

# **GLEAMS**

**Groundwater Loading Effects of Agricultural Management Systems**

VERSION 3.0

## **USER MANUAL**

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## ABSTRACT

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The publication is a user manual describing the input parameters for **GLEAMS**. **GLEAMS** is Y2K compliant, has an extended pesticide data base, and contains a two-compartment pesticide degradation component. The maximum number of pesticides that can be simulated simultaneously has been increased to 366. Parameter editors are available for user convenience in developing and editing parameter files. The model is available for P/C users with Windows95, Windows98, and Windows NT. Fortran source code is supplied, but the large arrays require compilers such as Microsoft Developer Studio or OS2. The executable code will not operate on DOS-based P/C's.

Keywords: hydrology, erosion, sediment transport, plant nutrients, nutrient cycling, pesticide transport, agricultural management, mathematical model, non-point source pollution.

## PREFACE

This publication represents not only the efforts of the present authors, but the combined efforts of those scientists and programmers contributing to the **CREAMS** model and earlier versions of **GLEAMS**. Some of the improvements and modifications have evolved in time through technology transfer and users' requests to make the model more comprehensive. Separate parameter files and output for the four model components have been maintained for maximum user consideration. Chemists with agri-chemical companies are not interested in the plant nutrient component, for example, and some environmental concerns may not be interested in pesticides but are concerned with nitrate leaching. These capabilities are recognized and appropriate model structure is maintained.

Parameter editors have been developed for each of the four components to aid users in preparation and editing parameter files. They are extremely helpful in establishing proper card sequences dependent upon options selected by the user.

Since **GLEAMS** is a continuum, previous publications documenting the model concepts are equally as important for this version as for earlier versions. Those important publications are referenced in this manual, and should be available to users from libraries or the authors. Some are out of print and some are available as computer files that can be printed.

The original **GLEAMS** version 3.0 and earlier versions of the model did not adequately consider applications for forest management systems. In this revision (081500), more consideration was given to forest applications as a result of the need of a European user in Poland as well as a user in the St. John's River Water Management District in Florida. Although the applicability is far from comprehensive, it is much more considerate to forest systems than before revision.

08/15/00

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## ACKNOWLEDGEMENTS

Several people facilitated and contributed to **GLEAMS** version 3.0, either directly or indirectly. It is impossible to recognize all of them individually, and many of those are model users who shared experiences, concerns, and data. Those who contributed directly, from **CREAMS** through **GLEAMS** have been recognized as contributing authors or in acknowledgments of previously published papers, nationally and internationally. Without their efforts, this version would be possible, and their contributions are acknowledged here.

Three groups are recognized for their support and funding: the USDA-Agricultural Research Service, the USDA-Natural Resources Conservation Service, and the University of Georgia, Biological & Agricultural Engineering Department. Other agencies and universities, domestic and foreign, have made contributions as well.

The original “**CREAMS** Team” is acknowledged for their dedicated efforts in model development. Those and others who contributed to **GLEAMS** are also recognized here. The best model in the world would be nothing without users, and the dedicated efforts of many specialists in the USDA-NRCS lead to the present model.

A primary reason for the development of this version was to make **GLEAMS** Y2K compliant. Since **GLEAMS** is a part of the USDA-NRCS repertoire of operational models, it was that agency’s request that emphasized the need for update. Their considerations collectively, as primary users, are recognized.

Dr. Dave Bosch, hydraulic engineer and acting research leader Dr. Bob Hubbard, USDA-ARS-SEWRL are recognized for their support in development and implementation of **GLEAMS** version 3.0. Their tolerance of a retiree working with their computer specialist was helpful in the project.

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