SERDP
Strategic Environmental Research and Development Program

Maximizing Sampling Efficiency and Minimizing Uncertainty in Presence/Absence Classification of Rare Salamander Populations

Conservation
CS-1393

Background:

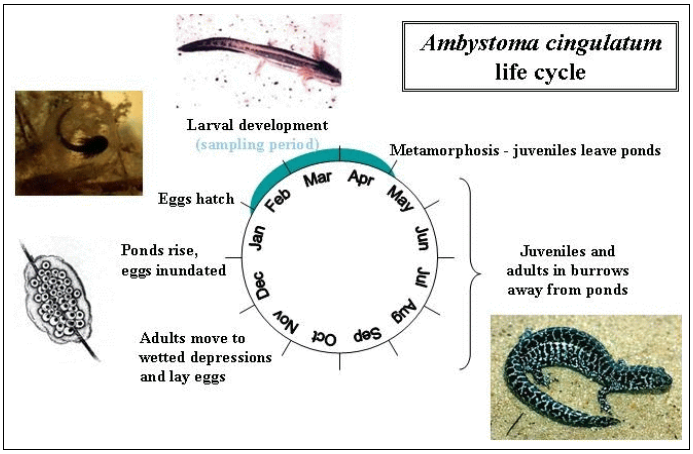
The flatwoods salamander (*Ambystoma cingulatum*) is a threatened species that is known to occur at 25 sites on Fort Stewart in southeastern Georgia. Of over 1,000 seasonal ponds, 483 have been identified through preliminary screening as likely to support *A. cingulatum* populations. Only a small number of these ponds have been thoroughly sampled to date, and biologists are faced with sampling the remaining ponds during the next decade to determine if *A. cingulatum* are present. The presence of *A. cingulatum* can limit installation activities (e.g., training exercises, timber harvest, facility development, road construction and use) that occur in these habitats. Until each of the ponds is classified, all will be treated as though *A. cingulatum* are present. Concluding that a rare species is absent with high certainty is not easy, and the effectiveness of present salamander collection techniques for sampling *A. cingulatum* is unknown. More importantly, the amount of sampling necessary to conclude with reasonable confidence that this species (and most other rare species) is absent from a particular location has not been determined.

Objective:

The overall objective of this project is to improve existing tools and develop innovative methods for efficiently surveying wetland habitats for rare salamanders (and other rare species), thus reducing the uncertainty in classifying a pond as absent of salamanders. Specific objectives include: (1) improve the success and efficiency of field sampling techniques, (2) improve predictions of the type and location of suitable habitat, (3) reduce the uncertainty of classifying a pond as uninhabited, and (4) minimize unnecessary sampling.

Process/Technology Description:

The effectiveness of existing larval flatwoods salamander capture techniques will be compared, and new techniques will be tested. Habitat modeling, using a newly developed Geographic Information System (GIS)-based statistical technique, will characterize those ponds that are most likely to support flatwoods salamander reproduction. Sequential sampling analysis will be conducted to define the level of sampling necessary to conclude with reasonable certainty that the species is absent from a pond. The modeling and statistical analysis tasks have only recently been adapted to the assessment of rare species, and this application to a threatened amphibian species will be unique.



The cryptic nature of flatwoods salamander adults and the overall scarcity of this species throughout its life cycle make effective determination of their presence extremely difficult.

Expected Benefits:

The general approach of sequential sampling and habitat modeling, if successful, could provide a standardized and statistically defensible method for adequately determining the presence of many threatened and endangered species present on military installations, without incurring the costs of overprediction or the consequences of conservation failure. (Anticipated Project Completion - 2008)

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