

# Societal extinction of species

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41 salience; extinction of experience; shifting baseline syndrome.

42

### 43 **Highlights**

44 - Just as population declines may lead to biological extinction, the decline of collective attention

45 and memory may lead to the societal extinction of species.

46 - Direct and vicarious experiences with species affect their societal salience and likelihood of

47 societal extinction.

48 - Societal extinctions affect perceptions of the environment, lead to a shifting baseline syndrome,

49 hinder establishment of more ambitious conservation/restoration targets, and diminish support for

50 conservation efforts.

51 - Several mitigation actions, relying predominantly on conservation education and marketing, are  
52 needed to reduce or reverse the societal extinction of species.

53

54

## 55 **Abstract**

56 The ongoing global biodiversity crisis not only involves biological extinctions, but also the loss of  
57 experience and the gradual fading of cultural knowledge and collective memory of species. We  
58 refer to this phenomenon as ‘societal extinction of species’ and apply it to both extinct and extant  
59 taxa. We describe the underlying concepts as well as the mechanisms and factors that affect this  
60 process, discuss its main implications, and identify mitigation measures. Societal extinction is  
61 cognitively intractable, but it is tied to biological extinction and thus has important consequences  
62 for conservation policy and management. It affects societal perceptions of the severity of  
63 anthropogenic impacts and of true extinction rates, erodes societal support for conservation efforts,  
64 and causes the loss of cultural heritage.

65

66 *Species go extinct twice – one time when the last individual stops breathing, and a second time*  
67 *when the collective memory about the species disappears.*

68 [adapted from a quote attributed to both Banksy and Irvin Yalom]

69

## 70 **The concept of societal extinction**

71 The ongoing biodiversity crisis is characterized by extinctions, and impoverishment and  
72 homogenization of biological communities [1-3]. Extinctions cause the loss of ecological functions,  
73 ecological and cultural ecosystem services [3-5], and consequently the **extinction of experience**  
74 (see Glossary) [6]. This depletion of human-nature interactions [7] can reduce the societal salience  
75 of species, to a point where they are collectively forgotten. We refer to this phenomenon as

76 ‘**societal extinction of species**’: the loss of **collective memory**, attention, knowledge,  
77 representations and **cultural products** associated with species from cultures and/or societies  
78 (Figure 1). We suggest that societal extinction is typically associated with biologically extinct  
79 species, but can also occur for extant species that have lost societal salience. Societal extinction  
80 represents a link between societies and nature (in their broad, inclusive sense), and thus is affected  
81 by changes in **society**, nature, and/or in their intersection. Like biological extinction, societal  
82 extinction operates at multiple spatial scales: a species can be globally or regionally extinct from  
83 either a biological or societal perspective.

84           Societal extinctions are relevant for conservation policy and management because  
85 collective memory guides individual and collective decision-making [8,9]. We argue that societal  
86 extinctions can affect people's perceptions of the environment, its natural state, severity of  
87 anthropogenic impacts, and true extinction rates. They can ultimately lead to collective generational  
88 amnesia, or a **shifting baseline syndrome** [8,10], and erode people's expectations of the state of the  
89 environment (i.e., what is normal or healthy) and their understanding of, and support for,  
90 conservation and restoration efforts [8].

91           Given the significance of these impacts, understanding the phenomenon of societal  
92 extinction could be important for mitigating the ongoing anthropogenic biodiversity crisis. Here, we  
93 suggest underlying mechanisms and factors that could affect this process, and discuss potential  
94 implications and mitigation measures.

95

## 96 **Societal salience dynamics, transformation and extinction**

### 97 *Communicative and cultural memory*

98           Collective memory and its two distinct but interrelated components—communicative and  
99 cultural memory—drive societal salience of species [11]. **Communicative memory** (also referred  
100 to as lived memory [9]) is generated through societal communication and interaction and

101 transmitted through personal interactions or contemporary dissemination channels, like news,  
102 movies, social and other media [11-13]; its dynamics tend to be associated with relatively short  
103 timeframes. **Cultural memory** (sometimes referred to as distant memory [9]) is maintained by  
104 physical or digital recordings and cultural products, such as oral traditions, literature, paintings, and  
105 other artworks; it typically unfolds over longer timeframes [11,12].

