



17

How to Make Policy-Makers Care about “Wicked Problems” such as Biodiversity Loss?—The Case of a Policy Campaign

Agnes Zolyomi

Introduction

One of the most spectacular characteristics of this planet is its abundance of life with over 9 million plants, animals and fungi species, all of which provide the basis of human society and economy (Cardinale et al., 2012). Despite its fundamental role however, biodiversity is continuously damaged and decreased by human activities. The alarming loss of biodiversity, which threatens the mass extinction of over 1,000,000 species, does not only critically endanger the biosphere but our very own existence (IPBES, 2019). Despite the increasing scientific evidence, humanity’s ultimate dependence on nature and its goods is seemingly not evident at the decision-making levels, resulting in a lack of policy prioritization of nature and its goods (Mace et al., 2018; Primmer et al., 2015;

A. Zolyomi (✉)

Coventry University, Coventry, UK

e-mail: agnes.zolyomi@coventry.ac.uk

WWF, 2018). With the current business-as-usual scenario, both the rate of biodiversity's loss and the risks for humanity continue to grow.

Policy-makers are on top of the food chain in determining many aspects of our society and economy by paving the general directions in policy. They are one of the (if not the most important) key players to influence the steering of the political agenda in a certain direction. At the same time, they are also the key players that are rather difficult to reach or affect especially if one is not a member of a large industrial or other lobby power, but rather belongs to an under-represented group that usually gets more eye-rolling (which is mostly the case with the nature conservation sector). So, we are given an under-represented cause from an under-represented group.

As a result, in order to convince decision- and policy-makers to put nature and biodiversity higher on the relevant policy and decision-making agendas, we need unprecedented communication and further scientific efforts. Thanks to trailblazer NGOs, IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) and other science-policy interfaces, such efforts have achieved promising results in recent years; however, numerous challenges are still to be faced. For one, communicating biodiversity and its loss is itself a grandiose task due to its complexity, and often indirect effects on one's life (e.g., we will most probably not feel the straightforward implications of the loss of tigers) (Kidd et al., 2019; Legagneux et al., 2018; Millner & Olivier, 2015; Sharman & Mlambo, 2012; Zaccai & Adams, 2012). However, communicating this to a special group of decision-makers at the highest level, who are targeted by myriads of messages from a vast number of often conflicting lobby groups and influencers, calls for all the creative and other resources and wits one can think of. If a communication piece is to stand out and to be heard, you need to have an actual message they are willing to listen to within an actual relevant policy process in an easily digestible, creative format that goes above their threshold level of uninterest. The challenge is that there is no exact secret or scientific recipe for how to do that—but there are indeed certain 'magic' ingredients.

In this chapter, I will discuss why biodiversity is particularly challenging to communicate, especially for policy-makers in democratic political systems that, for example, the EU represents. I will also showcase

specific strategies for communication that have already proved successful and have been dispatched by the conservation sector. Further potential methods and tools stemming from behavioural economics will also be presented with the recommendation to consider them at a more elevated level when formulating future policy messages. Through my personal experience, I will explore the application of these scientific strategies in the specific conservation campaign I was involved in, which aimed to safeguard the pillars of the European Union’s nature conservation policies from possible restructuring and watering down. I will furthermore reflect on the subsequent results and potential improvement of nature conservation and biodiversity messages to reach even more substantial policy impacts.

Biodiversity as a Diffuse Problem—And Other Inconvenient Truths

Apart from the everyday challenges of advocacy work in policy (e.g., short-termism, uncertainty and individual versus collective gains and losses), there is a further dimension to tackle complex issues such as climate change or biodiversity loss, the so-called diffuse or wicked problems (Millner & Olivier, 2015; Sharman & Mlambo, 2012; Zaccai & Adams, 2012). These problems are complex with no specific villain and victim, with a sense of remoteness of impacts and responsibility (Millner & Olivier, 2015) (again, it is sad that tigers will become extinct, but so what and how is this my fault anyway(?)). Additionally, stakeholders who manage or are interested in biodiversity are not only diverse and are therefore difficult to address and involve; the drivers of biodiversity losses are also multiple. In the context of the policy environment, stakeholders and interest groups are numerous, while their values and interests are often controversial and ambiguous (Sharman & Mlambo, 2012). Even more so, a solution to one aspect of a challenge can lead to probable further difficulties, inducing trade-offs and subsequent further complexity (Sharman & Mlambo, 2012). With the various interests and the lack of simple solutions to tackle the complex challenge in question, the issue is considered wicked (Rittel & Webber, 1973).

In particular, in terms of biodiversity, there is a limited understanding about societies' dependence on it, as well as of the sectorial and economic impacts of its loss (Zaccai & Adams, 2012). Confusion among policy-makers, as well as any particular individual, is further aided by the unclear definition of biodiversity and its loss, and accordingly, biodiversity policy messages and the various concepts in use (Legagneux et al., 2018; Sharman & Mlambo, 2012). In addition, personal ownership of responsibility for halting biodiversity loss is also incredibly low. The latter is partially due to the fact that neither the concepts of biodiversity and biodiversity loss, nor individual actions to tackle biodiversity loss, are adequately understood (Sharman & Mlambo, 2012)—or as a matter of fact, want to be understood.

The major drivers of biodiversity loss, which remain the over-exploitation of natural resources and agriculture (Maxwell et al., 2016), added to by inept governance (WWF, 2018), are related to our current world economy's and society's set-up. Biodiversity can be considered as the necessary victim of the ever-expanding global markets and human population (Maxwell et al., 2016) facing vested interests and political pressures to deliver on the economic scale (OECD, 2017). In addition, prioritizing nature can result in dreaded economic losses (e.g., enhancing environmental regulation can contribute to competitive disadvantage and higher costs that can affect jobs and growth (OECD, 2017)). In this arduous policy environment, it is therefore not too surprising to understand why communicating biodiversity is a demanding quest, and why certain tricks up one's sleeve are needed.

