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What are individual-level *nature amends*? Rescaling biodiversity offsetting from the community members' perspective

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Abstract

Effective solutions to biodiversity loss are multidimensional, requiring engagement from diverse stakeholders across various sectors and commitment levels. In this context, voluntary actions from community members emerge as a valuable addition to the large-scale nature conservation activities conducted by states and municipalities. Such actions complement biodiversity protection measures and legal requirements aimed at companies. This article delves into the rescaling of biodiversity offsetting to the community members level and explores it from the perspective of community members. Through workshops organized in four Finnish municipalities, participants were prompted to reflect on biodiversity offsetting in their daily lives. The results show community members' limited resources to conduct pro-biodiversity actions and highlight their diverse interpretations of the topic. Beyond direct biodiversity-enhancing action, like maintaining rural biotopes, eradicating alien species, or protecting forests, workshop participants called for indirect actions. These included education, eco-taxes, and the development of sharing economies. Thus, rather than solely focusing on biodiversity offsetting or the mitigation hierarchy, these suggestions underscore the need for diverse pro-biodiversity actions at the community member's level. Furthermore, the results highlight the need for support that enables community members and communities' work for biodiversity. Introducing the concept of *nature amends* addresses this need, enhancing the mitigation hierarchy's capacity to incorporate community members in nature conservation endeavors.

KEYWORDS

biodiversity offsetting, community members, ecological compensation, mitigation hierarchy, perceptions

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1 | INTRODUCTION

Ecological crises are mainstream in our contemporary life. Alongside climate change, land use changes are key drivers causing biodiversity loss, both linked to the production of human food and other commodities (Pörtner et al., 2021). The list of endangered species grows longer with every new analysis (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services [IPBES], 2019; IUCN, 2020). Despite international agreements setting targets for countries (e.g., Convention on Biological Diversity [CBD], 2022), concrete results remain scarce, leaving people around the world feeling worried and overwhelmed by the enormity of the challenge (Passmore et al., 2022). Nevertheless, individuals have also taken action in their own hands, engaging in proactive initiatives (Ganzevoort & van den Born, 2020; Passmore et al., 2022).

Emphasized in the Kunming-Montreal Global Biodiversity Framework (CBD, 2022), the solving of ecological crises requires the involvement of all segments of society, recognizing the contributions of local communities and indigenous people. While international agreements and national policies are important, they often provide inadequate guidance or motivation for ordinary community members to actively participate in biodiversity conservation efforts (Hegger et al., 2022; van den Born et al., 2018). The Global Biodiversity Framework calls for support for civil society action and emphasizes the need to enhance community members' knowledge and awareness (CBD, 2022).

Traditionally, biodiversity conservation has focused on establishing conservation areas and protecting specific species, which offers limited options for community members' action. Nonetheless, there exist some examples of biodiversity protection measures implemented in cooperation with local people, such as community-based conservation (Berkes, 2021). Biodiversity offsetting offers another perspective on nature conservation, shifting the focus from conserving nature to establishing connections between what is lost and what is conserved (Arlidge et al., 2018; Milner-Gulland et al., 2021). This connection is demonstrated via a conceptual framework called mitigation hierarchy, and it helps to concretize what is needed to maintain biodiversity, yet the ability of community members to exploit mitigation hierarchy and to act in the context of biodiversity offsetting remains ambiguous.

The mitigation hierarchy is a framework to estimate the human impact on environments and consider actions to reduce and compensate for the harm that is caused (Arlidge et al., 2018). The first step of the hierarchy is *avoid*, meaning a need to predict and prevent negative

impacts on biodiversity, including the cancellation of development projects (Arlidge et al., 2018; Phalan et al., 2018). The second step is called *minimize*, including actions and choices in the planning phase of a development project aiming at the minimum harm caused to nature. The third step of the hierarchy, *restore*, focuses on impacts that cannot be completely avoided or minimized at the site of the development project. When the ecological restoration (Gann et al., 2019) of a construction location is not possible, or it is inadequate to fully compensate for the caused harm, step four, *offset*, is used, and the damaged ecological values are protected elsewhere. In practice, offsetting can mean positive management in the form of restoration of degraded habitat and halting occurring degradation or eliminating the risk of imminent biodiversity loss by creating protected areas (Arlidge et al., 2018; Business and Biodiversity Offsets Programme [BBOP], 2012). While the role of the first steps in the hierarchy has been strengthened (Phalan et al., 2018), biodiversity offsetting is often the step gaining the most attention, as it is the step companies and organizations are rewarded for, instead of avoiding the harms or generating additional biodiversity values (Gelot & Bigard, 2021; Larsen et al., 2018; Maron et al., 2016). Furthermore, the mitigation hierarchy and biodiversity offsetting can currently feasibly be implemented only in limited situations (Milner-Gulland et al., 2021). Hence, there is a need to develop approaches that enable, make visible, and encourage proactive biodiversity-enhancing (pro-biodiversity) actions also beyond the strict mitigation hierarchy approach. A further developed version of the conceptual framework is the mitigation and conservation hierarchy (MCH) aiming to better include different actors and scales of action in the hierarchy (Milner-Gulland et al., 2021), but even in this context, we need more knowledge on the understanding and roles of community members in biodiversity action. In this article, we address this gap.

Biodiversity offsetting is neither calibratable to the community members' level nor does it directly include social aspects (Bezombes et al., 2017; Souza et al., 2021; Tupala et al., 2022). Biodiversity offsetting based on the best available science includes several principles (BBOP, 2012; Moilanen & Kotiaho, 2018). For example, biodiversity offsetting should include the calculation of ecological losses in a certain space and time (Moilanen & Kotiaho, 2018). The investigation of ecological values and their losses should include full consideration of the mitigation hierarchy. It should also follow the no net loss principle, the spatial reference frame of biodiversity valuation, the permanence of offsets and take into account time delays in offset gains (Moilanen & Kotiaho, 2018). At the level of community members, only a few or none

of these basic principles can be achieved. Community members can directly enhance biodiversity in various ways on their privately owned land, such as with private gardens or forests, but verification of achieved biodiversity gains without defining a baseline, external follow-up or national or regional compensation database causes difficulties. Furthermore, community members have multiple ways to indirectly contribute to combating biodiversity loss. For example, by joining and organizing demonstrations or activity in non-governmental organizations and political participation, community members have the power to create growing bottom-up pressure on governments and companies to better account for biodiversity in their actions (Drews & van den Bergh, 2015; Hegger et al., 2017; Stephan & Chenoweth, 2008). Community members action or changes in behavior can also lead to changes in social practices in the everyday lives of the wider population and sometimes develop into a new normal (Spaargaren & Oosterveer, 2010). Currently, none of these actions can be accounted for in the mitigation hierarchy, the conceptual framework, or biodiversity offsetting, the mitigation action. Thus, it would be useful to create a more holistic understanding of both the mitigation hierarchy concept and biodiversity offsetting as an action to better enable the promotion of pro-biodiversity action, by which we mean nature positive actions without conservational needs, even when it is unfeasible to match the action to caused biodiversity losses.

