Development of a Pilot Interactive Training Program for ATTACC Users

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March 2001
Foreword

This study was conducted for Commander, U.S. Army Corps of Engineers and the U.S. Army Training Support Center (ATSC) under A896 “Base Facilities Environmental Quality”; Work Unit CNC-T091, “Development of an Interactive Training Program for ATTACC Users.” The technical monitor was Dr. William D. Severinghaus.

The work was performed by the Land and Heritage Conservation Branch (CN-C) of the Installations Division (CN), Construction Engineering Research Laboratory (CERL). The CERL Principal Investigators were Mr. Michael L. Denight and Ms. Gwyn L. Howard. The technical editor was Gloria J. Wienke, Information Technology Laboratory. Mr. Stephen E. Hodapp is Chief, CEERD-CN-C, and Dr. John T. Bandy is Chief, CEERD-CN. The associated Technical Director was Dr. William D. Severinghaus, CEERD-CV-T. The Acting Director of CERL is Mr. William D. Goran.

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1 Introduction

Background

The Army Training and Testing Area Carrying Capacity (ATTACC) methodology is the Integrated Training Area Management (ITAM) standard for estimating training land carry capacity by relating training load, land condition, and land maintenance practices. Various decision support tools have been developed to simplify and automate the ATTACC methodology. These decision support tools include the Workplan Analysis Module (WAM), ATTACC Integration Module (AIM), ATTACC functions of the Range Facility Management Support System (RFMSS), and Land Condition Module (LCM).

Objective

The objective of this work was to develop an interactive computer-based training program for users of the ATTACC decision support tools. This software manual documents the development of the ATTACC tutorial program.

Approach

Authorware 5.1,* which uses object-oriented programming, was used in the development of this tutorial. Authorware is a program that allows the author to assemble multimedia into a functioning and comprehensive package for delivery via the Web, LANs, and CD-ROMs. It is the language in which many current and future models are being programmed; communication between programs would be easily accomplished.

* Authorware is a product of Macromedia, 600 Townsend Street, San Francisco, CA 94103.
Mode of Technology Transfer

The computer program documented in this report allows installations to implement the ATTACC methodology. The information in this report was provided to Army personnel responsible for ATTACC implementation including the U.S. Army Environmental Center (AEC), the U.S. Army Training Support Center (ATSC), and the Engineer Research and Development Center (ERDC).

The ATTACC Tutorial

To manually install the ATTACC tutorial CD-ROM, begin with the following steps.

1. Insert the CD-ROM into the CD-ROM drive.
2. Open the CD-ROM drive on your computer screen.
3. Double click on the ATTACCTutorialv1.exe file.
4. The introduction screen will appear and you may press the “Continue” button to proceed through the rest of the program. Figure 1 illustrates the opening screen.

Figure 1. Opening screen of the ATTACC tutorial.
By clicking on the "Continue" button, the following screen will appear (Figure 2). This is the main index page for the tutorial.

![Main Index](image)

**Section 1: Introduction**

**Section 2: Land Condition Module (LCM)**

**Section 3: Range Facility Management Schedule System (RFMSS)**

**Section 4: ATTACC Integration Module (AIM)**

Instructions: To go to a specific section, click a link above. Otherwise, click CONTINUE to proceed to Section 1.

Figure 2. Main index page for the tutorial.
The "Section 1: Introduction" selection (Figure 3) provides a screen that addresses the overall organization of the tutorial. It provides information on where the objectives and summaries for each section are located, and how to make use of the "Help" menus and pages.

![Welcome!](image)

Hello and welcome to the first section of this computer-based training application! This program will cover many different aspects of the ATTACC Decision Support Tool. Included in these topics will be in-depth discussion of what is ATTACC, how it can benefit your program, where do you obtain the components to run the system, and the definitions associated with these components.

Each section begins with an Objectives page which contains basic concepts that will be covered within the section. When you reach the end of a section, a Summary page will appear. Here, important terms and ideas will be reiterated.

If, at any time, you become confused with the user interface of this program, feel free to consult the help pages. To do so, click the Help menu and then click on Help Pages... These pages will provide information on the functions, features, and fonts available in the program.

If you feel like quitting the module without completing it, your progress will be automatically saved and when you restart the application, the last page you visited will be displayed.