Ways and Strategies for Communicating Biodiversity Messages

To date, there is a very limited amount of literature about how to communicate biodiversity messages effectively (Kidd et al., 2019), let alone scientific knowledge about specifically transferring conservation-related messages targeting decision-makers. In a recent attempt to divulge how biodiversity is communicated, Kidd et al. (2019) conducted a systematic review with the result that ecosystem services

and flagship species were most frequently the key frames within which authors transferred their messages. The familiarity principle (people tend to prefer those things that they can directly relate to or could be affiliated with (Reder and Ritter (1992)), risk perception, connection to nature or raising other emotions were also included in those articles as ways of communicating biodiversity. These communication methods and strategies will be briefly presented here. It is nonetheless important to note that these are only some examples of the probable tools; these can be further tailored by rhetoric analysis to choose what kind of concepts, terms, arguments, etc., can be used with different target audiences.

Communicating with Ecosystem Services

The ecosystem services concept was formed as a communication tool as early as the 1970s by Westman (1977) who described the value of services provided by nature (Bekessy et al., 2018). More focused work on nature services resulted in the term “ecosystem services” first described in the work of Ehrlich and Ehrlich (1981). The efforts to capture nature and its services in both ecological and financial terms were pushed by both ecologists and economists with the overall aim being to capture the immense dependence of human society and the economy on nature (Chaudhary et al., 2015). This concept was then further shaped and rose to international prominence with the renowned articles of Daily et al. (1997) and Costanza et al. (1997); these depicted the definitions of ecosystem services and provided an estimate of the monetary value of all ecosystem services in the world (over US\$16–54 trillion annually). These studies called for further scientific debates and triggered myriads of additional research, especially in ecosystem services valuation (Costanza et al., 2017).

Chaudhary et al. (2015) provide a thorough overview of the history and development of the ecosystem services concept that also continued to gain ground in the international policy arena: the concept was adopted by the UN’s Convention of Biological Diversity and the Millennium Development Goals in the early twenty-first century. Following its adoption by numerous multilateral agreements, a rapid uptake could be

witnessed by various disciplines, reaching its peak in 2005 with the global Millennium Ecosystem Assessment (MEA) synthesis report. The report not only provided a warning overview of the degrading status of the ecosystems and their services, but also connected the world's major scientists in a global mission to contribute to saving nature. Additionally, the MEA provided frameworks and standards on definitions, which were the basis of many following initiatives and studies. The Economics of Ecosystem and Biodiversity (TEEB) was launched in 2007 as a response to a G8+5 nations' proposal to assess the economic benefits of ecosystem services and the associated economic loss. In the same year, the idea of Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) was formulated with the aim of establishing a body similar to the International Panel on Climate Change (IPCC), specifically for biodiversity. The idea came into realization in 2010 with the overall goal being to communicate the importance of biodiversity and ecosystem services and to transfer scientific messages to policy-makers. Since this era, ecosystem services have gradually received prominence in additional (mostly environment and biodiversity relevant) global policies, including for instance, the Convention on Biological Diversity's Aichi Targets, Sustainable Development Goals and EU policies, and became the focus of thousands of scientific articles (Chaudhary et al., 2015).

Across its life course, the ecosystem services concept has attracted considerable criticism due to its anthropocentric and economic focus, which to some degree omits the intrinsic values of nature (Chaudhary et al., 2015). On the other hand, however, other arguments underpin the view that such a human-values-centred approach was needed for the concept to enable mainstreaming of the challenge and potential solutions among a wider range of stakeholders (Schröter et al., 2014). It is this very approach that is thought to enable nature to be depicted in a language that decision-makers in particular are able to grasp (Bekessy et al., 2018). The idea behind the valuation of ecosystem services ("putting a price tag on nature") is embodied in the notion that as a result of the valuation, decision-makers will understand the immense value of ecosystems and their services and therefore rational choices will be made to prioritize and protect them (Braat & de Groot, 2012; Costanza et al., 2017).

Not surprisingly, ecosystem services findings are also mainly prepared for these specific stakeholders (Bekessy et al., 2018), although to date, with limited evidence on their actual impacts (Martinez-Harms et al., 2015; Posner et al., 2016; Wright et al., 2017).

The international tendency for highlighting nature’s services has also been picked up by the European Commission, who communicated the social benefits of Natura 2000 (e.g., ten Brink et al., 2013) with the hope that the vast benefits of the EU’s protected area translated to socio-economic terms can serve as an eye-opener for decision-makers fixated on these figures. Ecosystem services also started to occupy significant roles in nature-relevant EU policy pieces; this includes the Biodiversity Strategy 2020 and its target 5, where member states were required to map and assess their ecosystem services and integrate them into their financial accounting system by 2020 (European Commission, 2019a). Furthermore, other major EU policies, including the Common Agricultural Policy and the Marine Strategy Framework Directive, also refer to ecosystem services (Schleyer et al., 2015).

Communicating with Flagship Species

In order to raise awareness about biodiversity, as well as raising funds for conservation, many strategies and campaigns use the flagship species approach. Here, organizations use an iconic and well-known species (e.g., panda, elephant, koala) most people are compassionate about and to which they attribute positive feelings. In this way, one can raise people’s attention not only about specific issues that are in direct relevance with the flagship species, but also in more general terms about the environment (Schlagloth et al., 2018).

First described in 1988 by Mittermeier, the flagship species concept showed, via case studies, how particular species were used to successfully convey conservation messages to the general public. Flagship species do not necessarily have to be cute, cuddly or majestic; their “use” largely depends on the target audience of the campaign and their cultural, traditional or historical connection with the species (Schlagloth et al., 2018). As Jepson and Barua (2015) point out, employing flagship species can be

categorized into three distinct groups: (1) providing a compelling moral background for policy work, (2) upscaling inter-institutional considerations, and (3) offering a good basis for justifying conservation efforts. However, while attracting attention to the importance of biodiversity, and often, biodiversity loss, this way of communication received critiques for putting too much focus on certain, mostly animal, species (Smith et al., 2012). On the other hand, some argue the flagship species approach is solely a way of communication used not only to raise funds successfully, but also for the conservation of those species, which may be less plausible to effectively advocate for (McGowan et al., 2020).

Others suggest extending the flagship approach to a flagship fleet by covering multiple species within one communication campaign to provide opportunities for less well-known or difficult-to-communicate species (Veríssimo et al., 2013). Although flagship species campaigns in many cases proved efficient and fruitful (e.g., in the case of the giant panda as the logo animal of one of the most successful NGOs), in other instances they failed to reach the desired outcome (e.g., in the case of the orangutan in a campaign addressing unsustainable palm oil, which did not entirely reach its target) (Jepson & Barua, 2015). There is limited knowledge on how exactly flagship species add to conservation outcomes and why certain species' relevant communication and advocacy actions became victorious, while others may achieve only modest outcomes (Jepson & Barua, 2015; Lundberg et al., 2019 and Veríssimo et al., 2013).

