



GREEN  
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POLICY REPORT  
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# 50 SHADES OF GREEN

THE FALLACY OF ENVIRONMENTAL MARKETS

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FRÉDÉRIC HACHE

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PART II.



*I sit on a man's back choking him and making him carry me, and yet assure myself and others that I am sorry for him and wish to lighten his load by all means possible ... Except by getting off his back.*

– LEO TOLSTOY

*If we want things to stay the same, things will have to change.*

– TOMASI DI LAMPEDUSA, 'THE LEOPARD'

Report “50 Shades of Green: the fallacy of environmental markets – Part II.”

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# EXECUTIVE SUMMARY

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Natural Capital is a new framing of nature, whose stated purpose is to put a price on nature to save it. A number of related recent developments are underway to develop environmental accounting frameworks at EU and international levels and create financial markets on ecosystem services.

Ambitious proposals have been made a few years ago to create a European offset market for biodiversity called habitat banking. Such a market would suffer from major unsolvable conceptual issues, including **measurement issues, incalculable additionality, highly uncertain valuations, an inexistent price signal** and thus could never achieve its environmental objectives.

Empirical evidence also suggests **an appalling social and environmental track record** for similar existing markets. As importantly, the selective pricing of only some ecosystem services and the ignorance of ecosystem interdependencies mean that **the resulting values cannot claim to represent biodiversity**.

Biodiversity as an asset class could also create significant **moral hazard and financial stability** issues by fostering the build-up of unmonitored risks, that need to be looked into as work on these markets progresses.

Yet, recent legislative initiatives linked to the European sustainable finance agenda suggest that **3 new European environmental markets may be created** and included in the future ecolabel on financial products and green bonds framework: biodiversity offset markets, water quality trading markets and markets on carbon capture and storage.

The 2019-2020 international agenda on biodiversity will also provide a favourable political context for a possible future legislative initiative mandating biodiversity offsetting at EU level.

Traditional environmental regulations would be far more effective, simpler and cheaper to address the critical loss of natural resources. They would **not require the unrealistic assumptions and oversimplifications** needed to create markets on biodiversity, and would **accommodate infinitely better the high scientific uncertainty and our incomplete scientific knowledge**.

Traditional binding regulations would also incidentally **make all finance sustainable with regards to biodiversity loss**, as the risk-adjusted returns of all economic activities and companies would automatically adjust and capital would shift accordingly. Just as with carbon markets, this **puts into question the current political focus on softening prudential regulation in exchange for a greening of banks' balance-sheets** and on creating new markets on pollution and environmental destruction.

**While putting a price on nature to save it is a catchy formula, it would therefore seem that regulating nature's destruction would be a far superior alternative.**

A public debate is needed on these issues of crucial public interest. In this respect, **recent calls to action to address the Earth's sixth mass extinction are both long overdue and very welcome, but a debate on the 'how' is also indispensable**. Market-based approaches like biodiversity offsetting should not be promoted as being part of the solution, given their intractable issues and poor track record. Likewise, sustainable finance should not foster the creation of such markets if it is to be truly sustainable.



## INTRODUCTION

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Addressing biodiversity loss is one of the defining issues of our generation. It is widely acknowledged that loss of biodiversity is reaching a critical scale with potential dramatic environmental, social, economic and geopolitical consequences.

**While there is a growing political momentum to address biodiversity loss, there is surprisingly little debate on the ‘how’. Yet the ‘how’ is arguably as important as the headline objective.**

**The ‘how’ is also in the process of changing radically**, with the growing prominence of market-based solutions in environmental policies and the mainstreaming of a new kind of sustainable finance: new environmental accounting frameworks are about to be rolled out, and proposals to create new European financial markets on pollution and environmental destruction are being pushed forward.

Based on the idea that markets would succeed where traditional environmental policies have failed, this **new approach to nature and conservation is rooted in the belief that we need to put a price on nature to save it**. As is the case with climate change mitigation policies, it is considered that financial markets are the best tool to curb biodiversity loss while minimising the cost of compliance for the private sector.

Nature is being reconceptualised as natural capital, ecosystems are being reframed as services to humans, unbundled, abstracted from time and place, quantified and valued in monetary terms, and the concept of biodiversity protection is progressively shifting from conservation to restoration.

While these policies can be traced back to the Rio summit of 1992, **a number of major developments are about to happen over the next 2 years:**

- ▣ The EU sustainable finance agenda may open the door to the inclusion of biodiversity offsetting, water quality trading and carbon capture and storage markets in green bonds and in the future ecolabel on financial instruments;
- ▣ The interest of the financial sector is picking up for nature as a new asset class<sup>1</sup>;
- ▣ 2020 will see the end of the implementation phase of the European environmental accounting framework<sup>2</sup>, the IUCN World Conservation Congress,<sup>3</sup> and the 15th Conference of the Parties of the Convention on Biological Diversity – expected to be the Paris Agreement of biodiversity;

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1 Sandor Richard L., Clark Nathan J., Kanakasabai Murali, Marques Rafael L., Environmental Markets: A New Asset Class, CFA Institute Research Foundation, January 2014. Online. Available at: <https://www.cfainstitute.org/en/research/foundation/2014/environmental-markets-a-new-asset-class>; Credit Suisse AG and McKinsey Center for Business and Environment, Conservation Finance From Niche to Mainstream: The Building of an Institutional Asset Class, January 2016. Online. Available at: <https://www.credit-suisse.com/media/assets/corporate/docs/about-us/responsibility/banking/conservation-finance-en.pdf>; United Nation, Convention to combat desertification, The LDN Fund: An Impact Investment Fund for Land Degradation Neutrality. Online. Available at <https://www.unccd.int/actions/impact-investment-fund-land-degradation-neutrality>

2 Wejchert Jakub, The KIP INCA project, European Commission – DG Environment. Online. Available at: [https://circabc.europa.eu/sd/a/c4e84b4e-0a6f-4fdb-8626-5f78eb0eb294/4\\_KIP%20INCA\\_ENV.pdf](https://circabc.europa.eu/sd/a/c4e84b4e-0a6f-4fdb-8626-5f78eb0eb294/4_KIP%20INCA_ENV.pdf)

3 International Union for Conservation of Nature, France to host IUCN World Conservation Congress 2020, May 2018. Online. Available at: <https://www.iucn.org/news/secretariat/201805/france-host-iucn-world-conservation-congress-2020>

- ▣ A No Net Loss EU legislative proposal that would make biodiversity offsetting mandatory at EU level has been in the works for a few years<sup>4</sup> and might be finalised once the new European Commission has taken up office.

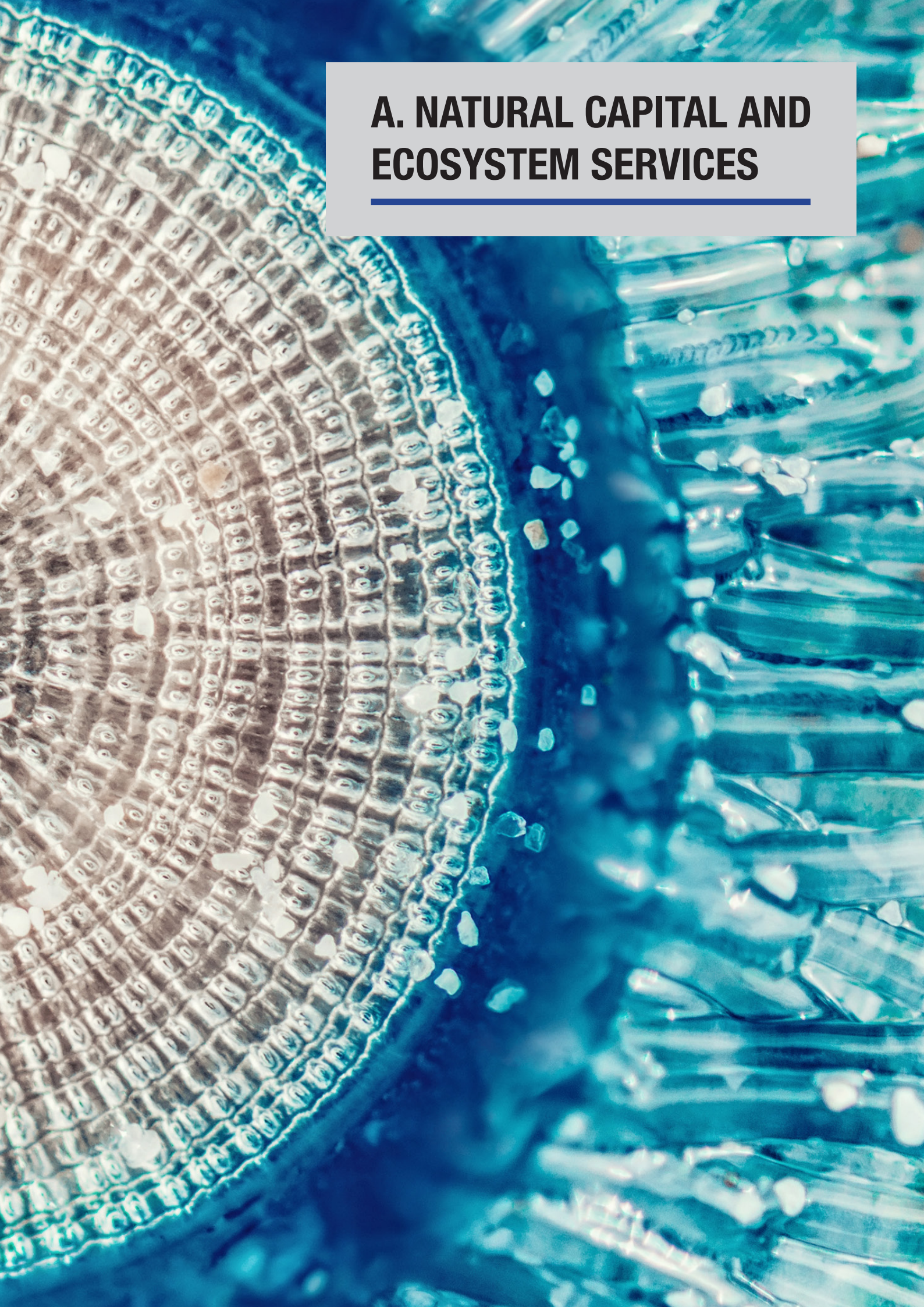
**In the light of these developments, it is necessary to analyse these new market-based mechanisms to assess whether they can meet their stated environmental, social and economic objectives.**

**While the increased focus on curbing biodiversity loss is both welcome and long overdue, now is the time to also focus on the ‘how’.** That is the objective of this paper.

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4 European Commission – Environment, No Net Loss, September 2016. Online. Available at: [http://ec.europa.eu/environment/nature/biodiversity/nnl/index\\_en.htm](http://ec.europa.eu/environment/nature/biodiversity/nnl/index_en.htm)



A microscopic image of plant tissue, likely a cross-section of a leaf or stem, showing cellular structures. The image is dominated by a large, curved, and highly textured area on the left, which appears to be a vascular bundle or a similar specialized tissue. This area is characterized by a dense, repeating pattern of small, rounded cells. To the right of this main structure, there is a more elongated and less dense area, possibly representing another part of the plant tissue. The overall color palette is a mix of light blue, teal, and brownish-gold, with some areas appearing more saturated than others. A semi-transparent grey rectangular box is positioned in the upper right corner, containing the text 'A. NATURAL CAPITAL AND ECOSYSTEM SERVICES' in a bold, black, sans-serif font. Below the text, there is a thin horizontal line.

## **A. NATURAL CAPITAL AND ECOSYSTEM SERVICES**

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## A. NATURAL CAPITAL AND ECOSYSTEM SERVICES

### 1. WHAT IS IT

A new framing of nature has emerged over the past decades called natural capital. It refers to the stock of natural resources (soil, air, water and all living organisms) providing a number of essential goods (fish, timber, water) and services to humans. The services are called ecosystem services and are measured in terms of their contribution to human well-being. They include for example pollination, water purification, preventing soil erosion and climate control.

Natural capital is an extension of the economic concept of capital to the natural environment.

Ecosystem services are grouped into four categories:

1. *Provisioning services*: the production of food, raw materials (wood), fresh water, medicinal resources;
2. *Regulating services*: climate regulation, control of air and water quality, crop pollination, limitation of extreme events (floods, storms, landslides, tsunamis), pest and disease control;
3. *Supporting services*: nutrient recycling, maintenance of genetic diversity;
4. *Cultural services*: spiritual and recreational benefits, such as ecotourism, outdoor recreation, spiritual enrichment.

The idea underlying this framing is that **we need to put a price on nature to save it**. Current environmental degradation is taken as evidence that environmental regulations are inadequate to protect nature. Instead, it is believed that environmental degradation must be included in the price of goods and services, as a way to incentivise environmental protection. The assumption is that a rise in the price of natural resources would provide a price signal that would incentivize a change in behaviour, replacing the need for regulation.

This requires first measuring the physical stocks of natural resources and ecosystem services, then putting a monetary value on them and then mandating the inclusion of these values in the price of goods and services.

The first two steps, measuring the stocks of natural resources and ecosystem services and putting a monetary value on them, are called **environmental accounting**. Two environmental accounting frameworks are currently being developed, one by the UN and the other by the European Commission.

The UN framework has been in the works since the Rio summit of 1992: 150 governments signed the Convention on Biological Diversity, an international treaty aimed at promoting the conservation and sustainable use of biodiversity. It stated that biodiversity values should be integrated in national accounts and reporting systems. The United Nations then started developing a system of economic environmental accounting.<sup>5</sup>

At EU level, the seventh EU Environment Action Program adopted in 2013 put as its first priority objective the protection, conservation and enhancement of the Union's natural

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5 System of Environmental Economic Accounting, What is the SEEA?. Online. Available at: <https://seea.un.org/>



capital. As part of this program, the European Commission then launched in 2015 KIP INCA,<sup>6</sup> a project aimed at designing a natural capital accounting framework and integrating it in national accounts by 2020. The framework is very similar to the UN one.

Beyond accounting, another step is necessary to truly put a price on nature: new regulations are needed to mandate the inclusion of natural capital's value in the price of goods and services. One way of achieving this is to create mandatory offset markets on ecosystem services. One example of such markets is offset markets on biodiversity and habitat destruction.

## 2. BIODIVERSITY OFFSETTING

### *Definition*

**Offsetting refers to an action aimed at compensating for environmental destruction taking place at a different time and place.** Setting up an offset market requires for a central entity to define the type of degradation to be compensated, the rules on what constitutes compensatory activity, where and when compensation can take place, and a common metric to measure whether compensation has been achieved.

Biodiversity offsetting typically works as follows: a construction company wants to build a new airport or highway in the South of Spain, and doing so would destroy a natural habitat for a rare species of flamingos. The law requires that in order for the construction project to be approved, a mitigation hierarchy must be followed: the company must first try to avoid destroying this habitat; it must then try to minimise the impact that cannot be avoided, and rehabilitate the degraded habitat following impacts that cannot be completely avoided or minimised.

If there is a **residual impact** after these three steps are taken, then the residual impact on biodiversity must be offset by recreating a habitat for the same species within a limited geographical range of the destruction and within a given timeframe. The construction company will commission a project developer to recreate such a habitat within X kilometres. It will receive in exchange biodiversity offset credits: certificates allowing for the destruction of a certain amount of biodiversity in a certain area, that it will use to comply with its obligations.

The mechanism is very similar to carbon offsetting. Essentially, **biodiversity offset markets can be described as markets for real estate developers and infrastructure companies** where they can trade permits to destroy biodiversity. The main difference is that **the number of underlying assets is vastly greater and more heterogeneous** in the case of biodiversity and ecosystem services: while there is a limited number of greenhouse gases, there is an incredibly large number of species and services, making it infinitely more difficult to define a common currency to trade on.

### *Track record*

Biodiversity offset schemes already exist in several countries. Due to a number of issues that we will explore in the following parts, the track record of these markets is very poor.

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<sup>6</sup> European Commission – Environment, Natural Capital Accounting, March 2019. Online. Available at: [http://ec.europa.eu/environment/nature/capital\\_accounting/index\\_en.htm](http://ec.europa.eu/environment/nature/capital_accounting/index_en.htm)

In Australia, a report by the Nature Conservation Council<sup>7</sup> found that “in 75% of cases, offsets resulted in “Poor” or “Disastrous” outcomes for wildlife and bushland, while only 25% resulted in “Adequate” outcomes. None resulted in “Good” outcomes for nature.” It concluded that instead of helping, offsetting pushes species to the brink, adding “extinction pressure to the very species these schemes are supposed to protect.”<sup>8</sup> Scientific evaluation studies also found 2/3 of expected offsets completely failed to materialize in Australia.<sup>9</sup>

In Canada, researchers found that 63% of projects that offset fish habitat loss failed to achieve their targets.<sup>10</sup> Another study analysing 558 offset projects between 1990-2011 found that despite offset attempts the net loss of habitats was 99%.<sup>11</sup>

In the USA, scientists looking at 12 of the longest established wetland mitigation areas in Ohio found that many did not even meet the regulation’s objectives.<sup>12</sup>

More broadly, a study looking at a broad range of restoration projects around the world found that **up to two-thirds of offsets aiming to restore an ecosystem were unsuccessful**.<sup>13</sup> The figure was even higher for offsets that created ecosystems from scratch.<sup>14</sup>

Such findings are not surprising since ‘there is evidence within the restoration ecology literature that shows that the science of restoration is still in its infancy and demonstrates mixed to poor outcomes. (...) Restoration ecology is a relatively young and inexperienced discipline with a still-embryonic and patchy evidence base. Given the complexity and variability of natural systems, the ecological community is increasingly recognizing that recreating or restoring ecosystems to some specified former state is often unlikely to be feasible, especially within reasonable timeframes’.<sup>15</sup>

This poor track record **does not mean that restoring degraded sites is a bad thing, but it puts into question the idea that doing so should create the right to destroy existing biodiversity elsewhere through the granting of credits.**

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- 7 Nature Conservation Council of NSW, Paradise Lost - The weakening and widening of NSW, biodiversity offsetting schemes, 2005-2016, 2016. Online. Available at: [https://www.nature.org.au/media/265228/bio-offsetting-report\\_v14.pdf](https://www.nature.org.au/media/265228/bio-offsetting-report_v14.pdf)
  - 8 Hunter Valley News, Nature Conservation Council believes offsetting pushing species to the brink, March 2017. Online. Available at: <https://www.huntervalleynews.net.au/story/4518198/new-study-finds-development-trumps-environment/>
  - 9 Nordic Council of Ministers, Planning biodiversity offsets – Twelve Operationally Important Decisions, 2018. Online. Available at: <https://norden.diva-portal.org/smash/get/diva2:1201285/FULLTEXT01.pdf>
  - 10 Quigley JT1, Harper DJ, Effectiveness of fish habitat compensation in Canada in achieving no net loss, Environmental management, 2006. Online. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/16456631>
  - 11 Nordic Council of Ministers, Planning biodiversity offsets – Twelve Operationally Important Decisions, 2018. Online. Available at: <https://norden.diva-portal.org/smash/get/diva2:1201285/FULLTEXT01.pdf>
  - 12 Mack John J., Micacchion Mick, An ecological assessment of Ohio mitigation banks: Vegetation, Amphibians, Hydrology, and Soils. Ohio EPA Technical Report WET/2006-1. Ohio Environmental Protection Agency, Division of Surface Water, Wetland Ecology Group, Columbus, Ohio, 2006. Online. Available at: [https://www.epa.state.oh.us/Portals/35/wetlands/Bank\\_Report\\_Ohio\\_Final.pdf](https://www.epa.state.oh.us/Portals/35/wetlands/Bank_Report_Ohio_Final.pdf)
  - 13 FERN, Briefing note 3: Biodiversity offsetting in practice, Jan 14
  - 14 Suding, K.N., 2011. Toward an era of restoration in ecology: successes, failures and opportunities ahead. Annu. Rev. Ecol. Evol. Syst. 42, 465–487. Available at: [http://nature.berkeley.edu/sudinglab-wp/wp-content/uploads/2012/09/Suding\\_2011\\_AREES.pdf](http://nature.berkeley.edu/sudinglab-wp/wp-content/uploads/2012/09/Suding_2011_AREES.pdf)
  - 15 CEEweb for Biodiversity, Critical review of Biodiversity Offset track record – For the purposes of IEEP in their review of ‘Policy Options for a potential EU No Net Loss Initiative’. Online. Available at: [http://www.ceeweb.org/wp-content/uploads/2011/12/Critical-review-of-biodiversity-offsets\\_for-IEEP\\_Final.pdf](http://www.ceeweb.org/wp-content/uploads/2011/12/Critical-review-of-biodiversity-offsets_for-IEEP_Final.pdf)



### 3. FROM NO LOSS TO NO NET LOSS

In order to develop biodiversity offsetting on a large scale, there is a need to develop a legal framework that makes it mandatory to offset. Two such frameworks are being developed by the European Commission and the United Nations.

A new concept of ‘No Net Loss of biodiversity’ emerged in 2011 with the new EU biodiversity strategy,<sup>16</sup> replacing the earlier ‘No Loss of biodiversity target’. As the European Commission explains, *“even when every effort is made to avoid, minimize and restore, human activities can still have negative impacts on biodiversity. To avoid a net loss of biodiversity and ecosystem services, damages resulting from human activities must be balanced by at least equivalent gains.”*<sup>17</sup>

This is a very significant shift: it means that the objective is no longer to curb damages to biodiversity resulting from human activity, but rather to ensure that damages are compensated by at least equivalent gains. In other words, **conservation objectives are complemented or replaced by restoration objectives**. In effect, this opens the door to biodiversity offset mechanisms such as the one described above to implement this new policy goal.<sup>18</sup>

Anecdotally, the term No Net Loss is claimed to have been originally coined by former US president George W Bush as a clever campaigning tactic to claw back some of the environmental vote in a tight race for the presidency.<sup>19</sup>

The No Net Loss objective also aims at expanding the scope of offsetting from protected species to all species and habitats. The argument is that *“there is currently no requirement for the compensation of unavoidable residual impacts on species and habitats that are not covered by nature legislation”*, and mandating the use of offsets could address these unavoidable residual impacts.

The European Commission has been working since 2014 on a future regulatory framework based on the No Net Loss initiative. Such a regulation – whose proposal may happen over the coming years – would in effect make biodiversity offsetting mandatory and thus create the demand for this new market.

16 European Commission – Environment, The EU Biodiversity Strategy to 2020, 2011. Online. Available at: <http://ec.europa.eu/environment/nature/info/pubs/docs/brochures/2020%20Biod%20brochure%20final%20lowres.pdf>

17 European Commission – Environment, No Net Loss, September 2016. Online. Available at: [http://ec.europa.eu/environment/nature/biodiversity/nnl/index\\_en.htm](http://ec.europa.eu/environment/nature/biodiversity/nnl/index_en.htm)

18 Kill Jutta, Economic Valuation and Payment for Environmental Services Recognizing Nature's Value or Pricing Nature's Destruction?, Heinrich Böll Stiftung – Ecology, September 2015. Online. Available at: [https://www.boell.de/sites/default/files/e-paper\\_151109\\_e-paper\\_economicvaluenature\\_v001.pdf](https://www.boell.de/sites/default/files/e-paper_151109_e-paper_economicvaluenature_v001.pdf)

19 Ruhl J.B., Salzman James, Gaming the Past: The Theory and Practice of Historic Baselines in the Administrative State, Vanderbilt Law Review 64:1, 1-57, January 2011. Online. Available at: <https://wp0.vanderbilt.edu/lawreview/wp-content/uploads/sites/89/2011/01/Ruhl-Salzman-Gaming-the-Past-64-Vand.-L.-Rev.-1-2011.pdf> ;

*“...I want to ask you today what the generations to follow will say of us 40 years from now. It could be they'll report the loss of many million acres more, the extinction of species, the disappearance of wilderness and wildlife; or they could report something else. They could report that sometime around 1989 things began to change and that we began to hold on to our parks and refuges and that we protected our species and that in that year the seeds of a new policy about our valuable wetlands were sown, a policy summed up in three simple words: “No net loss.”*— President George Bush, speaking to Ducks Unlimited, June 8, 1989 (USGPO, 1990:694);

Robertson Morgan M., No Net Loss: Wetland Restoration and the Incomplete Capitalization of Nature, Antipode 32:4, 463-93, 2000. Online. Available at: <http://illinois-online.org/krassa/hdes598/Readings/Wetlands/Wetland%20restoration%20and%20the%20incomplete%20capitalization%20of%20nature.pdf>

The UN is working on a similar initiative. As part of the UN 2030 agenda for sustainable development, 120 countries have committed to the Land Degradation Neutrality target setting programme. Land degradation neutrality is defined as “a state whereby the amount and quality of land resources, necessary to support ecosystem functions and services and enhance food security, remains stable or increases within specified temporal and spatial scales and ecosystems.”<sup>20</sup>

As the UN explains it, Land Degradation Neutrality ‘represents a paradigm shift in land management policies and practices. It is a unique approach that counterbalances the expected loss of productive land with the recovery of degraded areas.’

In plain English, **land degradation neutrality** aims at offsetting future land degradation with actions to restore degraded areas. It is therefore comparable to the No Net Loss initiative, promoting a shift from conservation to restoration of degraded land and habitat and opening the door to offsetting.

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20 United Nation, Convention to combat desertification, The LDN Fund: An Impact Investment Fund for Land Degradation Neutrality. Online. Available at: Land Degradation Neutrality - Achieving Land Degradation Neutrality. Online. Available at: <https://www.unccd.int/actions/achieving-land-degradation-neutrality>



## B. THE CASE OF HABITAT BANKING

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## 1. THE BOLDEST PROPOSAL SO FAR

We will focus here on a specific type of biodiversity offsetting called habitat banking. A proposal for an EU habitat banking market was developed at the request of the European Commission in 2010,<sup>21</sup> and there has been an attempt at introducing it into European environmental legislation in 2014, but it failed due to strong public opposition. However, this proposal is currently being used by other European institutions, and may serve as a blueprint for forthcoming markets. It is therefore a relevant case study.

While the following section analyses this specific market proposal, many of the comments and issues raised also apply to biodiversity offsetting in general and to any forthcoming offset market that would rely on similar methodologies.

### 1.1 What is habitat banking?

Habitat banking is an extension of biodiversity offsetting, turning offsets into assets that can be traded. It has two specific features:

#### **Not like-for-like:**

whereas biodiversity offsetting typically requires “like for like” compensation, i.e. the offsetting action must restore the same type of biodiversity (specific habitat or species) that has been damaged, habitat banking also allows in some cases for compensation with other types of habitats or species of ‘*equivalent or higher value*.’ The nature, scale and location of compensation projects can differ from the specific resources or services damaged: under typical biodiversity offsetting, a company destroying biodiversity would be required to compensate by restoring or creating a habitat for **the same species within a few kilometres** from the destruction; under a European habitat banking scheme however, the company might be required to compensate **somewhere in Europe, and with an ecosystem system of equivalent monetary value**. To use our earlier example, the company building an airport in the south of Spain and destroying in the process a flamingo habitat, could for example **compensate by creating a habitat for an endangered bat species in Romania**.

While such flexibility brings additional risks, it also enables **trading up**, i.e. compensating with biodiversity of higher value than that damaged, and enables the cumulative compensation of minor impacts. *‘This disconnect between assessment of damage and assessment of offsets (determination of debits and credits) is the key feature distinguishing habitat banking from offsets.’*<sup>22</sup> The proposal notes that current European Legislation is an obstacle to be addressed, as it makes *‘clear that compensatory measures should have a strict connection with the affected habitat type and its functions. It is this requirement that in our view poses the largest obstacle to habitat banking. The question arises how to circumvent this obstacle.’*<sup>23</sup>

Most importantly, such flexibility requires defining a **common metric** to determine and

21 Habitat banking is a technical report produced for the European Commission DG Environment. The content and views of the report do not necessarily represent those of the European Commission. See Eftec, IEEP et.al (2010) The use of market-based instruments for biodiversity protection –The case of habitat banking – Technical Report. Available at: [http://ec.europa.eu/environment/enveco/pdf/eftec\\_habitat\\_technical\\_report.pdf](http://ec.europa.eu/environment/enveco/pdf/eftec_habitat_technical_report.pdf)

22 Eftec, ibid

23 Eftec, ibid

compare the value of different habitats and species. As will be explained later, this metric is most often money.

