Pump Track and Recreation Grounds in Machynlleth, Mid-Wales. Over the last three years (2021 - 2023) the Trash Free Trails team has led three comparable clean-ups. With the total recorded SUP abundance going down significantly each year. Representing a 67% overall reduction.

While the datasets are not perfect and the methodologies used to gather them were subtly different, we are encouraged by this observation and if the trend continues we will have observed our first sustained reduction in SUP at a trail location.

Conclusion

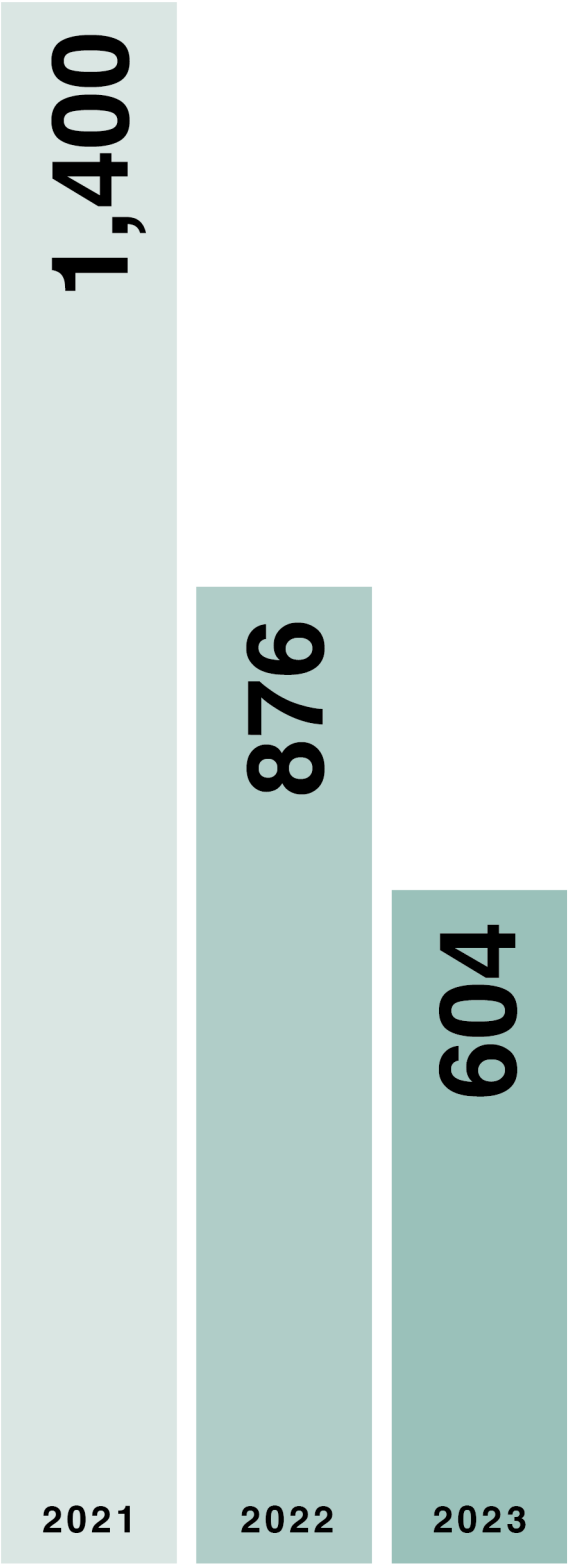
The prevalence data we have collected so far is compelling in its own right. At the most basic level it demonstrates that there is a huge amount of SUP out there in our recreational trail ecosystems. Approximately 9 million of them! Yet, on the flip side, we have shown that it is possible to gain a nuanced understanding of where and when SUP is escaping, thus gaining valuable insights into how to focus and tailor our mitigation and prevention strategies.

And, finally, what we have observed at locations like Yr Wyddfa and other sites in Machynlleth, River Elwy, Woburn and the Helipad Trail in Nepal gives us all the inspiration we need to continue building the world's first long term data set on the prevalence of SUP on recreational trails and the belief we can reduce SUP forever.

MACHYNLLETH FOCUS

BREAKDOWN: ITEMS BY YEAR

Based on comparable cleans, the amount of SUP found at the Pump Track and Recreational Grounds in Machynlleth, has dramatically decreased over the past 3 years.



The amount of SUP that is escaping into, and remaining in terrestrial ecosystems vastly outweighs that which escapes into our oceans. It is experienced by a great proportion of the human population every single day. Our data shows that a walker, runner or rider will observe a piece of SUP every 24 metres of their journey on average. In essence it is almost impossible not to encounter trash on our trails.

Yet despite that, where is the collective outcry? Elsewhere in this report we have talked about the use of blame and shame and the demonisation of the “litterbug”. But where is the positive call to arms? Where is our Blue Planet II, where is our informed and impassioned general public? Understanding the prevalence of SUP, we believe, is the fundamental first step in the process of informing and affecting change. But what comes next?

Further Reading

Law., 2017
Plastics in the Marine Environment

De Souza et al., 2018
Microplastics as an emerging threat to terrestrial ecosystems

Galloway et al., 2017
Interactions of microplastic debris throughout the marine ecosystem

Nelms et al., 2020
Marine anthropogenic litter on British beaches: A 10-year nationwide assessment using citizen science data

UNEP., 2022
Addressing single-use plastic products pollution

Environmental Investigation Agency 2020
Convention on Plastic Pollution Toward a new global agreement to address plastic pollution

Schulz et al., 2015
Statistical analyses of the results of 25 years of beach litter surveys on the south-eastern North Sea coast

Vriend et al., 2020
Rapid Assessment of Floating Macroplastic Transport in the Rhine

Gustavus., 2023
From Mountain Streams to Urban Rivers: An Assessment of Microplastic Sources and Characteristics

Syberg et al., 2020
A nationwide assessment of plastic pollution in the Danish realm using citizen science

Composition

The (Not So) Wonderful World of Single-Use Pollution

What makes up single-use pollution?

The ecological definition of composition in relation to flora and fauna species is; "The total number of different living organisms within a given biome or ecosystem. In a forest, the species composition would refer to all the different plants, animals, invertebrates, vertebrates, bacteria, and fungi within the environment".

With this in mind we define composition as;

> ***"the materials, uses, types, brands, sources and volumes of the single-use pollution items that we recover from our trails and wild places".***

Understanding the composition of single-use pollution is vital to understanding the 'story' of the litter; how it ended up in our ecosystem and how we begin to tackle the problem.

Our approach when analysing the composition of single-use pollution was guided by the following hypothesis; "The composition of recreational trail SUP items differs from marine and urban areas and varies with trail type, trail use and location".

Collecting data and the evolution of our methods

The aim of a TFT Trash Composition Survey is to establish the composition of the SUP removed within a defined area within which are recreational trails. From its first iteration, during our first ever Spring Trail Clean Tour in April 2019, our survey methodology has been designed to strike a balance between scientific accuracy, consistency and granularity and the ability and inclination of our citizen science volunteers.

The methodology has changed little since our first trail cleans and is as simple as laying out all removed items and organising them into universally understood categories before tallying them up.

We have quickly evolved from pen and paper. Upon receipt of seed funding for the State of Our Trails Report from Bosch eBike Systems in the summer of 2020 and Bangor University's acceptance of Dom's MRes proposal, our first action was to create an online 'Trail Clean Report' form.

As part of our commitment to scientific rigour and replicability, we have sought to translate established good practice from marine and beach litter monitoring programmes.

We have done this as far as possible, while making a deliberate decision to simplify their approach to categorising items. We are overwhelmingly dependent on the ability of citizen scientists to accurately record their findings. We have found that while a simplified framework theoretically risks losing granularity, this is countered by the value of an easy to use form and therefore a higher completion rate. As a practical example, imagine trying to categorise SUP after several hours of gathering trash in the rain; simplicity is therefore essential.

Our current checklist still contains 15 types and 73 individual items of single-use pollution. We believe it is the best balance of detail and pragmatic usability.

We are still evolving our approach. We have trialled using "Trash Category" cards to allow for quick sorting of gathered items on the ground. Even 15 types was too many for this process, so we are looking at alternative ways of sorting large quantities of gathered SUP.

We have also begun to conduct inferential statistics on all of our SoOT Report data sets. Our analysis suggests that there is a statistically significant difference in the total number of items found between SUP categories, most of the categories were statistically significantly different from each other, further supporting our belief in the importance of SUP composition monitoring.

Our findings

Perhaps the first point to address is how much of what was found could be defined as single-use pollution? For reference, we have created this specific definition of SUP:

> ***"Any mass consumption product/s or related materials, manufactured to be used once that have escaped the recognised waste disposal infrastructure and / or processes as a result of being discarded, disposed of, abandoned or lost within or adjacent to the ecosystems that recreational trails exist within".***

This also includes industrial / commercial items such as; forestry, farming, construction and recreational events. As well as potentially 'wind borne items' such as balloons and plastic farm silage wrap."

Over 81% of items recorded were defined as single-use pollution by respondents. We also asked respondents whether they went on to recycle the recyclable items that they found. 81% did so in 2023. As with much of our self-driven 'Do It Ourselves' ethos, this question had the dual purpose of the literal recording of the data and nudging people to recycle as much as they can.

Additional Methods & Assumptions

A lot of time goes into recording and reporting trash. So we make sure to respect the information by ensuring we use as much of it as possible. This means plugging some gaps. There are two assumptions we make.

The data tells us that the average distance travelled per trail clean is 3km. So if the data is incomplete then we use this value. Data also tells us that based on the average composition of a trail clean, one bin bag can hold 216 items of trash. This is used too.

TRASH REMOVED

BREAKDOWN: % SUP

A significant amount of the trash we find and remove from our trails is designed to be used just once.

80.9%
Single Use Pollution

19.1%
Not SUP

TRAIL CLEANS

BREAKDOWN: ITEM TYPES

The top ten item categories account for over 80% of all items. By far the largest type of trash we find are plastic bottles and Sweet and Crisp Wrappers. These alone account for 37% of all itemised items.

TRASH REMOVED

BREAKDOWN: % RECYCLED

The majority of people taking part in our trail cleans remove, report and recycle the trash that is found on our trails.

TRASH REMOVED

BREAKDOWN: DRS ITEMS

These items would be less likely to appear on our trails and would be responsibly returned if the DRS was brought into action as planned.

