Acta Scientiarum
http://periodicos.uem.br/ojs/acta
ISSN on-line: 1807-8672
Doi: 10.4025/actascianimsci.v47i1.72126

Review on the human-animal biodiversity interaction

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ABSTRACT. Little has been studied about human-animal interaction in general; Some particular experimental and descriptive studies provide information that must be systematized. The systematic review study aims to answer, using the standard Prisma methodology, the research question: What is known about the interaction of human-animal biodiversity? It includes original open access studies, of the experimental and descriptive type that provide relevant information, extracted from the Scopus database, from 2015 to 2023, using the keyword biodiversity, until the date of October 26, 2023. The analysis of the data uses cluster analysis, and the nearest neighbor method, 19 studies were selected that show the dynamic interaction between humans and animals. The study is limited to describing interactions between humans and animals, excluding other interactions. It concludes by showing the positive and negative impacts of coexistence, the majority being negative such as predation, transmission of emerging diseases, nutritional use, behavioral changes, changes in land use and their economic and social consequences, for which laws and policies that guarantee regulated coexistence.

Keywords: ecological balance; fauna; men; peaceful coexistence; ecosystem.

Received on May 5, 2024.
Accepted on September 6, 2024.

Introduction

There are few studies that describe the relationship of the members of the ecosystem, and no studies that specifically deal with human-animal interaction, although there is evidence that human activity is exterminating animal diversity or at least positively or negatively affecting this kingdom, it is also necessary to evaluate whether efforts to reverse the damage are working (Brodie et al., 2015a; Brodie et al., 2015b). Knowledge of the interaction allows the main actors to reinforce effective response actions and rethink those that do not have a sustainable solution. The objective of this study corresponds to the knowledge of the interaction of human and animal biodiversity, for which it evaluates the anthropogenic and zoogenic impacts, and their causes, as well as the places where the research was carried out and the species involved. However, it is necessary to define the terms biodiversity and biological diversity because they refer to the variety of life on Earth, which includes all levels of biological organization from ecosystems, species, genes and ethnic-cultural organization, in other words, it is the development of life in a given space (Aguirre Mendoza et al., 2017).

In addition, it should be noted that an ecosystem is a system that is made up of a set of organisms, the physical environment in which they live (habitat) and the biotic and abiotic relationships that are established between them. In other words, it is a community of living beings that interact with each other and with their environment, there are various types of ecosystems, such as marine, terrestrial, microbial and artificial. (Răcușan Ghircoiaș et al., 2023). It should be taken into account that in environmental sciences and biology the species was defined in many ways, for this study it is defined based on the biological concept, and focused on the ability of organisms to reproduce with each other and produce fertile offspring, as follows: species are "the set of organisms that share a common ancestor and that are separated from other groups by reproductive barriers". Taking into account the morphological concept of species, that is, prioritizing the physical characteristics of the organism, similar physical characteristics and their distribution in the geographical area. This concept of species focuses on the external appearance of organisms and not on their ability to reproduce with each other, in this case it is defined as "a set of morphologically similar individuals, usually associated with each other by a defined geographic distribution and separated from other sets by morphological discontinuities" (Castro-Campillo et al., 2018).

In the same way, ethnic-cultural organization in the context of ecosystems refers to the relationship between human communities and the ecosystems they inhabit, according to the Food and Agriculture Organization of the United Nations (FAO), the non-material benefits that people derive from ecosystems are

called "cultural services". These services include aesthetic inspiration, cultural identity, a sense of attachment to the homeland and a spiritual experience related to the natural environment. FAO highlights that cultural services are closely interconnected with other ecosystem services, such as supply and regulatory services. This classification includes the traditional practices and knowledge of the human communities that inhabit an ecosystem, and may include agricultural, medicinal, culinary, handicraft and other cultural practices transmitted from generation to generation (Matos et al., 2022) (Aguilar-Correa et al., 2019)

Material and methods

Type of research

The research corresponds to a systematic review study that follows the Prisma methodology standards, which bases its study on a checklist that we detail in the process of this study, for more information on the prisma method go to (Page et al., 2023). The research question is the axis of the research, as the study must focus on answering it, the defined question is: What is known about the interaction of human-animal biodiversity? And the specific questions are based on investigating the positive or negative human or animal impact, determining the mitigation or improvement methods they applied in the experiment, a current and future overview of the topic, and indicating the opportunities for improvement that are proposed.

Eligibility criteria

The eligibility criteria obey the delimitation of search and selection according to search and data collection criteria, the protocol indicates that the search is limited to articles of original open access studies, of the experimental and descriptive type that provide relevant information, extracted from the Scopus database, without time limit. Using the keyword biodiversity, as of October 26, 2023, consider the languages of Spanish and English. The search equation is as follows: (biodiversity) and not ("mini review" OR mini-review) AND (limit-to (doctype, "ar")) and (limit-to (language, "english") or limit-to (language, "spanish")).

The study carried out 3 filters, the first was filtered by titles, the second was filtered by abstract and the third filter by reading complete articles. To date, 196 articles have been written using the word Biodiversity. Of these, the first filter (by title) selected 64 articles, in this phase the articles that were simple or systematic review were eliminated, the minireviews were also excluded, the second filter applied is the filter by reading abstracts where 54 were selected, in this case the articles that evidenced through their abstracts the lack of relevant contribution regarding human-animal interaction were separated. The third filter applied was the filter by complete reading of the article, in this section 19 articles were selected, removing the articles from years younger than 2015, under the criterion of emerging and current interactions, in addition to removing the articles that did not have totally free access. Reviews of each registry were conducted independently by two researchers related to the environmental study who acted as selection experts. To do this, they used the excel database.

