MSc Thesis Report

Factors influencing decision-making on rewilding: a Dutch case-study

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Abstract

Rewilding has received growing attention in recent years as a promising approach to halt biodiversity loss and ecosystem degradation. Despite remaining controversial and heavily debated, little research has focused on the decision-making behind rewilding. This study aims to identify the main factors in, and their influences on, the decision-making process behind rewilding implementation. For this, an online survey was sent to 95 Dutch site managers, followed by 12 in-depth interviews. The data were analysed using a statistical analysis and a qualitative content analysis.

Five major factors of influence were found: Finances, Laws & regulations, Company policy, Personal conviction, and External pressure. Hereby Company policy and Personal conviction have a positive, stimulating effect on decision-making. The other three have a negative, inhibiting influence. Moreover, five minor factors of influence were observed: Available space, Sentiment, Presence of cultural-historical elements, Age, and (Type of) organisation. Hereof the first three factors have a negative influence on decision-making. Age and (Type of) organisation both have a neutral effect. Nevertheless, differences can be observed between younger versus older site managers in their decision-making. The same holds true for differences between different types of organisations/ownership.

For now, proponents and opponents of rewilding remain, as well as a group who is still undecided about the viability of rewilding. To promote further implementation of rewilding, currently inhibiting factors need to be addressed. It is recommended to improve flexibility of laws and regulations, increase existing subsidies, provide additional funding, and reduce external pressure, especially of governments and local residents.

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1. Introduction

For millennia, humans have shaped and altered their surroundings (Cantrell *et* al., 2017; IPCC, 2019; Navarro & Pereira, 2015b; WWF, 2020). In Europe too, ecosystems and landscapes have been strongly influenced by human activities. On the one hand, human management has had positive effects. Human interventions helped, for example, to maintain a broad variety of landscapes (Bakker, 2018). However, human activities have also had far-reaching negative effects on nature and biodiversity (Navarro & Pereira, 2015b; Pettorelli *et al.*, 2018; WWF, 2020). In the past four decades, population sizes of vertebrate species have dropped by 68% (WWF, 2020). At the same time, losses in biodiversity have been, and are to this day, increasing at an alarming rate (Pettorelli *et al.*, 2018; WWF, 2020). Human-induced climate change started to increasingly affect nature and biodiversity negatively, further worsening the situation (IPCC, 2014; IPCC, 2019; WWF, 2020).

Increasing evidence has shown traditional practices and usages of ecosystems are not sustainable, and action was and is needed (Corlett, 2016a; Navarro & Pereira, 2015b; WWF, 2020). Currently, increasing attention is being given to alternative approaches (Bakker, 2018; Perino *et al.*, 2019; Root-Bernstein *et al.*, 2018). Hereby the focus was, and is, on developing new nature areas, and restoring the ecosystems and ecosystem processes of degraded nature areas (Root-Bernstein *et al.*, 2018).

One often promoted, promising alternative to current approaches is rewilding (Lorimer *et al.*, 2015; Loth & Newton, 2018; Pettorelli *et al.*, 2018). Rewilding commonly aims to maintain, or increase, biodiversity by restoring ecological processes, ecosystems, and species (Lorimer *et al.*, 2015; Nogués-Bravo *et al.*, 2016; Pettorelli *et al.*, 2018). In order to achieve these aims, species are often (re)introduced, mainly keystone species, such as apex predators (Nogués-Bravo *et al.*, 2016; Torres *et al.*, 2018). Furthermore, rewilding often strives to create a self-sustaining and self-regulating ecosystem (Lorimer *et al.*, 2015; Pettorelli *et al.*, 2018; Torres *et al.*, 2018). As part of this, rewilding commonly involves minimal to no human management or interventions. In recent years, rewilding has been given increasing importance in nature policies and legislation (Lorimer *et al.*, 2015; Navarro & Pereira, 2015a). Not only as an approach to halt biodiversity loss, but also as an approach to climate change adaptation and mitigation (Bakker & Svenning, 2018; Cromsigt *et al.*, 2018; Pettorelli *et al.*, 2018).

Despite the growing attention paid to rewilding, uncertainties and difficulties remain about the effects of rewilding, its potential, and its implementation (Navarro & Pereira, 2015a; Nogués-Bravo *et al.*, 2016; Pettorelli *et al.*, 2018). In recent years, a lot of research has been conducted to close these knowledge gaps (e.g., Fernández *et al.*, 2017; Lorimer *et al.*, 2015; Navarro & Pereira, 2015a; Pettorelli *et al.*, 2018). Research focussing on facilitating well-grounded decision-making, however, is still rare (Pettorelli *et al.*, 2018; Schweiger *et al.*, 2019). Meanwhile, rewilding remains a controversial and heavily debated concept and practice (Lorimer *et al.*, 2015; Nogués-Bravo *et al.*, 2016; Pettorelli *et al.*, 2018). Scientists, decision-makers, site managers, and other stakeholders involved in nature management and conservation remain divided on whether rewilding should be widely implemented or not (Nogués-Bravo *et al.*, 2016; Perino *et al.*, 2019; Pettorelli *et al.*, 2018). At the same time, everyone involved in nature management and conservation strives towards the same goal of protecting nature (Bauer *et al.*, 2019). A better understanding of the decision-making on rewilding could contribute to a better understanding of this division among nature management and conservation professionals.

To get a better understanding of the decision-making on rewilding, a good understanding of the factors influencing decision-making is needed (Bauer *et al.*, 2019; Thompson, 2013). Decisions in nature management and conservation are influenced by numerous factors (McDonald-Madden *et al.*, 2008; Thompson, 2013). In addition, these decisions often have to be made in the face of complexities and uncertainties (McDonald-Madden *et al.*, 2008; Thompson, 2013; Wilson *et al.*, 2006). Major factors influencing decision-making with uncertainties involve psychological, institutional, and social factors (Bauer *et al.*, 2019; St. John *et al.*, 2011; Thompson, 2013). Hereby psychological factors relate to, for example, personal convictions (Thompson, 2013). Social factors relate to pressure from, and influences of, external stakeholders. Institutional factors consist of legal factors (i.e., laws and regulations), and organisational factors (i.e., company policy). Furthermore, monetary factors (i.e., available funding) are added to the list of major factors influencing decision-making (McDonald-Madden *et al.*, 2008; Wilson *et al.*, 2006). The reason for this is that decisions often have to be made with limited funding. This also holds true for nature management and conservation (McDonald-Madden *et al.*, 2008). Together these five factors often act like a lens through which is acted upon (Thompson, 2013).

However, a lot remains unknown about the importance of the different factors in influencing the decision-making on rewilding. This study aims to contribute to closing this knowledge gap. The objective is to get a better insight into the factors and their roles in influencing the decision-making of site managers on rewilding implementation in their management. To achieve this objective, a Dutch case study was used. Hereby an online survey was sent to Dutch site managers to generate quantitative data. Afterwards, interviews were held with a subset of survey participants to be able to obtain qualitative data. The Netherlands was selected as it has a long history of rewilding, combined with a large variety of nature types as well as organisations managing them (Bakker, 2018; Jepson, 2016; Root-Bernstein *et al.*, 2018).

In my research, the main research question is:

"*How do different decision-making factors affect the implementation of rewilding in nature management & conservation?*".

Additionally, I will answer the following sub-research questions:

- *How do Dutch site managers look at rewilding as a future management practice?*
- *What is hindering further implementation of rewilding by Dutch site managers?*

In the next chapter, I will present my theoretical framework. The first part will focus on rewilding as a concept and elaborate on the rewilding practices taken into account. Next, I will briefly discuss decision-making in nature management and conservation, followed by an elaboration on the main factors influencing decision-making considered. Chapter three will encompass a description of the study area and present my methods. Hereafter, in Chapter four, I will present the findings of my study. Chapter five will contain the discussion, followed by the conclusions of my study in Chapter six. At the end of the report, a reference list and the Appendices can be found.

2. Theoretical framework

2.1 Rewilding & rewilding practices

2.1.1 What is rewilding?

Rewilding is a concept with myriad different definitions (Deary & Warren, 2019; Lorimer *et al.*, 2015; Pettorelli *et al.*, 2018). Ever since the term was first used, the definition of rewilding has diversified and evolved over time (Jørgensen, 2015; Nogués-Bravo *et al.*, 2016). This to allow the term 'rewilding' to be used for a wide range of concepts and practices (Jørgensen, 2015; Lorimer *et al.*, 2015). Some consider this flexibility to be the strength of rewilding (e.g., Jepson & Schepers, 2016; Perino *et al.*, 2019). On the other hand, some scientists are convinced the large number of definitions of rewilding make the term lack clarity, thus hindering scientific discourse (e.g., Hayward *et al.*, 2019; Nogués-Bravo *et al.*, 2016).

Originally, rewilding was linked to the restoration of large, connected wilderness areas without human interventions (Deary & Warren, 2019; Jørgensen, 2015; Pettorelli *et al.*, 2018). These wilderness areas would serve to support keystone species like apex predators. Over time, the definitions have evolved towards a dynamic approach focused around restoring ecological processes and ecosystem functions (Nogués-Bravo *et al.*, 2016; Perino *et al.*, 2019). Species (re)introductions hereby has become the main operative tool. Nowadays, four broad forms of rewilding are being distinguished, each with different aims and visions (Pettorelli *et al.*, 2018; Table 1).

Table 1 *Types of rewilding with corresponding aim and vision (Donlan et al., 2006; Nogués-Bravo et al., 2016; Pereira & Navarro, 2015; Pettorelli et al., 2018; Svenning et al., 2016).*

Type of rewilding	Aim	Vision
Pleistocene rewilding[1, 2, 4]	Restoration of evolutionary potential and ecological processes lost during the late Pleistocene[1, 2, 4]	Enable the ecological effectiveness of megafauna[1, 4]
Trophic Rewilding[4, 5]	Restoration of top-down trophic interactions and corresponding trophic cascades[4, 5]	Promote self-regulating ecosystems[4, 5]
Ecological rewilding[3, 4]	Restoration of ecological processes[3, 4]	Promote natural processes[3, 4]
Passive rewilding[2, 4]	Restoration of natural ecosystem processes[2, 4]	Reduce human control of landscapes[2, 4]

The large number of different definitions of rewilding have caused confusion as well as contradictory views of what rewilding's main conservation aims are, or should be (Nogués-Bravo *et al.*, 2016). Nevertheless, all rewilding definitions would still have a common aim according to Lorimer *et al.* (2015): the authors state rewilding always aims to maintain, or enlarge, biodiversity, while lowering the impacts of past and present human interventions by restoring species and ecological processes. In this research rewilding will be defined as:

[1] Donlan *et al.* (2006)
[2] Nogués-Bravo *et al.* (2016)
[3] Pereira & Navarro (2015)
[4] Pettorelli *et al.* (2018)
[5] Svenning *et al.* (2016)

"*An approach to nature management and conservation that aims to maintain or increase biodiversity and reduce or reverse past and present human impacts by restoring and promoting natural ecosystem processes and functions*."
(adapted from: Lorimer *et al.*, 2015, p. 54).

In the next subchapters (2.1.2, 2.1.3, and 2.1.4), I will briefly discuss the rewilding practices considered: I) species (re)introduction, II) ecosystem restoration, and III) passive management. These practices were selected as they encompass the main strategies applied in the different types of rewilding (Nogués-Bravo *et al.*, 2016; Pettorelli *et al.*, 2018; Torres *et al.*, 2018). A second reason is that the selected practices are among the most commonly used rewilding practices in real-life nature conservation and management (Pettorelli *et al.*, 2018; Sandom *et al.*, 2013; Thompson *et al.*, 2018).

2.1.2 Species (re)introduction

The first rewilding practice considered relates to species (re)introduction (Jepson, 2016; Root-Bernstein *et al.*, 2018; Sandom *et al.*, 2013). This rewilding practice is often referred to as trophic rewilding but is also an important part of Pleistocene rewilding (Nogués-Bravo *et al.*, 2016; Svenning *et al.*, 2016). The idea behind this is that the (re)introduced species will restore trophic levels and trophic complexity (Jepson, 2016; Perino *et al.*, 2019; Svenning *et al.*, 2016). As a consequence of the restored trophic levels, interactions between the different trophic levels should lead to trophic cascading effects. These effects should promote self-regulation and self-sustaining of the ecosystem, as well as halt the loss of biodiversity and ecosystem services (Nogués-Bravo *et al.*, 2016; Sandom *et al.*, 2013; Svenning *et al.*, 2016; Torres *et al.*, 2018). Moreover, the (re)introduced species can be used to manage an ecosystem in a natural way, leading to a reduced need for human management practices such as mowing or culling (Svenning *et al.*, 2016).

Species that are (re)introduced are often keystone species (Pettorelli *et al.*, 2018; Sandom *et al.*, 2013). Keystone species are often defined as: "species that exert a disproportionally large effect on the ecosystem relative to their abundance." (Berry & Widder, 2014, p. 10). These keystone species can be divided into three categories. The first category consists of large herbivores, such as bison and cattle (Jepson, 2016; Nogués-Bravo *et al.*, 2016). A second category is comprised of large carnivores, such as the grey wolf (Nogués-Bravo *et al.*, 2016; Pettorelli *et al.*, 2018). The third category entails ecosystem engineers, such as wild boar and the beaver (Hood & Larson, 2015; Sandom *et al.*, 2013).

