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Final Project Write up

“The word "herp" is short for herpetofauna, which is the general term for amphibians and reptiles as a group” (DEC 1). In New York State many of these species are protected from collection which is attributed to their scarcity and/or delicate populations that are susceptible to fluctuation. Currently in New York State there is no management of herps as a whole and no population estimates are being done. This absence of information can result in species being extirpated from New York or populations being decimated without anyone knowing. Most herps, especially amphibians, have specific habitat requirements and groups like salamanders typically have limited expansion because their habitats are surrounded by unsuitable habitats and naturally, they can’t move very far very fast. Other groups like snakes that may not have as specific of a habitat are facing being collected to be sold, getting run over by cars, and not being able to find food and/or winter shelter in urbanized settings. Road crossings led by local groups and citizen science efforts of recording sightings are the only current management despite neither being actual population management. According, Dr. James Gibbs who we interviewed, “the current methods of detecting herps include, automated call loggers used for frogs and toads at night which counts based on how many are calling, finding salamanders in habitat or just finding their egg masses, snakes do not have a current ideal method and turtles likely will have cameras underwater to record them in the future but do not currently have an ideal method” (Gibbs 2022). These methods, at least for toads, frogs, and salamanders should be used yearly to monitor populations but unfortunately are used very little currently in NYS if at all. “Herpetofauna numbers are on a general decline so New York’s system of managing reptiles and amphibians is in need of revision” (DEC 1).

In 1990, the New York State Department of Environmental Conservation conducted a roughly 10-year survey aptly named the Herp Atlas Project that consisted of breaking New York into blocks and seeing how many species of herps could be found with an ideal of 20 species being found in each block which is very similar to how breeding bird survey are done. The survey resulted in approximately 70 species of reptiles and amphibians being detected within New York State. Since that project ended in 1999, if you want to see what herps have been seen in your area recently the best resource is Inaturalist, a citizen science led platform where anyone can submit observations. While all these observations can seem useful for management, Dr James Gibbs noted that “they are primarily in urban environments which typically leaves out most of the herps population area” (Gibbs 2022) and it is easy for people to fake observations or put them in the wrong spot, so they can be untrustworthy. The New York Amphibian and Reptile Survey (NYARS) has acted as a continuation of the Herp Atlas project with new data coming from citizens science as well but instead of being like Inaturalist with any creatures it is specific to herps. Although this effort may seem like a new way to begin to manage herps in NYS, the project is slow moving, has a lot of outdated data and still has much to be done before the data can be used in a significant way, “NYARS is in the process of establishing a taxonomic review working group (to check records) and a scientific advisory committee.” (NY). The NYARS website has a lot of data but not much of it can be backed up without scientific advisors checking the records. Even if the data that the NYARS has went under review, the data only shows occurrences which don’t equate to population sizes. Knowing these population sizes would be the first step to conservation and management. The root of the lack of progress NYARS and any other herp organization has is shortage of public interest and funding which we learned from our interview with Dr. James Gibbs when we asked why has there not been a new herp atlas project to which he said “Funding is the main reason there has not been a new atlas project. Funding is mostly public which comes from mostly tax on ammunition. That money goes more towards management of game species and hunted species as compared to less popular species like herps” (Gibbs 2022). The public are limited in ways they can interact and experience herps because of the difficulty there can be to find them. Programs like road crossings are a great way to get the public involved and learning about herps in their area while hunting can be a way to raise funds. Almost all herps in NYS are protected from hunting or collection besides the Snapping Turtle, and most frog species which have a specific season and require a small game license. “A fishing or hunting license is required to take frogs with a spear, club, hook, or by hand. A hunting license is required to take frogs with a gun or bow” (DEC 2). Despite the collection of these species not being monitored well by the state, hunting could be used as a way to get funds for more conservation similar to duck hunting. During our interview our group asked Dr. James Gibbs how hunting turtles and frogs might affect their populations and what his opinion on being able to hunt them is, he responded with “hunting these animals could have a huge impact on these species because we have no idea how many are in the population, and we can potentially hunt them into endangerment. Not knowing how many individuals are in a population means we can’t fix regulations and bag limits” (Gibbs 2022). So, while hunting can be a possible source of income for conservation, we would need to determine populations and be consistently watching them to ensure we don’t over hunt. Regardless, these limiting issues are consistent with any other limiting herp issue which is lack of funding and knowledge.

