

A scenic view of a waterfront with mountains in the background and a boat in the foreground. The image is overlaid with a blue gradient and a semi-transparent image of green foliage.

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# Biodiversity Conservation Messaging: A Comprehensive Review

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## **Abstract**

Biodiversity conservation is crucial for maintaining ecosystem stability and supporting essential services for human well-being. Effective messaging plays a vital role in engaging individuals and communities in biodiversity protection efforts. This literature review synthesizes current knowledge on biodiversity conservation messaging, exploring factors influencing messaging effectiveness, various approaches, and theoretical frameworks. It examines challenges such as information gaps, message fatigue, reaching diverse audiences, and evaluating messaging impact. The review highlights the importance of tailoring messages to specific audiences, using simple and clear language with actionable plans, utilizing storytelling and narrative techniques, employing both message tones, applying arts and visual communication, incorporating digital platforms, and fostering collaborations. The findings provide insights for future research and practice in developing impactful biodiversity conservation messaging strategies to inspire positive behavioural change and promote sustainable practices.

## **Introduction**

Biodiversity, encompassing the variety of life within and between species and ecosystems, is crucial for ecosystem functionality and human well-being, offering numerous ecosystem services like food, clean water, air quality, climate regulation, pollination, and recreational opportunities (Heydari et al., 2020). Despite its importance, biodiversity faces serious threats, primarily due to human activities, such as habitat destruction, overexploitation, pollution, invasive species, and climate change (World Health Organization & Secretariat of the Convention on Biological Diversity, 2015). Thus, biodiversity conservation has become paramount for sustaining ecological equilibrium and preserving the integrity of the Earth's ecosystems (Awasthi et al., 2014; Balmford et al., 2002)

Effective messaging is instrumental in biodiversity protection efforts, acting as a tool to raise awareness, shape attitudes, encourage sustainable behaviours, and motivate individuals, communities, and policymakers toward conservation initiatives (Dale et al., 2021; Jones, 2014). It bridges the gap between scientific knowledge and public comprehension, fostering a sense of stewardship and driving support for conservation (Buijs et al., 2008; Schultz, 2011). Communication strategies, ranging from public campaigns and educational programs to advocacy

efforts, can articulate the value of biodiversity, the challenges it faces, and the actionable steps for its preservation. Through various channels like traditional media, social media, and direct communication, they can effectively engage diverse audiences, appealing to their values, emotions, and motivations to inspire positive change and policy alterations favouring biodiversity protection (Kidd, Garrard, et al., 2019).

However, crafting effective messages for biodiversity protection is a complex task that requires a deep understanding of the target audience, appropriate communication channels, and applying relevant psychological and communication theories (Dietz, 2013; Veríssimo, 2019). Despite the challenges, the potential impact of effective messaging on biodiversity protection underscores its importance in conservation efforts.

The purpose of this comprehensive literature review is to synthesize the current state of knowledge on biodiversity conservation messaging for biodiversity protection. By examining academic and non-academic literature, reports, and websites, we aim to explore the range of messaging approaches, theories, and factors that influence the effectiveness of biodiversity conservation messaging. Additionally, this review seeks to identify best practices, challenges, and limitations in biodiversity conservation messaging. The insights gained from this review will inform future research and practice in designing and implementing effective messaging strategies to enhance biodiversity conservation efforts.

# Factors Influencing Messaging Effectiveness

## Cultural & Societal Contexts

The effectiveness of conservation messaging can be significantly influenced by the cultural and societal contexts in which they are delivered (Moorhouse et al., 2015). Messages need to be tailored to the values, beliefs, and norms of the target audience to ensure they resonate and lead to desired actions (Moorhouse et al., 2015).

## Communication Channels & Media Platforms Combined with Digital Sources

The choice of communication channels and media platforms can also impact the reach and effectiveness of conservation messages. Traditional media (e.g., TV, radio, print) and digital media (e.g., social media, websites, apps) offer different advantages and challenges, and the choice should be based on the target audience's media consumption habits (Veríssimo, 2019). Integrating digital sources such as digital museums and artificial intelligence can also improve the effectiveness of conservation messaging (Dale et al., 2021; Silvestro et al., 2022).

## Message Framing & Visual Communication

How messages are framed, including visual elements, can significantly influence their effectiveness. For example, positive framing (focusing on the benefits of action) and negative framing (highlighting the costs of inaction) can elicit different responses. Visual communication, such as compelling images or infographics, can also enhance message engagement and recall (O'Neill & Nicholson-Cole, 2009).

## Source Credibility & Trustworthiness

Messages from sources perceived as credible and trustworthy are more likely to be accepted by the audience (Dale et al., 2021). This includes factors such as the source's expertise, transparency, and perceived neutrality (Pornpitakpan, 2004).

## Timing & Frequency of Messaging

The timing and frequency of biodiversity conservation messaging can affect its effectiveness. Timing refers to the strategic placement of messages during critical moments or events relevant to the target audience. Frequency pertains to the number of times the messages are repeated or reinforced over time. Research suggests timely messaging aligned with essential events and

repeated exposure to messages can increase awareness, knowledge, and behaviour change (Hornik, 2002; Wakefield et al., 2010). Messages need to be delivered at a time when the audience is most receptive and repeated enough to reinforce the message but not so much that it leads to fatigue (Sheeran et al., 2015).

## **Theoretical Frameworks for Biodiversity Conservation Messaging**

The theoretical frameworks for biodiversity conservation messaging are diverse and multidisciplinary, drawing from fields such as social psychology, communication theory, and ethics. Some theories are not mutually exclusive while sharing common elements. Here are some fundamental theories and concepts identified in the literature.