2.1.3 Ecosystem restoration

A second rewilding practice considered is ecosystem restoration, also known as ecological restoration or habitat restoration (Corlett, 2016a; Thompson *et al.*, 2018). The aim of this practice is to restore and bring back ecological processes, ecosystem functions, and natural disturbances (Nogués-Bravo *et al.*, 2016; Perino *et al.*, 2019; Torres *et al.*, 2018). This to restore ecological integrity and self-regulation of ecosystems (Perino *et al.*, 2019; Prior & Brady, 2017; Torres *et al.*, 2018). Frequently, ecosystem restoration serves a second aim, of returning an ecosystem to a previous state (Corlett, 2016a; Nogués-Bravo *et al.*, 2016). Ecosystem restoration is often seen as an important part of ecological rewilding as well as of passive rewilding. This rewilding practice encompasses a large variety of activities. For this research, the focus will be on two activities, namely I) leaving behind dead wood, and II) leaving behind carrion. These activities are selected as they are the most commonly applied

practices in ecosystem restoration through means of rewilding (Thompson *et al.*, 2018; Van Klink *et al.*, 2020).

Leaving behind dead wood and/or (re)introducing large pieces of woody debris has become a common method to restore degraded ecosystems and ecosystem functioning (Seibold *et* al., 2015; Thompson *et al.*, 2018; Torres *et al.*, 2018). The goal is to increase the biomass and abundance of resources, thus altering nutrient cycles in the ecosystem. Following the increases in resources, the biomass and abundance of consumers in the food web will increase as well (Seibold *et* al., 2015; Thompson *et al.*, 2018). In addition, dead wood and/or woody debris contribute to habitat heterogeneity and ecological integrity (Prior & Brady, 2017; Torres *et al.*, 2018; Willby *et al.*, 2018). Higher habitat heterogeneity in turn promotes coexistence between species, which allows for an increased species richness.

Carrion is vital for many species and can have strong effects on food webs and ecosystems, mainly by influencing nutrient cycling (Barton *et al.*, 2019; Van Klink *et al.*, 2020). Higher availability of carrion promotes scavengers and other carrion-associated species (Barton *et al.*, 2019; Perino *et al.*, 2019; Van Klink *et al.*, 2020). This in turn will increase nutrient availability, as carrion is very nutrient-rich. Following decomposition, plant biomass and nutritional plant quality will increase (Barton *et al.*, 2013; Barton *et al.*, 2019). Carrion in turn was found to have profound positive effects on ecosystem heterogeneity and ecosystem functioning, while also supporting numerous species (Barton *et al.*, 2019; Perino *et al.*, 2019; Van Klink *et al.*, 2020). These effects even occur in naturally nutrient-rich ecosystems (Van Klink *et al.*, 2020).

2.1.4 Passive management

Passive management, also known as hands-off management, is the third rewilding practice considered in this research (Lorimer *et al.*, 2015; Navarro & Pereira, 2015b; Perino *et al.*, 2019). This rewilding practice is considered the main focus of passive rewilding. The emphasis of passive management is on reducing, or entirely ceasing, human management interventions (Navarro & Pereira, 2015b; Perino *et al.*, 2019). Examples of passive rewilding measures include low-intervention forestry management and no-hunting areas, as well as allowing population and community dynamics to return and re-establish (Fernández *et al.*, 2017; Perino *et al.*, 2019). Management interventions in early restoration stages may be needed and are therefore allowed within passive management and passive rewilding (Navarro & Pereira, 2015b). The overall aim of this type of management and type of rewilding is to reduce human control of the ecosystem and the landscape (Navarro & Pereira, 2015b; Perino *et al.*, 2019; Pettorelli *et al.*, 2018; Torres *et al.*, 2018).

2.2 Factors influencing decision-making

2.2.1 Decision-making in nature management & conservation

Decisions on nature management & conservation practices are often faced with myriad complexities and uncertainties (McDonald-Madden *et al.*, 2008; Thompson, 2013; Williams & Johnson, 2013). Many decisions therefore must be made with limited knowledge (McDonald-Madden *et al.*, 2008). Numerous factors influencing the decision-making can add to the uncertainties in place (McDonald-Madden *et al.*, 2008; Thompson, 2013). Ignoring the effects of limited knowledge and uncertainties in place may lead to non-optimal decision-making (McDonald-Madden *et al.*, 2008; Thompson, 2013; Wilson *et al.*, 2006). Identifying

these factors influencing decision-making and their effects could contribute to a more optimal decision-making (McDonald-Madden *et al.*, 2008; Thompson, 2013).

For years, economic models of decision-making have been used to explain human decision-making (St. John *et al.*, 2011). These models showed the importance of monetary factors (i.e., available funding) in influencing decision-making (St. John *et al.*, 2011; Thompson, 2013). These models, however, also showed human decision-making is not strictly financially rational (St. John *et al.*, 2011). This as decisions in nature management and conservation are often made with restricted knowledge and many uncertainties, inhibiting completely rational decision-making (McDonald-Madden *et al.*, 2008; Williams & Johnson, 2013; Wilson *et al.*, 2006). Major factors influencing decision-making with uncertainties involve psychological, institutional, and social factors (Bauer *et al.*, 2019; St. John *et al.*, 2011; Thompson, 2013). Psychological factors hereby encompass, for example, personal convictions, attitudes, and value orientations (Clayton, 2019; St. John *et al.*, 2011; Thompson, 2013). Social factors relate to influence and pressure exerted by external stakeholders. Institutional factors consist of legal factors (i.e., laws and regulations), and organisational factors (i.e., company policy). These five factors are important as they not only influence decisions individually, but may also interact with each other (Durant *et al.*, 2019; Thompson, 2013). Together these five factors often act like a lens through which decisions are made (Durant *et al.*, 2019; St. John *et al.*, 2011; Thompson, 2013).

2.2.2 Monetary factors

Nature management and conservation often must work with limited funding (McDonald-Madden *et al.*, 2008; Wilson *et al.*, 2006). This makes money a limiting factor in nature management and conservation, negatively affecting optimal decision-making (Caple, 2012; McDonald-Madden *et al.*, 2008). Distribution of the limited financial resources are therefore considered a major issue (Wilson *et al.*, 2006). Financial uncertainties, for example about the effects of climate change, further limit the ability of decision-makers to make optimal decisions (McDonald-Madden *et al.*, 2008; Wilson *et al.*, 2006). To best deal with limited funding and uncertainties, many managers are choosing risk-averse management and conservation practices (Carver, 2016; McDonald-Madden *et al.*, 2008). As uncertainties remain around the impacts of rewilding, the risk-averse approach combined with limited funding could be a reason for site managers not to implement rewilding (Carver, 2016; McDonald-Madden *et al.*, 2008; Pettorelli *et al.*, 2018).

On the other hand, limited funding could also serve as a reason to do implement rewilding practices, especially the passive management practice. Passive management after all involves much lower management costs compared to active management (Benayas & Bullock, 2015; Corlett, 2016b; Navarro & Pereira, 2015b). Costs could be further reduced by (re)introducing herbivores for grazing (Svenning *et al.*, 2016). Furthermore, high quality wilderness often provides enhanced ecosystem services (Cerqueira *et al.*, 2015; Corlett, 2016b; Petterelli *et al.*, 2018). Examples include flood prevention, supply of freshwater, removal of air pollutants, reductions in soil erosion, and carbon sequestration. Additionally, rewilding often leads to increased opportunities for recreation and tourism, if allowed in an area as part of the rewilding management (Bakker, 2018; Cerqueira *et al.*, 2015; Corlett, 2016b). If so, these new opportunities can, in turn, serve as additional sources of income (Bakker, 2018; Cerqueira *et al.*, 2015).

2.2.3 Legal factors

Legal factors form a second important type of factors influencing decision-making in nature management and conservation (Bakker, 2018; Thompson, 2013). Nowadays, countless laws, regulations, and policies are in place, focussing on nature management and conservation (Bakker, 2018; Navarro & Pereira, 2015a). Site managers and decision-makers must take these legal factors into account. However, the large number of laws, regulations, and policies in place can give a perceived sense of restriction in the decision-making space (Thompson, 2013).

Current nature management and conservation policies and legislations are often based on a 'compositionalist' paradigm (Pettorelli *et al.*, 2018). This paradigm promotes a focus on maintaining historical conditions of habitat types, and the presence of corresponding species and their past assemblages (Bakker, 2018; Pettorelli *et al.*, 2018). Broad implementation of rewilding practices could be hindered by this currently dominating paradigm, or at least be perceived to be so. Moreover, some laws, regulations, and policies directly inhibit implementation of specific rewilding practices. An example of this is related to carrion. Since large mammals are considered cattle, site managers are often forced to remove them as part of EU biohazard legislation (Jepson, 2016; Van Klink *et al.*, 2020).

2.2.4 Organisational factors

Organisational factors too can have a large influence on decision-making (Carver, 2016; Thompson, 2013). Examples of organisational factors include attitudes, beliefs, and visions of the organisation a site manager is working for. Hereby not only the attitudes, beliefs, and visions towards rewilding are important, but also the attitudes, beliefs, and visions about what good nature is. These organisational factors in turn influence the decision-making of site managers (St John *et al.*, 2011; Thompson, 2013). This can be directly as well as indirectly. Direct influences can, for example, take the form of company policies, for example on how much dead wood can be left behind, if any (Thompson, 2013). Indirect influences include, for example, a perceived restriction to decision-making, or a perceived pressure to act in a certain way (St John *et al.*, 2011; Thompson, 2013).

When a large diversity in types of ownership exist, the type of ownership also becomes an important influencing factor (Deary & Warren, 2017; Deary & Warren, 2019; Kansky & Knight, 2014). Hereby the key distinctions are between governmental organisations, NGOs/private organisations, and private owners. Each ownership type has its own approaches, objectives, and motivations (Dallimer & Strange, 2015; Deary & Warren, 2017). This diversity in approaches, objectives, and motivations is further increased when looking at the level of individual organisations. This makes the (type of) organisation a site manager is working for a key factor influencing their decision-making.

2.2.5 Psychological factors

Another key type of factors influencing the decision to implement rewilding or not are the psychological factors of a site manager (Bauer *et al.*, 2019; Clayton, 2019; Thompson, 2013). Psychological factors hereby encompass the attitude towards nature and towards rewilding, value orientations, vision of nature, and human-nature relationship of the site manager and/or decision-maker (Bauer *et al.*, 2019; Clayton, 2019; De Groot & Van den Born, 2003). These psychological factors in turn are strongly affected by other factors, such as heuristics, decision

biases, moral concerns for nature, gender, age, sentiment, and past experiences (Batavia *et al.*, 2020; Bauer *et al.*, 2019; Clayton, 2019; Thompson, 2013). Age and gender hereby are two of the most important and widely used factors (Kansky & Knight, 2014; Linnell & Jackson, 2019). The reason for this is that age and gender often explain variations in attitudes to a large extent.

An important factor of influence here is peoples' 'fear of the unknown' (Bauer *et al.*, 2019; Carver, 2016). Many managers, decision-makers, and landowners have a strong desire to maintain in control (Carver, 2016). This applies to both the nature management as well as the conservation sector. When applying rewilding, there is no clear picture of what will happen to an area. For many professionals, this uncertainty about what will happen is scary and could influence their decision-making (Auster *et al.*, 2020; Buller, 2013; Carver, 2016). The same holds true for the general public, who could fear (re)introduced species, such as a wolf. In turn, they could pressure an organisation to not follow up on their rewilding plans (Auster *et al.*, 2020; Lescureux *et al.*, 2011; Ward, 2019).

2.2.6 Societal factors

The final type of factor considered here are societal factors. Societal factors hereby refer to external pressure exerted by the media, citizens, co-operators, or other external stakeholders (Fernandes *et al.*, 2019; Thompson, 2013). With the increasing importance of stakeholder inclusion over the years, the influence of societal factors in decision-making increased as well (Fernandes *et al.*, 2019; Root-Bernstein *et al.*, 2018). In nature management and conservation this trend has been no different (Armitage *et al.*, 2012; Root-Bernstein *et al.*, 2018). However, having to collaborate and make decisions together with increasingly larger groups of stakeholders has also brought about its own new challenges (Armitage *et al.*, 2012; Lorimer *et al.*, 2015; Root-Bernstein *et al.*, 2018).

Creating and maintaining social and political support has become increasingly important (Root-Bernstein *et al.*, 2018; Thompson, 2013). A lack of social and/or political support can lead to conflicts and intense external pressure (Lorimer *et al.*, 2015; Thompson, 2013). Intense external pressure from stakeholders was found to often be the driving force behind decision-making (Brown *et* al., 2011; Thompson, 2013). Support from stakeholders is therefore important to maintain, and thus to keep in mind when making decisions (Bauer *et al.*, 2019; Fernandes *et al.*, 2019; Root-Bernstein *et al.*, 2018). To achieve this, it is important to take public opinions on, and attitudes towards, rewilding into account (Bauer *et al.*, 2009; Bauer *et al.*, 2019; Perino *et al.*, 2019). Other factors that can influence public support also need to be taken into account. Examples include sentiment of local residents and visitors towards a nature area, or the presence of cultural-historical elements (Bauer *et al.*, 2019; Deary & Warren, 2019). After all, public opinion and support are important influencers of the final decision to implement rewilding in an area or not (Bauer *et al.*, 2009; Brown *et* al., 2011; Thompson, 2013).

