

Sports for Nature: A brief guide on calculating impacts on nature

What is the aim of the guide?

This brief guidance note was commissioned by UNEP and produced by researchers at Wild Business Ltd/the University of Oxford, to introduce how a sports organisation could begin to approach assessment of their impacts on nature. The aim is to walk you – a sporting organisation – through 6 'Tiers' of increasingly extensive efforts to calculate impacts measured in terms of biodiversity¹ (i.e. your 'biodiversity footprint'). This does not include a footprinting 'tool' as such: the calculation of a biodiversity footprint still requires either in-house expertise, or contracting specialists. That said, it does introduce some specific tools and approaches that are already available; and, if you have already completed greenhouse gas (GHG) emissions assessments, then you are likely in a strong position to begin considering your impact on nature.

The briefing is designed to fit with emerging good practice on biodiversity impact assessment. For example, it broadly aligns with approaches promoted by the EU Corporate Sustainability Reporting Directive (CSRD) – which is becoming mandatory for an increasing number of organisations – as well as the recommendations made by the Taskforce on Nature-related Financial Disclosures (TNFD). This briefing also aligns with emerging approaches to strategy and target setting on nature for organisations, e.g. as outlined by the Science Based Targets Network (SBTN). These three (CSRD, TNFD, SBTN) are key examples of the emerging regulatory and policy environment that is either mandating or strongly encouraging organisations, of all shapes and sizes, to quantify, report and manage their impacts on nature.

While every sport should consider its impacts on nature, the size and scale of such an impact will depend strongly on the type of sporting activity, and the scale (including size of associated events and audiences, timescale, etc.). However, recent work into the biodiversity footprints of organisations shows that the largest impacts will often be hidden from view in their supply chains, rather than the direct operational impacts of their activities. This is likely similarly to be the case for many sports organisations.

Who is the guide for?

This brief guide has been designed to offer value to sports organisations of any type and size, and aims to be inclusive. It has been designed to be *tiered*; so that any given sports organisation can work to a level of complexity consistent with the resources, expertise, and ambition available. This guide will be shared with different sports organisations for feedback, so their experience and approach will be taken into account in future iterations. The authors of this document have worked on biodiversity footprints for organisations ranging in size across a wide variety of sectors, but this is the first time such an approach has been applied to sport. Consequently, it is important to view this as a living document, that will continue to draw on emerging work.

¹ Given that the impacts of any activity on nature tend to be measured in terms of the resultant decrease or increase in biodiversity i.e. "the variability among living organisms from all sources"



How much time and cost will this likely involve and who could help me?

The answer is "it depends", on the type and size of the sport organisation in question, as well as the resources already available. Some organisations may already employ sustainability professionals, in which case it might be possible to address Tiers 1 - 3 without subject specialists; though Tiers 4 onwards will require at least some specialist biodiversity knowledge. Other smaller organisations might need support from Tier 1. Tiers 5 - 6 could potentially involve research projects lasting months or years, depending on the degree of accuracy required. We share brief examples of results generated by non-sporting organisations, which involved a combination of in-house expertise (e.g. in lifecycle impacts assessment approaches) and contracting external researchers. Once there is more evidence of sports acting on this agenda, they will be added to this document. Another approach Sport for Nature are considering is whether members of the Nature Positive University Network² could offer support to sports in the baselining of their footprint so that further capacity can be provided to sport.

1. What sports is this for?

Key contextual information for an assessment of sporting impacts on nature will revolve around the type and scale of the sporting activity in question, as that will determine the categories and probable materiality of biodiversity impacts.

Nature of the sport

We can begin by categorizing sports into different communities of practice, as per the UNEP (2022)³; and considering that each will have specific challenges in relation to biodiversity impacts:

- Water sports: e.g. Sailing; Rowing; Surfing.
- Field sports: e.g. Cricket; Rugby; Football; Golf; Baseball.
- Snow and mountain sports: e.g. Skiing; Climbing; Mountain biking.
- Urban sports: e.g. Road Cycling; Running; Tennis; Athletics; Motorsport.
- Indoor Sports: e.g. Weightlifting; Judo; Badminton.
- **Combined sports events**: Organisations overseeing multiple sport types, such as Olympic committees.

