Researching the changes in population sizes caused by habitat destruction, involving Lacertilia, Mus Musculus, Cervidae, Scepolorus Occidentalis and Nymphal I. Pacificus

Abstract

Habitat loss has been shown to directly harm species within it. We learned this from researching experiments relating to Lacertilia, Mus Musculus, Nymphal I. Pacificus, and other large and small vertebrates. Habitat loss can occur for many reasons, such as the large-scale addition of Carbon Dioxide into the atmosphere or anthropogenic transformation of landscape. Dominant Research into this topic has focused more on habitat loss' effect on the small scale to single populations and thus have failed to look for the bigger general idea of how habitat loss affects all populations. The data was collected on various species, including large vertebrates, small mammals such as Mus Musculus, Reptilia, Sceloporus occidentalis, and Nymphal I. Pacificus. Our findings showed that habitat loss decreases the species richness, species population sizes of large vertebrates, and increases invasive species entering the ecosystem.

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Research Question

How does the loss of habitat size from Habitat Destruction/Fragmentation affect the species inside the habitat?

Hypothesis

When the size of the habitat decreases, invasive species, large and small vertebrates, and reptiles decrease as a result.

Variables

Habitat size, species, species richness, invasive species,

Background Research

Destruction of habitats and ecosystems leads to decreased populations in Late secondary-successional species; causing an increase in invasive species and secondary succession pioneer species (Rakan A Zahawi, Federico Oviedo-Brenes, Chris J Peterson 2017). Decreasing species diversity and damaging the ecosystems' overall health. Causing even further decreases in species richness.

Some habitat destruction can be directly tracked back to things like the large-scale addition of CO2 into the atmosphere. An example of this is the acidification of the ocean; in which C02 concentration in the atmosphere has been directly linked to the decrease in coral species health and richness (John E. N. Veron 2011). The example shows just how quickly we can permanently change the whole world. With many species not being able to adapt quickly enough.

Increased use of land has been shown to decrease the species' richness within the surrounding ecosystems due to large scale operations being done without effective/existing environmental protections to reduce effects on surrounding ecosystems and habitats. (Hanwen Zhang, Yanqing Lang 2022).

Habitat loss, like Habitat-destruction, is a man-made issue; so Informed laws could help discourage the cause of the problems. The EPBC Act is an example of this, being heavily ineffective continued the harm of the habitat (Michelle S. Ward, Jeremy S. Simmonds, April E. Reside 2019) ; the resulting damage allows for more invasive species to

take over. Causing competition against native species for space and food, hurting their population and possibly causing extinction.

The rate of habitat loss is important because it causes declines in the species richness and evenness of ecosystems (Wenting Wu, Chao Zhi, Chunpeng Chen, Bo Tian, Hua Su 2022). Causing severe permanent changes too quickly, forcing slower evolving species to emigrate from the area or go extinct; Federal organizations around the world have failed to produce educated well thought-out laws to prevent habitat loss causing Habitat loss and fragmentation. Habitat loss and fragmentation quickly lead to a sharp drop in biodiversity across the world with various species rapidly going extinction at a rate not seen before.

The size of a habitat determines the size of the species' populations. With large vertebrates being affected the most, Western ticks next most, small mammals like Mus Musculus following, and the least directly affected being Western-fenced lizards (Sceloporus Occidentalis) and other reptiles. As well as the increased species richness of invasive species (Lawrence et al., 2018a). This shows that the smaller the habitat sizes, the less stable it is for native species in it. With possibly much worse with quick-large scale events of habitat destruction and fragmentation.

Procedures

Procedure:

Acquired and Accessed Computer

Entered DOAJ website and found studies detailing habitat fragmentation, following the studies sources as well.

Habitat destruction studies accessed, read, and reviewed thoroughly

Important details of experiment/article documented

Data Analysis Procedure:
The data will be collected and analyzed from
https://esajournals.onlinelibrary.wiley.com/doi/10.1002/ecs2.2183

The graph used will be a cartesian plot with lines describing the position of the averages of each species along with a box plot describing the results from the researched experiment.

Ha size |	Pop. Of small mammals	Pop. Of large vertabrates	Pop. Of Lacertilia

Risk and Safety:

Staring into screen for too long, can hurt eyes after long periods – Breaks taken every 30-45 minutes

Sitting in a chair for too long, can hurt back, neck, etc. - Breaks taken every 30-45 minutes, active stretching in between breaks

Materials List:

Computer: used to access to the internet (WWW)

Table: used as a space to place computer down while working

Notebook and pen: used to take notes of important articles and information.

