

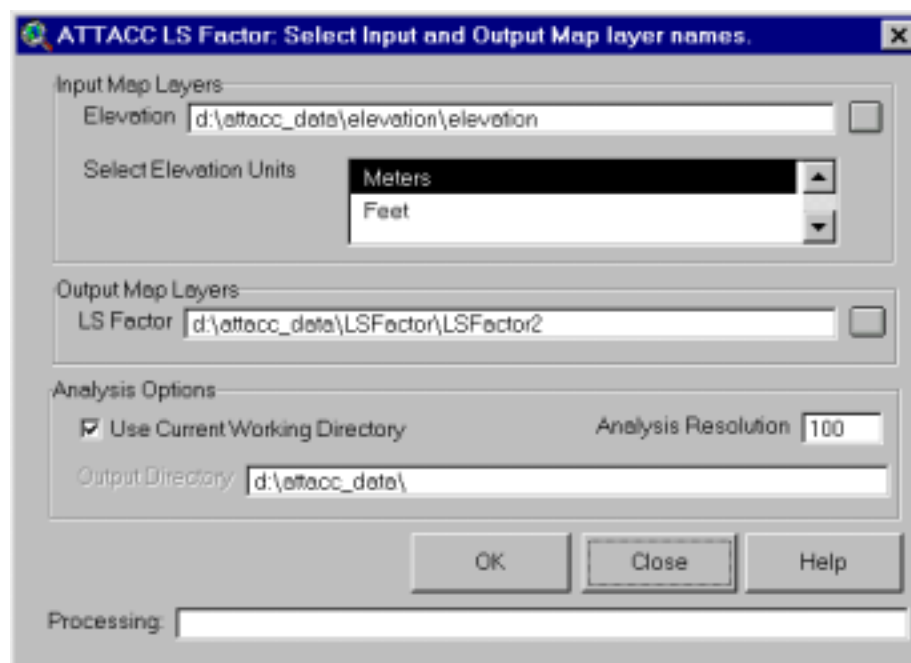


US Army Corps
of Engineers®
Engineer Research and
Development Center

Army Training and Testing Area Carrying Capacity (ATTACC) LS Factor Calculator User Manual, Version 1.0

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Foreword

This study was conducted for the Strategic Environmental Research and Development Program (SERDP) under Project CS-1102, "Improved Units of Measure for Training and Testing Area Carrying Capacity Estimation." The technical monitor was Dr. Robert Holst, Compliance and Conservation Program Manager, SERDP. Bradley P. Smith is Executive Director, SERDP.

The work was performed by the Ecological Processes Branch (CN-N) of the Installations Division (CN), Construction Engineering Research Laboratory (CERL). The CERL Principal Investigator was Alan B. Anderson. Mr. Hohmann is a researcher at CERL. Dr. Mitasova is a researcher at the University of Illinois, Urbana, and Dr. Warren is a researcher at Colorado State University. The technical editor was Linda L. Wheatley, Information Technology Laboratory. Stephen E. Hodapp is Chief, CN-N, and Dr. John T. Bandy is Chief, CN. The associated Technical Director was Dr. William D. Severinghaus. The Director of CERL is Dr. Alan W. Moore.

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1 Introduction

Background

The Integrated Training Area Management (ITAM) Program is the Army's formal strategy focusing on sustained use of training and testing lands. The Army Training and Testing Area Carrying Capacity (ATTACC) program is part of the ITAM Program, under proponent responsibility of the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS). ATTACC is a methodology for estimating the operations and support (O&S) costs of using land at Army installations for training and testing purposes. The ATTACC methodology includes specific processes and algorithms to predict land rehabilitation and maintenance (LRAM) requirements based on training and testing load and environmental conditions.

The ATTACC initiative began in May 1995 with a tasking from the Office of the Deputy Assistant Secretary of the Army (Environment, Safety and Occupational Health) and the ODCSOPS (Training Directorate) to the U.S. Army Concepts Analysis Agency (CAA). The tasking Terms of Reference specified four objectives:

1. Develop a methodology for estimating the operations and support costs of using land at Army installations for the training of ground forces.
2. Identify the key operations and support cost drivers of using land for ground force training by type of army unit and installation.
3. Develop cost estimating relationships that link land usage operations and support costs to a measure of training performance.
4. Use the cost estimating relationship to develop land-related operations and support costs of ground forces training for selected Army units and installations.

In response to the tasking, the U.S. Army CAA, in conjunction with the ATTACC project team, submitted Study Report CAA-SR-96-5 "Evaluation of Land Value Study (ELVS)" (CAA, June 1996). That report outlined a methodology for meeting the stated objectives and demonstrated the methodology for heavy unit training at Fort Hood, TX. In May 1996 the Chief, Training Simulations Division, ODCSOPS (DAMO-TRS) redesignated the methodology outlined in the ELVS

report as the ATTACC methodology and extended the objectives to include ITAM-wide implementation of ATTACC. Since then, the ATTACC project team has extended the methodology to include almost all types of Army units and institutional training and implemented ATTACC at several installations in various ecoregions. Headquarters, Department of the Army (HQDA) is also using ATTACC to estimate land maintenance requirements for the ITAM Program and is integrating ATTACC into the Army's Training Resource Model (TRM), as part of direct OPTEMPO. At the installation level, the ATTACC methodology is being integrated into training land management systems to support land management decisions.

Objectives

This user manual was prepared to provide instructions for using the ATTACC Length-Slope (LS) Factor Calculator software. Appendix A contains instructions for installing the software.

Research and development of the LS software is documented in several publications: development of the LS algorithms (Mitas and Mitasova 1998; Mitasova et al. 1995, 1996, and 1998); a demonstration/validation of the improved LS factor algorithm (Warren et al. 2000); and the development of error budgets for LS algorithms (Wang et al. 2000, 2001, and 2002; Gertner et al. 2002).

Approach

The ATTACC methodology consists of three main components: (1) training load, (2) land condition, and (3) cost analysis. ATTACC measures land condition in terms of the erosion status. Erosion status is the ratio of predicted erosion rates to tolerable erosion rates, with greater values indicating poorer land condition and lesser values indicating better land condition. Erosion rates are estimated using a modification of the Revised Universal Soil Loss Equation (RUSLE), a modification of the Wind Erosion Equation, and a modification of a dust emission model.

The ATTACC Land Condition Module (LCM) uses a modified RUSLE to estimate soil loss due to water erosion. The RUSLE is an extension of the Universal Soil Loss Equation (USLE), which is an empirical equation designed for the computation of average soil loss in agricultural fields. This equation was developed for detachment capacity limited erosion in fields with negligible curvature and no deposition and represents soil loss averaged over time and total area. Equation 1

shows the form of the RUSLE equation (Wischmeier and Smith 1978; Renard et al. 1997). Various modifications of this equation are often applied to the estimation of soil loss using a geographical information system (GIS) (Warren et al. 1989).

Equation 1. USLE equation.

$$E = R * K * LS * C * P$$

where E [ton ac⁻¹yr⁻¹] is the average soil loss,

R [(hundreds of ft-tons) in ac⁻¹hr⁻¹yr⁻¹] is the rainfall intensity factor,

K [tons hr (hundreds of ft-tons)⁻¹ in.⁻¹] is the soil factor,

LS [dimensionless] is the topographic (length-slope) factor,

C [dimensionless] is the cover factor,

P [dimensionless] is the prevention practices factor.

Revised versions of USLE and RUSLE use the same empirical principles as USLE; however, they include various improvements, including monthly factors, incorporation of the influence of profile convexity/concavity using segmentation of irregular slopes, and improved empirical equations for the computation of LS factor.

To incorporate the impact of flow convergence, the USLE hillslope length factor was replaced by an algorithm that accounts for upslope contributing areas (Moore and Burch 1986; Mitsova et al. 1995, 1996; Desmet and Govers 1996). The modified equation for computation of the LS factor in GIS in finite difference form for erosion in a grid cell representing a hillslope segment was derived by Desmet and Govers (1996). A simpler, continuous form of this equation for computation of the LS factor at a point on a hillslope was provided by Mitsova et al. 1996. The form of this equation is:

Equation 2. Improved LS Factor equation.

$$LS_{(r)} = (m + 1) * [A_{(r)} / a_0]^m * [\sin b_{(r)} / b_0]^n$$

where $A_{[r]}$ is upslope contributing area per unit contour width,

$b_{[deg]}$ is the slope,

m and n are parameters,

a_0 is the length of the standard USLE plot

b_0 is the slope of the standard USLE plot.

