Introduction

The common raven (Corvus corax) and desert tortoise (Gopherus agassizii) are both native species of the Mojave Desert in southern California. In their natural habitat, these two species will generally maintain a healthy population balance; however, for the past several decades, the common raven population has expanded significantly due to human interaction while the desert tortoise population has declined dramatically (Boorman, 1993, 1997, 2003; Kristan & Boorman, 2003). This decline in population has been so severe that in 1990, the desert tortoise was listed as a threatened species by the United States Fish and Wildlife Service (USFWS) under the Endangered Species Act. The common raven preys on the desert tortoise which is one cause of mortality for the desert tortoise (Boorman, 1993, 1997, 2001, 2003; Kristan & Boorman, 2003).

For the past five years, fieldwork had been performed by Dr. Wendy McIntyre from the Environmental Studies Department at the University of Redlands, California, in cooperation with the USFWS, to identify areas of heavy raven nesting and predation activity (herein referred to as “hot spots”) within the Mojave Desert region of southern California, even with human subsidies as an abundant food source. The common raven is an opportunistic predator (McIntyre, 2007). Even with human subsidies as an abundant food source, predation on the desert tortoise is still occurring. The data collected by McIntyre has not been used to determine if there is correlation between common raven nests with predation and common raven nests without predation. Is there a relationship between the nests and surrounding anthropogenic features. Researchers from both the University of Redlands and the USFWS are anxious to find patterns in the data in order to acquire a better understanding of the raven population. If there is correlation between various features, then management methods could be applied based on these results that might decrease the rapid growth of the common raven.

Reducing the raven population is crucial to protecting the desert tortoise population because raven predation has been linked as a contributing factor to their decline (Boorman, 1993, 1997, 2003; Kristan & Boorman, 2003).

Problem Statement

The common raven is an opportunistic predator (McIntyre, 2007). Even with human subsidies as an abundant food source, predation on the desert tortoise is still occurring. The data collected by McIntyre has not been used to determine if there is correlation between common raven nests with predation and common raven nests without predation. Is there a relationship between the nests and surrounding features? For example, does a nest closer to anthropogenic features? For example, does a nest closer to anthropogenic features such as a landfill have the same amount of predation on the desert tortoise versus a nest not surrounded by anthropogenic food sources? The data collected by McIntyre has not been used to determine if there is correlation between common raven nests with predation and common raven nests without predation. Is there a relationship between the nests and surrounding anthropogenic features. Researchers from both the University of Redlands and the USFWS are anxious to find patterns in the data in order to acquire a better understanding of the raven population. If there is correlation between various features, then management methods could be applied based on these results that might decrease the rapid growth of the common raven.

Discussion

The visual analysis helps show areas that have had reoccurring predation (Figure 3). There are many nests that have unknown species. If there were no direct signs of a common raven inhabiting a nest, the nest was marked as unknown. Of the observations for the years 2004 to 2008, there were 219 known common raven nests out of three 1331 sites observed. There were 993 observations with unknown species. Figure 5 and Figure 6 show the summary of number of predation sites and shells found for the common raven, red tailed hawk, other and unknown species.

Conclusion

The data was organized into a database that the client will be able to use for future analysis and data collection. The data presented helps users visualize areas with reoccurring predation based on the observations collected in the past five years. More research could be conducted to find a method suitable approach for spatial analysis. The sites of known reoccurring predation could be observed regularly.

The original scope of the project was to correlate the nest locations; however, this was eliminated from the project due to the data content. More research in different techniques on correlation would be useful. It is important to find out whether there is correlation to have a better understanding of the common raven nest locations. For example, is a nest location based on the accessibility to anthropogenic features or does it not matter at all. Based on prior studies, it is known that common ravens feed off of human subsidies. But what about the nests with predation on the desert tortoise? Is there more or less predation around nests near anthropogenic food sources? Reducing the common raven population in the desert tortoise critical habitat units is important because it could help the desert tortoise population recover. The sites that were observed help researchers know where predation is occurring in small sections of the Mojave Desert.

References


McIntyre, B. M. (2007, October 25). Using GIS to Analyze a Predator Prey Relationship of the Common Raven and Desert Tortoise at Fort Irwin and National Training Center. Lecture presented at Wendy McIntyre’s Faculty Club Forum, University of Redlands.

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