3. Methods

3.1 Study area

This study was conducted using a Dutch case study. The Netherlands was selected for a number of reasons. One reason being that rewilding currently is a hot topic in the Netherlands, receiving lots of attention (Bakker, 2018). A second reason is that the Netherlands has a large variety of nature types and organisations managing them (Bakker, 2018; Jepson, 2016; Root-Bernstein *et al.*, 2018). This allows for a diverse dataset. Furthermore, the Netherlands has a relatively long history of rewilding, when compared with other countries (Bakker, 2018; Root-Bernstein *et al.*, 2018). Since the last decades of the 20th century, the Netherlands has seen a fundamental change in the way society looks at, interacts with, and deals with nature (Bakker, 2018; Ministerie van Economische Zaken, 2014; Rientjes, 2002). This shift, in turn, has led to shifts in nature and conservation policy (Ministerie van Economische Zaken, 2014; Rientjes, 2002). Policies moved towards promoting robust, multifunctional nature areas (Ministerie van Economische Zaken, 2014). Debates on rewilding as well as numerous rewilding projects (e.g., the Oostvaardersplassen) were a major part of these developments (Bakker, 2018; Jepson, 2016). Consequently, rewilding has become a broadly known term under Dutch site managers.

The Netherlands is located in the north-western part of the European mainland. It has a surface area of 41,543 km^2, of which 4,990 km^2 (12.0%) is classified as forests or other terrestrial nature areas (CBS, PBL, RIVM, & WUR, 2020; CBS, 2018). The organisations responsible for managing and conserving this nature can roughly be divided into four types of ownership/organisations. Firstly, the State Forestry Service (Staatsbosbeheer), which manages 273,000 hectares of nature (Staatsbosbeheer, 2020). Secondly, Nature Monuments (Natuurmonumenten), which manages 109,000 hectares of nature (Natuurmonumenten, 2019). Thirdly, LandscapesNL (LandschappenNL), which encompasses the Provincial Landscapes (Provinciale Landschappen) that together manage 114,000 hectares of nature (LandschappenNL, 2020). The final category consists of private landowners, such as estates, private forest owners, and the Forest Groups (Bosgroepen). Private landowners in total own and manage nearly 120,000 hectares of forest and nature areas in the Netherlands (Federatie Particulier Grondbezit, 2020).

3.2 Survey

To gain information about the implementation of rewilding and the factors influencing this decision, I used a survey (see Appendix 1 for the Dutch version, and Appendix 2 for the English version). Surveys were selected as they allow for cost- and time-efficient collection of quantitative data from a large number of participants (Jones *et al.*, 2013; Ponto, 2015). Another major advantage of surveys is that they allow for standardisation (Frechtling, 2002). This is advantageous as it allows for comparisons to be made during statistical analysis. In addition, surveys are very suitable instruments for exploring and describing human behaviour, attitudes, and opinions, making surveys useful for my research (Ponto, 2015). Finally, surveys were selected as they can cover a variety of topics (Frechtling, 2002). One disadvantage of surveys is that they may lack depth by only providing a general picture (Frechtling, 2002; Jones *et al.*, 2013). In order to deal with this, interviews were held to provide in-depth data.

Questions were based upon previous work within the same project, combined with input from previous studies addressing similar issues (e.g., Bauer *et al.*, 2019; Bauer *et al.*, 2009; De Groot & Van den Born, 2003; Vodegel, 2020). Alterations and further additions to the questions were made to best fit my research. The survey consists of 14 questions, distributed over three sections. The first section consists of three multiple-choice questions to collect general information about the site managers. A second section consists of seven questions, which include closed yes/no-questions and questions using a three- or five-level Likert scale. These questions focus on the present-day situation. Hereby the aim is to get a better insight into the factors that influenced the decision to implement rewilding or not in the current management. Section three consists of four questions. In this section, there is a mix of closed multiple-choice questions and a ranking question. The scope of section three is on the future. Questions hereby relate to factors inhibiting further implementation of rewilding, and the viability of rewilding as a management practice for the future. After completing the survey, the site managers were asked about the possibility of an interview (see chapter 3.3 for further elaboration). Moreover, the respondents were asked whether they wished to receive my thesis report after completion. This as 'reward' for participating in my research.

The survey was sent to 95 Dutch site managers via e-mail. In the e-mail, the site managers could find a link to a Google Form where they could fill in the online survey. Site managers were selected semi-random. This to ensure all four categories of (types of) organisations (Staatsbosbeheer, Natuurmonumenten, LandschappenNL, and private landowners) were all well represented. To maximise the return rate, each respondent who did not completed the survey, received a reminder. The reminder was sent two weeks after the initial invite to fill in the survey. In the end, I achieved a response rate of 50.5%. For more information on age, gender, and (type of) organisation distribution, see Appendix 4. The data retrieved from the surveys served to provide the basis (i.e., the general picture) to answer my research questions.

3.3 Interviews

Following the survey, interviews were performed with a subset of the participants of the survey. Interviews were chosen as they are especially useful for exploring a participant's experiences, motivations, views, and beliefs (Gill *et al.*, 2008; Ryan *et al.*, 2009). This holds true in particular when the focus of the interview is on a specific phenomenon of interest, in this case the decision-making process on rewilding implementation (Ryan *et al.*, 2009). In addition, interviews allow for placing the research focus on the participant's views (Young *et al.*, 2018). The semi-structured type of interview was selected. This as the semi-structured character allows for predetermined questions to clarify the areas to be explored, while still allowing an interviewee to elaborate (Gill *et* al., 2008; Young *et al.*, 2018). Semi-structured interviews focus on allowing the interviewee to tell his/her story (Gill *et al.*, 2008; Ryan *et al.*, 2009). In this case, richer data can be obtained with semi-structured interviews compared to structured or unstructured interviews (Ryan *et al.*, 2009).

The interviews served to complement the quantitative data gathered from the surveys with deepening, qualitative data. Whereas the survey served to collect a large dataset, the interviews served to get personal, in-depth elaborations of the choices made. Participation in these interviews was voluntarily. At the end of the survey, responding site managers were asked whether they were willing to participate. The interviews lasted around 45 minutes and were held in Dutch. Due to the Corona virus (Covid-19) crisis, the interviews took place via Skype. In the end, I interviewed 12 site managers. See Appendix 4 for age, gender, and (type of) organisation distributions.

Overall, the aim of the interviews was to get a more complete and better understanding of decision-making of site managers related to the implementation of rewilding. This by asking the interviewed site managers to elaborate on their answers from the survey, for which some questions were prepared. Additionally, the interview aimed to promote the site managers to share their own experiences and opinions. By letting the site managers tell their story, the goal was to gather information and insights that may not have been retrieved through the survey or interview questions. The personal stories, experiences, and opinions retrieved from the interviews served to provide further elaboration and context to the decisions made. In turn, the outcomes of the interviews were used to substantiate the findings of the survey.

3.4 Data analysis

3.4.1 Survey

Data retrieved from the survey were ordered in Excel 2016. Next, the data were coded. This to allow for the statistical analysis to be conducted. Coding was applied to each question, with additional within-question divisions if needed. For the coding scheme used, see Appendix 3. A next step involved the survey data analysis using the statistical analysis software SPSS Statistics 27. For the analysis, the data retrieved from the 'General questions'-section was used. These data included gender (nominal data), age class (ordinal data), and (type of) organisation a site manager is working for (nominal data). Additionally, the clustered age class variable (ordinal data) was created. This to test whether larger age classes would yield different results compared to the smaller age classes as used in the survey. The aim of the statistical analysis was to determine the importance of these factors in influencing the decision-making process of the site managers on rewilding implementation. Statistical tests were conducted on the results of six questions from the survey. These questions included the questions 4, 6, and 8 (on the current implementation of the three rewilding aspects), question 11 (on the perceived viability of rewilding as a future management approach), question 12 (on the intention to implement more rewilding practices in the future), and question 13 (on experiencing factors inhibiting further implementation of rewilding). For the analyses, Chi-Square tests were used (McCrum-Gardner, 2008; Neideen & Brasel, 2007). When a Chi-Square test reported a significant association, a Cramér's V test was run to test the effect size. Following the data analysis, the data were explored and visualised using boxplots and pie charts. For these visualisations, SPSS Statistics 27 as well as Excel 2016 were used.

3.4.2 Interviews

The interviews were recorded in order to later be transcribed. Each interview was transcribed in Word as soon as possible. This to achieve the most accurate representation possible of the interview. The transcription was done according to the edited transcription approach (Smith, 2019). Following the transcription process, the transcript was read through a second time to check for possible typing or transcribing errors. Due to privacy, all transcripts were anonymised.

After transcribing the interviews, I moved on to the analysis part. Qualitative content analysis was selected for this as this type of analysis is very useful to analyse multi-faceted and sensitive phenomena (Elo & Kyngäs, 2008; Vaismoradi *et al.*, 2013). Moreover, content analyses are very useful for reporting of common issues stated in qualitative data (Vaismoradi *et al.*, 2013). As part of the analysis of the interviews, I started to analyse the transcripts of the

interviews in Word 2016. Hereby I made use of inductive, open coding, whereby the concepts and codes are derived from the data (Elo & Kyngäs, 2008; Vaismoradi *et al.*, 2013). The transcripts were analysed line by line. Comments addressing important subjects were given brief labels (codes) (see Appendix 5). Examples of important subjects include I) factors and/or stakeholders affecting the decision-making, II) factors and/or stakeholders affecting or hindering the implementation and execution of rewilding practices, and III) experiences, views, and opinions of site managers on rewilding. After applying the codes to a first interview as a sample, changes were made where required and new codes were created if needed. The new codes were applied to a new sample interview. This iterative process repeated itself until all interviews were coded. Next, different interview transcripts were compared and analysed to check for recurring categories and trends. The results from the analysis were used to complement the findings of the survey.

Illustrative examples and elaborations were labelled in the transcripts to allow for 'visualisations' of the interviews. These examples were selected to illustrate the views, considerations, and experiences of the site managers in relation to rewilding and its implementation. This to allow for in-depth elaborations and examples on the decisions made regarding rewilding, as well as the factors influencing them. Hereby the goal was to complement and deepen the insights retrieved from the findings of the survey.

4. Results

4.1 Factors influencing the decision to (re)introduce species

The overall implementation rate of species (re)introduction was 52.1% among survey participants (Appendix 4). Reintroduced species were often small animal species that were lost from the area, but were brought back, often as part of nature conservation or ecosystem restoration programs. Introduced species often included different species of cattle (e.g., Highland cattle) or sheep for grazing. Some site managers also reported introducing new tree species, as part of forest conversion plans in the light of climate change.

Finances was a major factor reported to slightly negatively influence decision-making (Figure 1, Table 2). This held true for both site managers who (re)introduced species and those who did not. The negative influence was often due to the financial costs of preparations and research prior to the actual (re)introduction. Before a species can be (re)introduced, extensive research needs to be conducted into the effects the new species, especially with animal species.

Laws & regulations was a nearly neutral factor of influence for many site managers who did (re)introduce species (Figure 1, Table 2). Survey respondents who did not implemented species (re)introduction, experienced Laws & regulations as slightly more negative. Several of the interviewees stated this had to do with strict laws and regulations, especially Natura 2000. One interviewee also reported to be limited by regulations of the SNL (Subsidies Natuur & Landschap; Subsidy Nature & Landscape): "Some management subsidies don't allow the use of non-native species. That is really limiting." (anonymous 8, organisation 2, personal communication, November 9, 2020). All site managers considered Laws & regulations an important, but often indirect, factor in their decision-making.

Company policy was generally considered a major factor. Survey participants who (re)introduced species rated the influence of Company policy positively, whereas those who did not re(introduce) species reported a neutral influence (Figure 1, Table 2). The positive rating was often related to high levels of personal freedom site managers experienced within their organisation and its company policies.

Personal conviction was rated to have a slightly positive influence on decision-making amongst both groups (Figure 1, Table 2). Many interviewees indicated their own personal conviction - their opinion - was an important, if not the most important, factor in their decision-making process. Proponents of species (re)introduction were more likely to (re)introduce species, whereas opponents more frequently tended to follow their conviction and not (re)introduce species. Among implementers as well as non-implementers, several interviewees reported to do stimulate dispersal of species.

External pressure was reported by both groups to slightly negatively influence decision-making on species (re)introduction (Figure 1, Table 2). Nearly all interviewees reported experiencing pressure from external stakeholders, such as local residents, local municipalities, and/or Provinces, negatively affecting their decision-making. Among site managers, a large variety existed in the perceived importance of External pressure as a factor influencing decision-making.

A final important factor, which negatively affected decision-making on species (re)introduction, was the size of an area. Several interviewees stated to have a desire to (re)introduce species in their areas. However, as the size of the area was considered too small, they decided not to (re)introduce species. Like one interviewee stated: "I would love to have deer, but the area is simply too small, with too many roads and too densely populated." (anonymous 8, organisation 2, personal communication, November 9, 2020).