The parameter a_0 has the value of 72.6 ft and the parameter b_0 has the value of 9 percent. It has been shown that the values of $m=0.6$ and $n=1.3$ give results consistent with the RUSLE LS factor for slope lengths less than 100 m, slope angles less than 14 degrees, and slopes with negligible tangential curvature (Moore and Wilson 1992). Exponents m and n can be calibrated if the data are available for a specific prevailing type of flow and soil conditions. The ATTACC LS Factor Calculator implements this improved algorithm for estimating LS factors for complex terrain.

A variety of funding sources were responsible for research, development, validation, and demonstration of the modified RUSLE LS Factor algorithms implemented in the ATTACC LS Factor Calculator software. Development of the improved LS algorithms was partially funded by Strategic Environmental Research and Development Program (SERDP) Office. Development of the improved LS algorithms was also partially funded by the Office of the Directorate of Environmental Programs (DAIM), Assistant Chief of Staff (Installation Management) (ACS(IM)). Several publications document the development of the LS algorithms (Mitas and Mitsova 1998; Mitsova et al. 1995, 1996, 1998). The U.S. Army Environmental Center (USAEC) funded a demonstration/validation of the improved LS factor algorithm. See Warren et al. (2000) for documentation of the demonstration/validation study. The Strategic Environmental Research and Development Program (SERDP) Office funded an error and uncertainty analysis of data and methods used to estimate LS factors. Several publications document the development of error budgets for LS algorithms (Wang et al. 2000, 2001, 2002; Gertner et al. 2002).

Several decision support tools have been developed to simplify and automate the ATTACC methodology. These decision support tools are the Workplan Analysis Module (WAM), ATTACC Integration Module (AIM), ATTACC Functions of the Range Facility Management Support System (RFMSS), and the LCM. Figure 1 shows the relationship of the ATTACC decision support tools. The ATTACC LS Factor Calculator is designed to work with these systems.

WAM consists of computer-based software programs that (1) develop ITAM projects and costs, (2) transmit the annual work plan and its projects, and (3) update work projects throughout the fiscal year. ITAM managers at installations, major Army commands (MACOMs), and HQDA use the WAM program to build and track ITAM projects from submission to completion and to provide standard project and work plan reports. The point of contact (POC) for WAM is Larry Jantz, Army Training Support Center (ATSC), ATTN: ATIS-ATMS, Fort Eustis, VA 23604; 757-878-3090.

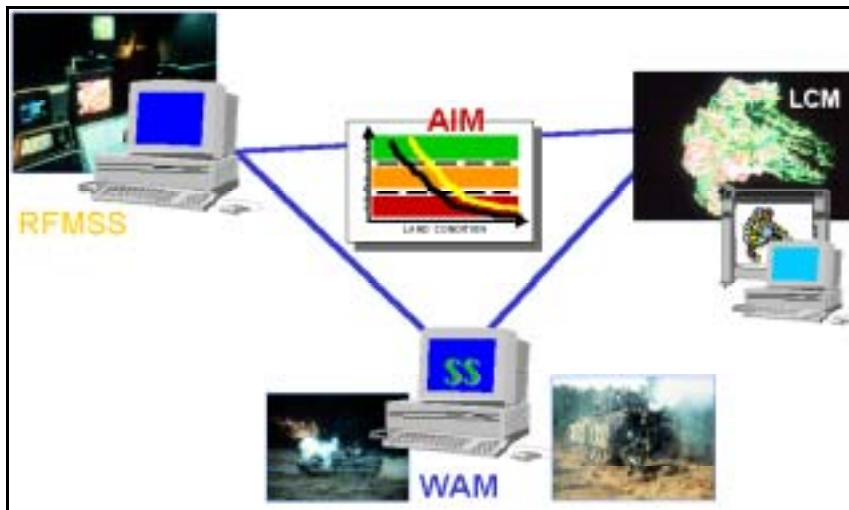


Figure 1. ATTACC software modules.

The RFMSS is a computer system that automates range control operations. It supports the key range management functions of scheduling, firing desk operations, and ITAM/ATTACC. RFMSS ATTACC functions can (1) calculate training load as events are scheduled and (2) compare training load to Red-Amber-Green maneuver impact miles (MIMs) threshold values (generated in AIM). The RFMSS POC is Larry Jantz, ATSC, 757-878-3090.

AIM is a computer-based software program that (1) integrates data from WAM, LCM, and RFMSS, (2) generates LRAM funding requirements, (3) predicts land condition, and (4) calculates MIM thresholds for use in RFMSS (see the *ATTACC Handbook* [USAEC 1999] for detailed information on MIMs). Installation-level ITAM managers use AIM to (1) analyze WAM project data to generate LRAM requirements, (2) analyze “what-if” training scenario impact, (3) calculate MIMs for specific units and events, and (4) calculate MIM thresholds. AIM integrates the three components of ATTACC. The AIM POC is Larry Jantz, ATSC, 757-878-3090.

The LCM is an ArcView^{*} GIS-based software application that estimates changes in land condition associated with mission activity. LCM automates the ATTACC Methodology for generating land condition curves. Land Condition Trend Analysis (LCTA)/GIS coordinators use the LCM and installation natural resources GIS data layers to generate land condition curves, which are an important input to

^{*} ArcView is a product of the Environmental Systems Research Institute (ESRI), 380 New York Street, Redlands, CA, 92373-8100; <http://www.esri.com>

AIM. The POC for the LCM is George Teachman, USAEC, ATTN: SFIM-AEC-EQN, 5179 Hoadley Road, Aberdeen Proving Ground, MD 21010-5401; 410-436-1593. Both the ATTACC LCM and LS Factor Calculator software packages are I3A-approved for use at Army installations (see Appendix B).

Mode of Technology Transfer

The LS Factor Calculator software documented in this report is available from the Engineer Research and Development Center, Construction Engineering Research Center (ERDC/CERL). The *ATTACC Handbook* (USAEC 1999) and Army Regulation 350-4, *Integrated Training Area Management (ITAM)*, document the standing operating procedures (SOPs) for implementing ATTACC.

2 Installing the ATTACC LS Factor Calculator ArcView Extension

To manually install ATTACC LS Factor Calculator files on your computer, complete the following tasks.

1. Copy the file *ATTACCLSext.avx* to your ESRI ArcView extension directory. This directory is typically “C:\ESRI\AV_GIS30\ARCVIEW\EXT32”. See your ArcView documentation if you did not accept default directory names when installing the ArcView software. The *ATTACCLSext.avx* file is the ATTACC LS Factor Calculator ArcView extension. ArcView extensions are add-on programs that provide ArcView users with specialized GIS functionality. Note that the ATTACC LS Factor Calculator requires the ArcView extension for Spatial Analyst.
2. Copy *ATTACCLS.hlp* to your ArcView help directory. This directory is typically “C:\ESRI\AV_GIS30\ARCVIEW\HELP”. See your ArcView documentation if you did not accept default directory names when installing the ArcView software. This file is the LS Factor Calculator online Windows® help sessions. The *ATTACCLS.hlp* file provides an online Windows® help session for using the LS Factor Calculator extension.
3. The LS Factor Calculator program has now been installed. You are ready to use the LS Factor Calculator program.

To use the setup program to automatically install LS Factor Calculator files on your computer, insert the ATTACC LCM compact disk (CD) into your CD drive. Select the <Start> button of the Windows® button bar at the bottom of your screen. Select the <Run> menu item. A run program dialog box will appear (Figure 2). Enter the CD drive letter and “*setup.exe*”. Then select <OK>. The ATTACC LCM setup program will begin. Follow the directions in the ATTACC LCM setup to install the ATTACC LCM program. For more information on program installation, see Appendix A.

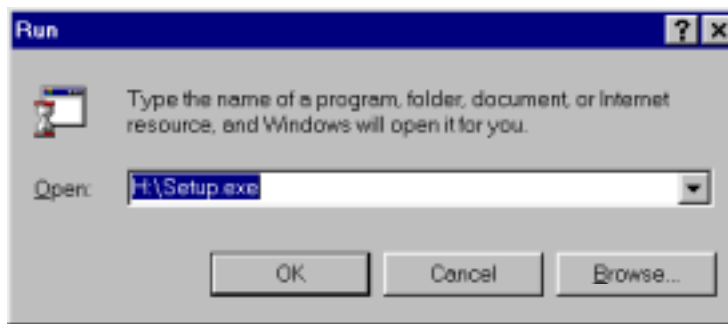


Figure 2. Windows® run programs dialog box.