Water, Snow and Mountain sports – and to some extent Field sports (e.g. golf) – may have large diffuse spatial footprints and/or those that overlap with natural habitats. Disturbance to or clearance of natural habitats remains one of the major drivers of biodiversity loss worldwide, and so this is likely to be a relatively major component of impacts on nature for these sports.

Conversely, Urban and Indoor sports are likely to have lower spatial footprints (certainly on natural habitats), and so the relative impacts might be larger for other aspects of the sports; such as energy use (e.g. in stadia), transport (for teams, fans, etc.), embodied impacts in materials (e.g. manufacturing of equipment), and so forth.

² <u>https://www.naturepositiveuniversities.net/</u>

³ United Nations Environment Programme (2022). Sports for Nature: Setting a baseline – Handbook. Nairobi, Kenya



It is not only the category of sport that dictates likely biodiversity impacts, but the type of events associated with it in terms of audiences. So, these might be condensed (e.g. football matches), diffuse/spread-out (e.g. road cycling), or primarily remote (e.g. watching televised sports). Audiences will have impacts on nature indirectly through their travel, supply chains for consumption of utilities (e.g. energy, water) or purchasing (e.g. food and drink), and in some case direct (e.g. disturbance of natural habitats).

Given this, it is important to begin with a comprehensive but high level overview of the potential biodiversity impacts your sport may have, and then once this is done, to focus in on the hotspots where reductions can most efficiently be secured.

Scale of the sport

Of course, it is not just down to the "type" of sport. The scale of the sport, i.e. the physical size of associated events, the audience reach, the temporal scale over which it takes place, etc. will also be critical. This might include considerations such as:

- <u>Spatial extent and density of sporting infrastructure</u> some sports may occupy large spatial footprints (e.g. golf courses) and/or large distances (e.g. cycle tours, sailing), especially if those impinge upon natural habitats, and this may have considerable direct land/sea use or disturbance impacts on nature;
- <u>Audience attendance</u> the size, location, and distribution of audience members will influence the impacts the audience has on nature. For example, in some cases, a major proportion of audience members will primarily travel to attend in-person (e.g. for lower league field sports). In others, the majority might be viewing remotely (e.g. motorsport rallies). There might also be some combination of in-person and televised viewing (e.g. premier league sports, tennis majors) with considerably different supply chain impacts;
- <u>Sportspeople</u> travel is also relevant regarding the sportspeople themselves, who may travel for games, to practice, etc. The type of training and supporting infrastructure needed to practice sports will influence distribution and attribution of impacts (e.g. some may need established networks of sports pitches e.g. field sports, others might require occasional use of multiple-use sites, others might use infrastructure built for different purposes e.g. road cycling).
- <u>Number and timing of events</u> the frequency and duration of sporting events will be a factor in the size of the impacts they have; some may have major impacts but only every four years (the Olympics, the football World Cup), or once a year (e.g. major tournaments in golf, cycling), or multiple events over the course of every annual season (e.g. national sports leagues).
- <u>Investments</u> larger and more visible/well-attended sports may have considerable brand power, and consequently be affiliated with larger investments/advertising. This in turn may exert impacts on nature through associated activities, side-events, etc.

2. Typical impacts

Plenty has already been written concerning the impacts of sports on the environment (Cerezo-Esteve et al., 2022⁴), and the direct impacts for nature have for example been captured in the 'Sports for Nature' technical series by the IUCN⁵ (focusing on the

⁴ <u>https://www.mdpi.com/2071-1050/14/20/13581</u>

⁵ <u>https://iucn.org/our-work/topic/tourism-and-sport/sports-nature</u>



impacts of sports events, and of sports infrastructure). Clearly, understanding the direct impacts of sport on nature is important.

However, there is a growing recognition that for many sectors (excluding perhaps the primary industries) the impacts on nature of a given organisation are likely to primarily occur through the supply chain (Fig. 1).