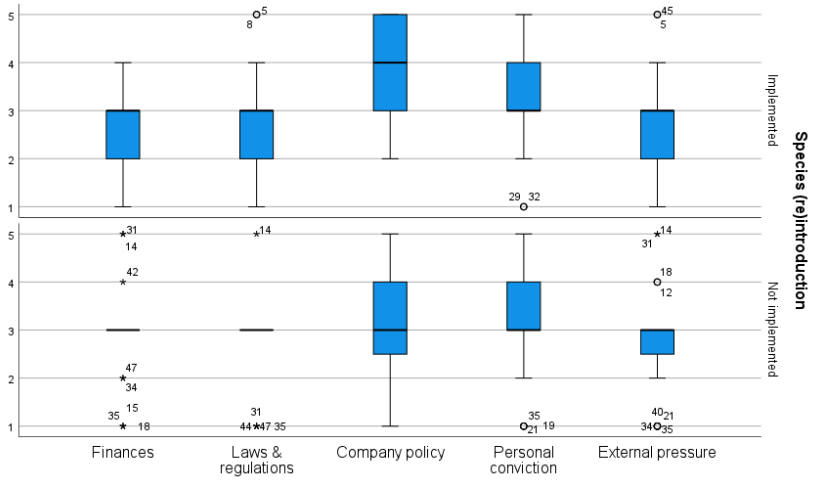

Figure 1 Rating of factors influencing the decision to (re)introduce species (N = 48). *The values are presented on a scale from 1 (strongly negative) via 3 (neutral) to 5 (strongly positive).*

Table 2 The mean and standard deviation (SD) per factor influencing the decision to (re)introduce species (N = 48). *Mean values are presented on a scale from 1 (strongly negative) via 3 (neutral) to 5 (strongly positive).*

Species (re)introduction	Factor influencing the decision	Mean	SD
Implemented (N = 25)	Finances	2.640	0.810
	Laws & regulations	2.960	0.935
	Company policy	4.040	1.060
	Personal conviction	3.480	1.159
	External pressure	2.640	1.150
Not implemented (N = 23)	Finances	2.870	1.014
	Laws & regulations	2.739	0.915
	Company policy	3.000	1.000
	Personal conviction	3.348	1.229
	External pressure	2.826	1.114

When tested, no significant associations were found between the decision to (re)introduce species and gender, age class, or clustered age class. Hence, these factors were considered to have little to no importance in influencing the decision-making on species (re)introduction. However, a significant association was found between the (type of) organisation and the decision to (re)introduce species (χ^2 (3) = 20.886, p = < 0.001). The effect size for this association, Cramér's V, was moderately high (0.660). Survey participants of the State Forestry Service reported the highest implementation rate of species (re)introduction (93.3%). Nature Monuments and LandscapesNL followed with a respective species (re)introduction rate of 53.3% and 30.0%. Participating private landowners reported a 0.0% species (re)introduction rate. Interviewees reported three main reasons for these differences. Firstly, private landowners' areas were considered too small to (re)introduce species. LandscapesNL

manages larger areas, with Nature Monuments and the State Forestry Service managing the largest areas, therefore having the most available space for species (re)introduction. Secondly, private landowners and LandscapesNL frequently stated to lack funding and/or expertise to successfully (re)introduce species. Nature Monuments and the State Forestry Service often did. Thirdly, the State Forestry Service was and is involved in numerous conservation or restoration programs funded by the state or the EU.

4.2 Factors influencing the decision to apply ecosystem restoration

Overall implementation rate of ecosystem restoration was reported to be 83.3% among participants of the survey (Appendix 4). Interviewees who stated to leave behind dead wood, did so in a variety of forms of dead wood. Frequently occurring forms included: standing dead wood, lying dead wood, floating/sunken dead wood, woody debris from logging, and broken branches (e.g., following a storm). Some site managers stated to actively create more dead wood, for example by ringing trees. Carrion left behind only included game species. The majority of site managers who leave behind carrion reported to only leave behind animals who died in their areas. A small number said to place carrion in their areas, as part of special programs. These imported carcasses consisted of animals hit by cars and/or animals shot by hunters elsewhere.

Finances was regarded a factor of minor importance in influencing decision-making on ecosystem restoration implementation. It was generally rated to slightly negatively influence the decision-making of both implementers as well as non-implementers of ecosystem restoration (Figure 2, Table 3). The explanation offered by interviewed site managers was that removing dead wood was expensive and not profitable for them. “We have a lot of small areas, so removing the dead wood from the forest is simply not financially viable. We would be losing money if we did.” (anonymous 1, organisation 1, personal communication, November 16, 2020).

Laws & regulations was considered a major factor, rated by both groups to slightly negative influence decision-making, but less negative than Finances (Figure 2, Table 3). For the majority of respondents, the main reason for this was national and EU laws and regulations prohibiting leaving carcasses behind. This because of biohazard and human health risks. Several interviewees described these regulations as something they needed to take into consideration but felt only little pressure arise from them.

Company policy was rated positively by site managers who did not implement ecosystem restoration, and even more positively by those who did (Figure 2, Table 3). All regarded Company policy to be an important factor. The majority of site managers who leave behind dead wood and/or carrion experienced positively, stimulating company policies. One interviewee, for example, said: “We are currently in a process of forest conversion. We are hereby stimulated to leave some of the dead wood behind.” (anonymous 1, organisation 1, personal communication, November 16, 2020). Interviewees who did not apply ecosystem restoration, however, also positively experienced the stimulating nature of these company policies. This as these stimulating policies allowed for more space in their decision-making compared to enforcing company policies.

Personal conviction was considered a major factor by some, and a minor factor by others. Site managers who did implement ecosystem restoration measures reported a strongly positively influence of Personal conviction (Figure 2, Table 3). Among those who did not implement ecosystem restoration, personal conviction was rated only slightly more positively than neutral. These ratings again were often strongly linked to decision-making space provided by the organisations participating site managers were working for.

External pressure, a key factor, influenced decision-making negatively, especially among survey participants who do not leave behind dead wood and/or carrion (Figure 2, Table 3). Nearly all interviewees reported to experience external pressure, especially from local residents and visitors. Over the years external pressure had increased and was reported to still be increasing. The majority of the interviewed site managers did not leave behind dead wood and/or carrion because of external pressure. Many of those who did, do so only in places where visitors are not allowed, or where they cannot see it. Available space and sentiment of visitors were hereby considered important factors of influence as well.

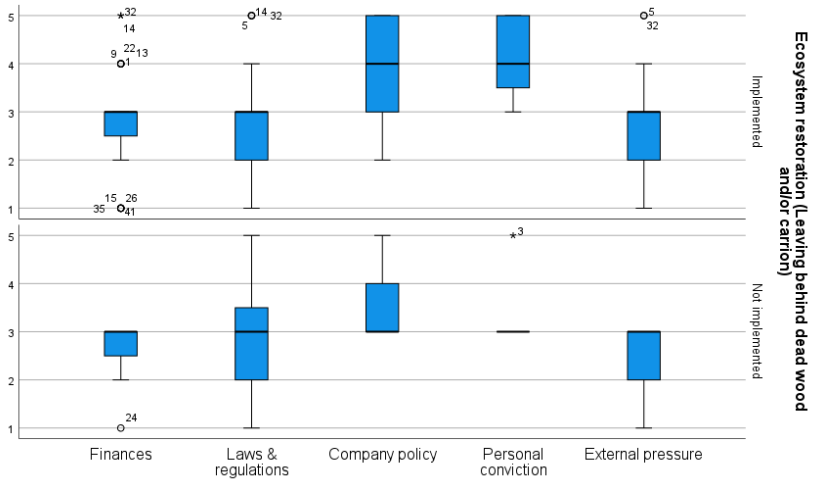

Figure 2 Rating of factors influencing the decision to apply ecosystem restoration (by leaving behind dead wood and/carrion) (N = 48). *The values are presented on a scale from 1 (strongly negative) via 3 (neutral) to 5 (strongly positive).*

Table 3 The mean and standard deviation (SD) per factor influencing the decision to apply ecosystem restoration (by leaving behind dead wood and/or carrion) (N = 48). *Mean values are presented on a scale from 1 (strongly negative) via 3 (neutral) to 5 (strongly positive).*

Ecosystem restoration (Leaving behind dead wood/carrion)	Factor influencing the decision	Mean	SD
Implemented (N = 40)	Finances	2.825	0.958
	Laws & regulations	2.775	1.025
	Company policy	3.950	0.932
	Personal conviction	4.100	0.778
	External pressure	2.825	0.844
Not implemented (N = 8)	Finances	2.625	0.744
	Laws & regulations	2.875	1.356
	Company policy	3.500	0.756
	Personal conviction	3.250	0.707
	External pressure	2.500	0.756

The statistical analyses yielded no significant associations between decision-making on ecosystem restoration and gender, age class, clustered age class, or (type of) organisation. Therefore, all four factors were considered to have little to no influence on the decision-making process on the implementation of ecosystem restoration.

4.3 Factors influencing the decision to apply passive management

Among survey participants, the implementation rate of passive management was 27.1% (Appendix 4). An important note for all interviewees who implemented passive management was safety. All specifically stated to apply management interventions to ensure the safety of employees and visitors remained guaranteed.

Finances was overall considered a major factor of influence, but variation existed between site managers. Implementers of passive management reported a nearly neutral influence, whereas non-implementers experienced a slightly positive influence of Finances (Figure 3, Table 4). Interviewees with many small areas reported the costs of active management often exceeded the benefits, making a passive management more interesting. Site managers who did not implement passive management often stated there to be a need to harvest wood in order to generate revenue.

Laws & regulations was regarded an important factor influencing the decision-making process. It had a slightly negatively influence among implementers of passive management, while rating slightly positive among site managers who did not implement it (Figure 3, Table 4). Several interviewees reported this having to do with their areas being protected, for example under Natura 2000. Many of these protected areas, such as meadow bird grasslands, require management in order to be maintained, thus ruling out the possibility of implementing a passive management. The same line of reasoning also applied to areas with important cultural-historical elements.

Company policy was an important factor with a positive influence being reported by both groups (Figure 3, Table 4). Interviewees who did implement passive management often stated it to be part of company policies and management plans for their areas. One of the interviewees, for example, stated: “Passive management is part of the process nature [procesnatuur] prescribed by the management plans that apply to my area.” (anonymous 4, organisation 3, personal communication, November 11, 2020). Site managers who did not implement passive management frequently referred to the protected status of their areas, and corresponding company policies.

Personal conviction, a major factor, was rated to strongly positively influence decision-making among both groups (Figure 3, Table 4). The majority of interviewees stated personal conviction was an important influencing factor in their decision-making. Some site managers said their own views of, and experiences with, their areas and previous management activities influenced their decision-making on the implementation of passive management. “I am strongly guided by what I see around me and what I have learned over the years.” (anonymous 3, organisation 4, personal communication, November 12, 2020). The presence of cultural-historical elements too played an important role for some site managers.

External pressure was regarded a minor factor, slightly negatively influencing decision-making of implementers, and having a nearly neutral influence according to non-implementers (Figure 3, Table 4). A few interviewees reported receiving some negative feedback from visitors and local farmers and residents. An example given by an interviewee: "There are also people who don't like it. They wonder if we do it [leaving behind dead wood] as a means to save money. They view it as messy or chaotic." (anonymous 6, organisation 3, personal communication, November 3, 2020). Sentiment of visitors, especially elderly, played an important role in their dislike of passively management nature areas. "Many people have seen the area they knew so well change into 'new' nature. Some people still struggle with that." (anonymous 4, organisation 3, personal communication, November 11, 2020). Its influence on the decision-making on passive management was considered to be minor. For the majority, external pressure was no major factor in their decision-making on the implementation of passive management.

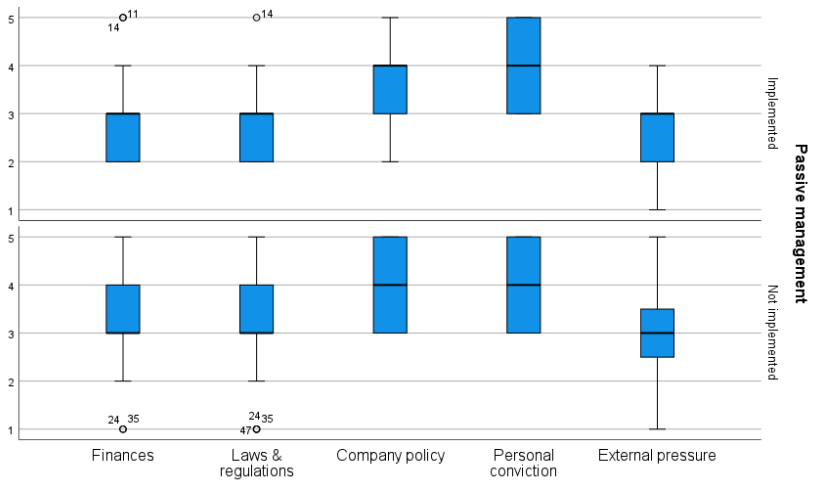

Figure 3 ***Rating of factors influencing the decision to apply passive management (N = 48).*** *The values are presented on a scale from 1 (strongly negative) via 3 (neutral) to 5 (strongly positive).*

Table 4 The mean and standard deviation (SD) per factor influencing the decision to apply passive management (N = 48). *Mean values are presented on a scale from 1 (strongly negative) via 3 (neutral) to 5 (strongly positive).*

Passive management applied	Factor influencing the decision	Mean	SD
Implemented (N = 13)	Finances	3.077	1.038
	Laws & regulations	2.923	0.862
	Company policy	3.615	1.044
	Personal conviction	4.000	0.816
	External pressure	2.769	0.927
Not implemented (N = 35)	Finances	3.143	0.879
	Laws & regulations	3.371	1.087
	Company policy	3.615	0.804
	Personal conviction	4.000	0.804
	External pressure	2.971	1.071

When tested, no significant associations were found between the decision-making on the implementation of passive management and gender, age class, clustered age class, or (type of) organisation. Hence these four factors were considered to have little to no importance in influencing the decision-making on the implementation of passive management.