106 Both phenomena affect, and usually reinforce, one another. Communicative memory of  
107 species is mainly based on personal memories of **direct experiences** and associated acts of  
108 communication (Box 1). However, it is also shaped by cultural memory and **vicarious experiences**  
109 based on cultural products [14]. In turn, species are more likely to feature in cultural products if  
110 they are present in communicative memory, through recurrent encounters and interactions [15], or  
111 **focusing events** [14]. Such communicative acts increase the potential for generating cultural  
112 products, or restoring attention towards existing products, thereby contributing to cultural memory  
113 [11,13].

114

#### 115 *Species extinctions and societal salience dynamics*

116 Many species go biologically extinct without ever entering the cultural memory, or even  
117 being discovered [16]. If known species decline, lose functional roles, and go extinct, the processes  
118 that generate and maintain their societal salience typically fade away. Direct experiences with such  
119 species gradually disappear and vicarious experiences dominate. Driven by the cessation of  
120 experience [6,17], communicative memory is lost over time through individual and generational  
121 amnesia, also termed shifting baseline syndrome [8,18,19]. For example, local knowledge of bird  
122 species in southwestern China diminished following their extirpation, to the point that people were  
123 unable to name any such species [20]. A similar story occurred among indigenous Tsimané in  
124 Bolivia [19]. Transgenerational, collective memory of extinct species, their vocalizations and  
125 appearance are lost [20,21]. Lack of records also contributes to this process; for instance, the

126 Honshu wolf (*Canis lupus hodophilax*) has only a few specimens in museum collections,  
127 challenging its memory within Japanese society [21].

128         Reports of the dire state or extinction of salient species are often followed by a surge in  
129 media and societal attention [22]. However, such increases are typically transient [23,24]. Species  
130 losses are generally mirrored by reduced prominence in new cultural products and fading cultural  
131 memory [15]. Nevertheless, we argue that societal extinction is context-dependent, non-binary, and  
132 challenging to measure. For example, a species could become extinct from wider society but  
133 maintain salience as media symbols or within smaller groups, such as rural or Indigenous  
134 communities.

135

## 136 **Drivers of societal extinction**

137         The main factors affecting the magnitude and rate of societal extinctions include species  
138 charisma, taxonomy, extinction time, spatial factors, sociocultural factors, ecology and  
139 demography, technology, and the status and uncertainty of extinctions (Figure 2).

140

### 141 *Species charisma*

142         The charisma of a species affects its societal salience both before and after extinction and  
143 may prolong or weaken the process of societal extinction. Charismatic species are often large,  
144 colorful, with forward-facing eyes, and phylogenetically close to humans; they are usually  
145 positively perceived, can be evolutionary outliers or otherwise behaviorally novel, but sometimes  
146 also dangerous animals [25-29]. For example, the enduring popularity of the dodo (*Raphus*  
147 *cucullatus*) and thylacine (*Thylacinus cynocephalus*) has led to their use as conservation flagships  
148 [30] or as targets for **de-extinction** [31]. Decades to centuries after their biological extinction, they  
149 feature prominently in cultural and commercial products, as mascots, emblems, and logos [32].  
150 Some species may even become societally *more* salient post-extinction *because* they are extinct

151 [30], potentially undergoing **cultural transformation** (Box 2), and sometimes even leading to  
152 'cultural mythicism' [33].

153           Most species, however, cannot become societally extinct because they never had a  
154 societal presence. Such societal absence is common in uncharismatic, small, cryptic, or inaccessible  
155 taxa. This includes most of biodiversity, predominantly invertebrates, plants, fungi and  
156 microorganisms. Societally absent species can be divided into two sub-groups: (a) species that are  
157 known by scientific and/or Indigenous experts but unknown by laypeople, and (b) species unknown  
158 to humankind. The second group is part of the **Linnean shortfall** in biodiversity knowledge,  
159 affecting understanding of societal salience and extinction.