Figure 1: results of publicised biodiversity footprint analyses for organisations. (a) Oxford University (Bull et al., 2022⁶); (b) the Guardian News and Media Group (2023⁷)

Both case studies above show clearly how large the indirect biodiversity impacts of an organisation's supply chains can be proportionally to its direct impacts; for instance, the impacts of the University of Oxford's procurement (e.g. laboratory materials) was much larger than the impacts of its buildings and estate. The footprint of the Guardian News and Media Group, conversely, was largest through the supply chain (printing and distribution) for its physical newspapers.

So we need to understand what those supply chain impacts are most likely to be for a given sports organisation, beyond the direct impacts. These can be considered in light of known key drivers of biodiversity loss globally by different types of human activity (see e.g. Maxwell et al., 2016⁸; Fig. 2) or by sector, and so we can consider these in relation to sports supply chains.

⁶ https://www.nature.com/articles/d41586-022-01034-1

⁷ <u>https://www.theguardian.com/environment/2023/nov/28/what-impact-does-the-guardian-have-on-the-natural-world</u>

⁸ https://www.nature.com/articles/536143a

Overharvestina

Hunting 1,680

Gathering 557

Logging 4,049

Fishing 1,118

plants

Agricultural activity

Timber

farming Aquaculture 112

plantations

Cropping 4,692

Livestock 2.267

Urban development

Tourism &

recreation

Housing 2,616

Problematic native species 262

950

Invasion & disease

Invasive species 2,084

Industrial 907

730



Figure 2: human activities classified as the primary threat to endangered wildlife species on the IUCN Red List (see Maxwell et al., 2016)

In terms of overharvesting, it is interesting to note that hunting and fishing play a role as threat to endangered species; but their role is subject to wider discussion and not the focus of this document. Many sports have considerable agricultural supply chains in terms of food and beverage (for events, audiences, athletes) forestry (timber and for construction, paper, etc.) supply chains. Urban sports can be linked to increased

demand for urban development, and similarly infrastructure expansion to cater for any sports (e.g. stadia or accommodation for large events, transport infrastructure). All sports use energy inputs - to power training grounds, stadia, manufacture equipment, etc. Audiences travel, as do athletes and their support teams; and so the impacts on nature of transportation of people (as well as goods) deserves consideration. All sports (through energy and fuel consumption, refrigerants, and various other means) contribute to climate change; and all will have other localised pollutant outputs. Given this, the likely hotspots for sport to be paying attention to are the land area occupied or disturbed by the sport, the infrastructure that supports the sport, the energy used, and the goods and commodities procured to support the sport (including, but not limited to, food consumption).

Energy production

Oil & gas

Renewable energy

Mining

Transportation 681 Roads & railways Service lines

492 Shipping lanes

Human disturbance

949 Recreation 121 War

Climate change

347 Drought

Fire

167 Other

454 Air-borne

Pollution

879

807

1.523

Dams

Industrial Agricultural

685 Habitat modification

578 Extreme temperature 716 Storms & flooding

System modification

Domestic waste

56

833

56

236 Work

Interestingly, we can predict that there are also some sports for which direct impacts are more noteworthy than others e.g. those that contribute to land use change by having very large spatial footprints (e.g. diffuse sports or those that take in place in natural or semi-natural habitats; surfing, mountain-biking, skiing, etc.), some for which introduction of invasive species may be an issue that requires considerable attention (e.g. sailing), and finally immense scope for positive impacts (see below).

Further, analyses by sector point to additional considerations for sports; e.g. the issue of the biodiversity impacts associated with the investments made by an organisation. which may lead to exceptionally large impacts on biodiversity downstream in the value chain. Hence, increasingly, emerging good practice on biodiversity footprinting is to consider direct impacts, upstream impacts in the supply chain, and where possible impacts across the entire value chain.



Sport can also have a positive impact on nature, it does not have to be negative.