The MCH, makes it possible to include non-attributable conservation measures into the hierarchy, including, for instance, consumption choices and biodiversity-friendly gardening (Milner-Gulland et al., 2021). The key idea in MCH is to go beyond mitigation to enable and encourage proactive conservation. Simultaneously, it enables the identification of suitable pro-biodiversity action for different kinds of actors, such as diverse companies, organizations, and the general public. It differs from the mitigation hierarchy by suggesting proactive actions for different actors in society, whereas the mitigation hierarchy is purely a conceptual framework which helps to understand the harms and mitigation possibilities of one project at a time. The MCH operates on four levels parallel to the mitigation hierarchy and adds a conservation hierarchy pathway, which can include aspects beyond project-specific mitigation and encompasses proactive conservation action. The levels in the conservation hierarchy are named as four “R’s”: refrain, reduce, restore, and renew. Proactivity decouples the action from specific caused harms and enables the addressing of past and systemic biodiversity losses. From the perspective of community members, refraining can mean refraining from consuming products with high biodiversity impacts. Reduction can be the

selection of a product or a service with lower impacts, while restoring refers to action, such as recycling and reusing items. Renewing in the context of conservation hierarchy for community members means more direct biodiversity-enhancing action, such as biodiversity-friendly gardening or the donation of money for conservation action. Note, that the term “restore” in Milner-Gulland et al. (2021) differs from ecological restoration as defined by Gann et al. (2019).

Looking at the breadth of potential action by community members, including political activity and more collective forms of action, it is clear that the MCH could use some further refining in terms of improving its applicability. Furthermore, the distinctions between the different “R’s in the context of community members remain a bit ambiguous. For instance, mowing your lawn less often could reasonably be seen as an activity reducing harm, even though Milner-Gulland et al. (2021) place it as a renewing activity. Similarly, donating money to restoring activities such as cleaning waterways from microplastics could be seen as restoring rather than renewing. To enable the operationalization of these kinds of initiatives at the level of community members, we need more information on how biodiversity offsetting and the mitigation hierarchy could be transformed into community members’ action and what it would require both from a procedural point of view and from the community members’ perspective.

In this article, we ask: (1) How do community members understand their own possibilities to conduct biodiversity-offsetting and biodiversity-enhancing (pro-biodiversity) action? and (2) What implications do the perceptions and suggestions of community members have on the MCH? As community members cannot follow all the principles of biodiversity offsets, we formulate the concept *nature amends* to make a difference between the community members version and biodiversity offsetting and place it in the context of MCH. Our analysis is based on findings from a series of community members workshops, and we discuss what possibilities emerged from the participants’ suggestions.

2 | MATERIALS AND METHODS

We organized four co-creation workshops aimed at envisioning and innovating biodiversity offsets at the community members level. In the time of the workshops, autumn 2018 and spring 2019, the Finland national nature conservation legislation was under renewal with the introduction of the biodiversity offsetting concept (Lehtiniemi et al., 2023). Hence, the time was fruitful for

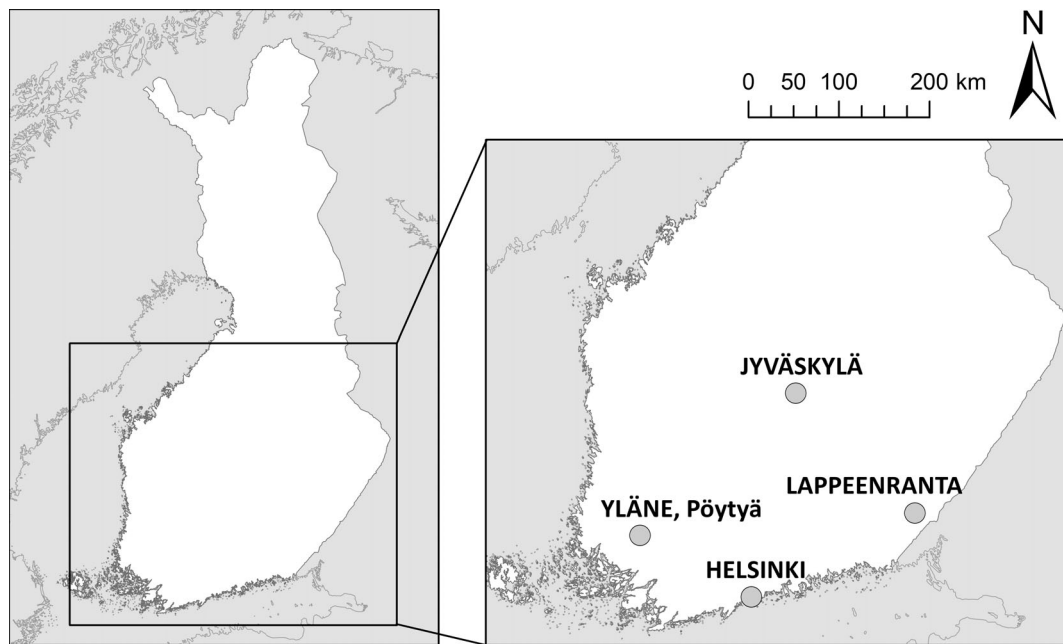


FIGURE 1 Finland is a country in northern Europe. Location of municipalities where workshops were held are presented in the map. Contains data from National Land Survey of Finland: Administrative borders 1:1 million 2023, and General Map 1:4.5 million 2010.

examining community members' perspectives on the topic.