160

#### 161 *Taxonomy*

162           Societal taxonomies do not always align with biological taxonomy. Many biological  
163 species are only societally salient as representatives of higher taxa, such as bats, sharks, or spiders.  
164 Moreover, societal salience can also be shaped by morphological and **evolutionary distinctiveness**  
165 [34]. For example, loss of a fish species from a large family such as Cyprinidae (e.g., Beyşehir  
166 bleak, *Alburnus akili* [35]) would likely be perceived as less troubling than the extinction of the  
167 Chinese paddlefish (*Psephurus gladius*), which was one of the last two members of the relict family  
168 Polyodontidae [36]. Furthermore, public concern about extinction is more focused on the loss of  
169 species than of subspecies or other evolutionarily significant units [37]. Moreover, some biological  
170 species may have multiple societal identities, often regionally differentiated. For example, *Rangifer*  
171 *tarandus* is known as reindeer in Northern Eurasia where it is herded and domesticated, but as  
172 caribou in North America where it is not. In addition, societal identity can jump from one species to  
173 another, mainly through taxonomic misidentification, as was the case with the red hen  
174 (*Aphanapteryx bonasia*), which inherited the dodo's name and identity in Mauritius following the  
175 extinction of the latter [38].

176

177 *Extinction time*

178           Extinctions can be distinguished by timeframe: contemporary, historic, or prehistoric. In  
179 contemporary extinctions, collective memory of species includes lived memory and direct  
180 experiences. Consequently, their extinction may be associated with strong emotions such as  
181 environmental grief, loss, and shame [39,40], which can strengthen societal attention and memory.  
182 In historic extinctions, species may remain within collective memory especially if they are iconic.  
183 However, most are fully culturally transformed (Box 2), and often maintained only in folklore.  
184 Rarely, awareness of societally extinct species can be restored from cultural products, as was the  
185 case with extinct goose species identified from ancient Egyptian paintings [41]. Prehistorically  
186 extinct species have never been part of human lived memory. These species can only enter cultural  
187 memory through vicarious experiences from museums and popular media. For example, dinosaurs  
188 only became known to science in the 18th century [42]. Their abstract, stylized, and symbolic  
189 representation in culture is more akin to mythical creatures (e.g., unicorns, griffins, or dragons) than  
190 real species.

191

192 *Spatial factors*

193           Societal salience and extinction dynamics vary spatially [32]. Collective memory is most  
194 resilient within a species' geographic range, where it emerged through direct interactions [7].  
195 Outside of ranges, collective memory arises predominantly through vicarious experiences (but  
196 sometimes also in botanical gardens, zoos, and museums). However, following biological extinction  
197 and cultural transformation, collective memories inside and outside the former range will converge.  
198 Furthermore, local biological extinction could lead to societal extinction, while elsewhere the  
199 species at issue may remain societally salient. The thylacine and the Tasmanian devil (*Sarcophilus*  
200 *harrisii*) were both extirpated on mainland Australia in the mid-Holocene [43] and lost from



201 Indigenous people's memory. Concurrently, both species persisted in Tasmania, where they  
202 remained important and salient among the Indigenous people.

203

#### 204 *Sociocultural factors*

205           The importance of nature to societies and cultures has been studied at great length from  
206 ethnographic and anthropological perspectives. Within this body of work, the importance of species  
207 loss from shared experiences and memories has also been noted [44,45]. Sociocultural changes may  
208 lead to societal extinction when species remain extant, as happens when the loss of Indigenous  
209 societies, cultures, rights to land, or languages causes the loss of their collective memory of species  
210 [46]. Cultural losses experienced by Indigenous communities from biological extinctions might be  
211 more acute because of their strong cultural ties to species. Furthermore, socio-economic changes  
212 driven by urbanization, industrialization, globalization, and modernization may radically change  
213 relationships with nature, leading to collective memory loss. For example, the replacement of  
214 traditional herbal medicine by modern medicine in Europe has degraded knowledge of many  
215 medicinal species [47]. Societal extinction may accelerate as intergenerational environmental  
216 knowledge-sharing is reduced [19]. More generally, sociocultural factors can decouple a species'  
217 societal status from its biological status.