24,353

6,479
Alcohol Cans + Glass Bottles

17,874
Soft Drink Cans + Plastic Bottles

Deposit Return Scheme (DRS)

Plugging a knowledge gap

The UK Government itself estimates that 14 billion plastic drinks bottles and nine billion cans are used in the UK every year. Yet less than 50% of them are recycled, with Greenpeace and the CPRE estimating that over 8 billion drinks containers were wasted across the UK in 2019.

A Deposit Return Scheme works as a system to encourage the reuse and recycling of drinks containers by paying a small deposit (10-20p) for the container of the drink you buy which you get back when you return it to a collection point e.g. in a supermarket or shop.

24,353 of the 207,948 items of SUP recorded in our State of Our Trails Report were drinks containers that would be eligible for inclusion in an 'all in' Deposit Return Scheme (DRS).

> ***Our data so far suggests that DRS eligible drinks containers are the most prevalent (by numbers and volume) and harmful items of SUP on recreational trails.***

In fact, it is for this reason that we strongly disagree with the current stated intention of the UK Government to leave glass drinks containers out of the proposed DRS.

Battle of the brands

We have already explored the role that brands and companies play when it comes to manufacturing the products that quickly become single-use pollution. If we are to reach a point where we can legitimately campaign for them to take great responsibility, we need to evidence the prevalence of those brands on the trails. This is not an exercise in blaming and shaming; it is an observation of the current reality and a point from which we will seek to encourage those brands to implement Extended Producer Responsibility (EPR) guidance as a priority.

A total of 98 individual product brands have been recorded on our trails and wild places so far by our volunteer Citizen Scientists. Yet despite this long list, when it comes to the most frequently recorded brands, the usual suspects stand out. We're sure that it comes as no surprise that Coca Cola, Pepsi Co, Red Bull, Monster, Lucozade, Cadbury, Mars, and Nestlé feature prominently in our 'Top 20'.

They add time and complexity to the surveying process, and there may be an element of collector bias, as some products are easier/quicker to identify. Despite this, volunteer Citizen Scientists have still been able to contribute meaningfully in this area, and we are now able to present the 'Top 20 SUP Brands' found on the UK's recreational trails.

How our data compares

Brand audits are relatively well established in the UK. Keep Britain Tidy, Surfers Against Sewage and more recently Planet Patrol have all conducted surveys.

The key difference between ours and others is that Coca Cola was not the number one most prevalent brand in our 'Top 20'.

> ***This is highly unusual as Coca Cola is the most prevalent brand in all but one of the surveys***
> *(they are 2nd to McDonalds in KBT's survey).*

Although it doesn't tell the full story of their corporate responsibility for the SUP issue, this 'dominance' is likely, primarily a function of their huge market share. With more than 500 brands held under the label Coca Cola hoovered up 42% share of the global soft drink market in 2020. Why then are Coca Cola not the most prevalent branded item of SUP on our recreational trails?

And, perhaps more urgently, who is?

MOST FOUND BRANDS

BREAKDOWN: ORGANISATIONS

Different organisations with an involvement in single use pollution, compile their own lists of their most found brands. The table below compares these organisations with our findings. The results are interesting.

Brand	TFT	SAS	PP*	KBT
Lucozade	1	6	8	5
Coca Cola	2	1	1	2
Red Bull	3	25	4	4
Monster	4	23	6	
Cadbury	5	3	3	6
Walkers	6	2	5	10
PepsiCo	7	10		7
McDonalds	8	4	2	1
Stella Artois	9	17	7	
Strongbow	10	29	9	
Haribo	11	8		11
Mars	12	7		
Nestle	13	5		
Budweiser	14	18		
SIS	15			
Costa	16	12		15
Fosters	17	22		
Carling	18	43		
High 5	19			
Danone	20	50		

**PP - Planet Patrol*

1. Coloured circles highlight the top three per list.

2. Outlined circles signify the list has the brand placed higher than TFT.

3. Blanks indicate these brands didn't appear in the other lists.

TRAIL CLEANS

BREAKDOWN: BRAND FOCUS

Our detailed survey asks our volunteers not only what their most found brand was but also their second and third most found brands. These are the results.

Most Found Brand

Lucozade **18.1%**

Coca Cola **17.4%**

Red Bull **10.8%**

Monster **10.1%**

Cadbury **3.9%**

Second Found Brand

Coca Cola **15.0%**

Lucozade **13.2%**

Red Bull **9.7%**

Cadbury **7.1%**

Budweiser **4.4%**

Third Found Brand

Cadbury **9.5%**

Coca Cola **9.5%**

Lucozade **7.1%**

Red Bull **7.1%**

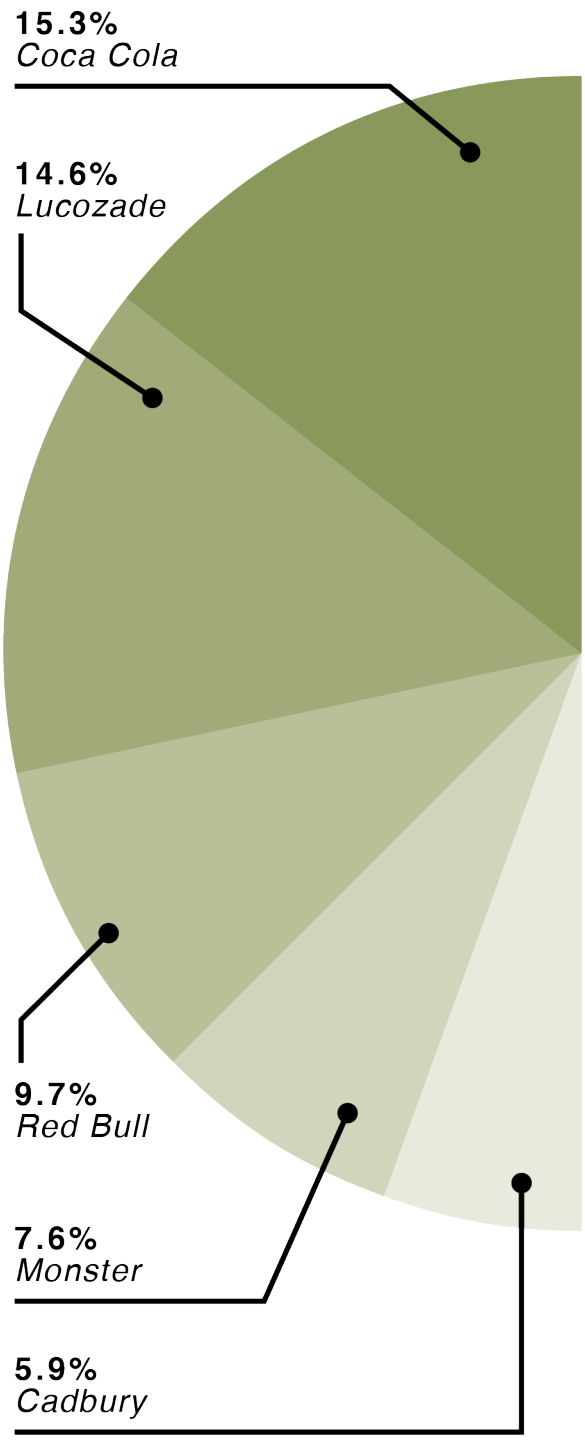
Walkers **7.1%**

TRAIL CLEANS

BREAKDOWN: BRAND FOCUS

The top five brands found account for over 50% of all brands found.

The most found brand across all positions (first, second and third most found) is Coca Cola. The most reported brand is Lucozade.



If you know, you know

Lucozade is the most prevalent branded SUP item on our recreational trails, based on the analysis of our State of Our Trails Report dataset. For those of us who have ridden, ran and roamed the UK's trails and wild places for any length of time, this may come as no surprise. However, in the national and global context of brand audits this is highly unusual. Lucozade has the fourth largest share of the soft drinks market in the UK, behind Coca Cola, Pepsi Co and Britvic respectively, but in terms of overall market value and sales, Coca Cola dwarves Lucozade in the UK.

Our hypothesis is that Lucozade is the most prevalent branded single-use pollution item on our recreational trails because of its identity as a 'Sports Energy Drink'. Many recreational trail users will view their activity as a 'sport', requiring challenge and exertion, and therefore additional energy. This may be particularly prevalent amongst those who are relatively new and/or novice trail users, and/or beginners in the activities that they are participating in.

This belief is further supported by the presence of Red Bull and Monster Energy in 3rd and 4th place respectively, the highest amongst our contemporaries' brand audits. Perhaps even more notably the presence of SIS and High 5 (sports energy gels, bars and hydration tabs) at numbers 15 and 20 respectively. Neither of these brands (or any comparable product brands) feature anywhere in the top 50 of SAS, Planet Patrol, KBT or Break Free From Plastic's (BFFP) global brand audit. It is likely these divergences reflect the kinds of products used and consumed by individuals in different environments for different activities.

Covid Crap!

An almost complete reduction in disposable face masks

The appearance (and disappearance) of Covid-19 face masks on our submissions tells a unique story. In many ways, the findings are not ground breaking; it makes sense that as fewer people carry an item, fewer in turn drop them (deliberately or by mistake).

If this applies to face masks, it can also

COVID spotlight

NO. OF LOCATIONS THAT MASKS WERE FOUND

150

% OF LOCATIONS MASKS WERE FOUND IN 2021

60 PERCENT

% OF CLEANS MASKS WERE FOUND IN 2021

55 PERCENT

TOTAL MASKS FOUND

830

Volunteer Focus

A-TEAMER

LUKE PENKETH

LOCATION

TAUNTON

TRAIL CLEANS

26

ITEMS REMOVED

390

TIME SPENT

29 HOURS

apply to vapes, disposable barbecues, and bottles of Lucozade. If individuals and communities are compelled to believe that they don't need an item, or their relationship to that item and its reputation changes we can expect a consequential reduction in related single-use pollution.

Conclusion

Why does composition matter? In some ways it doesn't. Litter is litter (well, litter is single-use pollution). But our research now means that we know more than ever about the make-up of the single-use pollution on our trails. We know the brands to speak to; we know the positive impact that a DRS has the potential to make. We know that single-use pollution isn't a static beast – it directly correlates with what people carry with them.

> ***These are hugely powerful revelations and will directly inform many of our next steps.***

Further Reading

OSPAR., 2022
OSPAR's vision is of a clean, healthy and biologically diverse North-East Atlantic used sustainably

MCS., 2023
Beachwatch Report 2022: What you found

GESAMP., 2019
Guidelines for the Monitoring and Assessment of Plastic Litter in the Ocean

KBT., 2020
Litter Composition Report

Planet Patrol., 2022 - 2021
Litter Impact Report

SAS., 2023 - 2023
Citizen Science Brand Audit

Darrah et al., 2019
Analysis of Branded Items found on UK Beaches

Euromonitor International., 2023
Soft Drinks Industry Analysis

Hogg et al., 2022
Impacts of a Deposit Refund System for One-way Beverage Packaging on Local Authority Waste Services

Break Free From Plastic., 2022
The Brand Audit Report 2018 - 2022

Ecological Impacts of Single-Use Pollution on Recreational Trails

More than an eyesore?