The workshops were based on and modified from futures workshops methods utilized in participatory futures research (e.g., Heinonen & Ruotsalainen, 2013; Jungk & Müllert, 1987; Luttamäki, 2014). The method highlights co-creation and diversity in participants and perspectives. The workshops took place in four different-sized municipalities in Southern and Central Finland, varying from the capital city (>660,000 residents) to a small rural community (approximately 2000 residents) (Figure 1). We were interested in collecting ideas from varying living areas and forms of housing—from urban and rural contexts. All the four municipalities are located in southern Finland, defined as the southern half of the whole 1157 km-long country (Statistics Finland [Stat.fi.], 2023a). Approximately 88% of Finland's inhabitants live in the area (Statistics Finland [Stat.fi.], 2023b). Finland is divided into 19 regions, each with a relatively densely populated urban center and surrounded by smaller towns and rural municipalities (Stat.fi., 2023b). Our study design included two regional centers (Jyväskylä and Lappeenranta), the capital (Helsinki), and one rural village (Yläne, part of Pöytyä). Workshops were advertised through venue partners in each locale, local educational institutions' mailing lists, press releases, nature-related Non-governmental organisations (NGO) such as scouts, and social media. They were also open for anyone interested.

Each workshop's agenda included an introduction with warm-up exercises. They included a value market exercise, which was used to elicit everyone's own perceived values toward nature using 20 descriptive words, and an outdoor biodiversity observation walk enriched with multisensory activities (Figure 2). A thematic introduction talk followed the warm-up phase. In the introduction, ecological crises, biodiversity offsetting, and the impact of consumption choices in western lifestyle were described to the participants. The biodiversity offsetting term was introduced to the participants at a general level, but its potential meaning in the context of community members' daily lives was deliberately left open to support innovative thinking of possible mechanisms and ideas that could be suitable for community members pro-biodiversity action. However, it was noted that offsetting should be something that adds biological diversity and simultaneously supports natural sites by reducing the human impact on nature. The introduction was followed by group work sessions. At the end of the day, we concluded with personal offsetting plans.

At the group work sessions, participants were divided into groups of three to five people, and each group was gathered around a diagram of an "offsetting loop" on a big piece of paper, which was modified from brainstorming methods and the Futures Wheel (Glenn, 2009) and adjusted to biodiversity offsetting and other pro-biodiversity actions. The diagram included sections for ideas, resources, and concerns. First, participants were asked to gather their thoughts on each section of the

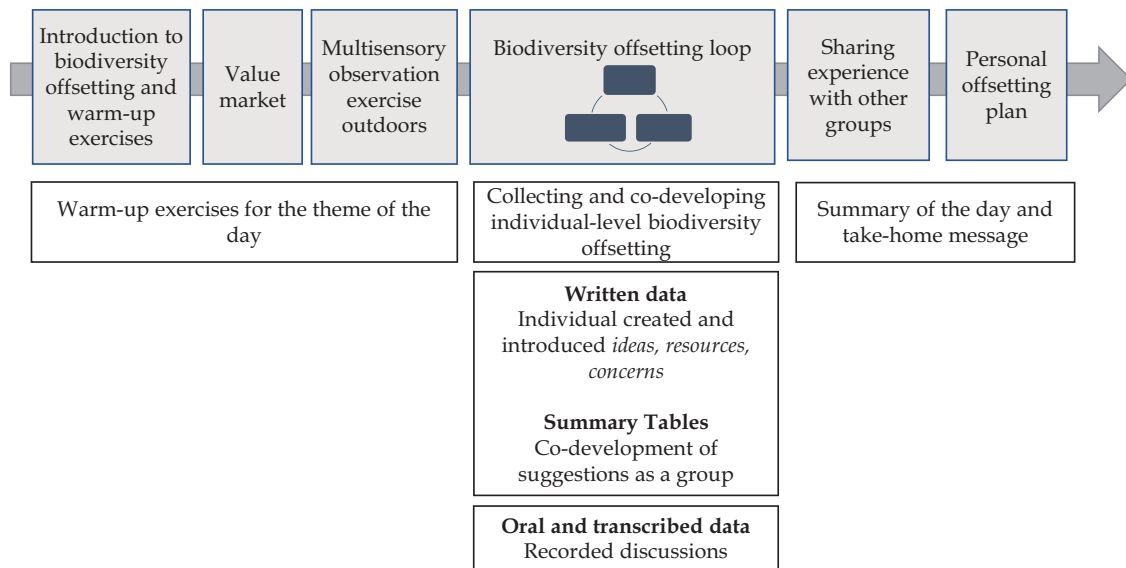


FIGURE 2 Process of the workshop day started with a warm-up phase with an introduction to the topic including a short lecture on biodiversity offsetting, a value market choice game and walking outdoors conducting multisensory observations. The main content of the day was collecting community members perspectives on biodiversity offsetting and the day ended with take-home messages.

TABLE 1 Workshop details in a nutshell. Despite the fewer participants in Yläne, the discussions were deeply focused on the topic and participants had plenty of knowledge in nature-related questions. Especially in the rural municipality, Yläne, participants also shared thoughts about agriculture and forest ownership in a concrete manner, as a way of living in that area.

Municipality	No. of participants	Date	Duration
Helsinki	10	September 5, 2018	7 h
Lappeenranta	7	October 6, 2018	7 h
Yläne, Pöytyä	5	October 27, 2018	7 h
Jyväskylä	14	March 16, 2019	7 h

offsetting loop using post-it notes. Group members discussed each category together, voted for the most promising ideas and resources or the most alarming concerns. The chosen issues were summarized and discussed further with the help of a printed table, where the participants were asked to identify the strengths and weaknesses of the ideas and suggest ways of supporting the resources and ways of mitigating the concerns (Appendix S1, Supporting Information). The analyzed data included the post-it notes, summary tables, and researchers' notes from the workshop discussions. In addition, the discussions were recorded in three of the workshops, and these recordings were used to support the researchers' notes.

A total of 36 participants joined the workshops (Table 1), resulting in a diverse group considering people's backgrounds. Occupations included a landscape architect, gardener, forestry engineer, farmer, student of environmental studies, customer service person, therapist, and teacher. Information about participants' ages was gathered by age group, starting from age 16 to

25 and ending with 66+ years. Forty-seven percent of participants were under 35 years old (Appendix S2, Supporting Information). Gender distribution was eight men and 28 women.

