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BUEE REU

RESEARCH PROPOSAL

Much of the anthropogenic sounds that we as humans hear every day has become constant background noise which most of us do not perceive or notice. The study of soundscapes in our urban environments have come to show that this ability to tune out noise is not done across all animal species. Although humans can continue to communicate, work, and reproduce effectively even when consistently exposed to high levels of road, rail, air, and construction activity, other organisms are seen to experience increasingly larger deleterious effects (Merchant *et al*.). The emerging field of soundscape ecology aims to study the acoustical makeup of any individual environment and this can be achieved with numerous methods, including passive and active monitoring. Modern society’s insensitivity to anthropogenic sounds has caused the emission of loud, disruptive, and consistent brown noise associated with urban development to be easily overlooked in policy. In summary, the anthropogenic noise that is being produced is basically omnipresent to those of us who produce it. As the levels of human activity increase in areas that were not previously exposed to such populations or conditions, it becomes necessary to understand and learn more about how species are being impacted (Katsen, 2012). In the present study, passive acoustic monitoring will be used to analyze levels of anthropogenic noise in the Hudson River. Our method includes passive techniques, meaning sounds will be recorded and analyzed with no further acoustical interference.

Oyster toadfish (*Opsanus tau*) are a Batracoidid species commonly known to inhabit the Hudson River in large numbers, making them easy to obtain and study. In addition to their abundance, Oyster toadfish are also a notable model organism due to their dependency on the production and perception of noise in order to sexually reproduce. Every breeding season, male Oyster toadfish will establish a nesting area where they will produce mating advertisement calls directed to females in order to attract them in to lay their eggs (Maruska et al.). These calls, usually referred to as boatwhistles, can only be efficient and useful for these males if they are being received as well as perceived by the females in the area. Female toadfish are only able to locate males when they hear their call and feel as though the strength of the call indicates a desirable male fitness. When calls are disrupted, there then exists no possibility of reproductive interaction between two individuals.

EXPERIMENTAL DESIGN

A Teledyne Hydrophone will be deployed over Pier 40 at The River Project in Hudson River Park. Here, the hydrophone will be left to record over a period of 24 hours. Once data is collected, levels of fish (both known and unknown species), biological, non-biological/anthropogenic, and unknown sounds will be evaluated. Once quantities are collected, data will be statistically analyzed to determine significant differences in noise levels observed throughout a 24-hour period.

**LITERATURE CITED**

Kasten, E. P., Gage, S. H., Fox, J., & Joo, W. (2012). The remote environmental assessment laboratorys acoustic library. *An archive for studying soundscape ecology*.

Maruska, K. P., & Mensinger, A. F. (2008). Acoustic characteristcs and variations in grunt vocalizations in the oyster toadfish *Opsanus tau. Environmental Biology of Fishes.*

Merchant, N. D., Witt, M. J., Blondel, P., *et al*. (2012). Assesing sound exposure from shipping in coastal waters using a single hydrophone and Automatic Identification System (AIS) data. *Marine Pollution Bulletin*