

[SUSAN ALLEN-GIL](#) **NO OPENINGS**

The effect of habitat degradation and toxic compounds on reproduction of freshwater fish

Introduction

My area of focus is environmental toxicology and habitat degradation in freshwater systems. More specifically, I am investigating:

- contaminant bioaccumulation and exposure in subsistence communities in the Arctic
- endocrine disruption and reproductive success of freshwater fish
- degradation of aquatic ecosystems

My research program has two distinct areas of focus, one of which takes place primarily during the academic year, and the other of which is performed mostly during the summer. The first area of focus is the combined effect of physical and chemical stressors on the reproductive success of freshwater fish. The second area of focus is the source, accumulation, and effects of pollutants in freshwater systems in the arctic, with particular emphasis on the potential consequences of pollutant exposure for subsistence indigenous Inupiat communities.

During the academic year

The research conducted in my laboratory during the academic year focuses on the cumulative impacts of habitat- and contaminant-related stress on the reproductive success of freshwater fish. The direct effects could be through available spawning substrate, whereas the indirect mechanism is postulated to be through a physiological stress response mechanism. We are currently in the process of optimizing our experimental design with respect to habitat structures, feeding regimes, and larval survival. Once we have optimized this experimental regime, we intend to repeat the experiment at different levels of exposure to an environmental endocrine disrupting compound to determine whether these two very different types of stressors are antagonistic, additive, or synergistic.

We investigate the reproductive success in terms of fertile egg productivity, growth and survival of offspring, and reproductive hormone profiles of adults in breeding pairs of fathead minnows (*Pimephales promelas*). We monitor breeding pairs of adult fathead minnows at different quantitative levels of habitat availability to investigate whether habitat availability either directly or indirectly affects reproductive success. Parameters that we measure include water chemistry (pH, conductivity, dissolved oxygen, temperature and alkalinity), condition of adult fish (length and weight), spawning success (number of eggs laid, frequency of spawn), and growth and survival of offspring (% survival, % hatch, egg diameter and larval length). At the end of 6 weeks, we sacrifice the adult fish and measure the levels of testosterone in the males and 17 β -estradiol in the females using ELISA kits.

Maintaining the proper conditions for spawning and tracking the reproductive success by spawn requires a team effort. Students involved in research in the lab work collaboratively to maintain the aquaria and monitor the fish and offspring. This means that the success of all aspects of the research relies on a high level of responsibility for students involved in the research. Failure to meet this obligation will not only impact one project, but that of the other students as well. On the positive side, the degree of collaboration means that students are able to participate in more aspects of the research than they could working independently. Students should expect to perform a combination of morning (8-10 am) and afternoon shifts (3-5 pm) including weekends. Also, prospective students should realize that we are at the mercy of the fish, and scheduling must remain flexible.