Data elements

The selected articles are shown in Table 1, indicating the year of publication, the editor of the journal and the reference. In addition to these data, data were extracted on anthropogenic effects, zoogenic effects, study site and species involved, the analysis of these data is presented in the data analysis and results item.

Table 1. Biological Reviews. Selected articles on human-animal biodiversity interaction.

Title	Year	Source title	Referencia
Foraging guild modulates insectivorous bat responses to habitat loss and insular fragmentation in peninsular Malaysia	2023	Biological Conservation	(Hazard et al., 2023)
The unequal burden of human-wildlife conflict	2023	Communications Biology	(Braczkowski et al., 2023)
The rise of hyperabundant native generalists threatens both humans and nature	2023	Biological Reviews	(Moore et al., 2023)
An emerging coastal wetland management dilemma between mangrove expansion and shorebird conservation	2022	Conservation Biology	(Choi et al., 2022)
Host plant availability and nest-site selection of the social spider stegodyphus dumicola pocock, 1898 (Eresidae)	2022	Insects	(Rose et al., 2022)
Biodiversity – gaining ground?	2022	Environmental Law Review	(Ronish & Hilburn, 2022)
Invasive rat drives complete collapse of native small mammal communities in insular forest fragments	2022	Current Biology	(Moore et al., 2022)

Each article was evaluated in relation to bias, this analysis was performed by comparing the institution of affiliation with the institutions related to the study. The selection was made by environmental experts using the database in the student version of Excel of Office 365 and the pdf reader of the original articles. Effect measures were evaluated taking into account the similarities between studies and their variables, so a cluster analysis was performed.

Synthesis methods

The data extraction was carried out on October 21, 2023 and considered the inclusion criteria: Articles that explain the relationship between humans and animals. Exclusion criteria: Articles that do not include the scientific name of the animal species in their research topic. Exclude review articles or don't collect first-hand data. The data were classified to recognize and identify the anthropogenic effects and zoogenic effects in each article, this allows comparing the intensity, quantity and severity of each effect, as well as the data that accompanies them.

On the other hand, the identification of the study sites was carried out in order to know the places where the results were applied, this also allows the proposal of studies in the least studied places or with the absence of research. The species involved were numbered in order to recognize their relevance and to propose new studies on species that have been little or not studied at all. The visualization was prepared by Excel charts.

Selection of studies

Articles that meet the requirements established at the beginning were selected, mainly those referring to first-hand experimental or descriptive information that indicate the interaction of man with animals, those that met these requirements were 19 indicated above (Figure 1).

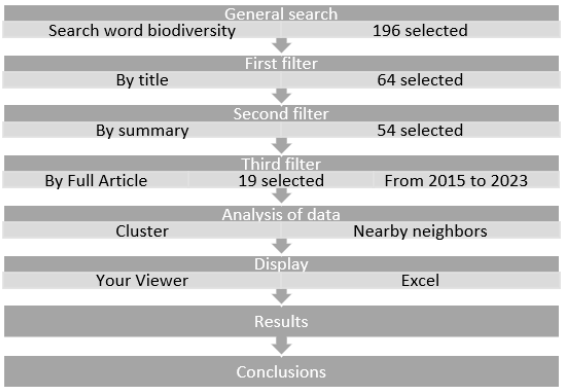

Figure 1. Flow chart for selection of studies on the interaction of human-animal biodiversity. The article selection and writing flow is displayed.

Results and discussion

The selected studies were conducted in Malaysia, Otavi, Thailand, Taiwan, Bulgaria, New Guinea, Southeast Asia, Belgium, Canada, Africa, New Zealand, England, China, Patagonia, Peru, Taiwan, Bulgaria and Borneo. From the 196 articles found with the word Biodiversity, the review of emerging themes was analyzed through graphical analysis, for which the Vos Viewer software was used and shown in Figure 2.

Figure 2 shows the main research delimited until 2023 since 2015, it can be visualized by the quantity analysis that the studies are mainly concerned with studying animals, secondly the studies of loss of habitation, then those related to the study of the sunflower helianthus annuus, phenotypes, mammals and humans and their effects, studies of ecosystem services and in the place of Southeast Asia are also noted. Using SPSS software, a classification analysis was made by the method of the nearest neighbor, which identified 3 predictors, the causes of impact, the anthropogenic effects and the activities causing the impact in order to know the interactions of the main predictors, there is evidence of a high relationship between the studies of animal activity and the construction and execution of hydroelectric dams. in lesser and second degree with the construction of dams. On the other hand, the relationship between the increase in anthropogenic pressure and the migrations of sockeye salmon is evidenced, as well as its effects on the degradation of coastal wetlands around the world. To a lesser extent, the tripartite relationship between the

acquisition of resources, advertising and defense of the territory with the improvement of plant activity is shown, the relationships and the graph of the predictor space can be seen in Figure 3.