3 Loading the ATTACC LS Factor Calculator Extension

To use an ArcView extension during an ArcView session, the extension must be loaded. To load the LS Factor Calculator extension into ArcView, complete the following tasks after starting ArcView.

1. From the File menu, select the *<Extensions>* menu option. The Extension Dialog appears, displaying the available extensions. Figure 3 shows the Arc-view menu.

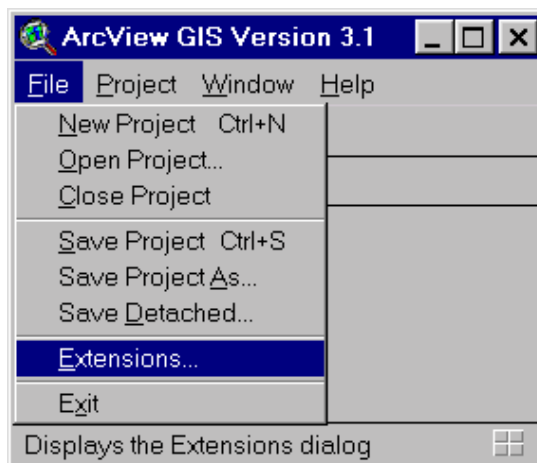


Figure 3. ArcView menu to load the ATTACC LCM extension.

2. Select the extension titled *<ATTACC LS>*. Press *<OK>*. The LS Factor Calculator extension is now loaded. Figure 4 shows the ArcView Extensions dialog box. Notice that the information box provides additional information about the extension. The LS Factor Calculator extension provides POCs for support using the LS Factor Calculator.

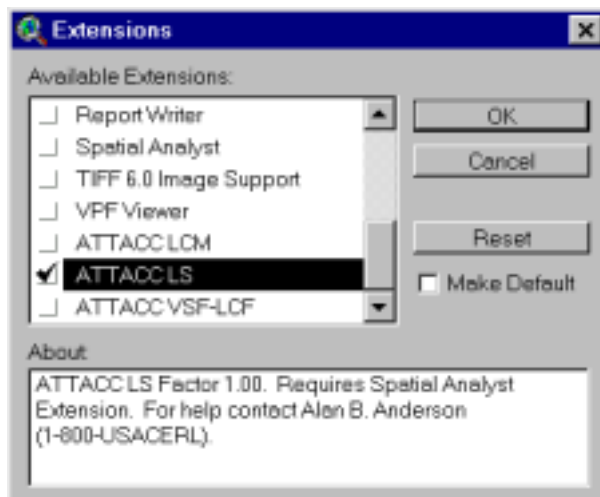


Figure 4. ArcView Extensions dialog box for selecting ATTACC LS Factor Calculator.

3. After loading the extension, an *<LS Factor Calculator>* button will appear on a project button bar (usually the row of buttons located directly below the menu bar) whenever a project is opened. The *<LS Factor Calculator>* button is not visible if a project is not opened. It will only be visible when the project window is the active window. To run the LS Factor Calculator program, press the *<LS Factor Calculator menu>* button, which looks like a hill with the letters “LS” above it. Figure 5 shows the *<LS Factor Calculator menu>* button.



Figure 5. ArcView window showing ATTACC *<LS Factor Calculator>* button.

4. After the *<LS Factor Calculator>* button is selected, the ATTACC Introduction screen is displayed (Figure 6). After selecting *<OK>* on the screen, the LS Factor Calculator input dialog box (Figure 7) will appear. Provide requested information and select *<OK>* to run the program. You will need to provide input data layer names, output data layer names, and analysis options. Chapter 4 provides detailed information on each input field. Online help is available when running the program. While the program is running, progress messages will be displayed in the *<Processing>* field at the bottom of the dialog box.



Figure 6. ATTACC LS Factor Calculator introduction screen.

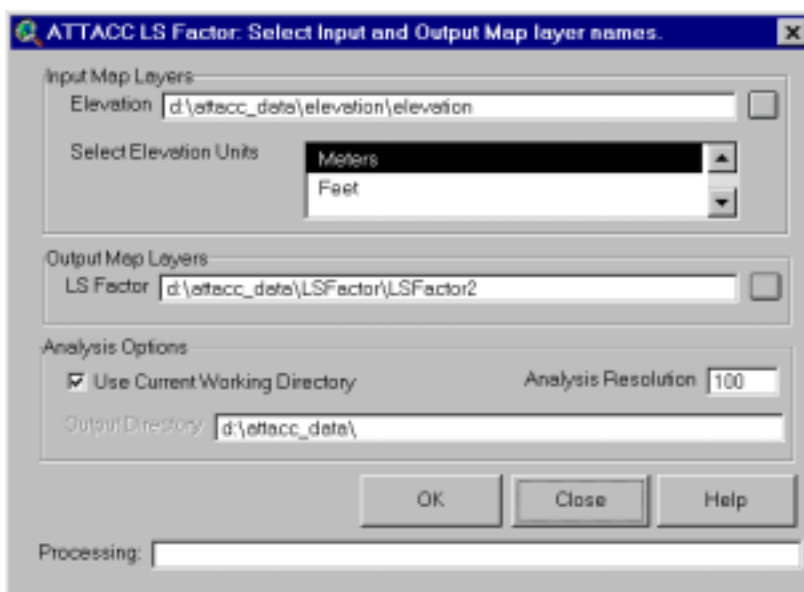


Figure 7. ATTACC LS Factor Calculator input dialog box.

5. After the program completes, output will be displayed in the project window. Chapter 4 describes each output in detail. Figure 8 shows typical program output.

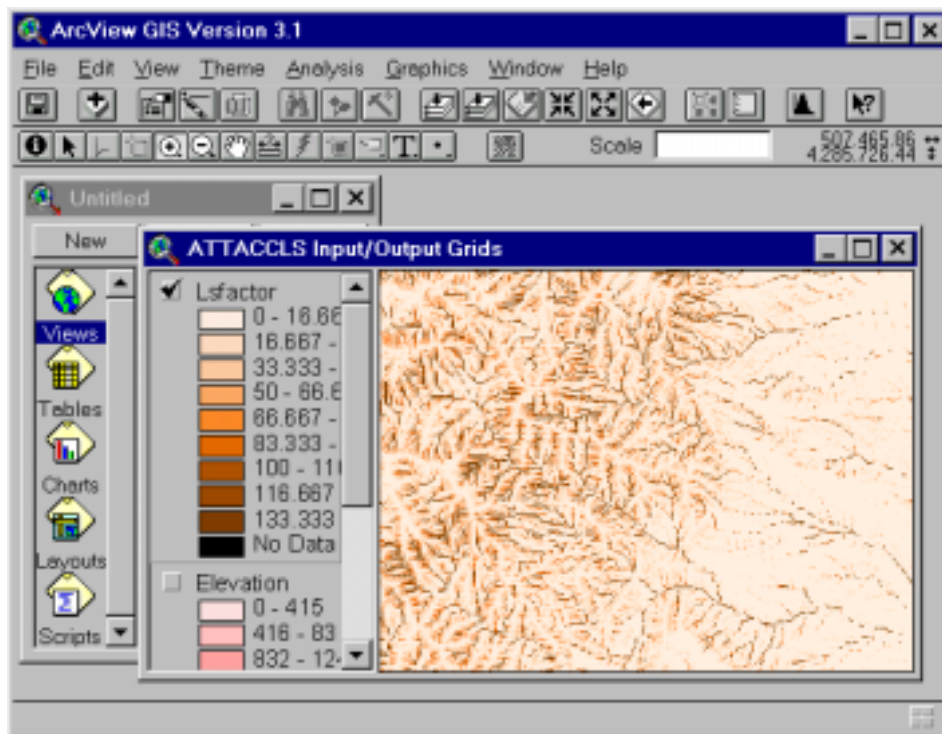


Figure 8. Typical ATTACC LS Factor Calculator output.

6. To terminate the LS Factor Calculator program before completion, press the <Stop> button on the lower right hand corner of the ArcView program window. Figure 9 shows the <Stop> button in a typical ArcView program window.