The most active and only ongoing method of conservation is the Amphibian Migrations and Road Crossings Project (AM&RC) which protects and assists vernal pool breeding species of herps when they are moving from their hibernation location to the vernal pools in the spring. Protecting herps crossing the road is crucial to their populations which is highlighted by a study done to determine if road mortality could threaten whole populations, they stated “Population projections based on spotted salamander life tables imply that an annual risk of road mortality for adults of >10% can lead to local population extirpation.” (Gibbs 2005). While the distance between their hibernation location may not be far from the vernal pool, due to all the roads that have been built, many times there is a busy road they must cross where they are endanger of being run over because they walk so slow. Using volunteers, the AM&RC entails going to high herp density roads usually near a vernal pool where amphibians are crossing. These volunteers record weather and traffic conditions which are the two most important factors that affect these crossings as the herps will only move on a rainy night and keeping track of the traffic could possibly and/or ideally lead to roads being closed for large crossings. According to the AM&RC “Since the project started in 2009, more than 850 volunteers have counted at least 46,000 amphibians and observed 20 species. They assisted 27,000 amphibians across roads during migrations and counted nearly 14,000 migrating amphibians killed by passing vehicles” (DEC 3). The continued monitoring of these crossings contributes to knowledge about where amphibians occur and how many there are in NYS which as mentioned before is very lacking, “Volunteer observations are building our understanding of where mole salamanders and wood frogs are especially vulnerable during their annual migrations and where their habitats are located. This information can be used for community planning and for groups of volunteers interested in starting "crossing guard" programs for the amphibian breeding season” (DEC 3). The continuation of this project can lead to measures being implemented to roads with the intent on assisting the crossings safely. An example of another method to assist in road crossings given by similar efforts in Central Europe entails “Buckets are dug into the soil at the fences to trap amphibians, which are carried over the roads manually by volunteers in the morning and during the night” (Puky) which I believe can easily be implemented in NY road crossing efforts. During our interview with Dr. James Gibbs we discussed road crossings and he made note that “the volume of roadkill is staggering and only will get worse as traffic volumes and speed is increasing” (Gibbs 2022) so these crossings will only become more important to monitor. If one salamander dies it may not seem that impactful but a study done in Ohio on Eastern Red-backed salamanders which also occur in NYS determined “Occupancy of plots by *P.cinereus* (Eastern Red-backed Salamander) exerted a statistically significant omnibus effect on invertebrate community composition, but the strength and direction of salamander effects varied seasonally” (Walton). So, despite how slow they move, salamanders definitely make a impact on the areas they reside in. In the Sierra Nevada, there is an endangered species of toad called the Yosemite Toad that has been declining due to being runover while crossing the road on the way to their breeding grounds. Rachel Van Horne, aquatic biologist with the Humboldt-Toiyabe National Forest realized the toads were attempting to cross under the roads though drainage pipes. Noticing this, she worked with the U.S. Fish and Wildlife in the area to implement under road passages made to help the toads cross safely. They emphasize the only reason they could get enough money to do this project, “Our district is always on the lookout to add wildlife-friendly infrastructure where appropriate to ongoing projects. It is much cheaper to include it in an existing project rather than do a separate project specifically for wildlife crossings” (Yosemite). This concept of being on the lookout for ongoing projects to find a cheaper way to protect herps is something New York State DEC should be paying attention to. During the interview our group conducted with Dr. James Gibbs we brought up why not implement under road crossings in New York to which he said, “Our road systems are replaces and repaired often due to the naturally occurring cracks and movement of the roads throughout the seasons, due to this fact under road crossings would be extremely expensive” (Gibbs 2022). Keeping this in mind maybe under road crossings specifically won’t work in New York but according to a study of behavioral analysis of the herps using under road crossings “Our analysis indicates that although turtles and frogs will traverse crossing structures of widely varying features, certain attributes of these structures do influence the patterns of usage” (Woltz) So maybe there will eventually be a form of under road crossing that could work in New York. Regardless, taking advantage of ongoing projects can protect herps in other ways despite the lack of funding.

Herpetofauna in New York State might not ever be as popular as duck hunting or birding but despite that we must attempt to monitor their populations and protect them as they are beneficial to our natural wildlife and globally on the decline, “In the approximately 30 years since the recognition of the crisis of global amphibian declines, much has been learned about the likely causes. Among the leading causes are several amphibian diseases” (Louise) so not only do we have to worry about road mortality, habitat loss and pollution but diseases amphibians face on their own. If funding were not a problem, we would be able to implement large scale counts, road crossings wherever need be and protection of important breeding grounds for all species of herps. Using examples of herp protection projects from other states can become a great way to quickly start implementing herp protection in New York State. The NYS Department of Environmental Conservation must allocate time and resources to educate New York residents about the herps we have and what each person can do to help in their own yard or local park.

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