### **Credits can be determined before debits:**

as offsetting actions do not need to match a specific damage, offset credits can be determined before debits have been assessed. Credits can be created in different quantities and locations and stored over time. As a result, unused credits can be traded among participants.

As a research article put it, *'habitat banking can, in some way, be seen as an extension of biodiversity offsets, turning offsets into assets that can be traded, creating a market system for developers.'*<sup>24</sup>

Beyond these two differences, the features of habitat banking are typically the same as biodiversity offsetting.

A **four steps mitigation hierarchy** must be followed, where offsetting is allowed only once the first three steps have been undertaken:

1. *Avoidance*: measures must be taken to avoid as much as possible adverse impacts of infrastructure building on biodiversity, such as careful spatial planning;
2. *Minimisation/reduction*: measures must be taken to minimise as much as possible the extent, duration and intensity of impacts that cannot be avoided;
3. *Rehabilitation*: measures must be taken to rehabilitate or restore on-site degraded ecosystems/habitats, following adverse impacts that cannot be completely avoided or minimised;
4. *Offset*: residual impacts after the first three steps have been completed must be compensated.

Once it has been established that offsetting is necessary, three questions must be answered:

#### **i. What is the damage to the environment?**

Estimating both temporary and permanent environmental damages requires establishing a baseline – the condition of the habitat / biodiversity had the damage not occurred – and comparing it to the current situation in terms of the quality and quantity of biodiversity affected.

The metric used to measure the damage depends on the type of equivalency method used, as will be explained later, and must be the same metric used to measure the compensation.

#### **ii. What kind of environmental resources and services are required to offset that damage?**

Possible measures include habitat relocation or creation in order to achieve a resource level at or above the baseline. *'On-site measures that fully repair the damaged resource*

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24 Ferreira dos Santos Rui, et al., Instrument Mixes for Biodiversity Policies – Policymix Report, Helmholtz Centre For Environmental Research – UFZ 2, June 2011, Online. Available at: [https://www.researchgate.net/publication/306915276\\_Offsets\\_Habitat\\_Banking\\_and\\_Tractable\\_Permits\\_for\\_Biodiversity\\_Conservation](https://www.researchgate.net/publication/306915276_Offsets_Habitat_Banking_and_Tractable_Permits_for_Biodiversity_Conservation)

*are not within the scope of habitat banking compensation. (...) On-site compensation measures could in theory be delivered by habitat banking, but in practice the circumstances where this could take place are likely to be rare.*<sup>25</sup>

Offsets have to establish equivalency rules, as ‘no compensation can ever be identical to the biodiversity that was damaged.’<sup>26</sup> The ‘like-for-like-or-better’<sup>27</sup> policy aimed at simplifying offsetting means that instead of compensating damage to a particular species or type of vegetation of which there are hundreds, it is proposed instead to define offsets more broadly in terms of types, where damage to ‘type B’ biodiversity can be offset by credits from ‘type A’.

The risk that everyone would want to offset with the easiest and cheapest-to-deliver type is deemed to be addressed by introducing ratios of relative biodiversity value, cost and scarcity between different types, and by adopting a ‘like-for-like-or-better’ policy allowing ‘trading-up’: in other words, it is allowed to compensate damage to a specific type of vegetation with credits of the same type or of a higher conservation value, as defined by the ratios / equivalences.

### iii. How much offsetting is sufficient?

An equivalency analysis must be performed to ensure that the number, type and size of compensation projects generate credits that are equivalent (or larger) than the debit, both quantified using the same metric.

Such an analysis is made more complex by the flexibility embedded in the ‘like-for-like-or-better’ framework: the analysis will determine for example the quantity of credits created before the damage in a different area and for a different type of biodiversity needed to compensate for a specific damage. Equivalences will also determine whether the restoration of a larger area than that damaged but for a shorter period of time is sufficient.

As the study puts it, ‘the biodiversity resources that are actually damaged and those that are used for compensation are likely to be of different kinds and in different locations. The “equivalency” between these differences is what lies in the heart of equivalency analysis.’<sup>28</sup>

## 1.2 Equivalence analysis

There are 3 types of equivalence analyses:

- ▣ **Resource Equivalency Analysis (REA)**, if the metric used is expressed in terms of resource units (number of fishes or birds).
- ▣ **Habitat Equivalency Analysis (HEA)**, if the metric is expressed in terms of habitats and ecosystem services (area of habitat damaged x degree of damage). For example, a pollution incident in a river may be assessed to result in a 50% reduction in the river’s value over 10 years.
- ▣ **Value Equivalency Analysis (VEA)**, if the metric is expressed in terms of money. VEA

25 Efttec, Supra

26 Efttec, Supra

27 Like-for-like-or-better is the official name describing not like-for-like offsetting

28 Efttec, Supra



includes 2 subtypes of analysis:

- **Value-to-value**, where both damage and benefit of compensation are measured in terms of their economic value. Value-to-value scaling will be applied for example where *‘proposed remediation projects provide different natural resources, habitats, or services other than those damaged.’*<sup>29</sup>

As an example, a popular fishing river has been contaminated by a chemical release, resulting in a loss of 600 recreational fishing trips each worth EUR 25 over a 3 year period. The present value of the future fishing trips lost is calculated. A value-to-value equivalency analysis will ensure that the monetary value of the offsetting activity matches the economic value lost with the missed fishing trips.

- **Value-to-cost**, where *‘damage is measured in terms of the economic value lost. The compensation actions are then designed to cost at most as much as the monetary estimate of this value lost.’*

*‘While value-to-cost can be used to design compensation, it is not strictly speaking an equivalency method.’*<sup>30</sup> In other words, while value-to-value aims at compensating the monetary value lost, value-to-cost deems a full compensation too costly and instead aims at not spending more in compensation costs than the value lost. Its objective is therefore more to limit the cost of compensation than to fully compensate.

### How do we choose between the 3 equivalence analyses?

According to the REMEDE Toolkit<sup>31</sup> on which the habitat banking proposal relies, resource-to-resource (REA) or service-to-service (HEA) equivalence approaches should be used first, but if not possible then alternative valuation techniques shall be used. VEA is implemented in situations where remediation of similar habitats or resources is either infeasible or undesirable and hence monetary units are needed to ensure equivalency:

*‘If the resources and services lost are **not amenable to any type of remediation, either on or off-site**, an economic valuation might be most appropriate. (...) For example, received monetary compensations for damages might be used to benefit the environment in a manner that is **not directly related to the losses, but valued equally by the affected public** nonetheless. (...) Economic methods might also be preferable if the damage were to a unique environment that has no equivalent in the area, or to an area of such an extent or location that equivalent remediation may be **disproportionately costly (...) or even impossible** (e.g. sufficiently large areas of the relevant habitat may not exist within a given area). (...) Similarly, complementary and compensatory restoration of abundant resources or services might be **undesirable**, but funding for a smaller out-of-kind project to compensate for a scaled loss might be highly valued by the public.’*<sup>32</sup>

In other words, Resource Equivalency and Habitat Equivalency should be used first.

29 REMEDE Toolkit. REMEDE stands for Resource Equivalency Methods for assessing Environmental Damage in the EU. It is a research project involving several EU Member States, Norway and the USA, and that receives funding from the 6th Framework Programme of the European Commission. The views expressed in its publications are those of the authors alone. See REMEDE: <http://www.envliability.eu/>

30 Efttec, Op. cit.

31 REMEDE, Deliverable 13 (D13): The Main Toolkit, May 2006. Online. Available at: <http://www.envliability.eu/publications.htm>

32 REMEDE Toolkit, ibid

Value Equivalency Analysis will be used when equivalent remediation is not possible, or disproportionately costly, or when the resources/services destroyed are abundant.

This begs the question of **what is deemed disproportionately costly**. As the toolkit puts it, *‘the judgement on the disproportionality of costs – how it can be measured, and where disproportionality begins – will thus **ultimately remain a political decision**. (...) Although there still isn’t a uniform approach across the Member States to deal with disproportionate costs, discussions have started in most Member States on finding an even-handed, transparent and pragmatic approach.*<sup>33</sup>

Suggestions can be grouped into two main criteria:

- **‘Costs are considered as disproportionate if they exceed the monetised benefits of achieving ‘good status’** (...) measures to achieve good status are only taken if the social benefits exceed the social costs, and thus create a net benefit to society. (...)
- The second is those that look at the distribution of costs on different actors and their ability to pay: here **costs are disproportionate if they create an unacceptable burden for a certain actor or group of actors**: this may be the case if implementing a course of action would threaten the economic viability of a sector in a certain region, and thereby create social and economic hardships that cannot be compensated. It may also be the case if the distribution of costs among actors is very much out of line with the contributions of these actors to the problem addressed, or if the additional costs mainly fall on actors that have already undertaken significant abatement efforts in the past. (...) While the second type of criteria – based on ability to pay and distributive aspects – rests on thinner methodological foundations, they are clearly relevant for the way that political decisions are taken, possibly more so than benefit-based criteria.<sup>34</sup>

**The subjective and political nature of the assessment of disproportionality of costs might mean in practice a significant flexibility to use Value Equivalency Analysis whenever desired, and thus a prominent role for monetary valuation.**

### 1.3 Economic valuation techniques - How do we put a price on nature?

The REMEDE Toolkit aims at measuring different values:

- ‘Use values’ that reflect the use humans make of the natural environment, whether direct e.g. fishing or agriculture, or indirect, e.g. watershed protection for flood mitigation.
- ‘Non-values’ are benefits derived simply from the knowledge that the natural environment continues to exist and will be passed on to future generations.
- ‘Option’ and ‘quasi-option values’: avoiding or delaying irreversible destruction of biodiversity, to safeguard for example future potential drug discoveries.

While some of these values can be directly observed in market prices, such as the price of

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33 REMEDE Toolkit, ibid

34 REMEDE Toolkit, Supra

timber or fish, many others cannot and thus require valuation techniques.

Values can be based on the direct benefits that environmental goods and services provide to people, in which case the following techniques are used:

### 1.3.1 Revealed preferences techniques

- a. **Hedonic property pricing:** this technique is based on the idea that the price at which a property sells in the market is determined in part by its environmental characteristics, such as noise, air quality and view of a park. As an example, if two identical flats sell for different prices and one has a view over a park whereas the other doesn't, the price differential between the two flats is used to estimate people's willingness to pay for a park view. This technique thus provides an estimation for some values of the park.
- b. **Travel Cost:** this is a survey-based technique that uses the costs incurred by individuals traveling to reach a site, and at the site, as a proxy for the recreational value of that site.

A questionnaire is administered to a sample of visitors to a site in order to ascertain their place of residence, demographic information, frequency of visit to the site and other similar sites, and trip information (purposefulness, length, associated costs etc). From the survey data, visit costs can be calculated and related to visit frequency so that a demand relationship may be established.

### 1.3.2 Stated preferences techniques

These use surveys to directly estimate people's willingness to pay (or willingness to accept compensation) for changes in environmental quality.

- a. **Contingent Valuation:** This is a survey-based technique where people are asked what they are willing to pay or willing to accept for a specified environmental change. For example, a survey can ask visitors to the Grand Canyon how much they are willing to pay for the Grand Canyon to still exist next year. The average price given can then be used as a proxy for the monetary value of the Grand Canyon.  
Such a technique was famously used to assess the damages that Exxon had to pay after the Exxon Valdez oil spill.<sup>35</sup>
- b. **Choice modelling:** This technique is also based on surveys, but here respondents are asked to choose between different scenarios with different environmental attributes and different costs.  
For example, the survey would ask respondents which of the following scenario they would choose:

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35 Extracts from the questions asked: 'In order to prevent damage to the area's natural environment from another spill, a special safety program has been proposed. We are conducting this survey to find out whether this special program is worth anything to your household. Although the cost would be high, the escort ship program makes it virtually certain there would be no damage to Prince William Sound's environment from another large oil spill during the ten years it will take all the old tankers to be replaced by double-hulled tankers. If the program was approved, here is how it would be paid for. All the oil companies that take oil out of Alaska would pay a special time tax which will reduce their profits. Households like yours would also pay a special time charge that would be added to their federal taxes in the first year and only the first year of the program. If the program cost your household a total of \$(amount) would you vote for the program or against it?'; see Carson Richard T., et al., A contingent valuation study of lost passive use values resulting from the Exxon Valdez oil spill (November 1992 Report to the Attorney General of the State of Alaska), Kluwer Academic Publisher, 2003. Online. Available at: [https://www.cerc.usgs.gov/orada\\_docs/DocHandler.ashx?task=get&ID=1020](https://www.cerc.usgs.gov/orada_docs/DocHandler.ashx?task=get&ID=1020)



- Option A: A 40% loss in area of unique ecosystems to your region
- Option B: A 15% loss in area of unique ecosystems to your region, a EUR 60 increase on your income tax and 15 jobs lost in the region
- Option C: A 28% loss in area of unique ecosystems to your region, a EUR 20 increase on your income tax and 40 jobs lost in the region.

### 1.3.3 Market values and proxies

Values can also be based on the role that ecosystem services play in the production of market- valued goods. In this case, the valuation of environmental goods and services is linked to the cost of providing them, which may be directly observed on the markets. This approach encompasses several methods, including the following ones:

- Opportunity cost: as an example, creating a new forest means losing land for agricultural purposes. The opportunity cost of creating a forest is thus the loss of foregone agricultural product sales. The value of the forest is considered to be at least this opportunity cost.
- Mitigation cost: The cost paid to avoid a potential environmental damage is used as a proxy for the cost to repair the damage. For example, *‘the cost of water filtration may be used as a proxy for the value of water pollution damages.’*<sup>36</sup>
- Subsidy cost: *‘an indication of the value of environmental goods may be inferred by considering the subsidies paid directly to producers for adopting production methods that are environmentally benign or beneficial. A common example would be subsidies paid to the agricultural sector for environmentally sensitive practices.’*<sup>37</sup>

### 1.3.4 Benefits transfer

Benefits transfer is a process whereby information regarding economic value in one context is applied to a new context for which an economic value is required. Instead of valuing each environmental good and service, their value is inferred from previous valuations, using the techniques described above and applying a set of criteria to ensure the appropriateness of transferring values.

### 1.3.5 Discounting and aggregation

Futures values are translated in today’s euros via the use of a discount rate. As REMEDE explains it, *‘Most, if not all, people would prefer to consume the good thing today because we have a limited life-span and may not be alive in 50 years’ time. This translates to a fundamental “impatience” that is known to characterise human behaviour. This impatience is often referred to as an individual’s “utility discount rate” or others might say this justifies the use of a “positive discount rate”. Positive discount rates imply that future consumption is worth less than today’s consumption, which justifies the act of discounting future values into present value.’*

*‘Another motivation for discounting is that fairness requires per capita income over all*

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36 REMEDE Draft deliverable 13 - Annexes to the Toolkit

37 REMEDE Draft deliverable 13 - Annexes to the Toolkit

*generations to be the same. Thus, if future generations are likely to be richer than we are (measured by economic growth in consumption, our numeraire), we have a moral right to discount. Or to put it differently, if we can decide between saving or consuming one unit, we can discount the value of saving now, because the future generation will be richer than we are now. In the formula that follows, this motivation is captured in the parameter  $G$ . This parameter implies that if the growth rate in consumption is, as it has been, about 2 percent, then those living in 100 years from now will be about 6 times “richer” than we are now. Thus, to ensure fairness in consumption across generations, we employ a positive social discount rate.’*

In other words, we should apply a positive discount rate to future environmental degradation and compensation to reflect our fundamental impatience, and to ensure that – based on an assumption of continued economic growth – future generations are not richer than we are today.

REMEDE also makes the case that the discount rate should not be zero<sup>38</sup> for two reasons: firstly, it would imply that a permanent degradation would have to be matched by a permanent compensation, and thus remediation cannot be scaled to a finite amount.<sup>39</sup> Secondly, a zero percent rate would imply that society is in no rush to remediate the damage, as compensation today or in 50 years would be considered equivalent.

Regarding the choice of the actual discount rate, REMEDE points out that the European Commission has produced guidance concluding that a 4% discount rate is appropriate. They highlight that a similar level is also used in practice in Spain and recommended by some government agencies in Sweden, whereas US guidance considers 3% a reasonable discount rate.<sup>40</sup>

## 2. UNDERLYING ASSUMPTIONS

*‘The danger that we risk when adopting economic methods for valuation of ecosystems is that these methods cannot be divorced from the underlying assumptions and theory. If you accept the methods, you are adopting those assumptions.’<sup>41</sup>*

### 2.1 Framing nature as a service provider is a conceptual shift

While we may be used to considering nature as something intangible and separate from society, **nature is in fact a social concept**. The *‘opportunities and constraints nature presents societies with can only be defined relative to specific sets of economic, cultural,*

38 As a reminder, a positive discount rate means that what happens in the future is less important than what happens today, whereas a zero rate means that both are equally important, and a negative rate means that the future is more important.

39 ‘Remember that REA is based on the assumption that a similar resource exists somewhere that can provide compensation (“substitutability”); thus, a zero percent discount rate – in conjunction with an assumed perpetual timeframe of analysis – violates this assumption and makes resource equivalency impossible.’  
‘When the discount rate is zero, remediation cannot be scaled to a finite amount. In other words, our example assumes a perpetual time horizon for the realisation of benefits, and in this case the oddity of not discounting becomes evident.’ REMEDE Toolkit Annexe 5 November 2006. Online. Available at: <http://www.envliability.eu/publications.htm>

40 REMEDE Toolkit Annexe 5, *ibid*

41 Ludwig Donald, Limitations of Economic Valuation of Ecosystems, *Ecosystems* 3:1, 31-35, 2000. Online: <http://link.springer.com/article/10.1007%2Fs100210000007>

and technical relations and capacities.<sup>42</sup> The philosophy of sciences has long recognised the role that systems of values, assumptions and propositions play in defining the way problems are framed and solutions proposed.

Framing nature as a service provider implies a utilitarian and anthropocentric view of nature, where nature is viewed as separate from humans, and nothing in the environment is valuable for its own sake, but only for the benefit that it brings to humans. By contrast, biocentrism is the view that we have direct moral obligations to things in the environment for their own sake, irrespective of their impact on human interests.

*‘Environmental problems are framed in terms of “externalities” (..) seen to derive primarily from ‘market failures’, amenable to repair through the internalisation of social costs into private costs that ultimately should be reflected in prices. (...) Since the solution of environmental problems is conceived essentially as an issue of influencing production costs and prices, this framework assumes that the solution to environmental problems lies on the technical domain of estimating and enforcing the ‘right price’.*<sup>43</sup>

As Sullivan explains, *‘the construction of nature as a “service provider” is a significant conceptual move enabling financial investment in measures of, and markets for, nature conservation. (...) In the process, inhabitants of service-producing landscapes also are radically reframed as service maintainers for consumers elsewhere’.*<sup>44</sup>

Nature is reconceptualised as a number of ecosystem services. Based on assumptions of fungibility, substitutability, excludability and rivalry,<sup>45</sup> ecological complexity is broken down into compartmentalised tradable units<sup>46</sup> abstracted from time and place. Ecosystem services are unbundled so that they can be individually traded. Yet, **ecosystems function as coherent holistic systems in which the different elements depend upon each other, which seriously puts into question the meaning, function and value of unbundled individual ecosystem services.**

The shift from ecosystem traits and functions to ecosystem services is more than a linguistic one: *‘while ecosystem traits and functions are analysed with descriptive and analytical methods and the results only change with new observations or new models*

42 *‘In this sense, the physical characteristics of nature are contingent upon social practices: they are not fixed. As one implication, it’s now argued that hazards can only be defined relative to the vulnerability of different groups in society. (...) As another, the way poor communities use (and abuse) local resources depends as much upon extra-local economic, political, and social forces as it does upon the nature of the resources themselves. For instance, for centuries, Nigerian farmers had successfully adapted their agronomy to the semiarid environment in which they lived. However, after the onset of British colonialism in the late nineteenth century, they suffered a series of major famines. The reason was because the British had undermined traditional agriculture and replaced it with the commercial production of cotton and groundnuts for export. Thus, now dependent on two main cash crops, the Hausa lost their self-sufficiency and became subject to the vagaries of foreign markets.’* See Castree, Braun, Social Nature, Theory, Practice, and Politics, 2001, Blackwell publishers. Online. Available at: [https://selforganizedseminar.files.wordpress.com/2011/08/castree\\_braun\\_social\\_nature.pdf](https://selforganizedseminar.files.wordpress.com/2011/08/castree_braun_social_nature.pdf)

43 Gómez-Baggethun, Muradian, In markets we trust? Setting the boundaries of Market-Based Instruments in ecosystem services governance, Ecological Economics 117 (2015) 217–224. Online. Available at: [https://www.zef.de/fileadmin/downloads/2015\\_Gomez-Baggethun\\_Muradian\\_EcoEco.pdf](https://www.zef.de/fileadmin/downloads/2015_Gomez-Baggethun_Muradian_EcoEco.pdf)

44 Sullivan Sian, Banking Nature? The Spectacular Financialisation of Environmental Conservation, Antipode 45:1, 198–217, 2013. Online. Available at: <https://siansullivan.files.wordpress.com/2010/12/sullivan-banking-nature-antipode-2013-published.pdf>

45 Fungibility is the property is the property of a good whose individual units are essentially interchangeable. Substitutability: Ability of two or more goods to be substituted for one another. Excludability: a good or service is called excludable if it is possible to prevent people (consumers) who have not paid for it from having access to it. Rivalry: a good is said to be rival if consumption by one party reduces the ability of another party to consume it

46 Vatn and Bromley, 1994; Salzman and Ruhl 2000



*of explanations, ecosystem services are analysed with subjective, preference-based methods, and the results change with beneficiaries, their habits, attitudes, education and income.*<sup>47</sup>

Framing nature as a service provider to humans also requires beneficiaries for nature to be valued: in other words, **ecosystem services are only valued to the extent that humans live nearby** and can enjoy their benefits, whereas similar ecosystem services taking place far from human settlements are valued at zero and can thus be destroyed. Similarly, the only environmental degradations considered are those leading to a decrease in human welfare.<sup>48</sup>

This is arguably a very partial view of nature that wilfully ignores environmental degradation that does not affect directly nearby human populations. This is also a very short-term view **ignoring the possibility that people may move**, and that areas that are today inhabited may tomorrow see human settlements.

Lastly, **major economic valuation frameworks tend to focus only on some ecosystem services and ignore the others, further narrowing down the part of nature that is visible and wilfully allowing for the build-up of unmonitored risks and environmental degradation.** As an example, the REMEDE toolkit provided the earlier example of a river polluted by chemical releases; it assessed the damage only in relation to the monetary value of fishing trips lost, ignoring the other ecosystem services and other stakeholders affected.<sup>49</sup>

In a textbook example of political marketing, some have suggested that the main opposition to ecosystem services comes down to a linguistic issue, as people are uneasy with the words. As a result, *‘in January 2018 30 global experts associated with the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) suggested a move away from the term, and towards ‘Nature’s Contributions to People’. They argued the latter was a more inclusive term that bypassed perceived failings of the ecosystem services framing.*<sup>50</sup>

## 2.2 Putting a price on nature to save it – an unhelpful metaphor

**The value of nature has been famously estimated to be** in the range of US\$16–54 trillion per year, with **an average of US\$33 trillion per year.**<sup>51</sup> **What does this figure mean? Is it helpful?**

Some have claimed that such a figure helps give more weight to ecosystem services in policy decisions, whereas others have argued that having a debate about what is the total

47 Spangenberg Joachim H., and Settele Josef, Precisely Incorrect? Monetising the Value of Ecosystem Services, Ecological Complexity 7:3, 327–37, 2010. Online. Available at: <https://esanalysis.colmex.mx/Sorted%20Papers/2010/2010%20DEU%20-Biodiv%20Econ.pdf>

48 ‘The term ‘benefit’ is used in the description of TEV above to mean maintaining or increasing human welfare. A cost, on the other hand, would relate to a change in the natural environment (e.g. pollution) that leads to a decrease in human welfare.’ REMEDE Toolkit Annexe, supra

49 REMEDE Toolkit p93–94, supra

50 Natural capital coalition: No One Wants To Put A Price On Nature, But We Do Need A Better Understanding Of Its Value. Online. Available at: <https://naturalcapitalcoalition.org/no-one-wants-to-put-a-price-on-nature-but-we-do-need-a-better-understanding-of-its-value/>

51 Costanza Robert et al., The Value of the World’s Ecosystem Services and Natural Capital, Nature 387:6630, 253–260, 1997. Online. Available at: <https://www.nature.com/articles/387253a0>

value of nature is actually pointless because we cannot live without it.<sup>52</sup>

Proponents of the economic valuation of nature argue that as prices have failed to reflect the true value of the natural world, the value of natural resources is not recognised by today's markets. A natural capital approach would '*illuminate Nature's often hidden value*'<sup>53</sup> and thus contribute to its protection. They advocate a market approach to conservation, based on the belief that markets allocate resources more efficiently than governments and regulations. '*The lack of market prices for ecosystem services and biodiversity means that the benefits we derive from these goods (...) are usually neglected or undervalued in decision-making.*'<sup>54</sup> '*If the money is only coming from the government budget, there's no incentive to make sure the conservation is done right, no meaningful pressure in the system. Whereas if the forest conservers are getting money from service buyers, the buyers will hold them accountable. If the system doesn't work, they won't keep paying.*'<sup>55</sup>

Such a framing relies on a number of debatable assumptions:

#### **a. Traditional regulations have failed**

One of the key implicit assumptions is that traditional regulations have failed to address environmental issues, and that markets will succeed where binding regulations have not. Yet such an assumption is incorrect. In the words of a foundation, '*regulations and prohibitions have always provoked resistance but have also proved highly effective. From the introduction of mandatory seat belts and catalytic converters to the prohibition of asbestos – regulatory policy can look back at a history of acceptance and success.*'<sup>56</sup> The hole in the ozone layer was also successfully addressed via a ban on chlorofluorocarbon chemicals.

In most cases where regulations have been put in place, they have proven highly effective. Therefore, the issue has not been the lack of effectiveness of regulations but instead a lack of political will to set up and implement more regulations.

Such a framing **implicitly conveys the incorrect message that governments are no longer able to implement appropriate environmental regulations and we should let the private sector take over conservation.**

It is also interesting to note that **creating a market for biodiversity destruction requires regulation to work – the same regulation deemed inadequate to protect nature** - as there would be no demand for offset credits unless it is mandatory to compensate: most people would not purchase credits on a voluntary basis. It therefore raises the interesting

52 Salles Jean-Michel, Valuing Biodiversity and Ecosystem Services: Why Linking Economic Values with Nature?, IDEAS Working Paper Series from RePEc, 2011. Online. Available at: [https://www.researchgate.net/publication/254427727\\_Valuing\\_biodiversity\\_and\\_ecosystem\\_services\\_why\\_linking\\_economic\\_values\\_with\\_Nature](https://www.researchgate.net/publication/254427727_Valuing_biodiversity_and_ecosystem_services_why_linking_economic_values_with_Nature)

53 Natural capital coalition: No One Wants To Put A Price On Nature, But We Do Need A Better Understanding Of Its Value. Online. Available at: <https://naturalcapitalcoalition.org/no-one-wants-to-put-a-price-on-nature-but-we-do-need-a-better-understanding-of-its-value/>

54 TEEB for National and International Policy Maker – Summary: Responding to the Value of Nature, 2009. Online. Available at: <http://www.teebweb.org/publication/teeb-for-policy-makers-summary-responding-to-the-value-of-nature/>

55 McAfee, Shapiro, Payments for Ecosystem Services in Mexico: Nature, Neoliberalism, Social Movements, and the State, 2010, Annals of the Association of American Geographers, June 2010 (1st publication), 2010. Online. Available at: <https://fds.duke.edu/db/attachment/2355>

56 Fatheuer Tomas, New economy of nature – A critical introduction, Heinrich Böll Stiftung 35, 2014. Online. Available at: [https://www.boell.de/sites/default/files/new-economy-of-nature\\_kommentierbar.pdf?dimension1=ds\\_oekonomie\\_natur\\_en](https://www.boell.de/sites/default/files/new-economy-of-nature_kommentierbar.pdf?dimension1=ds_oekonomie_natur_en)

question of what explains the greater political appetite to legislate to make paying for nature mandatory rather than legislate to protect nature via traditional regulations.