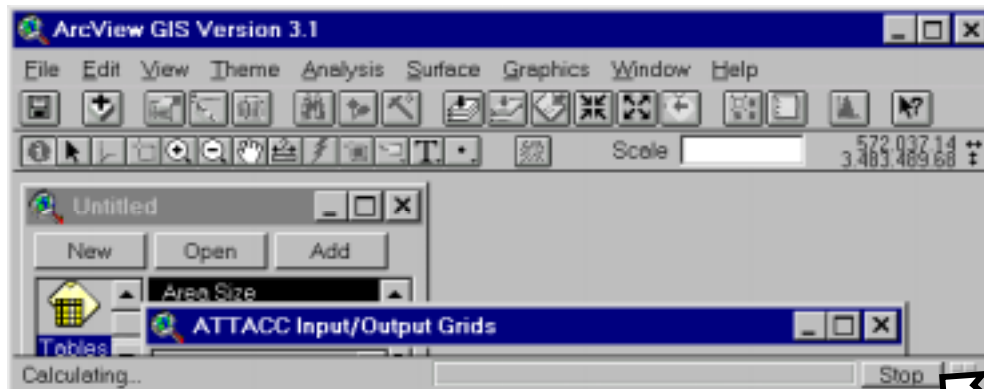


Figure 9. ArcView <Stop> button to terminate ATTACC LS Factor program.

You must open the LS Factor Calculator extension each time you want to use it unless you set up ArcView to automatically load the extension. See the documentation provided with the ArcView GIS software for details on automatically loading extensions.

4 ATTACC LS Factor Calculator Program Use

ATTACC LS Factor Calculator Input Fields

The LS Factor Calculator uses nine input map layers. The data required depend on the analysis options selected. The LS Factor Calculator disables/enables input and output fields depending on the analysis options selected. If required data are not specified or the files are missing, the LS Factor Calculator will notify you of the problem. The following sections summarize the data required to run the LS Factor Calculator program. For more information on ATTACC methodology, refer to the *ATTACC Handbook* (USAEC 1999). The handbook is available on the ITAM home page and as a Windows® help session (see ATTACC LCM User Manual).

Figure 10 shows the LS Factor Calculator input dialog box. The following sections refer to each of the input fields using the same names shown in the dialog box.

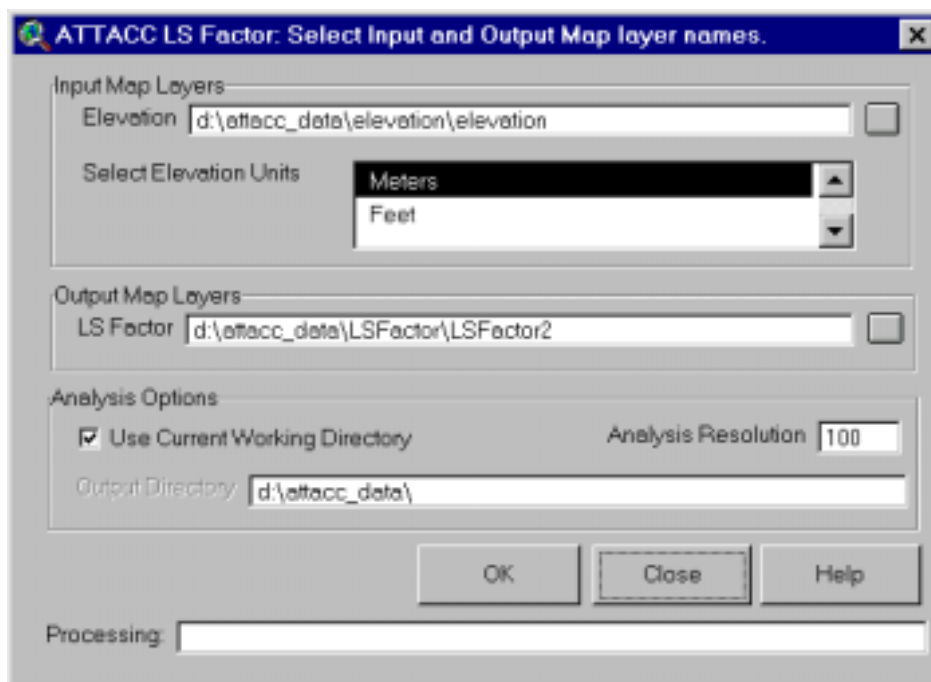


Figure 10. ATTACC LS Factor Calculator input dialog box.

The LS Factor Calculator input dialog will save input values between work sessions. If you exit ArcView, the dialog box input values will be saved. The next time you use the LS Factor Calculator extension, your input values will be restored.

Elevation

The elevation input field provides the name and location of the elevation map to be used when calculating an LS Factor map. The <*Select File*> button to the right of this field can be used to select a file name using the file open dialog box.

LS Factor values can be determined from elevation files such as the U.S. Geological Survey (USGS) Digital Elevation Model (DEM), National Imagery and Mapping Agency (NIMA) Digital Terrain Elevation Data (DTED), and similar gridded data sources.

USGS DEM is a digital file consisting of terrain elevations for ground positions at regularly spaced horizontal intervals and is available at the following website: http://rmmcweb.cr.usgs.gov/elevation/dpi_dem.html. The USGS produces five different digital elevation products. Although all are identical in the manner the data are structured, each varies in sampling interval, geographic reference system, area of coverage, and accuracy; with the primary differing characteristic being the spacing, or sampling interval, of the data. Several DEM products are available for distribution over the Internet.

NIMA DTED is a standard line of terrain products. A DTED is a uniform matrix of terrain elevation values.

Some military installations have used digitized contour maps to derive elevation files. The scale and resolution of these elevation files depends on the contour interval and map scale of the original contour data.

The choice of data source for determining the LS factor for ATTACC depends on the data available for each study area and the resolution and quality of the data. It is likely that different sources will be used for different study areas. Most study areas, however, will have available LS factor data. The most commonly used source of data for the LS factor in the ATTACC model are the 30m x 30m DEM and/or LS factors, using LCTA data extrapolated across the installation with soils maps.

Select File Buttons

Buttons located to the right of the Elevation and LS Factor text boxes are used to access a “file open/save” dialog box. Use this dialog box to locate input files and to name output files.

Select Elevation Units

The elevation units list box allows you to identify the measurement units of the elevation input data layer. Select meters or feet to identify the correct units associated with the vertical values in the elevation data.

LS Factor

Provide the name and location of the LS Factor output map. The *<Select File>* button can also be used to select a file name using the file open dialog box. Selecting an existing data file name will cause the current map to be overwritten by the newly created data. If you are calculating LS Factor values from several data sources, be sure to save output data layers to different locations.

Analysis Resolution

Specify the horizontal resolution of analysis for all calculations. The analysis resolution should be set to a resolution appropriate for the input elevation map.

Default Working Directory

Check the *<Use Current Working Directory>* check box if you want the ATTACC LS Factor Calculator to use your default ArcView working directory. This means that all temporary files will be written to your default directory. See your ArcView documentation for specifying your default working directory. Since the default directory is used to store temporary files, you will need to make sure there is sufficient disk space for calculations. Required space is determined by the size of the input files.

If you do not want to use your default working directory for temporary files, remove the check from the check box. When the check box is not selected, the *<Output Directory>* will be activated allowing you to specify an alternative directory.

Output Directory

The *<Output Directory>* is only activated when the *<Use Current Working Directory>* check box is not selected. The output directory listed in the input box will be used to store all temporary data files. Temporary files are stored to this directory to allow the user to easily cleanup their computer hard drive after running the program. Terminating the program early may leave temporary data files. The program also stores copies of displayed data to this directory.

OK Button

Select *<OK>* to process the selected ATTACC LS Factor Calculator options. If required input data is missing, you will be prompted for the missing data. While the program is running, progress messages will be displayed in the *<Processing>* text box at the bottom of the input dialog box.

Close Button

Select *<Close>* to exit the ATTACC LS Factor Calculator. Current dialog box values will be saved until the extension is next used.

Help Button

Press the *<Help>* button to get MicroSoft-Windows®-compatible online help on the use of the ATTACC LS Factor Calculator. The online help session is the same as the hardcopy users manual. Additional help with the ATTACC methodology is available in the online ATTACC Handbook help file.