218

#### 219 *Ecology and demography*

220           Demographic or ecological changes in extant species can also lead to societal extinction,  
221 as happens if species go functionally extinct, or remain only in remote, inaccessible locations.  
222 Species found in inaccessible habitats with low detectability, such as aquatic environments, are less  
223 salient to begin with, so can easily become societally extinct [48,49]. Furthermore, collective  
224 memory may fade more quickly for species whose habitats were lost. Societal extinction may also  
225 be affected by changes in species population structure, such as shifts to less salient age classes,

226 behavior, or morphology.

227

## 228 *Technology*

229           New technologies can change the way we share and maintain collective memory. Internet  
230 usage changes memory and attention at individual and population levels [50], while print and digital  
231 media may replace oral traditions and older people's roles as keepers of collective memory [9].

232 Shifting to technology-mediated experiences of nature further affects public perceptions and  
233 intensifies cultural transformation of species [51]. This process can accelerate via positive feedback,  
234 whereby digital content drives the generation of similar content (e.g., memes), potentially  
235 exacerbating representational inequality among species. Such digital amplification could accelerate  
236 societal extinction, as local species representations are replaced by globally iconic species [52].

237

## 238 *Status and uncertainty of extinctions*

239           Finally, species extinction status and the potential of rediscovery or reintroduction can  
240 also affect collective memory loss [39]. For example, a species may be perceived differently if it is  
241 biologically extinct, compared to extinct in the wild. Moreover, uncertainty about whether a species  
242 is extinct may help maintain its societal salience. Uncorroborated sightings of the ivory-billed  
243 woodpecker (*Campephilus principalis*), long considered extinct, revived public interest, search  
244 efforts, investments in recovery plans, and boosted birdwatching tourism [53]. Similarly, declaring  
245 the extirpation of the ghost orchid (*Epigogium aphyllum*) in the UK raised its profile and boosted  
246 search efforts by amateur botanists, eventually contributing to its rediscovery [54]. Species  
247 rediscoveries and efforts towards extinction reversal, such as reintroductions, rewilding, or de-  
248 extinction, often reinvigorate species societal presence [31,39,55].

249

## 250 **Implications and mitigation solutions**

## 251 *Consequences*

252           Understanding societal extinction of species is important for conservation theory, policy,  
253 and practice. Collective loss of memory can weaken pro-environmental attitudes and behaviors  
254 (Figure 2) [6,17]. Moreover, the shifting baseline syndrome changes public perceptions regarding  
255 the natural state of the environment, and reduces likelihood of pursuing ambitious conservation  
256 goals [8]. For example, megafaunal rewilding efforts might have greater support if wild Pleistocene  
257 megaherbivore herds were preserved in collective memory. Reintroduction efforts of more recently  
258 extirpated species, such as Eurasian beaver (*Castor fiber*) in the UK, may also suffer from their  
259 absence in collective memory as natural parts of ecosystems [56]. Societal extinction of traditional  
260 ecological knowledge can lead to cultural heritage loss [47].

261           In biologically extant but societally extinct species, societal absence may hinder  
262 conservation measures and accelerate biological extinction if, for example, core habitat is destroyed  
263 by development. Paradoxically, societal extinction could also be exacerbated by conservation  
264 policies, for example those that restrict access to natural areas. Conversely, societal extinction can  
265 help conservation by removing pressure on a species from exploitation or over-tourism [57].

266

## 267 *Mitigation solutions*

268           We suggest that conservation education and marketing campaigns could be important to  
269 counteract societal extinction [26,58]. Reviving the memory of societally extinct species is  
270 especially important when no living eyewitnesses remain [9]. Such initiatives should embrace a  
271 biocultural perspective on extinction that transcends ecological aspects of species to include their  
272 societal profile [39]. Indigenous people can be key allies in this process. Cultural memory of  
273 species should be incorporated in outreach activities to drive conservation support [59]. Targeted,  
274 long-term marketing campaigns could aim to increase connections with extinct species [30]. For  
275 example, the National Threatened Species Day in Australia is held annually on September 7, the

276 anniversary of the death of the last captive thylacine in the Hobart zoo [60]. Finally, tackling the  
277 process of societal extinction necessitates reducing the extinction of experience by, for example,  
278 combining direct nature interactions with conservation marketing [6].