While any assessment of impacts on nature should first consider the negative impacts that sport can have on biodiversity, it is important to note that positive impacts from sports on nature can or could also arise in multiple ways (though this can be harder to measure). For example:

- Financial support through raising money (events e.g. marathons raising money for environmental charities);
- Education and community engagement by raising awareness of natural environments and their condition (e.g. surfing, sailing);
- Supporting improvements at grassroot level through small grants that facilitate communities to improve the state of their local environment;
- Innovation and evolution by developing new green technologies (e.g. Formula E and other moto-racing); and,
- Monitoring and mapping landscapes which contribute to biodiversity assessment through citizen science (e.g. diving, mountaineering).

The metrics of these positive impacts are challenging to compare when held against the negative impacts on the environment as in some cases they can be intangible in their nature (e.g. raising awareness) unless designed with a firm intention from the outset and could not be easily compared against impact estimated from e.g. existing lifecycle impact assessment frameworks.

Nonetheless, it is still important for organisation to engage into downstream positive impacts, as they could have potentially significant impacts, even though these can be more complex to measure and the dividend of investing in positive awareness engagement downstream with audiences should be balanced with a more systemic approach to reducing negative impacts upstream.

3. So where to begin?

Approaches to biodiversity impact evaluation should build upon the experience and resources available to the sports organisation in question, their policies, and the quality of the data available. While 'do no harm' should be the maxim to begin with, engaging in this issue is a journey that will likely evolve and it's important to begin with the premise that every organisation can make a start and begin to consider their impact. It is recommended that larger and better resourced members of the Sport for Nature initiative work to get to at least Tier 3 within their first 12 months of joining the initiative so that the intention of signatories joining correlates with measurable and meaningful action, and not just 'nature-washing', with movement into Tier 4 underway considered in the second year of joining the initiative.

The organisation should work through the Tiers 1 - 6 below iteratively (Fig. 3), to the furthest point possible (understanding that later tiers may be beyond reach of organisations with limited resources). The multiple tiers below can be split out across three levels of engagement with nature: Entry (1 - 3); Advanced (4 - 5); Leader (6).





Figure 3: conceptual framework for tiered approach to biodiversity footprinting for sports organisations, depending upon resources and expertise

Tier 1: What type of impact

For the first step, the sports organisation would begin by categorising the most likely generic impacts of the sport on biodiversity, given the considerations outlined above (sections 1 - 2). In particular, this would include considering the <u>category</u> of the sport (i.e. field, snow and mountain, indoor, urban, water, combined), and the <u>scale</u> of activities (i.e. audience size and type, online viewers, number and frequency of events, internationality, etc.).

For example, as discussed, it is clear that most sports will have considerable impacts on nature through their supply chains; these could be listed in terms of e.g. energy use, manufacturing of equipment, impacts through audiences, and so on. But some sports will have larger audiences than others (travelling more, consuming more food, etc.), some will cause more direct disturbances to natural habitats (unlikely for e.g. urban sports), and some will require construction (e.g. major combined sports events), and so forth. Therefore, the first step is to attempt to exhaustively list all aspects of the sports organisation and its activities that are likely to lead to a significant impact on nature (irrespective of relative size). It is proposed that future iterations of this guide are accompanied by a comprehensive outline of likely impacts on nature corresponding to an exhaustive range of sports by category and scale – drawn from the conservation science literature – although this is beyond the current scope.

Tier 2: Where are the impacts

The next Tier is more involved, requiring inputs from colleagues across the sport itself, and involves the consideration of the likely spatial distribution of the impacts of that sports organisation on nature. That is, where do the impacts from the organisation on biodiversity actually occur? This can be considered both in terms of direct impacts (e.g. those under the immediate control of the organisations, such as linked to the location of its facilities), and in terms of the indirect impacts (i.e. through the



organisation's supply chains e.g. the source location for materials such as wood or rubber that goes into equipment):

- a) **Direct:** Considering the distribution of direct impacts will involve mapping all sports infrastructure (playing fields, competitive routes, etc.) as well as supporting infrastructure (stadia, transport infrastructure, temporary events facilities, etc.). This should be relatively straightforward for many organisations to ascertain.
- b) **Indirect:** This will likely be more challenging to specify this will involve defining the geographical root of supply chains; e.g. for food consumed by athletes/spectators, materials sourced to use in manufacturing equipment, and so on.