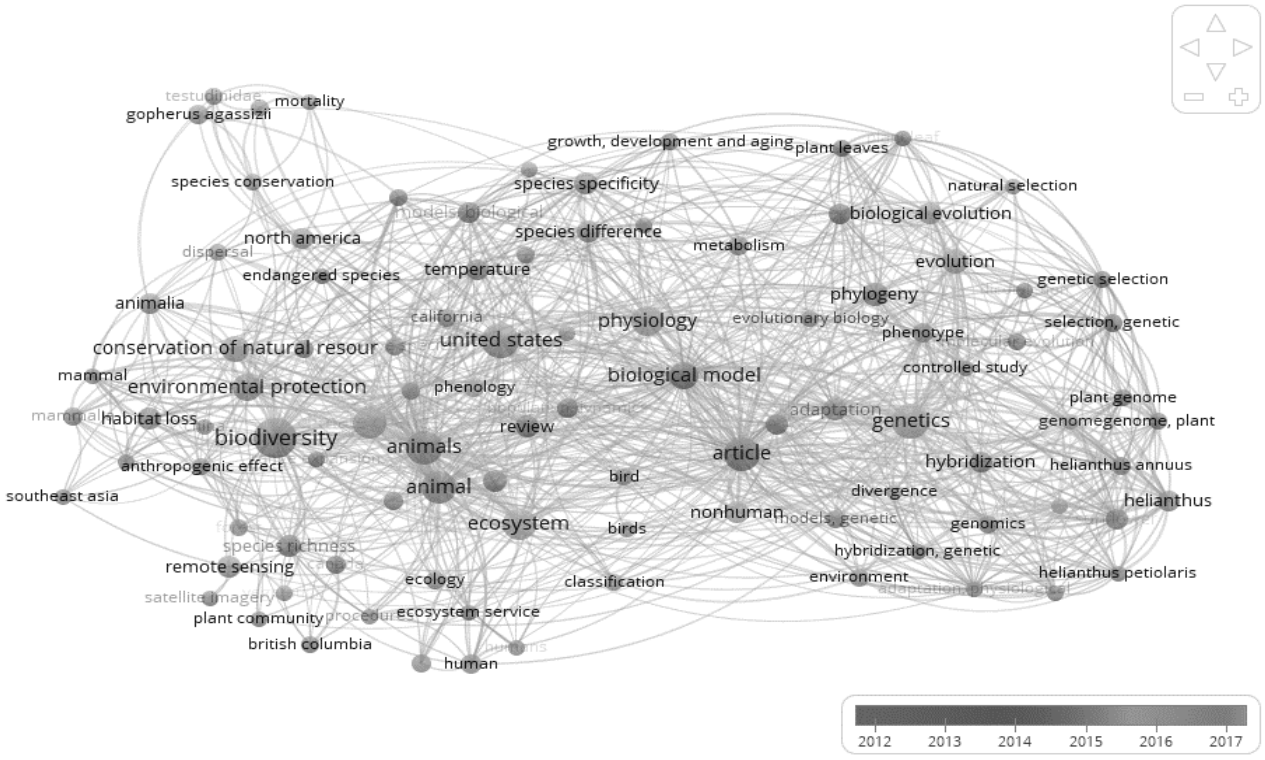

Figure 2. Original articles on biodiversity. Data were extracted in a simple search using the words: biodiversity.

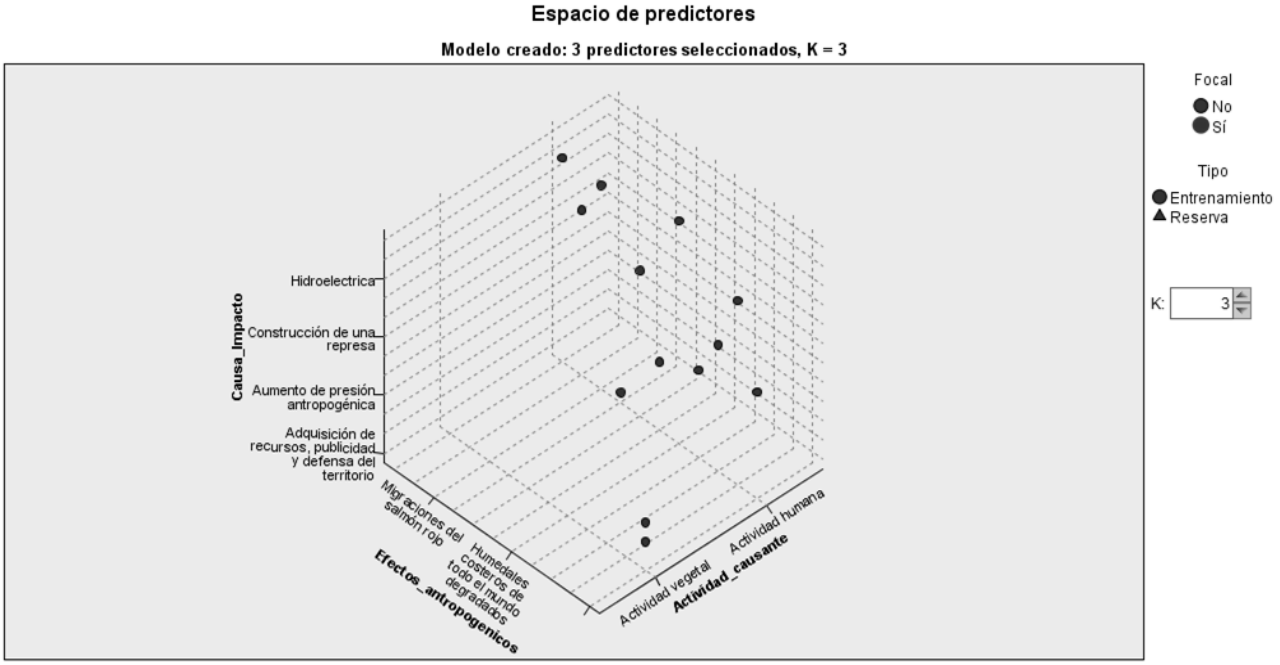

Figure 3. Predictors of plant animal diversity Interaction.