Chair: used to sit in while researching

Printer: used to print important information from data, graphs, and other for notebook

Discussion/Analysis

From the research, we observed that habitat size did not or had little effect on some types of animals, like what's seen from lizards in Figure 1. Small mammals also showed a positive effect when it was still small, but they later displayed a negative effect from the size of the habitat in Figure 1. Large vertebrates on the other hand displayed a consistently positive growth if you account for noise, giving it some variation. As Nymphal I. pacificus (a tick) density increased, it was shown to decrease invasive species richness in figure 2. Another interesting thing happened that can be shown with Nymphal I. pacificus, deer populations grow with increased land and as such Nymphal I. pacificus populations grow as well with land even though they aren't big enough to need much land they grow with the deer populations and as such grow proportionally to the land Figure 3 & 4.

Table 1 (Fig 1):

Site Area (ha, log)	Large vertabrates	Small mammals	Western-fence lizards
0.2	5	3	25
1	18	20	17
1.7	5	43	2

2.1	22	41	6
2.4	15	15	2
2.6	25	21	21
3.1	31	23	19
3.4	21	10	4

Table 2 (Fig 2):

Site Area (ha, log)	Invasive species richness (AIC 26.344)
0.2	3
1	3.8
1.7	1
2.1	1
2.4	1
2.6	1
3.1	0
3.4	2

Table 3 (Fig 3):

Site Area (ha, log)	Nymphal I. Pacificus density (ha, log)
0.2	1
1	1.5
1.7	0
2.1	2.2
2.3	2.5
2.4	4.1
2.6	1.8
3.1	4.1
3.4	4

Table 4 (Fig 4):

Relative Cervidae Abundance	Nymphal I. Pacificus density (ha, log)
0	0

0.1	1.1
6	1.9
9	4.1
14	1.5
15	2.6
19	4.2
23	2.3
27	4.2

Figure 1:

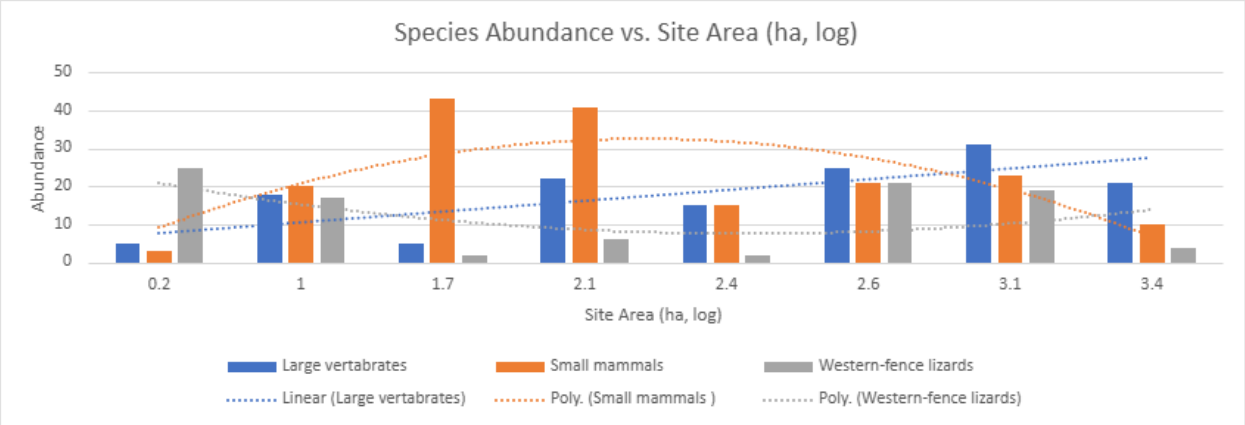


Figure 2:

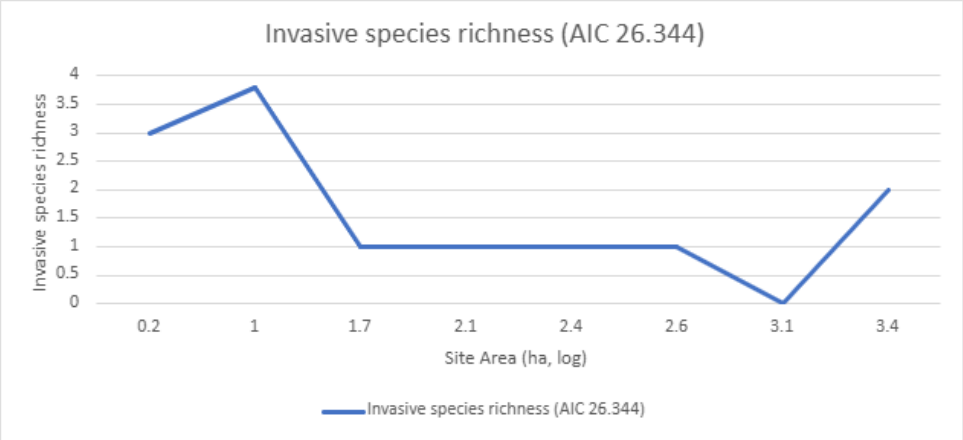


Figure 3:

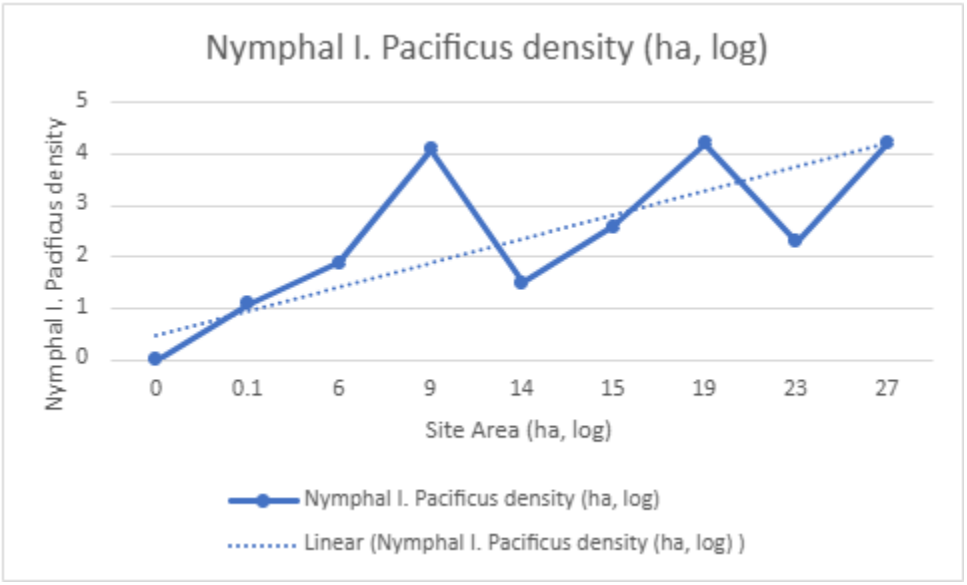
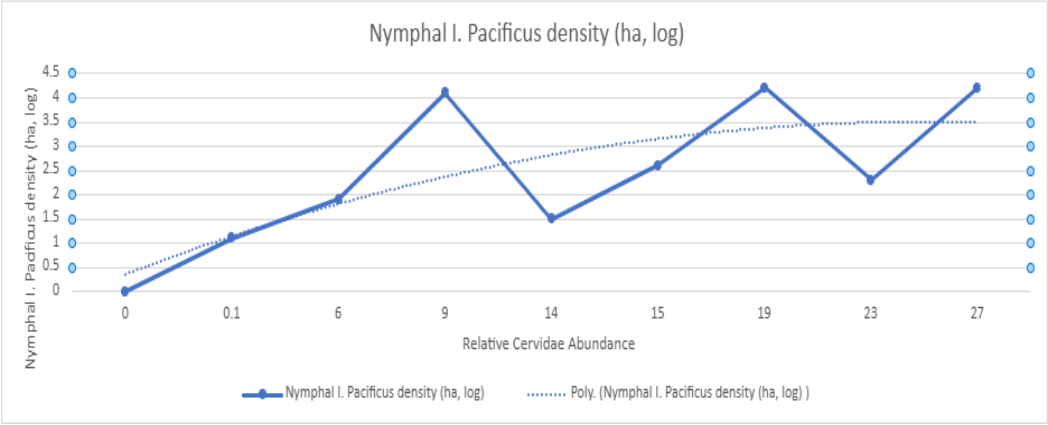


Figure 4:



Conclusion

We set out to show How the loss of habitat size from Habitat Destruction/Fragmentation affects the species inside the habitat; the objective being to provide more awareness to the dangers of outward city expansion and land waste and even in our struggle to provide new data we showed the data that we were able to source, which showed a positive relationship between habitat size and population size; which clarifies the overall effect the size of the habitat has on the ecosystem in the habitat.

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Ideas for future research

Based on what we learned through this research, we would research how species within an ecosystem are affected by quicker changes to the environment to learn more about the damage of Habitat Fragmentation has on each habitat's ecosystem. As changes to different environments have different effects on each ecosystem.

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