Processing Messages Display

While the ATTACC LS Factor Calculator is processing user requests, processing status comments will be displayed in this message line.

ATTACC LS Factor Calculator Output

The ATTACC LS Factor Calculator produces an LS Factor map at the resolution specified. The LS Factor map and the input elevation map are displayed in a view titled "ATTACCLS Input/Output Grids." Each time you run the ATTACC LS Factor Calculator, the current output will overwrite the old output. If you want to save any output from earlier runs, you need to save the data with a new name. Figure 11 shows typical program output.

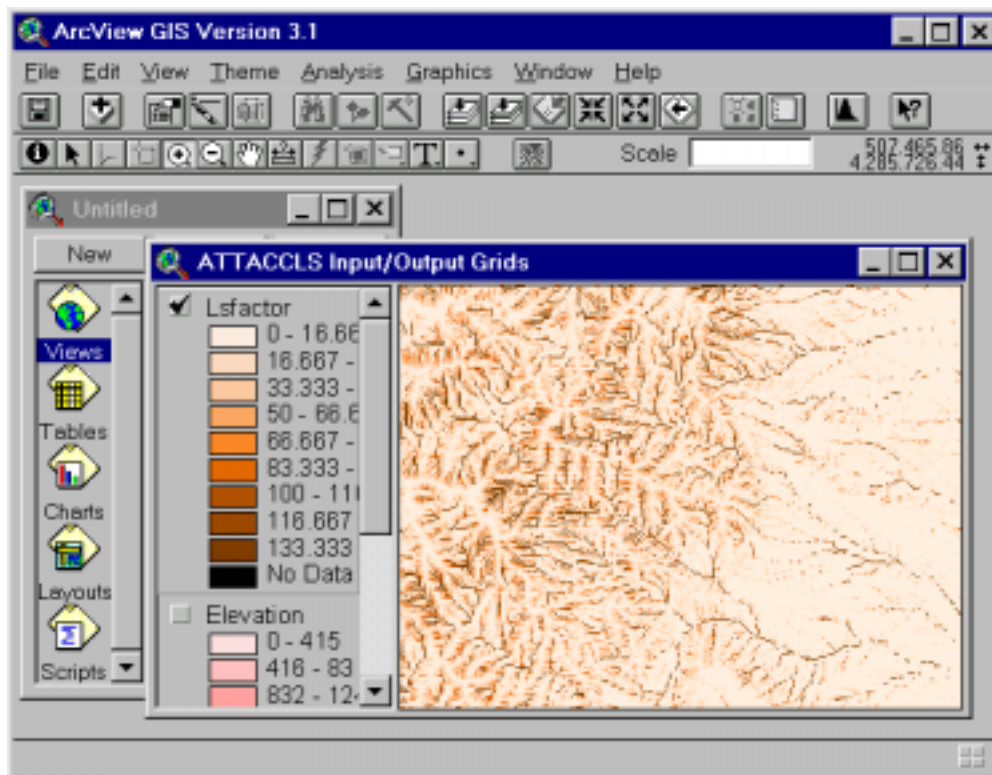


Figure 11. Typical ATTACC LS Factor Calculator output.

ATTACC LS Factor Calculator Online Help

A *<Help>* button is available in the LS Factor Calculator input dialog box. This button provides access to two online Windows® help sessions. Figure 12 shows the LS Factor Calculator help files dialog box. An LS Factor Calculator help session provides information on use of the LS Factor Calculator program. The help session provides basically the same information as this LS Factor Calculator User Manual. A second help session provides information from the *ATTACC Handbook*, and provides information on all aspects of the ATTACC program.

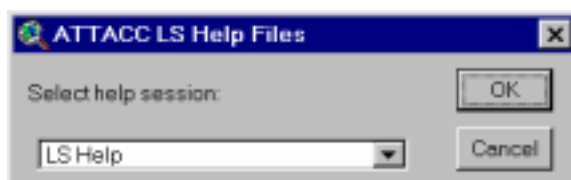


Figure 12. Help session dialog box.

5 Other Technical Aspects of the ATTACC LS Factor Calculator

Transferring ATTACC LS Factor Data to Other ATTACC Systems

The ATTACC LS Factor Calculator saves the LS Factor map to any directory that the user specifies. When using the ATTACC LCM program, simply indicate this directory and grid name in the LS Factor input field. The ATTACC LCM program will use the LS Factor map as provided. For more information on the ATTACC LCM input fields, see the ATTACC LCM Users Manual.

ATTACC LS Factor Calculator Error Messages

The LS Factor Calculator ArcView tool displays two types of error messages. First, LS Factor Calculator error messages inform you of errors specifically related to using the LS Factor Calculator. These error messages are related to the LS Factor Calculator scripts. Second, the LS Factor Calculator displays error messages generated by ArcView. These error messages are related to ArcView scripts that come with ArcView and are used by the LS Factor Calculator scripts.

All LS Factor Calculator error messages can be identified by the word “ATTACC” somewhere in the message or dialog box. ArcView error messages will not include the word “ATTACC” anywhere in the message or dialog box.

You will frequently see several messages in succession. The first message is usually the most informative because it describes the original problem. Subsequent messages usually describe problems resulting from the first problem.

The LS Factor Calculator will terminate for major errors and return you to the input dialog box. For minor problems that usually do not affect results, the LS Factor Calculator will complete the current analysis.

If a run of the LS Factor Calculator is terminated by using the <Stop> button, you will usually see a couple of error messages. These error messages can be

ignored. They simply indicate that some portion of the script was not completed and may result in invalid output.

ATTACC LS Factor Calculator Technical Support

For support using the LS Factor Calculator program, contact the following POC. If you identify program bugs or have suggestions for improving the program, please provide this information to the following POC as well.

Alan B. Anderson (ERDC)

Phone: 800-USA-CERL (800-872-2375) ext 6390

Email: alan.b.anderson@erdc.usace.army.mil

Fax: 217-373-7266

ATTACC LS Factor Calculator System Requirements

The LS Factor Calculator extension requires ESRI's ArcView. The extension has been tested with ArcView versions 3.0, 3.1, and 3.2. The LS Factor Calculator extension requires the ESRI ArcView Spatial Analyst extension. The LS Factor Calculator extension has been tested with ArcView Spatial Analyst versions 1.0, 1.1, and 2.0. Hardware and software requirements for ATTACC LS Factor Calculator are the same as for ArcView.

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Acronyms and Abbreviations

ACS(IM)	Assistant Chief of Staff (Installation Management)
AIM	ATTACC Integration Module
ATSC	Army Training Support Center
ATTACC	Army Training and Testing Area Carrying Capacity
CAA	U.S. Army Concepts Analysis Agency
CD	compact disk
CERL	Construction Engineering Research Laboratory
DAIM	Directorate of Environmental Program
DEM	Digital Elevation Model
DTED	Digital Terrain Elevation Data
ELVS	Evaluation of Land Value Study
ERDC	U.S. Army Engineer Research and Development Center
ESRI	Environmental Systems Research Institute
GIS	geographical information system
HQDA	Headquarters, Department of the Army
ISEC	U.S. Army Information System Engineering Command
ITAM	Integrated Training Area Management Program
LCM	Land Condition Module
LCTA	Land Condition Trend Analysis
LRAM	land rehabilitation and maintenance
LS	Length-Slope (factor)
MACOMs	major Army commands
MIM	Maneuver Impact Mile
NIMA	National Imagery and Mapping Agency
ODCSOPS	Office of the Deputy Chief of Staff for Operations and Plans
O&S	operations and support
RFMSS	Range Facility Management Support System

RUSLE	Revised Universal Soil Loss Equation
SERDP	Strategic Environmental Research and Development Program
SOP	standing operating procedure
TRM	Training Resource Model
USAEC	U.S. Army Environmental Center
USGS	U.S. Geological Survey
USLE	Universal Soil Loss Equation
WAM	Workplan Analysis Module

Appendix A: Installing or Removing the ATTACC LS Factor Calculator and Related ATTACC LCM Tools

Installing LS Factor Calculator and Related Tools

To manually install any LS Factor Calculator, refer to Chapter 2 of the main text for the specific tool and complete instructions.

To use the setup program to automatically install LS Factor Calculator, you will need to have the ATTACC LCM Installation CD. Not all versions of the ATTACC LCM Installation CD have the LS Factor Calculator software included. The process for installing the LS Factor Calculator is identical to the installation of other ATTACC components. The process only differs by the software extensions you select to install.