Scientific understanding of the impacts of single-use product pollution directly upon recreational trail ecosystems is scarce if not non-existent. However, what is already known about the impacts of plastic pollution on aquatic ecosystems, in combination with the growing understanding around microplastics in soils, justifies urgent investigation.

In a short time period we have sought to:

> *Establish an understanding of the impacts of single-use pollution on the flora and fauna of recreational trail ecosystems through in-situ ecological monitoring, to establish differences in floral community composition.*

> *Develop a methodological framework for future research*

> *Enable volunteer Citizen Scientists to accurately record and report instances of animal interaction with SUP as a key element of their 'Trail Clean Trash Surveys'*

At this stage, our aim is to demonstrate statistically significant impacts on the environment across the small number of monitoring sites we have established this year.

We have focused our investigations across three areas: impacts to flora, impacts to fauna and an analysis of soil composition for the evidence of microplastic build-up.

Methodological development

A short story

The problem with conducting research in a new area is there is no methodology to pick up and follow. We want to make sure that all of our research is contributing to a wider understanding of single-use pollution in a scientifically valid way. That means a rigorous approach and a repeatable methodology.

Measuring the impact of anything requires knowing when it was introduced to an environment. In the case of single-use pollution, that means knowing exactly when it was dropped and leaving it in situ to see what happens. In essence that means creating an artificial and protected littered area. This opened up two challenges:

> ***How do we convince a land manager to allow us to "dump some litter in the forest"?***

And how do we manage the moral and health and safety implications of leaving single-use pollution in the ecosystem?

We worked closely with Natural Resources Wales (NRW) and agreed a methodology where no 'new' single-use pollution was brought into the forests. Instead, we conducted a trail clean on adjacent NRW land and transplanted the SUP found to our experiment sites. This addressed the ethical dilemma that any introduction of SUP would potentially be an act of harm to the environment.

We set up 5m^2 experimental plots and controls, well away from trails to minimise the risk of human interaction. In each plot we placed an identical selection of single-use pollution. We then monitored changes to flora and signs of animal interaction over a set period.

Pandora's box;

The real world damage SUP is causing

Before we move on to the more concerning results of our research, let's look at the positives. Despite the recognised loss of biodiversity in the UK, our woodlands are diverse and flora and fauna rich. In the three beautiful forests that we chose to conduct this study - Coed y Brenin, Beddgelert and Gwydyr - we were able to identify seventeen separate species of forest flora across three locations, including; Common Tamarisk, Stripe, Wall, Haircap, Catherine's and Big

Shaggy Mosses, Brambles, Common Hazel, the Dogs Mercury, Great Wood Rush, Ivy, Bilberry, Silver Sitka Spruce, Western Red Cedar, White Cover, Oak, Soft Shield and Buckler ferns, Honeysuckle & various fungi.

The sites were criss-crossed by deer tracks, and we noted signs of or saw: ants, badgers, rodents including voles, squirrels, rabbits, foxes, spiders, ants and woodlice.

Flora Impacts

Our in situ ecological monitoring has demonstrated a clear visible impact of single-use pollution on forest floor flora growth. It makes sense (but is no less impactful) that as single-use pollution takes up space on the forest floor, there is simply less room for flora to grow and thrive, and our results support this theory. In itself this is hugely concerning. Using our estimate of 9.1 million items of SUP currently littering our trails and wild places, and multiplying that by the footprint of a 330ml Coke can of 84.1cm2, we get a figure of 1,891 acres of forest, moor and mountain floor is being suffocated by SUP. In a moment of sad irony, that's almost exactly the same area as the 1,728 acres of Beddgelert Forest, which hosted two of our experimental sites.

**Calculation conducted using the dimensions of a 330ml Coke Can [5.8cm x 14.5cm = area / footprint of 84.1cm2] as an example = 7,653,100m2 = 1,891 acres.*

What we haven't yet been able to demonstrate is whether there is a statistically significant, negative relationship between flora growth and SUP deposition. As yet, we have found no significant differences in total coverage and plant coverage between the control and experimental sites at the Coed y Brenin, Beddgelert and Gwydyr sites.

However, there are some interesting early findings, when looking at the data through a seasonal lens. From this we can deduce that higher sites are more impacted by SUP presence during the spring season and lower sites during the summer season.

At this stage, it is important to re-state that this stage of the research is as much about the efficacy of our methodologies as it is the findings. It is from this perspective that

Flora Focus

NO. OF SITE VISITS

60

NO. OF IMAGES ANALYSED

560

RESEARCH TEAM HOURS

790

AVERAGE % OF SUP

0.65 PERCENT

AVERAGE % OF FLORA

34 PERCENT

we are pleased to state that our proposed approach, through which to establish an understanding of the impacts of single-use pollution on the flora of recreational trail ecosystems, is sound. We intend to continue using this method in future research.

We remain concerned that SUP appears to impact flora beyond simply covering it up. Preliminary findings in this pilot study suggest that longer projects that can observe seasonality across more sites over a duration at least 48 months, could see differences in floral community composition.

While more work is needed to completely understand the mechanisms at play (and these vary depending on type and quantity of SUP, type and quantity of flora, time of year, weather, etc.), we observed several effects:

- Bleached foliage near glass and plastic bottles, potentially due to a greenhouse or magnifying glass style effect
- Dry ground in similar conditions to above
- Plants & moss growing through SUP
- Flat spots in moss, flattened foliage, holes in cover

Fauna Impacts

Our in-situ experimental observations of fauna interactions and impacts were supplemented by and compared to responses to our Trash Count Survey gathered since July 2020. Of all respondents to the questions on fauna interaction, 32% confirmed signs of interaction with the SUP they removed. Of those, 21% reported animal deaths in the form of methanogenesis, remains and/or bodies.

Observations at our experiment sites mirrored these statistics closely. Faunal interaction was variable across all experimental sites and across months with a maximum of five interactions recorded per month and a minimum of zero interactions. In total, 112 observations of animal interaction were recorded, during the total of 60 monitoring visits. These covered small, medium and large fauna, insects and other invertebrates through to mammals. There was a statistically significant difference between Gwydyr Low site in comparison with all other sites, with a higher rate of animal interaction recorded.

ANIMAL IMPACTS

BREAKDOWN: MONITORING SITES

Three sites were monitored monthly, in detail. Part of this detail included animal interactions. Below are the results.

Interaction	G	C	B	Tot
Chew Marks	4	1	1	11
	0	0	5	
Chew Throughs	6	1	0	14
	4	1	2	
Rip / Shredding	1	0	1	2
	0	0	0	
Floor Shavings	3	0	0	5
	0	1	1	
Carried / Moved	8	1	2	13
	1	0	1	
Nesting	10	4	0	32
	8	3	7	
Methanogenesis	6	1	0	8
	0	0	1	
Invertebrate Death	1	0	0	6
	3	2	0	
Mammal Death	0	0	1	1
	0	0	0	
Faunal Activity	3	9	0	20
	1	6	1	
Total	**59**	**30**	**23**	**112**

G: Gwydir

C: Coed Y Brenin

B: Beddgelert

Light Green: Low Site

White: High Site

Tot: All sites

Below is a sample of the kind of interactions we observed:

- A 'Science in Sport' (SIS) gel sachet with clear chew/shred marks within one month of the start of the experiment
- Microplastic shavings from animal chewing on the forest floor
- Crisp packets and polystyrene packaging torn to shreds
- Other peck/chew marks and signs of transportation
- Packets found with woodlice and worms on/inside
- Mammal footprints and scat through the sites, including badger and deer
- The remains of a bank vole (an ecosystem keystone species) in a glass beer bottle

In short, there was clear and widespread animal interaction. We know that those interactions have led to animal death. We also know that there is a likely mechanism for microplastics entering the food chain and soil ecosystem.

Soil Composition

Microplastic pollution is a ubiquitous problem in every single environment. There is no true environment that is microplastic free.

> ***Microplastics have been found in snowfall in Antarctica and in human blood.***

There have been many excellent studies on the impact of plastic pollution in the marine environment (some showing negative impacts on corals for example), however very little has been done in terrestrial environments. Soils have various pH, organic content, food webs and nutrient availability which may affect how these plastics break down. It is therefore important to study the source-to-sink of macroplastic to microplastics in soils, as these accumulate and/or are transported into rivers and seas, exacerbating the problem.

Our samples

Twelve soils samples were collected from three of our experiment sites. The samples

were sent to CGG Geoscience Laboratories for analysis. The control samples of each site showed very little amounts of microplastic pollution. However, it is clear that there is a background level of pollution already in the soils, before the experimental plots were implemented. Microfibres appear to be the dominant pollutant in these areas, with fibre length averaging around 200µm. However, the level of pollution was quite low; our screening process suggests that the average microplastic content in soils in these sites are around 2%.

After the initial baseline study, samples were collected from our experimental plots that had single-use pollution randomly placed within them. Microfibres still dominated the main type of pollution, however the length of the fibres reported are significantly larger, with the mean range of lengths between 600-2500µm (2.5mm), with some anomalous fibres exceeding 7000 µm (7mm). Fibres of this size were observed in all the samples.

