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"THE SOCIAL CONSEQUENCES OF RELOCATING ANIMALS FROM THEIR NATURAL HABITAT: A COMPREHENSIVE STUDY"

Jyotirmoy Panja
Research Scholar
Department of Zoology, CMJ University, Jorabat, Meghalaya, India.
Dr. Vishal K. Chhimpa
(Assistant Professor)
Research Guide
Department of Zoology, CMJ University, Jorabat, Meghalaya, India.
&
Dr. Kartik Maiti
(Assistant Professor)
Research Co-Guide
Department of Zoology, Raja N L Khan Womens' College (Autonomous), Midnapore, WB, India.

Abstract

Forest island size and degree of isolation have been thought to be the key factors affecting animal assemblages in fragmented forests up to this point in study. As there are many additional variables affecting animal persistence in forest islands, using such a simple method might have negative consequences on the findings and conclusions. We looked through the scholarly literature on the subject in order to identify these elements and gauge their significance. In addition to island size, other important elements impacting creature gatherings at the backwoods island scale incorporate fix structure, edge impacts, and nearby plant local area structure. The general number of woodland islands and their consolidated size, lattice penetrability, the presence of immense organic halls, as well as solitary trees and woods, appear to be the main determinants at the scene scale. Our analysis also shows that several of these components have a propensity to interact. For instance, edge impacts might decrease the amount of habitat that is acceptable in a patch of forest. Moreover, certain consequences of fragmentation may be hidden by a species' characteristics, such as movement, dietary preferences, or habitat specialization. The landscape context is also very important for the survival of animals in fragmented forests. So, we draw the conclusion that there is a critical need to use suitable bio-indicators to explore the aforementioned parts of habitat fragmentation at the neighborhood and scene scales.

Keywords: habitat fragmentation, biodiversity, animals

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1. INTRODUCTION

The study of non-human animals' (often referred to as animals') cognitive capacities, psychological frameworks, wellbeing, and responses to stresses are just a few examples of the natural animal behavior that may be studied. Animal behavior studies are also done for comparative reasons to learn how different and similar species are, as well as to mimic human behavior for things like psychiatric studies and pharmaceutical models. Yet, part of the material is equally pertinent to the research facility creature model overall due to the actual idea of utilizing lab animals as "models." This part focuses on the previous — where ethology goes into the lab setting to mimic the way of behaving of free residing animals. See the accompanying sections in this volume for more data on the utilization of animals to show illness or pharmacology specifically: Pippin, Cavanaugh, and Pistollato (2019, Part 20); Bailey (2019, Part 19); Carvalho et al., (2019, Section 16); Greek and Kramer (2019, Section 17); and Slam (2019, Part 20). (2019, Part 15) Shapiro has extra data on creature models utilized in brain science (1998). Demonstrating the way of behaving of wild animals in the lab could involve strategies that are truly painless, as opposed to other logical methodologies, like those in biomedical exploration. Despite the fact that the facts really confirm that specific conduct studies incorporate meddlesome methodology, (for example, infusing color for recognizable proof or cutting an opening in the skull to put cerebrum inserts), for those that don't, the physical and close to home aggravation of the subjects might slip by everyone's notice. This may likewise affect how thoroughly the 3Rs are utilized, with substitution in conduct research being a specific concern. Notwithstanding, trial controls, (for example, reproducing a drawn out presence of hunters), checking strategies, being caught in the wild and moved to a lab, or essentially living in a lab climate can bring about fluctuating levels of experiencing by forestalling a creature performing normal way of behaving and forcing an ongoing state (Relationship for the Investigation of Creature Conduct, 2018). (Especially in the event that they are a prey or regional animal groups) Logical issues with exploring wild creature conduct in the lab as well as issues with the creature model overall are likewise brought by research done up for the sake of creature government assistance.

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The entire initial segment of this section is committed to examining how animals are many times utilized in lab conduct exploration to reproduce wild way of behaving, the issues that emerge from doing as such, and how social examination has revealed logical imperfections in the creature model. The second piece of this part then talks about the ethical issues encompassing whether the overall logical interest in creature conduct legitimizes doing this concentrate in any case, with an accentuation on non-human primates (NHPS).

