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Corridor effectiveness for mammals

For my research paper, I investigated the effectiveness of corridors for mammals. The papers I reviewed ranged in date from 1993 to 2010 and studies located in South America, Europe, Africa, Australia, and North America. The mammal species were also varied and included small mammals, arboreal mammals, and large mammals. I was interested in understanding more about this topic because from the literature that I have read previously, it seems that there is not an agreement on whether or not corridors are effective and worth pursuing for mammal conservation.

The debate on corridor effectiveness is relevant to conservation especially today as we witness the impacts that habitat loss has on wildlife species worldwide. It is important that conservation methods are effective and based on sound science. The concept behind corridors is based on the theory of island biogeography and logically makes sense. Species must be able to move between isolated patches of habitats in order for the populations to survive. As a landscape becomes fragmented and habitat patches are disconnected, corridors between these habitat patches should theoretically provide a mechanism for immigration and emigration. The debate does not seem to be with the theory, but rather with whether or not animals will actually use the corridors for dispersal.

A counter argument to corridors is that there can be unintended negative impacts that must be considered in management decisions. Corridors may make it easier for invasive species to spread and further decimate native populations. Disease could also be propagated more quickly through corridors. Other dangers such as predators could hide in corridors causing them to be become a sink for population rather than a tool for conservation.

Another critique of corridors is the fact that by design because they are linear, they have a high edge-to-area ratio. Some mammal species avoid edge habitats and therefore would most likely not use the corridors. Mammal species that use edge habitats are often generalists, able to survive in subpar habitats, and therefore often not species of conservation concern. One study looked at the effects of the shape of the corridor on small mammals in an agricultural landscape in the UK. They found no evidence that the specialist species avoided the linear habitats.

The results from the papers that I reviewed for this study seem to indicate that corridors are effective for mammal conservation, although the effect of corridors differs drastically for different species. Out of the eight case studies that I selected, only one stated that their results indicated that corridors were not necessary and other conservation methods should be focused on instead.
The study on flying squirrels in an agricultural landscape in Sweden indicated that the squirrels used the corridors, but they also used other land uses for movement. This brings up an important point. Some species are able to disperse successfully through the landscape matrix. In other studies, they noted that their species was able to use the landscape matrix for dispersal, but preferred corridors; or they were able to use the surrounding matrix for movement, but not safely or successfully.

Corridor effectiveness is also dependent on the land uses in the landscape matrix that surrounds the habitat fragments. The results of a study on juvenile cougars in CA indicated that the quality of the corridor was less important than the fact that there was some means of dispersal for the population studied there. The study area contained six to eight lane highways, golf courses, and urban areas. Cougars must leave their natal habitat once reaching maturity, any dispersal route in this type of landscape is better than none.

A point that one of the papers brought up that I had not thought about before is that there are traits of individuals within populations that will more likely use corridors than others. Attributes such as age, reproductive status, and social status were mentioned as influencing the probability that an individual will use a corridor. This just seems to add another layer of complexity to this topic.

The question of the effectiveness of corridors is a complex one. It does not seem that there is a simple solution. It is dependent on many variables including the types of land uses in the surrounding matrix, the species that are slated to use the corridors, the preference of the species, and the attributes of individuals. It seems that corridors need to be very individualized to be effective and there is not a one-size-fits-all design criteria.

It may also be the case that the corridors are part of a conservation package and should not be viewed as a standalone conservation method. Habitat patches must be preserved in order for species to survive, but species, especially larger mammals, also need to be able to disperse and move between habitat patches. It seems that most of the studies show that corridors can be effective. Perhaps more time should be spent on determining how to make them more effective and utilized by more species.

A network of habitats with connecting corridors might be worth considering rather than isolated tracts of forests. The question then is for which species are you designing the network for since different animals have such different habitat and dispersal requirements. Larger mammals have more space requirements, but smaller mammals may have more specific micro-scale habitat requirements. It has been suggested to design corridors for the more vulnerable species and perhaps this is a good idea, but in doing so are other species being isolated instead?

Corridors do seem to be an effective mechanism for mammal dispersal, especially in fragmented habitats. The design or conservation of these corridors may need to be examined on a project by project basis taking into account the local ecology and landscape as well as conservation needs for that area.
Annotated Bibliography


This paper investigated the dispersal of nine radio-collared juvenile cougars in the Santa Ana Mountains of California. The site contained habitat patches, urban areas, and three corridors of varying length. Corridor parameters such as woody cover, roadways, artificial lighting and human settlement density were measured. The study found that juvenile cougars will utilize corridors for dispersal particularly those that have low artificial lighting, are not near high-speed roadways, have high woody cover, and low human settlement density.

This study was very interesting to read. Corridors are especially important for those larger mammals that must leave their natal range after reaching maturity as is the case with cougars. Out of the nine cougars that were studied, three were killed by vehicles, two were shot, and two recovered from vehicle accidents. In two of the three corridors, there were highways intersecting them; a 6-lane highway and an 8-lane highway both with underpasses. The cougars’ vehicle deaths did not occur in the corridors but in the habitat blocks although one cougar was injured by vehicle in the corridor. The study asserts that for cougars even low quality corridors are better than no corridors at all because dispersal is mandatory for their survival. It is good that there is some sort of management going on for the corridors, but it seems that they could do a much better job at making the corridors safer for the cougars.