4.4 Rewilding as a future management approach

Of survey participants, 31% stated to consider rewilding a viable management approach for their area for in the future (Figure 4). "I am a proponent of rewilding. I believe this is the way forwards for the long term. Also for maintaining biodiversity." (anonymous 11, organisation 3, personal communication, November 11, 2020). Site managers with this view, often already had one or several rewilding practices implemented in their current management. Some interviewees who were part of this group, considered rewilding viable for future management as it would simply be a continuation of their current management.

On the contrary, 38% of survey respondents reported to consider rewilding as a non-viable future management approach (Figure 4). Site managers with this opinion often had only one or none of the rewilding practices implemented in their current management. Two reasons were frequently reported by interviewees as to why they considered rewilding not viable for the future. A first reason was their personal conviction on rewilding as a management and/or conservation approach. The second reason related to the nature types occurring in their areas. Site managers responsible for grasslands, for example, considered rewilding not viable as it would result in the loss of the grasslands and its corresponding biodiversity. "If we wouldn't manage our terrains, species would be lost." (anonymous 2, organisation 1, personal communication, November 13, 2020).

The remaining 31% of site managers reported to consider rewilding as potentially viable for future management (Figure 4). Interviewees with this view had different reasons to substantiate their views. One interviewee said rewilding certain parts of her area might be a solution to cut costs. This as long as it would not negatively affect the remaining parts, or the biodiversity of the area, too much. Another interviewee mentioned to have the ambition to implement more rewilding, but currently lacked space for it. Some interviewees considered rewilding not to be viable in its current form, or in the society as it is nowadays. "Personally, I believe it [rewilding] is part of the system. However, it is not really possible in today's society." (anonymous 5, organisation 3, personal communication, November 16, 2020).

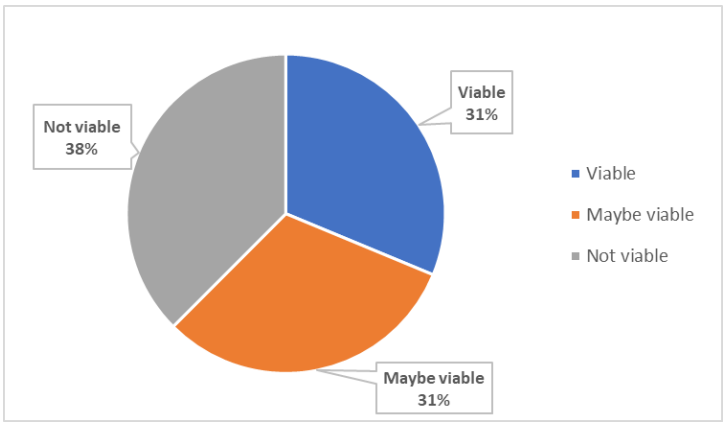

Figure 4 Viability of rewilding as a future management approach according to survey participants (N = 48).

When asked about their intentions to implement more rewilding in the future, 36% of survey participants stated to have the intention to implement more rewilding in the future (Figure 5). An additional 29% reported to maybe implement more rewilding practices in the future. The remaining 35% said to have no intention of implementing more rewilding in the future. Nearly all interviewees, stated their reasoning behind their intentions to implement more rewilding practices or not were the same as those behind their view on the viability of rewilding in the future.

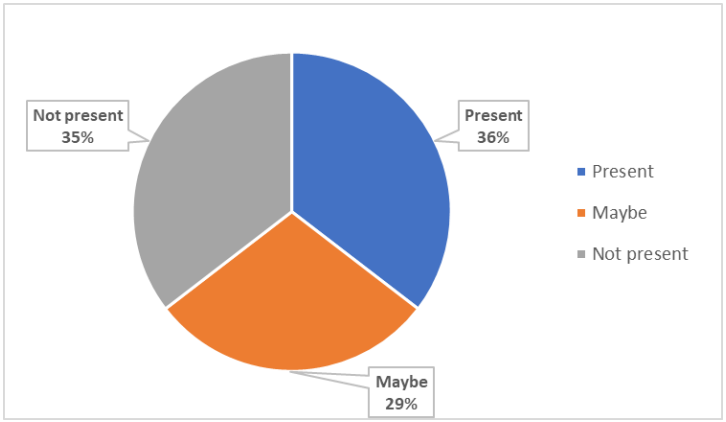

Figure 5 Intention of survey participants to implement more rewilding practices in the future (N = 48).

The statistical analysis yielded no significant associations between the perceived viability of rewilding as a future management approach and gender, age class, clustered age class, or (type of) organisation. Nor were any significant associations found between the intention to implement more rewilding practices in the future and gender, age class, or clustered age class. However, a significant association was found between the intention to implement more rewilding practices in the future and (type of) organisation (χ^2 (6) = 15.430, p = 0.017). The effect size for this association, Cramér's V, was moderately (0.567). Site managers of the State Forestry Service scored above average on having the intention to implement more rewilding in the future. Nature Monuments scored above average on both having the intention to implement more rewilding, as well as on not having the intention to implement more rewilding. LandscapesNL and Private landowners both had higher than average scores on maybe having the intention to implement more rewilding, and on not having the intention.

4.5 Factors inhibiting (further) implementation of rewilding

Among survey participants, 88% of site managers reported to experience factors inhibiting further implementation of rewilding practices (Figure 6). Only 6% of site managers stated to not experience any inhibiting factors when implementing rewilding, or other management, practices. The remainder, 6% of survey participants, said to have no opinion on the question.

The statistical analyses yielded no significant associations between experiencing factors inhibiting further implementation of rewilding practices and gender, age class, clustered age class, or (type of) organisation. Therefore, these factors were considered to only be small, if at all, inhibiting factors for further implementation of rewilding.

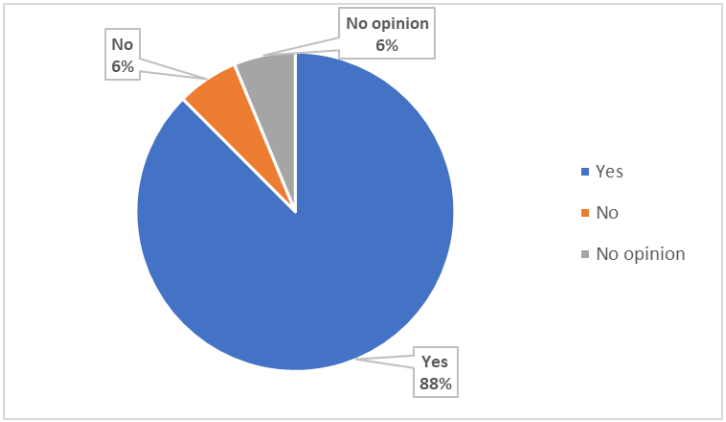

Figure 6 Survey participants experiencing factors inhibiting the implementation of rewilding practices (N = 48).

Survey participants who reported to experience inhibiting factors were asked to rank the factors from most inhibiting to least inhibiting (Figure 7, Table 5). Personal conviction was ranked as least inhibiting factor (Figure 7, Table 5). Only 2 out of 12 interviewees mentioned Personal conviction as an inhibiting factor. Both stated to consider Personal conviction to be a minor inhibiting factor.

Finances took fourth place, rated just slightly more inhibiting than Personal conviction (Figure 7, Table 5). Interviewees reported two major limiting issues related to Finances. A first was increasing management costs, especially due to nitrogen deposition, climate change, and other complex problems. The second issue related to decreasing or insufficient funding, especially in the form of provincial, governmental, and EU subsidies. One interviewee stated: "For us, finances are important in all of our areas. If we had unlimited money, we would do things differently than we do now." (anonymous 6, organisation 3, personal communication, November 3, 2020).

Company policy was ranked as third most inhibiting factor (Figure 7, Table 5). Several interviewees stated to expect it to become increasingly difficult to accomplish all management obligations and company objectives in the future. This in part due to complex issues, such as acidification, nitrogen deposition, and climate change. The main cause is the increasing pressure on land use and the different functions an area has to fulfil. One interviewee stated: "You always want to do your best, but it takes a lot of time. More and more is being asked from you as a site manager." (anonymous 1, organisation 1, personal communication, November 16, 2020).

Laws & regulations was ranked as second most inhibiting factor (Figure 7, Table 5). Interviewees stated laws and regulations entailed numerous obligations and objectives, which resulted in restrictions to their decision-making on management types and activities. "In the Netherlands, we have really boarded up everything with legislation." (anonymous 1, organisation 1, personal communication, November 16, 2020). A frequently occurring example was Natura 2000 regulation, which requires site managers to maintain specific habitat types and/or species occurring in their areas. Rewilding an area would therefore be likely to violate the Natura 2000 regulations, which is not a viable option for site managers.

External pressure was ranked as the most inhibiting factor (Figure 7, Table 5). Nearly all interviewees reported to expect increasing external pressure in the future. The general public has become more critical of site managers, and their management decisions. Several site managers also stated to experience decreasing levels of trust the general public puts in them. At the same time, many people have also started to react and respond from their feeling rather than being open to conservations, especially since the rise of social media. For many interviewees, this trend is an issue and is expected to likely remain so in the future.

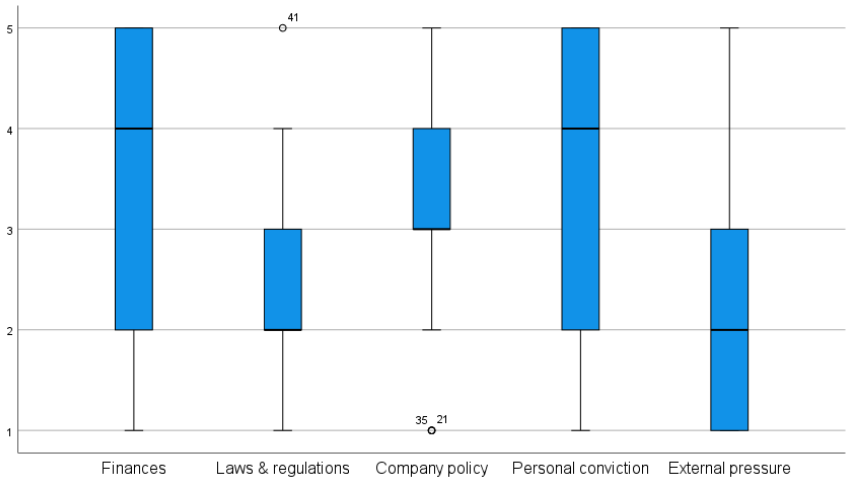

Figure 7 Ranking of factors inhibiting (further) implementation of rewilding (N = 42). *The values are presented on a scale from 1 (most inhibiting) to 5 (least inhibiting).*

Table 5 The mean and standard deviation (SD) per factor inhibiting further implementation of rewilding (N = 42). *Mean values are presented on a scale from 1 (strongly negative) via 3 (neutral) to 5 (strongly positive).*

Factor hindering more rewilding	Mean	SD
Finances	3.548	1.501
Laws & regulations	2.500	1.132
Company policy	3.190	1.018
Personal conviction	3.690	1.456
External pressure	2.071	1.257

Figure 8 and Table 6 show the rating of external stakeholders exerting pressure on the site managers participating in the survey, and on their management (decisions). Governments, including national, provincial, and local governments, were reported to exert the most pressure. Local residents followed closely behind, exerting quite some pressure on site managers and their decision-making. Farmers, visitors, and water boards were reported to exert some level of pressure, although large differences existed between different participating site managers. Companies were rated to exert little to no pressure.

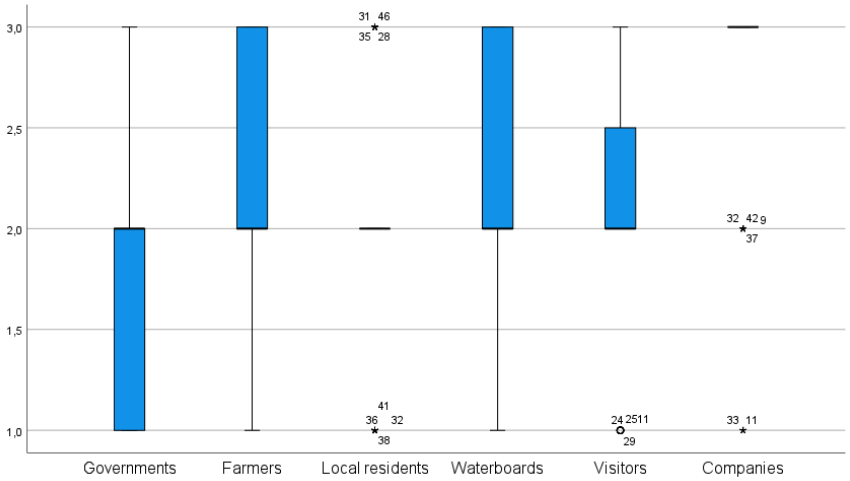

Figure 8 Rating of external stakeholders exerting pressure (N = 48). *The values are presented on a scale from 1 (a lot of pressure) via 2 (some pressure) to 3 (no pressure).*

Table 6 The mean and standard deviation (SD) per external stakeholder exerting pressure (N = 48). *Mean values are presented on a scale from 1 (strongly negative) via 3 (neutral) to 5 (strongly positive).*

External stakeholder exerting pressure	Mean	SD
Governments	1.771	0.660
Farmers	2.104	0.751
Local residents	1.979	0.565
Water boards	2.188	0.641
Visitors	2.125	0.606
Companies	2.750	0.565

4.6 Overview of main results

Resulting from the analyses, it becomes clear that decision-making on the implementation of rewilding is affected by numerous factors (Figure 9). Major factors of influence include I) monetary factors (Finances), II) legal factors (Laws & regulations), III) organisational factors (Company policy), IV) psychological factors (Personal conviction), and V) societal factors (External pressure). Minor factors of influence include I) available space, II) sentiment of local residents and visitors, III) the presence of cultural-historical elements which need to be preserved, IV) age (age class, and clustered age class), and V) (type of) organisation a site manager is working for. Gender was found to have little to no influence on decision-making on rewilding implementation.