***b. Individuals are assumed to act rationally, responding in consistent and predictable ways to price incentives.***

As discussed in our previous paper,<sup>57</sup> this assumption has been rebuffed by behavioural economist and Nobel laureate Daniel Kahneman among others. It has also been shown that *‘the effect of incentives on behaviour is mixed at best and is frequently perverse. When people are paid to do something that was previously part of their social norms—donating blood for example—the amount of the social good provided can decline (Gnezzzy and Rustichini, 2004). The presence of an award (or penalty) may actually have an opposing (or reinforcing) influence on what cognitive psychologists refer to as intrinsic motivation. This calls into question the relative importance of ‘getting the prices right’ in environmental policy, over potentially more effective non-price adjustments.*<sup>58</sup>

***c. Providing incentives is not the same as valuing the services***

Economist Geoffrey Heal notes that *‘providing the right incentives is not the same as valuing the services: we can provide the incentives without valuing the services, and we can value the services without providing incentives for conserving them. [...]. If our concern is to conserve these services, then valuation is largely irrelevant. Let me emphasize this: Valuation is neither necessary nor sufficient for conservation. We conserve much that we do not value, and do not conserve much that we value.*<sup>59</sup>

**Policy decisions are being transformed into cost-benefit analyses<sup>60</sup>:** the assumption is that once the price is high enough, environmental destruction will decline. Corporations will assess whether it is more profitable for them to curb environmental destruction or continue and pay a price for it. Environmental destruction thus becomes a cost of doing business. Such a shift is a fundamental change, as calculation of risk and profit opportunities replace political judgement. It raises an important and legitimate question: **on what basis do we decide that environmental policies should be subject to a cost-benefit analysis, when many other key areas of policy making are not?** For example, we do not rely on cost-benefit analyses or market prices for other key areas of policy making such as nuclear safety, tsunami prevention or national security issues.

In addition, there are **ethical choices to be made that cost-benefit analyses cannot consider:** the choice to be made on how the benefits and costs are distributed across

57 Hache, 50 shades of Green – The rise of natural capital markets and sustainable finance, part I Carbon, Green Finance Observatory, March 2019. Online. Available at: <https://greenfinanceobservatory.org/2019/03/11/50-shades/>

58 Gowdy John, Erickson Jon, Ecological Economics at a Crossroads, Ecological Economics 53:1 17-20, 2005. Online. Available at: [https://www.uvm.edu/giee/pubpdfs/Gowdy\\_2005\\_Ecological\\_Economics.pdf](https://www.uvm.edu/giee/pubpdfs/Gowdy_2005_Ecological_Economics.pdf)

59 Heal Geoffrey M., Valuing Ecosystems Services. Ecosystems, National Research Council 3, 24-30, 2000. Quoted in Kill Jutta, Economic Valuation and Payment for Environmental Services Recognizing Nature’s Value or Pricing Nature’s Destruction?, Heinrich Böll Stiftung – Ecology, September 2015. Online. Available at: [https://www.boell.de/sites/default/files/e-paper\\_151109\\_e-paper\\_economicvaluenature\\_v001.pdf](https://www.boell.de/sites/default/files/e-paper_151109_e-paper_economicvaluenature_v001.pdf)

60 Bouleau Nicolas, Analyse coûts-bénéfices, in Bourg Dominique, Papaux Alain, Dictionnaire de la pensée écologique, PUF, 24-27, 2015. Online: [https://www.puf.com/content/Dictionnaire\\_de\\_la\\_pens%C3%A9e\\_%C3%A9cologique](https://www.puf.com/content/Dictionnaire_de_la_pens%C3%A9e_%C3%A9cologique)



affected parties or generations is not addressed by the simple adding up of individual benefits.

**Conservation based on monetary considerations may also prove more fickle than conservation based on environmental laws.** A recent report provided the following example: *‘Suppose that there is a coffee grower in Costa Rica, who owns a plantation adjacent to a forest which is home to a colony of native bees. Bees are beneficial to coffee plants because they pollinate them, possibly increasing their yield. (...) For the coffee grower it might make sense to pay the owner of the forest not to clear it. In this case, the principles of the green economy seem to have worked: the forest owner has an economic incentive to keep the forest intact. However, what happens if the coffee plantation is converted into a pineapples’ plantation? Bees do not provide any benefit to pineapples, they may actually damage them. In this case, the operator of the plantation sees no benefit in keeping the forest standing; actually, he would be better off buying the forest and cutting it down. This example clearly illustrates the risks of basing the protection of the forest exclusively on monetary considerations and the problems of replacing strict environmental laws (...) with incentives-based mechanisms. Such an approach, in fact, justifies the destruction of all natural areas whose monetary value is low or still unknown.’*<sup>61</sup>

**Monetary valuations also ignore the incommensurability of values:** it has been argued that the values of nature are multiple and incommensurable, meaning that they can’t be measured on a single scale. Human actions result from multiple rationales resulting in multiple values other than money that are incommensurable and weakly comparable with one another.<sup>62</sup>

A market approach may for example be considered inadequate to address issues like racial segregation or abortion rights: no matter how much we are willing to pay for segregation, it remains morally reprehensible and arguably our ethical preferences cannot be adequately reflected on a monetary scale.<sup>63</sup>

As Daly and Farley put it, *‘putting dollar values on everything does not make the necessary decisions more objective; it simply obscures the ethical decisions required to make those ‘objective’ valuations.’*<sup>64</sup>

**Some values are also competing:** as an example, in the Galapagos Islands, ecotourism is competing with local fishing. While ecotourism can create much more value than local fishing of sea cucumbers, locals only see a small fraction of the tourism revenues and thus fight to put fishing first.

**Economic valuation also gives a new and much more prominent role to monetary compensation for environmental destruction.** As discussed in our previous paper, monetary compensation for environmental degradation is traditionally part of a wider

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61 Runci Alessandro, Biodiversity offsetting – A threat for life, Re:Common, Counter Balance, October 2017. Online. Available at: [http://www.counter-balance.org/wp-content/uploads/2017/10/Biodiversity\\_Offsetting\\_report\\_v4-screen.pdf](http://www.counter-balance.org/wp-content/uploads/2017/10/Biodiversity_Offsetting_report_v4-screen.pdf)

62 Martinez-Alier et al., 1998; O'Neill, 2001

63 *‘By no means do we leave everything to the economic calculus and the markets. Our society prohibits child pornography or the sale of votes at election time. It does not apply market mechanisms to the adoption of children or the availability of kidneys. What the market should regulate and what it should not, is a matter on which society must form a will of its own.’* Fatheuer T, New economy of nature – a critical introduction, Heinrich Böll Stiftung volume 35, 2014. Available at: [https://ng.boell.org/sites/default/files/new-economy-of-nature\\_kommentierbar.pdf](https://ng.boell.org/sites/default/files/new-economy-of-nature_kommentierbar.pdf)

64 Herman E. Daly, Joshua Farley, Ecological Economics: Principles and Applications, Island Press, 2004. Available at: <https://islandpress.org/books/ecological-economics-second-edition>

progress to right a wrong that also often includes public recognition of the wrong and commitment to change future behaviour.<sup>65</sup> Monetary compensation is also traditionally used retrospectively, when courts determine for example what damage individuals have suffered because of an oil spill. Economic valuation on the other hand makes monetary compensation part of a forward-looking project, in which a decision has to be made whether to allow future destruction.<sup>66</sup>

#### **d. Markets are assumed to be efficient**

As discussed in our previous paper,<sup>67</sup> the efficient market hypothesis is a theory that states that asset prices fully reflect all available information and it is therefore impossible to consistently 'beat the market' on a risk-adjusted basis. This theory has been a cornerstone of financial economics for two generations. It is at the core of the belief that markets provide the best allocation of capital and that market-based solutions are more efficient than government regulations.

The assumptions of the theory have been shown not to hold in reality: from asset prices' random walk, to the rationality of investors, low transaction costs, the existence of complete markets, and perfect information.

A number of Nobel laureates, from James Tobin to Richard H Thaler, Daniel Kahneman and Joseph Stiglitz have also shown that markets are not efficient in the strong or semi strong form. It is commonly accepted today that only the weak form may exist in reality.<sup>68</sup>

#### **e. It assumes that we are able to calculate what is lost and gained and put a price on it**

The tremendous scientific uncertainty combined with our very incomplete knowledge of ecosystems means that in reality we are not able to calculate what is lost and gained.

***'Our knowledge of ecosystem function is plagued by ignorance and uncertainty. (...) Even the best-informed scientists cannot confidently describe all the benefits provided by a given species or ecosystem or the impacts of human activities on them. Many contributions of ecosystems are essentially beneath perception, cognitively invisible (...). Yet typical valuation studies demand average consumers quantify these benefits.'***<sup>69</sup> We are also still discovering new species, with more than 400 species of mammals discovered since 1993<sup>70</sup> and approximately 18,000 new species named and classified every year.<sup>71</sup>

One reason for our ignorance is that ecological – economic systems exhibit highly complex, dynamic, and nonlinear behaviour in which a clear understanding of the part rarely translates into a clear understanding of the whole. In such systems everything is

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65 Kill Jutta, Economic Valuation and Payment for Environmental Services Recognizing Nature's Value or Pricing Nature's Destruction?, Heinrich Böll Stiftung – Ecology, September 2015. Online. Available at: [https://www.boell.de/sites/default/files/e-paper\\_151109\\_e-paper\\_economicvaluenature\\_v001.pdf](https://www.boell.de/sites/default/files/e-paper_151109_e-paper_economicvaluenature_v001.pdf)

66 Kill Jutta, Ibid

67 Hache, supra

68 Hache, supra

69 Farley, supra

70 Ceballos, Ehrlich, Discoveries of new mammal species and their implications for conservation and ecosystem services, PNAS, March 2009. Available at: <https://www.pnas.org/content/106/10/3841>

71 Forbes, B-A Parnell, Top 10 Brand New Species 2018 - Including One That Was Found In An Aquarium, May 2018. Available at: <https://www.forbes.com/sites/bridaineparnell/2018/05/23/top-10-brand-new-species-2018-including-one-that-was-found-in-an-aquarium/#470ae6f65ccc>

indeed connected to everything else. How can we value one component of such a system when a change in that component will have ripple effects throughout the system?<sup>72</sup> *‘We simply lack adequate understanding of ecosystems to know which functions are of value to humans and which are not, and often only find out after we have destroyed the ecosystem or species that provided them.’*<sup>73</sup> As Sullivan put it, *‘we are assigning tradable prices to new unstorable fictitious commodities of essentially unknowable environmental futures.’*<sup>74</sup>

**The ‘some number is better than no number fallacy’:** some argue that even if monetary valuation techniques are inaccurate, they should be used because no alternative estimate exists for public policy purposes. Put more crudely, one hears the argument that some number is better than no number.<sup>75</sup> Such argument is incorrect, firstly because unlike physical measurement, monetary valuation is not necessary for public policy purposes.

Secondly, the production of a number has important consequences, such as fostering a greater reliance on cost-benefit analyses in policy making, or providing an unwarranted sense of certainty and precision that hides our partial ignorance and the inherent unpredictability of the future. To quote Nobel laureate Joseph Stiglitz, *‘what we measure affects what we do, and if we measure the wrong thing we do the wrong thing.’* **A misleading and meaningless number is thus arguably worse than no number.**

Interestingly, even the inventors of the GDP indicator warn about the production and use of figures: *‘these figures have been produced and people use them. They will continue to be produced, and people will continue to use them. If we were starting afresh, I would have a great deal of sympathy with what has been said about not using a single figure, and not even producing one.’*<sup>76</sup>

As Spash put it humorously, *‘Unfortunately, like the hapless characters in Douglas Adams’ novel ‘Hitchhikers’ Guide to the Galaxy’, having found the answer to ‘life the universe and everything’ encapsulated in a single number the realisation is dawning that this lacks any meaning.’*<sup>77</sup>

For all these reasons, **while the formulation ‘putting a price on nature to save it’ is catchy and seems almost self-evident, it would seem that ‘putting rules on nature destruction to save it’ would be a far superior alternative.**

## 2.3 A neo-classical economic framing that ignores distribution and scale

Ecological economics views the economy as embedded within an environmental system, and rejects the assumption that human labour and technology can replace natural

72 Farley Joshua, The Role of Prices in Conserving Critical Natural Capital, Conservation Biology 22:6, 1399-1408, 2008. Online. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/19076873>

73 Farley Joshua, Costanza Robert, Payments for Ecosystem Services: From Local to Global, Ecological Economics 69:11, 2060-068, 2010. Online. Available at: [https://www.uvm.edu/gjee/pubpdfs/Farley\\_2010a\\_Ecological\\_Economics.pdf](https://www.uvm.edu/gjee/pubpdfs/Farley_2010a_Ecological_Economics.pdf)

74 Sullivan Sian, Banking Nature? The Spectacular Financialisation of Environmental Conservation, Antipode 45:1, 198-217, 2013. Online. Available at: <https://siansullivan.files.wordpress.com/2010/12/sullivan-banking-nature-antipode-2013-published.pdf>

75 Diamond Peter A., Hausman Jerry A., Contingent Valuation: Is Some Number Better than No Number?, Journal of Economic Perspectives 8:4, 45-64, 1994. Online. Available at: <https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.8.4.45>

76 Kill, Jutta, Supra

77 Spash Clive L., The Shallow or the Deep Ecological Economics Movement?, Ecological Economics 93:C, 351-62, 2013. Online. Available at: [http://www.sre.wu.ac.at/sre-disc/sre-disc-2013\\_01.pdf](http://www.sre.wu.ac.at/sre-disc/sre-disc-2013_01.pdf)



resources. If the economy is the whole, it can expand without limits, whereas if it is a part, its growth is limited and has an opportunity cost. This has important consequences: limits to growth would require a rethinking of the current economic paradigm to transfer the pursuit of growth and the expansion of the economy, a quantitative metric, into a pursuit of development, a qualitative metric of well-being. Acknowledging limits to growth would also require discussing distribution and curbing the rise of inequalities of the past decades.

Neo-classical economics by contrast views the economy as the whole and nature as a subsystem of the economy. Neo-classical economics also assumes that natural resources can be replaced by human labour and technology, and is therefore not concerned by limits to natural resources. As a consequence, it considers that the economy can expand without limits, not constrained by finite natural resources. Unlimited growth also enables to continue to promise a share of a bigger pie as an alternative to curbing inequalities, and therefore avoids opening the politically fraught question of distribution.

## 2.4 A paradigm shift from conservation to restoration

The logic of ‘degradation neutrality’ underpinning the No Net Loss initiative and the Land Degradation Neutrality concepts described earlier is a fundamental shift from protection and conservation of ecosystems to restoration and re-creation.

The allowance for compensation embedded in degradation neutrality can indeed generate perverse incentives, such as implicitly fostering ‘*destroying to restore*’, if this proves cheaper or more profitable than merely conserving, or if degradation is not properly accounted for.

In this respect, it has been found that in practice, **reference scenarios against which one aims to achieve no net loss are rarely articulated, leading to an inability to account robustly for net outcomes.**<sup>78</sup> Without a proper frame of reference of biodiversity decline, there is indeed no loss to avoid. Similarly, the absence of clear rules on when to move from one level to another along the mitigation hierarchy<sup>79</sup> means a lot of discretion in deciding when an environmental degradation can be avoided or should be offset.<sup>80</sup>

*‘The emerging paradigm of large-scale land restoration, premised on the instrumentalisation of ‘neutrality’ and the logic of offsetting points to a new dynamic in conservation finance. It reflects a fundamental shift from protection and conservation of ecosystems to an ‘economy of repair’.*<sup>81</sup> *‘Neutrality’ in this instance does not simply refer to reducing the magnitude of impacts of particular types of land use in particular localities, but rather embodies the dangerous idea that we can meaningfully compensate for assumed or actually existing degradation in one place through restoration and even ‘avoided degradation’ in another place.*<sup>82</sup>

78 Maron Martine et al., The Many Meanings of No Net Loss in Environmental Policy, *Nature Sustainability*, 1, 19-27, 2018. Online. Available at: [http://macroecointern.dk/pdf-reprints/Maron\\_NS\\_2018.pdf](http://macroecointern.dk/pdf-reprints/Maron_NS_2018.pdf)

79 International Union for Conservation of Nature and the Species Survival Commission, 2014 Annual Report of the Species Survival Commission and the Global Species Programme, 2014. Online. Available at: <https://portals.iucn.org/library/sites/library/files/documents/2015-024.pdf>

80 Maron Martine et al. Taming a Wicked Problem: Resolving Controversies in Biodiversity Offsetting, *BioScience* 66:6, 489-98, June 2016. Online. Available at: <https://academic.oup.com/bioscience/article/66/6/489/2754298>

81 Huff Amber, Brock Andrea, Accumulation by Restoration: Degradation Neutrality and the Faustian Bargain of Conservation Finance, *Antipode*, 2017. Online. Available at: <https://antipodefoundation.org/2017/11/06/accumulation-by-restoration/>

82 Huff Amber, Brock Andrea, Ibid

Yet, it has been demonstrated that we are unable to fully re-create ecosystem functions that have been destroyed, and that offsetting at best only partially compensates. The difficulty to measure what is lost and gained, the selective choice of functions to be compensated and the general impossibility to fully restore or re-create an ecosystem create a strong concern that the shift from no loss to no net loss may result in practice in a net loss.

### 3. A RELUCTANT COMMODITY WITH SERIOUS CONCEPTUAL ISSUES

#### 3.1 General issues

##### a. Public goods

Most ecosystem services are public goods: services where use by one individual does not reduce availability to others, and from which no one can be effectively excluded. Economists refer to public goods as ‘nonrivalrous’ and ‘nonexcludable.’ As an example, my benefiting from UV protection provided by the ozone layer does not prevent anyone else from benefiting from it. It would also be impossible to prevent people who have not paid for it to benefit from its protection. Likewise, while we can assign property rights to ecological assets such as a forest, it is impossible to establish such rights to the services the asset provides, such as regional climate regulation.

Public goods typically include national defence, street lights and other basic societal goods.

The public good nature of most ecosystem services has important consequences, as it means that it is not possible to create a market for them. **‘Markets are only possible when resources are excludable, markets are only efficient when resources are rival.’**<sup>83</sup> *‘For many services such as climate stability, the role of biodiversity in supporting all services, gas regulation, protection from UV radiation (..), non-excludability is a physical characteristic and not a policy variable. Open access use is unavoidable.’*<sup>84</sup>

*‘One function of price is to ration the use of resources, but if use of a non-rival resource does not diminish the quantity available, if use provides utility and the goal is to maximize utility, then using prices to ration consumption is inefficient. In other words, markets lead to a suboptimal supply of nonexcludable resources and suboptimal demand for nonrival resources.’* For these reasons, public goods generally require collective provision.

This is one of the **paradoxes of market-based solutions for ecosystem services**: much of the literature explains the market failure affecting the provision of these services in large part by their public good nature, but then proposes market-based mechanisms to address the failures.<sup>85</sup>

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83 Farley Joshua, Ibid

84 Farley Joshua, Costanza Robert, Ibid

85 The explanation of this paradox is the belief ‘that the conditions that underlie market failure, namely non-rivalry and non-excludability, are dynamic’ (Landell-Mills and Porras, 2002 p. 11). Prominent economists have however argued on the contrary that rivalry is a purely physical characteristic, and not at alldynamic. Excludability is in some cases a dynamic policy variable, but some ecosystem services are inherently non-excludable as an immutable physical characteristic (Daly and Farley, 2010; Kemkes et al., 2010). It would be virtually impossible, for example, to exclude someone from the benefits of climate regulation.

**THE MARKET RELEVANCE OF EXCLUDABILITY, RIVALNESS, AND CONGESTIBILITY**

	Excludable	Nonexcludable
<b>Rival</b>	Market goods; food, clothes, cars, houses, waste absorption capacity when pollution is regulated	Open access regimes (“tragedy of the commons”), e.g., ocean fisheries, logging of unprotected forests, air pollution, waste absorption capacity when pollution is unregulated
<b>Nonrival</b>	Potential market good, but if so, people consume less than they should (i.e., marginal benefits remain greater than marginal costs); e.g., information, cable TV, technology	Pure public good, e.g., lighthouses, streetlights, national defense, most ecosystem services
<b>Congestible</b>	Toll or Club Goods: Market goods when scarce, zero marginal value when abundant. Greatest efficiency occurs when price fluctuates according to usage, or if clubs are formed that prevent the resource from becoming scarce; e.g., ski resorts, toll roads, country clubs	Open access regimes: Only efficient to make them excludable (i.e. to limit access) during periods of high use; e.g., non-toll roads, public beaches, national parks

Source: Daly, Farley, *Ecological economics: principles and applications*, second edition, Island Press

**b. Pseudo commodities relying on debatable equivalences**

Habitat banking and other markets schemes on ecosystem services are vastly different from traditional capital markets in their objectives, structure and nature of the underlying assets. Just like carbon,<sup>86</sup> **ecosystem services markets are created by the need to comply with a regulation**: without regulation mandating the compensation of habitat and species destruction, there would be no demand for the credits and no market.

While regulation is responsible for the environmental objective of the market by setting the rules and determining what can be traded and when, the trading element merely aims at minimizing the cost of compliance for real estate developers, as it is deemed welfare enhancing. **What is traded, therefore, is the cost of compliance with regulation**, not externalities.

Incidentally, it would be interesting to investigate the similarities between compliance markets and litigation finance<sup>87</sup>, an area that raises serious ethical issues: **the command element of the market may incentivise betting on legal outcomes and identifying weaknesses in the legal framework as investment opportunities**.

Due to their hybrid nature, **these markets are also subject to much more government intervention than traditional markets, creating a much higher regulatory risk with**

86 See Hache, *supra*

87 At Vice’s Motherboard site, Jason Koebler wrote that Legalist is “*planning on weaponizing weaknesses in the courts system using historical lawsuit data as an investing opportunity*.” The article’s headline claimed that the startup was “Automating the Lawsuit Strategy Peter Thiel Used to Kill Gawker.” Hunt Joshua, What Litigation Finance Is Really About, The New Yorker, September 2016. Online. Available at: <https://www.newyorker.com/business/currency/what-litigation-finance-is-really-about>  
Wikipedia, Litigation funding. Online. Available at: [https://en.wikipedia.org/wiki/Litigation\\_funding](https://en.wikipedia.org/wiki/Litigation_funding)  
Lat David, Five Litigation Issues With Litigation Finance, Above the Law, December 2016. Online. Available at: <https://abovethelaw.com/2015/12/5-ethical-issues-with-litigation-finance/>



**important consequences for financial stability**, as we will discuss later.

Just like carbon, ecosystems services are not standardised, clearly delineated and readily tradable assets. Transforming them into tradable assets requires what is called a **commoditisation process**:

- ▣ The goal of reducing environmental destruction is replaced by a no net loss goal;
- ▣ Ecosystem service credits are created through regulatory means by artificially unbundling selected services from the complex ecosystems and assuming that they are fungible, substitutable, excludable and rival. Environmental destruction is abstracted from time and place and it is stipulated that it can be adequately compensated by the restoration or re-creation of ecosystem services elsewhere. The fact that there is no cap implicitly assumes that there is no residual impact after compensation;
- ▣ Monetary valuation goes further by enabling the compensation of one service by another of equivalent monetary value, in order to increase cost savings and market liquidity;
- ▣ These tradable assets are then transformed into financial instruments that can themselves be traded.

As there is an **infinitely greater number of ecosystem services than greenhouse gases with much more heterogeneity, the commoditisation process to transform them into liquid tradable assets requires an infinitely greater number of assumptions, equivalences and oversimplifications**. In turn, this heightens the inherent conflict between environmental integrity and standardisation / market liquidity.

The commoditisation process raises a number of concerns:

#### **i. Unbundling, decontextualization and partial valuation**

Ecosystems typically provide a bundle of services, not just one. As an example, a forest may provide CO<sub>2</sub> storage, protection against land erosion, wood, may also provide a habitat for many species, provide recreational services for people visiting it, etc.

We also know that **ecosystems are highly interdependent and function as coherent holistic systems, in which the different elements depend upon each other**. Animals and plants depend upon each other to survive, and a change that affects one organism affects all the organisms dependent upon it. As a result, **disaggregating and unbundling their functions in order to trade them separately may threaten the whole ecosystem**.

**The fact that in practice only some ecosystem services are valued and traded while the rest are wilfully ignored compounds this risk.** The REMEDE methodology acknowledges that it only takes into account some ecosystem services, stating that *'typically, it is impossible to describe all of the services that an ecosystem provides. Fortunately, to implement HEA, REA, or VEA, it is unnecessary to define all the possible services, but only a few significant ones, that correspond to key functions and the effects of the release.'*<sup>88</sup> Similarly, KIP INCA - the EU environmental accounting framework - states that *'when modelling ecosystem services, not all the drivers of change as well as*

88 REMEDE, Deliverable 13 (D13): The Main Toolkit – Toolkit, May 2006. Online. Available at: <http://www.envliability.eu/publications.htm>

*their interactions can be included in the models.*<sup>89</sup>

Academic research, however, concludes that *'biodiversity is (...) a system good that is not very conducive to piecemeal strategies. What is desired is not fragmented pockets of particular ecosystem services, but the overall viability of complex systems.'*<sup>90</sup> *'Most ecosystem services are produced as joint products (or bundles) from intact ecosystems. The relative rates of production of each service varies from system to system and site to site, and time to time, but we must consider the full range of services and the characteristics of their bundling in order to prevent creating perverse incentives and to maximize the benefits to society.'*<sup>91</sup>

**Ecosystem services are also place-specific and dependent upon the proximity of other ecosystem service components:** a forest provides different services in an area where most of the land is agricultural than a forest in another type of area, as it provides pest control in one case and not necessarily in the other. *'Biodiversity ecosystems are highly complex and place specific. This makes them by definition irreplaceable.'*<sup>92</sup>

For all these reasons, **fragmented pockets of ecosystems do not equal biodiversity.** This strongly puts into question the meaning and value of the artificial unbundling of individual services and their abstraction from time and place required for the commoditisation process.

## ii. Critical natural capital and the illusion of substitutability

Critical natural capital refers to ecosystem functions that are essential for our survival, for which substitution is difficult or impossible and where we are close to critical thresholds beyond which they will suffer irreparable damage. We do not know precisely what elements of natural capital are critical, nor do we know how close we are to the thresholds, but climate stability and biodiversity may certainly fit the definition. Critical natural capital is by definition invaluable as it is irreplaceable and essential to our survival.

**Attempting to put a monetary value on critical natural capital is arguably both meaningless and creates a dangerous illusion of substitutability with other ecosystem services:** policy makers may erroneously consider that it is enough to maintain the overall value of all priced ecosystem services, without paying attention to the mix and thus potentially leading to the irreversible loss of critical ones.