### **Psychological Theories**

#### **Elaboration Likelihood Model (ELM)**

The Elaboration Likelihood Model (ELM) proposes two distinct routes to persuasion: the central and peripheral routes (Cacioppo & Petty, 1984). The central route involves thoughtful consideration of the arguments presented, while the peripheral route relies more on superficial cues for persuasion. When applied to conservation messaging for biodiversity protection, the ELM suggests that effective messaging should cater to both routes. For those following the central route, well-articulated arguments outlining the importance of biodiversity and the consequences of its loss can stimulate thoughtful consideration and lead to lasting attitude change (Petty et al., 2002). For audiences more prone to peripheral processing, captivating imagery, endorsement by trusted figures, or emotional appeals can be effective (Cacioppo et al., 1983). Thus, the ELM can guide the development of comprehensive conservation messages that engage audiences on multiple levels, enhancing the likelihood of persuasion and fostering behaviours that support biodiversity protection.

#### **Theory of Planned Behaviour**

The Theory of Planned Behaviour, suggesting that attitudes, subjective norms, and perceived behavioural control guide intentions and, consequently, behaviour, can be employed in biodiversity conservation messaging to comprehend and impact public attitudes and actions towards conservation (Ajzen, 1991; Schultz, 2011). This approach underscores the significance of addressing individuals' outlooks on biodiversity, the effect of conservation-related social norms, and their perceived control over conservation actions, thereby enabling messaging to effectively mould their intentions and subsequent behaviours towards preserving biodiversity.

#### **Theory of Reasoned Action (TRA)**

The Theory of Reasoned Action (TRA), developed by Martin Fishbein and Icek Ajzen (1977), posits that individuals' behaviour is directly influenced by their behavioural intentions, which are, in turn, shaped by their attitudes toward the behaviour and subjective norms. Regarding biodiversity conservation messaging, the TRA suggests that messages should aim to influence



individuals' attitudes toward conservation behaviours and their perceptions of social norms around these behaviours. For example, messages highlighting the benefits of conservation behaviours and showing that these behaviours are socially valued can encourage individuals to engage in these behaviours.

### **Cognitive Dissonance Theory**

This theory posits that people experience discomfort when they hold conflicting beliefs or when their behaviour conflicts with their beliefs, and they are motivated to reduce this dissonance (Festinger, 1962). In the context of biodiversity conservation, messaging could highlight the dissonance between people's pro-environmental beliefs and behaviours that harm biodiversity, motivating them to change their behaviour.

### **Social Cognitive Theory (SCT)**

SCT posits that learning occurs in a social context with dynamic and reciprocal interactions between people, their behaviour, and their environment (Bandura, 1991). According to SCT, people learn through seeing the behaviours and results of others' acts in addition to their own experiences. In the context of biodiversity conservation, messaging can leverage SCT principles by showcasing role models demonstrating pro-environmental behaviours, which can motivate individuals to emulate these actions (Bandura, 1999). Also, conservation messages can harness SCT's concept of 'self-efficacy' - people's belief in their capabilities to execute certain behaviours - by providing information and tools that enhance individuals' confidence in their ability to perform actions beneficial for biodiversity (Bamberg & Möser, 2007; Bandura, 1977). Thus, conservation messaging that emphasizes observable, successful behaviours and reinforces self-efficacy can effectively foster pro-environmental actions supporting biodiversity conservation.

## **Sociological Theories**

### **Social Identity Theory**

The Social Identity Theory posits that individuals derive part of their identity from the social groups they belong to and are motivated to improve the status and positive distinctiveness of these groups (Tajfel et al., 1979). Applied to conservation messaging for biodiversity protection, the theory implies that framing conservation efforts as a group activity tied to a collective identity can foster a commitment to conservation behaviours (Hogg et al., 2017). For instance, messages that emphasize a community's shared responsibility for the local environment or a nation's unique biodiversity as a source of pride can invoke a sense of collective identity and inspire pro-environmental actions. Furthermore, communication strategies that promote the

perception of 'conservationists' as a positive and distinct social group may enhance individuals' willingness to identify with this group and adopt its norms, including behaviours supportive of biodiversity protection (Brewer & Gardner, 1996).

### **Social Norms Theory**

According to the Social Norms Theory, people's behaviour is impacted by their ideas of what is usual or typical (Cialdini et al., 1990). Conservation messaging can leverage this theory by highlighting positive conservation behaviours that are common or desirable in a particular community or society (Schultz, 2011).

### **Diffusion of Innovations Theory**

The Diffusion of Innovations theory, formulated by Rogers (2010), postulates that innovation, or new ideas, spreads through a society in an S-shaped curve, beginning with innovators, then early adopters, early majority, late majority, and finally the laggards. This theory can be strategically applied in conservation messaging for biodiversity protection (Singhal & Rogers, 2012). By identifying and targeting the innovators and early adopters in a community — those who are more likely to embrace new ideas and behaviours — conservationists can initiate a ripple effect that gradually influences the rest of society (Valente, 1996). For instance, novel practices or technologies that promote biodiversity, such as sustainable farming methods or ecotourism, can be introduced and diffused through key influencers within a community (Rogers, 2010). As these pioneers adopt and showcase the benefits of such practices, it encourages others to follow suit, gradually leading to broader acceptance and adoption (Valente & Davis, 1999). Therefore, the Diffusion of Innovations theory can help optimize conservation messaging strategies, fostering faster and broader behavioural change toward biodiversity protection.