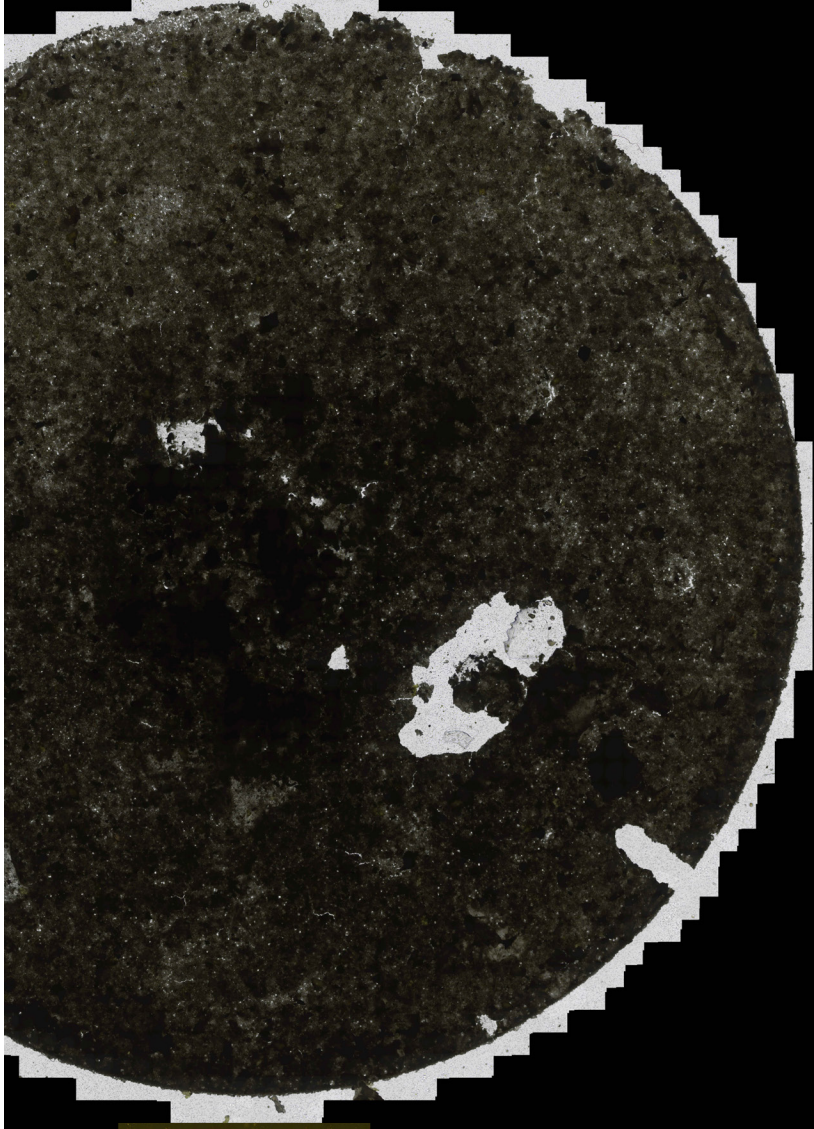
In addition, the average microplastic content went up; by as much as 8% in one location, but consistently by at least 1%. Each site has varying results, this may be for different reasons such as soil type, UV radiation intensity due to canopy cover, water exposure, extreme temperatures, and abrasion. What must be noted is the foot traffic at each site, which increases the intensity of change there. An example are the Coed y Brenin sites, which had the largest increase in microfibres but had the lowest initial plastic content in the soil.

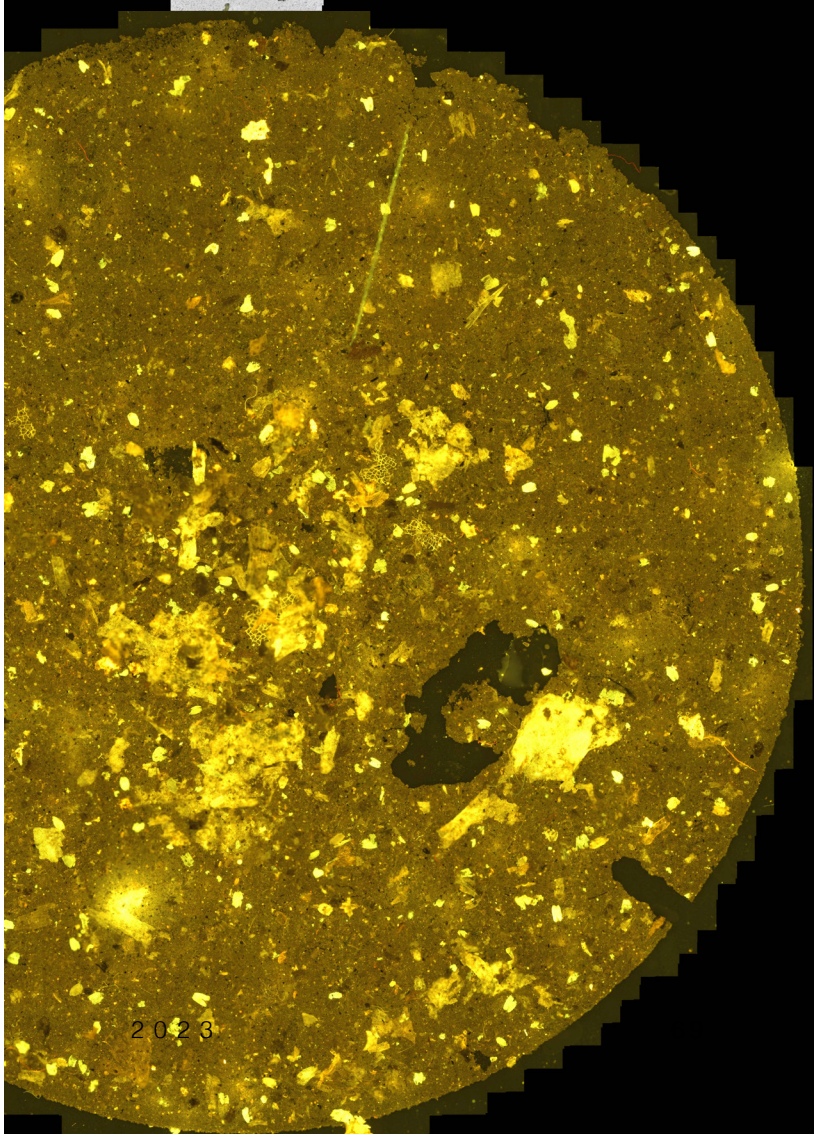
Microscopic soil sample images

The top image on the right shows a soil sample from the Beddgelert plot after digestion and separation. This is recovered on a plastic free filter paper and imaged for analysis.

The bottom image uses a blue light filter with the same soil sample. However, with the change in light source, different features of the soil are now visible. Fibres seen in this light source fluoresces orange, with the exception of the large fibre bundle at the top (7200um or 7.2mm) which fluoresces green.

This light source is very useful to look at the soil makeup with the pollen and burnt wood that is in this soil captured.





Conclusion and next steps

Despite the relatively small scale of this study in terms of location and length, the findings are both statistically significant and concerning. They suggest a clear deleterious impact of single-use pollution on all aspects of a typical forest environment.

> ***When combined with what we now know about the prevalence and composition of single-use pollution, our findings already represent a very clear and urgent warning.***

Even more worryingly, we aren't yet able to quantify with scientific confidence the total damage that is being done. As such, there is a pressing need to continue the research that we have started. We are confident that our methodological approaches are fit for purpose to continue this research – and will publish and share the methodologies to enable others to contribute.

Much of this work is beyond the realms of typical voluntary Citizen Science; due to the time commitment and relative complexity. Some elements are expensive – such as analysing the invertebrates collected within the soil samples for microplastics – and as such will require additional funding and collaboration with other organisations.

Further Reading

Bucci et al., 2020
What is known and unknown about the effects of plastic pollution: A meta-analysis and systematic review

Nielsen et al., 2023
Unfolding the science behind policy initiatives targeting plastic pollution

Tinya et al., 2021
Environmental drivers of forest biodiversity in temperate mixed forests – A multi-taxon approach

Bosker et al., 2019
Microplastics accumulate on pores in seed capsule and delay germination and root growth of the terrestrial vascular plant Lepidium sativum

Romtiti et al., 2021
Quantifying the entrapment effect of anthropogenic beach litter on sand-dwelling beetles according to the EU Marine Strategy Framework Directive

Morris et al., 1965
The Occurrence of Small Mammals in Discarded Bottles

Kolenda et al., 2021
Online media reveals a global problem of discarded containers as deadly traps for animals

Lange et al., 2017
The prevalence of plastic bag waste in the rumen of slaughtered livestock at three abattoirs in Nairobi Metropolis, Kenya and implications on livestock health

Buks et al., 2020
Global concentrations of microplastics in soils – a review

Rillig et al., 2012
Microplastic in Terrestrial Ecosystems and the Soil?

Zaglhoul et al., 2020
Biological indicators for pollution detection in terrestrial and aquatic ecosystems

Zhang K et al., 2021
Understanding plastic degradation and microplastic formation in the environment

Heather A. Leslie et al.,2022
Discovery and quantification of plastic particle pollution in human blood

Aves, Alex Revell et al., 2022.
First evidence of microplastics in Antarctic snow.

Santillo, D., K et al., 2019
"Plastic pollution in UK's rivers: a 'snapshot'survey of macro-and micro-plastic contamination in surface waters of 13 river systems across England, Wales, Scotland and Northern Ireland."

Corinaldesi, C., et al., 2021
Multiple impacts of microplastics can threaten marine habitat-forming species.

Impacts: Human

What is human the cost of trash?

What do we mean by human impact?
"Litter" is one of the most harmful acts individual visitors can perpetuate on the environment. The damage that SUP causes, however, goes far beyond the environmental impacts. It has a real diminishing effect when it comes to the restorative qualities of the great outdoors.

Research has already shown that the presence of SUP has a negative impact on visitors, in the form of visual pollution. It is a universally relatable emotion; the sinking feeling as we round a corner in the woods to be confronted by the sight of something that doesn't belong there.

Research from Ordnance Survey, found that; "the most unpleasant misdemeanours to upset Brits out walking" was dropping litter (78%), not picking up dog mess (71%) or leaving poo bags on the side of paths (71%), with a third of respondents stating that they "felt very strongly that walking was made less enjoyable when others disrespect the environment". The picture is bleak when you read this in conjunction with our own prevalence data. In effect, virtually every single outdoor experience that we have will be adversely impacted by the sight of SUP.

Fortunately, there is some good news to balance this. There is a growing body of work that has examined the broader benefits associated with conservation volunteering activities. One such study reported that beach cleans were rated as the most 'meaningful' coastal activity, associated with positive mood, higher marine awareness and pro-environmental intentions.

To explore the impact of SUP on our experience of the outdoors in more detail, we need to better understand the negative effects. How damaging is the presence of litter to our ability to connect with wild places and enjoy all the associated health benefits? Can we measure the positive impact and sense of connection that trail cleans bring? We are excited to already have new findings to contribute to the existing body of research.