For efficient management and protection of wildlife in a world that is becoming more and more controlled by humans, an understanding of the consequences of human disturbance is essential. Recent decades have seen a rapid increase in human population, which has led to an increase in resource needs. This need has resulted in an expanding and all-pervasive network of highways that bring people closer to the habitats of animals. The complex, frequently unpredictable, and time- and space-varying behavior of animals may be affected by human activities along road networks. In fact, it is expected that changes in human activity—in addition to the quantity of individuals yet the kind of action — will influence changes in how untamed life acts. For example, earlier examinations recommended that a few hunting procedures and mechanized sporting exercises might greatly affect untamed life than less intrusive unsettling influences. Yet, there is currently little information on how human disturbances really affect behavior, population dynamics, and life histories.

1.1.Inadequacy of Relocation Processes

Overall, it was believed, however, that there is a serious dearth of quantitative data on the ecological elements of relocation, especially with regard to the justifications for relocation and post-relocation biodiversity restoration. In connection with this, it was believed that the current administration of PAs lacked defined aims, creating a perplexing scenario that left little possibility for alternative paradigms, such as restricted forest product extraction or local engagement.

At the seminar, there was a lot of discussion on the serious gaps in the relocation procedures as well as the shortcomings of the relocation package in the past, in addition to the scientific basis

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for relocation. Environmentalists generally believe that the relocation procedures have been flawed and that the requirements of the displaced people, especially with regard to their transition into a new economy and future livelihood security, have not received enough consideration. In particular, RuchaGhate (SHODH, Nagpur), who had researched this topic within TadobaAndhari Tiger Reserve in Maharashtra, pointed out vividly the significance of assessing the degree of local people's economic dependency on forest resources inside PAs. While planning a move, these dependencies must be measured and taken into consideration.

In addition, the effectiveness of a PA's relocation effort can only be assessed if baseline socioeconomic data on the moved population exists to allow for a comparison with post-relocation status. Nevertheless, it seemed that in the majority of the PAs where relocation has occurred, the attempts at a thorough effect assessment are limited by a lack of comprehensive baseline data. A team made up of different stakeholders, individuals, the forest department, and researchers should conduct thorough baseline and post-relocation surveys using a consistent approach in order to determine the true effect of relocation on people's life. Here, concerns of decision-making and planning openness assume paramount importance. One of the rare studies evaluating the socioeconomic impact of relocation efforts in India was given by AsmitaKabra (Samrakshan Trust) from the Kuno Wildlife Sanctuary in Madhya Pradesh, the suggested location for the restoration of the Asiatic lion, which is now very endangered. She drew attention to the grave flaws in the relocation plan that left many houses in far worse shape than before, and that too in an unfamiliar setting. A previous evaluation of displaced residents from Rajaji National Park by Joy Das Gupta (West Bengal National University of Judicial Sciences) revealed that the procedure had been incredibly unjust, with no consideration given to the quality of the land in the relocation areas and a dearth of agricultural support services.

Nonetheless, it was believed that the shortcomings in the relocation procedure were more closely tied to implementation issues than to the actual relocation package, which has progressively improved over time. An attempt is being made to significantly enhance landholding status via the relocation process in PAs, as opposed to the "land-for-land" strategy used in the case of other development projects like dams (where landless people are not considered for land distribution).

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1.2.Missing Links in Relocation

Despite the government's track record, some of the presentations showed that there has recently been a noticeable improvement in the methods used and the results obtained, with a rising effort on the part of forest managers to more sensitively address the issues at hand and take aspects of equity and justice into consideration. A comprehensive strategy connecting PA management with local residents' lives is still lacking, nevertheless. These strategies must, of course, be location-specific rather than based on a universally applicable blueprint. Mahesh Rangarajan, an environmental historian who examined the issue of relocation from a historical perspective, discovered that the debates about relocation in the 19th and early 20th centuries, when the management of forests was more focused on colonial interests, seem to closely mirror very similar concerns in the present. It says a lot about the forest department's ongoing monolithic attitude and lack of regard for local cultures, economics, and concerns that discussions concerning forest protection have not evolved much since then.

The relocation seminar served as a forum for practitioners, scholars, and representatives of civil society organizations to exchange experiences and, more importantly, perspectives. The most important result of the seminar was that it made it increasingly evident that reality is typically mixed and that it is necessary to examine both the successes and issues in PA management in general and the relocation of people in particular with more objectivity.

Such activities will cause a collective realization that it's important to continually seek out fresh viewpoints on many facets of PA administration. And that, only when the many stakeholders (PAmanagers, researchers, and people) are prepared to exchange knowledge, be open to alternative ideas, and, most importantly, are committed to both conservation and people's livelihoods, may fresh views develop.