The UN acknowledged this risk in its economic accounting framework: *'when the values of ecosystem assets are estimated in monetary terms, it becomes possible to compare and aggregate these values across asset types because the same measurement unit (money) is used. However, comparisons between the various asset values may lead to misleading*

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89 European Commission, Implementing an EU system of accounting for ecosystems and their services, Joint Research Centre, 2017. Online. Available at: [http://publications.jrc.ec.europa.eu/repository/bitstream/JRC107150/jrc107150\\_jrc107150\\_jrc\\_report\\_ecosystem\\_services\\_accounts\\_final\\_pubsy.pdf](http://publications.jrc.ec.europa.eu/repository/bitstream/JRC107150/jrc107150_jrc107150_jrc_report_ecosystem_services_accounts_final_pubsy.pdf)

90 Vatn Arild et al., Can Markets Protect Biodiversity? An Evaluation of Different Financial Mechanisms, Norad reports 19, 2011. Online. Available at: <https://norad.no/en/toolspublications/publications/2012/can-markets-protect-biodiversity-an-evaluation-of-different-financial-mechanisms/>

91 Farley Joshua, Costanza Robert, Ibid

92 FERN, Briefing note 2: What is biodiversity offsetting and why is it problematic?, January 2014. Online. Available at: [https://fern.org/sites/default/files/news-pdf/Biodiversity2\\_EN.pdf](https://fern.org/sites/default/files/news-pdf/Biodiversity2_EN.pdf)

conclusions regarding sustainability, since it may be implied that the various asset types, including ecosystem assets, can be readily substituted for each other without leading to a loss in the overall value of assets.<sup>93</sup> Presenting different values side by side ‘may easily be interpreted as implying that all of the assets are substitutable. Indeed, in some cases, the underlying assumption that the sustainability of well-being requires maintenance of only the total value of the stock may suggest that the mix of assets in the balance sheet is not a significant consideration. The contrasting view is that there are certain assets, particularly environmental ones, that may be essential and not substitutable. This view underlies the notion of critical natural capital.’<sup>94</sup>

More generally, as Daly and Farley put it, **‘it is unlikely that we can develop substitutes for most of [ecosystem] services, including their providing suitable habitat for humans. We scarcely understand how these services are generated, and we are not aware of all of them.’**<sup>95</sup> This seriously challenges the idea that we could safely substitute ecosystem services, as is required to transform them into liquid tradable assets.

### iii. Assuming that losses can be offset

The economic theory of compensation relies on the assumption that losses can be offset, linked to the controversial assumption of substitutability.

It has been argued that ‘some elements of the natural environment can clearly be restored, created or re-created while there are others for which there is **limited evidence of re-creatability**’. According to several authors (e.g. Salzman and Ruhl, 2000; Ring et al., 2010a; Wissel and Wätzold, 2010) the problems to establish equivalence arise mainly due to three dimensions: type (restored and destroyed habitat provide different functional values), space (configuration and connectivity of sites matters) and time (restoration of habitat requires time, leading to increased vulnerability).<sup>96</sup>

Academic research found that ‘unlike a building that can be retrofitted for sustainability, once habitat is destroyed it might be impossible to reconstruct. Revegetation and restoration can increase tree cover and create habitat for some species. However, **to date recreation of ecosystems with all component species and functions has proved prohibitively expensive or impossible** (Wilkins et al. 2003).’<sup>97</sup>

Even the UN stated that ‘major restorations should not be considered an ‘offset’ to reductions in ecosystem assets due to harvesting of timber and other resources in other ecosystem assets, since the impacts on the flows of ecosystem services from different ecosystem assets are not likely to be directly comparable.’<sup>98</sup>

93 United Nations, System of Environmental Economic Accounting 2012 – Experimental Ecosystems Accounting, 2014. Online. Available at: <https://ec.europa.eu/eurostat/documents/3859598/6925551/KS-05-14-103-EN-N.pdf>

94 United Nations, *ibid*

95 Daly, Farley, *supra*

96 Morris et al (2006) mentioned in Ferreira dos Santos Rui et al., Offsets, Offsets, Habitat Banking and Tradable Permits for Biodiversity Conservation, in Ring Irene, Schröter, Schlaack Christoph (Eds.), Instrument Mixes for Biodiversity Policies – POLICYMIX Report 2, Helmholtz Centre for Environmental Research – UFZ Leipzig, June 2011. Online. Available at: [https://www.researchgate.net/publication/306915276\\_Offsets\\_Habitat\\_Banking\\_and\\_Tradable\\_Permits\\_for\\_Biodiversity\\_Conservation](https://www.researchgate.net/publication/306915276_Offsets_Habitat_Banking_and_Tradable_Permits_for_Biodiversity_Conservation)

97 Bekessy Sarah A., et al. The biodiversity bank cannot be a lending bank, Conservation Letters 3, 151-158, 2010. Online. Available at: <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1755-263X.2010.00110.x>

98 United Nations, *ibid*



#### iv. Preferences are assumed to be inherently stable

As prices depend on preferences, future preferences must be known in order to plan for an optimal allocation of resources. To address this, **preferences are assumed to be inherently constant, changeable only by external influences.**<sup>99</sup>

Yet, it is well-known that social preferences are dynamic and linked to social, cultural and economic contexts. In addition, while in traditional markets people always want more gold, grain or stocks no matter the state of the world, **preferences are less stable for pseudo commodities and change with location and over time:** consumers have mixed preferences about biodiversity vs development that are conditional upon states of the world and subject to change. As an example of our evolving preferences, beaches only became widely popular after annual paid leave was introduced a century ago, which led to mass tourism.

Ecosystem service valuation thus *‘reflects the current knowledge and the current preferences and use structures, is bound to change with consumption and production patterns and thus dependent on settlement and leisure patterns, the location of industries and on development processes in general.’*<sup>100</sup>

#### v. Not even a proxy

Quantification only works by reducing complexity. It has been argued that *‘quantified biodiversity (or nature) is therefore something specific, produced by means of quantification. It is not a proxy, it is something different, (...) the Nature that Capital can see.’*<sup>101</sup>

The incomplete state of research in biodiversity combined with the artificial unbundling and partial pricing of ecosystem services, controversial assumptions of substitutability and ability to offset, the wilful ignorance of services that do not benefit humans today and the fact that the markets can only capture a subset of the values involved means that the resulting figures cannot claim to represent even a proxy of biodiversity. In turn, **this strongly puts into question the representativeness and meaning of what is being calculated, and whether it can be used to protect biodiversity.**

As an academic paper put it, *‘in the process of finding methods for commercialising biodiversity, the greatest risk is that the link between the proxy and biodiversity is lost.’*<sup>102</sup>

### 3.2 Measurement issues

#### a. We are unable to measure accurately what is lost and gained

As stated in the habitat banking study, *‘the idea that compensation through offsets or habitat banking credits can achieve a no net loss or a net gain of biodiversity rests on the assumption that it is possible to measure what has been lost and what has been*

<sup>99</sup> Spangenberg, Settele, supra

<sup>100</sup> Spangenberg, Settele, supra

<sup>101</sup> Fatheuer Thomas, supra

<sup>102</sup> Landell-Mills Natasha, Porras Ina, Silver bullet or fools' gold? A global review of markets for forest environmental services and their impact on the poor, iied, March 2002. Online. Available at: <http://pubs.iied.org/pdfs/9066IIED.pdf>

***gained, and that these measurements are meaningful to the impacted stakeholders and authorities.***<sup>103</sup>

Yet, as the habitat banking proposal acknowledges, *‘when compared with other areas of science, such as physics or mathematics, the available science for estimating the extent of restoration required to achieve equivalent ecological services is much more imprecise and complex.*<sup>104</sup>

**Our knowledge of ecosystem functions is also plagued by ignorance and uncertainty, many contributions of ecosystems are not perceptible** and even the best-informed scientists are unable to measure all the benefits provided by a given species or ecosystem or the impacts of human activities on them. Even the strongest proponents of valuing ecosystem services acknowledge that *‘we have not yet identified – let alone utilised – the full range of ecosystems services potentially available’,*<sup>105</sup> *‘we have only scratched the surface of what natural processes and genetic resources have to offer.’*<sup>106</sup>

This is particularly problematic in the context of biodiversity offsetting where what is not measured will not be valued and its destruction will be both ignored and allowed for free. Yet we are still continuously discovering hundreds of new plants that may yield the next generation of antibiotics<sup>107</sup>. They may come for example from bacteria from recently explored caves in British Columbia<sup>108</sup>. However, such caves and new plants once valued at zero may well not survive this new approach to nature conservation.

*‘The economic optimum (..) may well represent the optimal destruction of biodiversity. It may even call for such devastation, by demanding to substitute non-utility providing elements of ecosystems for ‘more productive’ ones.*<sup>109</sup>

As Vatn and Bromley point out, ***‘the precise contribution of a functional element in the ecosystem is not known – indeed is probably unknowable – until it ceases to function’ – and even then, with a sample size of one unique ecosystem, the resulting knowledge is merely anecdotal.***<sup>110</sup> There are and will remain enormous uncertainties about how ecosystem services are provided, the magnitude of their benefits, and how human activities affect their provision.<sup>111</sup>

The UN highlighted in its experimental ecosystem accounting framework the significant uncertainty related to physical measurement of ecosystem services and ecosystem

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103 Efttec, supra

104 Efttec et al., supra, quoted in Santos et al. supra

105 TEEB for National and International Policy Maker, 2011. Online. Available at: [http://doc.teebweb.org/wp-content/uploads/2017/03/TEEB-for-Policy-Makers\\_Website.pdf](http://doc.teebweb.org/wp-content/uploads/2017/03/TEEB-for-Policy-Makers_Website.pdf)

106 TEEB for policy makers, summary: responding to the value of nature <http://www.teebweb.org/publication/teeb-for-policy-makers-summary-responding-to-the-value-of-nature/>

107 New Scientist, Hundreds of newly-discovered plants may yield new crops or drugs, May 2007. Online. Available at: <https://www.newscientist.com/article/2131426-hundreds-of-newly-discovered-plants-may-yield-new-crops-or-drugs/>

108 Ward Tom, Inside the slimy underground hunt for humanity’s antibiotic saviour, Wired, August 2018. Online. Available at: <https://www.wired.co.uk/article/bacteria-cave-antibiotics-antimicrobial-resistance>

109 Spangenberg Joachim, Settele Josef, supra

110 Farley Joshua, 2008, supra

111 Farley Joshua, Costanza Robert, supra

assets.<sup>112</sup> It concluded that ‘overall, given the significant conceptual and measurement challenges involved in developing ecosystem asset accounts, this section is intended only to introduce the possibility of developing such accounts; it does not provide advice or recommendations concerning their compilation.’ In plain words, this means that **after drafting a 198 pages report on ecosystem accounting, the UN refrained from recommending its use** due to the conceptual and measurement challenges involved. NGO FERN concurred, stating that, ‘**measuring biodiversity is almost impossible to do accurately and is prohibitively expensive.**’<sup>113</sup>

Compounding our uncertainty, ‘**time lags between loss of an ecosystem or species and the noticeable loss of services may be greater than a human lifespan.** For example, scientists hypothesize that when Passenger Pigeons went extinct, the abundance of acorns led to booms in deer and mouse populations followed by booms in deer tick populations and finally in the spirochetes that fed on them, resulting 100 years later in an epidemic of Lyme’s disease (Blockstein 1998). By the time we are aware of a problem, it may be irreversible.’<sup>114</sup>

#### **b. No net loss compared to what? Additionality cannot be measured accurately**

Biodiversity offsetting requires not only being able to measure what is lost but also what is gained by the offsetting action. In this respect, the most important feature of any biodiversity offsetting project is additionality, defined as its added environmental value compared to what would have occurred without the offset.

As an example, restoration of scrubland and forest projects in Europe may have no added value, as such habitats are already increasing with or without the projects, due to land abandonment.

Burgin (2010) also found that ‘there have been over 16,000 hectares of conservation banks developed under US mitigation schemes, but 75% or more would probably have been developed even without legislation to mitigate loss.’

Measuring additionality requires setting up a counterfactual baseline scenario of what would have happened without the project, i.e. estimating what biodiversity would have been over a relevant period of time. Yet, ensuring additionality is widely acknowledged to be incredibly difficult and costly, if at all possible, as baseline scenarios cannot be verified. This is not surprising: **the same high scientific complexity, uncertainty and incomplete scientific knowledge that prevent us from measuring accurately ecosystem services also prevent us from setting up robust alternative biodiversity scenarios.** The fact that additionality is not calculable had already been amply evidenced in carbon offset markets.<sup>115</sup> The allowance for not like-for-like compensation worsens the issues, making it incredibly more difficult to attempt to ensure additionality.

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112 ‘It is clear that, given the scarcity of data for many ecosystem services, physical measurement of the flow of ecosystem services, in particular at aggregated levels, is prone to uncertainty. (...) It is now recognized that ecosystem changes are often sudden, involving thresholds at which rapid and sometimes irreversible changes occur in a new ecosystem state. Predicting the threshold level for, and timing of, such changes is a complex undertaking and one that is prone to substantial uncertainty.’ United Nations, *supra*

113 FERN, Briefing note 3: Biodiversity offsetting in practice, January 2014. Online. Available at: [https://fern.org/sites/default/files/news-pdf/Biodiversity3\\_EN.pdf](https://fern.org/sites/default/files/news-pdf/Biodiversity3_EN.pdf)

114 Farley 2008, *supra*

115 see Hache, *supra*



Yet, no detailed guidance is offered on how to ensure additionality in habitat banking. It is impossible however to define a baseline without a frame of reference for no net loss. As a result, no net loss is often interpreted as maintaining a trajectory of background decline, as without it there would be no losses to offset.<sup>116</sup> This lack of guidance may foster fudging baselines in order to increase claimed benefits.

### 3.3 Valuation issues

#### a. Money is not a neutral metric

Monetary equivalence provides a convenient common metric for all ecosystem services and thus facilitates offsetting one with another and the creation of a liquid financial market for biodiversity offsetting.

However, in doing so, **money provides an illusion of substitutability between all ecosystem services resulting in crucial loss of information**<sup>117</sup> and fostering the erroneous idea that it is enough to maintain the overall value of ecosystem services to protect biodiversity.

**Money also obfuscates the ethical and political choices to be made** by framing them as 'objective' cost-benefit analyses, and facilitates ignoring the incommensurability of values. **Putting a cost on environmental destruction makes it more acceptable to destroy** than under traditional environmental regulations: as long as the fee is paid, it is ok to pollute and degrade nature.

Monetary valuation may arguably **delay structural changes rather than facilitate them**, as gradual increases in prices foster incremental changes in behaviour at best. **Had we created a market scheme on slavery, child labour or asbestos instead of banning them, it is far from clear that this would have resulted in faster and better outcomes.** In fact, fostering incremental change over structural change is an objective rather than an unintended consequence of offset markets: it is feared indeed that structural change may have an excessively adverse impact on growth and competitiveness, that must be avoided as a priority.

Moreover, money enables trading in the cost of compliance with regulation. This raises interesting questions: while minimising the cost of compliance is a legitimate objective, **on what basis do we determine that compliance with the law is a question of financial means in some areas of policy making and not others?** Most areas of policy making are subject to binding regulations, such as labour rights, food safety, nuclear safety, and airline safety where no offsetting is allowed and no matter how much money you are willing to pay, you are required to avoid certain practices. On what grounds do we decide as a society that environmental destruction potentially affecting the future survival of humanity

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<sup>116</sup> Maron Martine et al, 2016, supra

<sup>117</sup> 'Ecosystems or their services are not easy to make into commodities that can be delineated and their value measured in a single term. They are rather characterized by opaqueness, uncertainty, thresholds etc. – all kinds of dynamics that make monetization result in loss of crucial information (Vatn and Bromley 1994).' Vatn Arild et al., Payments for Nature Values Market and Non-market Instruments, Norad report 5, 2014. Online. Available at: [https://www.researchgate.net/publication/284032940\\_Payments\\_for\\_Nature\\_Values\\_Market\\_and\\_Non-market\\_Instruments](https://www.researchgate.net/publication/284032940_Payments_for_Nature_Values_Market_and_Non-market_Instruments)

should be subject to different standards? The argument that binding environmental regulations would be too coercive and have an adverse impact on growth is weak, as any regulation arguably curbs short-term profits and GDP growth.

Lastly, using money as a common metric enables speculation on future biodiversity destruction, **attracting a number of stakeholders that have no intrinsic interest in conservation**, such as hedge funds and banks, and as a result shifts prices away from supply/demand and intended policy incentives.

## b. Weak methodologies

Each of the valuation methodologies described earlier presents a number of serious biases and issues that question their validity.

### i. Hedonic property pricing

Revealed preference methods like hedonic pricing and the travel cost method assume that people's preferences can be revealed by their purchasing habits. Yet, deriving preferences would require knowing which options were discarded. For example, if I have the choice only between an apple and an orange and I choose the apple, it can be said with certainty that the apple is preferred to the orange. However, in real life, **as we do not know what alternative options were discarded, we cannot rank preferences.**

Such approaches also assume that preferences remain constant over time and people are rational, assumptions that have been shown not to hold.

Regression analyses also **fail to distinguish between social and environmental factors**: using the previous example of a flat overlooking a park, reasons for purchasing it and paying the price differential may also include prestige - the fact that it is a social marker - and having more affluent neighbours, in addition to, or instead of the park view.

Hedonic pricing is also **not suited where environmental impacts are not perceived in property purchasing decisions, or where environmental impacts have yet to occur.**

Similarly, it may also **overvalue what is considered pretty but is not useful** from an environmental perspective: for example, a wetland or mangrove is likely to be less valued than a view over a marina or a lilies field with low biodiversity, whereas the former has far more biodiversity value.

Lastly, this approach assumes that changes in characteristics change the willingness to pay, which is reflected in market prices. *‘However, empirical work comparing the changes in individual well-being caused by pollution to housing prices have shown that they do not necessarily reflect the local environmental quality changes (Rehdanz and Maddison, 2008).’*<sup>118</sup>

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<sup>118</sup> Spangenberg, Settele, supra

## ii. Travel cost method

The major weakness is that travel cost methods **can only measure direct use values, and ignore non-use values** (maintaining a natural area for the sake of its existence or to transmit it to future generations even if one never visits it) **and future direct use values**.

It also assumes the existence of rational individuals who seek first and foremost to minimize cost of travel over other factors (length and effort of the journey, etc). It is acknowledged that both travel cost and hedonic pricing methods **may at best provide a lower bound estimate of value instead of a comprehensive value estimate**. Yet, in the absence of better methodologies, these lower bound estimates would likely be used as actual values.

Anecdotaly, the natural capital project<sup>119</sup> has suggested that *‘in the absence of empirical data on visitation, we parameterize the model using a proxy for visitation: geotagged photographs posted to the website Flickr. Using photographs, the model predicts how future changes to natural features will alter visitation rates and outputs maps showing current and future patterns of recreational use.’*<sup>120</sup> Such a proposal would obviously raise interesting questions, such as why Flickr and not Facebook or Instagram. It is also **not clear that nearby indigenous communities make significant use of Flickr**, enabling their preferences to be taken in to account. Such a method would thus likely discriminate against local communities that take less pictures of their everyday surroundings than visiting tourists.

## iii. Stated preferences methods

Survey-based techniques trying to estimate people’s willingness to pay are subject to well-documented issues and biases: **people can lie** (as evidenced by opinion polls’ failures to predict certain election results), **are often inconsistent in their answers** and have a poor understanding of what motivates them. They are also **vulnerable to behavioural biases and being influenced by the formulation of the questions**.

As an example, in 1980 a sample of Chicago residents were asked how much they would be willing to **pay to preserve visibility levels at the Grand Canyon. The average answer was \$90**. In 1981, another Chicago sample was asked the same question, after first being asked for their willingness to pay for visibility improvements in Chicago and the eastern United States. **This time, the mean willingness to pay was only \$16.**<sup>121</sup>

**It is also well documented that answers change with income, age, location (asking the same question in different places produces different answers, e.g. rural versus city populations) social groups, culture and attitude of the researcher.** For example, tourists are likely to put a different value than local residents on a given place.

119 The natural capital project is a partnership between Stanford University, the Chinese Academy of Sciences, the University of Minnesota, the Stockholm Resilience Centre, The Nature Conservancy, and the World Wildlife Fund. It has developed a suite of free, open-source software models used to map and value the goods and services from nature that sustain and fulfil human life. Natural Capital Project – Stanford University, Who we are. Online. Available at: <https://naturalcapitalproject.stanford.edu/what-is-natural-capital/#who-we-are>

120 Natural Capital Project – Data (inVEST), Visitation and Tourism, 2017. Online. Available at: <http://data.naturalcapitalproject.org/invest-releases/3.4.2.post2+n0838473120c8/userguide/recreation.html>

121 Diamond Peter A., Hausman Jerry A. et al., Chapter II - Does Contingent Valuation Measure Preferences? Experimental Evidence, Contributions to Economic Analysis 220, 41-77, 79-85, 87-89, 1993. Online: <https://www.sciencedirect.com/science/article/pii/B9780444814692500080>



*'Given the complexity of biodiversity, **one may question whether individuals asked to pay or offer a price actually have the necessary knowledge to make an informed choice.** Using markets to value the good may imply putting trust in consumers having very little insights in what the factual issues are.'*<sup>122</sup> Expressed willingness to pay is also subject to external temporary factors such as an economic downturn or pessimism about the future at the time the questions are being asked, that may bias the answers.

Respondents may also not have preferences for the public good in question, leading to similar answers to widely different questions. This is known as the **embedding effect**, where for example, respondent would express roughly the same willingness to pay to clean up one lake and to clean five lakes. Willingness to pay also ignores the preferences of future generations.

More generally, **economists have also long expressed scepticism of the validity of answers to hypothetical questions.** As the UN stated, *'contingent valuation measures may overestimate economic values if respondents do not believe that they will actually have to pay the amount they say they would be willing to pay for a service.'*<sup>123</sup>

As importantly, studies have found **major discrepancies between willingness to pay and willingness to accept:** willingness to pay answers the question how much are you willing to pay to still have the Grand Canyon next year, whereas willingness to accept answers the question how much are you willing to accept in exchange for the disappearance of the Grand Canyon next year. While in theory both questions may produce similar results, *'empirical studies show however that WTA almost always exceeds WTP (Hanneman 1991) even for market goods. A review of 45 studies comparing the two measures showed that the mean ratio of WTA to WTP is seven, with the discrepancy increasing as goods become less like ordinary market goods (Horowitz & McConnell 2002).'*<sup>124</sup>

The discrepancy is due to a number of factors: **willingness to pay is constrained by individuals' wealth and income, whereas willingness to accept is not; people also value more EUR 1 of loss than EUR 1 of gain; people also prefer what they have to what they do not have,** a phenomenon known as the endowment effect (Tversky & Kahneman 1991). As a result, willingness to pay can seriously underestimate the value of environmental features; yet it remains the dominant approach to valuation (Bromley 1995; Knetsch 2005).

Lastly, **a major limitation to willingness to pay is the fact that the more a species is threatened, the more people are willing to pay:** *'if certain measures need to be taken to safeguard the survival of the species, it may be a lethal failure to wait until the number of surviving individuals has shrunk enough to generate a WTP which in turn would justify to take preventive action without reducing the total welfare in an economic sense.'*<sup>125</sup>

As Diamond and Hausman concluded, *'we think that the evidence supports the conclusion that to date, contingent valuation surveys do not measure the preferences they attempt to measure'*.<sup>126</sup>

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122 Vatn Arild et al., 2011, *supra*

123 United Nations, *supra*

124 Farley Joshua, 2008, *supra*

125 Spangenberg, Settele, *supra*

126 Diamond, Hausman, 1994, *supra*

#### iv. Market values and proxies

The REMEDE toolkit itself concludes that the values derived from market approaches ‘do not represent true valuations (...), risks the undervaluation of environmental goods’ as ‘knowing the price of a good only informs on the cost of obtaining that good, rather than the actual benefit derived from the ‘consumption’ of the good.’<sup>127</sup>

Each of the methods present severe limitations:

The **opportunity cost method** only provides a lower boundary of value and not an actual value, as it only considers whether the environmental good is of greater value than the opportunity cost. In addition, distorted market structures reflecting political objectives as in the agricultural sector may bias the true opportunity costs.

**Mitigation cost methods** ‘will typically only provide a partial assessment of the environmental impact of interest. For instance, the cost of water filtration in order to improve water quality will only account for the impact that is experienced by water companies and their customers, and will not account for water pollution damages to aquatic ecosystems.’<sup>128</sup> As importantly, this approach equates the economic value at risk at present with the value of the ecosystem, whereas it is at best a low boundary of value rather than an actual value.

**Shadow project costs**, an approach concerned with the cost of providing an equal environmental good at an alternative location relies on the assumption that the replacement system will provide qualitatively and quantitatively equivalent functions, a debatable assumption as discussed earlier.

**Subsidy costs** ‘will typically rely on what may be arbitrary values set by government which do not reflect opportunity cost.’<sup>129</sup>

Beyond the methods themselves, **the choice of the method to apply to a particular good or service can also introduce biases**, as different methods will produce different results. An EU project report found that valuation methods ‘have been used in the past in a somewhat haphazard way, using whatever method was either considered politically correct, or technically feasible with the data available, within the time frame allowed for the assessment and decision process.’<sup>130</sup>

The same EU project report goes on to list **recurring major methodological problems in valuation processes**, including:

- **‘Selection of the relevant and representative human population** to involve in the various methods employed, to elicit preferences and willingness to pay (or accept) from at individual level, and then to sum across sub-populations and the whole population.
- **Time and space dependency of the preferences assigned:** people in the selected population have different preferences and are willing to pay different amounts of

127 REMEDE, Deliverable 13 (D13): The Main Toolkit – Annexes to the Toolkit, May 2006. Online. Available at: <http://www.envliability.eu/publications.htm>

128 REMEDE, *ibid*

129 REMEDE, *ibid*

130 OpenNESS, Framework for integration of valuation methods to assess ecosystem service policies, final draft March 2015. Online. Available at: [http://www.openness-project.eu/sites/default/files/OpenNESS%20D4.2%20Framework\\_%20Integrated\\_Valuation\\_Final\\_Draft\\_March\\_23-2015.pdf](http://www.openness-project.eu/sites/default/files/OpenNESS%20D4.2%20Framework_%20Integrated_Valuation_Final_Draft_March_23-2015.pdf)

money for their preferred benefits in different phases of their life; there are also marked differences in cost-of-living levels across regions and countries, even in Europe. Such factors are important when decisions are made in processes involving a high degree of democratic input. Likewise, the use of monetary valuation to inform decisions may be more appropriate in a market economy than in a context of peasant, indigenous, or other community-based societies where environmental values are deeply interwoven with community and spiritual values (Gómez-Baggethun and De Groot, 2010).

- **The temporal and spatial scales of the ecological dynamics of the service providing ecosystems may not be ‘in sync’ with the temporal and spatial scales of the social and economic dynamics of the community of people which strive to satisfy their human needs, and therefore choose to manipulate and manage ecosystems with a focus to produce the relevant benefits. (...)**
- **Monetization within and across currency systems has dependencies on financial markets and currency exchange rates, and for some ecosystem services valuation methods even depends on housing and commodities market and stock exchange dynamics. Decision makers face the challenge to make decisions with long term impacts, across highly dynamic markets with fluctuating prices.’**

#### v. Benefit transfer, aggregation and discounting

The biases and weaknesses of each methodology are **compounded by a number of elements, from benefit transfer, to aggregation and discounting.**

**Benefit transfer:** according to the REMEDE toolkit, ‘a distinct appeal of the benefits transfer approach to economic valuation is its expediency and value for money properties in relation to commissioning original valuation studies (...) The main disadvantages of benefits transfer focus on questions of accuracy in the values derived in relation to original valuation studies. However, concerns regarding accuracy are a necessary trade-off if otherwise decision-making will not be informed as to the likely monetary value of the environmental goods and services.’ In other words, **it is faster and cheaper to try and apply economic valuations in different contexts than to perform valuation studies in each context. The accuracy of the results is known to be problematic as willingness to pay for a particular good will change with location,<sup>131</sup> culture, and social group, but such an issue is dismissed,** as accuracy is deemed less important than not having a value at all. This is obviously a very weak and debatable answer to the concern, highlighting once again the trade-offs against environmental integrity required by market-based solutions.

**Aggregation:** Aggregating the values obtained by different methodologies for specific goods and services increases by orders of magnitude the uncertainty associated with the valuations.