By cluster analysis between the activities and years of publication having as an identifier the titles of the articles, 5 clusters were obtained, the first smaller cluster has as representative the theme of human impacts on species, the second deals with zoogenic effects on man, the third deals with the human-animal conflict, The fourth deals with the negative and positive effects of human constructions and the fifth cluster deals with the human threat to humans and animals, these issues are dealt with in greater detail in the following sections. Below is the product of these classifications (Figure 4):

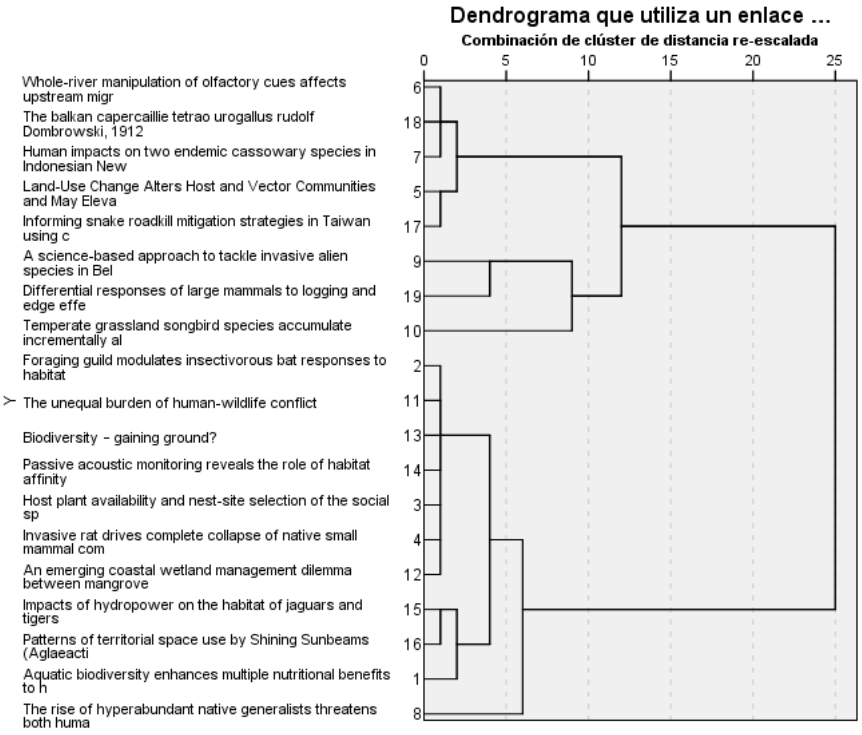

Figure 4. Cluster of selected articles on the interaction of human-animal biodiversity. The numbers indicate the order of the items in each division.

Figure 4 shows that the articles are grouped into 5 groups taking into account the year of publication and the types of activity. Next, the questions are answered: What impact is studied in the article?, What mitigation methods were applied?, What is the current and future outlook? And what opportunities for improvement are proposed?

Impact of the animal kingdom on man

It is indicated as an impact of the animal kingdom to humans that there is a diversity of oceanic species that offer nutritional benefits to ecosystems. And the complementarity in the concentrations of nutrients offered by the species is proposed for the increase of nutritional benefits by increasing Total Nitrogen. It provides a future prospect for obtaining nutritious food based on aquatic ecosystems. So it offers the opportunity to balance the products to obtain nutritious foods. Figure 5 shows the interaction between aquatic biodiversity and the human diet.

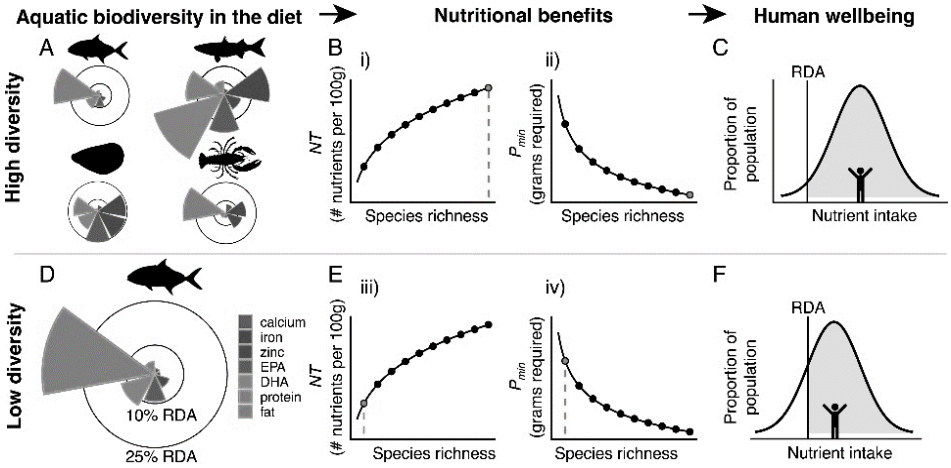

Figure 5. Interaction of aquatic biodiversity with nutrition.