Future discussion on relocation must be founded on a more frank evaluation of its numerous components, including its need, its steps, its components' contents, and its effects. With more thorough discussion and evaluation, a policy framework guiding relocation procedures in India should ultimately result from these analyses. This seminar may be a crucial step in establishing a

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drawn-out process of fact-finding, research, discussions, and agreements on PA management that will be accommodating to site-specific methods and solutions.

2. LITERATURE REVIEW

We searched the literature for articles that linked the richness of animal species with habitat heterogeneity. The equivalent terms "habitat diversity," "habitat complexity," "structural diversity," "structural complexity," "structural heterogeneity," "spatial heterogeneity," "spatial complexity," "foliage height diversity," "foliage diversity," "architectural complexity," "vegetation complexity," and "vegetation heterogeneity" were also remembered for an ISI Web of Science search. Here, concentrates on that didn't survey vegetation construction or that put a greater amount of an accentuation on gathering structure than on the quantity of species were precluded. We underline the limited idea of our writing evaluation since this choice of natural watchwords can't be viewed as demonstrative of the writing on habitat heterogeneity and creature species variety all in all. For example, "habitat intricacy" was not found in the writing search, albeit an examination that utilized the expression "intricacy of habitat" to depict vegetation structure was. We found that the exploration discoveries differed as far as test size and the level of importance they found for the relationship between habitat heterogeneity and species variety. Tragically, it couldn't embrace an exhaustive meta-investigation (see, for instance, Gurevitch et al., 1992, 2001) inferable from an absence of information and the serious level of irregularity of quantitative primary elements. Consequently, we utilized the "vote-counting" approach (Doors, 2002) involving essential includes for the applicable classifications to assess expansive patterns.

3. ANIMAL ABUNDANCE

The most urgent research topic, according to Roedenbeck et al (2007)’s road ecology study agenda, is "Under what conditions can roadways impact population persistence?" They contend that the lack of research evaluating the impacts of roads at the population level is the reason why this subject has not been addressed. Roedenbeck et al. (2007) use review articles that were released in 2000 and earlier to back up this assertion. Underhill and Angold (2000) claim in one

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of these review articles that "concrete information is still missing for the impact of roads and traffic at the population level," and they quote a review paper from 1991 to back up their claim. Hence, the argument that there aren't many population-level road ecological studies (Roedenbeck et al. 2007) depends on investigations and cases that are presently 8 to 17 years of age.

The Global Meeting on Biology and Transportation, street nature meetings at environment and transportation gatherings, the rise of street biology research focuses, (for example, the Street Biology Center at the College of California at Davis and the Middle for Transportation and the Climate, North Carolina State College), and other indicators show that "road ecology" has become a legitimate sub-discipline of ecology over the past ten years (Forman et al. 2003). The ever-growing transportation network has led to an upsurge in interest in the environmental consequences of roads. The major worry of environmental planners and conservationists is that traffic and roads may be causing animal numbers to decline or perhaps disappear (Trombulak and Frissell 2000, Forman et al. 2003). Is there any data to support this concern? It is obvious that a current assessment of the status of population-level research on traffic impacts is necessary. To give an up-to-date assessment of the state of knowledge in this field, the first goal of this research is to perform a thorough evaluation of the empirical literature on the impacts of roads on animal population abundance and dispersion.

3.1.Elements that have an impact on animal assemblages on a landscape-wide scale

A greater percentage of natural ecosystems are being altered as a consequence of extensive human activity. Anthropogenic space differs in proportion to and composition from comparatively natural habitats depending on the location of the globe and the scale being addressed. As a consequence, human-modified landscapes are becoming more significant for biodiversity on a worldwide scale (Carrara et al. 2015). In research on the consequences of fragmentation that have been done so far, many writers have largely concentrated on the traits of individual patches without considering the meaning of their encompasses, which joined with these patches comprise a scene. However, other publications claim that this position is crucial (Collinge, Palmer 2002).