As an academic article put it, ‘the results of valuation are not robust, unambiguously

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<sup>131</sup> ‘Many ecosystem service values, especially those relating to local benefits, are context specific. This reflects the natural environment’s sheer diversity and the fact that economic values are not a natural property of ecosystems but are integrally linked to the number of beneficiaries and the socioeconomic context. The role of a coastal buffer zone to protect against extreme weather events can be vital or marginal, depending where you live. Water regulation is a lifeline in certain conditions, a useful back-up in others.’ TEEB, 2009, supra



*calculated, clear-cut value figures (although they are often presented as such), but methodology-dependent outcomes (i.e. different methods applied to the same object of measurement result in widely diverging values), influenced by a range of subjective assumptions. As no method is applicable to all ecosystem services, there is no way of defining a methodological standard, and with the divergence of results, **aggregation of valuation outcomes into a total value calculation is scientifically dubious.***<sup>132</sup>

As noted by the UN in its 2012 experimental ecosystem accounting framework,<sup>133</sup> **‘assuming that the valuation of ecosystem services is possible, the logic underpinning the concept of aggregation is akin to that guiding the addition of values of output from an enterprise that produces a range of different outputs. While simple in concept, this approach assumes that each ecosystem service is independent.’** However, the framework recognises that ‘ecosystems are likely to be highly interdependent.’

Furthermore, ‘aggregation within an ecosystem will be affected by the consistency in the approaches to valuation of individual ecosystem services. (...) However, **even in cases where a consistent valuation concept is applied, the use of different measurement approaches for different ecosystem services may still result in gaps and overlaps in valuation** which need to be considered.’

Finally, the UN adds that **‘the degree of meaningfulness of the resulting sum of values of different ecosystem services depends on the level of coverage** of the measured ecosystem services. In cases where the ecosystem services measured do not provide a relatively complete coverage of the set of ecosystem services, the aggregated value may be of reduced usefulness.’ Yet as we have seen, most frameworks only measure and value a limited number of ecosystem services, thereby failing to provide the comprehensive coverage required to provide meaningful values.

Quite strikingly, the UN chapter Accounting for Ecosystems in Monetary Terms ends with the following disclaimer: *‘the present chapter introduces possible areas for integration of ecosystem accounting and standard presentations of economic accounts but **deliberately refrains from providing specific recommendations**, for the following reasons: (a) There are differing views about the meaningfulness of integrated measures and accounts in light of the assumptions required for valuation in monetary terms and, consequently, about the ability to use integrated measures and accounts for policy purposes.’* In other words, the authors of the framework do not even agree among themselves that the results are meaningful.

**Discounting:** Discounting is a crucial component of habitat banking as it enables compensating today’s environmental destruction with past or future offsetting, and offsetting permanent destruction with temporary restorative actions.

As discussed in our previous paper, **discounting in the context of environmental policies raises several concerns:** the mere act of discounting with a positive rate implies that the future value of resources is less important than their value today, or put differently it discriminates against future generations by considering that they are less important than the current one.

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<sup>132</sup> Spangenberg, Settele, supra

<sup>133</sup> United Nations, supra

Not using discounting at all would have far more environmental integrity, as the horizon of offsetting projects would have to match that of the related environmental destruction, and offsetting actions would have to start when the damage starts. Doing so would be consistent with the Biodiversity and Business Offsets Programme Principles, which state that the design and implementation of biodiversity offsets should have *‘the objective of securing outcomes that last at least as long as the project’s impacts and preferably in perpetuity.’*<sup>134</sup>

In this respect, REMEDE’s argument that requiring permanent compensation would prevent scaling remediation to a finite amount is weak, and clearly indicates that cost-effectiveness is being prioritized over environmental integrity.

As recognised by the UN, the choice of the discount rate itself is also no trivial matter, as it requires taking into consideration different social and equity values and intergenerational concerns. On that topic, **REMEDE’s recommendation to use a 4% discount rate means that what happens in a hundred years from now is valued at almost zero today:** EUR 100 in 100 years discounted at a rate of 4% are worth EUR 2 today. Practically, a discount factor of 4% effectively equates 100 years with perpetuity, as what happens after 100 years is valued at almost zero today. **Positive discount rates therefore have an inherent bias to ignore intergenerational equity and favour the current generation.** The higher the rate, the bigger the discrimination against future generations.

### c. REMEDE criteria to use monetary valuation and value to cost

As stated by the REMEDE toolkit, monetary valuation might be preferable if the damage were to a unique environment that has no equivalent in the area, or to an area of such an extent or location that equivalent remediation may be **disproportionately costly, impossible, or undesirable** as the resource or service is abundant.

Costs are considered as disproportionate if they exceed the monetised benefits of achieving ‘good status’, or if they create an unacceptable burden for a certain actor or group of actors, i.e. they threaten the economic viability of a sector, or the costs would fall on companies that have already made significant efforts in the past. REMEDE acknowledges that assessing the disproportionality of costs ultimately remains a political decision.

In practice, while resource and habitat equivalency analyses are supposed to be prioritised, this gives significant **flexibility to use value equivalency analysis over resource and habitat equivalency analyses whenever desired, based on political considerations and subject to the influence of private interests’ lobbying instead of being based on environmental considerations.** This flexibility further weakens the environmental integrity of the framework, and is likely to mean in practice a significant use of monetary valuation with all its attached flaws, whenever deemed convenient.

Likewise, **the criteria to use value-to-cost over value-to-value are problematic in**

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134 The Business and Biodiversity Offsets Programme (BBOP) is a collaboration of more than 80 leading organizations and individuals including companies, financial institutions, government agencies and civil society organizations, who are members of its Advisory Group. Together, the members are testing and developing best practice on biodiversity offsets and conservation banking worldwide. BBOP, Principles on Biodiversity Offsets - Forest Trends. Online. Available at: [https://www.forest-trends.org/wp-content/uploads/imported/BBOP\\_Standard\\_on\\_Biodiversity\\_Offsets\\_1\\_Feb\\_2013.pdf](https://www.forest-trends.org/wp-content/uploads/imported/BBOP_Standard_on_Biodiversity_Offsets_1_Feb_2013.pdf)

**our opinion.** As stated by REMEDE, *‘if valuation of the lost resources and/or services is practicable, but valuation of the replacement natural resources and/or services **cannot be performed within a reasonable time-frame or at a reasonable cost**, then the competent authority may choose remedial measures whose cost is equivalent to the estimated monetary value of the lost natural resources and/or services.’*<sup>135</sup>

**Neither reasonable time-frame nor reasonable cost are defined in the annex of the toolkit, which potentially opens the door to an extensive use of value-to-cost over value-to-value, despite the explicit acknowledgement that value-to-cost does not even aim at compensation.**

#### **d. Possible use of a fee in lieu of credit and an independent fund**

The habitat banking study proposes to simultaneously offset several individually minor but cumulatively significant environmental degradations, via the payment of a fee to an independent trust fund. The expert multi-stakeholders fund would purchase credits from habitat banks for strategic conservation priorities differing from the degradations to be offset.

As the study explains, *‘the rationale for creating an independent body to allocate funds is that a rule-based system for calculating credits would be either too simple to optimise biodiversity benefits or too complex to administer with reasonable transaction costs.’*<sup>136</sup> Lowering transaction costs would enable offsetting impacts that would otherwise be unlikely to be covered.

The study notes however, that such a proposal is controversial as it could be subject to political capture; it also observes that declines in some habitat types may occur as a result *‘though unlikely to be of importance’*, and that unlike like-for-like offsetting, **net biodiversity change would not be quantified.**

Such a proposal raises a number of concerns: it would **further increase the disconnection between environmental destruction and offsetting measures, thus making it impossible to ensure adequate compensation and accountability.** History suggests that there is a non-negligible risk of pressure to expand over time the scope of what is ‘non-significant and low impact’, as a way to cheapen the cost of compliance.

Regarding the risk that *‘Loss of direct linkage between impact and compensation may risk loss of important elements of biodiversity’*, the study responds that such an approach *‘only applies to very low level (individually insignificant) impacts on widespread biodiversity that would not normally be covered by conventional compensation systems, and for which like for like compensation would usually be inappropriate.’* Yet, arguably **either something is worth protecting – and requires adequate compensation, measured additionality and accountability – or it isn’t.**

**The choice of a multi-stakeholder group deciding what conservation priorities are strategic is also a cause for concern,** given the track record of imbalance and private

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<sup>135</sup> REMEDE, Deliverable 13 (D13): The Main Toolkit – Annexes to the Toolkit, May 2006. Online. Available at: <http://www.envliability.eu/publications.htm>

<sup>136</sup> Eftec, *supra*



interests' influence over such groups.<sup>137</sup> Unsurprisingly, the study notes that such an approach is *'likely to be supported by key stakeholders' but 'increases complexity and potential for conflicts of interest.'*

#### e. Allowance for trading

Last but not least, beyond the enormous uncertainties, biases and limitations involved in monetary valuation methodologies and aggregation of values just described, **the trading of credits will further disconnect prices from any environmental value and likely correlate them with totally unrelated factors such as financial markets' global risk appetite and other asset classes' price fluctuations.**

As discussed in our previous paper,<sup>138</sup> agricultural commodity derivatives markets offer some very useful and relevant lessons in this respect, such the attraction of new types of speculators, major price distortions, correlation to other financial asset classes and increasing price volatility. We will come back to this issue later and only mention it at this stage to give the full picture of all the layers of uncertainty compounding one another: **value equivalency methods add major uncertainty and biases to the already highly uncertain physical measurement of inherently complex and only partly understood ecosystem processes; trading adds a third layer of disconnection and volatility to prices deemed to represent parts of biodiversity. This seriously puts into question the meaningfulness of the figures produced and their usefulness for policy making.**

We let Spangenberg and Settele conclude: ***'there is no sound way of calculating the value of ecosystem services beyond the immediate expenditures needed. Is this a pity? We dare say no – even a price figure for all ecosystem services, even a soundly calculated one, would not be too helpful for defining political priorities. (...) To operationalise the intention which was the motivation and driving force for monetisation in the first place, (...), it is essential to address the deeper causes of biodiversity loss. (...) Safeguarding them can be a political decision, not in need of an economic justification by valuing the services. (...) Such a decision would address the ecosystem as whole, not individual services, as the good to be protected.'***<sup>139</sup>

### 3.4 Incentive issues

#### a. No price signal

Market-based schemes like habitat banking rely on the existence of a price signal to allocate land between different uses.<sup>140</sup> However, it has been demonstrated<sup>141</sup> that **once**

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137 European Parliament study, Composition of the Commission's expert groups and the status of the register of expert groups, 2015. Online.  
Available at: [http://www.europarl.europa.eu/RegData/etudes/STUD/2015/552301/IPOL\\_STU\(2015\)552301\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2015/552301/IPOL_STU(2015)552301_EN.pdf)

138 Hache, supra

139 Spangenberg, Settele, supra

140 *'The market system of habitat banking has an advantage of providing price signals that can help allocate land between different uses. If biodiversity compensation is required by law, the market gives an incentive for credits to be priced at a level sufficient to secure appropriate land for their delivery.'* Eftic et al, supra

141 Bouleau Nicolas, *Le mensonge de la finance*, Éditions de l'Atelier, 2018. Online: [https://www.amazon.fr/mensonge-finance-math%C3%A9matiques-signal-prix-plan%C3%A8te/product-reviews/2708245554/ref=dpx\\_acr\\_txt?showViewpoints=1](https://www.amazon.fr/mensonge-finance-math%C3%A9matiques-signal-prix-plan%C3%A8te/product-reviews/2708245554/ref=dpx_acr_txt?showViewpoints=1)

**price volatility reaches a certain level, prices are unable to transmit any information.** Beyond a certain level, price fluctuations matter more than the actual price level, as it is impossible to see any trend on what is objectively observable.<sup>142</sup>

In this respect, **the allowance in habitat banking to generate biodiversity credits before debits and to trade them freely opens the door to speculation, which is the biggest driver of volatility.**

High volatility is an inherent feature and the main characteristic of financial markets. In the case of habitat banking, **volatility will be further increased compared to traditional capital markets by 2 factors:**

- ▣ The huge scientific uncertainty and our incomplete knowledge of ecosystems will likely generate additional volatility: as an example, the discovery of new feedback loops or the crossing of an unexpected threshold would likely lead to abrupt changes in the price of corresponding credits.
- ▣ It is already known that the end of natural resources will go hand in hand with a rise in volatility.

In addition, should habitat banking fail to lead to a decline in the loss of biodiversity over time, this could make investors nervous and thus further increase price volatility.

This means that functioning **habitat banking markets would most likely exhibit extremely high volatility**, as is already the case in carbon markets, **and consequently an inexistent price signal – even though the price signal is the very reason for the creation of such markets.**

As an example, imagine that you are a real estate developer planning to build residential housing complexes in a forested area. Identified and valued ecosystem services include habitats for a species of rodents. The price of credits for this service fluctuates from EUR 5 one month, to EUR 14 the next month and to EUR 4 the month after. Which reference price should you use to determine whether your 5 year construction project is profitable and whether you should relocate your complex elsewhere?

This is a major conceptual issue meaning that habitat banking prices will be unable to transmit any relevant information to corporations and policy-makers. The logical conclusion should be to **stop the mitigation hierarchy before offsets and abandon market-based solutions for biodiversity as they will never be able to deliver on their environmental objectives.**

## **b. Fosters cheapest to deliver**

The allowance for 'like-for-like or better' compensation is likely to foster offsetting in areas where land is cheapest and of habitats that are easiest and fastest to restore. Yet, cheap land is often cheap for a reason, including the fact that it may be of low biodiversity interest. The fact that additionality cannot be measured accurately further incentivises traders to favour cheapest to deliver projects over stronger conservation outcomes. This phenomenon is known in economic theory as adverse selection.

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<sup>142</sup> Bouleau, *ibid* Also see Bouleau Nicolas, Combien coûte la nature ?, Le blog de Nicolas Bouleau, October 2018. Online. Available at: <http://www.nicolasbouleau.eu/combien-coute-la-nature/>

This may lead to adverse conservation outcomes over time, such as a decline in the biodiversity value of areas of offset projects, and a focus of offset projects on a limited number of habitats and species.

As an academic article put it, *‘sites with low opportunity costs are more unlikely to be developed anyway, so there is an incentive for landowners to offer these areas first for a biodiversity offsets program. When these would have regenerated naturally through lack of use, there is a question of whether the offsets generated offer benefits that are additional to those that would have come about without the trading scheme.’ ‘Long rehabilitation times create uncertainty regarding effectiveness, requiring either an additional area of offsets to compensate for the risk of not achieving full rehabilitation in the long term, or limiting the habitat banking market to only habitats that have rapid restoration times (e.g. wetland creation which measured in terms of area is rapid, versus forest regeneration which is slow). (..). The habitat banking market would therefore be limited to sites of less conservation interest for biodiversity.’*<sup>143</sup>

Other studies concurred,<sup>144</sup> one stating that *‘some vegetation types (e.g., grasslands) will take less time to restore and revegetate than others. This may have the effect of encouraging proponents of vegetation clearance to avoid the destruction of ecosystems that are extremely difficult to regenerate/reconstruct and/or to seek investment in restoration of some vegetation types that are faster to restore. However, it is necessary to ensure that different vegetation types are not substitutable, so that the loss of one vegetation type cannot be offset with credits obtained from the restoration of another.’*<sup>145</sup>

The habitat banking proposal acknowledges this risk, noting that like-for-like compensation *‘reduces the risk of developing systems that encourage offsets that select the lowest cost compensation measures.’* The proposal however explains that the issue is addressed by the allowance of some schemes for trading up, i.e. offsetting with actions targeting more threatened species and habitats. Such a response fails however to address adequately the issue, as trading up is allowed and not mandatory, and it is unclear why some developers would choose more difficult and expensive offset projects.<sup>146</sup>

### **c. Other agency problems: incentives to underdeliver offsets, to ignore the mitigation hierarchy, and to allow the offsetting of offsets’ destruction**

A study found that *‘biodiversity offsetting is exposed to agency problems because of asymmetric access to information between developers and regulators, uneven sharing*

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143 Vatn et al, Can markets protect biodiversity? An evaluation of different financial mechanisms, Noragric Report No. 60, June 2011. Online. Available at: <https://www.nina.no/archive/nina/PppBasePdf/Rapporter%20i%20ekstern%20rapportserie%5C2011%5CBarton%20Ca%20Norsgric%20Report%2060%202011.pdf>

144 *‘Development is less likely to occur on habitats which are difficult to restore / enhance / re- create, if the mitigation hierarchy is followed diligently, if the value of these habitats is appropriately reflected in the chosen metrics and if ‘like-for-like-or-better’ compensation is required’* ICF GHK, Exploring potential demand for and supply of habitat banking in the EU and appropriate design elements for a habitat banking scheme - Final Report submitted to DG Environment, 2013. Available at: [http://ec.europa.eu/environment/enveco/taxation/pdf/Habitat\\_banking\\_Report.pdf](http://ec.europa.eu/environment/enveco/taxation/pdf/Habitat_banking_Report.pdf)

145 Bekessy et al, the biodiversity bank cannot be a lending bank, Conservation Letters, June 2010. Online. Available at: [https://www.researchgate.net/publication/227726458\\_The\\_biodiversity\\_bank\\_cannot\\_be\\_a\\_lending\\_bank](https://www.researchgate.net/publication/227726458_The_biodiversity_bank_cannot_be_a_lending_bank)

146 *‘Like-for-like compensation does not necessarily produce the best biodiversity outcome. Therefore, some compensation schemes allow trading up, such that resources are used on higher conservation priority habitats and species than those impacted. For example, conservation benefits could be obtained by using funds or land to take urgent action in response to threat to habitats or species that have inadequate protection or are irreplaceable rather than those that are well protected or readily restorable.’* Eftec, *ibid*

of risks between these parties, and institutional incentives against the delivery of environmental outcomes (Eisenhardt 1989, Salzman and Ruhl 2000). For example, a developer may have an incentive to underdeliver offset obligations in order to reduce their costs when the regulator has limited capacity to monitor their activities for compliance. Similarly, there is an incentive to overestimate the conservation benefits from a potential offset site by assuming an implausibly negative biodiversity trajectory in the absence of the offset (Maron et al. 2015a; Gordon et al. 2015). These agency problems can be compounded as the number of actors increases, such as through the involvement of third-party offset providers. Without adequate oversight, there is a risk that the integrity of the offset transaction is diminished as the original biodiversity impact becomes more removed from the delivery of the offset.’<sup>147</sup> It concluded that **as increased scrutiny of offset trades can be politically unpalatable, the incentives to underdeliver offset obligations or to accept poor trades cannot be entirely eliminated.**

**Enforcing the mitigation hierarchy and proving that all alternatives to offsets have been exhausted may also prove difficult.** On the contrary, it may be tempting for developers not to enforce the mitigation hierarchy properly. In fact, there is already some evidence that in countries that require following the mitigation hierarchy, most jurisdictions do not properly implement an avoidance hierarchy.<sup>148</sup>

A number of academic studies and the habitat banking proposal itself found that **‘clear rules on when to move from one level to another along the mitigation hierarchy do not exist (...). Instead, developers and regulators decide on a case-by-case basis with little guidance or reference to past cases on whether an impact can or cannot be avoided and how much impact minimization is adequate before the residual impact can be considered unavoidable and therefore a candidate for offsetting.’**<sup>149</sup> It concluded that **the absence of clear rules may incentivise a reduced focus on the mitigation hierarchy.**

In fact, a 2017 report from the French Senate concluded that while the 2016 French biodiversity law requires the use of a mitigation hierarchy, in practice decision makers tend to forget the ‘avoid’ and ‘minimize’ steps. **‘The culture is rather to focus mostly on offsetting. The sequence avoid-minimize is not sufficiently or not at all implemented.’**<sup>150</sup> The report **‘also points to the lack of state controls on the effectiveness and monitoring of offsetting activities. (...)** There is still fuzziness on many points. What happens to natural compensation sites once the approval period has

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147 Maron et al, supra

148 CEEweb for Biodiversity, supra

149 Maron et al, supra: A study on wetland mitigation markets also listed compensation at the expense of avoidance and minimization amongst the risks facing regulators, noting growing concerns that the growth of US mitigation banking has led to monitoring authorities becoming relaxed on these prerequisites.

Hook Patrick W., Shadle Spenser T., Navigating Wetland Mitigation Markets: A Study of Risks Facing Entrepreneurs and Regulators, CBD, December 2013. Online. Available at: <http://ow.ly/d/1Q7l>

Also see ‘The key issue in the interpretation of the mitigation hierarchy is the consideration of what are appropriate measures. This is not explained in most references to the mitigation hierarchy.’ Eftic, ibid

Also see ‘There is an incentive on-site to increase what is unremediable ‘residual biodiversity loss’. With lacking enforcement developers have an incentive to substitute more expensive on-site minimization and mitigation measures for cheaper off-site biodiversity offsets. Where this happens it could damage the legitimacy of habitat banking.’ Vatn et al 2011, ibid

150 Compensation des atteintes à la biodiversité : construire le consensus – Rapport de M. Ronan DANTEC, fait au nom de la commission d’enquête, n° 517 tome I, Sénat, April 2017. Online. Available at: <http://www.senat.fr/presse/cp20170511.html>



passed?”<sup>151</sup> The report also highlights a risk of conflicts of interest: ‘Who will be the experts who are supposed to assess the absence of a net loss of biodiversity?’

Last but not least, **empirical evidence suggests that offsets deemed to be in perpetuity may in practice prove very temporary, when land set aside for offset projects is being used for new development projects in exchange for new offsets.** As an example, waterfalls and river banks set aside in perpetuity to offset for a dam reservoir in Uganda were subsequently submerged, once another developer obtained permission for another dam on the river Nile. Likewise, a woodland set aside to offset a Rio Tinto mine was later destroyed when it, too, became part of a corporate project to mine.<sup>152</sup>

#### d. Risk of instrumentalisation to weaken existing legislation

A study already expressed some concern that biodiversity offsetting interferes in the ability of laws to prevent damage, and found that ‘*biodiversity offset test cases in the EU show that **the permission to offset has weakened legislation that currently prevents damage** (...). This means that rather than preventing damage through the price of offsets, biodiversity offsetting may increase levels of biodiversity destruction and undermines the EU’s targets to reduce biodiversity loss.*’<sup>153</sup>

Evidence from other areas of environmental legislation<sup>154</sup> suggests a real risk that existing conservation laws could be dismantled under the claim that they are no longer needed as market mechanisms have replaced them.

### 3.5 Social issues

#### a. Social equity

Allowing compensation to take place at a different time and place - one of the defining features of habitat banking - means that the beneficiaries of habitat restoration are likely to be different from the people impacted by the environmental loss to be compensated. And the wider the scope of the market scheme the bigger the issue. **It is unclear for example how we could get public buy-in for intra-EU cross border offsets within an EU habitat banking scheme, when we already face huge political opposition to proposals such as a European deposit guarantee scheme or a common EU fiscal policy.**

151 Novethic, Compenser la destruction de la nature : les entreprises à la peine, 22 mai 2017. Online. Available at: <https://www.novethic.fr/actualite/environnement/biodiversite/isr-rse/compenser-la-destruction-de-la-nature-une-demarche-compromisee-pour-les-entreprises-144449.html>

152 Kill Jutta, Regulated destruction of biodiversity, Heinrich Böll Stiftung, November 2018. Online. Available at: <https://www.boell.de/en/2018/11/29/regulated-destruction-biodiversity>

153 CEEweb for Biodiversity, supra

154 “The EU’s Integrated Pollution Prevention and Control (IPPC) Directive was modified to explicitly exclude CO<sub>2</sub> emission limits for the “installations” (power stations and industrial plants) which are covered by the EU ETS amid fears that it could lead to energy efficiency improvements, reducing demand for emissions allowances and in so doing weaken carbon prices. Similarly, the revision of the Energy Taxation Directive was weakened (and ultimately abandoned) for fear of affecting carbon prices.” Corporate Europe Observatory, EU emissions trading: 5 reasons to scrap the ETS, October 2015. Online. Available at: <http://corporateeurope.org/environment/2015/10/eu-emissions-trading-5-reasons-scrap-ets>

CE Delft, A comparison between CORSIA and the EU ETS for Aviation, December 2016. Online. Available at: [https://www.transportenvironment.org/sites/te/files/publications/2016\\_12\\_CE\\_Delft\\_ETS\\_CORSIA\\_final.pdf](https://www.transportenvironment.org/sites/te/files/publications/2016_12_CE_Delft_ETS_CORSIA_final.pdf)

Take the example of a German company destroying a biodiversity rich area in Northern Germany that is the habitat of many rare birds to build an airport, and compensating by financing the creation of a habitat for an endangered species of bats in Greece. While the destruction would be considered to be offset, German populations living near the forest may feel differently. The same issue could also arise within a single country, as citizens of Napoli may not care much for the replacement of their local forest by a new park in Milan. **The issue of social equity embedded in the design of habitat banking may thus exacerbate regional tensions.**

Biodiversity loss and ecosystem destruction may also lead to significant intra-EU citizen migrations over time that cannot be addressed by biodiversity offsetting policies, and require a far more ambitious and comprehensive policy response.

#### **b. Competition for land use, green land-grabbing and human rights violations**

The supply of credits is dependent on the availability of land. As a result, over time and if implemented on a big enough scale, **habitat banking may exacerbate competition for land use** between urban development, agriculture and offset projects such as natural parks.

As the Eftic report noted, *‘in the context of Europe, (...) the questions to ask in the design of habitat banking would include how much competition between agriculture and habitat banking there will be.’* This could become problematic if land uses of crucial importance but lower relative profitability such as agriculture were to become priced out. Such competition for land use based on pure profitability criteria may as well conflict with the European commission objective of inclusive growth in its sustainable finance agenda.

As an example, Colombia has recently introduced one of the most comprehensive environmental offsetting frameworks. As a result, *‘between 2013 and 2015 alone, the potential demand for land declared a biodiversity offset amounted to more than 180,000 hectares. A major land question is thus looming, as an observer in Colombia pointed out: ‘With over 8 million hectares under mining titles, over 130 oil and gas companies with operations in the country over at least 1.5 million hectares, including Shell, Oxy, Chevron, ExxonMobil, and Petrobas, and thousands of kilometres of highways in the pipeline that will affect critical biodiversity hotspots, one of the key questions is where are the hundreds of thousands of hectares needed in offsets going to come from.’ (...) **Conflict over land will thus become an increasing corollary of biodiversity offsetting.** Existing biodiversity offset projects already demonstrate this reality.’*<sup>155</sup>

Biodiversity offsetting has also already been documented to lead in many cases to **land-**

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<sup>155</sup> Kill, Regulated destruction of biodiversity, Heinrich Böll Stiftung, Nov 2018.  
Available at: <https://www.boell.de/en/2018/11/29/regulated-destruction-biodiversity>

**grabbing, community displacements and human rights abuse.**<sup>156</sup> The expansion of financial markets to new areas such as biodiversity offsetting and ecosystem services has been called **a new enclosure of the Commons**,<sup>157</sup> disempowering indigenous communities as investors take control of forests, fisheries, land and water resources historically managed as collective resources.

Beyond the obvious social and moral issues, there is significant evidence that eviction of local communities to create offset projects may also be detrimental to the environmental objectives, as many studies have shown that **local ownership and use of land leads to better stewardship.**<sup>158</sup>

Of equal concern is the fact that **biodiversity offsetting is likely to disproportionately affect poor populations and communities with informal land property rights:** the availability of land depends on the land-use value, and areas of lower economic value are easier to find for offset projects.

#### 4. FINANCIAL STABILITY RISKS

Beyond the social and environmental integrity issues, habitat banking – once mandated on a big enough scale – could generate significant financial stability risks that need to be researched.