In the European Union context in relevance to campaigning for Natura 2000, and nature conservation in general, the large carnivores of Europe (brown bear, wolf, the European and Iberian lynx species, and the wolverine) as well as predatory birds have enjoyed a prominent role in campaigns (BirdLife, 2020; WWF, 2020). If we take a look at the specific campaign videos of BirdLife for instance advocating for strong nature conservation policies, mostly large mammals and birds steal the lime-light with the occasional appearance of marine fauna (BirdLife, 2020), suggesting that these are the flagship species that are believed to attract people (see also Baimukhamedova, this book).

The Familiarity Principle and Targeting Emotions

The familiarity principle is the concept that, in decision-making, people tend to prefer something of which they have preliminary knowledge and are familiar with; this can play a key role in communicating biodiversity messages (Kidd et al., 2019). In a recent experiment with donation preferences for opportunities to fund various flagship species and familiar ecosystems, it was revealed that familiarity played the most important element when deciding whether to financially support a project (Lundberg et al., 2019). This concept is in close relation to reducing psychological distance in order to enable a closer connection between the target audience and the communicated entity, by emphasizing the relationship or the impacts of proximity to the audience (Kusmanoff et al., 2020). Accordingly, when compiling a communication or advocacy campaign, it is important that the specific stakeholder group addressed by the campaign can connect with the entity used, not only emotionally, but ideally geographically or conceptually as well.

Let us take a look again at the tiger case or the animal’s habitats in Asia. Many would consider it a very unfortunate and sad event if more rainforests or birch forests disappeared, together with the tiger becoming extinct. However, without personal attachment or the familiarity feeling, it would most probably remain a distant calamity (such as the Australian wildfires eradicating koalas or the polar bear’s disappearance—despite the flagship species). Now, consider the forests you have been visiting with your family for the summer holidays for 20 years being felled and the squirrels you watch every Saturday with your children disappearing for good. You would certainly feel a more significant loss due to your familiarity with the squirrels and would be more prone to take action against their disappearance.

At the heart of all this, of course, there are the emotions that steer our decisions in many, if not most, cases, contrary to the common belief that we decide rationally (Thaler, 2015). We can think about what drove us when we made our most recent donations. Whereas statistics and numbers may be believed to work well when selecting our options (the rational theory of decision-making states that we carefully consider

our choices and choose the one that “best” serves our needs (Liebe & Preisendörfer, 2010)), evoking emotions is usually a more effective means to appeal to people, especially when we have such an arsenal of the cute and the cuddly. Such emotional messages can be built on compassion in a positive manner to ask for a contribution, or can take the shape of a negative message that is mostly built on fear (e.g., fear of the extinction of whales during the hunting season) (Kusmanoff et al., 2020). Understandably therefore, the European campaigns on nature conservation feature local species one can directly relate to and are familiar with. These trigger some specific emotions (awe, fear, affection) and maybe personal experience or memory, making these species for us more as a subject of concern in case of probable extinction. As we can see in the videos of BirdLife (2020) mentioned above, most species (brown bear, wolves, otter, deer, squirrels, seals, dolphins, various bird species) are known by European residents and there is a high chance they have already encountered them in person.

Amending Biodiversity Communication Messages with Social and Behavioural Economics Theories

Even though biodiversity professionals may not always draw scientific lessons from other disciplines—just as we could see in the specific case detailed below about the Fitness Check campaign for the EU nature policies review—economic, sociology, psychology, and communication studies can guide conservationists to reach the better results we desperately need. For instance, it was pointed out by Kusmanoff et al., (2016, 2020) that conservation messages often miss one of the initial steps of defining and targeting the precise audience, and the messages often land with people who are already supportive towards the pitch. Different audiences need different messages, simply because various groups hold distinct values and social norms. Typically, groups can be formed based on their motivations (e.g., motivated by self-interest, altruism or pro-environmental behaviour), and so these groups

are prone to act differently to various messages. For instance, an ultimately dedicated environmental activist will be difficult to motivate purely by monetary benefits, whereas members of other groups may be driven by self-interest and, accordingly, will be more likely to act on knowledge of financial gains.

A major building block of a campaign should also be grounded on social norms as they are believed to be one of the determining factors of environmental behaviour (Ajzen, 1991; Cialdini et al., 1990; Farrow et al., 2017). Social norms define what is approved of in a given social context and what behaviour should not be conducted (for instance, if many of our friends are vegetarian and ardent animal right protectors, we are more likely to believe this is an important issue and act accordingly, e.g., donate to animal rights organizations, buying products that do not harm animals, turn to a vegetarian diet ourselves, etc.). By understanding behaviour and driving norms, messages can be framed in order to nudge the target audience (Kusmanoff et al., 2020). For instance, in terms of a biodiversity campaign, we can highlight that most people have already donated to the cause, or already signed the petition framing that it is the norm to do so (meaning you are strange not to sign it).

There are also numerous heuristics and biases that can be used in communicating biodiversity messages as they impact people’s decision-making. The classical example of the framing effect is Kahneman and Tversky’s (1979) prospect theory. Here, the authors refuted the rational choice theory element, the expected utility theory stating that people, instead of rationally and meticulously calculating their chances in uncertain situations, rather bid on the certain gain versus only a probable significantly larger value, while gamble eagerly to avoid losses. Accordingly, messages can be framed to highlight the benefits in avoiding losses, and use negative framing (which, however, is indeed challenging in the biodiversity loss context if it is competing with jobs and growth losses).

The endowment effect may also be worth considering as it states that a certain item owned by us will be considered as having a larger value than others in the market, as certain additional (e.g., emotional) values are contributed to it (Kahneman et al., 1990). This may be used in situations amplifying, for instance, a specific species’ value for a specific area. A related concept, the scarcity heuristic (we tend to contribute more value

to an item if it is scarce) may also be employed, especially considering that most species in communicating biodiversity are endangered or close to extinction (Kusmanoff et al., 2020). The confirmation bias (we tend to agree with those arguments that underpin our belief system (Nickerson, 1998)), together with the *status quo* bias (we tend to dislike changes in the system we are used to) (Samuelson & Zeckhauser, 1988)), also affect advocating for biodiversity—unfortunately, in an adverse way. Mostly, this is because it is unpleasant to hear that certain, big-scale changes are needed to overwrite the current business-as-usual scenario. To date, there are almost 200 identified heuristics and biases; these may be worth examining when compiling a campaign for biodiversity (Kusmanoff et al., 2020).