Volunteer Focus

A-TEAMERers

MARV, JOHN, ROSS AND HELEN

LOCATION

EASTRIDGE

TRAIL CLEANS

19

ITEMS REMOVED

400

TIME SPENT

29 HOURS

Methods

How do you measure the emotional impact of single-use pollution? How do you begin to quantify something that for many of us is a gut feeling? We have used various methods to understand this: spoken to our own community face-to-face; communicated by harnessing the power of social media; and utilised pre-existing surveys. Here's a quick summary of our main research streams:

METHOD 1

Clockwork Orange, October 2022

We used Instagram Story sets exploring disruption to enjoyment of nature caused by single-use pollution. 'Happiness' was measured on a slider scale sticker to establish if seeing SUP in the landscape lowered this, as well as qualitatively asking if and how SUP is disruptive to enjoyment of place. Around 50 people participated in the slider activity.

METHOD 2

Nature Connection Online Panel Discussion, October 2022

An online 75 minute public panel discussion with five panellists representing expertise across nature connection, outdoor and transformative learning. The results discussed in this impact section relate to thematic findings around the benefits of nature connection and the role of SUP removal.

METHOD 3

Semi-Structured Interviews at Kendal Mountain Festival, November 2022

These interviews gained a qualitative understanding of meanings and feelings of connection with nature, as well as the barriers and disruptors to experiencing this.

METHOD 4

Nature Enjoyment Disruption Scale: Cycling World Championships, August 2023

During this event, we asked people to indicate on a scale to what extent seeing SUP affects their enjoyment of trails and wild places; ranging from not at all through to not being able to enjoy a place at all.

METHOD 5

Pathway Narratives, Summer 2023

The A-Team and wider TFT ecosystem were invited to reflect on questions informed by the pathways to nature connection (based on existing research). These questions captured experiences of nature local to the participants. They also encouraged reflection on context-specific experiences of trails and single-use pollution.

METHOD 6

Trash Survey Data: Ongoing

As well as recording prevalence and composition counts, the Trash Survey captures quantitative data relating to people's experiences during the removal of trash and the benefits that come from this, such as connection with nature, pro-environmental intention, and social outcomes.

Negative Impacts: Disruption of enjoyment & negative emotions

Results 1: Single-use pollution and the disruption of enjoyment

In our Clockwork Orange Instagram experiment, participants expressed a considerable reduction in their enjoyment of the landscape/trail image after seeing an image of SUP; an average of 95% enjoyment, lowering to 40% enjoyment. When asked if SUP was disruptive to enjoyment of place, the answer was a unanimous "yes" which participants expressed not understanding the "lack of respect for others/place" and a sentiment of "humanity not living up to ideals".

There was a similar story during our in-person data collection at the Cycling World Championships in Scotland in August 2023, where when asked to rate how far SUP disrupts enjoyment of nature, the vast majority of people's said 'a lot', with many 'not able to enjoy a place at all'

What does that mean?

The reduced enjoyment overall leans towards the hypothesis that the 'visual noise' of single-use pollution can have a negative impact on an individual's enjoyment of images of place. The findings

also showcase how individuals also relate this to their own lived experiences, not just in visual representation on social media. The apparent ambivalence in dropping single-use pollution, arguably fuelled by the disconnection discussed in the Causes section is contrasted and matched by the strength of this reaction.

Results 2: Feelings associated with encountering single-use pollution

So why is there this disruption of enjoyment? Our qualitative methods can help shed light on some of the reasons for this, particularly the feelings generated when seeing single-use pollution:

- Angry / frustrated / annoyed / confused
- Sad / upset / disappointed
- Hopeless/it is normalised/ reminder of reality
- Disrespect
- Surprised
- Enjoyment disrupted / negative image
- Motivates removal

These themes demonstrate the variety of emotions, ranging from anger to sadness, to it being a reminder of reality, arguably creating desensitisation in some places, and heightened sensitivity in others.

> ***"I still feel some anger and despair, particularly if it's somewhere I regularly trail clean." –***
> *A quote taken from our research.*

As well as an acknowledged disruption of enjoyment we also recorded a negatively affected sense of connection with nature. Our findings demonstrated the complex relationship between single-use pollution and nature connection. Many stated that seeing SUP in the environment made them feel less connected to nature, but respondents also shared feelings of feeling more connected (or both even both more and less), potentially as a protective response.

> ***"Single-use pollution feels like a stain, or a scar.***

> ***A tear in a beautiful painting acting as a reminder of how far away from nature many people have fallen"***
> *Pathway Narratives survey quote*

What does that mean?
Beyond noting the emotions identified in these results, can we draw any other conclusions? The strong reactions identified may result in deeper divides between those who don't engage in littering behaviour and those who do. The notion of single-use pollution being a 'reminder of reality' when on trails and in wild places further perpetuates the divide between 'litter' being the norm in certain contexts and places, and infuriating people in others, but shows a consistency in the dropping of SUP in both of these spaces.

Conclusion
The results confirm what we know; the presence of single-use pollution on our trails elicits negative feelings from those who observe it. What else can we conclude?

The negative feelings associated with the encounter of single-use pollution demonstrate an emotional response. This is at the opposite end of the spectrum from the disconnection discussed in the 'causes' section of this Report, which implies a lack of awareness, care, or possible desensitisation to both the presence of 'litter' and the dropping of it. Further research needs to be undertaken to understand this polarised experience.

The sparks of anger, frustration and sadness recorded demonstrate our affection for the places that we feel are being threatened or damaged. People care. And if people care they have the potential to catalyse a positive impact. For Trash Free Trails to be successful we must harness and direct that emotion.

Positive Impacts: Bags full of trash, minds and hearts full of nature
Trail Cleans represent one pathway in particular, towards participants feeling compassion. Compassion demonstrates a sense of empathy, care, and tangible positive action for nature. This section explores the TFT landscape of Citizen Science and Trail Cleans as a way of (re)connecting people with nature through the meaningful act of removing SUP from recreational trails, and the moments of connection that occur alongside and intertwined with SUP removal, merging and amplifying benefits for people, nature, and science. Here we can understand how trail clean participation, whether self-led or community-organised can help people 'walk the path to connectedness' (Lumber et al., 2017).

> ***Trash Free Trails as 'facilitating the pursuit of nature connection'***
> *Nature Connection Online panel*

Results 1: Positive impacts of trail cleans: personal, social and nature

We already know that Trail Cleans have a direct positive impact on the local environment. They also have an overwhelmingly positive influence on the individuals who take part. Thematic analysis of our qualitative data shows the diverse positive impacts and perceptions of Trail Clean participation.

Self

> ***"I am hyper aware of things around me, knowing what shouldn't be there, where to look. I feel focussed and with purpose. After a trail clean I feel proud and a sense of achievement"***
> *Pathway Narratives survey quote*

Over 90% of people in our Trash Survey stated that they have positive feelings after taking action and conducting a trail clean.

Social

> ***"It gives me hope amongst my sometimes***

> ***overwhelming climate anxiety that there are other people taking time to care for the places they love too!"***
> *Pathway Narratives survey quote*

65% of people in our Trash Survey said they had met new people while conducting a trail clean.

Nature

> ***"Connection is made when revisiting a place that leaves you feeling more positive than before, and that deserves nurturing, care and attention in return"***
> *Pathway Narratives survey quote*

Over 90% of respondents to our Trash Survey stated that they felt more connected with nature after a Trail Clean. Virtually all (over 99%) said they would take part again, demonstrating a pro-environmental intention.

Results 2: Leaving a positive trace, creating ongoing impacts

Unpacking the nature connection benefits of the above findings helps us to understand why they extend beyond the boundaries of the Trail Clean itself. Thematic analysis of our various qualitative methods describe what nature connection means and creates for this community:

- Social / sense of community / cohesion
- Change in perspective on nature/ world
- Empowerment rather than overwhelm
- Change in perspective on self
- Sense of purpose
- Inspiration / creativity
- Improved well-being
- Belonging
- Freedom / escape
- Empathy
- Sense of familiarity/closeness with nature
- Joy
- Peace / calm
- Gratitude

Volunteer Focus

A-TEAMER

ALI HAIR

LOCATION

STIRLING

TRAIL CLEANS

6

ITEMS REMOVED

1,800

TIME SPENT

10 HOURS

The symbiotic benefits and impacts of this connection is beautifully captured in the following quotes; personal significance of trails mirrored by feelings of empathy towards nature and the desire to protect these 'gifts'.

> ***"They are my safe space, my haven. They are where I escape to when I need to recharge and when I have energy, I am drawn to them for excitement, awe and beauty."***
> *Pathway Narratives survey quote*

> ***"I'm sorry for what we have done to you but I hope that you know that for some of us the tide is turning and we are finally understanding that what you've given to us is a gift that's worth protecting"***
> *Pathway Narratives survey quote*

Conclusion

We recognise and are inspired by the different ways in which people are motivated to care for trails and wild places, and how this motivates single-use pollution removal. The individual ingredients of the positive feedback loop are not prescriptive, but full of emotion and personal experience. Despite this, at its core, in the middle of that loop, is connection in its various forms and meanings.

Where does that leave us?

This section has demonstrated the intertwined relationship between single-use pollution and nature connection.

We must recognise the real and damaging impact of encountering trash on recreational trails. We know and have all experienced the negative emotions punctuating and disrupting our enjoyment of a run, ride or walk.

SUP (or the removal of it) also has the power to be a catalyst for transforming this negative into an abundance of positives.

Through its removal, single-use pollution can be reconceptualised as symbolic of reconnection – picking up trash whilst simultaneously picking multiple benefits, such as a sense of community stewardship, positive feelings, and pro-environmental empowerment – showing how impacts can transcend the length of the trail: leaving a positive trace and creating ongoing connections.

Great things happen when action (removing SUP), citizen science (recording data), a sense of community (stewardship), and being on trails (nature engagement), all combine.

Further Reading

Cherrier., & Türe. 2022.
Blame work and the scapegoating mechanism in market status-quo.

Lumber., et al., 2017
Beyond knowing nature: contact emotion compassion meaning and beauty are pathways to nature connection.

Ordnance Survey 2021
https://www.ordnancesurvey.co.uk/newsroom/news/new-research-reveals-brits-frustrations-around-lack-of-walking-etiquette

Pocock., et al., 2023
The benefits of citizen science and nature-noticing activities for well-being, nature connectedness and pro-nature conservation behaviours.

Richardson., & Butler., 2022.
The nature connection handbook: A guide for increasing people's connection with nature.

Schultz., 2002
Inclusion with nature: The psychology of human-nature relations.

Schuttler. et al., 2018
Bridging the nature gap: Can citizen science reverse the extinction of experience?

Vining. & Merrick, 2012
'Environmental Epiphanies: Theoretical Foundations and Practical Applications',

Wyles., et al., 2016
Can beach cleans do more than clean-up litter? Comparing beach cleans to other coastal activities.