To use the setup program to automatically install LS Factor Calculator and related ATTACC LCM tools on your computer, insert the ATTACC LCM CD into your CD drive. Select <Start> on the Windows® button bar at the bottom of your screen. Select <Run> on the menu. A run program dialog box will appear (Figure A1). Enter “*drive:\setup.exe*” in the text-input box where “*drive*” is the CD drive letter. You may also use the <Browse> button to locate and select the “*setup.exe*” file (Figure A2). Then select <OK>. The ATTACC LCM installation program will begin.

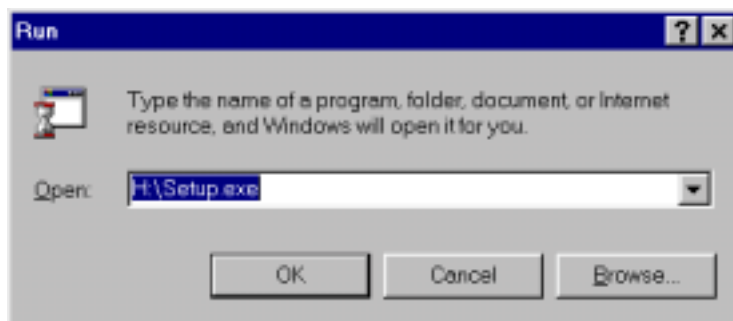


Figure A1. Windows® run programs dialog box.

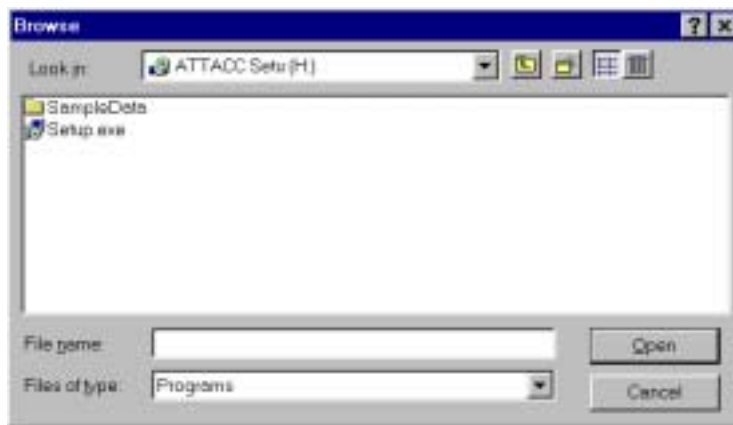


Figure A2. Browse dialog box used to locate installation program.

You will see the ATTACC setup initialization screen (Figure A3). After a few seconds the initialization process will be complete and the ATTACC LCM installation setup welcome screen (Figure A4) will appear. If you do not see the welcome dialog box, you already have a version of the ATTACC LCM installed on your computer. See the *Removing and Updating ATTACC LCM and Related Tools* section of this appendix if you already have a version of the ATTACC LCM installed. Select <Next> to continue or <Cancel> to terminate the installation. You may cancel the installation at anytime and all installation files will be removed from your computer system.

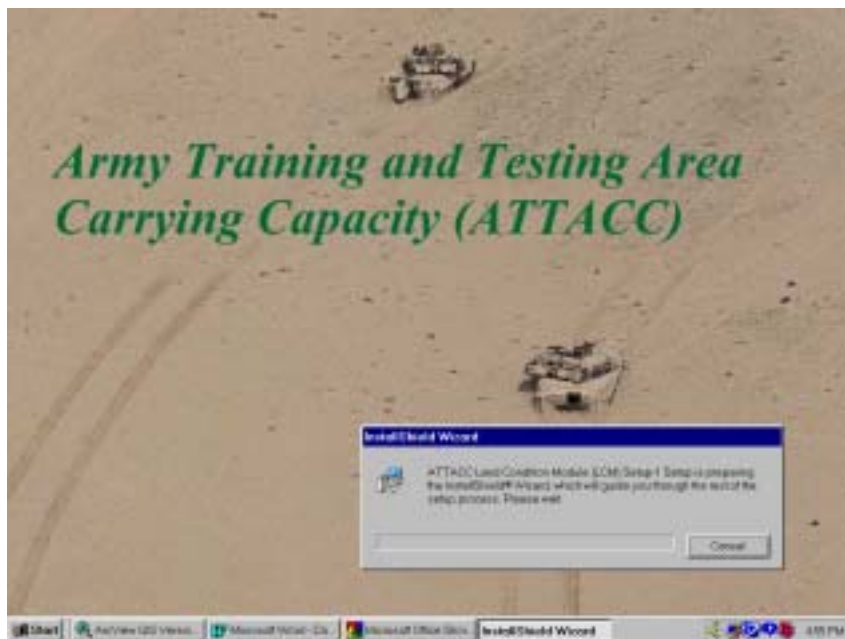


Figure A3. ATTACC LCM installation program initialization screen.



Figure A4. ATTACC LCM installation welcome screen.

A series of three dialog boxes will prompt you to provide file locations for the ATTACC LCM extension, online help, and sample data (Figures A5, A6, and A7). Each dialog box provides information concerning required file locations. Use the *<Browse>* button to access the locate file directories dialog box. Use the *<Back>* button to return to earlier ATTACC LCM installation dialog boxes to correct previously provided information. Select *<Next>* to proceed to the next input dialog box.

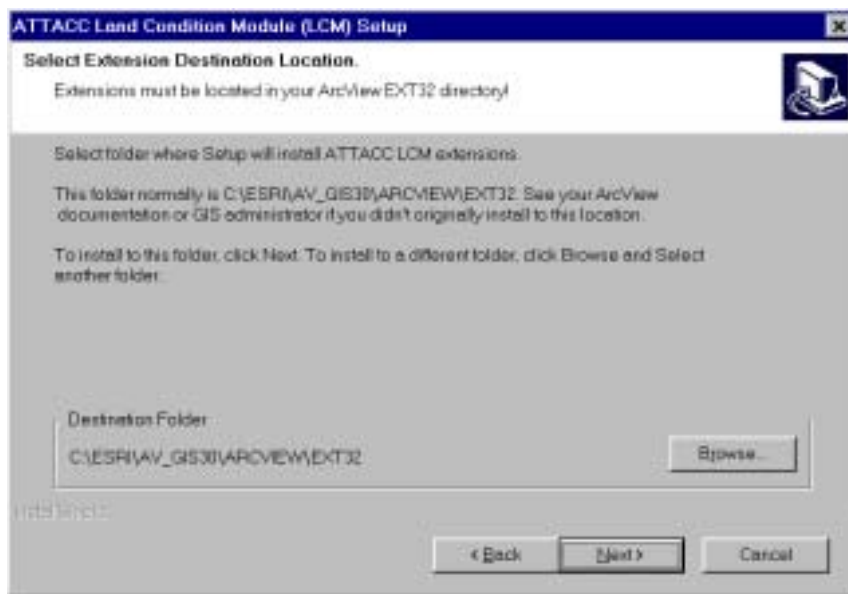


Figure A5. ATTACC LCM installation program dialog box to specify destination folder for ATTACC LCM extension files.

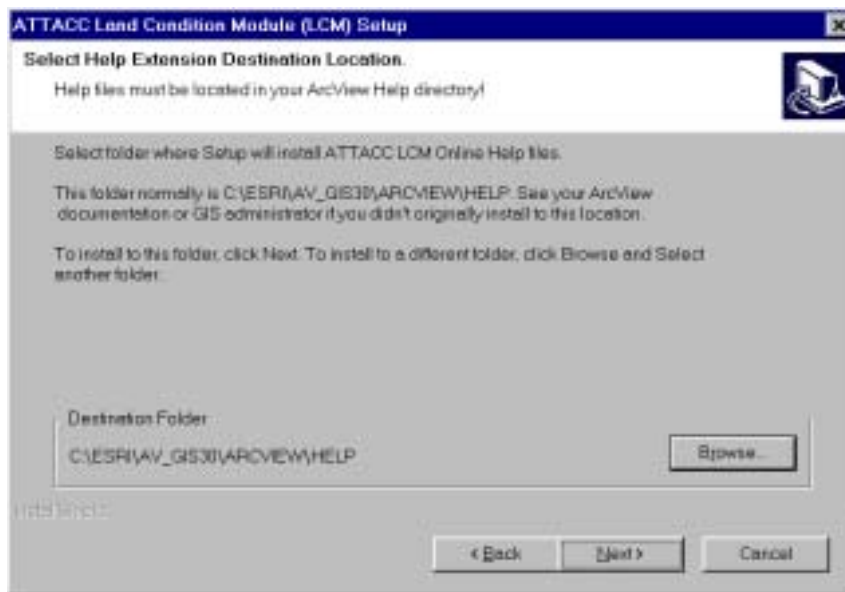


Figure A6. ATTACC LCM installation program dialog box to specify destination folder for help files.