In our analysis, we were interested in all of the ideas community members generated in the workshops and how those ideas could be thematically accounted for as individual-level biodiversity offsetting. We systematically analyzed and transcribed discussions with deductive content analysis (Elo & Kyngäs, 2008) by using Atlas.ti analysis software (Version 23.0). The analysis included two rounds. First, we categorized the discussed topics and arguments into classes following the thematic structure of the workshop (ideas, resources, and concerns). The first round made the whole diversity of ideas and resources visible. On the first coding round, we noticed two main actors in the data, which we named *individual* and *community*. The individual relates to propositions with the subject *I'*, with suggestions one can do independently. *Community* was observed as different groups of actors acting at different levels, such as neighbors, a

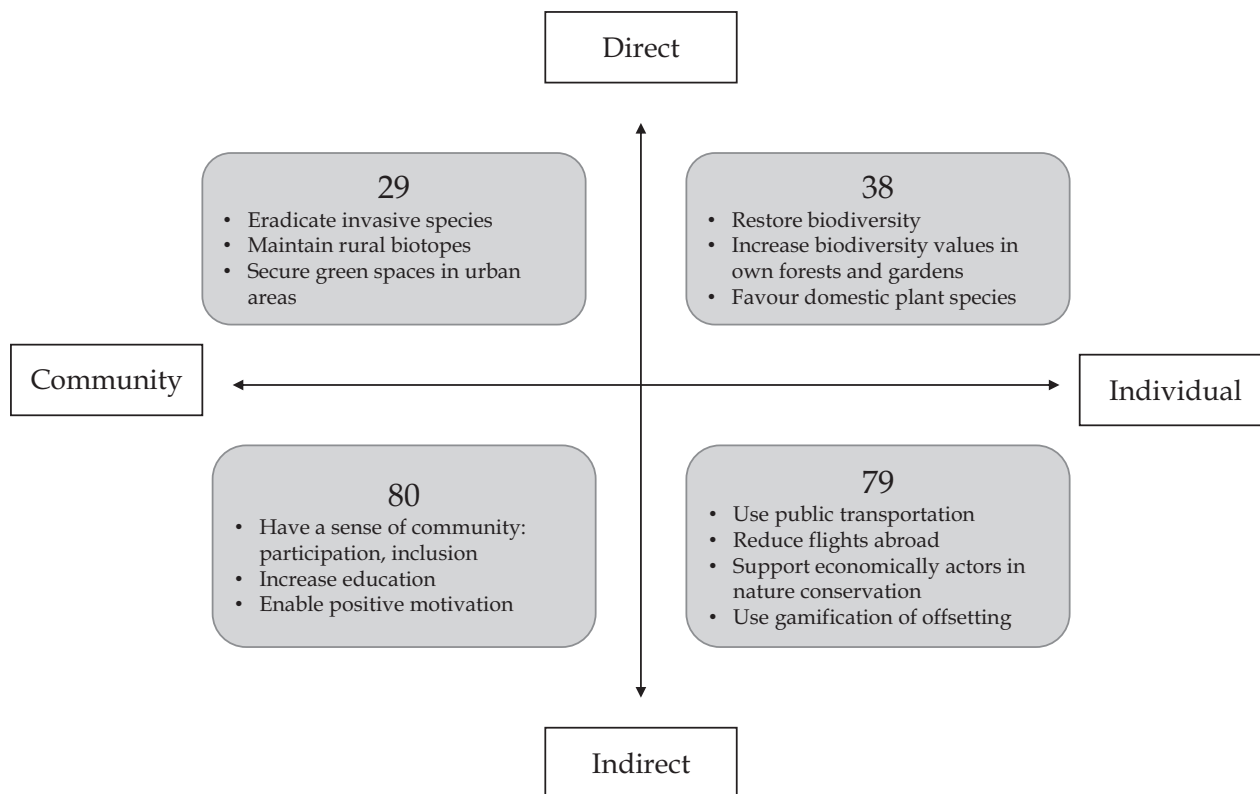


FIGURE 3 Results of deductive coding of ideas and resources suggested by participants were divided into two dimensions: Individual–community and direct–indirect community members’ level biodiversity offsetting actions. The numbers indicate the number of ideas proposed for the category.

residents’ association, a municipality or state, or an unclearly identified plural actor required for wider level changes, which was interpreted as belonging to this category. Furthermore, after the first round of analysis, we observed that most of the suggestions covered themes related to sustainable ways of living instead of direct rehabilitation or compensation actions connected to biodiversity. Our second dimension of analysis was *direct* or *indirect*, by which we separated hands-on actions enhancing biodiversity directly at a certain location, and indirect actions, which describe non-location-based actions with biodiversity impacts, such as consumption choices. We conducted the second round of analysis, focusing on these two dimensions: individual–community and direct–indirect actions. Suggestions from the class resources, which could also be categorized as proposals for individual-level biodiversity offsetting, were included in the second round of analysis. Concerns were left out of the analysis since they were unlinked to the presented ideas.

3 | RESULTS

Collected ideas and resources resulted in a variety of biodiversity-enhancing action, without direct connection

to harms caused by individuals. Suggestions varied from concrete hands-on to service- and purchase-based actions, from obligatory to voluntary actions, and from education to political influencing. Participants in our workshops suggested more indirect than direct individual-level biodiversity offsetting actions (Figure 3). In addition, suggestions in the individual category were slightly more common than community-based ones were, but here the difference was rather small. In all four workshops, the participants repeatedly discussed the importance of working together rather than acting alone, despite the workshop introduction that guided participants to think about individual actions.

Community direct actions were related to land use, natural areas, or work to maintain those. Examples of this category include restoration actions to create and maintain rural biotopes such as meadows and semi-natural pastures, pilot biodiversity-offsetting projects, the eradication of invasive species, and the creation of green roofs. These actions were seen to be meaningful as collective action and thus offering a wider impact than when managed by individuals alone. Still, restoration actions, including the eradication of invasive species, were the most common suggestion of individual actions as well. Furthermore, workshop participants suggested group-based voluntary work in general. Participants noted that

both nature and the local community can benefit from the suggested actions, such as creating meadows in public green spaces.

Some of the suggestions were a mixture of actor levels covering both community and individual aspects:

Clearing and managing rural biotopes on municipality or state-owned land, meaning that people, NGOs and others could do this, and municipalities would agree with these ideas since usually they do not have enough resources to manage areas. This could be a way to take care of nearby nature and it would be more successful if done together. (M3, Jyväskylä workshop)

The participants noted that some of the suggested direct community-level actions could be incorporated into the existing land use plans of municipalities, and they discussed this might require a change of attitudes regarding land use in the municipal level, including also the general public and the inhabitants. Participants discussed possibilities to secure green spaces in urban areas as a response to urban infill via the actions of residential associations:

Then at least in big cities wastelands are taken into use like—they have been given to residential associations who have created parks or playgrounds for children—this is also the adding of green in urban areas. (N9, Yläne workshop)

Residents' associations were seen as important community actors that could mediate the needed land use change while considering the limited resources of municipalities and the lack of more general municipal level will for the change.