## **Communication Principles & Approaches**

### **Framing Theory & Message Framing**

This theory explains how the way an issue is presented or "framed" can influence people's perceptions and responses (Entman, 1993). By employing diverse frames—such as presenting biodiversity loss as a moral, economic, or health issue—messaging can appeal to varied audiences (Jacobson et al., 2015). Furthermore, emphasizing the positive benefits of conservation (gain-framed messages) or the negative outcomes of inaction (loss-framed messages) can strategically influence individuals' attitudes and behavioural intentions, effectively stimulating motivation for desired behaviours (Kidd, Bekessy, et al., 2019).

## **Health Communication Approaches**

Health Communication Approaches, traditionally used to promote public health objectives, can be effectively applied to conservation messaging for biodiversity protection. These approaches often rely on persuasive tactics and strategies to incite behavioural change, drawing on principles such as using clear and actionable messages, tailoring information to specific audiences, and leveraging various media channels for dissemination (Kreps & Neuhauser, 2010). For instance, fear appeals, which highlight the potential negative consequences of not adopting a recommended behaviour, can underline the severe repercussions of biodiversity loss (Witte & Allen, 2000). Similarly, the concept of 'framing' in health communication, which stresses presenting information in ways that resonate with audience values and beliefs, can be employed to craft compelling narratives about biodiversity conservation (Malikhao, 2018). By using health communication approaches, conservation messaging can become more persuasive and effective in instigating pro-environmental behaviours and supporting biodiversity protection (Malikhao, 2018).

## **Social Marketing Campaigns**

Social Marketing Campaigns, which utilize marketing principles to influence social behaviours, can be highly effective in conservation messaging for biodiversity protection. Such campaigns aim to change or reinforce behaviours by understanding and targeting audience needs and want, creating appealing messages, and delivering them through appropriate channels (Andreasen, 2002). In the context of biodiversity conservation, social marketing campaigns can foster pro-environmental behaviours by increasing public knowledge, shaping attitudes, and promoting interpersonal communication about conservation issues (Green et al., 2019). These campaigns are particularly useful in combating destructive practices such as illegal hunting and overfishing. Hence, integrating social marketing strategies into conservation programs can bolster their effectiveness by motivating behavioural change and fostering a greater commitment to biodiversity protection.

## **Community-Based Social Marketing (CBSM)**

CBSM combines psychology with social marketing to foster sustainable behaviours within community settings, proving instrumental for conservation messaging for biodiversity protection. CBSM typically involves identifying barriers and benefits associated with desired behaviours, designing a strategy to address these elements, piloting the strategy with a segment of the community, and finally, broad-scale implementation and evaluation (McKenzie-Mohr, 2000). A key feature of CBSM is its emphasis on direct contact with people and creating community-wide changes in behaviour, which can lead to long-lasting effects (Linder et al., 2018; McKenzie-Mohr,

2000). For instance, CBSM can be used to promote community involvement in local conservation efforts, encouraging practices like responsible waste disposal or preservation of local habitats (Linder et al., 2018; McKenzie-Mohr, 2000). By incorporating CBSM strategies into conservation messaging, these initiatives can foster more sustainable behaviours, leading to more successful and lasting biodiversity protection (Linder et al., 2018; McKenzie-Mohr, 2000).

### **Nudging**

"Nudging" involves subtly steering individuals towards beneficial choices without eliminating any options (Thaler & Sunstein, 2008). This approach can be effectively utilized in conservation messaging for biodiversity protection. Nudges can be designed to guide individuals and communities towards pro-environmental behaviours, such as recycling or reducing energy consumption, by making these choices more intuitive and easy to follow. For instance, providing clear information on product labels about their environmental impact, or setting eco-friendly options as the default in choice scenarios, are nudging strategies that can lead to more sustainable decisions (Sunstein & Reisch, 2014). As such, incorporating nudging techniques into biodiversity conservation messaging can subtly influence behaviours and promote sustainable practices, contributing to biodiversity protection.

### **Connectedness to Nature**

Theoretical frameworks for biodiversity conservation messaging emphasize the importance of fostering a connection to nature, known as nature connectedness, as a key strategy for promoting pro-environmental attitudes and behaviours (Capaldi et al., 2014; Ives et al., 2017; Restall & Conrad, 2015; Richardson et al., 2020; Zylstra et al., 2014, 2014). Nature connectedness involves individuals feeling a sense of unity with nature and is associated with increased happiness, improved mental health, and a greater inclination to engage in behaviours that protect the environment (Capaldi et al., 2014; Restall & Conrad, 2015; Weir, 2020). Research indicates that spending time in nature can enhance nature connectedness and promote pro-environmental attitudes and behaviours (DeVillie et al., 2021). Therefore, interventions aimed at increasing exposure to nature can be effective in promoting biodiversity conservation. However, not all nature-based activities have the same impact on connectedness, and the effects vary (Capaldi et al., 2014). Apart from direct contact with nature, practices such as mindfulness, meditation, and recreational drug use can also foster connectedness. Positive affect is positively associated with connectedness, while negative affect is negatively correlated. Individual differences, including age, gender, and worldviews, influence connectedness, and psychological processes like self-awareness and affect mediate the relationship between nature and connectedness (Capaldi et al., 2014). The "pathways to nature connectedness" framework

proposes promoting sensory contact, positive feedback, and care for nature to cultivate a stronger human-nature bond for a sustainable future (Richardson et al., 2020). This framework can guide the development of biodiversity conservation messages aimed at enhancing nature connectedness. Overall, fostering a connection to nature holds promise as a strategy for promoting biodiversity conservation, and future research should continue exploring the underlying processes, moderators, and cultural aspects of connectedness, while conservation messaging should be designed to nurture this connection (Capaldi et al., 2014; DeVille et al., 2021; Ives et al., 2017; Restall & Conrad, 2015; Richardson et al., 2020; Weir, 2020; Zylstra et al., 2014, 2014).