279         Collective memory also needs to be rekindled in reintroduction programs, especially for  
280 species extinct in the wild. In the same way that cultural identity has been strengthened by  
281 resurrecting dead languages (e.g., Cornish [61]), highlighting society's historic links with extinct  
282 species could lay the groundwork for rewilding and reintroductions and increase conservation  
283 support. A good example is Alagoas Curassow (*Pauxi mitu*), an endemic bird from northeast Brazil  
284 that went extinct in the wild 40 years ago [62] and was reintroduced in 2019 [63]. Prior to  
285 reintroduction it was the subject of a high-profile public campaign that used the slogan "Let's bring  
286 this Alagoan home", explicitly linking its reintroduction to regional cultural identity.

287

## 288 **Concluding remarks**

289         Ultimately, the escalation of societal extinction can cause many problems for  
290 conservation practitioners (see Outstanding Questions). The ongoing extinction crisis and  
291 increasing disconnection of humans from nature are creating a growing **societal extinction debt**,  
292 with many occurrences of societal extinction likely lying ahead. Sustaining awareness of species  
293 and their threats also holds cognitive and emotional consequences for individuals [64]. Resolving  
294 these issues will require multidisciplinary approaches that go beyond ecology and conservation  
295 biology.

296

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536 **Box 1. Direct and vicarious experiences.**

537 Collective memory of a species stems from both (1) direct or embodied experiences, and (2)  
538 indirect, vicarious, or disembodied experiences [51]. Direct experiences are mainly built through  
539 direct human-nature interactions based on sensory (mainly visual and acoustic) contact [7]. As such,  
540 they are associated with specific, first-hand species knowledge and awareness, its morphology,  
541 behaviour, environment, and its cultural ecosystem services. Except for contact with species in  
542 captivity, especially in zoos and botanical gardens [65], direct experiences are spatially constrained  
543 to the species' range. Direct experiences are also highly dependent on a species' abundance,  
544 population trends, behaviour, visibility, and accessibility.

545         Conversely, vicarious experiences are based on virtual exposure to species (i.e., without  
546 direct sensory contact with the species), through various physical or digital records from natural  
547 history, literature, art, oral traditions, and media [66]. While vicarious experiences may involve  
548 realistic species representations, they can also be highly stylized, symbolic, or even fantastical  
549 representations (e.g., anime), and may not directly link to species in their natural settings [51,65].  
550 They tend to be less dependent on species presence, distribution, or status, and are more influenced

551 by other factors, such as a species' charisma, historical fame, socio-economic or symbolic value.  
552 The type of experience on which a memory is based can affect its characteristics. Individual  
553 vicarious memories tend to be faint and ephemeral, while direct experiences, especially those  
554 associated with strong emotions, generate more long-lasting individual memories [9,51], and even  
555 environmental epiphanies [67]. Also, the psychological intensity of an individual's nature  
556 experience is often positively correlated with their resulting drive to achieve pro-environmental  
557 actions [68].

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## 562 **Box 2. Cultural transformation.**

563         Following their biological extinction, some species undergo societal extinction, while  
564 others remain societally salient, or even increase in presence (Figure 1). However, collective  
565 memory of such extinct but salient species often undergoes substantial changes: it is disassociated  
566 from its biological identity and culturally transformed. Direct experiences and lived memory are  
567 lost, while vicarious experiences and inaccurate, stylized, or simplified representations become  
568 dominant [51]. For example, following the extinction in the wild of the Spix's macaw (*Cyanopsitta*  
569 *spixii*), children living within the Curaçá municipality, part of its previous range, incorrectly  
570 believed that this species resides in Rio de Janeiro following its appearance in the animated movie  
571 'Rio' [69]. Moreover, prior to extinction, virtual species can compete with the real populations for  
572 societal attention and provide a false appearance of abundance [70]. Processes of cultural  
573 transformation mostly occur in species that were societally salient. These species have more virtual  
574 representation in commercial, artistic, and cultural outlets, which enables the disassociation of their  
575 societal from biological fates [70].