Individual direct actions covered similar themes to the category “community direct actions,” but the actions were scaled to individual level and targeted to smaller areas or resulted in smaller or mostly local impacts. Biodiversity restoration ideas were the most common suggestions, including, for instance, turning lawns to meadows or adding other biodiversity increasing elements such as deadwood and nesting boxes or bee hotels in private gardens. In addition, forestry-related actions were suggested, such as buying a piece of old field and reforesting it, and increasing biodiversity values in one's own forests. Forestry-related actions are particularly relevant in the Finnish context because in Finland, 43% of forests are owned by individual people (Metsäkeskus, 2022).

Esthetic preferences were identified as an important factor that potentially inhibit these kinds of pro-biodiversity actions. Participants discussed the need for esthetic education in landscape or garden design to support individual gardeners' possibilities and willingness to act. More knowledge on favoring domestic plant species in gardens was also highlighted. To make pro-biodiversity action more mainstream more rapidly, some participants even called for an obligatory form of individual-level biodiversity offsetting in cases when privately owned property is bordered with commonly owned land:

Should there be, in the future, if a property borders on public land—then these land-owners would be obliged to watch and maintain the border zone, to see that no invasive species get in or to maintain it so that it stays forested or something like that. (M3, Jyväskylä workshop)

Individual indirect suggestions varied from concrete suggestions, such as “use a bicycle,” to more abstract development of one's personal relation to nature. The concrete suggestions related to the sustainable way of living included the reduction of flights abroad, the reduction of energy consumption, using public transportation or a bike, and walking. Ideas such as remote work, avoiding plastic packaging (plastic strike), repairing broken items and clothes, recycling, and buying local food were mentioned often.

Besides suggestions related to sustainable lifestyles, individuals were seen as capable of providing a different kind of economic support by giving donations. These included support for NGOs in nature conservation or in environmental actions in general. Individuals could also support forest owners or private gardeners who are taking pro-biodiversity actions on their own land. In addition, different ways of doing voluntary work to benefit environmental issues and sharing your own knowledge with others were mentioned.

Participants were innovative in the workshops and gave suggestions that demanded new methods or actors to implement individual-level offsetting. Gamification via smart phones was also presented. For example, a user could use a mobile app to follow the development of a degraded site toward a natural state by adding pictures and collected information to the app. The idea did not include information about who would carry out the work at the site, but related ideas were introduced in other discussions, where services called banks were introduced:

A bank where one can follow one's own performance in offsetting by donating or by hands-on compensation actions, or by involvement in a certain project, so that people can collect compensation credits for themselves. (N1, Lappeenranta workshop)

Indirect community actions included general supporting actions that could also better enable individual pro-biodiversity action. Participants called for increasing the sense of community and enhancing participation possibilities in decision-making via more open public discussion events in communities. To support sustainable ways of living, better public transportation and enabling a shared use of existing resources were called for. The latter included a resource bank where you could inform your own skills and strengths for others to ask for your know-how. Communal living arrangements were highlighted, including self-sustaining units that enable you to “grow your own vegetables and pick berries and mushrooms” (Helsinki workshop). In addition, the organization of and sharing of information at the community-level events that support sustainable lifestyles, such as community clean-up days in municipalities, were mentioned.

Besides carrots, sticks were also discussed. As possibilities, the participants highlighted, for instance, new environmental taxes, product-based eco-taxes, and the reduction of private cars in city centers as well as “punishment of private car users and others who act irresponsibly” (N20, Jyväskylä workshop). Including compensation payments in building permits were also mentioned:

I'll add here compensation payments in, for instance, building permits. Then you don't have to think about it but instead you can trust that wiser experts have determined the right amount of payment ... it's easy for you. (N17, Jyväskylä workshop)

The need for easy and adjustable individual-level biodiversity offsetting options was a theme throughout discussions in all of the workshops. This can be seen as community-level action in the form of the need to create easy solutions such as the compensation payment or even the creation of a biodiversity offsetting bank, where community members could buy and sell offsetting credits. A similar call for simple solutions was visible in the recognized need for labeling and the normalization of compensated products for consumers and in the idea to influence community forest owners (state, municipality, or parish), when pro-biodiversity actions could be larger in scope and done by a stronger/bigger actor.

Visibility and education for pro-biodiversity actions were recognized as important: in order to become a new normal and to be valued, publicity and an increased level of knowledge are needed. In terms of education, especially the need to teach children was highlighted. In addition, the general need for education, “enlightenment of all levels” (Jyväskylä workshop), was often discussed. Participants called for more accessible and adapted information targeted to different kinds of users. As a practical suggestion, a possibility to borrow a biologist from the library to advise on biodiversity-friendly gardening was presented. This can be seen as a new service targeted at all community members. Besides education, participants required pioneers, groups of people, or companies to lead the way toward pro-biodiversity action. In two workshop groups, famous persons were called upon to be trendsetters in the theme to provide public visibility:

All happenings—like those arranged by celebrities, concerts by famous musicians, etc.—to get more awareness. (N3, Lappeenranta workshop)

To further motivate action, participants expressed a need for incentives, such as prizes for good achievements in pro-biodiversity actions that one could use to demonstrate the sustainability of their lifestyle. In addition, participants highlighted a need to better express the positive side and benefits that an individual can get from pro-biodiversity action. It needs to be seen increasingly as something that makes people feel good and as a desired way of using their time instead of as an obligation.

4 | DISCUSSION

4.1 | Complexity of biodiversity offsetting at the level of community members or community

Our results show that it was hard for community members to distinguish between activities aimed at benefiting biodiversity (such as enhancing habitats for endangered species) and more general environmental care (such as bike riding). The number of suggestions for direct action was lower than the number for indirect ones, indicating that people found it somewhat challenging to imagine physical biodiversity-enhancing actions.