Manifesto

Our Trash Free Manifesto For Change

We have framed this Report as one of the most comprehensive views of the state of single-use pollution on our trails possible. It would not be that view without a forward look, one that emphasises how we will achieve meaningful, long-lasting change to achieve our mission.

The Trash Free Manifesto outlines 5 Areas for Change, crossing terminology, policy change, innovation in education and business, and the vitality of international action on plastic pollution. This Manifesto reflects what we believe is the most comprehensive plan to tackle single-use pollution, one that almost anyone, anywhere, can contribute to. With each Area For Change is a tangible action you can take to bring us closer to a trash free future.

1

Single-Use Pollution.

Let's call it what it is.

We stand for: society-wide change in the terminology and tone that we use to describe the issue, from 'litter' to 'single-use pollution'.

FACT - 81% of recreational trail litter was classed as single-use products by TFT SoOT Report citizen scientists.

In 1953 an alliance of American packaging industry corporations came together to form Keep America Beautiful (KAB). Coining the term 'Litter-Bug', they made a strategic decision, which permanently shifted the burden of responsibility from the manufacturers of single use products to their consumers. It was here the Western 'anti-litter' movement was born.

2023 is the 70th birthday of KAB and it is time to admit that it has failed. Countless numbers of governmental, commercial and non-profit organisations, initiatives and campaigns have formed to tackle the 'Litter-Bug' issue, Yet, the numbers (and outrage) continue to steadily rise.

So, before we can even begin to think about tackling the problem of "litter", we need to rethink the very foundations of the problem; what does litter really mean?

Litter Is A Bad Word

The origins of the term 'litter' and 'litter-bug' render the term fraudulent. As such, it is a morally corrupt term that has become laden with pre-conceived and polarising associations. Furthermore, litter is a technically inappropriate term for the items of human made detritus that escapes into all ecosystems on Earth.

What should we call it?

Let's call it what it is. Pollution. There is clear and growing evidence that this human made detritus is harmful to the health of the ecosystems that it escapes into. This is the definition of pollution, and we should not avoid it any longer.

What's more 82% of the recreational trail litter removed as part of this report, was classed as single-use products by our Citizen Scientists. This means that the most accurate and appropriate term that we currently have at our disposal is single-use pollution (SUP)

Does it really matter?

The terminology we use to discuss environmental harm is hugely important to the outcome of that discussion. It is easy to bury the state of our environment in terminology that poorly reflects reality, or disguises subtextual inferences based on bias and polarisation. We refuse to contribute to that narrative anymore.

Why Are We Championing This Change?
We believe that this simple change can help to reset and refresh the movement to tackle SUP. By changing the terminology we can shed decades old preconceptions and exemplify a new 'shared responsibility' approach.

In service of this Area For Change, we are calling for:

- UK Government to recognise that the term SUP is a more accurate and appropriate term to classify the human made, mass consumption related items that have escaped from the recognised waste management infrastructure, into the environment.
- Global media to share the origin story of the 'Anti-Litter' movement in order to encourage new and critical thinking on the issue.
- NGOs working on the issue, to use the term SUP and emphasise what we are 'for' rather than what we are 'against' as motivation to act.
- Consumers of single-use products to acknowledge their primary role in the SUP issue.

2 Connection first

We stand for:

Active (re)connection between people and nature; using the simple act of care that is represented by a trail clean as a tool for starting a journey towards that relationship.

FACT: Over 90% of respondents to our Trash Survey stated that they felt more connected with nature after a trail clean, and over 99% of people said they would take part again.

(Re)Connection is key

We believe that single-use pollution removal is symbolic of wider nature (re) connection. Facilitate the diverse benefits of nature connection, it is a tangible way of expressing that connection in actively contributing to the well-being of places and nature. By embracing this approach, anger-orientated litter associations can be transformed into positive narratives of connection and compassion, and in doing so create a positive feedback loop that helps tackle what we believe to be the root cause of SUP; disconnection.

Connection with nature creates ongoing benefits; personally, socially, and ecologically. In further understanding, celebrating, and facilitating this (re) connection, benefits can be created that extend beyond the length of the trail.

We are calling for a nationwide focus on active (re)connection between people, places and nature. The benefits of leading a nature-abundant and connected life are widely evidenced both in this Report and in further research. To support this, we also need to remove barriers to accessing the outdoors; that's why we will continue to champion the aims of the Right to Roam campaign.

It is clear that there are overwhelming benefits to engendering this connection at an early age, forging a lifetime relationship. We must provide young people with the opportunity to experience, and learn from, the natural world – repositioning outdoor education as essential in their growth and development.

How can we do this?

By filling as many bags full of trash and minds and hearts full of nature as we can, across a diverse range of communities and places. This means providing opportunities for people to access nature and help them follow a path to reconnection. Our TrashMob Academy programme has already been hugely successful, and we will continue to develop the scheme as well as making the content available to educators.

In 2024, TFT is launching the Purposeful Adventure Fund to support organisations, funds and individuals that are providing opportunities for people that have never experienced nature. The Purposeful Adventure Fund will become a place where communities, individuals and leaders can come to seek funding to make access to nature more available to people who need it the most.

This goes beyond our own actions though. We believe that outdoor education can no longer be an optional frill alongside the mainstream curriculum. The time has come for students, pupils and educators to be in, with, and for nature as part of their journey through the system. We will campaign for, and support moves to instate this.

What are we championing?

- Education in, with and for nature to be embedded in the mainstream curriculum.
- The recently announced Natural History GCSE, due for a 2025 launch. This is an opportunity for young people to be nature-literate, to learn about British wildlife and how it relates to the rest of the world for the first time in the history of the UK Curriculum.
- Providers of recreational and adventurous activities to inspire the pursuit of purposeful adventure that positively contributes to self, place, and nature, recognising not just the personal importance of time outside, but how these activities can be a catalyst for diverse benefits relating to well-being, communities, and ecosystems.
- Campaigns, movements & communities with a focus on the promotion of access to nature such as Right to Roam. Without the opportunity to experience nature, we cannot ask people to protect it, and it's important we are able to make nature (re)connection accessible to as many as possible.

3

No brainer policy change. NOW.

We stand for:

The UK Government to finally implement and enforce:

- Ban disposable vapes with immediate effect
- An 'all in' deposit return scheme (DRS)
- Extended producer responsibility (EPR) legislation for single use packaging
- Implement the recommendations of the High Ambition Coalition (HAC) of over 50 governments (including the UK) to end plastic pollution by 2040

FACT: In 2020, no Trash Count Report submissions reported disposable vapes. By 2021, 50% of all reports included them. In 2023 so far, 100% of surveys have reported the removal of disposable vapes.

FACT: we throw away 2 million single-use disposable vapes every week in the UK alone

Dispose of disposable vapes for good

We have recorded an exponential increase in the number of disposable vapes being found on our recreational trails since 2019. Worryingly, our early findings suggest that the rise is most prevalent in the trail type that we define as; 'Urban Green Spaces - Such as; playgrounds with trails running through/ across/around them'. Or in other words, where children play.

Disposable vapes are sealed units, powered by a rechargeable, lithium-ion battery and they should not be 'disposed' of via the 'general' municipal/public waste stream, due to the potential for fire and toxic contamination.

While no single-use pollution belongs in our environment, disposable vapes are the definition of a pointless, damaging product. As such, we will push for the banning of their sale from the earliest possible opportunity.

FACT: 24,353 DRS suitable drinks containers were recorded, making up 12% of the SUP items reported by TFT Citizen Scientists.

FACT: The number of single use plastic carrier bags found on the UK's beaches from a high of 13 on average in 2013, to just three in 2021.

FACT: DRS can be highly effective, with collection rates close to 100 per cent in some cases.

The facts about DRS

Deposit Return Schemes (DRS) are a powerful policy mechanism that can enable high collection and recycling rates for clean, single-use packaging. They are already in place in 10 European nations and at least 25 further afield. And, there is clear evidence that shows when implemented correctly, they can be highly effective, with collection rates close to 100 per cent in some cases. The UK Government has

itself conducted cost-benefit analyses on a DRS, showing that it will be worthwhile in the long-term. Research conducted by Zero Waste Scotland found that 70% of people in Scotland "want" a DRS and that £62 million a year could be saved tackling the indirect impacts of single-use pollution.

Why are we waiting?

As far back as 2017, a Deposit Return Scheme was on the cusp of introduction. Thanks to years of campaigning by many of the organisations that we now work closely with, then Prime Minister, Theresa May and Environment Secretary Michael Gove supported the roll out. Amidst the constant political flux that seems to have followed the snap election later that year, momentum towards a DRS has been lost. Worse than that, the delay has allowed those opposed to a scheme – within the drinks industry and beyond – to redouble their efforts to block it. We are seeing similar delays and blocks to the proposed DRS due to be introduced in Scotland in August 2023.

Whether the result of shifting government priorities, the desire to coordinate efforts across the whole UK, the sluggishness of the British political system, campaigning by interested parties or a combination of all of the above, we are still without a DRS. This isn't just about politics and policy, it is about its effects.

What are we championing?

We must all now do everything within our power to ensure that October 2025 is a hard deadline for the introduction of a UK wide 'all in' DRS. Based on our data, this could result in a 12% reduction in the number of single-use pollution items being recorded on our trails and wild places, and it is our belief that this would happen almost overnight. In turn, this would reduce the number of fauna and flora being harmed by SUP.

To support this aim, we are championing:

- *The Power of Data* - When considering the implementation of new Government policy such as the DRS the need for 'litter picking NGOs' to gather robust data on composition of SUP becomes clear. There is a giant, recreational trail shaped, knowledge gap on the causes, prevalence and impacts of drinks containers on our trails and wild places. This report marks the moment where we begin to plug that knowledge gap, but we must:
- *Being a voice for our trails* - Our trails and wild places currently have no voice within the movement to introduce a DRS. That is about to change. We will contribute our data to the DRS campaign movement and seek to become an active member of the DRS coalition.
- Invoicing the companies for the price and for the time we have committed to removing their products from recreational trails.
- *Explicit performance targets* - The law must set aggressive performance targets for redemption, recycling, post-consumer recycled content, and refill and reuse that start small but ramp up within 10 years. Redemption and recycling targets should be set at 90% as soon as possible. These targets will ensure that the program is operating as effectively as possible while mandating the needed transition from single-use beverage containers to reusable and refillable containers.
- *Extended Producer Responsibility (EPR)* – we see the DRS as the beginning rather than the end point. We will campaign for further "extended producer responsibility" legislation; and will not be satisfied until corporations begin to OWN. THEIR. SH*T.
- Utilising the upcoming General Election as a rallying point

Shared responsibility: Own Your Sh*t.