![Figure 3. Introduction screen.](image)

Section 1 provides an overview of what ATTACC is and how it can benefit Land Managers (Figures 4 and 5).
Welcome to Section 1 - Introduction!!!

SECTION 1
OBJECTIVES

Important Concepts Introduced in this Section:

- Through this section you'll be able to gather a better idea of what ATTACC is and how it has been developed.

- You'll also gain a better perspective on how it can benefit you as either a Land Manager or a Trainer and your individual programs.

Figure 4. Section 1 objectives.

Section 1 - Introduction Index

Topic 1: What is ATTACC?

Topic 2: How does it benefit me?

Instructions: To go to a specific Topic, click a link above. Otherwise, click NEXT to proceed to Topic 1.

Figure 5. Section 1 overview.
Figure 6 shows a screen that provides a general introduction to the concepts of ITAM and ATTACC. Those items highlighted in red text on the screen can be clicked on to generate a definition as shown in the following.

**Topic 1: General Introduction**

ITAM is the Army’s program for managing training land. One of the major objectives of ITAM has been to develop a method for estimating training land carrying capacity AND incorporate this concept into training land management decisions.

- ATTACC is the standard methodology for estimating carrying capacity.
- It relates training load, land condition, and land maintenance practices.
- This provides a means for estimating future LRAM costs with regards to future training requirements.

Instructions: The highlighted word above is a glossary term. Click it to get its definition.

Figure 6. General introduction screen with highlighted ITAM definition box.
The screen shown in Figure 7 outlines the suite of decision support tools used within the ATTACC methodology.

The Official Lingo: ATTACC is the standard ITAM methodology for estimating training land carrying capacity by relating training load, land condition, and land maintenance practices.

In other words, ATTACC is no single entity, but a combination of decision support tools which act together to automate the ATTACC methodology. Those tools include the following:

- Land Condition Model (LCM)
- Range Facility Management Support System (RFMSS)
- ATTACC Integration Module (AIM)
- Workplan Analysis Module (WAM)

Together, they are a suite of tools which provide a means to gather a relative assessment of land health and future condition with regards to training loads and LRAM.

Figure 7. Decision support tools that form ATTACC.
The screen shown in Figure 8 provides a conceptual framework for the ATTACC tools and a definition for each. The tools are outlined in red on the screen and are accompanied by a definition for that specific tool. The example provided is for the RFMSS.

Figure 8. ATTACC structure outline.
Within Section 2 (Figure 9), the Land Condition Module is introduced. The main topic being addressed is the concept of Erosion Status (ES) (Figure 10). This topic area is discussed in detail due to the important part it plays in the ATTACC methodology; it determines acceptable soil loss levels for a given parcel of land.

SECTION 2
OBJECTIVES

Important Concepts Introduced in this Section:

- What the Land Condition Model is, how it works, and where to get data
- Understand the components needed to generate the LCM curve
- Discussion on how LCM relates to the other modules of ATTACC.

Figure 9. Section 2 screen.
Figure 10 outlines the method for calculating land condition in terms of Erosion Status and the factors that are taken into consideration.

**What's LCM and How's it Work?**

- LCM measures land condition in terms of Erosion Status (ES) through the use of the Revised Universal Soil Loss Equation (RUSLE).

- RUSLE factors in the following land conditions:
  - Percent vegetative cover
  - Climate
  - Soil Type
  - Length/Slope (a topographic derivative)
  - Conservation Practice Factor

Figure 10. Introduction to Erosion Status screen.
Figure 11 illustrates the Revised Universal Soil Loss Equation (RUSLE) used for calculating Erosion Status.

The formula for RUSLE is: \[ ES = \frac{(R \times K \times LS \times C \times P)}{T} \] Where......

- **ES** = Erosion Status
- **R** = Climatic Factor
- **K** = Soil Erodibility Factor
- **LS** = Topographic Factor
- **C** = Vegetative Cover
- **P** = Conservation Support Practices
- **T** = Soil Loss Tolerance

Figure 11. RUSLE equation used for determining soil loss.
Data for input to RUSLE can be obtained in a variety of places, as illustrated by Figure 12.

Where do I get this data?