Community members recognized that their lifestyles and consumption choices have diverse indirect impacts on nature, even though they rarely made direct connections between the harm that their actions cause and the action to mitigate it, and they did not present solutions connected

to the impacts. This is understandable, because often it is not possible to measure the caused indirect impacts and the required offsetting of our everyday life choices and actions (Arlidge et al., 2018). However, community members suggested indirect actions to manage the impacts, and they questioned the right to consume without sanction and the negligence of biodiversity loss.

The low number of direct suggestions in our data can also reflect limitations community members experience regarding concrete biodiversity-enhancing actions in their everyday life. A core problem was limited access to land on which to perform the direct actions (Tanguay et al., 2021). Furthermore, community members called for easy actions and established regulations that do not require a deep understanding of the impacts but offer clear guidelines on suitable action. Examples in the suggestions included taxation, labeling of products, and donations for already existing nature conservation actors such as NGOs. Thus, community members can also find it too burdensome to be responsible for understanding the complex impacts of their actions and to identify the right solutions for offsetting the harms.

Collective action emerged as a core topic in relation to pro-biodiversity action. Besides concrete ways of working together, the collective action reflected various supportive actions needed for individual community members and communities to be able to perform both direct and indirect pro-biodiversity action (Day et al., 2022). This supportive action included education, the creation of guidelines for action, and enabling better public engagement in decision-making. Furthermore, this kind of supportive action is needed to make the pro-biodiversity action visible and rewarding (Day et al., 2022), in contrast to everyday habits that easily stay hidden.

Despite the initial guidance in the workshops introducing the concept of biodiversity offsetting and encouragement for the participants to think about ways to conduct offsetting in their own actions, the diversity in the discussions pointed out the shortcomings of the offsetting concept in the community members context. Either consciously or unconsciously, community members proposed measures at different steps in the mitigation hierarchy, instead of mere biodiversity offsetting. Furthermore, their proposals related more to the MCH proposed by Milner-Gulland et al. (2021) than mitigating known and measured nature losses. Hence, it seems reasonable to discuss their proposals in the context of the MCH.

4.2 | Biodiversity offsetting, MCH, and nature amends

We started our workshops by introducing biodiversity offsetting to the participants. Often, when studying

something novel, results may be different than expected. Community members talked less about biodiversity offsetting and more about non-harm-related actions. The biodiversity offsetting baseline relies on the accountability of caused harm and compensation linked to measured biodiversity loss in a particular location (Arlidge et al., 2018, Moilanen & Kotiaho, 2018). This accountability is crucial in preventing further losses, and biodiversity offsetting can be reasonably expected from larger scale actors such as companies and municipalities. Since the actions proposed by the participants were non-harm-related and they differ from proactive conservation—which we understand as action leading to nature conservation outcomes (Milner-Gulland et al., 2021), these voluntary yet smaller-by-impact actions deserve their own concept.

Individual and community action to combat biodiversity loss is essentially unconnected to caused harms and this distinction needs to be clearly communicated. Hence, we propose a novel concept, “nature amends,” to include all direct and indirect individual and community-level pro-biodiversity action. We define nature amends as potential yet powerful small-scale pro-biodiversity actions, either direct or indirect, conducted by community members individually or jointly. Nature amends as a term is more easily understandable for people as it expresses regret and apology toward nature. Nature amends are actions that have a positive impact on the state of biodiversity, and they are reachable for individuals and their communities. While the concept of nature amends shares similarities with traditional nature management, ecological restoration, and community-based conservation, it extends beyond these direct actions, thereby encompassing a broader spectrum of activities available for individuals and communities. Thus, it enables the recognition of the diversity of actions that can be undertaken.

At the individual level, biodiversity offsetting is currently unfeasible. In contrast to carbon offsetting, even donations for biodiversity offsetting projects cannot reliably be used to compensate the harms caused by donating individuals since there are no ready-made tools for biodiversity loss estimation. Hence, a broader approach that is able to make a range of pro-biodiversity actions visible is needed. This could support the role of community members in combating biodiversity loss: increase their awareness about the possibilities to act and strengthen their belief that they can and know how to act. In the following, we incorporate our conceptual finding “nature amends” in MCH.

The MCH (Milner-Gulland et al., 2021) can be applied to multiple user levels, and it helps with accountability problems for smaller actors and non-expert-led projects, challenges that were recognized in our workshops. The four steps—refrain, reduce, restore, and renew—can all

be identified from our results. Step one, refrain (avoid) was less discussed in our data. Suggestions related to reducing consumption and refraining from harmful actions create a continuum to the second step, reduce (minimize), which can be related to various actions connected to more sustainable living and making better consumption and lifestyle choices, such as utilizing public transportation and reducing flying. We would also classify recycling, unlike Milner-Gulland et al. (2021), under the step reduce, rather than restore, since recycling is mostly about reducing harms caused by the utilization of virgin materials and can be seen as “buying less.” The first two steps mostly relate to indirect actions conducted by individuals. Step three, restore, can be linked, for instance, to eradicating invasive species, maintaining rural biotopes, and securing green spaces in urban areas. These include both community and individual action, and while mostly being direct action, also indirect action such as donations to conservation NGOs can be included in the restore step, when they are directed to restoration activities. Here it is important to avoid confusion by noticing that, in Milner-Gulland et al. (2021), the category restore, in terms of individuals, is similar to rehabilitation described in international principles and standards for the practice of ecological restoration (Gann et al., 2019). In our proposal, step four, renew, is related to rehabilitation, where the goal is to reinstate ecosystem functioning for continuous supply of ecosystem services that can come from nonnative ecosystems (Gann et al., 2019). Thus, in our data, renewing consists of diverse actions to introduce new biodiversity values that may differ from native ecosystems at a certain place. In our results, these include turning lawns into meadows, favoring domestic plant species in private gardens, and creating new urban green spaces. Donations to create new biodiversity values can also be included in this step. A useful distinction between the steps restore and renew can be made via considering whether the action is restoring some lost biodiversity value at a specific place or whether it is creating new biodiversity values at other locations (see also Gann et al., 2019). In this sense, for example, turning lawns into meadows most often is renewing, unless the lawn used to be a meadow.