Note: Aquatic biodiversity substantially increases human well-being as they have multinutrient and complementary profiles (A) differ in the average micro and macronutrient content for representative species

of fish (Abramis brama, Mullus surmuletus), molluscs (Mytilus galloprovincialis) and crustaceans (Nephrops norvegicus). The orange dots in B and E correspond to potential diets of high and low levels of biodiversity. Seafood eaters with limited access every day do not reach diet targets, they are low in diversity (D-F versus A-C), this image was taken from and is commons certified for reproduction. (Bernhardt & O'Connor, 2021). The outlook indicates that the economic consequences of livestock loss to large carnivores can be very high, because up to two-thirds of a household's annual income can be lost in a single livestock predation event. Families living within Jigme Sigmye National Park in central Bhutan lost 17% of their annual per capita income due to predation by the tiger (Panthera tigris) and leopard (Panthera pardus), and those on the edge of Tanzania's Serengeti National Park lost more than 19% annually due to predation by leopards and lions (Panthera leo). The novel sector of conservation finance may include South Africa's "Rhino Bond" and Sweden's payment for the presence of wolverines. Both are linked to the population performance of these species on community lands and protected areas. Conservation models that promote tourism and income generation in non-protected areas, but are not necessarily limited to non-consumptive tourism. It should be noted that the costs associated with predation events are often negligible compared to climatic or disease-related shocks, which run into billions of dollars (Braczkowski et al., 2023)

One of the selected studies studies studies the human impacts on two endemic cassowary species and indicates that human accessibility is not related to the local abundance of cassowaries, nor is the influence of pigs on cassowary distribution at fine spatial scales. Cassowaries are functionally important as dispersers of plant seeds, their loss through overexploitation could have important consequences for the regeneration of forests and the functioning of ecosystems. A list of recommendations on sustainable wildlife hunting was also prepared and disseminated to local governments in Papua, Indonesia. Currently, northern cassowaries have been detected in 71 of a total of 2,433 chamber-days in Nimbokrang, and dwarf cassowaries in 46 of the 2,211 chamber-days in the Arfak Mountains. It is proposed to increaseefforts to control hunting and ensure its sustainability (Brodie & Pangau-Adam, 2017). It is recommended to avoid future development of agriculture in the vicinity of intact forests. Establishing population trends for pigs and macaques is imperative, as they are linked to cascading impacts on the fauna and flora of local forest ecosystems, and human health and the economy. Pigs (Sus spp.) and macaques (Macaca spp.) harbor high pathogenic loads and are known to carry several diseases, including brucellosis, leptospirosis, Nipah, tuberculosis and Japanese encephalitis (discussed in more detail in section V.5). They also share high rates of immune similarity to humans, with recent evidence of malaria outbreaks in apes in Central Kalimantan, Indonesia, acting as reservoirs of disease and providing considerable potential for the transfer of zoonotic diseases to humans. In Malaysia, Singapore and Indonesia, significant efforts are being made to manage the overabundant populations of pigs and macaques. Population control through cage capture, culling, hunting and sterilization can be effective when adequate resources are available, but these species have high fecundity which makes control difficult. Management efforts to limit pig and macaque access to oil palm have largely failed. A study investigates the unequal burden of human-wildlife conflict, the impacts of this conflict can be mentioned in Figure 6.

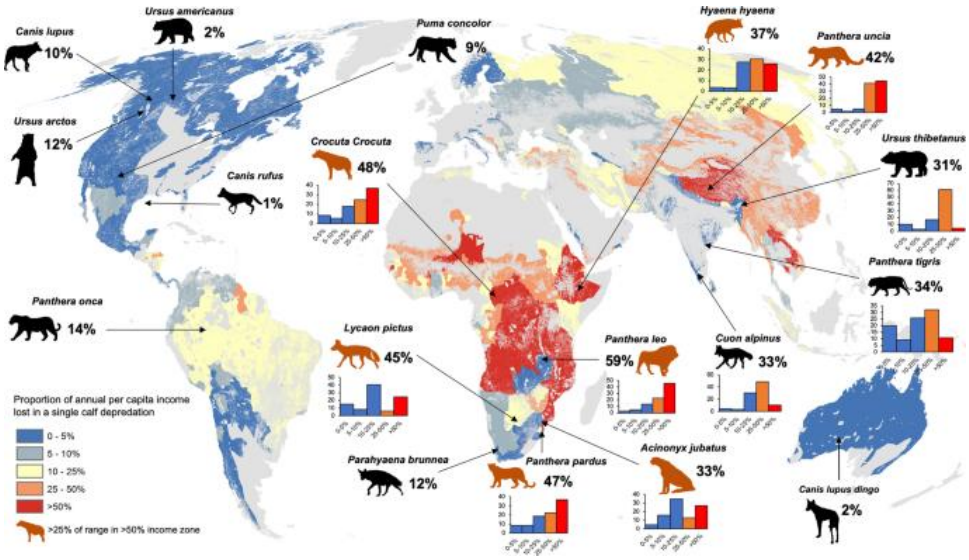

Figure 6. Predation events.

Note: A single farmer is exposed to a single calf (250 kg) predation event anywhere in the range of a given carnivore. The orange silhouettes represent those species that have >25% of their range located in areas where communities would experience a >50% loss of economic income through predation. This chart was taken from (Braczkowski et al., 2023) and has a commons distribution. According to the Biodiversity Integrity Index, the UK is the 12th most ecologically depleted country in the world, conserving only 42% of its native species diversity and abundance. England is even more ecologically depleted than the UK as a whole, mainly due to agriculture, urban growth and past deforestation. England's statutory landscapes are a product of traditional agriculture, rather than remnants of untouched nature. In this cultural context, improving biodiversity often means re-establishing traditional pre-industrial land management techniques, including hedgerow maintenance and carefully supervised grazing, rather than simply letting nature take its course. That is why the Environment Act was issued , which provides for the creation of a central register of biodiversity offsets in order to avoid double counting. In their current form, net biodiversity gain and local nature recovery strategies are only loosely connected. In other words, the implementation of net profit does not reflect the overall vision set out in the strategies established a decade ago. After analysing the results of six local planning authorities that have already adopted net gain, the researchers found that 95% of biodiversity gains were provided at or near development sites, compared to only 4.5% of gains provided off-site. The new legislation on the net gain of biodiversity represents a historic milestone and a vital step in reversing the long-term depletion of the natural environment by human activity. We believe that policies require further refinement to realize the vision of "bigger, better, more united places for nature." In particular, the orientation of the mitigation hierarchy should be revised to encourage a better balance between in situ mitigation and contribution to ecological networks (Ronish & Hilburn, 2022) .