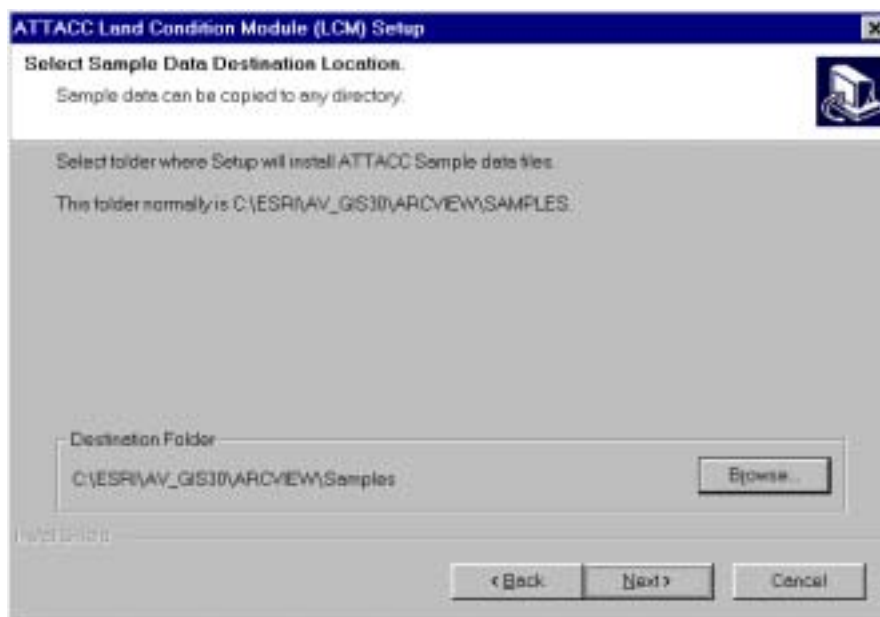


Figure A7. ATTACC LCM installation program dialog box to specify destination folder for sample data files.

After specifying file locations, you will need to specify the type of installation (Figure A8). The *Typical* installation option will install all Arcview extensions, help files, and sample data. The *Compact* installation option will install only Arcview extensions and help files. It will not install sample data. The *Custom* installation allows you to select the desired extensions, help files, and sample data to install on your computer. Select <Next> to proceed with the installation.

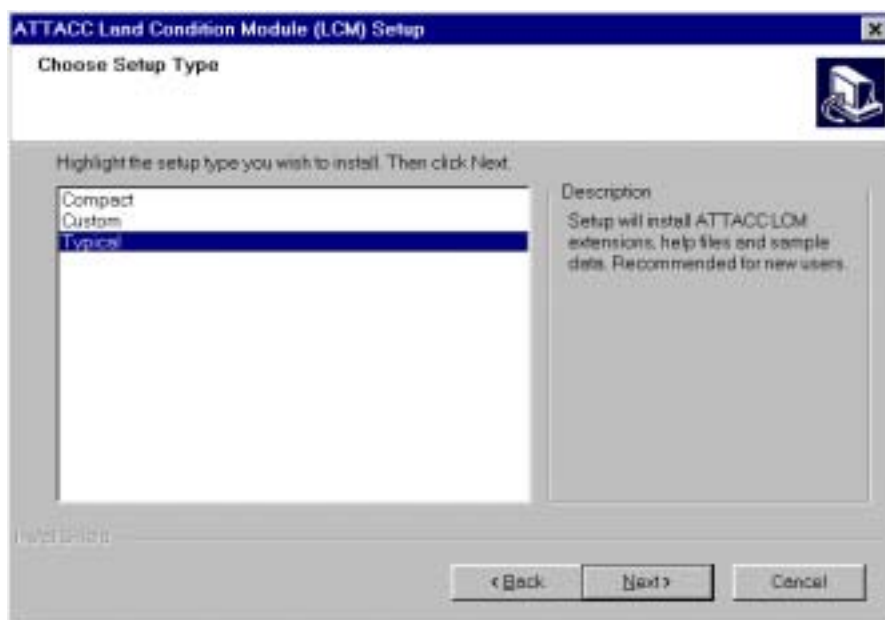


Figure A8. ATTACC LCM installation program setup type selection dialog box.

If you selected the *Custom* installation option, you will proceed to the ATTACC LCM installation program Select Components dialog box (Figure A9). This dialog box will not be seen if you selected the *Typical* or *Compact* setup options. Check each file option that you want installed. Highlighting an option provides supplemental information in the description section of the dialog box. Hard drive space requirements for the selected options and available hard drive space are provided at the bottom of the dialog box. Select the <Next> button to proceed with the installation.

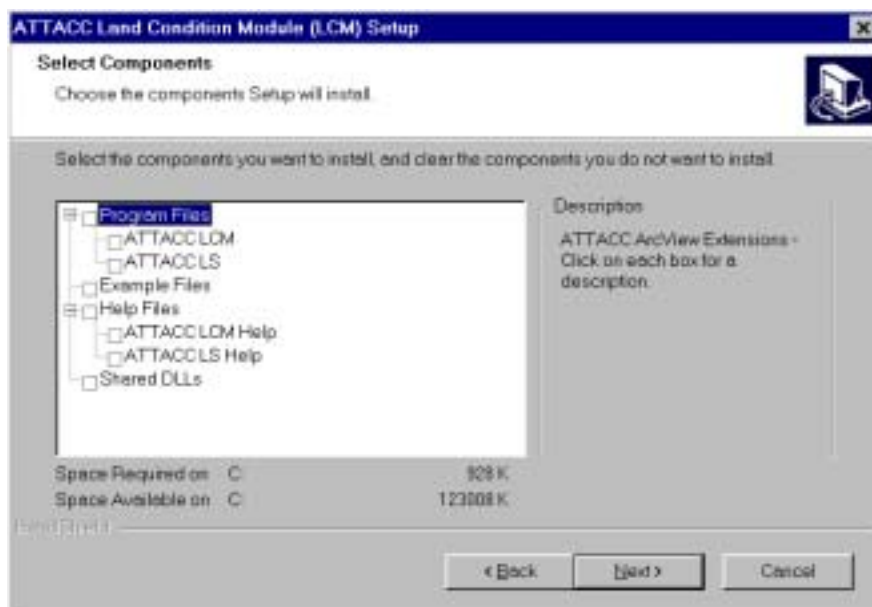


Figure A9. ATTACC LCM installation program select components dialog box.

You will need to designate a program folder or a file group (Figure A10). This designation can be an existing file group or a new file group. The installation program defaults to the “*ATTACC LCM*” file group. You will probably want to accept the default value. Select <Next> to proceed with the installation.

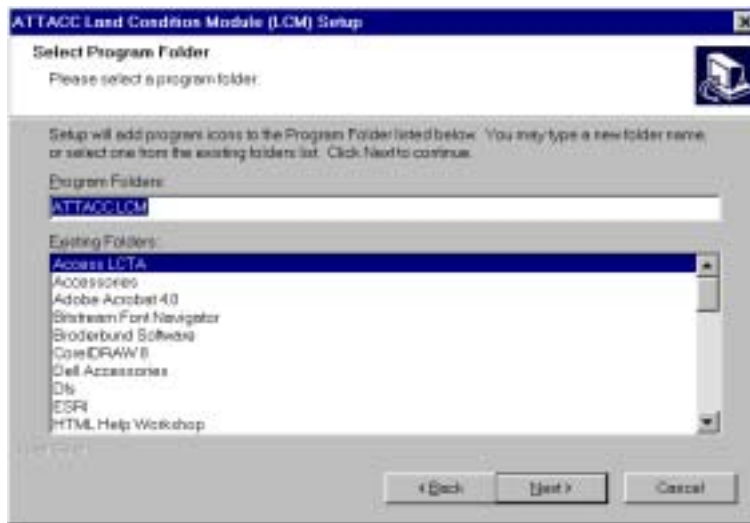


Figure A10. ATTACC LCM installation program folder selection dialog box.