**Habitat banking fosters increased competition for land use and land ownership, and speculation on land value based on highly uncertain valuations.** Both prime land and cheap land are impacted, the former for development projects and the latter for offset projects. *‘Where land is constrained, land prices are likely to increase as offsetting becomes another competing land use. The impact on land prices may also be influenced by whether and how offset requirements are announced in advance of schemes being*

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<sup>156</sup> As much has already been written on these topics we chose not to expand and instead provide references: Kill Jutta, Franchi Giulia, Rio Tinto’s biodiversity offset in Madagascar – Double landgrab in the name of biodiversity?, World Rainforest Movement, Re:Common, March 2016. Online. Available at: [https://wrm.org.uy/wp-content/uploads/2016/04/RioTintoBiodivOffsetMadagascar\\_report\\_EN\\_web.pdf](https://wrm.org.uy/wp-content/uploads/2016/04/RioTintoBiodivOffsetMadagascar_report_EN_web.pdf)  
 Vidal John, The tribes paying the brutal price of conservation, The Guardian, August 2016. Online. Available at: <https://www.theguardian.com/global-development/2016/aug/28/exiles-human-cost-of-conservation-indigenous-peoples-eco-tourism>  
 Re:common, Turning forests into hotels The true cost of biodiversity offsetting in Uganda, Apr 2019. Online. Available at: <https://www.recommon.org/eng/turning-forests-into-hotels-the-true-cost-of-biodiversity-offsetting-in-uganda/>  
 Friends of the Earth UK, New tricks: biodiversity offsetting and mining, February 2019. Online. Available at: <https://policy.friendsoftheearth.uk/publications/new-tricks-biodiversity-offsetting-and-mining>  
 IWGIA, New green powers in the global land grab violate indigenous peoples’ rights, October 2017. Online. Available at: <https://www.iwgia.org/en/focus/land-rights/2520-new-green-powers-in-the-global-land-grab-violate-indigenous-peoples-rights>  
 International Institute for Environment and Development, ‘Land grabbing’: is conservation part of the problem or the solution?, September 2013. Online. Available at: <https://pubs.iied.org/pdfs/17166IIED.pdf>  
 Global Witness, Defenders of the Earth - Global killings of land and environmental defenders in 2016, 2017. Online. Available at: [https://www.globalwitness.org/documents/19122/Defenders\\_of\\_the\\_earth\\_report.pdf.pdf](https://www.globalwitness.org/documents/19122/Defenders_of_the_earth_report.pdf.pdf)  
 Carbon Trade Watch, A tree for a fish, December 2014. Online. Available at: [http://www.carbontradewatch.org/downloads/publications/CTW\\_A\\_Tree\\_for\\_a\\_Fish-EN.pdf](http://www.carbontradewatch.org/downloads/publications/CTW_A_Tree_for_a_Fish-EN.pdf)

<sup>157</sup> Tricarico Antonio, The Coming Financial Enclosure Of The Commons, Counter Currents. Online. Available at: <http://www.countercurrents.org/2016/08/22/the-coming-financial-enclosure-of-the-commons/>

<sup>158</sup> Daly, Farley, supra

*introduced, as well as the scarcity of the habitats required.*<sup>159</sup>

As habitat banking is an offset-based scheme and not a cap-and-trade one, offset creation is in theory unlimited. In practice, however, **available land for offset projects is limited** – and likely to grow scarcer in the future – **and therefore vulnerable to speculative bubbles**. The fact that offsetting is not like-for-like and that credits can be created before debits further opens the door to land speculation.

Obviously for these risks to materialise, habitat banking would have to be made mandatory on a big enough scale. This is unlikely to happen in the short term but is a **realistic enough prospect over the next decade to warrant consideration and adequate planning**. Potential developments in EU No Net Loss policies, UN Land Degradation policies and China's natural capital policies should go hand in hand with parallel investigations into and prevention of related financial stability risks.

#### **4.1 High scientific and regulatory uncertainty, combined with incomplete scientific knowledge and weak valuation methodologies, creates a high risk of market failure and abrupt loss of investor confidence.**

As discussed earlier, ecosystems exhibit highly complex, dynamic, and nonlinear behaviour that may include the presence of abrupt, irreversible thresholds, the distance to which is unknown. Compounding our uncertainty, time lags between the loss of an ecosystem or species and the noticeable loss of services may be greater than a human lifespan. Our knowledge of ecosystem functions is also plagued by ignorance and uncertainty. **This high uncertainty and incomplete knowledge translate into highly uncertain valuations, which are vulnerable to new scientific discoveries, unexpected ecosystem reactions and cliff effects in losses of biodiversity.**

**The artificial unbundling and selective pricing of only some ecosystem services, the ignorance of interdependencies and weak valuation methodologies further increase the risk of abrupt price changes.** The difficulty of calculating additionality may also incentive delegating due diligence to third-parties, with related risks of **indiscriminate fire-sales in times of stress**.

**The hybrid nature of habitat banking also creates a high regulatory risk, exposing it to political interference and potentially abrupt changes in market rules**, in turn impacting prices. Markets created by regulations are indeed subject to regular reviews of said regulations; the higher regulatory uncertainty is also necessary to integrate into market rules new scientific findings about ecosystem functioning and biodiversity loss, such as crossing a critical threshold.

As a recent example of regulatory uncertainty, the market briefly priced 2024 carbon futures contracts at around EUR 5.5 t/CO<sub>2</sub>, before the expected reform of the EU ETS phase IV led to a jump in prices over EUR 25.<sup>160</sup> As another example, a study on US mitigation banking lists amongst the risks facing entrepreneurs and regulators the risks of

<sup>159</sup> ICF GHK, Exploring potential demand for and supply of habitat banking in the EU and appropriate design elements for a habitat banking scheme – Annexes submitted to DG Environment, January 2013. Online. Available at: [http://ec.europa.eu/environment/enveco/taxation/pdf/Habitat\\_banking\\_annexes.pdf](http://ec.europa.eu/environment/enveco/taxation/pdf/Habitat_banking_annexes.pdf)

<sup>160</sup> EEX, European Emission Allowances Futures, March 2019. Online. Available at: <https://www.eex.com/en/market-data/environmental-markets/derivatives-market/european-emission-allowances-futures#/2019/03/27>



rules' changes on what must be offset, the risks of geographic service area changes after arrangements have been agreed upon that could threaten the integrity of the industry and its financial soundness, and uneven enforcement of the rules across areas.<sup>161</sup>

**The much higher scientific and regulatory uncertainty in habitat banking compared to traditional financial markets is a cause for concern from a financial stability perspective.** While financial markets are designed to handle risk – defined as a type of uncertainty where all the outcomes and their related probabilities of occurrence are known – they are not able to handle pure uncertainty and ignorance.<sup>162</sup> As a result, **this very high uncertainty is likely to translate into highly uncertain valuations, subject to abrupt changes in market rules and prices and losses of investor confidence.**

According to the BIS, *'assets with a higher degree of market uncertainty are more liable to sudden and unexpected shocks. Investors and regulators have to treat exposures to these assets with a higher degree of caution and request adequate uncertainty premiums on top of risk premiums. (...) An investment strategy based on maximizing profit with respect to market risks naturally omits market uncertainty. So do public authorities that regulate and supervise the markets on the basis of risks. As a consequence, the financial system is liable to the build-up of unrecognized and unmanaged market uncertainty in good times and can suddenly fall apart leaving the stakeholders of the socio-economic system guessing "what went wrong?"'*<sup>163</sup>

The decision to only consider and value certain ecosystem services while ignoring others, to artificially unbundle services and not fully account for interdependencies means that **internalising environmental externalities via habitat banking is likely to create new externalities and the potential build-up of unmonitored risks. In finance, this is called a basis risk:** you purchase an insurance against adverse price fluctuations and the insurance price is supposed to move in an opposite and equal direction to that of the asset being insured. If, however, the insurance does not perfectly cover your risk, you are exposed to a residual risk called basis risk: the risk that the insurance price might not move in normal, steady correlation with the price of the underlying asset, and that this fluctuation in the basis may negate the effectiveness of the hedging strategy.

Beyond the obvious environmental integrity issues attached to a mismatch between the environmental degradation and the offset project, unmonitored basis risks can also generate unforeseen and substantial potential losses. This could for example translate into sudden unexpected losses of biodiversity and a significant repricing of all related or similar offset projects.

The high interdependency of ecosystem services where different elements depend upon each other has other interesting consequences: **if ecosystem interdependency was comprehensively taken into account, ecosystem services prices would be interconnected by a far more complex web of mutual dependencies than traditional financial assets. Not only is interconnectedness a well-known factor**

<sup>161</sup> Barrett Kelli, Demystifying wetland mitigation risks for investors, GreenBiz, February 2014. Online. Available at: <https://www.greenbiz.com/blog/2014/02/03/new-paper-demystifies-wetland-mitigation-risks>

<sup>162</sup> Pure uncertainty occurs when we know all the possible outcomes but cannot assign meaningful probabilities to them. Ignorance or absolute uncertainty occurs when we do not even know the range of possible outcomes.

<sup>163</sup> Slovik Patrick, Market uncertainty and market instability, in Irving Fisher Committee, Proceedings of the IFC Conference on „Initiatives to address data gaps revealed by the financial crisis“, ECONPAPERS, 430-435, August 2010. Online. Available at: <https://www.bis.org/ifc/events/5ifcconf/slovik.pdf>

**of systemic risk, but this would also make ecosystem markets much less cost-effective than traditional markets.** In such systems everything is indeed connected to everything else. How then can we value one component of such a system when a change in that component will have ripple effects throughout the system? To take a simple analogy, pricing the value of one ecosystem service taking into account the web of interdependencies (and assuming that all related ecosystem services are priced) would be equivalent to having to reprice all the stocks in a given market in order to be able to calculate the price of one particular stock. **The choice to value only some ecosystem services and not take into account comprehensively interdependencies greatly improves the cost-effectiveness of the market, but at the cost of environmental integrity and of the aforementioned basis risk / the creation of new externalities.**

**Interdependencies also create path dependency in prices.** The value of a natural habitats generally increases when other habitats are in the vicinity,<sup>164</sup> as species travel between different habitats and if the habitats become too remote or isolated from others, they lose in biodiversity value. As a result, market decisions on one land may change the value of neighbouring lands. Let's take the case of two connected habitats with different owners. Each habitat is valued EUR 10 individually, and there is an additional EUR 10 for connectivity. The first of the two sites to be destroyed or displaced destroys the connectivity value and is therefore more costly to destroy or displace than the second one. In order to assess the cost of compensating for the destruction of either site, you need to know if it is the first one or the second one of the areas to be displaced. **Such path dependency means that the order of trading matters – modelling prices would require making assumptions about the intentions of neighbouring agents,** it may also generate undesirable incentives<sup>165</sup> and lead to suboptimal biodiversity outcomes if left to the markets.

**Implementing habitat banking on a European scale may also generate cross-border issues.** Offsetting environmental destruction in one Member State by the creation of a habitat in another may prove politically difficult in times of tensions. As an example, during economic or political crises pensioners from Northern Europe may become reluctant to invest their savings in offset projects taking place in the UK or Greece, with potential impacts on asset allocation and prices.

#### **4.2 Biodiversity as an asset class<sup>166</sup> could foster subprime offsets, procyclicality, and create a significant risk of speculative bubbles on land ownership and contagion to other asset classes. The contagion channels would transmit the high uncertainty of habitat banking prices to other markets.**

Let us imagine the following hypothetical scenario: we are 7 years from now, habitat banking is now mandatory in Europe and China, and required to obtain infrastructure loans from multilateral development banks. As population continues to grow and we have

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<sup>164</sup> Hartig Florian, and Drechsler Martin, Stay by Thy Neighbor? Social Organization Determines the Efficiency of Biodiversity Markets with Spatial Incentives, *Ecological Complexity* 7:1, 91-99, March 2010. Online. Available at: [https://www.researchgate.net/publication/222681301\\_Stay\\_by\\_thy\\_neighbor\\_Social\\_organization\\_determines\\_the\\_efficiency\\_of\\_biodiversity\\_markets\\_with\\_spatial\\_incentives](https://www.researchgate.net/publication/222681301_Stay_by_thy_neighbor_Social_organization_determines_the_efficiency_of_biodiversity_markets_with_spatial_incentives)

<sup>165</sup> It may create a free rider problem, for example where agents try to induce their neighbour to make the first move towards conservation so that they can capture a higher value for conversion.

<sup>166</sup> With habitat banking features such as not like-for-like and the allowance to issue credits before debits.

maintained our economic model, real estate and infrastructure development continues at a rapid pace and the cheapest land available for offset projects has already been purchased.

Most institutional investors have started to invest in biodiversity offset projects, either via green bonds, new sustainable finance indices, commodity indices or through securitisations of offset projects' future cash flows. They are attracted by the relatively high returns and low correlation of this new asset class. Capital guaranteed structured products whose return is linked to offset credits are also popular with retail investors thanks to their Ecolabel. The relatively large profit margins of this new asset class combined with investors' appetite have made biodiversity one of the most profitable commodities, attracting in turn the interest of hedge funds and banks.

**Competition for and speculation on land start to resemble real estate bubbles**, and some start to worry that we are already entering bubble territory. Investors are a bit more nervous than in real estate, due to the much more uncertain valuations of ecosystem services and **rising doubts about the environmental integrity of third-party green ratings and subcontracted due diligence**: should these doubts persist, this could lead to a severe repricing of land from its offset value to its agricultural or other alternative uses value. They also fear a **political backlash as agriculture is being progressively priced out** of Europe.

In addition, in order to feed the demand from investors, new offset projects of lower quality and with a higher risk of not being approved are being launched. Some call them **subprime offsets**. Lack of available land also leads to structured credit products synthetically replicating the pay-off of biodiversity offset projects.

So far, there have been only a few cases of disputes over settlements of derivatives instruments linked to habitat banking: unclear valuation methodologies have led to disagreements over whether trigger events happened and some accusations of market manipulation have been made, reminiscent of past disputes over credit default swap (CDS) contracts.<sup>167</sup>

Regulators start to be nervous, as **thanks to a new green supporting factor, less regulatory capital is required to hold these products**. As a result, European banks' solvency has declined as sustainable finance was growing. Regulators know that should the market turn, **the shock could spread rapidly to other markets through the usual contagion channels: indices mixing biodiversity credits with other commodities, securitisations of offset credits that spread the risk far and wide, and traders exiting trades in other asset classes to lock in some gains, in order to compensate for their losses on offsets**.<sup>168</sup> Such channels could transmit very quickly the high uncertainty of biodiversity offset prices to other asset classes and the wider economy.

As happened with commodity derivatives, **biodiversity as an asset class has also attracted a new type of speculators, trend-following index investors** whose insensitivity to prices amplifies market shocks.<sup>169</sup> The reaction of the new deep learning

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<sup>167</sup> The Economist, Conflicts in the credit-derivatives market threaten to undermine it - A ruling on the exact meaning of a complex contract surprises markets, January 2019. Online: <https://www.economist.com/finance-and-economics/2019/02/02/conflicts-in-the-credit-derivatives-market-threaten-to-undermine-it>

<sup>168</sup> The mere fact of considering biodiversity as an asset class has made traders look at it from the prism of so-called risk appetite and implicitly correlates it with other major asset classes in times of crisis.

<sup>169</sup> See Hache, *supra*

algorithmic funds is however unpredictable.

The habitat banking proposal had foreseen that, just like the price volatility of the EU ETS is correlated with global oil prices, *‘it may be that habitat credits will be similarly correlated to land prices, or world food prices. However, **habitats, land and food markets are likely to be subject to greater market failures (e.g. seasonality, fewer traders) than EU CO2 and global oil markets.** The EU ETS has also been able to adjust allocations over time (through allocations rounds), learning from experience and gradually altering performance targets. There is room to do this with CO2 emissions because they are fungible over time. Biodiversity does not share this quality, as losses can be irreversible.’*<sup>170</sup> Through commodity indices, a shock affecting habitat credits could impact not only land prices but also global agricultural commodity prices.

In addition, regulators know that **biodiversity offsetting is procyclical**: demand for offsets and thus credit prices is correlated with real estate development and global growth, potentially amplifying the financial impact of construction boom and bust cycles.

EU institutions hold an emergency meeting to debate whether to modify the rules of the market, and there is pressure on central banks to intervene in order to save big European private pension funds from significant losses.

**Does any of it sound familiar? While this scenario is obviously highly hypothetical, it highlights why regulators should monitor developments** in this area in order to be able to prevent rather than cure any future potential issue.

#### 4.3 Mis-selling and moral hazard

Similar to the risk described for carbon credits, inappropriate transfers of risks to retail investors must be prevented. Inappropriate transfers of risk could for example include offset project developers that repackage and sell the risk of not getting approval for their projects, infrastructure and real estate developers that transfer the risk of non-compliance, and the risk of reassessment of the number of offsets required.

As governments bear the ultimate responsibility for biodiversity loss, this may incentivise the private sector to take on excessive risks, under the assumption that they may not bear the consequences of failure: offset projects may fail to address loss of biodiversity, and investors in offset projects may suffer substantial losses. If said investors are politically sensitive, as are retail investors and pension funds, this could in turn lead to a political temptation to bail them out. There is therefore a double moral hazard, both environmental and financial, that must be minimised.

## 5. AN UNEXPECTED COMEBACK

The 2010 original publication of the proposal for habitat banking was followed by a 2012 study by the European Commission on the *‘Innovative Use of Financial Instruments and Approaches to Enhance Private Sector Finance of Biodiversity’*, a 2013 study *‘Exploring potential Demand for and Supply of Habitat Banking in the EU and appropriate design*

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<sup>170</sup> Eftic, supra



*elements for a Habitat Banking Scheme*<sup>171</sup> and a 2013 study on *'Policy Options for an EU No Net Loss Initiative*.<sup>172</sup>

In 2014, the European Commission launched a consultation on a future initiative called no net loss, related to action 7 of the biodiversity strategy. Under its commitment to Better Regulation<sup>173</sup> aimed at improving the quality of EU policy making, the Commission also crucially launched a fitness test of the EU Habitats and Birds Directive that pushed for the introduction of habitat banking. The resulting public outcry mobilised over half a million people in protest<sup>174</sup> and led the Commission to conclude in 2016 that the directives remained fit for purpose but in need of better implementation.<sup>175</sup>

While some feared that this conclusion could still leave the door open to future deregulation,<sup>176</sup> many thought that habitat banking had been abandoned.

However, an action plan for nature, people and the economy was published in 2017, proposing 15 actions to improve the implementation of the Birds and Habitats Directives: *'We are laying a solid foundation for reconciling biodiversity protection and economic activities, including investment in our natural capital.*<sup>177</sup> Actions included **new guidance on integrating ecosystem services into decision-making and stimulating private sector investment in nature projects through the Natural Capital Financing Facility**

A partnership between the European Commission and the European Investment Bank, the Natural Capital Financing Facility (NCFF) is a EUR 400 million initiative intended to better protect Europe's natural capital<sup>178</sup>. The NCFF provides *'innovative financial solutions to support bankable projects, which are or have the potential to be revenue-generating or cost saving, promoting the conservation, restoration, management and enhancement of natural capital for biodiversity & ecosystem services and climate adaptation benefits. (...) The primary aim of the NCFF is to **provide a proof of concept to demonstrate that biodiversity & ecosystem services and nature-based climate adaptation projects can be financed through innovative and sustainable market-based mechanisms.** The*

171 European Commission - Environment, Environmental economics - Support to sectoral policies: Biodiversity, June 2016. Online. Available at: <http://ec.europa.eu/environment/enveco/biodiversity/>

172 Institute for European Environmental Policy (IEEP), Policy Options for an EU No Net Loss Initiative – Final Report, January 2014. Online. Available at: <http://ec.europa.eu/environment/nature/biodiversity/nnl/pdf/Policy%20Options.pdf>

173 European Commission, Better regulation. Online. Available at: [https://ec.europa.eu/commission/priorities/democratic-change/better-regulation\\_en](https://ec.europa.eu/commission/priorities/democratic-change/better-regulation_en)

174 Neslen Arthur, Conservationists declare victory for wildlife as EU saves nature directives, The Guardian, December 2016. Online. Available at: <https://www.theguardian.com/environment/2016/dec/07/eu-nature-directives-birds-habitats-directives>

Morgan Sam, EU decides against tinkering with flagship nature directives, Euractiv, December 2016. Online. Available at: <https://www.euractiv.com/section/climate-environment/news/eu-decides-against-tinkering-with-flagship-nature-directives/>

Corporate Europe Observatory, No to Biodiversity Offsetting!, November 2013. Online. Available at: <https://corporateeurope.org/climate-and-energy/2013/11/no-biodiversity-offsetting>

175 European Commission - Environment, Fitness Check of the Birds and Habitats Directives, April 2017. Online. Available at: [http://ec.europa.eu/environment/nature/legislation/fitness\\_check/index\\_en.htm](http://ec.europa.eu/environment/nature/legislation/fitness_check/index_en.htm)

176 ClientEarth, Commission finds nature directives fit for purpose but in need of better implementation, March 2017. Online. Available at: <https://www.clientearth.org/commission-finds-nature-directives-fit-purpose-need-better-implementation/>

177 European Commission - Press release, New Action Plan to help regions defend biodiversity and reap the economic benefits of nature protection, Brussels, 27 April 2017. Online. Available at: [http://europa.eu/rapid/press-release\\_IP-17-1112\\_en.htm](http://europa.eu/rapid/press-release_IP-17-1112_en.htm)

178 European Investment Bank, Successful roll-out of EUR 400m natural capital initiative supporting conservation across Europe, May 2018. Online. Available at: <https://www.eib.org/en/infocentre/press/releases/all/2018/2018-128-successful-roll-out-of-eur-400m-natural-capital-initiative-supporting-conservation-across-europe.htm>

*ultimate objective is to demonstrate to investors their attractiveness for the longer term, in order to develop a sustainable flow of capital towards those projects and achieve scale.*<sup>179</sup>

The NCFF started as a 3 to 4 year pilot phase. Target projects include payments for ecosystem services and biodiversity offsets. The NCFF guide to applicants explained that the **'establishment of habitat banks requires substantial investments in acquiring rights to land and in undertaking habitat restoration and management activities. Revenues are normally generated through the sale of conservation credits, as measurable biodiversity benefits are acquired over time.'**<sup>180</sup>

A first loan agreement backed by the natural capital financing facility was signed in April 2017, called **bank on nature**.<sup>181</sup> The loan was made to Rewilding Europe Capital, a provider of loans to SMEs involved among other things in natural habitat extension.

The Natural Capital Facility has been described as the **main tool within the EU LIFE programme to promote biodiversity offsetting and habitat banking**. Some civil society organisations have expressed serious concerns about this programme and its one-size-fits-all approach focused on profitability.<sup>182</sup>

Beyond the NCFF, a number of related initiatives are underway:

- In October 2018 the World Bank launched its environmental and social framework<sup>183</sup> that will apply to all new World Bank investment project financing. Standards include assessing environmental and social impacts, adopting a mitigation hierarchy and *'where significant residual impacts remain, compensate for or offset them, where technically and financially feasible.'* Borrowers *'will avoid adverse impacts on biodiversity and habitats. When avoidance of adverse impacts is not possible, the Borrower will implement measures to minimize adverse impacts and restore biodiversity in accordance with the mitigation hierarchy.'* Likewise, measures to improve resource efficiency and pollution prevention include water consumption offsets. *'All financial institutions receiving support from the World Bank will have to apply the requirements of this framework when giving loans or guarantees.'* In effect, **the World Bank has introduced mandatory biodiversity offsetting as a condition to receive financial support.**

179 European Investment Bank, Natural Capital Financing Facility. Online. Available at: <http://ec.europa.eu/environment/biodiversity/business/assets/pdf/ncff.pdf> European Investment Bank, Natural Capital Financing Facility Boosting investment for biodiversity and nature-based adaptation to climate. Online. Available at: <https://www.eib.org/en/products/blending/ncff/index.htm>

180 ICF International, European Commission, European Investment Bank, Natural Capital Financing Facility: A Guide for Applicants, 2015. Online. Available at: [http://ec.europa.eu/environment/archives/life/funding/financial\\_instruments/documents/ncff\\_guide\\_applicants.pdf](http://ec.europa.eu/environment/archives/life/funding/financial_instruments/documents/ncff_guide_applicants.pdf)

181 European Investment Bank, European Commission, Rewilding Europe Capital, Bank On Nature: First loan agreement backed by Natural Capital Financing Facility signed in Brussels, April 2017. Online. Available at: [https://www.eib.org/attachments/press/bankonnature\\_memo-final.pdf](https://www.eib.org/attachments/press/bankonnature_memo-final.pdf) Rewilding Europe, Bank on Nature: European Investment Bank boosts Rewilding Europe Capital, April 2017. Online. Available at: <https://rewildingeurope.com/news/bank-on-nature-european-investment-bank-boosts-rewilding-europe-capital/>

182 Carbon trade watch, The Natural Capital Finance Facility: A window into the green economy, December 2014. Online. Available at: <http://www.carbontradewatch.org/publications/the-natural-capital-finance-facility-a-window-into-the-green-economy.html>

183 The World Bank, Environmental and Social Framework. Online. Available at: <https://www.worldbank.org/en/projects-operations/environmental-and-social-framework> The World Bank, Environmental and Social Standards (ESS). Online. Available at: <https://www.worldbank.org/en/projects-operations/environmental-and-social-framework/brief/environmental-and-social-standards#ess6>

- On 4-5 July 2018 the **first Land Degradation Neutrality forum** took place in Seoul.<sup>184</sup> In November, a coalition of 200 individuals from conservation organisations, governments, companies and financial institutions joined in a **‘Call to Action’ for greater efforts to secure ‘Biodiversity Net Gain’**.<sup>185</sup> This call echoes similar views put forward by the Natural Capital Coalition, a coalition of almost 300 business, finance and civil society organisations including Credit Suisse, Coca-Cola, Dow Chemical, the European Commission, Nestle, Suez, Repsol, Shell, Total, the UN Environmental Programme, the World Bank and WWF.<sup>186</sup>

## 6. BETTER THAN NOTHING?

### 6.1 Can habitat banking be fixed?

If we add up the measurement issues, the selective pricing of only some ecosystem services, the valuation issues, and traded prices based on speculation, we arrive at **a tentative market for a poorly defined underlying asset that is certainly not biodiversity**, and whose prices involve layer upon layer of uncertainty, bias and subjectivity, resulting in an arguably meaningless figure.

This market is in addition **characterised by inherent and unavoidable trade-offs** between market viability, liquidity and low transaction costs on one hand, and environmental integrity on the other. These inherent trade-offs mean that even if it were possible to address the environmental flaws – which is not possible for some of them – it would get in the way of creating a functioning and profitable market and thus it is unlikely that the issues would be addressed.

Finally, **the inexistence of the price signal, the inability to calculate additionality and the lack of evidence of recreability of ecosystems lead to the inescapable conclusion that habitat banking markets will never be able to meet their environmental objectives and should not be created**. This is not a question of being for or against markets, but merely of acknowledging that while markets provide many benefits, there are some tasks such as addressing environmental issues for which they are ill-suited.

In practical terms, this means that **mitigation hierarchies should replace the ‘offsetting’ step by ‘cancel the development project or move it elsewhere.’ It also means that market-based solutions should not be promoted as part of the solution to biodiversity loss and should not be included in sustainable finance**.

**The same conclusions apply to any comparable market blueprint for other ecosystem services** relying on similar methodologies. Environmental accounting in monetary terms based on similar methodologies also shares similar flaws.

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184 United Nations - Convention to Combat Desertification, First Global Land Degradation Neutrality Forum, 2018. Online. Available at: <https://www.unccd.int/news-events/first-global-land-degradation-neutrality-forum>

185 Natural Capital Coalition, More than 200 Governments, Business, Financial Institutions & NGOs Join Call to Action for Biodiversity “Net Gain”, November 2018. Online. Available at: <https://naturalcapitalcoalition.org/more-than-200-governments-business-financial-institutions-ngos-join-call-to-action-for-biodiversity-net-gain/> Forest Trends, Call-to-Action-Signatories, November 2018. Online. Available at: <https://www.forest-trends.org/wp-content/uploads/2018/11/Call-to-Action-Signatories-21-11-18-1.pdf>

186 Natural Capital Coalition, No One Wants To Put A Price On Nature, But We Do Need A Better Understanding Of Its Value, August 2018. Online. Available at: <https://naturalcapitalcoalition.org/no-one-wants-to-put-a-price-on-nature-but-we-do-need-a-better-understanding-of-its-value/>

The potential disruption caused by loss of biodiversity is on a scale unimaginable. The potential economic, social and geopolitical ripple effects of reaching a critical biodiversity threshold cannot be overstated, from food shortages to tens of millions of new environmental migrants. In this respect, **creating a habitat banking market would entrench the status quo, while providing the unwarranted illusion that the issue is being addressed and under control.** It would also divert limited and precious political momentum from more robust alternatives and would therefore be worse than nothing.