We stand for:

The producers of single-use, mass consumption products to formally acknowledge a shared moral responsibility for single-use pollution. Alongside their consumers.

FACT: Between 1991 and 2011, the US beverage industry outspent proponents of DRS bills by as much as 30 to 1.

FACT: In 1990 Coca Cola promised to use an average of 25% of recyclates in its PET bottles. Now, three decades later, that percentage is only 10%.

Acknowledgment

We have already talked about the one-way street when it comes to taking responsibility for single-use pollution in our environment. A blame the 'litter-bug' approach has not and will not affect change. It also completely side-steps the producer's role in generating ever increasing volumes of single-use, everlasting products.

Transparency

One of the reasons it is so important for us to press for shared responsibility is the current tactics employed by most of the large producers. In many cases there is not just apathy towards change; we see tactics designed to cloud, confuse and derail efforts to introduce legislation that would lead to a demonstrative reduction in the amount of single-use pollution in the environment.

In 2022 the Conservation Law Foundation (CLF) produced the 'Big Beverage Playbook for Avoiding Responsibility', and identified five negative tactics used by many of the largest drinks companies.

- Blame the consumer
- Lobby to defeat legislation (e.g. DRS, EPR and disposable vapes)
- Silence support for systemic change (e.g. by providing just enough
- Money to local recycling programmes to forestall calls for more comprehensive reform)
- Make promises, then break them - (e.g. In 2008 when New York and Connecticut stood on the verge of adding bottled water to their deposit programs. Nestlé set an "industry recycling goal of 60% for its PET plastic bottles by 2018. In 2018, the company's PET bottle collection rate languished at just 31%).
- Play along, then undermine (e.g. there is a similar history of these companies outwardly supporting legislation, but lobbying against it in the background, or seeking changes that weaken responsibility/effect. E.g. Coca Cola UK's leaked 2017 DRS blocking presentation)

The CLF report also notes that goals and promises are always voluntary and that there are no sanctions if a goal is not achieved. If it does not achieve one of its goals, the company blames uncontrollable external factors such as consumers who do not recycle enough.

Note to the brands: Just so you're not surprised when this happens, we will call these tactics out when we see them!

Accountability

We are tired. We are tired of unfulfilled promises. We are tired of insidious campaigning and lobbying. We are tired of profit being placed above our environment. We are tired of paying the price for corporate greed. We are tired of bland environmental statements that are not followed up on. We are tired of seeing the same branded products in the natural environment again and again and again. We are tired of the complete lack of meaningful engagement from the firms producing them.

> ***So, let's make it clear. Until we see a significant reduction in the amount Lucozade, Coca Cola, Red Bull, Monster, Walkers, PepsiCo, McDonalds, Stella Artois, Strongbow, Haribo, Mars, Nestle, Budweiser, SIS, High 5 and any other brand you can think of, on our trails and wild places NOBODY is doing enough.***

Noble Edge Effect

We aren't naive enough to believe that the large corporations who have operated in this way for decades will immediately change their behaviour and risk profits without a reason to do so.

The good news is that we think there is an opportunity for those brands who are brave enough to do things differently. Those

who have the courage to take the lead in acknowledging and transparently addressing the impacts of their products and practices and holding themselves accountable to their commitments. When companies demonstrate authentic environmental & social responsibility that is perceived as genuine by consumers, they are rewarded with increased respect, which in turn leads to greater profits. This is called 'Noble Edge Effect'.

What are we championing?

We are challenging the most-littered brands to put down their copy and paste 'playbooks', to think beyond their outdated 'brand bibles' and to consign bland, non-binding 'boilerplate' environmental 'commitments' to history. It's time to start fresh, with a clean slate.

Own Your Sh*t.

How do we achieve this gentle revolution in how brands face up to their single use products polluting our environment? As with any issue the first step to resolution is acknowledgement. So that's where we're going to start.

In 2024 we're going to begin seeking out positively challenging conversations with the 20 'most littered' brands. Backed by the evidence that our citizen scientists have gathered and, using our new 'Own Your Sh*t Checklist', we will begin a push for a new kind of corporate social and environmental responsibility. One that is founded on human principles of acknowledgement, transparency and accountability. One that is real.

Doing our fair share

Even though we are a species that relies on sharing responsibility for our very existence, the issue of 'responsibility' when it comes to social and environmental issues can be extraordinarily polarising.

We have had many experiences of otherwise stalwart allies being enraged by a self-invented perception that, by challenging brands to accept more responsibility for their products escaping into the environment, we are, in some way, excusing the people who carelessly discard the items onto our trails and wild places.

To be utterly and unequivocally clear, it is the consumer who bears the majority of the responsibility for ensuring that this does not happen. We will say this only once. However, that's the great thing about responsibility, it can be shared by those who have a stake. Particularly, those who benefit from the process.

Trash Free Trails are one of those 'stakeholders' and we pledge to keep removing and recording single-use pollution from the places we love for as long as it takes. All we're asking is for Lucozade, Coca Cola, Red Bull and others to do their fair share too.

5

The 2025 UN Plastics Treaty

We stand for:

Pioneering vital improvements in the standardisation, harmonisation and centralisation of single use product pollution monitoring, in service of the aims and objectives of a new, legally binding, UN Global Plastics Treaty. Putting our trails and wild places on the map.

> ***"The UN Plastics Treat is the most important multilateral environmental deal since the Paris climate accord in 2015"***
> *Inger Andersen, Head of the UN Environment Programme (UNEP).*

What is the Plastics Treaty?

In March 2022 representatives from 173 countries (including the UK) passed a resolution mandating the creation of a multilateral treaty to address plastic by 2025. The resolution, agreed at the UN Environment Assembly in Nairobi, Kenya, called for a treaty covering the "full lifecycle" of plastics from production to disposal and will be negotiated until 2024.Once in force, it could be plastics' symbolic equivalent of the Paris Agreement on climate change, and in its provisions, likely even more far-reaching.

How Trash Free Trails can contribute

Plastics Treaty Member States identified "4 pillars of action that form the structural and conceptual framework for the Convention on Plastic Pollution" (EIA., 2020). Pillar

1 “Monitoring & Reporting on the state of the environment and implementation” - identified as being key in understanding the relative success of the treaty - outlines clear objectives to:

- Enhance, standardise and harmonise monitoring methodologies and programmes.
- Facilitate national / international data inventories and sources
- Increase the quality and impact of related action, systematically review and update their approach and ensure comprehensive, periodic assessments are conducted to track progress.

What are we championing?

In real world terms, Pillar 1 calls upon those of us who have made it our mission to reduce environmental SUP to improve the quality, quantity and cross ecosystem connection of our monitoring programmes. To give the Treaty the best chance of success our data must be globally cohesive and complete. Free of knowledge gaps and historical quirks, in service of no other master than our planet.

This is where the State of Our Trails Report comes in. Over the next two years, we will contribute to the aims and objectives of the UN Plastics Treaty in the following ways:

- Plugging knowledge gaps - As we’ve already highlighted, our knowledge of SUP in recreational trail ecosystems has lagged far behind that of marine and riverine systems. Our growing dataset and the work of a steadily expanding group of peers around the world, such as No Trace Trails and Syberg et al’s 2020 nationwide assessment of plastic pollution in the Danish realm using citizen science, means that we are now beginning to address this.
- Continuing and expanding our SUP research - We need a massive, multi-year dataset to match those of our marine contemporaries. We need to replicate, expand and enhance our research over a minimum 5 year period. We need to better understand the systemic and behavioural causes of SUP.
- Making our SUP prevalence, composition and impacts data collection methodologies as robust and accessible as possible; Inspiring, informing and equipping people to use them as Citizen Scientists for the trails and wild places that they love.
- Seek to collaborate (with a small ‘c’) with peer organisations such as; Surfers Against Sewage, Save Our Rivers, Marine Conservation Society, World Cleanup Day and the Ocean Conservancy to pilot harmonised data collection, analysis and reporting approaches.
- Contribute, as a member, to the Global Plastics Treaty Coalition’s work to prepare and negotiate the draft Plastics Treaty.
- Submit our SoOT Report findings (both SUP and Nature Connection) to INC 3 in Kenya in November 2023 (The third session of the Intergovernmental Negotiating Committee to develop an international legally binding instrument on plastic pollution, including in the marine environment) and INC 4 in Ottowa in April 2024.
- Attend INC 5 in Korea in November 2024 to be a voice for our trails and wild places and the people who love them. And to do our utmost to support the ratification of a world changing UN Plastics Treaty.

Our 2025 Action Plan

Let’s take stock and revisit the aim of the State of our Trails Report. That is, to serve as the scientific backbone to our work to create a sustained reduction in the amounts of SUP on recreational trails and a corresponding increase in nature connection amongst the people who visit them.

In essence the Report is our organisational conscience, holding us accountable to our mission and vision. For this to be more than just lip-service we will need to develop, implement and consistently review a clear and achievable strategy. One that can be understood and acted upon by our entire community and easily broken down into time defined stages.

A Timeline For Change

Our Manifesto For Change acts as a guiding star as we lay the foundations of a trash free future, but we know they will require contributions from beyond the TFT community, relying on resilient networks of diverse organisations and individuals contributing to achieving them. This is why we’re also outlining our Action Plan for Trash Free Trails.

This timeline highlights the key moments and milestones we here at Trash Free Trails will be working towards until 2030. From this moment on we will begin communicating with our community about how we're going to achieve them, and how they can contribute meaningfully to our mission.

Further Reading

DEFRA, 2023
Coverage of update to Extended Producer Responsibility scheme, UK Government,

DEFRA, 2021
Reforming the UK Packaging Producer Responsibility System: Impact Assessment, UK Government Plastic Soup

Plastic Soup Foundation., 2022
Is Coca Cola's latest promise really a step forward?