Deviating from MCH, our results included a considerable amount of mostly indirect community-level actions, which does not fit the current forms of MCH suggested for community members or NGOs. These actions were about different ways to support and enhance the capacities of individuals and communities to conduct pro-biodiversity action, such as improving public participation opportunities, providing education and information about different possibilities and developing novel solutions to support more sustainable ways of living. To

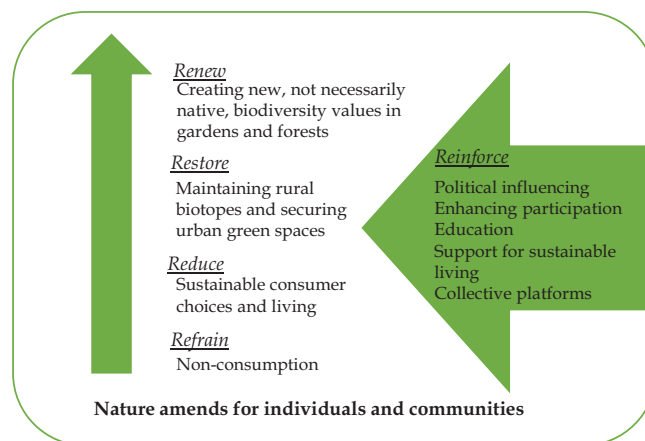


FIGURE 4 Comparison of the mitigation and conservation hierarchy and results of this study.

include these types of actions, we introduce a new *R*, *reinforce*. Reinforce works on the background of the other hierarchical steps and is connected to all of them in the form of community members' action needed to enable and facilitate other community members' actions in the conservation hierarchy. Similar to the direct and other indirect actions, these are important in combating biodiversity loss and their role should be made more visible while promoting the different possibilities to act. As these actions cannot be directly placed into the conservation hierarchy thinking, we propose them as overarching activities that are related to supporting all the steps (Figure 4).

All these “R’s together constitute ‘nature amends,’ which we suggest as the more understandable concept to be utilized when working with community members. With other actor groups, such as land use planners or business representatives, different concepts may be more relevant, such as the biodiversity offsetting itself. While the MCH is a very useful conceptualization, it creates a risk of confusion with the mitigation hierarchy and the no net loss goal. It is vital to see community members action as a part of global nature conservation targets and to support community members” know how to act, as proposed in Global Biodiversity Framework in themes where mainstreaming of biodiversity conservation and whole society approaches are called for (CBD, 2022).

5 | CONCLUSION

We studied the scalability of biodiversity offsetting at the community members level. Our study examined in a concrete way how community members translate biodiversity offsetting to individual-level action. Our results indicate that when taking into account the current

knowledge and capacity level, there are major limitations to scaling biodiversity offsetting and the mitigation hierarchy at the community members level. As the direct connections between losses and gains are difficult to establish, community members propose action that can be more easily interpreted as adding nature values rather than coupling them to nature losses. Community members also have different understandings, interests, and resources, all influencing their capacities to engage in pro-biodiversity actions. To better enable individual action, they need support from collective indirect pro-biodiversity action. We introduced the concept of nature amends as a way to accessibly discuss the mitigation hierarchy and pro-biodiversity action at the level of community members and to conceptualize the role of collective action in the MCH. Besides refrain, reduce, restore, and renew, a fifth *R*, reinforce is needed to support and enhance community members' and communities' capacities for direct and indirect pro-biodiversity action. In the future, the conceptualization could be strengthened by more empirical research on how community members understand the earlier steps in the mitigation hierarchy in relation to nature amends and their possible active part in operationalizing the concept.

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DATA AVAILABILITY STATEMENT

Data are not available—participant consent. The participants of this study did not give written consent for their data to be shared publicly, so due to the sensitive nature of the research, supporting data are not available.

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REFERENCES

Arlidge, W. N. S., Bull, J. W., Addison, P. F. E., Burgass, M. J., Gianuca, D., Gorham, T. M., Jacob, C. D. S., Shumway, N., Sinclair, S. P., Watson, J. E. M., Wilcox, C., & Milner-

- Gulland, E. J. (2018). A global mitigation hierarchy for nature conservation. *Bioscience*, *68*, 336–347.
- Berkes, F. (2021). *Advanced introduction to community-based conservation*. Edward Elgar Publishing.
- Bezombes, L., Gaucherand, S., Kerbirou, C., Reinert, M.-E., & Spiegelberger, T. (2017). Ecological equivalence assessment methods: What trade-offs between operationality, scientific basis and comprehensiveness? *Environmental Management*, *60*, 216–230.
- Business and Biodiversity Offsets Programme (BBOP). (2012). *Standard on biodiversity offsets*. BBOP. <http://bbop.forest-trends.org/guidelines/Standard.pdf>
- Convention on Biological Diversity (CBD). (2022). *Kumling-Montreal Global Biodiversity Framework*. CBD/COP/DEC15/4. <https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-04-en.pdf>
- Day, G., Fuller, R. A., Nichols, C., & Dean, A. J. (2022). Characteristics of immersive citizen science experiences that drive conservation engagement. *People and Nature*, *4*, 983–995.
- Drews, S., & van den Bergh, J. C. J. M. (2015). What explains public support for climate policies? A review of empirical and experimental studies. *Climate Policy*, *16*, 855–876.
- Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, *62*, 107–115.
- Gann, G. D., McDonald, T., Walder, B., Aronson, J., Nelson, C. R., Jonson, J., Hallett, J. G., Eisenberg, C., Guariguata, M. R., Liu, J., Hua, F., Echeverría, C., Gonzales, E., Shaw, N., Decler, K., & Dixon, K. W. (2019). International principles and standards for the practice of ecological restoration. Second edition. *Restoration Ecology*, *27*, S1–S46. <https://doi.org/10.1111/rec.13035>
- Ganzevoort, W., & van den Born, R. J. G. (2020). Understanding citizens' action for nature: The profile, motivations and experiences of Dutch nature volunteers. *Journal for Nature Conservation*, *55*, 125824. <https://doi.org/10.1016/j.jnc.2020.125824>
- Gelot, S., & Bigard, C. (2021). Challenges to developing mitigation hierarchy policy: Findings from a nationwide database analysis in France. *Biological Conservation*, *263*, 109343.
- Glenn, J. C. (2009). The futures wheel. In J. C. Glenn & T. J. Gordon (Eds.), *CD-ROM futures research methodology V3.0*. The Millennium Project.
- Hegger, D. L. T., Mees, H. L. P., Driessen, P. P. J., & Runhaar, H. A. C. (2017). The roles of residents in climate adaptation: A systematic review in the case of The Netherlands. *Environmental Policy and Governance*, *27*, 336–350.
- Hegger, D. L. T., Mees, H. L. P., & Wamsler, C. (2022). The role of citizens in sustainability and climate change governance: Taking stock and looking ahead. *Environmental Policy and Governance*, *32*, 161–166.
- Heinonen, S., & Ruotsalainen, J. (2013). Futures clinique—Method for promoting futures learning and provoking radical futures. *European Journal of Futures Research*, *1*, 1–11.
- Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). (2019). In E. S. Brondizio, J. Settele, S. Díaz, & H. T. Ngo (Eds.), *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. IPBES Secretariat.