### **Neutral Theory of Biodiversity**

The Neutral Theory of Biodiversity, a fundamental concept in ecology, proposes that the diversity and relative abundance of species in ecosystems are shaped primarily by random processes rather than deterministic factors (Hubbell, 2011). While not directly applied to conservation messaging, this theory provides a valuable framework for understanding biodiversity. It helps us appreciate the natural dynamics of species diversity and could potentially guide conservation efforts by highlighting the importance of protecting all species, regardless of their currently perceived importance, given their equivalent ecological roles under this theory. Conservation messages grounded in the Neutral Theory of Biodiversity could emphasize the inherent value of all species and the unpredictability of their roles in ecosystem stability, underscoring the importance of comprehensive biodiversity protection.

# Messaging Strategies & Effectiveness for Biodiversity Conservation

## Framing and Message Framing Techniques

### Framing Tones

#### *1. Positive Framing / Appeals to Intrinsic Values*

Positive framing, also known as appeals to intrinsic values, is a conservation messaging strategy that emphasizes the benefits of pro-environmental actions (Kidd, Garrard, et al., 2019; Kusmanoff et al., 2020; McCunn et al., 2021). This approach is particularly effective in fostering emotional connections with nature and inspiring participation in conservation efforts (Kidd, Garrard, et al., 2019; Kusmanoff et al., 2020; McCunn et al., 2021).

One of the key strategies within positive framing is promoting the aesthetic and spiritual value of biodiversity. This involves highlighting the beauty, diversity, and intricate patterns found in natural ecosystems. By showcasing these aesthetic aspects, messaging can evoke a sense of admiration and appreciation for the natural world. Research has shown that emphasizing the aesthetic value of biodiversity can foster positive attitudes toward conservation and encourage individuals to engage in pro-environmental behaviours (Dawkins & Lambe, 2022; Zylstra et al., 2014). Furthermore, this approach emphasizes the intrinsic value of biodiversity, focusing on the beauty, wonder, and spiritual significance of the natural world, thereby fostering an emotional connection with nature (Chan et al., 2012).

Another effective approach within positive framing is fostering emotional connections between individuals and nature. This involves highlighting the emotional benefits and personal experiences that can be derived from engaging with biodiversity. Messaging can evoke positive emotions and a sense of connectedness by emphasizing the joy, wonder, and tranquillity that nature provides. Studies have shown that emotional connections with nature are associated with increased pro-environmental attitudes and behaviours (Anderson & Krettenauer, 2021; Geng et al., 2015; Mayer & Frantz, 2004). This approach seeks to cultivate a sense of love, respect, and awe for the natural world, encouraging individuals to protect biodiversity out of a deep emotional commitment to nature (Kals et al., 1999; Mayer & Frantz, 2004; Nisbet et al., 2009).

However, while positive framing can inspire participation in conservation efforts, it may also lead to complacency and be less effective for behavioural change than negative framing (Baumeister et al., 2001; Hornsey & Fielding, 2016; Kusmanoff et al., 2020). Therefore, it is crucial to balance the use of positive framing with other messaging strategies to promote biodiversity conservation effectively.

## *2. Negative Framing / Threat-Based Messaging*

Negative framing or threat-based messaging in the context of biodiversity conservation emphasizes the adverse consequences of not taking action. This approach can create a sense of urgency and stimulate action by highlighting the negative impacts of biodiversity loss, such as increased vulnerability to natural disasters, loss of ecosystem services, and threats to human well-being (Keesstra et al., 2016). It might involve underlining the severe consequences of habitat loss or species extinction if conservation measures are not implemented (Kusmanoff et al., 2020).

However, this approach has its drawbacks. Conservation messages can be perceived as overly negative or doom-laden, which can lead to disengagement (Clayton et al., 2013). While messages highlighting the dire consequences of biodiversity loss can grab attention, they can also lead to despair and inaction. People may feel that the problem could be bigger for them to make a difference (Knight, 2008).

Effective messaging strategies should emphasize the direct and indirect impacts of biodiversity loss on human well-being, economy, and ecosystem services (Díaz et al., n.d., 2019). For instance, biodiversity loss can lead to reduced crop yields, increased vulnerability to natural disasters, and loss of potential medical substances (Cardinale et al., 2012). Furthermore, biodiversity loss can exacerbate climate change by reducing the capacity of ecosystems to sequester carbon (Hooper et al., 2012).

Raising awareness of environmental crises and urgency is crucial for promoting pro-environmental behaviours and policies. Messages should highlight the severity and immediacy of environmental crises, such as climate change, deforestation, and species extinction (Moser, 2010). Moreover, messages should also convey the urgency of taking action to address these crises. This can be achieved by presenting clear and specific actions that individuals and societies can take to mitigate environmental crises (Moser & Dilling, 2007). For instance, messages can encourage individuals to reduce their carbon footprint by changing their consumption patterns and advocate for policies that promote sustainable development and conservation.

### **Message Framing**

It is crucial to strategically frame the message to highlight personal benefits instead of social or environmental benefits to engage the audience more effectively (Kolandai-Matchett & Armoudian, 2020). Furthermore, the framing of the information can influence the tone of the

comments, suggesting the importance of careful message framing in conservation communication.

### ***1. Emotional Framing***

Both emotional appeals and storytelling are effective tools in biodiversity conservation messaging. However, their effectiveness depends on various factors, including the audience's values, perceptions, and the context in which the message is delivered. Therefore, it is crucial to strategically leverage these tools to maximize their impact (Martell, 2022).