As far as possible, the organisation should match geographical locations against all the impacts sources listed under Tier 1.

Identifying specific biodiversity features: When mapping the direct and indirect impacts, sports are encouraged to then map direct and indirect spatial distribution against known biodiversity features. At this phase, it is not about quantifying impacts on nature, but to show the degree of overlap, and so potential risk. Biodiversity 'features' might include e.g. threatened species' ranges (IUCN Red List), known protected areas (the World Database on Protected Areas) where the sport is undertaken.⁹ While this will depend partly on the resources available to the organisation in question; e.g. in terms of expense of the data and/or possibility of access to it, human resources available to collate and analyse the data, and so-on.

Tier 3: Identifying your hotspot

Having listed likely sources of impacts on nature (Tier 1) and the possible spatial distribution of impacts, both direct and indirect (Tier 2), the next stage would be to start estimating the relative materiality of different impacts. That is, where are the organisations likely 'hotspots' of biodiversity impact. For example – for the organisation in question – are the relative impacts likely to be particularly large from energy use and construction (linked to stadia), from direct disturbance to habitats (from routes used in certain types of long distance race), from food consumption and travel associated with audiences (for major global sports events), and so on?

This will vary widely by type of sport and by scale, and unless the organisation has some basic technical expertise on biodiversity in-house, it may well require external support to help assess the materials impact. The likely relative importance (though not absolute size) of impacts on nature, for the impacts listed under Tiers 1-2, could be gauged by e.g. implementing the <u>ENCORE</u> framework with a focus on physical risks; or, by consulting or surveying expert ecologists that could potentially be available from the Nature Positive University network. The outcome from Tier 3 should be to take the full set of impacts listed (Tier 1), informed by the known spatial distribution of impacts where possible (Tier 2), and begin ranking those in order of likely importance to nature conservation.

Tier 4: Using GHG calculations as a guide to impact on nature

Under Tier 4, the priority is to use available environmental data to begin estimating the relative size of impacts on biodiversity from your sports organisation's activities, and

⁹ Useful sources of relevant 'biodiversity' data include the Integrated Biodiversity Assessment Tool (IBAT), PREDICTS dataset, and others such as global Critical Habitat classification maps.



from this to prioritise highest impact sources for deeper subsequent analysis. This is relevant to sports organisations that already have greenhouse gas (GHG) emissions accounting and reduction (e.g. Net Zero) plans. The approach under Tier 4 is based partly on the fact that, under previous efforts to calculate organisational biodiversity footprints, GHG emissions are often reasonably indicative of the profile of biodiversity impacts by activity (e.g. Bull et al., 2022; Taylor et al., 2023¹⁰).

Organisations that have already collated available GHG data will likely be able to match GHG emissions to the associated activity categories listed under Tiers 1 and 3. For example, the aforementioned work with The Guardian News and Media Group found that GHG emissions associated with forestry supply chains and organisational energy use were a key driver of biodiversity impact profiles. This will not be true for all organisations, but it provides a useful approximate steer for organisations not moving towards Tiers 5, 6. Completing Tier 4 analyses will allow the organisation to do two things; (1) quantify the proportional contribution to overall GHG emissions made by each organisational activity, and (2) include qualitative consideration of the quality and reliability of the data available for each activity.

In turn, (1) means that the organisation can further refine the list of top activities likely contributing to biodiversity impacts, via release of GHG emissions (where those might be e.g. energy use, travel, and manufacturing of materials). Again this is *indicative* of some key impact areas only, and should not mean the organisation rules out impacts dominated by other types of impact pathway e.g. natural habitat change or disturbance (for instance, food consumption is often found to be a much larger component of biodiversity footprints than carbon footprints due to land use; Bull et al., 2022). As for (2), data quality will highlight for which activities the organisation is likely to be able to perform a deeper dive on data analysis linked to biodiversity impacts. The intended joint outcome of both is further refine the list of expected activities with the largest impacts on nature, and to prioritise some for further investigation.