- International Union for Conservation of Nature and Natural Resources (IUCN). (2020). *IUCN red list 2017–2020 report*. https://nc.iucnredlist.org/redlist/resources/files/1630480997-IUCN_RED_LIST_QUADRENNIAL_REPORT_2017-2020.pdf
- Jungk, R., & Müllert, N. (1987). *Future workshops: How to create desirable futures*. Institute of Social Inventions.
- Larsen, S. V., Kørnøv, L., & Christensen, P. (2018). The mitigation hierarchy upside down – A study of nature protection measures in Danish infrastructure projects. *Impact Assessment and Project Appraisal*, 36, 287–293.
- Lauttamäki, V. (2014). *Practical guide for facilitating futures workshops*. Finland's Futures Research Center, Turku School of Economics, University of Turku. isbn:9780-952-249-297-5.
- Lehtiniemi, H., Aulake, M., Paloniemi, R., & Huttunen, S. (2023). Pulling biodiversity offsetting in different directions—stakeholder frames in the preparation of the Finnish nature conservation act. *Biological Conservation*, 283, 110137.
- Maron, M., Ives, C. D. C. D., Kujala, H., Bull, J. W. J. W., Maseyk, F. J. F. J. F., Bekessy, S., Gordon, A., Watson, J. E. M. J. E. M., Lentini, P. E. P. E., Gibbons, P., Possingham, H. P., Hobbs, R. J., Keith, D. A., Wintle, B. A., & Evans, M. C. M. C. (2016). Taming a wicked problem: Resolving controversies in biodiversity offsetting. *Bioscience*, 66, 489–498.
- Metsäkeskus. (2022). *Metsätalousmaan omistus omistajaryhmittäin*. <https://app.powerbi.com/view?r=eyJrIjoiYT12OWU1ZTEtZDBmOS00MzUxLTg2ZGYtNGMxMDgzMzcyZGU1IiwidCI6ImVhMjQwMTY4LTU1NjA1NDYyMC05NmI1LWE4MjMxOWNIODBhMSIsImMiOj19>
- Milner-Gulland, E. J., Addison, P., Arlidge, W. N. S., Baker, J., Booth, H., Brooks, T., Bull, J. W., Burgass, M. J., Ekstrom, J., zu Ermgassen, S. O. S. E., Fleming, L. V., Grub, H. M. J., Hase, A. v., Hoffmann, M., Hutton, J., Juffe-Bignoli, D., Kate, K. t., Kiesecker, J., Kumpel, N. F., ... Watson, J. E. M. (2021). Four steps for the earth: Mainstreaming the post-2020 global biodiversity framework. *One Earth*, 4, 75–87.
- Moilanen, A., & Kotiaho, J. S. (2018). Fifteen operationally important decisions in the planning of biodiversity offsets. *Biological Conservation*, 227, 112–120.
- Passmore, H.-A., Lutz, P. K., & Howell, A. J. (2022). Eco-anxiety: A cascade of fundamental existential anxieties. *Journal of Constructivist Psychology*, 36(2), 138–153. <https://doi.org/10.1080/10720537.2022.2068706>
- Phalan, B., Hayes, G., Brooks, S., Marsh, D., Howard, P., Costelloe, B., Vira, B., Kowalska, A., & Whitaker, S. (2018). Avoiding impacts on biodiversity through strengthening the first stage of the mitigation hierarchy. *Oryx*, 52, 316–324.
- Pörtner, H.-O., Scholes, R. J., Agard, J., Archer, E., Arneth, A., Bai, X., Barnes, D., Burrows, M., Chan, L., Cheung, W. L., Diamond, S., Donatti, C., Duarte, C., Eisenhauer, N., Foden, W., Gasalla, M. A., Handa, C., Hickler, T., Hoegh-Guldberg, O., ...
- Ngo, H. (2021). *Scientific outcome of the IPBES-IPCC co-sponsored workshop on biodiversity and climate change*. https://boris.unibe.ch/185025/1/2021_IPCC-IPBES_ScientificOutcome.pdf
- Souza, B. A., Rosa, J. C. S., Siqueira-Gay, J., & Sánchez, L. E. (2021). Mitigating impacts on ecosystem services requires more than biodiversity offsets. *Land Use Policy*, 105, 105393.
- Spaargaren, G., & Oosterveer, P. (2010). Citizen-consumers as agents of change in globalizing modernity: The case of sustainable consumption. *Sustainability*, 2, 1887–1908.
- Statistics Finland (Stat.fi.). (2023a). *Finland in figures, environment and nature*. https://www.tilastokeskus.fi/tup/suoluk/suoluk_alue_en.html
- Statistics Finland (Stat.fi.). (2023b). *Population and society*. https://www.tilastokeskus.fi/tup/suoluk/suoluk_vaesto_en.html
- Stephan, M. J., & Chenoweth, E. (2008). Why civil resistance works: The strategic logic of nonviolent conflict. *International Security*, 33, 7–44.
- Tanguay, L., Bissonnette, J. F., Turgeon, K., & Calmé, S. (2021). Intervention levers for increasing social acceptance of conservation measures on private land: A systematic literature review and comprehensive typology. *Environmental Research Letters*, 16, 073007.
- Tupala, A.-K., Huttunen, S., & Halme, P. (2022). Social impacts of biodiversity offsetting: A review. *Biological Conservation*, 267, 109431.
- van den Born, R. J. G., Arts, B., Admiraal, J., Beringer, A., Knights, P., Molinaro, E., Polajnar, H. K., Porras-Gomez, C., Smrekar, A., Soethe, N., Vivero-Pol, J. L., Ganzevoort, W., Bonaiuto, M., Knippenberg, L., & De Groot, W. T. (2018). The missing pillar: Eudemonic values in the justification of nature conservation. *Journal of Environmental Planning and Management*, 61, 841–856. <https://doi.org/10.1080/09640568.2017.1342612>

SUPPORTING INFORMATION

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