Monetary factors had a negative effect on decision-making on species (re)introduction and ecosystem restoration, but a positive effect on decision-making on passive management implementation. Legal factors negatively affected all decision-making, except among site managers who did not implement passive management. This group reported a positive influence of legal factors. Organisational factors as well as psychological factors positively affected all decision-making. Societal factors had a negative influence on all decision-making. Available space, Sentiment, and the Presence of cultural-historical elements all had a negative influence on the decision-making process. Both Age as well as (Type of) organisation neither had a positive, nor a negative, influence on decision-making. Nevertheless, both factors did do influence the decision-making process on rewilding implementation. Age showed a trend whereby younger site managers (< 35 years) were more likely to implement rewilding,

whereas older site managers (> 55 years) were more likely to not implement rewilding. Likewise, differences were sometimes observed between different (types of) organisations.

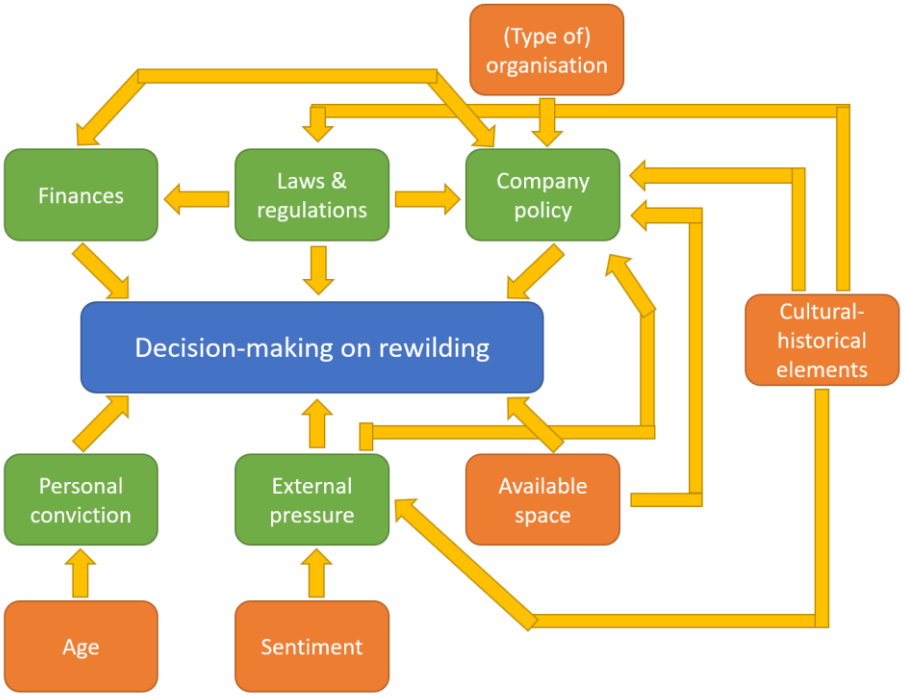

Figure 9 Conceptual model of factors influencing decision-making on rewilding. *Green boxes represent the main factors influencing decision-making, orange boxes are minor factors. The yellow arrows indicate the direction of influence of a factor.*

Among survey participants, 31% of site managers reported to consider rewilding a viable future management approach for their areas. An additional 31% deemed rewilding to be potentially viable. The remaining 38% of site managers considered rewilding non-viable for future management. When asked about their intentions to implement more rewilding (practices) in the future, 36% of survey participant reported to have these intentions. A further 29% stated to maybe implement more rewilding (practices) in the future. The remainder, 35%, said to have no intentions of implementing more rewilding in the future. One significant association was found, between the (type of) organisation and the intention to implement more rewilding in the future.

Nearly all site managers (88%) stated to experience factors inhibiting (further) implementation of rewilding. Personal conviction (psychological factors) was ranked as least inhibiting factor, closely followed by Finances (monetary factors). Company policy (organisational factors) took third place. Laws & regulations (legal factors) was ranked as second most inhibiting factor. External pressure (societal factors) was considered the most inhibiting factor. Of external stakeholders taken into consideration, governments and local residents were rated to exert the most pressure.

5. Discussion

The goal of this study was to get a better insight into the factors influencing the decision-making of site managers on rewilding implementation in their current and future management. The negative effects of Finances, Laws & regulations, and External pressure met the predictions. Limited funding was often reported as a limiting factor in decision-making, as expected (McDonald-Madden *et al.*, 2008; Wilson *et al.*, 2006). Findings show the distribution of the limited financial resources were often considered a major issue, supporting the findings of Caple (2012), and Wilson *et al.* (2006). The large number of laws, regulations, and policies in place nowadays were found to restrict decision-making space, supporting the findings of Thompson (2013). Hereby the most restricting include the SNL (Subsidie Natuur & Landschap; Subsidy Nature & Landscape) and Natura 2000 regulations. Additionally, current policies and legislation were reported to be too focussed on maintaining the current natural conditions, hindering the implementation of rewilding practices. This finding supports the findings of other studies, such as Bakker (2018), and Pettorelli *et al.* (2018). As predicted, the findings show the increasing importance of social and political support in decision-making on rewilding. Moreover, the results show the large influence of external stakeholders, especially governments and local residents, and the increasing external pressure experienced by site managers. Governments, local, provincial, national, and EU, mainly exert pressure through increasing laws and regulations, as well as through subsidy allocations. Local residents increasingly want to be involved in decision-making regarding nature areas near them, hereby exerting increasing levels of pressure. In addition, many people have started to react and respond to (management) decisions of site managers. This further increases the pressure site managers experience from external actors. These results add to a long list of studies with corresponding findings (Bauer *et al.*, 2019; Fernandes *et al.*, 2019; Root-Bernstein *et al.*, 2018; Thompson, 2013).

Company policy, on the other hand, was reported to positively influence decision-making. This in contrast to the findings of other researchers, such as Carver (2016), St John *et al.* (2011), and Thompson (2013). Like predicted, nearly all site managers did experience pressure from within the company, and its policies. Contrary to the prediction, the companies and their policies were often considered to be flexible enough to not restrict decision-making space (too much). Proponents of rewilding felt supported by the company policies in their decision to implement rewilding, be it only in specific parts of an area. Meanwhile, opponents of rewilding felt strengthened in their decision-making as company policies often allowed for some flexibility or were merely stimulating in nature rather than enforcing. Personal conviction too, positively influenced decision-making, and formed an important influential factor. This outcome supports findings of other researchers, such as Bauer *et al.* (2019), Clayton (2019), and Thompson (2013). As expected, past experiences, attitudes towards nature and towards rewilding, visions of nature, and human-nature relationships all play an important role in influencing personal conviction (Bauer *et al.*, 2019; Clayton, 2019; St John *et al.*, 2011).

Available space, Sentiment, and Cultural-historical elementals all negatively affected decision-making. Available space hereby refers to a lack of areas large enough to successfully implement rewilding. Numerous other studies found comparable results for densely populated areas, like the Netherlands (Bakker, 2018; Bauer *et al.*, 2019; Pereira & Navarro, 2015). While this does not make rewilding unsuitable for the Netherlands, it does hinder it, and brings about its own problems (Bauer *et al.*, 2019; Maller *et al.*, 2019). Sentiment refers to the sentiment of local residents and visitors. These peoples' sentiment caused them to fear what

would happen to their beloved areas if rewilding would be implemented (Bauer *et al.*, 2019). This in turn often had to do with peoples' 'fear of the unknown', not knowing what will happen once rewilding has started (Auster *et al.*, 2020; Carver, 2016). The fear, emotions and sentiment caused negative attitudes towards rewilding (Clayton, 2019; St John *et al.*, 2011). Consequently, these stakeholders started to pressure site managers to not implement rewilding. Cultural-historical elements are often highly valued, not only by site managers, but also by a wide range of other stakeholders (Deary & Warren, 2019). Maintaining cultural and cultural-historical landscapes are often the norm rather than the exception, even in nature areas and areas considered to be 'wild' (Marris, 2011; Marris et al., 2013). The presence of cultural-historical elements makes rewilding implementation contested (Deary & Warren, 2019). This has to do with peoples' fear of losing the cultural-historical elements following the rewilding of an area.

Besides having no significant associations, gender neither showed observable differences. This finding is in-line with the findings of other studies, including Clayton (2019), and De Groot & Van den Born (2003). Despite both age class and clustered age class not yielding significant associations, differences between (clustered) age classes could be observed. In general, survey participants under 35 years old viewed rewilding more positively and had above average implementation rates. Participants over 55 years old were generally more negative towards rewilding, often with below average implementation rates. These findings support results from other studies, such as Bauer *et al.* (2009), Bauer *et al.* (2019), and De Groot & Van den Born (2003). This difference could (in part) be explained by differences in worldview between different ages (Bauer *et al.*, 2009; Bauer *et al.*, 2019; Buijs, 2009). Bauer *et al.* (2009) found older people were significantly more likely to have an anthropocentric, also known as utilitarian, worldview. People with an anthropocentric worldview view nature as something that should be shaped and maintained based upon the needs and desires of humans (Buijs, 2009; Keitsch, 2018). Hence older people would be more averse to a free development of nature, which is what rewilding entails (Bauer *et al.*, 2009; Bauer *et al.*, 2019). On the other hand, younger people were more likely to have a biocentric or ecocentric worldview (Bauer *et al.*, 2009). These worldviews are based around the intrinsic values of all living organisms, or that of species and the ecosystem as a whole respectively (Batavia *et al.*, 2020; Buijs, 2009; Keitsch, 2018). People with these worldviews would be more likely to be in favour of rewilding (Bauer *et al.*, 2009; Bauer *et al.*, 2019).

(Type of) organisation yielded two significant associations, one with species (re)introduction, and one with the intention to implement more rewilding in the future. Among non-significant associations, differences were frequently present. These differences are due to different (types of) organisations and ownership having different philosophies, management objectives, views on rewilding, and what rewilding entails (Deary & Warren, 2017; Deary & Warren, 2019; Loth & Newton, 2018). Deary & Warren (2019) found private landowners predominantly focus on sustainable land management and maintaining cultural heritage. The reason for this is that private landowners need to pursuit commercial objectives in order to survive. Nevertheless, conservation objectives and rewilding have been gaining increasing interest among private landowners (Benayas & Bullock, 2015; Deary & Warren, 2017). NGOs, such as Nature Monuments and LandscapesNL, were mostly focussed on wilderness enhancement and restoring wild nature (Deary & Warren, 2019). This as nature protection and restoration frequently the main purposes are of conservation NGOs. Governmental agencies, such as the State Forestry Service, generally take a middle road (Taylor, 2013). This because governmental agencies need to take other (governmental) goals into consideration as well, besides their main focus of nature management and conservation.

The present study did have some limitations which need to be considered. A first limitation was the composition of the survey respondents. Private landowners (17%), and to a lesser extent LandscapesNL (21%), were underrepresented in the survey data (Appendix 4). This may have influenced the results, leading to a skewed representation of reality. Females only covered 23% of survey participants, resulting in an unequal gender distribution (Appendix 4). However, this distribution represents the underrepresentation of females in the nature management and conservation sector. Females generally cover about 20-30% of personnel in the work field, with even lower numbers among site managers (Kropman, 2015; Oomen, 2016; Staatsbosbeheer, 2020). Another limitation is that many subgroups created during the statistical analysis contained only small numbers of site managers. This causes an increased chance of type II errors; whereby significant associations were not found despite existing in real life. Future researchers could overcome these limitations by using a larger, more representative sample. Finally, this study had a demarcated scope, focussing on decision-making of site managers on rewilding, and identifying the factors influencing this decision. For this reason, the selected rewilding practices needed to be implementable by a site manager in his/her own area. Therefore, some important components of rewilding, such as the restoration of natural disturbances and stochasticity, were not taken into account in this study.

The findings of this research can be used by all people, institutions, and other stakeholders concerned with, or interested in, rewilding, and the decision-making behind its implementation. This study's first contribution is by providing a contemporary overview of rewilding implementation in the Netherlands. Moreover, this research contributes to closing the existing knowledge gaps on decision-making on rewilding, and the factors influencing this process. The outcomes can be used to support or influence the decision-making process of site managers. In addition, this study contributes by providing a starting point for future research. Finally, results from this research can serve as an example for other site managers and nature areas throughout Europe. However, it is hereby important to keep in mind the results cannot be generalised. This as important factors, such as culture, human-nature relationships, and attitudes towards rewilding, can vary greatly between different (European) countries (Bauer *et al.*, 2019; Clayton, 2019).