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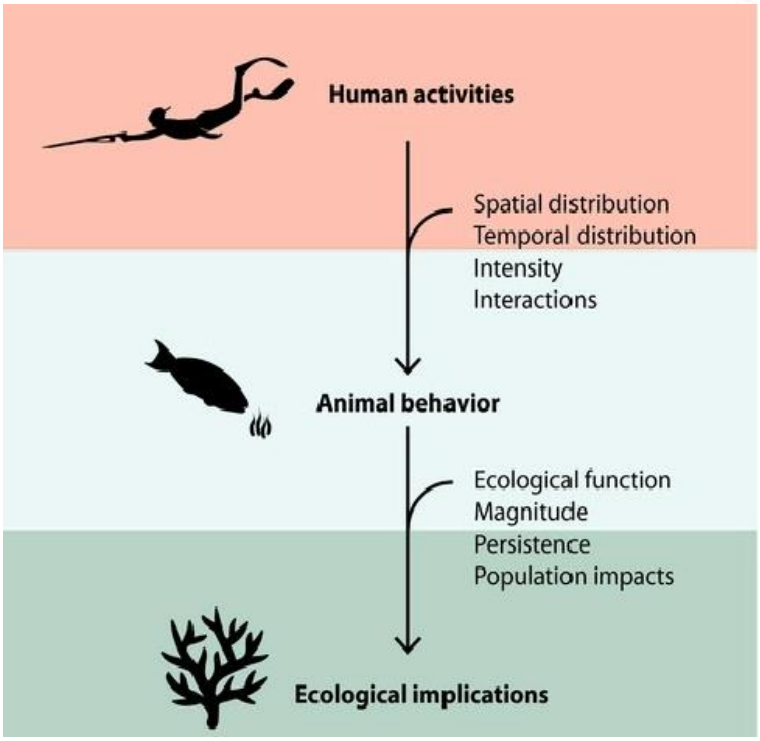

Fig 1: Links between human influences, animal behavior, and ecological repercussions are influenced by a number of factors.

Given that environmental fragmentation affects the whole landscape, viewing the results of fragmentation from the perspective of a fix's highlights is an obliged system (Fahrig 2003). Furthermore, many elements, including those at the macroscale (like the amount and all out area of woodland islands, as well as their extent to the scene), as well as those in miniature regions (like the outer layer of the island, its shape, and vegetation structure), influence the design of fauna gatherings in a given area (Debinski et al. 2001; Arroyo-Rodrguez et al. 2013; Fuentes-Montemayor et al. The safeguarding of creature species associated with woods is a pivotal part in protecting biodiversity in the scene. The strength of eurybiotic and intrusive species, as well as the absence of delegates of woods fauna, may come from the isolated person of backwoods environments as well as the deficiency of their absolute region due to fragmentation (Umetsu, Pardini 2007).

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The most vulnerable species are said to go extinct below a certain percentage of the forest habitat in a landscape because of the exacerbated impacts of fragmentation (Fahrig 2003). For instance, it has been shown that the majority of forest bird species vanish when a landscape's forests are reduced to less than 10% of its pre-loss size. Hence, conserving a sizable portion of the forest ecosystem is essential to sustaining a serious level of natural assortment of woodland creature species in the scene (Radford et al. 2005; Carrara et al.; 2015). Less isolation due to the presence of a large forest area in the terrain (Fahrig 2003), which benefits species that cannot migrate over great distances, such flying forest cricket species (Ribas et al. 2005). The all out number of islands that make up the whole area of woods is another essential component. The quantitative and subjective construction of creature gatherings uncovers the strength of species related with this kind of climate, for instance, an expansion in the overflow of the bumble bee Apismellifera L. Their large number is related with a huge portion of edge conditions in the scene (Watson et al. 2004; Brosi et al. 2008).

Notwithstanding the amount of woodland collections, the beginning of the timberland fauna is a urgent component in supporting it in the scene. As it ended up, produced woods don't give these animals the equivalent, or even near to, circumstances as wild forests. The reduced vegetation structure of the artificial forest is distinctive, particularly early in its growth. Without a layer of well-developed shrubs and herbaceous plants that provide a food basis, shelter, and breeding locations, the tree stand is basically one age. Because of this, certain species cannot survive in such a forest due to the environment. One of these is the Furnariidae family's uniform treecreeper, Hylexetastesuniform'sHellmayr, which is unique to the native Amazonian woods (Moura et al. 2013; Batary et al. 2014).

