Toxicological Effects of Smokes and Obscurants on Aquatic Threatened and Endangered Species

Conservation
CS-1332

Background:

The need for military readiness and maintenance of training lands carries with it the need and obligation to maintain various natural resources. Preparation for possible battlefield conditions requires military training activities to use smokes and obscurants (S&O). Many threatened and endangered species (TES) cohabit training areas where S&Os are released; therefore, the impact of S&Os on the vitality and survivability of TES and their habitats, including aquatic ecosystems, must be ascertained.

Objective:

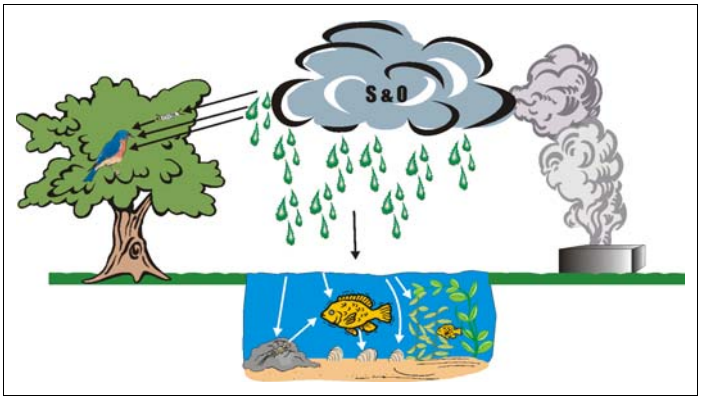
The objective of this project is to study the direct and indirect effects of field deposition of the five most common S&Os on relevant aquatic organisms.

Summary of Process/Technology:

This research will study the impacts and effects of varying concentrations of fog oil, graphite, and three colored smoke S&Os on three phylogenetic classes of aquatic organisms including threatened and endangered (TE) fish, their insect prey, and TE freshwater mussels. This will be accomplished through collection of S&O chemical deposition in the field, field exposure of selected organisms, laboratory analysis of S&O chemical deposition, and controlled laboratory exposure of selected organisms. Specific measurements on the effects of S&Os will include: insect larvae and pupae survival, adult emergence, and oviposition; survival, condition, and egg hatching of fish; survival of mussels; and bioaccumulation of chemicals in tissue residues for all species. In addition, the insect-fish-mussel, food-predator-life cycle-host interrelationships will be examined and interpreted in the context of observed results.

Benefit:

The results will provide valuable information on the effects of military S&Os on aquatic organisms of interest to the U.S. military. This information will be of direct use to units and personnel at the field and installation level as well as other federal and state biologists, natural resource managers, and similar experts. Research will be published to provide guidance for the selection and use of S&Os that offer optimal environmental protection with minimal impact on troop readiness. These data will also be supplied to the Conservation Technology Team for use in identifying U.S. Army requirements and exit criteria associated with the impact of S&Os on TES and their habitats.



Interactions among aquatic organisms and impacts of smokes and obscurants deposition in the environment.

Accomplishments:

This project began in FY 2003. Accomplishments will be noted upon completion of the project.

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