In the future, more research is required to close remaining knowledge gaps (Lorimer *et al.*, 2015; Pettorelli *et al.*, 2018; St John *et al.*, 2011; Svenning *et al.*, 2016). A first research area relates to the need to study predictors of human behaviour, especially in interplay with other factors influencing decision-making (Bauer *et al.*, 2019; Clayton, 2019; St John *et al.*, 2011; Thompson, 2013). Using existing social-psychological models, a great contribution could be made to better understand peoples' beliefs underlying their decisions and behaviours (Bauer *et al.*, 2019; St John *et al.*, 2011). Additionally, a better insight is needed into the roles of attitudes, knowledge, education, incentives, preferences, uncertainty, and cognitive limitations mutually affect decision-making (Bauer *et al.*, 2019; St John *et al.*, 2011; Thompson, 2013). Again, a lot can be learned from existing knowledge arising from other disciplines (St John *et al.*, 2011). Information gained from this research area will not only improve our understanding of human behaviour, but our understanding of, and skills in, influencing this behaviour as well (Bauer *et al.*, 2019; St John *et al.*, 2011).

Two other important research areas include risk assessments and economic cost-benefits analyses (Fernández *et al.*, 2017; Pettorelli *et al.*, 2018; Svenning *et al.*, 2016). Improved risk assessments and risk management are needed to enhance the performance of rewilding policies with lacking scientific certainty (Pettorelli *et al.*, 2018; Schindler & Hilborn, 2015).

Hereby the focus should not only be on ecological risks, but also include social, political, and financial risks. Moreover, a better insight into the risks and uncertainties associated with rewilding is key to managing the expectations of all stakeholders involved (Pettorelli *et al.*, 2018). At the same time, a lot remains unknown about the costs and benefits of different conservation approaches, including rewilding (McCreless *et al.*, 2013; Pettorelli *et al.*, 2018). Therefore, economic cost-benefit analyses are required to better support decision-making on rewilding (Fernández *et al.*, 2017; Pettorelli *et al.*, 2018).

Monitoring and evaluation are two final future research areas suggested (Bauer *et al.*, 2019; Durant *et al.*, 2019; Pettorelli *et al.*, 2018). There is a need for long-term, science-based monitoring and evaluation of rewilding projects and their ecological effects (Pettorelli *et al.*, 2018; Schweiger *et al.*, 2019; Svenning *et al.*, 2016; Torres *et al.*, 2018). Furthermore, monitoring and evaluation is required on the effects of rewilding on human dimensions, including social, psychological, cultural, and economic dimensions (Bauer *et al.*, 2019; Durant *et al.*, 2019; Owens & Wolch, 2019). Examples of research directions hereby include I) attitudinal changes towards rewilding over time, II) the impacts of wild nature on human health and well-being, III) changes in views on, or connections to, nature following rewilding, or IV) the societal benefits of rewilding projects (Bauer *et al.*, 2019; Pettorelli *et al.*, 2018).

6. Conclusion

This study aimed to identify the main factors and their influences on the decision-making process on rewilding implementation. Resulting from a quantitative and a qualitative analysis, it can be concluded that there are five major factors of influence, and five minor factors of influence. Of the major factors, Company policy (organisational factors), and Personal conviction (psychological factors) had a positive, stimulating effect. Finances (Monetary factors), Laws & regulations (legal factors), and External pressure (societal factors) all showed a negative, inhibiting influence. Of the minor factors, Available space, Sentiment, and the Presence of cultural-historical elements all had a negative influence on the decision-making process. The two remaining minor factors, Age and (Type of) organisation, had a neutral influence. Age showed a trend whereby younger (< 35 years) site managers were more likely to implement rewilding whereas older (> 55 years) site managers were less likely to do so. Likewise, differences between different (types of) organisations, and types of ownerships, were observed.

When looking at the future of rewilding, proponents, opponents, and site managers who are still undecided remain to this day. While proponents and opponents frequently reported to have made up their mind, those who have not decided can still be influenced. In order to promote further rewilding implementation, currently inhibiting factors need to be tackled. Hereby the focus should be on increasing the flexibility of laws and regulations, and reducing pressure from external stakeholders, especially of governments and local residents. Increasing existing subsidies and funding, and providing additional financial support, will further promote the implementation of rewilding.

Despite having a confined scope, focussing on rewilding practices site managers could implement in their own area, this research has made two key contributions. Firstly, this study provides a contemporary overview of rewilding implementation in the Netherlands. Secondly, this research contributed to closing existing knowledge gaps on the role and importance of different factors influencing decision-making in nature management and conservation. The findings of this study can be used to support, or influence, the decision-making process of site managers. This to promote further implementation of rewilding, the often promoted approach to halt biodiversity loss and restore ecosystems and their natural processes.

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Appendix 1 Survey (Dutch)

Introductie

Verwildering (rewilding) is een manier van natuurbeheer en -bescherming, waarbij de zelfregulerende natuur centraal staat. Bij verwildering doet de mens een stapje terug en laat zij de natuur haar gang gaan. Het doel is om natuurlijke processen, wilde dieren, en wilde natuur terug te laten keren.

De vragenlijst duurt ongeveer 5-10 minuten om in te vullen.

Alvast bedankt voor het invullen van deze vragenlijst! Door het invullen helpt u mij enorm bij mijn afstudeeronderzoek van de Master Bos- en Natuurbeheer aan de Wageningen Universiteit (WUR).

Deel 1 Algemene informatie

1. Wat is uw geslacht?
    - Man
    - Vrouw
    - Neutraal
2. Binnen welke leeftijdscategorie valt u?
    - < 25 jaar
    - 25-34 jaar
    - 35-44 jaar
    - 45-55 jaar
    - 55-64 jaar
    - > 65 jaar
3. Voor welke (soort) organisatie bent u werkzaam?
    - Staatsbosbeheer
    - Natuurmonumenten
    - LandschappenNL (Provinciale Landschappen)
    - Particuliere landeigenaar (bijvoorbeeld een landgoed of Bosgroep)

Deel 2 Huidige situatie

4. Heeft u diersoorten (bijvoorbeeld Schotse Hooglanders, herten, Konikpaarden, otters, en/of bevers) uitgezet in uw gebied als onderdeel van uw beheer?
    - Ja
    - Nee
5. Hoe hebben de volgende factoren uw keuze beïnvloed? Een factor beïnvloedt uw keuze negatief wanneer de factor u hindert in uw keuze. Een factor beïnvloedt uw keuze positief wanneer de factor u stimuleert in uw keuze.

	Sterk negatief	**Zwak negatief**	**Neutraal**	**Zwak positief**	**Sterk positief**
Financiën/geld					
Wetten & regels					
Beleid vanuit de organisatie					

Persoonlijke overtuiging					
Druk van buiten					

6. Laat u dood hout en/of karkassen liggen in uw gebied?
    - Ja
    - Nee
7. Hoe hebben de volgende factoren uw keuze beïnvloed?

	Sterk negatief	**Zwak negatief**	**Neutraal**	**Zwak positief**	**Sterk positief**
Financiën/geld					
Wetten & regels					
Beleid vanuit de organisatie					
Persoonlijke overtuiging					
Druk van buiten					

8. Voert u een passief beheer? Dit betekent dat u weinig tot geen beheeringrepen uitvoert in uw gebied.
    - Ja
    - Nee
9. Hoe hebben de volgende factoren uw keuze beïnvloed?

	Sterk negatief	**Zwak negatief**	**Neutraal**	**Zwak positief**	**Sterk positief**
Financiën/geld					
Wetten & regels					
Beleid vanuit de organisatie					
Persoonlijke overtuiging					
Druk van buiten					

10. Kunt u bij de volgende partijen aangeven hoeveel druk zij uitoefen op uw beheeractiviteiten en besluiten?

	Veel druk	**Enige druk**	**Geen druk**
Overheden			
Boeren			
Omwonenden			
Waterschappen			
Bezoekers			
Bedrijven			

Deel 3 Toekomst

11. Ziet u verwildering als een goede optie voor toekomstig beheer in uw gebied?
    - Ja

- Misschien
- Nee
- Geen mening

12. Zou u in de toekomst graag meer verwilderingspraktijken willen toepassen in uw toekomstige beheer? Denk hierbij aan dieren uitzetten, dood hout/karkassen laten liggen, en/of passief beheer voeren.
    - Ja
    - Misschien
    - Nee
    - Geen mening
13. Ziet u belemmerende factoren bij het (verder) invoeren van verwilderingspraktijken?
    - Ja
    - Nee
    - Geen mening
14. Als u bij de vorige vraag 'Ja.' heeft ingevuld, kunt u dan de volgende factoren rangschikken? Nummer 1 is meest verhinderend; nummer 5 is minst verhinderend.

	Nummer 1	**Nummer 2**	**Nummer 3**	**Nummer 4**	**Nummer 5**
Financiën/geld					
Wetten & regels					
Beleid vanuit de organisatie					
Persoonlijke overtuiging					
Druk van buiten					

Deel 4 Afsluitende vragen

15. Zou ik mogelijk contact met u mogen opnemen voor een interview (over toelichting van uw antwoorden)? De interviews zullen ongeveer 45 minuten duren en plaatsvinden tussen maandag 26 oktober en vrijdag 4 december 2020.
    - Ja
    - Nee
16. Bent u geïnteresseerd in het ontvangen van het eindverslag van mijn afstudeeronderzoek (verwacht in februari 2021)?
    - Ja
    - Nee
17. Als u 'Ja.' heeft gekozen bij vraag 15 en/of 16, zou u dan hieronder uw naam en contactgegevens (e-mail en telefoonnummer) willen achterlaten?
    - Naam: ….
    - E-mail: …
    - Telefoonnummer: …

Hartelijk dank voor het invullen van de vragenlijst! Nog een prettige dag gewenst!
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Appendix 2 Survey (English)

Introduction

Rewilding is an approach to nature management and conservation which is centred around the self-regulation of nature. Key to rewilding is to reduce human involvement and let nature go her own way. The aim of rewilding is to enable natural processes, wildlife, and wild nature to return.

The survey will take around 5-10 minutes to complete.

Thanks in advance for participating in this survey! By participating, you are contributing to my Master thesis research at the University of Wageningen (WUR).

Part 1 General information

1. What is your gender?
    - Male
    - Female
    - Neutral
2. What age class are you in?
    - < 25 years
    - 25-34 years
    - 35-44 years
    - 45-55 years
    - 55-64 years
    - > 65 years
3. For which (type of) organisation are you working?
    - State Forestry Service (Staatsbosbeheer)
    - Nature Monuments (Natuurmonumenten)
    - LandscapesNL (LandschappenNL)
    - Private landowner (e.g., an estate or Forest Group)

Part 2 Present day situation

4. Have you (re)introduced animal species (such as cattle, deer, Konik horses, otters, and/or beavers) in your work area as part of your management?
    - Yes
    - No
5. How did the following factors influence your decisions? A factor influences your decision negatively when the factor is inhibiting your decision-making. A factor influences your decision positively when the factor is stimulating your decision-making.

	Strongly negative	**Weakly negative**	**Neutral**	**Weakly positive**	**Strongly positive**
Finances					
Laws & regulations					
Company policy					

Personal conviction					
External pressure					

6. Do you leave dead wood and/or carrion behind in your work area?
    - Yes
    - No
7. How did the following factors influence your decisions?

	Strongly negative	**Weakly negative**	**Neutral**	**Weakly positive**	**Strongly positive**
Finances					
Laws & regulations					
Company policy					
Personal conviction					
External pressure					

8. Do you apply passive management in your work area? This involves carrying out little to no active management practices.
    - Yes
    - No
9. How did the following factors influence your decisions?

	Strongly negative	**Weakly negative**	**Neutral**	**Weakly positive**	**Strongly positive**
Finances					
Laws & regulations					
Company policy					
Personal conviction					
External pressure					

10. Could you please indicate much pressure the following stakeholders exert on your management practices and decision-making?

	A lot of pressure	**Some pressure**	**No pressure**
Governments			
Farmers			
Local residents			
Waterboards			
Visitors			
Companies			

Part 3 Future situation

11. Do you consider rewilding a viable management approach for your work area for the future?

- Yes
- Maybe
- No
- No opinion

12. Would you like to implement more rewilding practices in your management plans in the future? Think of (re)introducing animal species, leaving behind dead wood/carrion, and/or applying passive management.
    - Yes
    - Maybe
    - No
    - No opinion
13. Do you experience factors hindering (further) implementation of rewilding practices?
    - Yes
    - No
    - No opinion
14. If you selected 'Yes.' at the previous question, could you please rank the following factors? Number 1 is most inhibiting; number 5 is least inhibiting.

	Number 1	**Number 2**	**Number 3**	**Number 4**	**Number 5**
Finances					
Laws & regulations					
Company policy					
Personal conviction					
External pressure					

Part 4 Closing questions

15. Could I perhaps contact you for an interview (to discuss your answers of this survey)? The interviews will take about 45 minutes and will take place between Monday October 26th and Friday December 4th.
    - Yes
    - No
16. Would you be interested in receiving my final thesis report (expected in February 2021)?
    - Yes
    - No
17. If you selected 'Yes.' at question 15 and/or 16, could you please leave your name and contact details (e-mail and phone number) behind below?
    - Name: …
    - E-mail: …
    - Phone number: …

Thank you for filling in this survey! Have a nice day!