For animals with wide home ranges and the ability to travel long distances, such as predators, which often leave woodland patches looking for food, the capability of the vegetation around the patches is particularly vital. For example, bats from the family Myotis spp. move around the territory between groups of mid-field trees and timberland regions, where they find a decent food source (bugs). At the point when there aren't enough of these plant bunches in the scene, the bats are constrained to look through more effectively for food, which requires a ton of energy

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(Tubelis et al. 2007; Umetsu, Pardini 2007; Fuentes-Montemayor et al. 2013). Thus, a part that may significantly diminish the negative outcomes of fragmentation is a region around the timberland fixes that is great for creature scattering, like one with countless trees and brambles close by the patches (Antongiovanni, Metzger 2005). Regrowing the natural vegetation next to forest sections may provide alternate habitats for animals and aid in their dispersal (Umestsu, Pardini 2007). The character of the region around forest patches is not a major limiting factor for species with restricted dispersion ability, tiny individual territories, and tight ecological preferences, it should be highlighted. These creatures include microlepidopteron species found in forests. In their case, the quantitative and subjective construction of the vegetation was confined (inside the fix), and just countless species and populaces of deciduous trees (for instance) affected the quantity of species and their populaces (Fuentes-Montemayor et al. 2013).

3.2.Shape of the island

The math of creature collections inside a woodland section likewise influences how they are coordinated (Orrock et al. 2011; Fuentes-Montemayor et al. 2012). This was just viewed as in few explores on the impacts of backwoods habitat fragmentation on creature gatherings (Table 1), yet its significance is critical (Ewers, Didham 2006; Cherkaoui et al. 2009; Orrock et al. 2011). On account of their structure, woodland patches with a similar size and plant design could significantly shift concerning the living conditions of the animals.

Coligne (1996) uses the example of two regions with the same surface area but different forms as an illustration (elongated or compact). Compact islands essentially have a lesser part of the edge climate, which is dependent upon the impact of open space and have calculations that are like a square or circle (Coligne 1996; Fuentes-Montemayor et al. 2012). This sort of setting is more common in timberland patches with a drawn out structure or a limit that is advanced (countless exceptionally unpredictable shapes). The forest island in this instance, like its smaller cousin, lacks a stable living habitat, and even its size cannot completely offset the detrimental impacts of edge (Ewers, Didham 2006; Cherkaoui et al. 2009).

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Along these lines, the presence of specific creature species (like a few kinds of woodland butterflies) might be confined to the inside of the backwoods parts (Hamazaki 1996; Fuentes-Montemayor et al. 2012). The presence of various creature species might come from this, contingent upon whether the fix is expanded or conservative (Cherkaoui et al. 2009). Along these lines, deciding a fix's structure is a critical device for deciding the biotic and abiotic factors that help creature endurance in a divided habitat (Helzer, Jelinski 1999; Cherkaoui et al. 2009). Contingent upon the island's structure, creature gatherings (species number and populace sizes) may move another way from that displayed previously. In his exploration on the nursery millipede (Oxidusgracilis C.L. Koch), for instance, Hamazaki (1996) discovered a higher concentration of these invertebrates in an environment with an extended island. According to Brosi et al. (2008) and Brosi (2009), an animal's response to an island's design relies on its preferred environment.

Because of their inclinations according to the boundary for woods gatherings, the Meliponini tribe's members in Apidae disappeared as an island's edge increased, while the Apini and Euglosini tribes increased in number (Brosi et al. 2008; Brosi 2009). On the other hand, animals that are not confined to a particular habitat, such as eurybionts, which may live in both open areas and at the edge of forests, do not respond to an increase in the proportion of a forest island's edge environment by changing their species or population (Watson et al. 2004). These creatures include Cincidela spp. insects, which may be found both in open areas and on the edges of forest islands (Orrock et al. 2011). Assemblages of forest species with small individual territories that live in large patches do not change in structure as a result of the island's shape because, despite having an ominous shape (like stretched islands), these species have a sufficiently huge interior zone to help stable everyday environments for generation, prey, and safe house. These animals incorporate the Passeriformes, which are recognized by minuscule bodies and compelled individual reaches (Watson et al. 2004; Cherkaoui et al. 2009).