#### **(1) Emotional Appeals in Biodiversity Conservation Messaging**

Emotional appeals play a crucial role in biodiversity conservation messaging. They can significantly influence public attitudes and behaviours toward biodiversity conservation (Veríssimo, 2019). Emotional appeals can be categorized into positive (e.g., love, joy, and hope) and negative (e.g., fear, guilt, and anger). Both positive and negative emotional appeals can be effective, but their effectiveness may depend on the context and the audience (O'Neill & Nicholson-Cole, 2009).

Positive emotional appeals often focus on the beauty, wonder, and intrinsic value of nature. They inspire a sense of awe and foster a deeper connection with nature (Rozema & Nowak, 2021). These appeals can effectively engage the audience by emphasizing things that matter to the audience (Kusmanoff et al., 2020). However, the effectiveness of these appeals may vary depending on the audience's values and perceptions.

Negative emotional appeals highlight the threats and consequences of biodiversity loss. They provoke a sense of urgency and stimulate action (Salazar et al., 2022). These appeals can be particularly effective when the audience perceives a high risk to biodiversity. However, they must be used cautiously to avoid inducing feelings of helplessness or overwhelming the audience.

#### **(2) The Power of Storytelling in Connecting with Audiences**

Storytelling is another powerful tool in biodiversity conservation messaging. It can make complex scientific concepts more accessible and relatable to the public (Cox, 2013; Wang et al., 2022). Stories can evoke emotions, stimulate imagination, and foster empathy toward non-human species (Kidd, Bekessy, et al., 2019). Moreover, storytelling can bridge the gap between knowledge and action in biodiversity conservation by presenting relatable characters, conflicts, and resolutions (Jones, 2014; Kolandai-Matchett & Armoudian, 2020).



However, it is essential to ensure that stories are accurate, culturally sensitive, and ethically sound. Misrepresentation of biodiversity issues can lead to misunderstanding, skepticism, or backlash (Ballejo et al., 2021; Cox, 2013).

## **2. Rational Framing**

Rational framing in conservation messaging can be a powerful tool for influencing perceptions and promoting pro-environmental behaviours. However, the effectiveness of different types of framing can vary depending on the context and the target audience. Therefore, it is crucial to tailor the framing strategy to the specific conservation issue and the characteristics of the target audience.

### **(1) Loss & Gain framing**

Loss and gain framing involves presenting the same information in terms of potential losses or gains. In biodiversity conservation, a loss-framed message might emphasize the species and habitats that could be lost due to inaction, while a gain-framed message might highlight the species and habitats that could be saved through conservation efforts (Kidd, Bekessy, et al., 2019). However, the effectiveness of loss and gain framing can depend on various factors, including the target audience and the nature of the conservation issue (Clayton et al., 2009).

### **(2) Distance Framing**

Distance framing is a type of rational framing used in conservation messaging. It includes two main categories: spatial framing and temporal framing. These frames can significantly influence the audience's perception of biodiversity conservation issues and willingness to take action.

**Spatial framing** involves presenting biodiversity conservation issues in a local or distant context. Local framing might highlight the impacts of biodiversity loss in the audience's immediate environment, while distant framing might focus on biodiversity issues in far-off locations. The effectiveness of spatial framing can depend on the audience's sense of place and perceived connection to the local or distant environment (Malhi et al., 2020; UN environment programme, 2022).

**Temporal framing** in conservation messaging emphasizes the impacts of biodiversity loss or the benefits of conservation in either the immediate (short-term) or future (long-term) context. Immediate framing underscores the current effects of biodiversity loss, such as habitat loss or climate change impacts (Government of Canada, 2018; Silvestro et al., 2022). Conversely, future framing highlights the potential benefits of conservation actions, such as preserving ecosystem

health, preventing species extinction, and mitigating climate change (Hurlbert et al., 2019; UNESCO, 2022). This framing can influence perceptions of urgency and importance and can be tailored to the target audience's temporal orientation. In biodiversity conservation messaging, contrasting the immediate costs of conservation actions with the long-term benefits for biodiversity and ecosystem health can be a powerful tool (UN environment programme, 2022; White et al., 2019).

### (3) Economic & Utilitarian Messaging

Economic and utilitarian messaging emphasizes the economic benefits of biodiversity conservation. Biodiversity contributes to the economy by providing ecosystem services, including carbon sequestration, water provision, and livestock production on natural pastures. These services are essential for human well-being and economic development (Naidoo et al., 2008). Furthermore, ecosystem services are the benefits that humans derive from ecosystems. Highlighting the value of these services can help communicate the importance of biodiversity conservation (Naidoo et al., 2008).

### (4) Behaviour-Focused Messaging

Behaviour-focused messaging encourages pro-environmental behaviours by promoting awareness of the benefits of such behaviours and the negative consequences of non-environmentally friendly actions (Schultz, 2014). Providing actionable steps is another essential component of behavior-focused messaging strategies. This involves giving individuals and communities clear and specific actions they can take to contribute to biodiversity protection. Research has shown that when individuals are provided with specific actions they can handle, they are more likely to engage in pro-environmental behaviours (Abrahamse et al., 2005).

## **Message Contents**

### **1. Informational Messages**

Informational messages are integral to conservation messaging, providing factual details about biodiversity and its significance (Dale et al., 2021). These messages, often loaded with facts, figures, and scientific evidence, serve to educate audiences about the importance of biodiversity, the threats it faces, and the protective measures that can be taken (Clayton et al., 2013). They are instrumental in raising awareness and enhancing knowledge about biodiversity conservation, promoting pro-environmental behaviour (Dale et al., 2021).