This study investigated the abundance of chipmunks in 4 wood sites and 18 fencerow habitats of varying quality in farms near Ottawa, Canada. They defined the individuals trapped as “resident” if it was trapped in the same fencerow in two or more trapping sessions and “transient” if it was trapped only once in that habitat. The purpose of the study was to determine how chipmunks use the fencerows and which parameters (width, habitat, linear connectivity) were important for effectiveness of fencerows as corridors for chipmunks. The study found that fencerows closer to woods had a higher proportion of individuals trapped in both woods and fencerows, but that more than half of all chipmunks were trapped only in fencerows and not in the woods. Resident individuals used the fencerow as habitat. The habitat parameter (floristic richness and structural attributes) was significant but neither corridor width nor linear connectivity was significant. The abundance of residents, however, was positively correlated with increase in width. Transient individuals used the fencerows as corridors through the farm matrix. Linear connectivity was listed as the most important parameter.

My main critique of this paper is that the results are difficult to interpret. It may be that they the individuals captured are all using the fencerows in different ways and therefore the results are in themselves confusing, but I would have liked the authors to have clarified and simplified the results to a greater extent.
An interesting point from the study is that even animals of the same species and population may use the corridors differently. There are individuals that used the fencerows as habitat and others that used them for movement pathways between habitat patches. This would be another factor to consider in corridor design and management.


A meta-analysis was conducted on 35 studies containing 78 experiments on the effectiveness of corridors. In particular, the authors were interested in whether corridors increase movement; if the effectiveness was taxa dependent; and if there was a difference between the effectiveness of natural corridors as opposed to created corridors. The results of the study indicated that corridors do increase movement between patches. The effectiveness of corridors is taxa-dependent being more important for invertebrates, non-avian vertebrates, and plants than for bird species. In addition, it was found that natural corridors increase movement more than the created ones.

I found this to be an interesting study that gave a good review of the current corridor research. The explanation of the objectives and results were clear. The results from the study all seem intuitive. The study found that taxa respond differently to corridors, therefore an interesting point discussed in the paper is that land managers will have to decide which taxa to design or conserve corridors for in fragmented landscapes.


This review paper summarized findings of studies that investigated the use of corridors for biodiversity conservation. It discusses the theory behind corridor use, described some examples in studies, and also highlighted some of the key arguments against corridors. The authors concluded that there is weak scientific basis on the effectiveness of corridors and that managers should use them with caution and conjuction with other conservation measures.

The argument against corridor use was very interesting. Fires, introduced animals, diseases, and invasive species were listed as some negative repercussions of corridors. It is also noted that corridor design is quite complex. Studies have shown that organisms use the corridors differently and require different criteria for the corridor effectiveness, therefore it is difficult to determine for which organisms to manage. It was interesting to read about the negatives and concerns associated with corridors.


The paper reviews the various definitions that are used for corridors and describes how the lack of consistent terminology can lead to confusion about the purpose and efficiency of
corridors. It seeks to provide clarity on this issue by describing the six ecological functions (habitat, conduit, filter, barrier, source, and sink) that corridors may provide and urging people to explicitly document the function of the corridor when designing or researching them.

I thought this paper was very informative and provided clear examples and definition to break down the complexity of corridor functions. In a field that is so multi-disciplinary, it is imperative that everyone is clear on the definitions that they and others are using. Two studies that seem to have contradictory results on the effectiveness of corridors may actually have been testing for different things based on their interpretation of “corridor”. This is very important to take into account when researching the literature for consideration of corridor design and effectiveness.


The effects of corridors on arboreal mammals in Queensland, Australia were investigated in 36 linear rainforest remnants. The study used spotlight study surveys during 108 sampling nights and measured corridor parameters such as width, height, isolation, elevation, and floristic composition. They recorded six species including the lemuroid ringtail possum which is a vulnerable species. The results of the indicate that linear forest remnants may function as habitat and potential movement corridors for most arboreal mammals of that area if they are at least 30-40 m wide and floristically diverse.

I thought this paper was well-written and contained a lot of good information. The analysis was straight-forward and well explained. There is an interesting discussion of the habitat tolerances for each of the six recorded species. The vulnerable species, lemuroid ringtail possum, required primary-forest trees, a hollow cavity high in a tree for daytime sleeping, and is strictly arboreal and not able to cross open fields; whereas most of the other species do not have such strict habitat and movement requirements. It is suggested that corridors in this area be designed to include the needs of the lemuroid ringtail possum. This discussion highlights the importance of understanding the ecology of species in fragmented landscapes.