Impacts of man on animal

On the other hand, the article: The foragers' guild modulates the responses of insectivorous bats to habitat loss and island fragmentation in Peninsular Malaysia indicates how the impact of the construction of dams for hydroelectric dams in addition to the fact that these will triple by 2035, whose effect will be the extermination of insectivorous bat species, mainly those that depend on the forest. Mitigation methods have not yet been applied. Human population growth creates an excess demand for energy and the decarbonization of that energy, which is why hydroelectric plants were proposed as the best option, currently representing 73% of the renewable energy in the world, but it is necessary to recognize that the construction of river dams contributes to habitat loss and fragmentation in lowland forests. They propose to guarantee the quality of the habitat accompanied by its functional connectivity to maximize the diversity of bats, in addition to favoring the growth of forest species on which it feeds. It is necessary to seriously evaluate the proliferation of hydroelectric dams because of their harmful effect on the islands by deteriorating and altering the diversity of bats and activity at the guild level (Hazard et al., 2023).

The article: Invasive Rats Cause Total Collapse of Native Small Mammal Communities in Insula Forest Fragments indicates the decline in species richness as the size of the island decreased and isolation time increased, accelerated by the increasing dominance of the ubiquitous Malayan voles (Rattus tiomanicus). This species was already hyperabundant on smaller islands in initial samplings (1992-1994, 66% of individuals), but became monodominant on all islands, regardless of island size, in the most recent study (2020, 97%). This species became the dominant monkey on island fragments 33 years after isolation, to date no mitigation methods have been applied. It is anticipated that forest landscapes will be fragmented by the construction of dams, the impact mitigation measure is to reduce the extent of habitat degradation, can help maintain native biodiversity and prevent the overabundance of Rattus. (Moore et al., 2022) . One of the studies indicates that the manipulation of olfactory signals in the river affects the migration of sockeye salmon, this impacts an 80% reduction in the probability of fish entering the tributary from the main channel of a river and an increase in migration times by an average of 12.2 hours. with females taking 4.6 hours longer than males to enter the tributary. Mitigation methods include regulating native water conditions in the Seton River during sockeye salmon migrations to avoid negative impacts on the timing and success of migration. Unfortunately, more dams are being built, thus affecting the ecosystem environment. To avoid further damage, it is proposed to regulate the conditions of construction and execution of hydroelectric dams (Drenner et al., 2018).

Temperate grassland songbird species gradually accumulate along a primary productivity gradient, a persistent scarcity of resources can decrease plant productivity and reduce resource availability for species at higher trophic levels. In the grasslands we examined, this reduces the number of songbird species. It is

proposed to promote the accumulation of detritus to increase the number of songbird species. Currently, semi-arid and temperate grasslands such as the one we are studying often have periodic resource shortages that can dictate the characteristics of species accumulation both in the plant and at higher trophic levels. The proposal of this paper is to act on semi-arid and temperate grasslands, managing them with ecosystem-wide techniques that promote plant productivity, enabling managers to mitigate the effects of climate change by proactively improving habitat quality for a wide range of species. (Harrower et al., 2017). A study seeks to maintain complete assemblages of bats in fragmented island landscapes in East Asia, including area-sensitive bat species, as hydropower-induced fragmentation is an emerging threat to forest biodiversity in the tropics and subtropics, most habitat loss and fragmentation is still associated with the expansion of agricultural and grazing landscapes. Ever-increasing amounts of wilderness areas are falling victim to emerging threats, particularly posed by the global boom in hydroelectric dam construction. The (López-Bosch et al., 2022) selection of the appropriate site for the construction of dams is proposed, avoiding the flooding of large forest areas and the creation of numerous habitat islands, of which the sonotypes of forest bats have mainly become extinct. Palmeirim and Gibson (2021) Studying the impacts of hydropower on jaguar and tiger habitat, they found that hydropower, which aims to meet the world's growing demand for energy with minimal environmental costs, has become one of the main drivers of habitat loss, fragmentation and degradation worldwide. Currently, 3700 hydroelectric dams with more than 1 MW of installed capacity are being developed, many of them in tropical developing countries that maintain high levels of biodiversity. Despite the known risks to freshwater biodiversity, it is often assumed that dam construction does not significantly affect terrestrial biota. The future growth of hydropower will disproportionately affect jaguar habitat. The study found more than 10 times more planned prey within the jaguar's range compared to the tigers' distribution. Strategies that could help mitigate the impacts of hydropower infrastructure, in the case of existing reservoirs, surrounding habitats should be included in protected area systems to prevent expansion of the hydropower footprint and trigger the decline of top predators, overall biodiversity, and associated ecosystem services. One study dealt with tropical mountain hummingbirds. It indicates that territorial behaviors and the influence of intrusion pressure have a direct relationship, on the other hand, the relationship between the position of the central areas and the characteristics of the habitat associated with the defense of the territory, the avoidance of predators or other behaviors not related to foraging was not found. There was also no relationship between the use of non-central areas and the use of habitat based on the acquisition of resources. Patterns of land space use by Shining Sunbeams can be characterized by core areas not determined by foraging behavior (Pavan et al., 2020). An article studies snake run-overs. The density of the roads had little influence on roadkill sightings; Areas with dense roads may be of lower habitat quality and contain fewer snakes (Yue et al., 2019). Natural history and landscape factors should be taken into account in roadkill mitigation design to effectively reduce snake roadkills. The following article indicates that after 1890, the species tetrao urogallus became extinct out of a total of 46 squares (39.7%). The continued increase in anthropogenic pressure requires accurate data on trends in the threatened Balkan capercaillie in Bulgaria. The isolated population in the mountains of the Western Balkans has become extinct. The average number of male exhibitors, when using the maximum value for population size, is 8.4 males per 5 square km (n = 141 squares) and 3.98 males per lek (n = 298 leks). One paper found that carnivorous mammal species were largely or completely confined to the primary forest, although habitat use for the Cloudy Leopardby Sunda (*Neophelis diardi*) increased towards the ecotone. However, several large ungulates were found completely (the elephant *Elephas maximus* and Banteng *Bos javanicus*) or mostly (sambar *Russian unicolor*) in felled forests (Brodie et al., 2015c). In the absence of hunting, disturbed habitats can be important for the conservation of certain vulnerable and endangered species. Both sambar and (Brodie et al., 2015a). The Muntjac (*Muntiacus*spp.) They strongly avoided the edge of habitat in the cleared forest and in the primary forest, respectively. The lowest habitat use by these species persisted between 2 and 4 km from the habitat boundary, farther than has been observed by the in filtration other edge effects, such as Canopy desiccation. It is critical that thresholds in logging intensity are identified to avoid declines in habitat use by taxa, such as carnivores, that appear intolerant to the pressure of intensive logging.