## **2. Personal Relevance & Tailored Messaging**

Messages in conservation messaging that are personally relevant and tailored to the audience's values, beliefs, and experiences tend to be more persuasive and impactful (Dale et al., 2021). The efficacy of these messages relies heavily on their alignment with the audience's interests, values, and experiences (Corner et al., 2014). For example, a message about deforestation's impact on local wildlife might resonate more with a rural audience, while an urban audience may be more engaged by a message about urban green spaces' role in supporting biodiversity (Corner et al., 2014). Thus, tailoring messages to the audience's identity and values is a crucial aspect of effective communication, as noted in the context of climate change communication (Corner et al., 2014; Dale et al., 2021).

### **Message Formatting**

#### **1. Simple & Clear Language**

Using simple and clear language for biodiversity conservation messages is crucial for effective communication. This approach helps understandably convey complex topics, using metaphors, analogies and references to existing social or cultural knowledge (Ontario et al., 2017). The goal is to create empowering and positive messages that motivate people to take action toward biodiversity conservation (de Lange et al., 2022). For instance, messages can highlight how biodiversity supports essential needs such as food, clean water, medicine, and shelter (World Wildlife Fund, n.d.). It is also essential to tailor the messages to the audience's level of understanding and context, making them personally relevant and impactful. This approach can help overcome the challenges of communicating multifactorial and comprehensive topics like biodiversity conservation (Council of Europe, 2016).

#### **2. Actionable Information**

Actionable information for biodiversity conservation messages is essential to translate knowledge into action and bridging the knowledge-action gap (Buxton et al., 2021). This involves understanding habitats, species, ecosystems, and threats and recognizing Indigenous knowledge systems. Collaboration among scientists and stakeholders is crucial for transformative change (Buxton et al., 2021). Concrete actions are essential, and strategies for durable conservation can be shared through resources like the Biodiversity Action Guide (The Nature Conservancy, n.d.). It is also important to empower locals for lasting conservation and use financial mechanisms to support these efforts (The Nature Conservancy, n.d.). Furthermore, integrating biodiversity into policies, increasing financial resources, enhancing private funding, promoting innovative finance for biodiversity, and ensuring data accessibility are key actions for effective implementation

(Environment and Climate Change Canada, 2023). Lastly, individuals can contribute to biodiversity conservation by promoting sustainable practices, learning about nature, and supporting local conservation efforts (Nature Trust, n.d.).

### **3. Visual & Multimedia Approaches**

Visual and multimedia methods, including images, videos, infographics, and interactive media, are increasingly employed in conservation messaging, enhancing engagement, comprehension, and recall of conservation messages (Dale et al., 2021). These visuals can make abstract concepts more concrete, trigger emotions, and seize the audience's attention. For instance, a video depicting the beauty and threats of a coral reef can serve as a compelling tool for advocating marine conservation (Nicoll et al., 2016). This amplifies the role of visual imagery in communicating environmental issues such as climate change (O'Neill & Nicholson-Cole, 2009).

## **Message Sources & Messengers**

### **1. Credibility & Trustworthiness of Message Sources**

The credibility and reliability of the origin of a message significantly influence how the message is received (Dale et al., 2021; O'Keefe, 2015). In the context of biodiversity conservation, messages from sources perceived as experts or trustworthy, such as respected scientists or conservation organizations, maybe more persuasive.

### **2. Influential Messengers & Opinion Leaders**

Influential individuals or opinion leaders can significantly impact the attitudes and behaviours of their followers (Rogers, 2010). In biodiversity conservation, these effective messengers could be well-known figures in the field, celebrities known for their environmental activism, or local community leaders (Dale et al., 2021).

### **3. Role of Social Networks in Spreading Conservation Messages**

Social networks can be powerful in spreading messages and influencing behaviour (Valente, 2012). Messages can spread quickly through social networks, and individuals are often influenced by the attitudes and behaviours of their network peers. In the context of biodiversity conservation, social media platforms could be used to spread conservation messages to a broad audience.

## **Challenges & Limitations in Biodiversity Conservation Messaging**

### **The Complexity of Biodiversity Issues Influenced by Socio-Political Factors**

Biodiversity conservation involves complex ecological, social, and economic issues. Communicating these complexities to the public can be challenging. Simplifying the message can lead to misinformation while providing too much detail can overwhelm the audience (Newbold et al., 2015). Meanwhile, conservation messaging does not exist in a vacuum. It is influenced by broader socio-political contexts, including political ideologies, cultural values, and social norms. These factors can shape how messages are interpreted and whether they lead to behaviour change (Knight, 2008).

### **Lack of Public Understanding & Interest with Limited Reach of Conservation Messages**

Conservation messaging often needs a more straightforward and compelling narrative, making it easier for the public to understand and engage with the issues at hand (Clayton et al., 2013). Many people lack a basic understanding of biodiversity and its importance. This can make it challenging to engage the public in conservation efforts. Furthermore, biodiversity is often seen as a distant problem that does not directly affect people's lives, reducing their motivation to act (Knight, 2008). Worsley conservation messages often fail to reach a broad audience. They are typically disseminated through channels that are most accessible to people who are already interested in and informed about biodiversity issues (Dale et al., 2021; Knight, 2008). There is a lack of understanding of the target audience's values, beliefs, and attitudes, which can lead to ineffective messaging (Clayton et al., 2013).