Data for ATTACC is generally available through the following:

R Factor (a constant) - published isoerodent maps

K and T Factor maps - digitized NRCS soils survey maps

LS Factor map - derived from DEM, DTED, or LCTA data

C Factor map - use LCTA data extrapolated across the installation by remotely sensed data, vegetation maps or soils maps

P Factor (a constant) - Subject Matter Experts and published values

Available Training Lands map - created by omitting restricted areas (i.e. bodies of water, impact areas, etc)

Training Areas map - map used for scheduling training in the RFMSS program

Figure 12. Data availability for RUSLE.
ES is used to determine the Land Condition Curve illustrated in Figure 13.

This allows ATTACC to generate a Land Condition curve.

Figure 13. Land Condition Curve.
As Figure 14 illustrates, the Land Condition Curve can be shifted toward a more sustainable condition to allow a greater training load with appropriate Land Rehabilitation and Maintenance (LRAM) inputs.

The Land Condition Curve is expressed qualitatively on a Red-Amber-Green scale with Red representing poor land condition and Green good condition.

With LRAM practices invested into this training section, we can shift the land condition towards a more sustainable level or carrying capacity.

Figure 14. Land Condition Curve shift.
Determining ES through the use of the LCM is integral to the ATTACC methodology. Figure 15 summarizes a few of the more important points addressed by this system.

- LCM is the heart of ATTACC - it's an ArcView GIS-based software application which estimates changes in land condition associated with mission activity.

- It is used by LCTA/GIS coordinators to synthesize natural resources data layers and produce a land condition curve.

- LCM is a necessary input for the ATTACC Integration Module (AIM).

Figure 15. Summary of LCM screen.
The RFMSS is another key component to the ATTACC methodology. RFMSS (Figure 16) is primarily focused on tracking and calculating the impact of Maneuver Impact Miles (MIMs).

Section 3 - RFMSS

Topic 1: Overview of RFMSS and its Components

Topic 2: Understanding MIMs

Instructions: To go to a specific Topic, click a link above. Otherwise, click NEXT to proceed to Topic 1.

Figure 16. RFMSS opening screen.
The topic of RFMSS was divided into several parts (Figure 17).

![Topic 1: RFMSS Overview](image)

Part 1: RFMSS Capabilities

Part 2: RFMSS ATTACC Functions

Part 3: Basic Units of Measurement

Part 4: Benefits and Status

Instructions: To go to a specific Part, click a link above. Otherwise, click NEXT to proceed to Part 1.

Figure 17. Parts of RFMSS system.
Overall the most salient item addressed within this part of the tutorial is Topic 2 "MIMs." As illustrated in Figure 18, MIMs are an integral part of the ATTACC calculations.

Figure 18. MIM screen.
In addition to pop-up menus and definitions, the tutorial incorporates weblinks to commonly used Army sites (Figure 19).

For more information on all of the ATTACC components, click on the address below.

This website is full of information regarding ITAM, ATTACC, and the Army's goals for a sustainable future on our training lands.

To access the website, simply click the link below:


Figure 19. Weblink screen for additional help.
Section 4, as seen in Figure 20, briefly covers the ATTACC Integration Module (AIM).

**SECTION 4**

**OBJECTIVES**

Important Concepts Introduced in this Section:

- This section will give a brief overview of how the ATTACC Integration Module (AIM) works.

Figure 20. AIM screen.
AIM integrates all components of the ATTACC system (Figures 21, 22, and 23). It takes into consideration the LCM and MIMs to establish required data to be used in the Workplan Analysis Module (WAM).

How do we load or analyze the information required?

**AIM Screen**

*Land Condition*

- Coordinator inputs land condition data sets from LCM
- Coordinator sets Green/Ambient, Amber/Red, and Target land condition thresholds
- MIM thresholds are automatically entered on the training load screen

Figure 21. AIM Land Condition screen example.
How are MIMs handled in AIM?

AIM Screen

Training Load

- ITAM Coordinator manually enters annual MIMs from RFMSS
- AIM compares MIMs thresholds & the MIMs goal to annual MIMs from RFMSS
- AIM also provides MIMs by type unit and type event for what-if scenarios

Figure 22. AIM Training Load screen example.

How are LRAM requirements generated?

AIM Screen

Land Maintenance

- AIM calculates the total LRAM funding requirement. (Step 3)
- $MIM is calculated for use in RFMSS
- AIM automatically links to LWAM LRAM projects & their associated costs

Figure 23. AIM Land Maintenance screen example.
References


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