Pecci et al., 2022
THE BIG BEVERAGE PLAYBOOK FOR AVOIDING RESPONSIBILITY (Noble Edge Effect - The Decision Lab)

Key Milestones

2024

- Trash Counts (twice a year until 2030)
- Dom submits his MRes to Bangor University on his 45th Birthday
- Nature Connection Surveys (twice a year until 2030)
- Trash Surveys (twice a year until 2030)
- Plastics Treaty INC 4 Ottawa SoOT Report Submission - April
- Citizen Science Training Programme: with 10 UK communities in an enhanced SoOT monitoring project
- A Trash Free Manifesto at the UK General Election
- SoOT article submitted to the International Journal of Environmental Science and Technology.
- TFT Research Team join the Surfers Against Sewage Brand Audit (until 2030)
- New MRes submitted to Bangor University - 'Solving the energy drinks' single-use plastic pollution problem: Developing and disseminating the message to stop SUP submission.
- Citizen Science Hub Launch - Digital Citizen Science Training
- TFT Research Team join in with Marine Conservation Society Beachwatch (until 2030)
- TFT Research Team attend INC 5 Korea
- Nature Connection post doctoral research project announced: The Causes and Human Impacts of SUP
- Annual SoOT Report - Focus on what has changed since the General Election
- 1750 data sets submitted

2025

- 5 year SUP PhD begins
- 5 year Nature Connection Post Doctorate Study begins
- Citizen Science Hub - New interactive website launches
- Spring Clean Strikes
- 'Own. Your. Shit' Campaign Action
- Trash Free Trails International: Surveys in the Himalayas
- 5th Annual of Our Trails Alliance
- Our SUP monitoring methods are recognised by OSPAR et al
- 2,750 data sets submitted

2026

- Citizen Science Hub App Launch
- Plastics Treaty - UK Government mandate & funding for SUP monitoring
- Annual SoOT Report 2026
- Nature Connection Post Doctoral Research published
- 4,000 data sets submitted

2027/8

- The UN update Sustainable Development Goal (SDG) 15 'Life on Land' to include specific reference to SUP, in line with SDG 14; Life Below Water.
- The 5th State of Our Trails Summit
- Annual Meeting of Our Trails Alliance
- 5,500 data sets submitted

2030

- 8,500 data sets submitted
- SUP & Nature Connection Research Projects
- An evidenced, sustained reduction in the amount of SUP on recreational trails has been achieved
- A corresponding increase in nature connection amongst visitors to trails and wild places
- The 2030 State of Our Trails Report

What's Our Next Big Next Step?

This Report also marks a watershed moment for the Trash Free Trails team. Since that moment in 2017 when Dom realised that there was no science on the causes, prevalence, composition, impacts and solutions to recreational trail SUP he has led the SoOT Report project. This has been fine until now (thanks to the support of the incredibly talented contributors to this report). However, the time has come to hand over the reins to the real scientists! Haha.

On February 4th 2024, Dom will hand the MRes version of this Report to Bangor University. At that moment, he will shift his focus to building and supporting our Citizen Science Research programme, a programme that is already in the safe hands of our first ever Research Officer, PJ Serrano. So, let's start as we mean to go on, and let PJ take it from here…

Introducing PJ

Hello! My name is PJ Serrano and I am taking the role of TFT's first ever Citizen Science Research Officer.

I will ensure that all TFT projects and activities are developed and delivered in a way that enables the generation and consolidation of scientifically robust data that feeds directly into the SoOT Report and will develop and deliver the new "Citizen Science Training Programme".

As part of Trash Free Trails 2025 Action Plan, my role is focused on the creation of a new Citizen Science Hub for September 2024. This hub will form a place for volunteers to learn how to conduct better data collection and more robust research. They will develop new skills to enhance data collection, storage, analysis, and reporting practices. This will empower them to be involved in the process of co-producing knowledge, including data collection and analysis across the spectrum of issues identified by our manifesto.

As an example, we will set up ten "reference point" trail locations to be monitored and analysed by our new citizen scientists over a longer period than ever.

This approach fits perfectly with Trash Free Trails' wider ethos. The citizen scientist scheme will bring people closer to the trails and wild places they love and hugely increase our own understanding of the prevalence, composition and impact of single-use pollution. Even better, it allows TFT to stay "smallnormous"; a small and focused central team (now including me!), but an enormous, passionate – and better informed than ever – TrashMOB volunteer base across the world.

I will also attend the Plastics Treaty Coalition and work with other stakeholders with the aim of investigating, field testing and making recommendations to improve the standardisation, harmonisation, and centralisation of each other's methodologies. In short, we don't simply want to gather and analyse more data. We want that data to be the best it can be, relevant and comparable to other's work.

On a personal level, this role is an important placement as part of my studies at Bangor University. This is about much more than my professional and academic life though. I care deeply about TFT's mission and I can't wait to work with the team, our volunteers and wider network of allies.

> ***"Caminante, no hay camino; se hace camino al andar"***
> *"Traveller, there is no road; you make your own path as you walk."*

Oh, and the quote above is from a Spanish poem that was turned into a pop song in the 80s. The line became a joke between my Dad and I as we walked the Camino de Santiago this summer. We'd say it to each other whenever we got tired. I think it perfectly describes what Trash Free Trails is trying to achieve. We know our destination, and will work together to make our own path there.

Get Involved

What can I do right now?

To make taking action as simple as possible, this quick guide highlights some of the things you can do right now to take charge of the state of our trails and protect them for the future.

FOR EVERYONE

Stop using the word 'litter'; tell your friends why

Send the Report to your MP

Share the Report in your workplace; organise a team trail clean

FOR POLICY MAKERS

Advocate for the immediate ban of disposable vapes

Support the nationwide implementation of the Deposit Return Scheme

Advocate a U-turn on the delay of new Extended Producer Responsibility rules to 2025

Champion the introduction of outdoor curriculum into mainstream education

FOR PRESS AND MEDIA

Announce a change in house style from 'litter' to 'single-use pollution'

Champion wider coverage of actions taken to tackle terrestrial, as well as marine, pollution

FOR BUSINESS AND BRANDS

Double down on support for the implementation of the Deposit Return Scheme

Champion the new Extended Producer Responsibility rules in your work ecosystem

Share a transparent accountability statement taking responsibility for terrestrial pollution, providing your own action plan

FOR NOT FOR PROFITS AND CHARITIES

Announce a terminology change from 'litter' to 'single-use pollution'
Lobby for the ban on disposable vapes

Champion nature connection for everyone, everywhere

Engage in active dialogue with peer organisations towards streamlining research methods, contributing a standardisation as promoted by the UN Plastics Coalition

Final Comments

Back in 2021 we compared our first State of Our Trails report to a map. A few trusty folds of paper pack in a glorious combination of inspiration, information and instruction that – when placed in the right hands – can tell us where we are, how to reach our destination and flag any obstacles along the way.

This report has grown in size. It certainly isn't a 'few folds of paper' any more, but the map analogy holds true.

If in 2021 we were able to look at the UK in 1:50,000 scale, in 2023 we are now able to see it in 1:25,000 scale. For the most part all that extra detail was always there; just as a map is simply reflecting the world around us. We just weren't in a position to research and demonstrate it two years ago.

> ***Now, for the first time anywhere, we have been able to begin explaining the impact that single-use pollution is having on terrestrial trail ecosystems.***

The single-use pollution landscape is also changing over time though; even two years ago, disposable vapes weren't even a blip in our trash composition statistics. Now our data shows that it's almost impossible to conduct a trail clean without finding at least one (with their poisonous and damaging lithium-ion batteries).

There's a lot more to map. In literal terms, even though we have supporters around the globe, the majority of our research is in the UK. We are still at the beginning of our journey when it comes to our research into the impact of single-use pollution. And, as we've already seen, the composition and prevalence of SUP has the potential to change over time.

This isn't our last State of Our Trails report. As we have already outlined, we will continue our research, and work with other organisations to ensure our methodologies can be replicated across different ecosystems and locations.

We aren't just cartographers though.

> ***We have the opportunity to shape our environment. We are activists; in the true meaning of the word. We get out there and make a difference.***

Our manifesto outlines exactly how we will do that, and we've explained how you can support our aims. The true test of the effectiveness of our work will be played out in the data we gather in the long term.

There will, eventually, be a last State of Our Trails report; when single-use pollution is banished to be a thing of the past. Let's work together to reach that point.

Contributors

This report has only been possible with the team effort of the following people:

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The 700 volunteers who submitted the data sets

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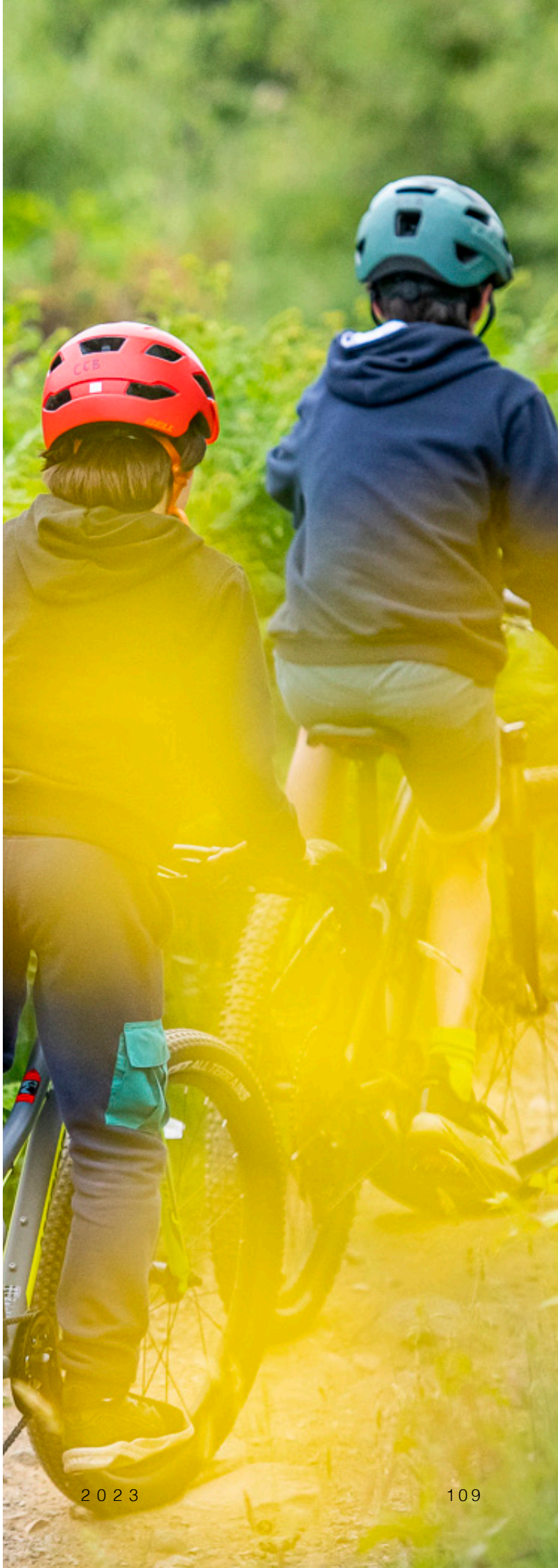

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