### **Overcoming Information Gaps & Scientific Complexity**

Biodiversity and ecological concepts can be intricate, making it challenging for the general public to understand and engage with the messaging effectively (Dale et al., 2021). Bridging these gaps and translating scientific knowledge into accessible language and visuals is essential (Dale et al., 2021). Research suggests the use of clear and concise language, visual aids, and storytelling techniques to enhance comprehension and engagement (Dale et al., 2021; Kusmanoff et al., 2020).

## **Addressing Message Fatigue & Desensitization**

In an increasingly connected world, individuals are exposed to a multitude of messages, leading to message fatigue and desensitization (Kidd, Garrard, et al., 2019). This poses a challenge for biodiversity conservation messaging, as it may struggle to capture and maintain attention amidst competing messages (Kidd, Garrard, et al., 2019). To address this, messaging strategies should focus on novelty, personal relevance, and emotional appeal. Tailoring messages to resonate with individual values and using creative approaches can help overcome message fatigue and increase message impact (Dale et al., 2021).

## **Reaching Diverse & Hard-to-Reach Audiences**

Biodiversity conservation messaging faces the challenge of reaching diverse and hard-to-reach audiences. Different demographics, socio-economic backgrounds, and cultural groups may have varying levels of exposure to and interest in biodiversity issues (Kusmanoff et al., 2020). It is crucial to employ inclusive and culturally sensitive messaging strategies that consider the specific needs, values, and communication preferences of different audience segments (Kusmanoff et al., 2020). Collaborating with community leaders and organizations and utilizing diverse communication channels can help overcome barriers and reach a broader audience (Mayer & Frantz, 2004).

## **Lack of Evaluation & Feedback**

Measuring the impact of biodiversity conservation messaging is challenging and requires robust evaluation frameworks and methodologies. Effective evaluation involves collecting and analyzing data on audience perceptions, knowledge gain, behaviour change, and long-term impact. Pre- and post-campaign surveys, interviews, and behavioural observations can provide valuable insights into the effectiveness of messaging strategies (Kidd, Bekessy, et al., 2019). However, conservation messaging faces limitations due to a lack of resources, including financial resources and staff expertise. Insufficient resources hinder the development and implementation of effective messaging strategies (Addison et al., 2015). Additionally, a lack of reliable baseline and ongoing monitoring data further complicates the development of effective conservation messages. The systematic evaluation of conservation messages is often lacking, making it challenging to learn from past experiences and improve future messaging strategies (Knight, 2008). Furthermore, integrating decision triggers into existing management frameworks can be challenging due to a lack of technical guidance and methods (Addison et al., 2015).

## **Recommendations & Best Practices**

### **Contents for Composing Conservation Messages**

#### **Use of Trusted Messengers**

Messages delivered by trusted and credible sources are more likely to be accepted (Dale et al., 2021; Pornpitakpan, 2004). Therefore, it is important to identify and engage such messengers in conservation communication efforts (Clayton et al., 2013).

#### **Tailoring Messages to Specific Target Audiences**

Tailoring biodiversity conservation messages to specific target audiences is essential for maximizing their impact. By understanding the values, beliefs, knowledge levels, and communication preferences of different audience segments, messages can be developed that are more relevant and engaging. Research suggests segmenting audiences based on demographic characteristics, psychographics, and behaviour patterns to deliver targeted messages that resonate with the audience's interests and motivations (Clayton et al., 2013; Kenter et al., 2011). It is crucial to tailor conservation messages to the specific values, interests, and needs of the target audience, increasing the message's relevance and the likelihood of acceptance and action (Clayton et al., 2013).

#### **Use Simple & Clear Language with Actionable Information**

This approach ensures that complex topics related to biodiversity conservation are conveyed in an understandable and relatable manner, thus promoting engagement and fostering long-term relations with the audience (Fernández-Llamazares et al., 2020). The messaging should focus on key biodiversity themes such as the importance of natural assets and appreciation of local species (City of Surrey, 2021). Furthermore, it's essential to understand the audience and tailor the messages to their context, making them personally relevant and impactful (Chariandy et al., 2012). Actionable information is crucial as it translates knowledge into action, bridging the knowledge-action gap. This can be achieved by guiding action and specific strategies for biodiversity conservation (Bergman et al., 2022). Thus, combining simple and clear language with actionable information can play a vital role in societal transformations toward sustainability and biodiversity restoration (de Lange et al., 2022).

#### **Utilizing Storytelling & Narrative Approaches**

Storytelling and narrative approaches have proven to be highly effective in biodiversity conservation messaging, as they possess the ability to captivate audiences, evoke emotions, and foster connections. By incorporating personal narratives, case studies, and vibrant imagery, the

significance of biodiversity can be effectively conveyed, leading to inspiration and action. Engaging narratives can be constructed by showcasing success stories, highlighting local champions, and demonstrating the tangible impacts of biodiversity conservation efforts (Clayton et al., 2013; Dale et al., 2021; Kusmanoff et al., 2020). Furthermore, storytelling serves as a powerful tool for making conservation messages more engaging, memorable, and persuasive. However, it is crucial for the stories to be authentic and relevant to the intended audience (Clayton et al., 2013).

### **Balancing Both Positive & Negative Messages**

Conservation messages that focus on the positive outcomes of conservation actions can be more effective in motivating behaviour change, and this is because they can inspire hope and a sense of efficacy among the audience (Clayton et al., 2013). However, overly positive messages may fail to convey the seriousness of biodiversity loss, while too much emphasis on negative emotions can lead to fear, apathy, or denial (O'Neill & Nicholson-Cole, 2009). Therefore, it's important to strike a balance between positive and negative messages to make the most use of their effectiveness based on audience and context (Clayton et al., 2013)

### **Use of Visual & Multimedia Approaches**

Visuals can be a powerful tool in conservation messaging. They may be used to arouse feelings, draw attention, and make abstract concepts more concrete (Dale et al., 2021; Kusmanoff et al., 2020). However, they should be used carefully to avoid misinterpretation (Clayton et al., 2013).