Communicating messages to influence decision-makers are, of course, embedded in a wide array of theories, far more than those listed above. These social and economic theories address variations of norms, beliefs, narratives or social biases and heuristics aiming to explain how a nuance of change in the communication may result in different outcomes. However, it is important to underline that at the time of working on our nature conservation campaign in 2014–2016, I had only very vague ideas of the science on communicating or advocating for biodiversity—despite being a member of an advocacy NGO for years. Yet, many of our strategies detailed below mirror well the currently emerging field of communicating biodiversity messages that borrows ideas from other well-established disciplines (Kidd et al., 2019). At the same time, it is overly evident that many advocacy and research messages should be further tailored in order to nudge decision-makers towards prioritizing biodiversity on a more extensive scale.

Communicating Biodiversity on the Frontline—A Case of Advocating for the European Union’s Nature Policies

Overview of the Fitness Check Process and Relevant Actors

In 2014–2016, the conservation sector was preoccupied by the so-called Fitness Check process of the EU nature conservation policies (the Birds Directive and the Habitats Directive)¹; which threatened the possible opening up, and consequently weakening of the nature legislation. Jeopardizing the EU’s Nature Directives and together with it the EU-wide Natura 2000 network of protected areas, meant the century’s war to prepare for in conservation, and the green NGO world I also worked in started to get ready for the fight.

At the EU level of conservation, the Natura 2000 network (defined by EU nature policies, the Birds and Habitats Directives) provides the basis for nature conservation covering almost 20% of the EU terrestrial area and over 6% of marine territory (European Commission, 2020). This network of protected areas includes most of the national parks in the EU, nationally protected sites and many nature reserves; it helps protect our natural heritage, the species and habitats that can only be found within the European Union area (European Commission, 2020). Natura 2000 is also very unique, being the single almost continent-wide, multiple-country overlapping area of protected sites, subsequently also needing EU-wide legislation to coordinate work in different national settings (European Commission, 2019b).

The Natura 2000 network is designated and managed based on two pieces of EU-level legislation, the Birds Directive and the Habitats

¹ Within the Regulatory Fitness and Performance Programme (REFIT) in 2012, the Commission wanted to ensure EU policies are smart, “fit for purpose”, efficient and relevant to be pursued at the EU level. Within this scope, nature legislation also needed to be scrutinized by a fitness check process to assess the effectiveness, efficiency, coherence, relevance and EU added value and, if needed, to identify obsolete segments or excessive elements to feed into future policy considerations and amendments (European Commission, 2014).

Directive. They were drafted in 1979 (Birds Directive) and 1992 (Habitats Directive) to set the basis for an EU-wide network and establish its overall operational and management principle and processes (European Commission, 2019b). Natura 2000 is currently the basis of the nature conservation of the Union, being very much valued and cherished (although often criticized) by the conservation sector. Having an EU-wide network and relevant legislation means assurance, and in many cases, another pair of scrutinizing eyes on top of the national level. This signifies to the whole sector of nature conservationists that nature and protected areas are important at the EU level, and they can count on legal support and remedy. However, as such, to a whole set of other sectors it means a number of nuisances at various levels. For instance, Natura 2000 legislation calls for more rigorous scrutiny and assessment in terms of new investments affecting protected sites, while it also impacts on farmers, who often feel too strictly impeded by Natura 2000 restrictions on agricultural land. No wonder, therefore, that certain opposing sectors could see an opportunity, while nature conservationists were anxious when the so-called Fitness Check of the two directives were announced. Regular review of EU policies is a normal process as pieces of legislation with time and changing conditions often need a revisit to ensure the policy is still fit for purpose. However, knowing that many would be cheering for a weaker EU nature policy, nature conservationists were awaiting a probable desperate struggle.

In the case of the campaign addressing the Fitness Check of the Nature Directives, various stages and stakeholders needed to be tackled and addressed. First, the European Commission put together its evaluation study on whether the directives are fit for purpose, for which various evidence was needed. The evidence gathering was comprised of interest groups and online public consultations, national and scientific reports, followed by consultations on the Fitness Check results in 2015 (European Commission, 2014). Based on the information collected and provided, the Commission published its staff working document with the conclusion of the results in 2016 (European Commission, 2016). However, between the two phases of the information synthesizing study in March 2016 and publishing of the policy evaluation in the staff working paper in December 2016, over nine months had passed, and the

announcement of the Fitness Check results was continuously postponed. The time was ticking, making the conservation sector anxious and uneasy of the probable results. To counteract any unfortunate events, further actors of the EU policy arena, including the European Parliament, the European Council, stakeholder groups and citizens, were additionally drawn upon to put additional pressure on the Commission until the publication of the staff working paper in December 2016. Eventually, the campaign yielded success; the document emerged stating that the Nature Directives are fit for purpose, and further actions are needed to enhance their implementation (European Commission, 2016).

In the above-described process, obviously all of the relevant actors and stakeholders needed to be addressed with different keywords and messages. Factual messages were needed to raise the interest or break down potential arguments mainly, at the official consultation scale. At the European Parliament level, for the Members of the Parliament who are directly elected by the public, it was inevitable to show that citizens support this initiative, or that it was in the interest of the public to pursue it. At the general public level, emotions needed to be awoken. Accordingly, various formulations of messages and numerous vessels, which are ideally compelling to the specific stakeholder groups, were selected and employed.

My Recollections of Our Campaign to Safeguard the European Union’s Nature Directive

In the period 2014–2016, the international conservation NGO network I was involved in also found it quintessential to take part in the Fitness Check campaign as many of the NGO’s national members from Central and Eastern Europe (CEE) worked directly with Natura 2000, and the main mission of the organization was to conserve biodiversity. The CEE region also took pride in saying that Natura 2000 gave the opportunity for the EU to preserve in the CEE region what

no longer exists in Western Europe: nature. Additionally, with somewhat more pro-development and infrastructure favouring governments in many countries of the CEE region, weaker nature legislation could have resulted in imminent and irreversible loss of biodiversity. So in short, we had a lot at stake—and we needed a successful campaign.