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4. A MORAL CHALLENGE

Nearly all debates about the morality of using animals in experiments include some type of utilitarian calculus, which is defined as "one that attempts to balance the good results of testing with the costs associated with it" (Gruen, 2011, p. 118). We argue that institutions dedicated to pure research, which primarily use animal breeding and care to pique scientific interest, face a significant ethical dilemma. In a critical sense, producing and keeping animals in bondage for the express objective of concentrating on their way of behaving is more troublesome to rationally defend than invasive biomedical procedures given a utilitarian calculation. The welfare problems raised by invasive biomedical research are undoubtedly greater than those raised by social examination, yet the previous' government assistance concerns can — and frequently are — contended away based on anticipated viable addition. On the other hand, it is true that SCBB research raises less welfare problems. Yet, without any anticipated or foreseen practical advantage to rely on, it is far from evident why reproducing and raising chimpanzees in captivity would be preferable than putting existent chimps in a sanctuary. By far most of conduct research on chimpanzees (past, present, and future) is consequently hard to legitimize, despite the richness of information gained through captive studies. Clearly, there is a significant task at hand that warrants careful study.

Frans de Waal at the Arnhem Zoo (e.g., de Waal, 1998) and Michael Tomasello at the Wolfgang Köhler Primate Exploration Center working with the Leipzig Zoo (e.g., Tomasello et al., 2007) are two analysts who direct SCBB research in zoological organizations and can give extra supports to bondage, like the protection endeavors of their host establishments (see later conversation). Making a compelling argument for the morality of producing and sustaining NHPS at institutions dedicated to pure study, such as the Yerkes Public Primate Exploration Center or the New Iberia Primate Exploration Center, is extremely difficult. In the US, there are currently eight Public Primate Exploration Focuses, excluding several additional organizations with government funding that are very similar, like the NIRC. In addition to more typical biomedical research, several of these institutes have also studied SCBB in chimpanzees. The Humane Society of the United States has accused both the Yerkes office and, all the more

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famously, the New Iberia office of moral infractions. Subsequently, 220 New Iberia chimpanzees were resigned to the Task Chimps shelter in 2016 (Guha and Sullivan, 2015; Gruen, 2011, p. 116). (New Iberia Exploration Center, N.D.). Significantly, the contention gave here difficulties the ethical avocation for keeping chimpanzees in imprisonment (even in "enriched" or "naturalistic" settings) merely for scientific curiosity. It does not depend on these more heinous examples.

4.1.A Moral Principle

How about we push ahead with definite thinking by tolerating what we accept to be an uncontroversial guideline: government assistance interests of others shouldn't struggle with or offset intrigues spurred by the craving to fulfill scholarly interest (with no predictable or anticipated down to earth benefit), as the previous YPE of interests are equivalently minor in contrast with the last option. This general notion is applicable to studies on both humans and other sentient beings that are able to have interests. The fact that it does not deem all behavioral research immoral is crucial. It is obvious that releasing many captive animals into the wild wouldn't be to their greatest advantage (Gruen, 2011). Subsequently, this approach may handily support the continuation of numerous animals in gatherings at zoological offices with statements of purpose that emphasis on protection and additionally government assistance, alongside other government assistance targets of the NHP populaces in issue. For example, the Wolfgang Köhler Primate Exploration Center site expresses that "some research focuses on the husbandry and care of great apes in captivity" and that "the breeding programed at the zoo is set within the worldwide strategy of the European Endangered Species Program (EEP)". Moreover, the principle is not infringed as long as the tests carried out in these settings can be persuasively justified as not endangering the welfare of the test participants. The basic tenet of the concept is that X's interests always trump Y's inclinations in chasing after their scholarly interest. This remembers X's inclinations for actual versatility, sexual inclination, general mental prosperity, and different variables. Subsequently, whenever X's government assistance interests and Y's inclinations struggle, Y should legitimize why their inclinations in directing SCBB research are not irrelevant in contrast with X's government assistance interests or that they don't genuinely

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offset any of X's government assistance interests (as specialists in zoological establishments might guarantee). However, if the previously mentioned rationale is legitimate, apparently to follow that none of the SCBB research done on the New Iberia chimpanzees, for instance, was morally reasonable, accordingly the test we have given in view of this guideline is significant for future examination projects.

5. CONCLUSION

The discovery of novel contact and avoidance signals between two very well-studied species demonstrates the method's broad application to the rapidly growing area of biotelemetry. Study of behavioral transitions in relation to the environment and varied distances from other species reveals not just an animal's location or average habitat utilization, but also the reasons for that animal's whereabouts and behavior. The Markov chain method that we've discussed here might be improved upon and used to manage delicate species, identify possible conservation hotspots, and provide precise predictions about interspecies interactions and habitat usage in unstudied regions.

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