### **Repeated Exposure**

Repeated exposure to conservation messages can increase their effectiveness. However, the frequency and timing of the messages should be carefully planned to avoid causing annoyance or desensitization (Clayton et al., 2013).

## **Interactions with Other Platforms & Stakeholders**

### **Incorporating Social Media & Digital Platforms**

Social media and digital platforms play a crucial role in biodiversity conservation messaging in today's digital age. These platforms provide opportunities to reach large and diverse audiences, foster engagement, and facilitate two-way communication. By leveraging social media networks, online communities, and interactive content, biodiversity conservation messages can gain more comprehensive visibility and encourage active participation (Bergman et al., 2022; Dale et al., 2021). Additionally, utilizing multimedia formats such as videos, infographics, and interactive



websites can enhance message effectiveness (Bergman et al., 2022; Dale et al., 2021; Kidd, Garrard, et al., 2019; Kusmanoff et al., 2020).

### **Collaboration & Partnerships for Effective Messaging**

Collaboration and partnerships play a crucial role in effective biodiversity conservation messaging. Engaging with local communities, NGOs, government agencies, and other relevant organizations can enhance the reach and impact of messaging campaigns. Collaborative efforts facilitate pooling resources, expertise, and networks, resulting in an amplified messaging effect and coordinated action. Partnerships can involve joint campaigns, co-creation of content, and shared advocacy, bolstering the visibility and credibility of biodiversity conservation messages (Clayton et al., 2013; Dale et al., 2021). It is important for conservation messages to involve local communities and acknowledge their knowledge, values, and needs. This strategy encourages a sense of ownership and dedication to conservation efforts (Clayton et al., 2013).

### **Identification of Beneficiaries at Different Scales & Emphasizing Co-Benefits**

The spatial scale of ecosystem services is a crucial factor to consider in biodiversity conservation messaging. While certain services like tourism and recreational activities may be provided in a specific location, their benefits may extend beyond the local community. Non-local or international visitors often reap the primary advantages of these services (Hein et al., 2006; TEEB, 2010). Messages that emphasize the co-benefits of biodiversity conservation, such as improved health, economic advantages, and enhanced well-being, can be more persuasive. By making the benefits of conservation more tangible and relevant to the audience, these messages effectively convey the importance of preserving biodiversity (Clayton et al., 2013).

## Conclusions

The extensive literature review has illuminated the intricate factors that shape the efficacy of biodiversity conservation messaging. The cultural and societal milieu significantly influences the resonance of conservation messages, underscoring the importance of customizing messages to resonate with the values and beliefs of specific audiences. The selection of communication mediums, digital integration, and the presentation of messages, particularly through visual means, is crucial in maximizing the outreach and impact of conservation initiatives. The trustworthiness of the source, combined with the timing and frequency of the message, further enhances the potency of the communication.

Several theoretical frameworks, spanning both psychological and sociological domains, provide deep insights into the public's perceptions and behaviours regarding biodiversity conservation. Models such as the Elaboration Likelihood Model, Theory of Planned Behaviour, and Social Cognitive Theory shed light on the cognitive pathways that dictate individual reactions to conservation messages. Sociological paradigms, like the Social Identity Theory and Social Norms Theory, underscore the sway of group dynamics and societal standards on conservation actions. Principles from communication studies, including framing theory and health communication models, offer tactical guidance for devising narratives that can shift public sentiment and encourage eco-friendly actions. Moreover, pioneering methods like nudging and community-centric social marketing spotlight the promise of subtle tactics and community involvement in championing sustainable actions. The notion of nature connectedness emphasizes the innate human-environment bond, suggesting that nurturing this relationship can significantly bolster conservation advocacy. Interestingly, the Neutral Theory of Biodiversity presents an unconventional viewpoint on the intrinsic worth of every species, accentuating the unpredictability of their contributions to ecosystem stability. This perspective can be leveraged to champion the holistic protection of biodiversity.

At its core, effective biodiversity conservation messaging is an intricate blend of diverse factors, theories, and approaches. By amalgamating these insights, conservationists can design powerful messages that not only enlighten but also galvanize collective efforts to safeguard our planet's vast biodiversity.

This literature review's findings pave the way for several implications for future endeavours in biodiversity conservation messaging. The success of messaging strategies hinges on numerous elements, such as framing, tone, content, delivery format, source credibility, and the overarching socio-political backdrop. While positive framing can foster a deep connection with nature and

spur conservation participation, it's vital to balance it with the urgency conveyed by negative framing to prevent complacency. The emotional and rational framing of messages, coupled with the delivery format, significantly impacts audience engagement. Messages from esteemed sources amplify their persuasiveness, and leveraging social networks can exponentially increase their reach.

Nevertheless, biodiversity conservation messaging faces hurdles. The multifaceted nature of biodiversity issues, compounded by socio-political dynamics, poses communication challenges. A general lack of public awareness and engagement with biodiversity often relegates it to a peripheral concern. Consequently, conservation messages sometimes miss their mark, reaching only a limited audience.

To sum up, while a plethora of strategies exist for biodiversity conservation messaging, their success is contingent upon the context and the intended recipients. Tailoring the message to the specific conservation concern and the audience's characteristics is paramount. The path forward lies in delving deeper into the nuances of these strategies across varied contexts and honing even more impactful messaging techniques.

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