When we started to prepare our specific communication campaign to safeguard the European Union's key nature conservation policies, a number of us were not very aware of the above scientific theories and strategies.² Nevertheless, we had a pre-concept: while we would aim to target decision-makers with facts (mostly on the socio-economic importance of nature), we would address the public by building on and raising their emotions to support nature. However, there were other factors of the campaign that also needed to be taken into account. For instance, the green NGO world needed to align its messages as it had to be shown to our key audience—EU decision-makers—that the whole conservation sector is behind the unified tagline that the Nature Directives should remain untouched. In addition to aligning our messages, it made sense to fall in line to a certain extent with the bigger NGOs (BirdLife, EEB, WWF), especially the 'Nature Alert' campaign, towards the public, as opposed to having several micro-campaigns by different organizations. However, it was also crucial that we reach our specific audience in the CEE and the CEE in Brussels (meaning decision-makers from this region), and add a special spice to the overall NGOs' campaign.

Accordingly, our planned campaign focused on the CEE region, and was ultimately two-fold. On one hand, facts and figures on Natura 2000 sites and its contribution to jobs and growth, as well as other socio-economic benefits, were prepared mostly for the decision-makers, who were deemed to make rational decisions (applying the rational choice theory as well as the ecosystem services concept). On the other hand, the other key element was the demonstration of public support, both by activating various stakeholders and the public (targeting emotions as well as additional biases). With both these components, we planned to have ample ammunition to show to the various EU decision-makers that

² We did, however, have communication professionals in-house, as well as cooperation with the network of the large international environmental NGOs, who are also experts in campaigning and who may have been aware of the above principles: I was definitely not among them.

the CEE was clear that the Nature Directives were central pieces of EU legislation and should not be touched.

To achieve this aim, we first built a detailed database of the groups we needed to address as final message receivers. We identified the final receivers as the EU decision-makers (including the European Commission, European Parliament, and European Council), who would ultimately steer and decide on the Fitness Check’s outcome and, as a secondary group, the general public. The latter was deemed secondary only as it was planned that the general public would act more as a vehicle to transmit messages towards decision-makers, instead of being the final receiver. In addition to the general public, another transmitter was our group of CEE allies that we named “Friends of Natura 2000”. We identified and sought to include these “friends”, who came from various backgrounds (from artists through local businesses to farmers), and provided their names and personal messages and stories about supporting Natura 2000. This group of Natura 2000 allies acted in four ways: (1) it showed the wide support of the general population, (2) reduced psychological distance and evoked emotions (as politicians from that specific region or country or even field of work may relate more to their personal messages), (3) broke the *status quo* and confirmation bias and showed that not all farmers, businessmen, etc., who are thought to be ardent attackers of the directives, consider Natura 2000 as a necessary evil and hinderance of development, and (4) acted as an upscale platform to reach further stakeholders and the general public during communication. We featured 27 individuals and organizations (singer, tourist expert, wine maker, teacher, farmer, horticultural organization, etc.) from several countries, and could use their messages within the campaign.³

We built largely on the rational choice theory that, ideally, decision-makers consider socio-economic benefits of nature. When seeing nature’s contribution to the then EU motto of “jobs and growth”, they may think that they should persevere with the directives because of their vast socio-economic benefits. Therefore, when the Commission report was being prepared to show evidence about how the directives are fit for purpose,

³ These messages and other elements of the campaign can be found here: <http://www.ceeweb.org/work-areas/working-groups/natura-2000/welovenatura2000/>

and during interservice consultation (when the directives were discussed among Directorates General (DG)), we provided a brochure to over 500 EU decision-makers on case studies about the contribution of the nature directives to socio-economic development in Central and Eastern Europe (strictly in brevity with short texts and beautiful photos). The brochure included for instance, how Natura 2000 sites contributed to the income of 2,300 families in Sighișoara-Târnava Mare, Romania, or how the restoration of river meanders resulted in flood risk reduction estimated at €500 per ha (Loppin & Kotulak, 2016).⁴ In addition to this, in many of our advocacy letters to the European Parliament and various DGs to support the fact that nature directives are fit for purpose, we highlighted the factual messages on Natura 2000 contributions to the economy through showcasing ecosystem services (and flagship species, although the latter was mostly through visual materials of photos and videos). Our messages to decision-makers very much focused on the fact that European nature is unique and in peril. The responsibility of safeguarding our European natural heritage is in the hands of the decision-makers, which in a way can be seen as triggering the endowment effect and the scarcity heuristic. A specific Twitter campaign on the socio-economic benefits of Natura 2000 and its ecosystem services, together with messages from the Friends of Natura 2000 group from each CEE country, was also used for the campaign to call for contributions for the Commission's public consultation and for general support for the directives.

During these campaigns a specific landscape or a flagship species were displayed. To reduce the psychological distance, to build further on emotions and the familiarity principle, and to mobilize the general public (especially the youth that may be more familiar with producing short films), we also called for a short film contest specifically on the importance of Natura 2000. This short⁵ film was deployed when we targeted decision-makers on Twitter and via emails addressing 779 Members of the European Parliament and other EU decision-makers asking them to

⁴ The brochure is available: http://www.ceeweb.org/wp-content/uploads/2011/12/CEEweb_N2000_fact_sheet_ev.pdf.