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Appendix 3 Coding scheme survey data

Survey question	Within-question divisions (if applicable)	Codes answer possibilities
1		1 = Male. 2 = Female. 3 = Neutral.
2	'Original' age classes	1 = < 25 years. 2 = 25-34 years. 3 = 35-44 years. 4 = 45-54 years. 5 = 55-64 years. 6 = > 65 years.
	Clustered age classes	1 = < 34 years. 2 = 35-54 years. 3 = > 55 years.
3		1 = State Forestry Service (Staatsbosbeheer). 2 = Nature Monuments (Natuurmonumenten). 3 = LandscapesNL (LandschappenNL). 4 = Private landowner (e.g., an estate).
4		1 = Yes. 2 = No.
5	I = Finances. II = Laws & regulations. III = Company policy. IV = Personal conviction. V = External pressure.	1 = Strongly negative. 2 = Weakly negative. 3 = Neutral. 4 = Weakly positive. 5 = Strongly positive.
6		1 = Yes. 2 = No.
7	I = Finances. II = Laws & regulations. III = Company policy. IV = Personal conviction. V = External pressure.	1 = Strongly negative. 2 = Weakly negative. 3 = Neutral. 4 = Weakly positive. 5 = Strongly positive.
8		1 = Yes. 2 = No.
9	I = Finances. II = Laws & regulations. III = Company policy. IV = Personal conviction. V = External pressure.	1 = Strongly negative. 2 = Weakly negative. 3 = Neutral. 4 = Weakly positive. 5 = Strongly positive.
10	I = Governments. II = Farmers. III = Local residents. IV = Water boards. V = Visitors.	1 = A lot of pressure. 2 = Some pressure. 3 = No pressure.

	VI = Companies.	
11		1 = Yes. 2 = Maybe. 3 = No. 4 = No opinion.
12		1 = Yes. 2 = Maybe. 3 = No. 4 = No opinion.
13		1 = Yes. 2 = No. 3 = No opinion.
14	I = Finances. II = Laws & regulations. III = Company policy. IV = Personal conviction. V = External pressure.	1 = Number 1. 2 = Number 2. 3 = Number 3. 4 = Number 4. 5 = Number 5.

Appendix 4 Additional data visualisations

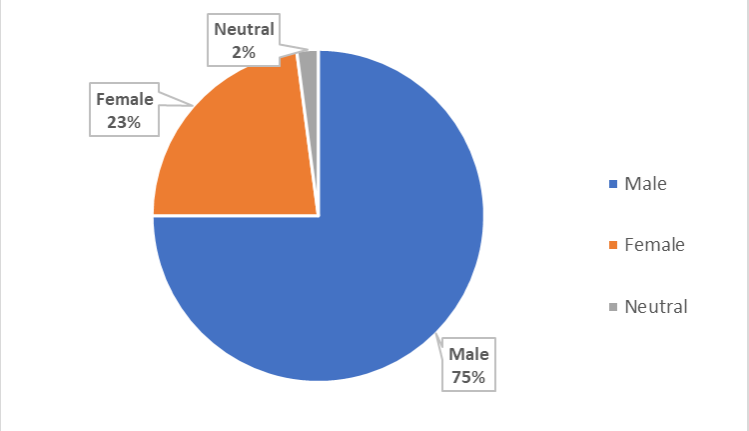

Figure 1 Distribution of genders of survey participants (N = 48).

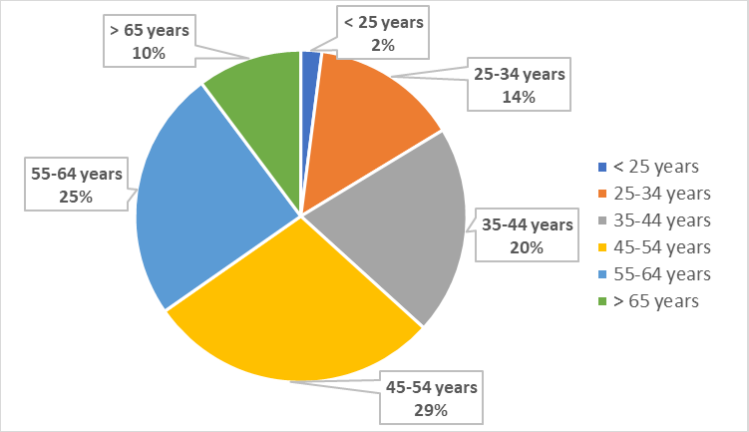

Figure 2 Distribution of age classes of survey participants (N = 48).

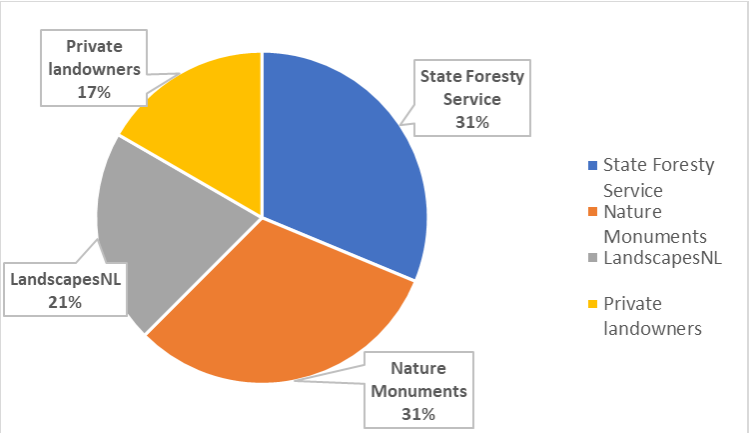

Figure 3 Distribution of (type of) organisation of survey participants (N = 48).

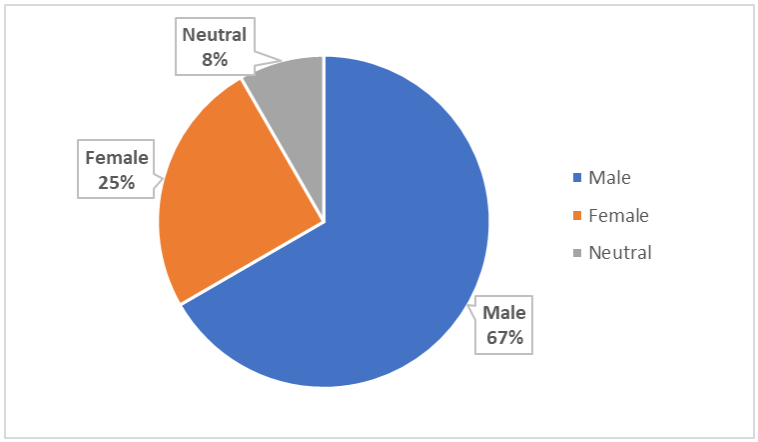

Figure 4 Distribution of genders of interviewees (N = 12).

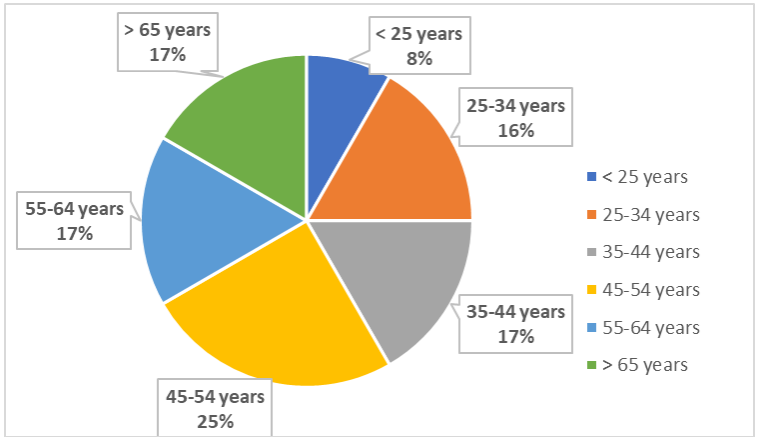

Figure 5 Distribution of age classes of interviewees (N = 12).

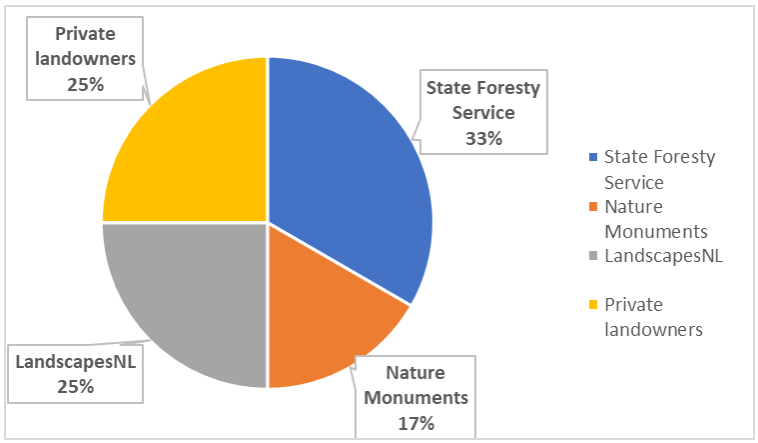

Figure 6 Distribution of (type of) organisation of interviewees (N = 12).

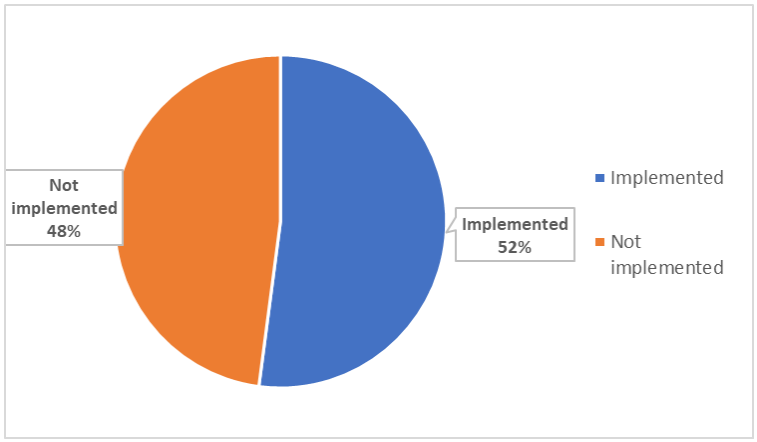

Figure 7 Implementation of species (re)introduction by survey participants (N = 48).

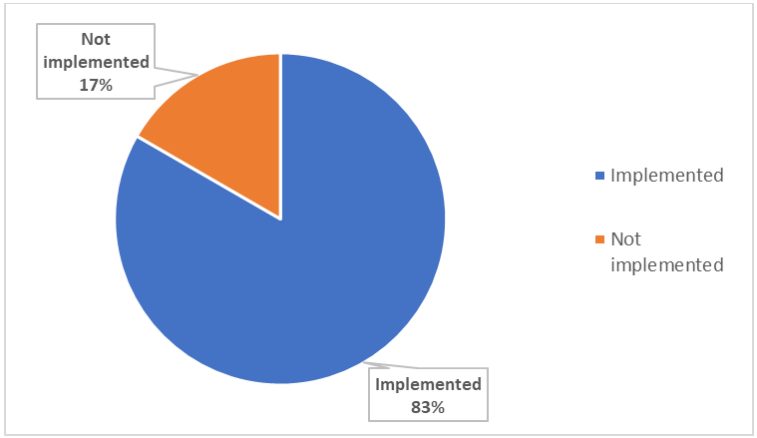

Figure 8 Implementation of ecosystem restoration by survey participants (N = 48).

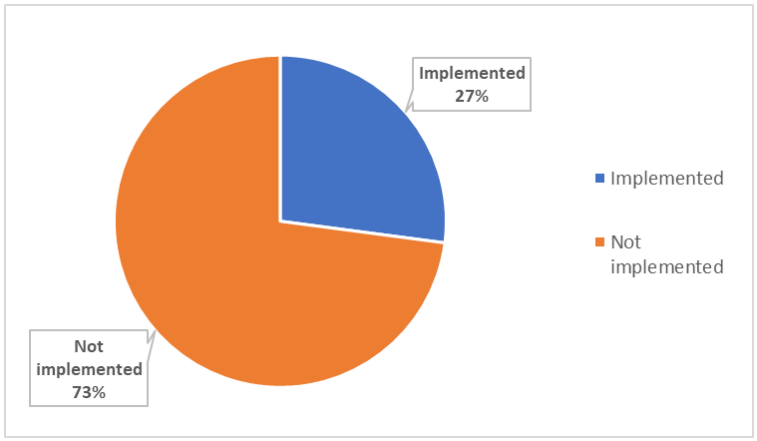

Figure 9 Implementation of passive management by survey participants (N = 48).

Appendix 5 Coding scheme interview data

Top-level code	Mid-level code	Third-level code
Area description		
Species (re)introduction		
Ecosystem restoration		Ecosystem restoration - carrion
		Ecosystem restoration - dead wood
Passive management		
Experiences with rewilding		
Major factors influencing decision-making	Monetary factors	Monetary factors - positive
		Monetary factors - negative
	Legal factors	Legal factors - positive
		Legal factors - negative
	Organisational factors	Organisational factors - positive
		Organisational factors - negative
	Psychological factors	Psychological factors - positive
		Psychological factors - negative
	Societal factors	Societal factors - positive
		Societal factors - negative
Minor factors influencing decision-making	Available space	Available space - positive
		Available space - negative
	Sentiment	Sentiment - positive
		Sentiment - negative
	Cultural-historical elements	Cultural-historical elements - positive
		Cultural-historical elements - negative
Future perspective of rewilding		Future - positive
		Future - neutral
		Future - negative
Inhibiting factors		Monetary factors - inhibiting
		Legal factors - inhibiting
		Organisational factors - inhibiting
		Psychological factors - inhibiting
		Societal factors - inhibiting
Important (side) notes		