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587 **Glossary:**

588 **Collective memory:** shared pool of memories, sustained by a community.

589 **Communicative (lived) memory:** memory generated through societal communication and  
590 interaction.

591 **Cultural (distant) memory:** memory maintained by physical or digital recordings and cultural  
592 products.

593 **Cultural product:** tangible and intangible creations of a particular culture.

594 **Cultural transformation:** substantial changes in collective memory of a species, characterized by  
595 its disassociation from its biological identity.

596 **De-extinction:** recreation of once-extinct species, such as by genetic resurrection [31].

597 **Direct (embodied) experiences:** experiences built through direct human-nature interactions based  
598 on sensory contact [66].

599 **Extinction of experience:** progressive loss of daily interactions between people and nature [6].

600 **Evolutionary distinctiveness:** the amount of non-redundant evolutionary change embodied within



601 a given taxon [34].

602 **Focusing events:** sudden, relatively uncommon attention-grabbing events, which often concentrate  
603 attention on previously dormant issues.

604 **Linnean shortfall:** the major gaps in taxonomic knowledge, with only a fraction of species  
605 worldwide described by science.

606 **Shifting baseline syndrome:** a gradual change in the accepted norms for the condition of the  
607 natural environment due to lack of past information or lack of experience of past conditions [8].

608 **Societal extinction debt:** time-delayed societal extinctions of species.

609 **Societal extinction of species:** loss of societal attention and collective memory of a species.

610 **Society:** a group of people who live together in a particular social system.

611 **Vicarious (indirect, disembodied) experiences:** experiences based on virtual exposure to species,  
612 through various physical or digital records from literature, art, oral traditions, and media [66].