⁵ Too cool to be killed, watched over 4000 times - <https://www.youtube.com/watch?v=0SKomG50Lwk>.

demand the outcomes of the Fitness Check Publication (as it was continuously postponed), and to back up the Nature Directives. In this letter, we showed both the overwhelming support of the citizens triggering emotions and the socio-economic facts.⁶

Ultimately, our CEE campaign, as well as the overall EU-wide NGO campaign, proved victorious and it was deemed that the Nature Directives are fit for purpose; to be fully effective, however, further national prioritization and funding are required (European Commission, 2016). It was, however, difficult to grasp the exact recipe for the success. If you work on an international scale involving a number of different stakeholders and messages with a multitude of socio-economic and institutional factors in play, it is practically impossible to judge what exactly made an impact, what was the actual trigger, or how they formed a complex system to induce change. There could be literally thousands of momenta or actors or processes and their interplay that could have possibly sealed the fate of the Nature Directives. Still, in order to attempt to have some idea, at least of the probable impacts of your efforts, some steps may be advised. Receiving direct feedback, e.g., getting a phone call or email thanking you for your contribution (clearly, only helpful if it is evident that it is not an autoreply), or seeing CEE case studies as references in the evaluation, are extremely useful to track down any potential impactful measures. Continuous follow-up monitoring actions are also very much needed whether from direct contacts or via an Internet search or references made; you can inquire if your input was taken into account. In this regard, social media is a fantastic tool as it aids tracking of what had happened with your messages. For instance, when you notice that a CEE Member of Parliament Tweeted the short film you sent him calling for support for the Nature Directives, you know you hit home. Of course, sheer numbers also add to evidencing impact—although because the campaign at the EU scale was a joint effort between multiple organizations, it was difficult to know to what extent precisely. However, it is known that the Nature Directives related campaign triggered the largest

⁶ The letter to the Members of the European Parliament can be found here: <http://www.cee.org/wp-content/uploads/2011/12/CEEweb-for-Biodiversitys-letter-to-MEPs-ask-for-the-fitness-check-results-on-Natura-20001.pdf>.

public consultation in the EU's history with over half a million contributions (WWF, 2016), and by all means, we also contributed to this success, especially considering the CEE region.

Overall, when putting these actions under the auspices of social-economic and communication theories, our campaign was built on two areas: familiarity principle and emotional connections with public pressure evoking the responsibility of decision-makers to safeguard Europe's future by protecting its nature; and, the socio-economic contribution of Natura 2000 to appeal to decision-makers with the perceptions that they work under rational behaviour theories. Looking back with hindsight on the work of preparing and implementing our campaign for the Nature Directives, it is astonishing to see how much our ways of communication and methods used can be justified by the science behind communication or other social science disciplines, even if at the time we had no, or only limited knowledge about it. Many of our headlines were grounded on socio-economic facts about nature's contribution and therefore, rational decision-making theory, due to the belief that it is the only way to attract the other sectors and to diminish their arguments of Natura 2000 being an obstacle to development. In addition to this, we also used additional framings. We employed the familiarity principle and the endowment theory addressing, e.g., the Polish Members of Parliament with the socio-economic relevance of Polish Natura 2000 sites or Polish flagship species. We also used creative short videos on European nature produced by the public to appeal to their emotions (as well as to their senses by acting as their voters ask them).

On the other hand, however, we made relatively limited use of exploiting emotions and reframing Natura 2000 according to Kahneman and Tversky's Prospect Theory (1979) of highlighting losses and the potential value of this, amplifying fear and negative consequences. We could also have triggered other biases on a more elevated scale, including the confirmation bias with potentially more provocative campaigns. In addition, we could have dug deeper and tried to group our stakeholder groups based on their social norms and values and tailor messages accordingly—although of course, as with every NGO, we also struggled with limited resources. Overall, despite having adequate scientific knowledge of relevant social theories, we still exploited relatively well the possible

biases and heuristics, as well as steering emotions. On the other hand, we massively built on facts and figures about the socio-economic relevance of Natura 2000 and ecosystem services with the firm belief that decision-makers will only make rational choices (now, I know better). It is also interesting to see how practitioners’ knowledge can be apt even without the actual knowledge of scientific theories, but more importantly, how much practice and science can provide to each other, ultimately resulting in a more complex and conscientious plan of action.

Conclusions: Pry, Plan and Follow up

To date, various scientific theories and strategies stemming from them can aid the forming of more impactful messages targeting decision-makers. These theories and strategies may very well be employed in the context of biodiversity, even if the overall topic is often thought to be a challenging concept that may not resonate well with people at the top—either because of its diffuse and complex nature or because of vested and competing economic interests. If carefully crafted however, as can be seen in the above case, communicating rational arguments embedded in monetary values with ecosystem services, steering feelings of familiarity with flagship species, or showing overwhelming public support, can help in reaching the desired outcomes. Formulating messages, however quintessential, are only the beginning of the cumbersome process of communication and advocacy. The right vessel should be chosen, together with the right audience for which the messages are relevant and with which they can resonate. The most difficult challenge remains how to grasp and involve that audience, especially if they are in a special bubble. In this, meticulous planning and specific research on your audience’s members and their background can assist. Discovering ways of how best to trigger the familiarity principle or showcase socio-economic messages, how to understand the ruling norms or even how to activate certain biases that push the right buttons, are the building blocks of forming impactful messages. Furthermore, following up on your tactics and potential results (e.g., by asking for direct feedback or monitoring

indicators) can provide useful tips in finding out what worked best and what to employ and fine-tune for the next occasion.

References

- Ainscough, J., de Vries, A., Metzger, M., Rounsevell, M., Schröter, M., Delbaere, B., de Groot, R. and Staes, J. (2019) Navigating pluralism: Understanding perceptions of the ecosystem services concept. *Ecosystem Services*, 36: 100892. <https://doi.org/10.1016/j.ecoser.2019.01.004>.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behaviour and Human Decision Processes*, 50, 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Bekessy, S. A., Runge, M. C., Kusmanoff, A. M., Keith, D. A., & Wintle, B. A. (2018). Ask not what nature can do for you: A critique of ecosystem services as a communication strategy. *Biological Conservation*, 224, 71–74. <https://doi.org/10.1016/j.biocon.2018.05.017>
- BirdLife. (2020). Nature alert. <https://www.birdlife.org/europe-and-central-asia/project/nature-alert>.
- Braat, L., & de Groot, R. (2012). The ecosystem services agenda: Bridging the worlds of natural science and economics, conservation and development, and public and private policy. *Ecosystem Services*, 1(1), 4–15. <https://doi.org/10.1016/j.ecoser.2012.07.011>
- ten Brink, P., Bassi, S., Badura, T., Gantioler, S., Kettunen, M., Mazza, L., Hart, K., Rayment, M., Pieterse, E., Daly, E., Gerdes, H., Lago, M., Lang, S., Markandya, A., Nunes, P., Ding, H., Tinch, R., & Dickie, I. (2013). *The economic benefits of the Natura 2000 network*. Publications Office of the European Union.
- Cardinal, B., Duffy, J., Gonzalez, A., Hooper, D., Perrings, C., Venail, P., Narwani, A., Tilman, D., Wardle, D., Kinzig, A., Daily, G., Loreau, M., Grace, J., Larigauderie, A., Srivastava, D., & Naeem, S. (2012). Biodiversity loss and its impact on humanity. *Nature*, 486, 59–67. <https://doi.org/10.1038/nature11148>
- Chaudhary, S., McGregor, A., Houston, D., & Chettri, N. (2015). The evolution of ecosystem services: A time series and discourse-centered analysis. *Environmental Science and Policy*, 54, 25–34. <https://doi.org/10.1016/j.envsci.2015.04.025>

- Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology*, 58, 1015–1026. <https://doi.org/10.1037/0022-3514.58.6.1015>
- Costanza, R., de Groot, R., Braat, L., Kubiszewski, I., Fioramonti, L., Sutton, P., Farber, S., & Grasso, M. (2017). Twenty years of ecosystem services: How far have we come and how far do we still need to go? *Ecosystem Services*, 28(2017), 1–16. <https://doi.org/10.1016/j.ecoser.2017.09.008>
- Costanza, R., Arge, R., Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R. V., Paruelo, J., Raskin, R., Sutton, P., & Belt, M. (1997). The value of the world's ecosystem services and natural capital. *Nature*, 387, 253–260. [https://doi.org/10.1016/S0921-8009\(98\)00020-2](https://doi.org/10.1016/S0921-8009(98)00020-2)
- Daily, G. C., Alexander, S., Ehrlich, P. R., Goulder, L., Lubchenco, J., Matson, P. A., Mooney, H., Postel, S., Schneider, S. H., Tilman, D., & Woodwell, G. G. (1997). Ecosystem services: Benefits supplied to human societies. *Natural Ecosystems: Issues in Ecology*, 1(2), 1–18.
- Ehrlich, P. R., & Ehrlich, A. H. (1981). *Extinction: The causes and consequences of the disappearance of species*. Random House.
- European Commission. DG Environment. (2014). Fitness check mandate for nature legislation. https://ec.europa.eu/environment/nature/legislation/fitness_check/docs/Mandate%20for%20Nature%20Legislation.pdf.
- European Commission. DG Environment. (2016). Fitness check of the birds and habitats directives. https://ec.europa.eu/environment/nature/legislation/fitness_check/index_en.htm.
- European Commission. DG Environment. (2019a). Ecosystem services and green infrastructure. https://ec.europa.eu/environment/nature/ecosystems/index_en.htm.
- European Commission. DG Environment. (2019b). Nature and biodiversity law. https://ec.europa.eu/environment/nature/legislation/index_en.htm.
- European Commission. DG Environment. (2020). Natura 2000. https://ec.europa.eu/environment/nature/natura2000/index_en.htm.
- Farrow, K., Grolleau, G., & Ibanez, L. (2017). Social norms and pro-environmental behavior: A review of the evidence. *Ecological Economics*, 140, 1–13. <https://doi.org/10.1016/j.ecolecon.2017.04.017>
- Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). (2019). Media release. *Nature's dangerous decline 'Unprecedented' species extinction rates 'Accelerating'*. <https://www.ipbes.net/news/Media-Release-Global-Assessment>.

- Jepson, P., & Barua, M. (2015). A theory of flagship species action. *Conservation and Society*, 13(1), 95–104. <https://doi.org/10.4103/0972-4923.161228>
- Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1990). Experimental tests of the endowment effect and the Coase theorem. *Journal of Political Economy*, 98, 1325–1348. <https://doi.org/10.1086/261737>
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2): 263–291. https://doi.org/10.1142/9789814417358_0006
- Kidd, L. R., Garrard, G. E., Bekessy, S. A., Mills, M., Camilleri, A. R., Fidler, F., Fielding, K. S., Gordon, A., Gregg, E. A., Kusmanoff, A. M., Louis, W., Moon, K., Robinson, J. A., Selinske, M. J., Shanahan, D., & Adams, V. M. (2019). Messaging matters: A systematic review of the conservation messaging literature. *Biological Conservation*, 236, 92–99. <https://doi.org/10.1016/j.biocon.2019.05.020>
- Kusmanoff, A. M., Fidler, F., Gordon, A., Garrard, G. E., & Bekessy, S. A. (2020). Five lessons to guide more effective biodiversity conservation message framing. *Conservation Biology*, 00, 1–11. <https://doi.org/10.1111/cobi.13482>
- Kusmanoff, A. M., Hardy, M. J., Fidler, F., Maffey, G., Raymond, C., Reed, M. S., & Bekessy, S. A. (2016). Framing the private land conservation conversation: Strategic framing of the benefits of conservation participation could increase landholder engagement. *Environmental Science & Policy*, 61, 124–128. <https://doi.org/10.1016/j.envsci.2016.03.016>
- Legagneux, P., Casajus, N., Cazelles, K., Chevallier, C., Chevrainais, M., Guery, L., Jacquet, C., Jaffre, M., Naud, M., Noisette, F., Ropars, P., Vissault, S., Archambault, P., Bety, J., Bertaux, D., & Gravel, D. (2018). Our house is burning: Discrepancy in climate change vs. biodiversity coverage in the media as compared to scientific literature. *Frontiers in Ecology and Evolution*, 5: 175. <https://doi.org/10.3389/fevo.2017.00175>.
- Liebe, U., & Preisendörfer, P. (2010). Rational choice theory and the environment: Variants, applications, and new trends. In M. Gross, H. Heinrichs (Eds.), *Environmental Sociology*. Springer.
- Loppin, C., & Kotulak, M. (2016). Fact sheet—The socio-economic benefits of Natura 2000 in Central and Eastern Europe. http://www.ceeweb.org/wp-content/uploads/2011/12/CEEweb_N2000_fact_sheet_ev.pdf.