Shared interaction

The article: Availability of host plants and selection of nesting sites of the social spider stegodyphus dumicola pocock, 1898 (Eresidae). He indicates that this type of spider guards environments against

browsing animals, so it aims to avoid its extermination by characterizing the plants that favor the growth of social spiders. On the current and future panorama, it is evident that the conditions in which some organisms develop are extreme ecological conditions, such as high temperature fluctuations and low rainfall, which influence activity patterns with an evident physiological response to avoid dehydration. Therefore, it proposes as an opportunity for improvement the selection of suitable plants for the growth of certain social species (Rose et al., 2022). One of the studies indicates that the rise of hyperabundant native generalists threatens both humans and nature. (Moore et al., 2023) The impact identified in this article is that many species respond negatively to forest edges, in these areas species that exploit habitats and resources disturbed and modified by man can thrive, they are known as the 'winners' that easily overcome the natural densities supported by undisturbed habitats and produce negative impacts on other native fauna and flora. In order to mitigate this problem, a 1 m trench was built with 1.5 m solid metal sheets mounted vertically over the trench and extending along approximately 5 km of the edge of the forest plantation, but after a few weeks, the ditch had flooded, the pigs enjoyed these areas as pseudo-wallows, and then they would dig underneath or push the compromised fence. Another species involved are macaque species that easily circumvent these barriers. The situation is unlikely to improve. Long-term monitoring data focused on species abundance are essential to assess baseline population levels and the effectiveness of ongoing management techniques.

A study on mangrove expansion and shorebird conservation indicates that wetlands around the bay provide important wintering and stopping habitats for some 40,000 migratory shorebirds, including 4 critically endangered or endangered shorebird species and 9 near-threatened shorebird species. As a mitigation method in mainland China, there are policies such as the Forest Law of the People's Republic of China and the Wetlands Protection Law that provide guidelines on the protection and management of mangroves. This has increased the extent of mangrove forests since 2000. The latest mangrove conservation and restoration action plan aims to increase the current extent of mangrove forests by at least 30% by 2025 through active planting and substantial financial support to local departments. The current outlook on mangroves shows the expansion during the last 3 decades, mainly through the expansion of the mangroves. As a result, local managers and stakeholders have actively removed mangrove seedlings or cut down mangrove tree stumps to slow mangrove expansion and preserve open tidal flats for shorebirds to feed on. It is proposed to ensure the costs and benefits of mangrove restoration or afforestation effort, and that good decision-making will balance the relative benefits of mangrove expansion and tidal plain conservation by taking into account which areas are of greatest importance to biodiversity, including shorebirds (Choi et al., 2022). One of the articles was commissioned to study the effect of land-use change on the alteration of host and vector communities, indicating that recent outbreaks of various emerging infectious diseases have drawn much attention to the health consequences of anthropogenic degradation of the environment and that as methods of remediation it indicates reducing the impact of man, But both fragmentation and agriculture benefit host and vector communities that raise the risk of disease (Guo et al., 2019)

Presentation biases and certainty of the evidence

The evaluation of the quality of the articles includes the evaluation of authorship and affiliation, the largest proportion of authors have scientific experience and their data are reliable, their affiliations are from recognized institutions in the field. 88% of articles have a clear title and abstract, but 100% are consistent with the content of the article, providing an accurate overview of the study. The selection methodology is original experimental and descriptive articles, the main design obeys the cluster analyses, this methodology is appropriate for the amount of data extracted in each study. Regarding the analysis of results and analysis, it is verified that the results are clearly presented, supported by concrete data and without interpretative biases.

In total, 80% of its references correspond to literature reviews of data less than 10 years old, in addition to being relevant, as they show high citation rates in some cases. The conclusions and discussion are supported by the results, their discussion is logical and based on relevant data and literature. Cite the citation style correctly. All articles were peer-reviewed and indexed by Scopus.

General interpretation of the results

This section provides a general answer to the questions posed at the beginning of the study.

What impact is studied in the articles?