## 6.2 Why do we continue working on these initiatives, knowing all the issues?

### Better than nothing?

An oft heard comment is that biodiversity offsetting may not be perfect but it is better than nothing. As a prominent think tank put it, *'compensation projects are strongly criticized for their ecological deficiencies. Such changes would, of course, pose a risk, but it is likely that, compared to the current situation, they could represent a progression.'*<sup>187</sup> Such a statement does not dispute the environmental deficiencies of compensation projects, and merely attempts at justifying them by saying that they are better than nothing. Yet, as political momentum to focus on an issue is a limited commodity, working on such projects diverts precious political attention from more robust alternative solutions. Let me say that again because there is a widely shared misconception on this topic stemming from a lack of familiarity with policy processes: **weak policy tools do not come 'in addition to' other policy tools, they come 'instead'**: once weak policy tools are in place, the issue is deemed to be addressed and the political focus shifts to other topics. Refraining from implementing weak policy tools on the other hand would create the political space to implement robust solutions. Market-based solutions have also been shown to be instrumentalised to dismantle existing regulations. **This makes offsetting effectively worse than nothing.**

Secondly, **the question itself, of whether they are better than nothing is a moot one, as there could not be 'nothing'**: the growing awareness among citizens of the issue means that it would be politically untenable not to act in any way. If offsetting wasn't there, there would therefore be alternative solutions. As a result, the suggestion that it is better than nothing is an extremely weak justification.

### Asking the wrong question

Proponents of market-based solutions seem to rely on the neo-classical / environmental economics framework. As a result, different questions are likely to be asked than under different frameworks such as ecological economics, leading to different answers. As an example, **asking how can we make market-based solutions work better for the environment leads to a different policy response than asking whether market-based solutions are more or less effective than alternative policy tools.** The former is a narrower question based on a higher set of assumptions that does not even consider alternative policy tools. It can not possibly lead to the conclusion that market-based solutions are inadequate, as the framing of the question does not consider this possibility.

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<sup>187</sup> Laurans Yann, Colsaet Alice, Saujot Mathieu, Zéro artificialisation nette, à quelles conditions ?, Institut du Développement Durable et des Relations Internationales (IDDRI), July 2018. Online. Available at: <https://www.iddri.org/fr/publications-et-evenements/billet-de-blog/zero-artificialisation-nette-queles-conditions>



### An environmental failure and a political success

The green economy framing typically derives from neo-classical economics: based on the belief that *‘all global problems have a common basis, namely the misallocation of capital,’*<sup>188</sup> the green economy is defined as *‘one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. It is low carbon, resource efficient, and socially inclusive’* (UNEP, 2011). Its broad political support is arguably rooted in the misguided hope that all competing interests will get what they want. By promising simultaneously unlimited growth, environmental protection and social fairness, such an approach obscures the trade-offs to be made, depoliticizes the issue, favours incremental change and arguably entrenches the status quo.

Belief in the win-win narrative promoted by the green economy might be explained by several factors: disillusionment after decades of failure, lack of knowledge about financial markets and greater availability of funding for civil society organisations supporting the green economy may explain the co-optation of many NGOs.<sup>189</sup> **Lobbying by entrenched private economic interests and fears for competitiveness, growth and jobs may explain the support of some policy makers.**

To get a sense of the importance of private interests’ lobbying efforts, according to a recent study, oil and gas groups spent more than \$1bn since the Paris Agreement lobbying to undermine the climate fight.<sup>190</sup> The economic sectors potentially impacted by biodiversity offsetting and its alternatives include real estate, infrastructure, mining, oil and gas, agriculture and finance. This gives an idea of the economic interests at stake and might explain in no small part the continued support for these policies.

The dynamic is arguably similar in many respects to that of climate change policies, where disputes over cost sharing and the fact that market-based policies are both an environmental failure and a political success explain much of the continued support for current policies.

The underlying issue is the incredible magnitude of the economic, social and geopolitical implications of the risks and related required changes,<sup>191</sup> combined with a desire to minimize changes to the way of life of high-income countries and a perception of

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188 Heinrich Böll Stiftung, Critique of the Green Economy - Toward Social and Environmental Equity, 2012. Online. Available at: [https://us.boell.org/sites/default/files/downloads/Critique\\_of\\_the\\_Green\\_Economy.pdf](https://us.boell.org/sites/default/files/downloads/Critique_of_the_Green_Economy.pdf)

189 Carbon Trade Watch, A tree for a fish, Dec 2014, box page 4 ‘the role of NGOs for conservation’. Online. Available at: [http://www.carbontradewatch.org/downloads/publications/CTW\\_A\\_Tree\\_for\\_a\\_Fish-EN.pdf](http://www.carbontradewatch.org/downloads/publications/CTW_A_Tree_for_a_Fish-EN.pdf)

190 Forbes, Mixed Messages From Oil And Gas Sector As \$1 Billion Lobbying Effort Undermines Climate Fight, April 2019. Online. Available at: <https://www.forbes.com/sites/mikescott/2019/04/02/mixed-messages-from-oil-and-gas-sector-as-1bn-lobbying-effort-undermines-climate-fight/#f22f44219bee> also see Hauser, European Union Lobbying Post-Lisbon: An Economic Analysis, Berkeley Journal of International Law, 2011. Online. Available at: <https://scholarship.law.berkeley.edu/cgi/viewcontent.cgi?article=1411&context=bjil>

Corporate Europe Observatory, Corporate lobbying influence over the Council of the EU, Dec 2017. Online. Available at: <https://corporateeurope.org/power-lobbies/2017/12/corporate-lobbying-influence-over-council-eu> Transparency International, Lobbying en Europe : l’absence de régulation laisse la porte ouverte à la corruption, April 2015. Online. Available at: [https://www.transparency.org/news/pressrelease/lobbying\\_en\\_europe\\_labsence\\_de\\_regulation\\_laisse\\_la\\_porte\\_ouverte\\_a\\_la\\_corr](https://www.transparency.org/news/pressrelease/lobbying_en_europe_labsence_de_regulation_laisse_la_porte_ouverte_a_la_corr)

191 Cagiagli Laura, Global Risks Report 2019: three of top five are related to climate, Foresight, January 2019. Online. Available at: <https://www.climateforesight.eu/global-policy/global-risks-report-2019-environment-related-risks-account-for-three-of-the-top-five-risks-by-likelihood-and-four-by-impact/> Watts Jonathan, Stop biodiversity loss or we could face our own extinction, warns UN, The Guardian, November 2018. Online. Available at: <https://www.theguardian.com/environment/2018/nov/03/stop-biodiversity-loss-or-we-could-face-our-own-extinction-warns-un>

differentiated impact.<sup>192</sup>

Psychology has long evidenced that **tribalism and group identity outweigh facts,**<sup>193</sup> **especially at times of fear for the future;** this is now exponentially compounded by the filter bubbles of social media. As a result, **we tend to discard easily inconvenient facts when they are not shared by the groups we identify with.**

As already discussed in our previous paper, **acknowledging that limits to natural resources may create limits to growth would also open the politically fraught question of distribution** that most elected officials are reluctant to address: *'limits to growth removes the promise of a share of a bigger pie as an alternative to curbing inequalities.'*<sup>194</sup>

As a result, policy tools that are weakly effective and foster incremental change while providing a perception of potential future effectiveness 'once the price is right' offer precious political flexibility. They enable to reconcile in appearance diverging interests without having to acknowledge the politically difficult trade-offs being made. In this respect, **biodiversity offset markets are likely to prove both an environmental failure and a political success for a time, as is already the case with carbon offset markets.**

## 7. THE ALTERNATIVE

As discussed earlier, traditional environmental regulations have a track record of success, from addressing the hole in the ozone layer to the issue of asbestos. The issue was never the lack of effectiveness of these policies but rather the lack of political appetite to set up more or enforce existing ones with rigour. Changing policy tools from market-based approaches to binding regulations would thus give us a much better chance of reaching our environmental objectives.

Binding environmental regulations aimed at curbing biodiversity loss would have several marked advantages over market-based pricing mechanisms:

- ▣ They would **not require impossible trade-offs between environmental effectiveness and economic viability;**
- ▣ They would **accommodate much better incommensurable values** instead of reducing everything to cost-benefit analyses. They would also accommodate more easily our changing preferences;

192 'The consequences of biodiversity loss and ecosystem disruption are often harshest for the poor, as they depend on local ecosystem services for their livelihoods' UNEP Convention on Biological Diversity press release, 2006. Online. Available at: <https://www.cbd.int/doc/press/2006/pr-2006-11-06-ssc-en.pdf>

Business Insider, Silicon Valley's ultra wealthy are reportedly buying up \$8 million doomsday bunkers in New Zealand, September 2018. Online. Available at: <https://www.businessinsider.fr/us/silicon-valley-moguls-8-million-doomsday-bunkers-new-zealand-2018-9>

193 Chua Amy, Tribal World: Group Identity Is All, Foreign Affairs, July/August 2018. Online. Available at: <https://www.foreignaffairs.com/articles/world/2018-06-14/tribal-world> Levine Saul, Belonging Is Our Blessing, Tribalism Is our Burden, Psychology Today, February 2018. Online. Available at: <https://www.psychologytoday.com/us/blog/our-emotional-footprint/201802/belonging-is-our-blessing-tribalism-is-our-burden>

Mason Liliana, Kahan Dan, Transcript: Tribal Psychology, You are not so smart. Online. Available at: <https://youarenotsosmart.com/transcripts/transcript-tribal-psychology/>

194 Daly, Farley, supra

- They would **accommodate much better scientific uncertainty and our incomplete scientific knowledge**, in that adjusting the regulations for new scientific discoveries would be less economically disruptive than abruptly changing the rules governing already issued financial instruments;
- They would **require incomparably less fragile assumptions and weak methodologies**: among other things they would not require artificially unbundling ecosystem service, ignoring interdependencies and abstracting values from time and place, nor would they require using lower bounds of values as proxies for actual values and aggregating values from different methodologies. As a general rule, the policy tools that require the least amount of assumptions and oversimplifications are the soundest, and they should logically be favoured;
- They would **provide more certainty and ability to plan for the private sector**, thereby reducing the cost of the transition and potential adverse impacts on jobs. In addition, they would not be more coercive than current policies for a given amount of political will, as political willingness translates equally across policy tools;
- They would work, that is, provide **much more robust and stable policy incentives** to curb the loss of biodiversity than weak price signals and offset projects of debatable additionality. In turn, when political ambition picks up in the future in the wake of natural catastrophes, they could be tightened to suit our new ambitions. On the contrary, habitat banking markets will remain ineffective irrespective of the level of political ambition;
- They would **not foster the build-up of unmonitored risks** linked to the partial pricing of ecosystem services, incorrect assumptions of substitutability, debatable ability to offset and dubious additionality;
- They **would foster more innovation** by legislating for outcomes and pushing for structural change in high-income countries;
- They **could be implemented as fast as we wish**, only slowed down by our desire to phase-in the implementation in order to smooth the transition;
- They would **reduce potential financial stability risks linked to reaching critical biodiversity thresholds** and to creating new asset classes. They would also not create moral hazard;
- They would **make all finance sustainable with regards to biodiversity loss**. The risk-adjusted returns of all economic sectors and companies affecting biodiversity would automatically readjust, inducing an automatic shift of capital flows towards green sectors and companies.

In turn, this **puts into question the current political focus on 'changing finance' to address biodiversity loss and other environmental issues**. It argues instead for changing weak environmental regulations, which would in turn change finance. Once again, the political focus on sustainable finance can thus be understood as a choice to incentivise curbing biodiversity loss via financial regulation rather than induce it via environmental regulation.

While the benefits of traditional environmental regulations are mostly about effectiveness and cost, the objections are of a political nature: more robust environmental regulations

would probably face greater resistance from economic actors likely to be adversely impacted. They **would therefore inevitably open the question of cost sharing** between the different stakeholders, in order to get broad buy-in and achieve fairness. Just as with climate policies, this question is arguably the biggest hurdle to be addressed. It is widely understood that this question will have to be answered at some point, regardless of our policy choices. **The question is thus when, rather than if, we will have the political willingness to face it.**

Such policy debates about critical issues of public interest are arguably long overdue and welcome. However, a likely consequence is that, at least initially, such policies may not find the broad international support that less effective policies do. **This raises in turn the question of whether it is better to start acting now with robust policies and a lower number of countries – with a view to increase the number of countries over time, or with weak policy tools and broad international coalitions – hoping to change policy tools to increase ambition over time.** Given the track record and intractable issues of market-based solutions, the question needs to be asked, instead of leaving it as one of the many unspoken and unchallenged choices underlying our environmental policies.

As biodiversity loss continues and its consequences start to affect us in more visible ways over the coming decades, while biodiversity offset markets fail to address the issue, public pressure to act will increase and support for more effective policies is likely to grow. Therefore, **once again, the question can be understood as one of timing, as the sooner we act the less disruption we will face.**

This also incidentally challenges the claim of market proponents to be ‘pragmatic’ and ‘realistic’: taking into consideration the environmental, economic and political dimensions of the issue at hand, **pragmatism argues in favour of facing these questions sooner rather than later**, as the potential environmental, economic, social and geopolitical risks far exceed the marginal economic benefits of continuing to pursue doomed policies for a few more decades.

As the prominent economist Spash put it, *‘while market-based approaches may consider themselves to be more pragmatic than public conservation policies, their lack of accountability and robust foundations make them precisely less pragmatic.’*<sup>195</sup>

There seems to be little political appetite to put in place alternative more robust policy tools for now. Yet, as with climate policies, if markets on biodiversity were to be created, they might not last more than one or two decades: building evidence of their ineffectiveness while the loss of natural resources continues and starts to become visible would likely make them gradually become politically untenable.

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<sup>195</sup> Spash Clive L., *Terrible Economics, Ecosystems and Banking, Environmental Values* – The White Horse Press 20, 141-145, 2011. Online. Available at: [https://www.clivespash.org/wp-content/uploads/2015/04/Spash\\_TEEB\\_2011\\_EV\\_v20\\_no2\\_final.pdf](https://www.clivespash.org/wp-content/uploads/2015/04/Spash_TEEB_2011_EV_v20_no2_final.pdf)



## **C. TOMORROW'S MARKETS**

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## 1. NATURE AS AN ASSET CLASS

Until regulations are put in place mandating biodiversity offsetting and the compensation of the destruction of other ecosystem services, we are at the prehistory of nature as an asset class. Yet, some financial institutions already perceive the potential of this new market.

In a 2016 report titled ‘*Conservation finance – from niche to mainstream: the building of an institutional asset class*’,<sup>196</sup> Credit Suisse assessed that ‘*sustainable farmland, healthy forests, clean water and abundant habitat stand to become more valuable as the global population climbs to 9 billion by 2050. (...) Conservation finance, as this field is called, represents **an undeveloped, but emerging private sector investment opportunity of major proportion.** (...) Over time, conservation investments will be considered as traditional fixed-income, venture capital or alternative investments, which can easily fit in the portfolios of institutional, high-net-worth and even retail investors interested in large-scale, high impact ecosystem conservation. (...) The continuing disappearance of Earth’s last healthy ecosystems is sadly no longer news. What is news is **that saving these ecosystems is not only affordable, but profitable.** Nature must not be turned into a commodity, but rather into an asset treasured by the mainstream investment market.*’

The report estimated the **total estimated conservation finance investment potential to be around USD 200 – 400 billion between now and 2020**. The report noted that ‘*for institutional investors, the risk-return profile of a product outweighs any other characteristics. Low correlation with other asset classes helps ensure a diversification effect. The conservation impact of a product is generally of little importance.*’ The report noted as well that ‘**the continuous growth of the conservation finance market illustrates that attempts to monetize environmental externalities are slowly coming to fruition.**’

In 2015, Credit Suisse had already launched together with Althelia Ecosphere its first conservation investment product called Nature Conservation Notes.<sup>197</sup> The description explained that ‘*financial returns for the Notes’ investors are generated through the sale of sustainably certified commodities (...) and **revenues from payments for ecosystem services** (e.g., forest carbon credits, biodiversity). Positive social and environmental impacts are generated through the financing of community-based organisations, **biodiversity and water conservation**, as well as climate change mitigation.*’<sup>198</sup>

The note was named the ‘*2015 Sustainable Forestry Deal of the Year*’ by the leading news and analysis service Environmental Finance.

Other institutions are taking notice. In 2014 the CFA institute had published a report entitled ‘*Environmental Markets: A New Asset Class*’<sup>199</sup> in which it assessed that

196 Credit Suisse and McKinsey Center for Business and Environment, *Conservation finance – from niche to mainstream: the building of an institutional asset class*, 2016. Online. Available at: <https://www.credit-suisse.com/media/assets/corporate/docs/about-us/responsibility/banking/conservation-finance-en.pdf>

197 Althelia, Press Release: Althelia Ecosphere joins forces with Credit Suisse, launching the Nature Conservation Notes to accelerate private sector conservation finance for the preservation of ecosystems, 12 January 2015. Online. Available at: [https://althelia.com/wp-content/uploads/2015/01/AE\\_CS-150112\\_press-release\\_Note-launch-web.pdf](https://althelia.com/wp-content/uploads/2015/01/AE_CS-150112_press-release_Note-launch-web.pdf)

198 Crédit Suisse, *Nature conservation*. Online. Available at: <https://www.credit-suisse.com/ch/en/family-offices-und-hochvermoegende/philanthropie-und-nachhaltige-anlagen/nachhaltige-zukunft/naturschutz.html>

199 CFA Institute, *Environmental markets: a new asset class*, 2014. Online. Available at: <https://www.cfainstitute.org/en/research/foundation/2014/environmental-markets-a-new-asset-class>

**‘environmental asset classes are not a hope for tomorrow but a reality today. This new asset category promises to grow dramatically. Examples of environmental assets are rights to emit local and regional pollutants, such as sulfur dioxide and nitrogen oxide; rights to emit global pollutants, such as carbon dioxide; renewable energy credits; water quality and quantity rights; catastrophe and weather risk; and indices of sustainable corporate equities.’**

Other recent examples include a forestry bond whose investors can choose to have their coupon paid in cash or in carbon offset credits.<sup>200</sup> Investors who opt to receive the verified carbon units can either retire them to offset their carbon footprint or sell them in the offset market. The bond was issued by the International Finance Corporation, a member of the World Bank Group, and Bank of America Merrill Lynch, BNP Paribas and JP Morgan were lead placement agents for the deal.

2017 saw the launch of the **first Land Degradation Neutrality fund**.<sup>201</sup> The fund is managed by Mirova, an affiliate of Natixis Investment Managers dedicated to responsible investing, and invests in *‘sustainable land management and land restoration projects undertaken by the private sector worldwide.’*

2017 also saw the creation of a new European Green Securities Steering Committee<sup>202</sup> with the goal of promoting green securities market development in Europe. The committee has backing from the Climate Bonds Initiative (CBI) and the European Covered Bond Council (ECBC) with the support of the UNEP Inquiry.

In 2018, Paris Europlace published a report<sup>203</sup> entitled ‘Emergence of the Natural Capital & Biodiversity Asset Class’ as *‘part of its mission to make green and sustainable finance a driving force in developing the Paris Financial Center and positioning Paris as the leading financial centre on these issues.’* The report supports **‘the emergence of the Natural Capital asset class’** to protect biodiversity, restore damaged ecosystems and notes that *‘in the next years in France, we will be extremely well positioned to be a hub on Biodiversity issues, as France will take the Presidency of the G7 and will host major international events on the topic.’* In a recent interview, the French ambassador in charge of the environment concurred, highlighting the need for clear objectives at the 2020 conference on biodiversity, such as defining for example *‘the number of hectares of natural habitat or species to preserve, or the zero net loss of biodiversity proposed by NGOs.’*<sup>204</sup>

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200 Ali Hamza, IFC launches forestry bond that can pay its coupon using REDD+ credits, Environmental Finance, October 2016. Online. Available at: <https://www.environmental-finance.com/content/news/ifc-launches-forestry-bond-that-can-pay-its-coupon-using-redd-credits.html>

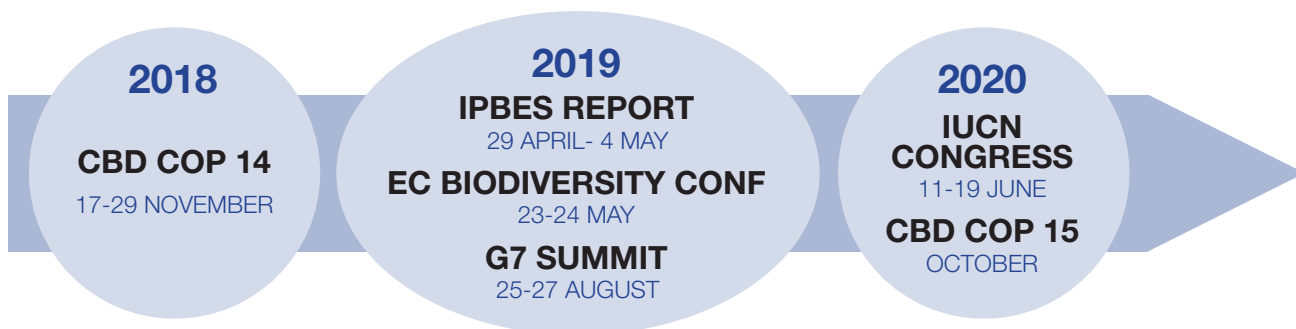
201 United Nation, Convention to combat desertification, The LDN Fund: An Impact Investment Fund for Land Degradation Neutrality. Online. Available at: <https://www.unccd.int/actions/impact-investment-fund-land-degradation-neutrality>

202 Kidney Sean, New EU Green Securities Steering Committee to Promote Climate Finance Opportunities, Climate Bonds Initiative, July 2017. Online. Available at: <https://www.climatebonds.net/2017/07/new-eu-green-securities-steering-committee-promote-climate-finance-opportunities>

203 Finance For Tomorrow by Paris Europlace, Emergence of the Natural Capital & Biodiversity Asset Class: Mapping Mapping of the French stakeholders, November 2018. Online. Available at: <https://financefortomorrow.com/en/2018/11/29/emergence-of-the-natural-capital-biodiversity-asset-class/>

204 ActuEnvironnement.com, Biodiversité : « Il faut fixer des objectifs simples pour réussir la mobilisation », February 2019. Online. Available at <https://www.actu-environnement.com/ae/news/Biodiversite-objectifs-simples-reussir-mobilisation-Yann-Wehring-32915.php4>





## 2. FORTHCOMING MARKETS

Three major new markets are likely to emerge over the next 5 years in Europe. It is therefore important to try and understand how they will be created, how they will work and what will be their likely environmental, economic and social impact.

### 2.1 Biodiversity offsetting

After the failed attempt at introducing habitat banking in the EU, work has continued in preparation of the future No Net Loss initiative, notably with the 2016 publication of a study ‘supporting the elaboration of the Impact Assessment for a future EU Initiative on No Net Loss of Biodiversity and Ecosystem Services’.<sup>205</sup> It concluded that ‘in the longer term mandatory offsetting with a wider scope than considered in this study (i.e. beyond development projects, so as to address agriculture, forestry and marine impacts) would be required to achieve the NNL objective.’ It also listed a number of legislative entry points to promote no net loss, such as revisions of the Common Agricultural Policy, the Environmental Liability and several other directives.

Proposed initiatives included developing an EU No Net Loss label, making EU infrastructure funding conditional upon minimising biodiversity damage, and **introducing mandatory EU requirements to offset losses to all biodiversity and ecosystem services after 2020.**

Other related initiatives are underway:

- On 1 November 2017 the Delegation of the European Union and Chinese authorities launched the new project ‘Natural Capital Accounting and Valuation of Ecosystem Services’ in Beijing. ‘This new three-year action will deepen bilateral collaboration on environmental policies. Its main objective is to **mainstream natural capital accounting and valuation of ecosystem services in data driven decision and policy making**, in order to influence policy-makers at national, regional and local level.’<sup>206</sup> France and China are also strengthening their exchanges ahead of the next Conference of the Parties of the Convention on Biological Diversity (COP15

<sup>205</sup> Institute for European Environmental Policy, Supporting the Elaboration of the Impact Assessment for a Future EU Initiative on No Net Loss of Biodiversity and Ecosystem Services – Final Report, April 2016. Online. Available at: [http://ec.europa.eu/environment/nature/biodiversity/nnl/pdf/NNL\\_impact\\_assessment\\_support\\_study.pdf](http://ec.europa.eu/environment/nature/biodiversity/nnl/pdf/NNL_impact_assessment_support_study.pdf)

<sup>206</sup> Delegation of the European Union to China, Press release: EU and China deepen collaboration on environmental policies and Natural Capital Accounting, 06 November 2017, Beijing. Online. Available at: [https://eeas.europa.eu/delegations/china\\_en/35110/EU%20and%20China%20deepen%20collaboration%20on%20environmental%20policies%20and%20Natural%20Capital%20Accounting](https://eeas.europa.eu/delegations/china_en/35110/EU%20and%20China%20deepen%20collaboration%20on%20environmental%20policies%20and%20Natural%20Capital%20Accounting)



CBD) in Beijing<sup>207</sup> in 2020 and the next IUCN World Conservation Congress that will take place in France in 2020.<sup>208</sup> *'China is now establishing a network of 'Ecosystem Function Conservation Areas' to focus conservation in areas with high return-on-investment for public benefit'*.<sup>209</sup> China's ambitions in this area may have large political implications: **just as competitiveness concerns with the USA were until recently used as an argument to avoid regulating in Europe, China's market-based approach to conservation might be used tomorrow as an argument not to regulate environmental destruction in Europe.**

- In March 2018, the United Nations General Assembly declared 2021 – 2030 *'the UN Decade on Ecosystem Restoration'*.<sup>210</sup> The UN is also working on a conservation treaty for the high seas called a *'Paris Agreement for the ocean'*.<sup>211</sup> The hope is to have a treaty ready for signing by the world's nations by mid-2020.
- In June 2018 the European Commission launched a **fitness check of the EU biodiversity strategy to 2020** that will be completed in Q4 2020. The related consultation asked whether the current biodiversity strategy is cost-effective and flexible enough, and what factors could improve its cost-effectiveness.<sup>212</sup>
- In June 2018, the European Commission presented legislative proposals on **the future of the Common Agricultural Policy after 2020**,<sup>213</sup> that will see a **greater market orientation of the CAP with a 'strong commitment to deliver public goods and ecosystems services related to soil, water, biodiversity, air quality'**.<sup>214</sup>
- In 2018, France published its Biodiversity Plan 2018 - 2024<sup>215</sup> that focuses on six

207 Proposal from the World Economic Forum's Global Future Council on Biodiversity and the Economy in response to notification 2018-063 relating to the Post-2020 Global Biodiversity Framework. 14 December 2018. Online. Available at: <https://www.cbd.int/doc/strategic-plan/Post2020/postsbi/wef.pdf>

208 United Nations - Climate Change, France et Chine sur la même longueur d'onde climatique ?, January 2018. Online. Available at: <https://unfccc.int/fr/news/france-et-chine-sur-la-meme-longueur-d-onde-climatique> Ministère de la Transition Ecologique et Solidaire, Congrès mondial de la nature de l'IUCN 2020 à Marseille : Emmanuelle Wargon a présidé la réunion de préfiguration du comité local de pilotage, December 2018. Online. Available at: <https://www.ecologique-solidaire.gouv.fr/congres-mondial-nature-luicn-2020-marseille-emmanuelle-wargon-preside-reunion-prefiguration-du>

209 Guerry Anne D. et al. Natural capital and ecosystem services informing decisions: From promise to practice, Proceedings of the National Academy of Sciences, 112:24, June 2016. Online. Available at: <https://www.pnas.org/content/pnas/112/24/7348.full.pdf> International Union for Conservation of Nature, IUCN China organises Gross Ecosystem Product workshop at IUCN World Conservation Congress, February 2016. Online. Available at: <https://www.iucn.org/news/china/201609/iucn-china-organises-gross-ecosystem-product-workshop-iucn-world-conservation-congress>

210 United Nations - environment, New UN Decade on Ecosystem Restoration offers unparalleled opportunity for job creation, food security and addressing climate change, March 2019. Online. Available at: <https://www.unenvironment.org/news-and-stories/press-release/new-un-decade-ecosystem-restoration-offers-unparalleled-opportunity>

211 Leahy Stephan, The UN Starts a Conservation Treaty for the High Seas, National Geographic, December 2017. Online. Available at: <https://news.nationalgeographic.com/2017/12/un-high-seas-conservation-treaty-ocean-protection-spd/>

212 European Commission, Report: Evaluation of the EU Biodiversity Strategy to 2020. Online. Available at: <https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2018-3259397>

213 European Commission, The common agricultural policy at a glance – The common agricultural policy supports farmers and ensures Europe's food security. Online. Available at: [https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cap-glance\\_en#thecapafter2020](https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cap-glance_en#thecapafter2020)

214 European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - The Future of Food and Farming, 29 November 2017, Brussels. Online. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017DC0713&from=E>

215 Comité interministériel biodiversité, Plan Biodiversité, Ministère de la Transition Ecologique et Solidaire, July 2018. Online. Available at: [https://www.ecologique-solidaire.gouv.fr/sites/default/files/18xxx\\_Plan-biodiversite-04072018\\_28pages\\_FromPdf\\_date\\_web\\_PaP.pdf](https://www.ecologique-solidaire.gouv.fr/sites/default/files/18xxx_Plan-biodiversite-04072018_28pages_FromPdf_date_web_PaP.pdf)

strategic priorities and 90 actions. Proposed actions include strengthening the preservation and restoration of ecosystems and degraded land, defining together with all stakeholders the appropriate time horizon and trajectory to achieve the Zero Net Artificialisation objective<sup>216</sup>, improving the implementation of the existing mitigation hierarchy in order to guarantee Zero Net Artificialisation, putting in place payments for ecosystem services and supporting the definition of a biodiversity impact metric comparable to the ton of CO2 for climate change.

