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Evaluation of Standard Practices for Ranking and Prioritizing Pollutants in the Contaminant Assessment Process (CAP)

The U.S. Fish and Wildlife Service's (USFWS) Raleigh Field Office and partners have completed an evaluation of pollution risk assessment tools that would expand the utility of data collected by USFWS biologists on national wildlife refuges. Service biologists complete Contaminant Assessment Process reports for refuges nationwide; our December 2005 report* identifies mechanisms to more thoroughly rank and prioritize those data for more consistent and accurate pollutant risk assessments.

Pollutant sources, like this burning landfill adjacent to an eastern NC national wildlife refuge, can harm refuge plant, fish, and wildlife resources

***Ward S, D Shea and G Cope. 2005. *Development of a Standardized Process for Ranking and Prioritizing Contaminants in the Contaminant Assessment Process*, USFWS, Raleigh, NC.**

Background: Pollutants can harm lands and waters managed by the Department of the Interior, such as national wildlife refuges. To help identify and evaluate pollutant threats to these public lands, the USFWS Division of Environmental Quality and U.S. Geological Survey Biomonitoring of Environmental Status and Trends Program developed the Contaminant Assessment Process (CAP). The CAP has two parts, retrospective analysis and field sampling. Existing information on pollutant sources is reviewed and interpreted in the retrospective analysis portion of CAP. Information gathered in the retrospective analysis, including ranking and prioritizing contaminants, supports the development of focused data collection plans that make up the field sampling portion of the process.

The CAP approach is being used to inventory contaminant concerns on refuges nationwide, and has produced an electronic inventory of pollutants on or threatening these lands. The magnitude of threat that specific pollutants pose depends largely on toxicity and exposure. When the toxicity of a pollutant and the nature of exposure are known, estimating risk is relatively simple. Unfortunately, in most cases, either the toxicity of a contaminant to a specific organism or the nature of its exposure is unknown. Investigators using the CAP are faced with trying to evaluate the threats posed by multiple contaminants, released to multiple media (air, water, soil, etc.), to multiple organisms. Different CAP users could very easily develop different risk estimates in these scenarios.

Managers sought a more uniform approach for ranking and prioritizing pollutants in CAPs. The USFWS Raleigh Field Office Environmental Contaminants staff and partners with North Carolina State University reviewed the existing CAP framework, identified the most commonly reported contaminants in CAPs, and reviewed ranking and prioritizing approaches for chemicals and contaminated lands used by others. Some highlights of the evaluation and report include the following:

- Review of CAPs for 126 refuge areas indicted that broad contaminant concerns were identified much more frequently than specific pollutants; the only specific pollutant identified in more than 25% of refuges in this sample was lead. Lack of specificity in CAPs and

inconsistency in its application create a problem for any contaminant ranking and prioritization system which attempts to mine CAP data. Accordingly, managers may want to limit the use of broad categories (e.g., sewage, heavy metals, oil and grease, airborne particulates) in the CAP database to encourage specificity in listing chemical concerns. Specific recommendations to refine the CAP database are presented.

● Most chemicals listed as concerns have an abundance of toxicological information to help with developing accurate risk assessments; management recommendations to CAP users encouraging reliance on specific toxicological profiles for these chemicals would enhance consistency of evaluations (e.g., encourage use of a standard set of published toxicity values for chemicals commonly reported in CAPs). Developing new toxicity summaries for frequently encountered pollutants currently lacking good reviews (such as the Department of the Interior's Contaminant Hazard Review Series) would improve accuracy and (if used consistently) comparability of results from different CAPs.

● Review of 23 chemical hazard ranking or waste site ranking systems developed by other federal, state, academic and industry groups suggest that there is not any one existing system that fully addresses the needs of ranking and prioritizing pollutants within CAP applications. Existing ranking and prioritization systems are commonly limited by a tradeoff between consistency (for programmatic evaluation purposes) and accuracy (at the site-specific evaluation level).

● A chemical by chemical (as opposed to use of surrogate chemicals) ranking and scoring system based on persistence, bioaccumulation, and toxicity may have some utility in aiding managers with determining the potential for a chemical to cause environmental effects. Modification of a generic chemical ranking and scoring system, such as the Michigan Department of Environmental Quality's Chemical Scoring and Ranking Assessment Model (SCRAM) could help with CAP applications.

● The frequently encountered lack of exposure data subjects any qualitative system to major inaccuracies at any given site, even with the consistent and accurate use of toxicity data. Even minimal chemical exposure data collection would enhance the ability to conduct accurate and consistent screening level ecological risk assessments.

● Investment in analytical chemistry (to get exposure data) and toxicity profiles or benchmarks (to obtain consistent interpretations using established risk assessment frameworks) appear preferable to full-scale development of a new ranking and prioritization protocol.

● Interviews with four government, academic and industry experts in risk assessment of hazardous waste sites contributed to the findings of this report.

The report is available from the USFWS at http://nc-es.fws.gov/ecotox/SRP Final report.pdf. It contains summaries of the CAP database review, reviews of other chemical and hazard ranking and prioritization systems, and recommendations for CAP users and managers.

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