The article examined whether or not root voles use ditches as corridors between habitat patches. The movements of radio-collared root voles were tracked in a landscape of ditches and agricultural meadows in the Netherlands. The root vole is categorized as a vulnerable species potentially due to habitat loss and fragmentation and competition with other vole species. The study found that the voles preferred to use the ditch corridors over the agricultural meadows for movement between the preferred habitats of reed patches. This study was interesting because it shows that the type of corridor also influences the type of animals that may utilize it. It would be interested to know if the other vole species
would also use this type of ditch corridor or if this is could be an escape route for the vulnerable root vole.

The authors make an interesting point that is very intuitive, but potentially not considered which is that “the value of the habitat corridors for any given population will depend on the individual’s decision to enter it.” The corridor may be designed to entice a particular species, but that does not mean that it will necessarily use it.


The paper briefly discussed the design considerations and challenges of wildlife corridors by describing proposed wildlife corridors in the Eastern Usambara Mountains and on Mount Kilimanjaro in Tanzania. The stated purpose of the wildlife corridors was “to promote species survivorship within a reserve.” They noted that the corridors should be designed for “nonextinction-prone species upon which extinction-prone species are dependent.” The paper also discussed some of the adverse effects of corridors such as disease transmission, predators, and invasive plants and animals.

The paper highlights the consideration and planning that must go into corridor design. It seems there are still a lot of gaps in the scientific knowledge and validity of corridor effectiveness and even more in how to best design corridors. In addition, it seems like there a lot of variability depending on the landscape matrix, region, and ecosystem. I liked that this paper brought some of these points to light in providing real world examples of corridor design and planning.


The movements and home-ranges of radio-collared wolves were surveyed in three recovery areas in the northern Rocky Mountains region. Data was also collected on the habitat characteristics such as road density, human density, elevation, land use data, and prey (ungulate, cattle, sheep) density. The study found that effective corridors link two of the three recovery areas while the third recovery area is not well connected. The results indicate that it is important to establish and conserve this missing corridor to maintain the wolf populations.

I found this paper to be interesting and the results applicable to the need for corridors within fragmented habitats. The article discusses the fact that wolves are able to move through undesirable areas to get to habitat patches, but that for five out of the six times that wolves were found to use these undesirable areas, it resulted in death, disappearance, or relocation of
the wolf. I think this is an important point to consider. It may be physically possible for some species to move between habitats without corridors, but they might not be successful in doing so.


This study measured the abundance and distribution of small mammals in 26 sites in the Atlantic forest landscape in Brazil. The purpose of the study was to investigate how small mammals are affected the habitat fragmentation and the presence of corridors. They found that the abundance and alpha diversity (richness) of small mammals decreased with fragment size, but beta diversity (spatial variability) actually increased as the fragment size decreased. In regards to corridors, they found that the presence of corridors was significant with the total abundance and both alpha and beta diversity. Thus, they concluded that corridors are effective for small mammals in fragmented habitats in the Atlantic forest and may “buffer habitat fragmentation effects in tropical landscapes.”

I enjoyed the discussion about the use of small mammals for this study. The authors highlighted the ecological role that they may play in a tropical landscape such as seed dispersal to aid in forest regeneration. They also pointed out that small mammals may be good indicators for this type of research because they inhabit a variety of land uses and “clearly respond to habitat and landscape alterations.”

The authors also suggest that studies be conducted on longer time scales because of the fact that small isolated habitat fragments are vulnerable to local extinctions and therefore the animal communities within them may be highly variable. I thought this was an important point to take into consideration. Even though corridors may aid in the distribution of abundance and diversity of the small mammals in fragmented landscapes, there are still dangers associated with isolated habitat patches.


The movements of radio-collared flying squirrels were measured in Southern Finland. The study site consisted of preferred habitat, corridors between the preferred habitats, and matrix of three non-preferred habitat types (two with various tree species and one open area). The results showed that the squirrels did use the corridors if they were present, but if they were not available the matrix habitats were used for movement between the preferred habitat patches. The authors concluded that for this landscape structure in Southern Finland, the corridors did not have much of an effect on the squirrels’ movements and conservation need not focus on corridors.

I found this paper to be very interesting. It highlights the fact that corridors are not necessarily effective for all species. The paper provides an interesting discussion that includes the attributes of an animal within a species that might be more likely to use corridors such age,
reproductive status, and social status. This is a point that I had not considered and adds to the complexity of designing or maintaining corridors for conservation.


This study investigated the small mammal diversity and richness in various habitats in agricultural landscapes in Gloucestershire, UK by live-trapping methods. They were interested in comparing the mammal communities in woodland, set-aside lands, crop fields, and hedgerows of varying widths and understanding if the small mammals preferred non-linear habitats or linear habitats. The results indicated that small mammal communities do not avoid linear habitats, although linearity may have an effect, it differs by habitat and species.

The fact that corridors are linear tracts of land and therefore have high edge-to-area ratios is an important fact to consider, especially in researching small mammals. For taxa, species, or individuals that avoid edge habitats, this could be limiting factor in the effectiveness of the corridor.

I thought this paper was well written and I especially liked how they pose their hypothesis and explain what they would expect to see from the research if that hypothesis is true. They also refer back to their original hypothesis within their discussion that I found to be a very clear way of communicating their work.