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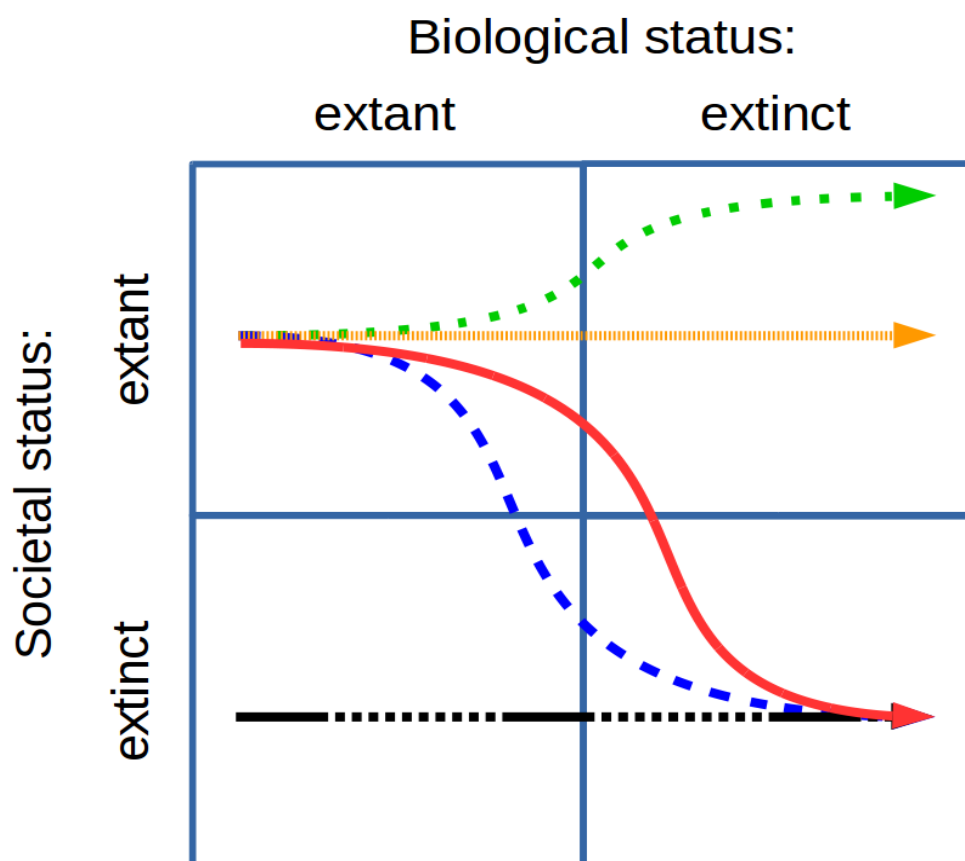
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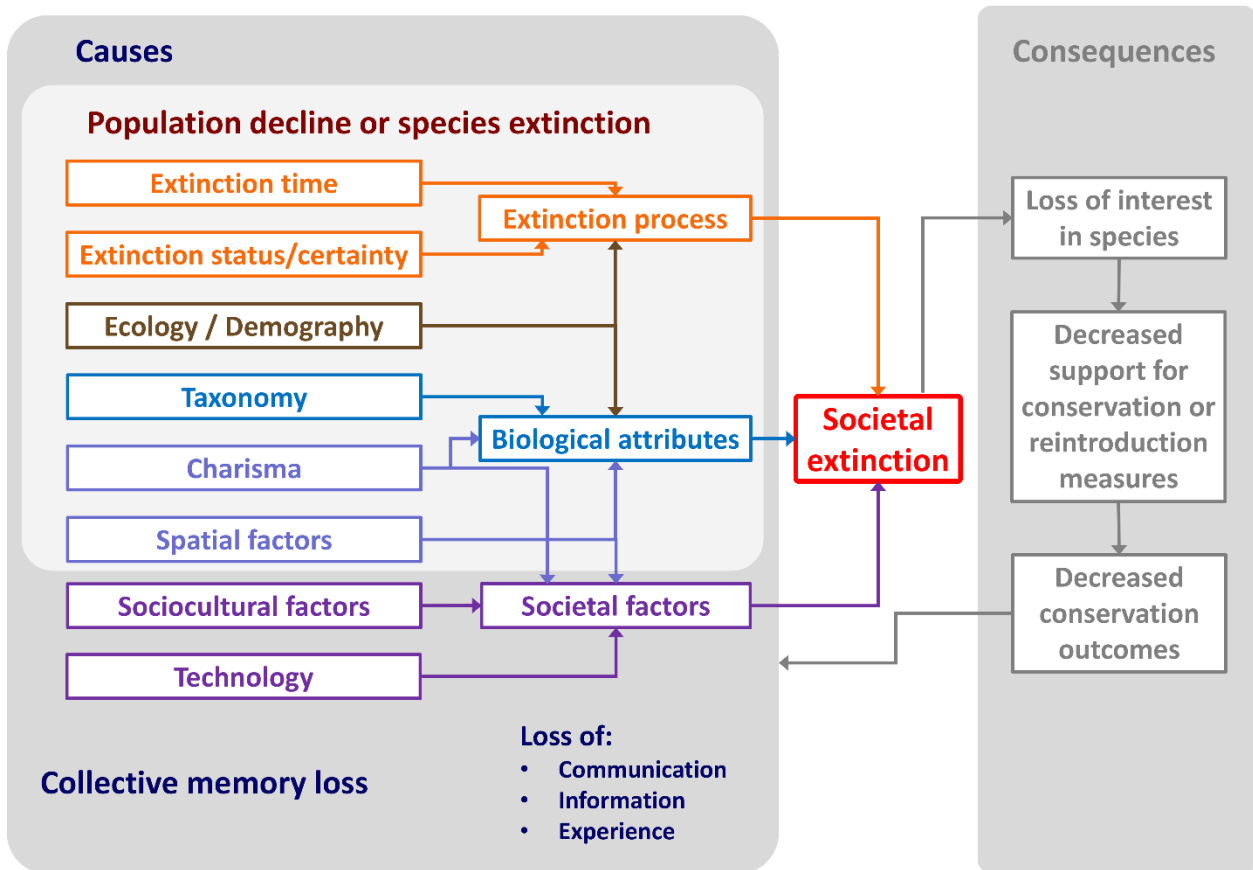
636 **Figure captions**