- That same year at the UN biodiversity conference, the Council of the EU called for the adoption of a long-term strategic approach on biodiversity mainstreaming, and highlighted that **ecosystem restoration, conservation and ecosystem-based approaches could significantly contribute to combating climate change.**<sup>217</sup>
- In November 2018, the European Commission unveiled its 2050 climate strategy.<sup>218</sup> It noted that **preserving and restoring ecosystems and nature-based solutions have a key role to play** and provide multiple benefits for mitigating climate change, while also benefiting biodiversity.
- The 2018 IPBES report<sup>219</sup> to policy makers highlighted the need to *‘ensure that the environmental, social and economic costs of unsustainable land use and production practices are reflected in prices.’* It also explained that **‘voluntary or regulation-based incentive mechanisms for safeguarding biodiversity and ecosystem services can help avoid, reduce and reverse land degradation. Such mechanisms include both market and non-market-based approaches.’**  
 Unsurprisingly, the more recent 2019 IPBES report confirmed in its advance unedited version that *‘additional tools could include economic instruments for financing conservation both non-market and market based, including for example payment for ecosystem services, biodiversity offset schemes, blue-carbon sequestration, cap-and-trade programmes.’*<sup>220</sup>
- Last but not least, the recent **European taxonomy legislative proposal on sustainable finance may open the door to including biodiversity offsetting within green activities and in its future ecolabel for financial products.** The text

216 The artificialisation of soils refers to the building of infrastructures on natural land, thereby transforming land from its natural origin to artificially covered areas.

217 Tsioumani Elsa, EU Adopts Negotiating Position for 2018 Biodiversity Conference, International Institute for Sustainable Development, October 2018. Online. Available at: <http://sdg.iisd.org/news/eu-adopts-negotiating-position-for-2018-biodiversity-conference/>

218 European Commission, Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank – A Clean Planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy, 28 November 2018, Brussels. Online. Available at: [https://ec.europa.eu/clima/sites/clima/files/docs/pages/com\\_2018\\_733\\_en.pdf](https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_en.pdf)

219 The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is an independent intergovernmental body, established by member States in 2012. Its objective is to strengthen the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development. IPBES, The assessment report on land degradation and restoration – summary for policy makers, 2018. Online. Available at: [https://www.ipbes.net/system/tidf/spm\\_3bi\\_ldr\\_digital.pdf?file=1&type=node&id=28335](https://www.ipbes.net/system/tidf/spm_3bi_ldr_digital.pdf?file=1&type=node&id=28335)

220 IPBES, Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - ADVANCE UNEDITED VERSION – 6 May 2019 [https://www.ipbes.net/sites/default/files/downloads/spm\\_unedited\\_advance\\_for\\_posting\\_htn.pdf](https://www.ipbes.net/sites/default/files/downloads/spm_unedited_advance_for_posting_htn.pdf)

of the proposal<sup>221</sup> uses specific keywords suggesting – when put in context – that biodiversity offsetting could be included, such as ‘land degradation neutrality’ and ‘restoring’ and ‘enhancing’ biodiversity and habitats, in addition to merely conserving and protecting them.

Indeed offsets are often described as ‘*positive management interventions such as restoration of degraded habitat*’<sup>222</sup>; the choice of the word ‘restore’ is thus not neutral. There has also been a recent linguistic shift where the term biodiversity offsetting is progressively being replaced by ‘degraded land restoration’. If offsets were not to be included in the taxonomy, the wording may have been limited to ‘protecting and conserving biodiversity’. Similarly, the reference to ‘enhancing’ biodiversity and habitats is most often found in references to biodiversity offsets; land degradation neutrality is the alternative name given by the UN to the concept of no net loss at the core of offsetting.

**The details however will only be known on 1 July 2022, when the Commission publishes its related technical screening criteria via a delegated act.** The proposal strikingly proposes that the co-legislators (European Parliament and Council) empower the Commission to define alone the details of the taxonomy proposal. Given the crucial public interest dimension of this proposal for future European environmental policies, **some may question whether it is appropriate to omit the European Parliament from participating in this process.**

The inclusion of biodiversity offsetting in the taxonomy would mean its inclusion in the future ecolabel on financial products and the green bond framework, with potential related benefits such as the favourable tax and prudential treatments and public credit enhancement guarantees that are currently being considered for green bonds.<sup>223</sup> While it would generate some demand, it would not by itself be sufficient to create a European market.

**The last missing piece of the puzzle would be a European legislative initiative mandating biodiversity offsetting at EU level,** indispensable to create demand and thus create a market.

In our view, a No Net Loss initiative mandating EU biodiversity offsetting might be expected around 2020-2021. As shown earlier, there are indeed many welcome calls to urgently address loss of biodiversity in order to avoid the earth’s sixth mass extinction.<sup>224</sup> Many of

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221 Article 11 of the proposal states for example that protection of healthy ecosystems – one of the 6 environmental objectives – is defined as follows: ‘an economic activity shall be considered to contribute substantially to healthy ecosystems where that activity contributes substantially to protecting, conserving and enhancing biodiversity and ecosystem services in line with the relevant legislative and non-legislative Union instruments, through any of the following means:

(a) nature conservation (habitats, species); protecting, restoring and enhancing the condition of ecosystems and their capacity to provide services;

(b) sustainable land management, including adequate protection of soil biodiversity; land degradation neutrality’ European Commission, Provisional Data - Institutional investors’ and asset managers’ duties regarding sustainability: (Section) Feedback 52 . Online. Available at: [https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-5524115\\_en#pe-2018-3333](https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-5524115_en#pe-2018-3333)

222 Ecostar - Natural Talents, State of European Markets 2017 - Biodiversity Offsets and Compensation, June 2017. Online. Available at: <https://www.ecostarhub.com/wp-content/uploads/2017/06/State-of-European-Markets-2017-Biodiversity-Offsets-and-Compensation.pdf>

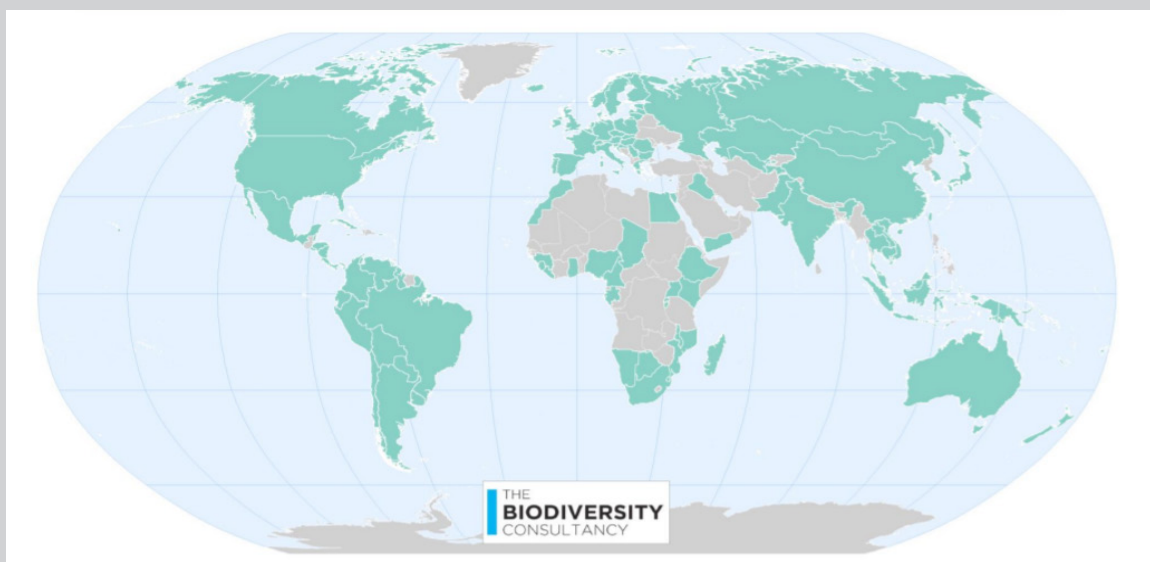
223 The consultation on green bonds mentions amongst possible recommendations developing public ‘*credit enhancement guarantees for sub-investment grade green bonds*’, ‘*tax incentives at issuer or investor level*’ and ‘*favoring EU green bonds in relevant financial sector regulation and prudential rules*’. European Commission - Banking and Finance, Invitation for feedback on the TEG preliminary recommendations for an EU Green Bond Standard, 2019. Available at: <https://ec.europa.eu/eusurvey/runner/teg-report-green-bond-standard?surveylanguage=en>

224 Watts Jonathan, *supra*. Available at: <https://www.theguardian.com/environment/2018/nov/03/stop-biodiversity-loss-or-we-could-face-our-own-extinction-warns-un>

these calls however also suggest that the solution would be to reflect unsustainable use in prices, and that voluntary or mandatory market-based solutions ‘could help’ avoid, reduce or reverse biodiversity loss. **While they typically fail to mention the words ‘offsets’ and ‘credits’** – and also fail to mention the intractable conceptual issues and appalling track record of such tools - **they create a favourable political context for a future legislative initiative mandating biodiversity offsetting** or habitat banking at EU level.

**The busy international 2019-2020 agenda on biodiversity will provide many opportunities to further advance calls to introduce such proposals**, from the IPBES first worldwide report on biodiversity and ecosystem services since 2005<sup>225</sup>, to the 2019 G7 summit whose agenda includes biodiversity,<sup>226</sup> to the 2020 IUCN World Conservation Congress<sup>227</sup> and the 2020 CBD COP15<sup>228</sup> in China whose focus is the post-2020 international governance on biodiversity. As it would be very unlikely to see a no net loss initiative before the new European Commission has taken up office in November 2019, **2020 seems likely to see a major shake-up of European biodiversity policies.**

**Countries that have, are developing, or starting to discuss national government policies that require, encourage, guide or enable the use of biodiversity offsets (in green)**



*Map used with permission from The Biodiversity Consultancy's Industry Briefing Note 'Government policies on biodiversity offsets' available at [www.thebiodiversityconsultancy.com](http://www.thebiodiversityconsultancy.com). Data by country now publicly available through the Global Inventory of Biodiversity Offset Policies (GIBOP) web-portal, a collaboration of TBC, IUCN, and the University of Kent*

225 IPBES, L'IPBES s'apprête à publier le premier rapport d'évaluation mondial sur la biodiversité et les services écosystémiques depuis 2005, 14 December 2018. Online. Available at: <http://www.fondationbiodiversite.fr/fr/actualite/263-2018/1103-la-venue-de-l-ipbes-a-paris-en-2019.html>

226 GEO (Agence France Presse), Biodiversité: la France ambitieuse à défaut d'être forcément exemplaire, April 2019. Online. Available at: <https://www.geo.fr/environnement/biodiversite-la-france-ambitieuse-a-defaut-detre-forcement-exemplaire-195422>

227 International Union for Conservation of Nature - World Conservation Congress, Marseille 2020, IUCN World Conservation Congress. Online. Available at: <https://www.iucncongress2020.org/>

228 UN2020, Timeline to 2020:Convention on Biological Diversity (CBD). Online. Available at: <http://un2020.org/timeline/timeline-cbd/>



## 2.2 Water quality trading

Water quality trading, also called nutrient trading, is a cap and trade system where companies are required to obtain permits in order to pollute rivers with nitrogen and phosphorus. It is very different from trading water itself, and shares many similarities with carbon markets. Framed as trading the ‘water filtration’ ecosystem service, **these markets trade in the cost of compliance with water pollution regulations.** Just as carbon markets are markets for polluters to trade rights to pollute the atmosphere, water quality trading markets are markets for companies to trade rights to pollute water. Such markets already exist in the USA<sup>229</sup> where they have a poor track record.<sup>230</sup>

A 2012 report titled ‘Towards efficient use of water resources in Europe’ by the European Environment Agency stated that economic instruments such as tradable permits were a means to correct market failures and deliver efficient outcomes: market-based approaches *,frequently offer a more effective means of achieving environmental policy objectives than traditional environmental policy instruments such as direct regulation of polluting activities (EC, 2000).*<sup>231</sup>

At the time of writing, we do not yet know whether such an approach will be part of the recommendations of the current ‘Fitness Check of the Water Framework Directive and the Floods Directive’<sup>232</sup> launched in 2017.

The recent European taxonomy proposal on sustainable finance however seems to indicate that such an approach may be allowed in the taxonomy. The proposal defines environmentally sustainable economic activities as activities that contribute substantially to one or more of six environmental objectives without significantly harming any other objective. One of the six environmental objectives is the sustainable use and protection of water and marine resources.

Article 8 of the taxonomy specifies that activities contributing to this objective include:

*‘(d) Improving water efficiency, facilitating water reuse, or any other activity that **protects or improves quality of Union’s water bodies** in accordance with Directive 2000/60/EC;*

*(e) ensuring the **sustainable use of marine ecosystem services or contributing to good environmental status of marine waters**, as determined on the basis of the qualitative descriptors set out in Annex I to Directive 2008/56/EC and as further*

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229 World Resources Institute, Water Quality Trading. Online. Available at: <https://www.wri.org/our-work/project/water-quality-trading> Maryland Nutrient Trading, Welcome to the Maryland Nutrient Trading Program. Online. Available at: <http://www.mdnutrienttrading.com/>

Department of Environmental Protection (Pennsylvania), Nutrient Trading. Online. Available at: <https://www.dep.pa.gov/Business/Water/CleanWater/NutrientTrading/Pages/default.aspx>

230 Food & Water Watch, Water Quality Trading: Polluting Public Waterways for Private Gain, November 2015. Online. Available at: <https://www.foodandwaterwatch.org/insight/water-quality-trading-polluting-public-waterways-private-gain> Sharon Kelly, Water Pollution Trading Programs Under Fire as Report Finds Lax Oversight, „Shell Games“ Put Waterways at Risk, DESMOG, November 2015. Online. Available at: <https://www.desmogblog.com/2015/11/19/water-quality-trading-programs-under-fire-report-finds-lax-oversight-shell-games-put-waterways-risk> The Wall Street Journal, Letter: Water-Quality Trading: EPA Program Falls Short, February 2003. Online. Available at: <https://www.wsj.com/articles/SB1044411382892905213>

231 European Environment Agency, Towards efficient use of water resources in Europe, 2012. Online. Available at: <https://www.eea.europa.eu/publications/towards-efficient-use-of-water>

232 European Commission, Public Consultation: Fitness Check of the Water Framework Directive and the Floods Directive. Online. Available at: [https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-5128184/public-consultation\\_fr](https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-5128184/public-consultation_fr)

*specified in Commission Decision (EU) 2017/84855.<sup>233</sup>*

Further details will be provided in the technical screening criteria to be established by the European Commission via a delegated act by 1 July 2022.

Article 10 of the proposal ‘*Substantial contribution to pollution prevention and control*’ also lists among the activities contributing to its objective:

- ‘(a) **reducing air, water and soil pollutant emissions** other than greenhouse gases;*
- (b) **improving levels of air, water or soil quality in the areas in which the economic activity takes place** whilst minimizing negative impacts on, and risks to, human health and the environment.’*

While the succinct text is open to widely different interpretations, the reference to ‘*improving water quality*’, ‘*reducing water pollutant emissions*’ and to ‘*ecosystem services*’, combined with past references by the European Commission to tradable permits for water pollution<sup>234</sup> **may open the door to the possible inclusion of water quality trading in the list of green economic activities** and in the future ecolabel on financial products.

Hopefully the second report of the technical expert group on sustainable finance on ‘*Climate change adaptation and other environmental activities*’ due in Q2 19 will provide more clarity on these articles. Failure to do so would mean having to wait until July 2022 to know how the Commission envisions achieving these objectives.

## 2.3 Carbon capture and storage

As described in our previous paper,<sup>235</sup> carbon capture and storage (CCS), is the process of removing CO<sub>2</sub> from the atmosphere and storing it. Carbon can be stored in geological rock formations several kilometres below the surface, depleted oil fields and deep saline aquifer formations.

Carbon can also be stored in soils, trees and coastal areas, making the link with ecosystem services. Storing carbon in soils is called climate smart agriculture, storing carbon in trees is called sustainable forestry and storing carbon in coastal and marine ecosystems such as mangroves is called blue carbon<sup>236</sup>.

Storing carbon in soils, trees and coastal areas is not a bad idea in itself. However, its valuation as an ecosystem service is problematic for the reasons described in the previous part: **highly uncertain valuations based on an oversimplified view of ecosystem interactions** potentially leads to wrong policy choices and **detrimental social impacts**. As explained by a former Bolivian ambassador to the UN, it can also **generate perverse incentives** to cut trees in order to be able to claim credits for ultimately cutting less than

233 European Commission, Provisional Data - Institutional investors’ and asset managers’ duties regarding sustainability: (Section) Feedback 52 . Online.  
Available at: [https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-5524115\\_en#pe-2018-3333](https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-5524115_en#pe-2018-3333)

234 Spence Timothy, An EU cap-and-trade scheme for water pollution? Greens say no, Euractiv, November 2012. Online. Available at: <https://www.euractiv.com/section/agriculture-food/news/an-eu-cap-and-trade-scheme-for-water-pollution-greens-say-no/>

235 Hache, supra

236 The Blue Carbon Initiative, Mitigating climate change through coastal ecosystem management. Online. Available at: <http://thebluecarboninitiative.org/>

planned.<sup>237</sup> In addition, **storing carbon in soil is not permanent and highly uncertain**; as NGO Carbon Market Watch put it, *‘sequestration of carbon in land cannot compensate for continued fossil fuel emissions – the impact of fossil fuel emissions are permanent, whereas storing carbon in forests and soils is temporary and can be easily reversed by cutting the forests for example.’*<sup>238</sup>

Climate smart agriculture is also being promoted under the argument that a rising global population will necessitate higher food productivity, requiring ‘sustainable intensification.’

According to an NGO, climate smart agriculture is being presented as the *‘agro-ecological poster boy to usher in more intensive and industrial models of agriculture. (...) But there is another key aspect to Climate Smart Agriculture that is even more worrying, and that is the question of how this vision is to be financed. While much of the rhetoric focuses on the need to help farmers adapt to climate change, it is the mitigation benefits of agriculture that has some mouths watering. **Climate Smart Agriculture thus comes in a package with carbon offsets**, enabling the carbon credits generated by farmers’ carbon sequestering activities, to be sold to consumers in rich countries who believe that they have now „offset“ their polluting activities. (...) **Soil carbon markets could open the door to offsets for GM crops and large-scale biochar land grabs.***<sup>239</sup>

**The issue with storing climate carbon in soils via climate smart agriculture is thus not so much the activity itself**, as long as it doesn’t lead to land grabbing, **but the fact that it opens the right to offset credits despite the uncertain and temporary nature of the storage that does not compensate for the permanent impact of fossil fuel emissions.**

The carbon capture and sequestration market is projected to grow from an estimated USD 4.25 billion in 2016 to USD 8.05 billion by 2021. Factors such as growing demand for energy and rising environmental concerns across the globe are driving the market.<sup>240</sup>

**Article 6 of the taxonomy proposal on sustainable finance lists among the economic activities contributing substantially to climate change mitigation ‘increasing carbon capture and storage use.’**<sup>241</sup> The wording clearly indicates that carbon capture and storage will be included in green activities and in the future ecolabel, despite the serious concerns associated with it. We will have to wait until the related delegated act due by 31 December 2019 to have more details.

Interestingly, as an NGO noted *‘a little over ten years ago, forest conservation was excluded from the Clean Development Mechanism, and the EU decided to ban offset credits from forestry and land use land change activities in the EU-ETS. And for very*

237 Goodman Amy, Pablo Solón on COP 20 and Carbon Markets: This is a New Mechanism to Commodify Nature, Democracy Now, December 2014. Online. Available at: [https://www.democracynow.org/2014/12/9/pablo\\_solon\\_on\\_cop20\\_and\\_carbon](https://www.democracynow.org/2014/12/9/pablo_solon_on_cop20_and_carbon)

238 Carbon Market Watch, NOT SMART: climate smart agriculture in carbon markets, November 2014. Online. Available at: <https://carbonmarketwatch.org/2014/11/25/promoting-climate-smart-agriculture-with-carbon-markets-would-not-be-a-smart-move/>

239 The Gaia Foundation’s Blog, Farming Carbon Credits a Con for Africa: The many faces of Climate Smart Agriculture, December 2011. Online. Available at: <https://gaiafoundation.wordpress.com/2011/12/16/farming-carbon-credits-a-con-for-africa-the-many-faces-of-climate-smart-agriculture/>

240 Markets and Markets, Press Release: Carbon Capture and Sequestration Market worth 8.05 Billion USD by 2021. Online. Available at: <https://www.marketsandmarkets.com/PressReleases/carbon-capture-sequestration.asp>

241 European Commission, Provisional Data - Institutional investors’ and asset managers’ duties regarding sustainability: (Section) Feedback 52. Online. Available at: [https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-5524115\\_en#pe-2018-3333](https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-5524115_en#pe-2018-3333)

*good reasons. There is an inherent high risk that forest offset credits do not represent real emission reductions due to leakage, the impermanence of forest carbon, inflated baselines, problematic additionality testing and difficult monitoring reporting and verification. If these artificial credits would be traded in a global compliance market, global emissions would actually rise.*<sup>242</sup> **It is unclear what made the EU change its mind.**

**The inclusion of the 3 markets described above would raise serious questions about the environmental integrity of the taxonomy proposal on sustainable finance, given the issues described in this paper and the track record of similar existing markets.**

Such an inclusion would mean that biodiversity offsetting, water quality trading and carbon capture and storage may be part of the future ecolabel on financial instruments. It would also mean that they might be allowed within green bonds with potential tax benefits, and favourable prudential treatments such as green supporting factors and public credit enhancements, thereby making them more profitable.

**There are two ways to create and generate demand for these new markets: either make them profitable enough, or find a legal basis to create a mandatory requirement to offset.** Current legislative proposals indicate a significant political willingness to increase their profitability. Future legislative initiatives mandating the compensation of biodiversity destruction, water pollution and carbon offsetting for agriculture would greatly increase the demand for such markets. For biodiversity offsetting, this might come for example via a potential future No Net Loss initiative, for water via the potential recommendations of the fitness test of the water framework directive, and for blue carbon via a No Net Loss of wetland initiative.

It is therefore **essential to closely monitor legislative developments in these areas and ask for more transparency concerning the definition of the technical screening criteria, in order to have a much-needed public debate on these issues of crucial public interest** instead of being presented with a fait accompli once new laws are in place. As the European Parliament has a veto right on delegated acts, it will bear a historic responsibility to ensure the soundness of future European environmental policies.

If there are to be such markets in the future despite all their flaws, their design must minimise the issues described earlier, and **appropriate regulation and supervision must be put in place.**

As an example, any future biodiversity offsetting scheme should in our view:

- ▣ comprehensively account for all related ecosystem services and interdependencies;
- ▣ only allow like-for-like offsetting;
- ▣ only allow offsetting within a limited distance from where the debit takes place;
- ▣ only allow the creation of credits after rehabilitation impacts have been verified;
- ▣ ban credits linked to the cumulative offsetting of small impacts, as accountability and additionality are incredibly hard to assess. The activity itself is welcome, but it should not give the right to offset credits;
- ▣ only allow end-users to buy or sell credits in order to curb excessive speculation;

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242 Carbon Market Watch, REDD, April 2013. Online. Available at: <https://carbonmarketwatch.org/2013/04/09/redd/>



- ▣ include a cap on how much can be offset, in order to account for the significant residual impact of offsets, limit procyclicality and land speculation;
- ▣ include appropriate restrictions on what, where, when and how traders can buy or sell. Such restrictions may for example restrict over-the-counter trading and limit the velocity of trading.

Even with such rules, the environmental integrity of such a market would remain significantly inferior to environmental regulation, but it would at least remove some of the worst aspects.

## CONCLUSION

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The reframing of nature as natural capital and the related shift in environmental policies from conservation to restoration could have crucial consequences for policy making related to environmental destruction and biodiversity loss.

These developments could foster a very partial vision of nature with extremely low environmental integrity, potentially leading to the build-up of unmonitored risks obscured by the false certainty of the numbers produced.

They would also obscure the moral and ethical choices to be made and the distributional aspects, by depoliticising the issues.

They could foster the development of market-based solutions that can not address the critical issues at hand. Once again, it is not a question of supporting or opposing markets, but merely of acknowledging that while markets provide many benefits, they also have limitations and are unsuited to addressing this issue.

In addition, the progressive introduction of such new environmental policies through sustainable finance would reframe environmental issues as technical discussions for experts, thereby removing them from public debates.

This may explain why there is so little debate at EU level about recent legislative proposals that might promote new financial markets in ecosystem services.

However, as these policies will shape our common future and possibly our survival as a species, now is the time to discuss them and their alternatives, to assess their respective merits and draw the lessons from the track record of similar existing policies.

A public debate is much needed, not only about the level of ambition of European environmental policies, but also on the 'how', i.e. the policy tools used to achieve these objectives.

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GREEN  
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## ABOUT US

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The Green Finance Observatory is an independent NGO whose mission is to analyse new financial markets and instruments linked to environmental policies, to assess whether they can meet their stated environmental, economic and social objectives.

We are a small team of ex financial market and policy advocacy professionals. Our respective experiences led us to conclude that while there was a tremendous expertise on environmental matters in the CSO universe, fewer civil society organisations were engaging in complementary and essential angles such as finance, looking at the nuts and bolts of green financial markets and instruments.

Find out more about the organisation on our website:  
[www.greenfinanceobservatory.org](http://www.greenfinanceobservatory.org)