The studies are oriented to the study of the impacts of the animal kingdom on man, of man on animals and shared interaction. A first impact of animals on humans is their nutritional benefits, especially ocean species, currently their richness of total nitrogen increase per intake is used. But the negative impacts must be pointed out, so a study deals with the economic consequences of the loss of livestock at the hands of large carnivores, this affects nearby neighbors, reporting losses of more than 19% mainly aimed at lions and leopards. The impacts on cassowaries leave open questions, since there is no relationship between human interference and survival, so only game control programs are implemented, they also mention that these animals are carriers of endemic diseases emerging in the areas of contact with humans. In addition to (Bernhardt & O'Connor, 2021) (Braczkowski et al., 2023) (Brodie & Pangau-Adam, 2017) these factors (López-Bosch et al., 2022), the expansion of agricultural and grazing landscapes, bringing the decrease of wild areas, is bringing human-animal coexistence closer to the coexistence of animals, thus bringing emerging diseases transmissible by animals closer together. Regarding the impacts of man on the animal, mention is made of the intrusion of dams of hydroelectric dams that falls on the extermination of species such as the insectivorous bat, the recent dominance of the ubiquitous Malayan field rat (Rattus tiomanicus) and the habitat of jaguars and tigers. On the other hand, it is mentioned that animals are guided by their olfactory characteristic and these are being changed by human interference, which is why it is important to study the behavior of sockeye salmon and its changing behavior around olfactory perceptions indicating that there is an increase of 12.2 hours for migration and delay of entry to larger effluents. It is indicated that the hand of man produces the scarcity of grasslands inhabited by songbirds, tropical hummingbirds, the threats of extinction of the Balkan capercaillie. Agriculture (Hazard et al., 2023) (Hazard et al., 2023) (Palmeirim & Gibson, 2021) (Drenner et al., 2018) (Harrower et al., 2017) (Pavan et al., 2020) , urban growth and deforestation are regulated for their control by environmental laws () in many cases carnivorous mammals are confined to smaller spaces such as leopards, elephants when escaping from felled forests. Issues of coexistence were led to study the number of snake accidents on dense and isolated roads, together with the relationship between the quality of the habitat. (Ronish & Hilburn, 2022) (Yue et al., 2019)

The **s**hared impacts were specifically studied by the effect of change in land use alters communities, their interactions and the vectors that transmit emerging infectious diseases, on the other hand humans plant plants that benefit the breeding of species and these in turn bring benefits of control of other animals. On the other hand, there are generalist, native, hyperabundant and uncontrolled species that threaten coexistence with humans and animals. The relationship between the existence and maintenance of mangroves and migratory shorebirds, which in many cases are in danger of extinction, was also studied. The problem is that when mangroves increase, wetlands decrease, so the inhabitants avoid the expansion of mangroves. (Guo et al., 2019) (Rose et al., 2022) (Moore et al., 2023) (Choi et al., 2022)

What mitigation methods were applied?

To obtain the best nutritional benefits from consumption, it is necessary to supplement species to oceanic concentrations. On the other hand, in order to mitigate the negative effects it is necessary to reduce human-animal conflicts, a good example is to prevent damage from large carnivores through human guardians or the construction of protective enclosures. The mitigation of human impacts would have to guarantee sustainable hunting, for which education and training play an important role, as well as workshops and agreements with the State. If the problem is the expansion of the urban area or human cultivation, it is necessary to moderate it and take care of the protected areas and avoid total access to certain critical areas of ecosystem survival. An interesting proposal is the issuance of environmental care laws. On the other hand, it is necessary to moderate the construction of hydroelectric dams and roads, evaluate the appropriate places and carry out studies to optimize environmental care by simulated means in the care of species such as bats, birds, terrestrial bats, jaguars, tigers, etc. It is also necessary to accept the isolated area of animal species, because only in this way can the contagion of diseases such as products of animal vectors be avoided.

What is the current and future outlook?

The current panorama indicates human-animal interaction but with a certain neglect and interruption of habitat, mostly due to anthropogenic action, which can be the construction of hydroelectric dams, indiscriminate logging, agriculture or urban expansion, on animal habitats, this brings consequences of

natural response such as the damage of predation of domestic species, transmission of diseases or other beneficial effects such as the use of nutritional benefits. control of other species, knowledge and coexistence with natural species.

What opportunities for improvement are proposed?

A healthy diet based on materials of oceanic biological origin is proposed. On the other hand, with regard to human-animal conflicts, the implementation of financing policies for conservation through bonds and the creation of protected areas and sustainable tourism is foreseen. Regarding the expansion of agriculture, it is proposed to moderate its extension and intensity, it is necessary to distance certain species in order to avoid contagion by emerging diseases, and the implementation of policies for the management of hyperabundant populations and national protection laws that are bringing benefits to vulnerable ecosystems is currently being seen. The construction of hydroelectric dams and dams must be regulated and deeply reflected on the inevitable damage caused by their construction and execution alone. On desertification, it is necessary to manage plantations to mitigate climate change. As well as monitoring logging intensity thresholds. Regarding shared interactions, it is necessary to select suitable plants for the development of social species, which can control the excessive growth of natural or exotic predatory species to the detriment of the native fauna and flora. The care of the expansions of mangroves and wetlands in favor of certain species that live in them.

Conclusion

The negative impacts of the animal on man were in areas of safety, material damage or health. The positive impacts are in nutritional areas, species control and social coexistence.

Human impacts on animals are mainly caused by hydroelectric dams and other intrusions into natural habitats. Humans issue protective - regulatory laws and actions for the benefit of animals. Humans apply impact mitigation and moderation methods, but they are being neglected. In this sense, improvements to human-animal interaction are proposed to be applied in conflict environments.

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