638 **Figure 1. Diagram outlining the main conceptual types of trajectories of societal extinction.**

639 Trajectories are based on biological and societal species status (extant or extinct). Continuous red  
640 line – standard scenario, societal salience declines following species extinction towards complete  
641 societal extinction. Blue dashed line – societal extinction occurs while the species is still extant,  
642 often due to different socio-cultural, demographic or ecological changes. Green dotted line –  
643 species experiences increasing societal salience following its biological extinction, most often due  
644 to its charisma and value. Orange striped line – societal salience of a species remains unaffected by  
645 its extinction, often because it was already culturally transformed. Black dash-dotted line – species  
646 was already societally absent prior to biological extinction, so its societal status remains unaffected  
647 by its disappearance. The figure presents only the major types of scenarios, while there are many  
648 more possible variants and more complex combinations of trajectories. It also does not present  
649 transient peaks in societal salience, such as those that often follow extinction reports, nor the  
650 trajectories characterized by extinction 'reversal', for example due to species rediscovery,  
651 reintroduction, or de-extinction.

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654 **Figure 2. Framework displaying the causes and consequences of societal extinction.** Societal  
 655 extinction is caused by collective memory loss, driven either by population decline and species  
 656 extinction, or by different societal factors that can decouple the process of societal extinction from  
 657 the biological status of a species, often through the process of cultural transformation. Societal  
 658 extinction process could be affected by several main drivers: extinction time, status and uncertainty  
 659 of extinctions (extinction status/certainty), ecology and demography (ecology/demography),  
 660 taxonomy, species charisma (charisma), spatial factors, sociocultural factors, and technology. It  
 661 leads to a loss of interest in societally extinct species, decreased support for conservation or  
 662 reintroduction measures, and decreased conservation outcomes, which in turn drive and further  
 663 strengthen the causes of societal extinction. Links among the elements are to a great extent  
 664 hypothesized, and further studies are now needed to assess and quantify evidence for such links.  
 665  
 666 **Outstanding questions**

- 667 - Under what conditions, and over what spatial scales, is societal extinction of a species likely to  
668 occur and to progress more rapidly?
- 669 - Can we tease apart the biological from human drivers of societal extinction?
- 670 - How omnipresent and differently manifested is societal extinction across societies, and how  
671 specific is it?
- 672 - Under what conditions does preventing societal extinction of a species make it less likely to  
673 become biologically extinct?
- 674 - What are the best methods to record and maintain local and indigenous knowledge of species?
- 675 - What is the relationship between the ongoing process of loss and impoverishment of languages  
676 and societal extinction?
- 677 - What are the best approaches and strategies for societal de-extinction?
- 678 - What measures are needed to promote public awareness of societally non-existent species, and  
679 how do such interventions differ from (and influence) those aimed at maintaining interest in salient  
680 (societally extant) species?
- 681 - Should we strive to remind people about fully or nearly extinct species with an impending or  
682 already manifested societal extinction, or should we allocate efforts to other species that are more  
683 likely to societally persist?
- 684 - Could a stronger focus on societally extinct species detract much needed attention from imminent  
685 or future societal extinction risks to other species, and how can we balance this potential trade-off?
- 686 - When does mainstreaming knowledge about a species risk increase in the threats to its survival,  
687 for example through unsustainable exploitation?
- 688 - Will focusing on societal extinction take conservation attention from other conservation issues, or  
689 are these new messages mostly synergistic with previous ones?
- 690 - What are potential negative effects of promoting cultural and national identity through local  
691 nature?

692 - Should we always strive to combat collective memory loss, or should we accept that there are  
693 human psychological and cognitive constraints that will inevitably lead to a change in saliency for  
694 different species through time?  
695 - Are the emotional costs of remembering species too high for individuals, given the growing  
696 prevalence of ecological grief?  
697  
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