Durango Nature Studies

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Executive Summary

The objectives of the trip to Durango Nature Studies was to examine and collect samples to identify from the DNS property. The main objective of the trip was to examine leopard frogs and bullfrogs by collecting them with a net in the riparian area of the DNS property. Other objectives were to collect macroinvertebrates from the pond area and the Florida river, and collect water samples to test for nitrates, phosphates, ph, and dissolved oxygen.

The fieldwork that was conducted were water quality tests such as; nitrate tests, ph tests, phosphate tests, and a dissolved oxygen test from both the pond and river. Other fieldwork included capturing macroinvertebrates from the Florida River and pond. This was done using nets and dislodging sediment from the river and pond beds. Encounter surveys and frog population counts were another form of fieldwork done on the DNS property.

The use of DNS property was acquired to conduct the water quality tests and frog population. Water was taken from the DNS property and various macroinvertebrates to examine. The DNS property has three main parts; Riparian area, Prairie Dog habitat, and upper lot. Each of the three sections have a different variety of plant life and animal life. The upper lot and prairie dog area were used to map out the DNS property, While the riparian area was used for water sampling.

The annual budget of DNS is around $140,000 on average. Making up this amount of money, 57% of this is contributed from outside sources. 43% of this is earned

revenue. The trip to DNS was successful hence the 0 bullfrog population in the pond, and all of the water quality tests were also conclusive. We will be making recommendations for future management and monitoring efforts with this budget in mind.

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Species Overview

Rana Pipens

Rana Pipens is commonly known as a northern leopard frog. These frogs are a moderate sized frog with the females usually larger than the males. According to Smith the size range varies from 5.1cm to 9 cm. Leopard frogs require water, mostly in the form of small ponds, rivers, and streams, although leopard frogs have been found up to 5.3km from any body of water. This is defined as the adult upland habitat. Merrell states that northern leopard frogs tended to frequent grassy meadows with grass several inches to a foot long. Leopard frog tadpoles are considered to be generalist herbivores, but have been found scavenging dead animals. Usually leopard frog tadpoles consume free floating algae. Mature leopard frogs are considered carnivorous and they are generalist insectivores. According to Merrell, Northern leopard frogs ate mostly insects, but have been found to have smaller leopard frogs in their stomach, along with hummingbirds and small snakes. In the winter, adult leopard frogs migrate to overwintering sites, although the population decrease of leopard frogs may be contributed to overwinter mortality. Leopard frogs generally hibernate underwater in ponds, streams, and rivers. The frogs tend to hide under debris, and in places with high oxygen concentration. Leopard frog breeding varies because of environmental cues. Breeding time varied from mid March to late May (Corn 1989). Two or three days of air

temperature of 15-20 degrees Celsius were required to initiate calling activity. When the leopard frogs breed, they lay eggs afterwords. The egg count in one clutch can vary from 645-6727. A leopard frog is considered endangered. The frogs had very much population, but population has declined. This is because of the many threats that face this species. According to Smith, the threats are; habitat destruction, chemicals, introduced predators, acidification, and over collection.

Rana Catesbeiana

Rana Catesbeiana is a type of frog species that is commonly known as the bullfrog. Bullfrog size ranges from 10-18 centimeters and are considered distinctive large (Shaw 2010). Bullfrogs are also considered generalist predators. Generalist predators eat everything they can fit in their mouths. Bullfrogs prey on other amphibians. Bullfrogs are considered native in the eastern part of North America. Bullfrogs have been introduced to 40 countries. The bullfrog had been listed as one species on the 100 most invasive species. According to Ficetola (2007), In Europe, at least 25 independent introductions of the bullfrog occurred in 8 countries. Bullfrogs overwinter in water, but cannot live where temperatures are below -20C. Most bullfrogs overwinter as larvae. Bullfrogs breed in June and July in America. The bullfrogs usually lay two egg clutches per year, but the smaller clutch is the second. Egg clutched have been found to be up to 20,000 eggs in one layer of thickness. Male bullfrogs are very territorial. Male bullfrogs have been seen acting aggressively towards other male bullfrogs. *Rana Catesbeiana* has had a negative an many species such as; western

pond turtles, tree Frogs, small birds, fish, and small snakes. Bullfrogs are a threat because, they are generalist predators, and they carry a deadly fungus called chytridiomycosis. Bullfrogs have a resistance to this fungi, but other native species do not. Chytridiomycosis effects frogs by producing too large amounts of a protein called keratin. This makes the skin of the frog too thick and the frog can no longer absorb nutrients through the skin. It it known that non native fish have a symbiosis with the bullfrogs. Bluegill increase the survival of the bullfrog. Bluegill reduce the amount of prey that preys on bullfrog larvae.

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Discussion and Recommendations

The diversity index states that the vegetated area of Durango Nature Studies has an average diversity of 1.3. Anything from 1.0 to 4.3 is considered average. Anything above 4.5 is almost unheard of. Diversity of macroinvertebrates in the DNS pond was found at 1.72 index whereas the diversity of the Florida River was found at 1.62. DNS property showed that the ecosystem was average. The stonefly was not found a the DNS property because the stonefly requires good water quality to live in. The DNS property has a moderate water quality. Although stoneflies were not found on the DNS property many other Macroinvertebrates were found such as damselflies and caddisflies. This was because these organisms have a higher tolerance. The studies showed that there was a higher phosphate level than average. This may be because of the heavy rain from the recent days that brought in fertilizer phosphate and water was exposed to more contaminates. This effects the the algae in the ponds and rivers causing more growth. If the Phosphate level gets too high, algal blooms may occur. Algal blooms cause dissolved oxygen levels to be lowered. This causes animals to die because they rely on dissolved oxygen. Phosphorus levels can be decreased by decreasing the amount of fertilizer that is used in farming upstream. If the phosphorus is decreased upstream, than downstream will have lower phosphate levels. In the past three years, a bullfrog was never caught on the DNS property, but it is known that the bullfrogs are there. Bullfrogs can be eliminated by using pitfall traps to be checked daily. The pitfall traps can be baited with bullfrog food such as small prey. To promote leopard

frog populations, bullfrogs must be eliminated. To do this, one must utilize pitfall traps, and whenever a bullfrog is caught, it should be removed from the property. Eliminating predators will increase leopard frog populations. Visual encounter surveys estimated the bullfrog population to be 6 whereas the mark-recapture data states that an estimated 20. In this habitat, the visual encounter survey proves to be more effective because visual encounter can be used. If visual encounter surveys can not be used, then the mark-recapture data proves more effective.