WATER QUALITY AND QUANTITY INTERPRETATIONS, WINDOWS PESTICIDE SCREENING TOOL (WIN-PST)

I. INTRODUCTION

This part of Section II of the Field Office Technical Guide (FOTG) contains background information and guidance on the Windows Pesticide Screening Tool (WIN-PST). WIN-PST is a pesticide environmental risk screening tool used to evaluate the potential for pesticides to move off-site with water and eroded soil/organic matter. The ratings are based on the potential for a chemical to move below the root zone or to a field's edge. The soil-pesticide loss interaction ratings are then adjusted to provide a qualitative risk assessment of the effects of a specific chemical on human health or non-target species from chemical exposure. Ratings can be adjusted to reflect numerous management factors that affect the fate of chemicals in the environment (e.g., application rate and timing, irrigation, residue management, etc.) and site conditions (i.e., high water table, slopes greater than 15 percent or the presence of macropores).

The soil/pesticide ratings are first approximations of pesticide movement potential and should not by themselves be used to make pest management recommendations. They can, however, help in the decision-making process.

The WIN-PST software and documentation can be downloaded from the NRCS National Water and Climate Center website at: http://www.wcc.nrcs.usda.gov/pestmgt/winpst.html.

II. PESTICIDE PROPERTIES DATABASE

Selected pesticide properties affecting pesticide fate and associated pesticide leaching and runoff ratings are contained in the Pesticide Properties Database. The data is grouped by either active ingredient or by product name. A list of toxicities for fish and humans is also included.

The current WIN-PST pesticide data can be downloaded from the website listed above. Database definitions can be found in the Glossary included with the WIN-PST software. Instructions for downloading or updating the pesticide data are also available at the NRCS National Water and Climate Center website.

The Pesticide Properties Database may list chemicals not currently registered for use in Michigan <u>and will not</u> be considered as a listing of approved products. The Michigan Department of Agriculture should be consulted concerning the current status of a particular product.

III. SOILS DATA

The Soils Data Set for WIN-PST contains selected soil properties affecting pesticide fate and associated pesticide leaching and runoff ratings. Separate runoff ratings show the relative potential for chemicals to move in surface runoff in the soluble phase, and to move in surface runoff attached to soil particles. **The soil ratings may be used to help select conservation practices which control chemical movement.**

The soils data set for Michigan lists soils for all Michigan counties by soil map unit. Soil information includes the map unit symbol, the component name, surface layer texture, and component percentage of that map unit. Data used to develop the leaching and runoff ratings are also included.

Soils for Michigan and for other states can be downloaded from the NRCS National Water and Climate Center website. A Glossary of terms used in the soils database can be generated along with the WIN-PST Soils Report.

IV. WIN-PST SCREENING PROCEDURE AND INTERPRETATION

Background

Pesticides have varying potentials to move off-site. Similarly, soils vary in potential to move chemicals off-site. Thus, a pesticide applied to two different soils may have different potentials for movement. WIN-PST considers the effects of both soil and pesticide properties on pesticide movement.

WIN-PST is a Tier-1, Windows-based tool that uses the Soil/Pesticide Interaction Screening Procedure, Version 2 (SPISP II) developed by Goss and Wauchope (1990). (This document can be found on the NRCS Water and Climate Center website under "Documents Related to WIN-PST"). The SPISP II study used an agrichemical fate computer model called the Groundwater Loading Effects of Agricultural Management Systems (GLEAMS), which was developed by the USDA-Agricultural Research Service. Over 40,000 soil and pesticide parameter combinations were run through GLEAMS, and the most sensitive soil and pesticide parameters were determined through statistical analysis of the completed GLEAMS runs. Further analysis created mathematical relationships and breakpoints within and between parameters. Algorithms were created using these relationships and breakpoints. Real pesticides and soils can then be ranked by applying these algorithms to their respective soil and pesticide parameters. Overall interaction ratings, representing the interaction between soils and pesticides, are created by developing a matrix of individual soil and pesticide rankings.

The SPISP II ratings do not take pesticide toxicity into account; however, WIN-PST Interaction Reports include hazard ratings which combine the soil/pesticide interaction ratings with exposure adjusted toxicity ratings. The result is, for any WIN-PST interaction rating and exposure-adjusted rating, a single hazard (potential hazard) rating for each target species (i.e., risk to human health and fish toxicity).

Procedure

1. The user should determine the water resource concern (i.e., groundwater or surface water quality), then select the leaching and/or runoff procedure to evaluate potential loss to that resource. Benchmark conditions; including soils, pesticide(s) used or considered, site conditions and management practices; should be documented.

2. Find the leaching potential and/or soil surface loss potentials for the critical **soil map unit(s**) from the county-specific soils ratings table. Rate the entire soil map unit by its most sensitive component.

3. Find the **pesticide** leaching and/or surface loss potentials in the pesticide table. When using a pesticide product with more than one active ingredient, rate the entire product by the most hazardous active ingredient.

4. Using the Reports function, generate the **Interaction Report** for the soil/pesticide combination chosen. A separate Soils report and Pesticide report can also be produced, which can be helpful in choosing alternatives or mitigation strategies.

A tutorial on how to create WIN-PST reports is available on the NRCS National Water and Climate Center website, under "Documents Related to WIN-PST."

Interpretation of the Hazard Ratings

WIN-PST classifies the potential hazards into five classes:

X – Extra High
H – High
I – Intermediate
L – Low
V – Very Low

(NOTE: Only leaching hazard uses the very low class.)

Refer to the FOTG, Section III, Quality Criteria for guidance on "acceptable" hazard ratings. In general, action (mitigation techniques) would be taken for soil/pesticide interactions classified as 'Extra High', 'High,' or 'Intermediate.' Mitigation measures may include changes in pesticide use (i.e., a different pesticide, reduced rate, banding or spot spraying instead of broadcast applications, etc.), adoption of buffer practices that reduce the movement of soil particles off-site (i.e., residue management, filter strips, windbreaks, etc.), or adoption of cultural and/or biological control practices.

Hazard ratings do not preclude the use of a pesticide. Pesticide users must follow label directions and Michigan State University Extension pesticide recommendations.

Limitations

The WIN-PST ratings are considered a first approximation because of several limitations including those listed below:

1. The ratings do not consider site specific factors which affect the persistence of chemicals (e.g., soil pH, moisture, and temperature).

2. The ratings are based on the potential for a chemical to move below the root zone or to a field's edge. Transport and other environmental fate factors beyond those zones are not considered.

3. The ratings address only movement of the pesticide active ingredient, not the formulated product. Adjuvants or other inactive ingredients may affect pesticide toxicity.

4. The ratings do not address most metabolites or breakdown products of an individual chemical.

References

USDA-NRCS, National Water and Climate Center, "Windows Pesticide Screening Tool WIN-PST." http://www.wcc.nrcs.usda.gov/pestmgt/winpst.html

USDA-NRCS, National Employee Development Center, June 2001, "Environmental Risk Analysis: Pest Management" Module 5, Part D, Sections 10-12 in: Nutrient and Pest Management Considerations in Conservation Planning Student Workbook, Self-Paced Study Guide.