Tier 5: Determining the biodiversity footprint

Tier 5 involves performing a comprehensive and focused biodiversity footprint for the organisation and its supply chains, in line with emerging good practice. Again, doing so is likely to require either in-house expertise in relevant methods, or external guidance – and so would only currently be expected for organisations with considerable resources available to devote to this. It is likely also to be part of an element of the sporting body's commitments under the SBTN or TNFD frameworks, which is recommended for sports of a certain size to consider. It is recommended that Sports for Nature works with a cohort of sports who as peers could undertake such an evaluation of their work and use this as a learning tool for other sports to then learn from as their ambition in support for Sport for Nature grows.

There are multiple approaches towards implementing biodiversity footprints, which can be typically grouped around those focused on (a) non-spatial lifecycle impact assessments (e.g. Bull et al., 2022¹¹; Fig. 4), or (b) spatial analyses that use extensive

¹⁰ <u>https://www.nature.com/articles/s43016-022-00660-2</u>

¹¹ A two-step method based on an approach published by the University of Oxford (Bull et al., 2022) methodology. Use a variety of frameworks to calculate mid-point impacts from activity data (EXIOBASE, national GHG conversion factors, Ristic et al., 2019, etc.). Activity data can include spend on equipment categories, passenger kilometres of flights, energy consumed in kWh, water used in cubic meters, food consumed in kilograms of product types, GB of online activities. These mid-point environmental impacts include GHG emissions, acidification, eutrophication, land use, water



geographical information about supply chain impacts to measure the actual distribution of biodiversity impacts worldwide. The latter is preferable, if possible, but is much harder to achieve as spatial supply chain data are not typically available for lots of organisations; meaning that the former is often used to estimate relative impacts on biodiversity for different activity categories.



Figure 4: conceptual framework for a lifecycle impact assessment (LCIA)-type approach to biodiversity footprint evaluation (from Bromwich et al., 2025)

The headline outputs for such footprint analyses are as shown diagrammatically in Figure 1 above; comprehensive quantitative estimates of the relative impacts on biodiversity of all organisational activities. This extends work completed under Tier 4 by focusing specifically on the profile of biodiversity impacts, rather than inferring those based on GHG emissions.

Tier 6: Considering the full scope of biodiversity impacts

The final stage would be to move towards full value chain analysis; that is, moving beyond supply chain analyses alone (Tier 5) to consider downstream impacts too.

This becomes extremely interesting, as it does not just involve negative impacts on nature (e.g. caused by end-of-life disposal for equipment or event waste) but also potentially positive impacts too. For instance, this might include the role of sports in public awareness of biodiversity loss; and any influence on the audience and beyond, associated with potential important downstream positive impacts on nature.

Approaches towards quantifying downstream impacts are less well-defined than upstream impacts, and would likely require bespoke analyses. Again, this would likely involve working with expert resources where available in-house, or with external support from consulting/academic partners, and it is recommended that Principle IV of the Sport for Nature Framework (around Educate and Inspire Positive Action In And Across Sport) has a clearer measurable set of indices so that the efficacy of interventions in this area are comparable between sports with knowledge, attitudes and practice outcomes considered.

use, ecotoxicity (marine, freshwater, and terrestrial). These mid-point impacts are then harmonized into a final biodiversity impact score (potential disappeared fraction of species, species year), using frameworks such as LC-Impact or ReCiPe.



4. Worked Case Studies

In future versions of this document, we will include further information on worked case studies; these will be based on the application of the '6 Tier' framework approach to a variety of different sporting organisations. The current version of the document is generalised – these case studies will provide illustration as to how different types of sporting organisation might apply the framework and, crucially, what Tier different organisations might strive to works towards. Equally, the case studies will provide insight into the level of work and resources required to carry out analyses to different levels under this type of biodiversity footprint framework, especially the higher Tiers.

As supporting information for these case studies, our current intention is to also work to include:

- the creation of an illustrative categorical/heatmap matrix for expected biodiversity impacts associated with different sporting organisations (by type of sport, the scale of organisational activities, and likely typical biodiversity impacts);
- the outcomes of focus group discussions on biodiversity impacts with selected sports organisations; and,
- an assessment of the feasibility and applicability of the broad Tiered framework outlined above.

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