- Lundberg, P., Vainio, A., Macmillan, D. C., Smith, R. J., Veríssimo, D., & Arponen, A. (2019). The effect of knowledge, species aesthetic appeal, familiarity and conservation need on willingness to donate. *Animal Conservation*, 22, 432–443. <https://doi.org/10.1111/acv.12477>
- Mace, G. M., Barrett, M., Burgess, N. D., Cornell, S., Freeman, R., Grooten, M., & Purvis, A. (2018). Aiming higher to bend the curve of biodiversity loss. *Nature Sustainability*, 1, 448–451.
- Martinez-Harms, M. J., Bryan, B. A., Balvanera, P., Law, E. A., Rhodes, J. R., Possingham, H. P., & Wilson, K. A. (2015). Making decision for managing ecosystem services. *Biological Conservation*, 184, 229–238. <https://doi.org/10.1016/j.biocon.2015.01.024>
- Maxwell, S., Fuller, R., Brooks, T., Watson, J. (2016). Biodiversity: The ravages of guns, nets and bulldozers. *Nature*, 536. <https://doi.org/10.1038/536143a>.
- McGowan, J., Beaumont, L. J., Smith, R. J., Chauvenet, A. L. M., Harcourt, R., Atkinson, S. C., Mittermeier, J. C., Esperon-Rodriguez, M., Baumgartner, J. B., Beattie, A., Dudaniec, R. Y., Grenyer, R., Nipperess, D. A., Stow, A., & Possingham, H. P. (2020). Conservation prioritization can resolve the flagship species conundrum. *Nature Communications*, 11, 1–7, Article 994. <https://doi.org/10.1038/s41467-020-14554-z>.
- Millner, A., & Olivier, H. (2015). Beliefs, politics, and environmental policy. *Review of Environmental Economics and Policy*, 10(2). <https://doi.org/10.1093/reep/rew010>.
- Nickerson, R. S. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology*, 2, 175–220. <https://doi.org/10.1037/1089-2680.2.2.175>
- OECD. (2017). *The political economy of biodiversity policy reform*. OECD Publishing.
- Posner, S. M., McKenzie, E., & Ricketts, T. H. (2016). Policy impacts of ecosystem services knowledge. *Proceedings of the National Academy of Sciences of the United States of America*, 113(7), 1760–1765. <https://doi.org/10.1073/pnas.1502452113>
- Primmer, E., Termansen, M., Bredin, Y., Blicjarska, M., Garcia-Llorente, M., Berry, P., Jaaskelainen, T., Bela G., Fabok, V., Geamana, N., Harrison, P. A., Haslett, J. R., Cosor, G. L., & Andersen, A. H. K. (2015). Caught Between personal and collective values: Biodiversity conservation in European decision-making. *Environmental Policy and Governance*, 27(6), 588–604. <https://doi.org/10.1002/eet.1763>.

- Raue, M., & Schneider, E. (2019). Psychological perspectives on perceived safety: Zero-risk bias, feelings and learned carelessness. In M. Raue, B. Streicher, E. Lerner (Eds.), *Perceived safety. Risk engineering*. Springer. https://doi.org/10.1007/978-3-030-11456-5_5.
- Reder, L. M., & Ritter, F. E. (1992). What determines initial feeling of knowing? Familiarity with question terms, not with the answer. *Journal of Experimental Psychology: Learning, Memory & Cognition*, 18(3), 435–451. <https://doi.org/10.1037/0278-7393.18.3.435>.
- Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, 4(2), 155–169. <https://doi.org/10.1007/BF01405730>
- Samuelson, W., & Zeckhauser, R. (1988). Status quo bias in decision making. *Journal of Risk and Uncertainty*, 1, 7–59. <https://doi.org/10.1007/BF00055564>
- Schlagloth, R., Santamaria, F., Golding, B., & Thomson, H. (2018). Why is it important to use flagship species in community education? The koala as a case study. *Animal Studies Journal*, 7(1), 127–148.
- Schleyer, C., Görg, C., Hauck, J., & Winkler, K. J. (2015). Opportunities and challenges for mainstreaming the ecosystem services concept in the multi-level policy-making within the EU. *Ecosystem Services*, 16(2015), 174–181. <https://doi.org/10.1016/j.ecoser.2015.10.014>
- Schröter, M., van der Zanden, E. H., van Oudenhoven, A. P. E., Remme, R. P., Serna-Chavez, H. M., de Groot, R. S., & Opdam, P. (2014). Ecosystem services as a contested concept: A synthesis of critique and counter-arguments. *Conservation Letters*, 7, 514–523. <https://doi.org/10.1111/conl.12091>
- Sharman, M., & Mlambo, M. C. (2012). Wicked: The problem of biodiversity loss. *GAIA—Ecological Perspectives on Science and Society*, 21(4). <https://doi.org/10.14512/gaia.21.4.10>.
- Smith, R. J., Veríssimo, D., Isaac, N. J. B., & Jones, K. E. (2012). Identifying Cinderella species: Uncovering mammals with conservation flagship appeal. *Conservation Letters*, 00(2012), 1–8. <https://doi.org/10.1111/j.1755-263X.2012.00229.x>
- Thaler, R. H. (2015). *Misbehaving: The making of behavioral economics*. W.W. Norton & Co.
- Veríssimo, D., Fraser, I., Girao, W., Campos, A. A., Smith, R. J., MacMillan, D. C. (2013). Evaluating conservation flagships and flagship fleets. *Conservation Letters*, May/June 2014, 7(3), 263–270. <https://doi.org/10.1111/conl.12070>.

- Westman, W. E. (1977). How much are nature’s services worth? *Science*, 197, 960–964. <https://doi.org/10.1126/science.197.4307.960>
- Wright, W. C. C., Eppink, F. V., & Greenhalgh, S. (2017). Are ecosystem service studies presenting the right information for decision making? *Ecosystem Services*, 25(2017), 128–139. <https://doi.org/10.1016/j.ecoser.2017.03.002>
- WWF. (2016). EU Nature Directives are ‘Fit for Purpose’, concludes European Commission expert study. <https://www.wwf.eu/?272571/EU-Nature-Directives-are-Fit-for-Purpose-study>.
- WWF. (2018). *Living planet report-2018: Aiming higher*. In M. Grooten, & R. E. A. Almond (Eds.), WWF, Gland.
- WWF. (2020). Large carnivores. https://wwf.panda.org/knowledge_hub/where_we_work/alps/our_solutions22222/large_carnivores/.
- Zaccai, E., & Adams, W. M. (2012). How far are biodiversity loss and climate change similar as policy issues? *Environment, Development and Sustainability*, 14, 557–571 (2012). <https://link.springer.com/article/10.1007/s10668-012-9344-x>.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter’s Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter’s Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