The ATTACC LCM installation program will now install the selected files. The ATTACC LCM installation program Setup Status dialog box (Figure A11) will keep you informed of installation progress.

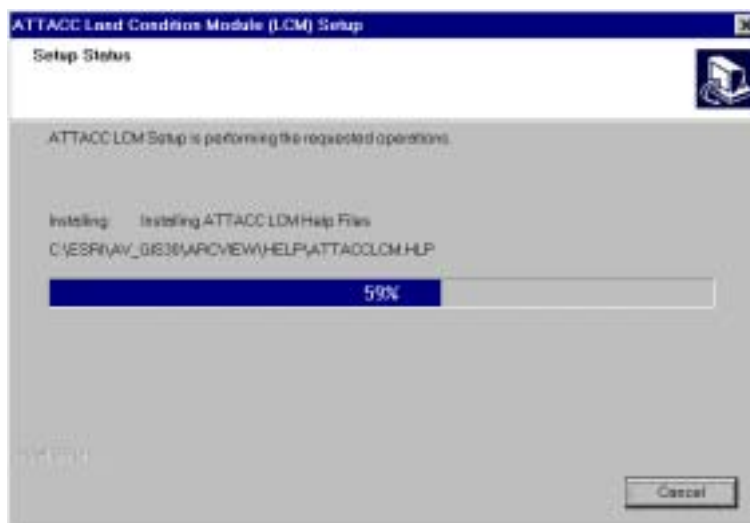


Figure A11. ATTACC LCM installation program setup status dialog box.

When you see the ATTACC LCM installation program completion screen (Figure A12), the installation is complete. Select <Finish> to exit the ATTACC LCM installation program.



Figure A12. ATTACC LCM installation program completion dialog box.

Removing and Updating ATTACC LCM and Related Tools

Use the MS Windows® *Add/Remove Programs* utility to remove the LS Factor Calculator software, add other ATTACC modules, or load a newer version. To use this utility, select the *<Start>* button on the Windows® button bar at the bottom of your screen. Select *<Settings>*. Then select *<Control Panel>*. You should see the Control Panel dialog box (Figure A13). Run the *Add/Remove Programs* utility by selecting the icon.

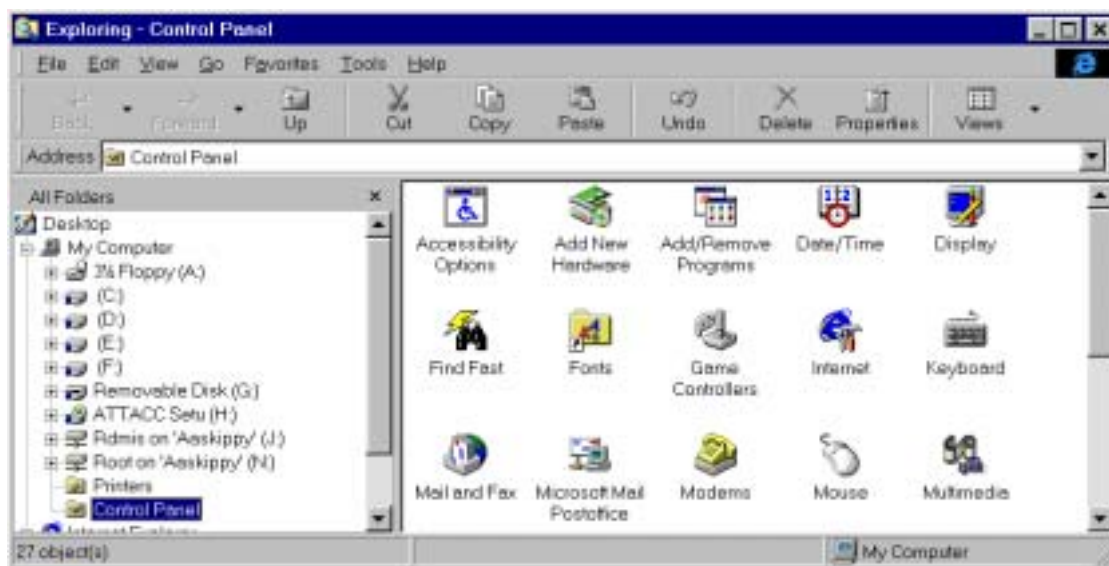


Figure A13. Control Panel dialog box.

The Add/Remove Programs dialog box (Figure A14) now appears. Locate and highlight the *ATTACC LCM* program group. Then use the <Add/Remove> button to start the ATTACC LCM remove/update program.

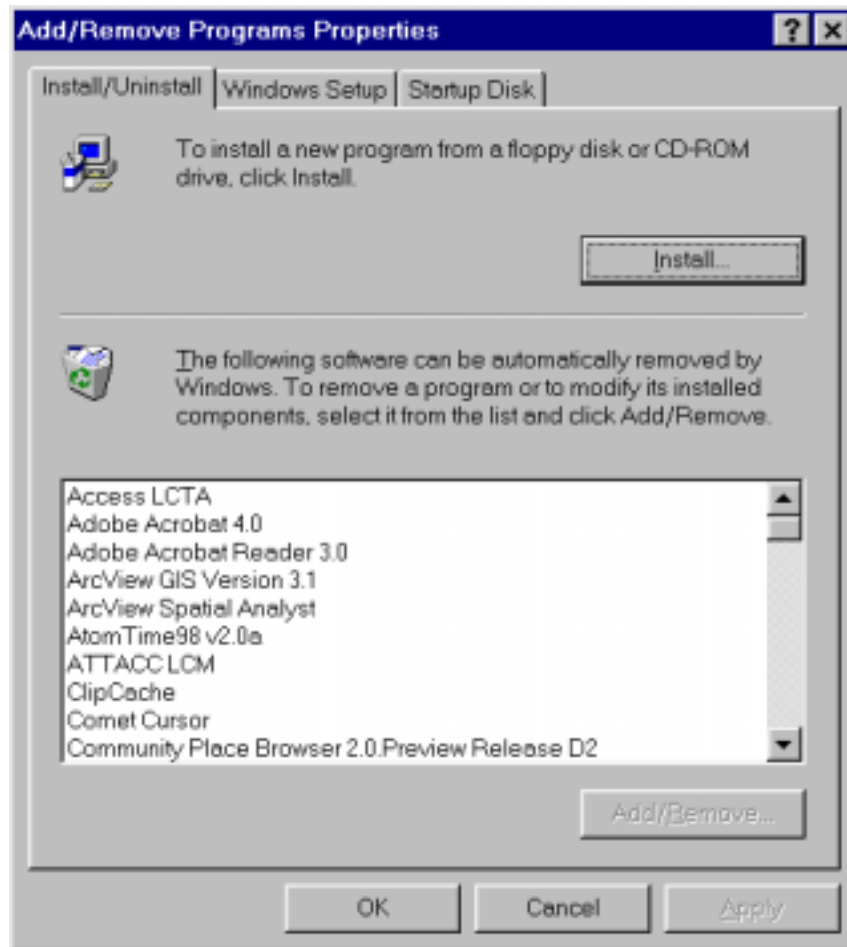


Figure A14. Add/Remove Programs dialog box.

After the ATTACC LCM remove/update program begins, you will see the uninstall program options dialog box (Figure A15). Select the <Remove> option to remove all ATTACC LCM components installed on your computer. This option will remove all installed files but will not remove any data files created by the ATTACC LCM program. Select the <Repair> option to reinstall the same components originally installed. Use this option if you have corrupted or deleted any files originally installed. Select the <Modify> option to add or remove selected ATTACC LCM components. Use this option to remove components no longer needed (i.e., sample data) or add components that were not originally installed. Select <Next> to proceed with the remove/update program.



Figure A15. ATTACC LCM remove/update program options dialog box.

If you selected the *Modify* option, you will see the program maintenance and uninstall dialog box (Figure A16). This dialog box will not be seen if you selected either the *Repair* or *Remove* option. Check each file option that you want installed and uncheck each file option you want removed. Highlighting an option provides supplemental information in the description section. Hard drive space required for the selected options and available hard drive space are shown at the bottom of the dialog box. Select <Next> to proceed with the installation.

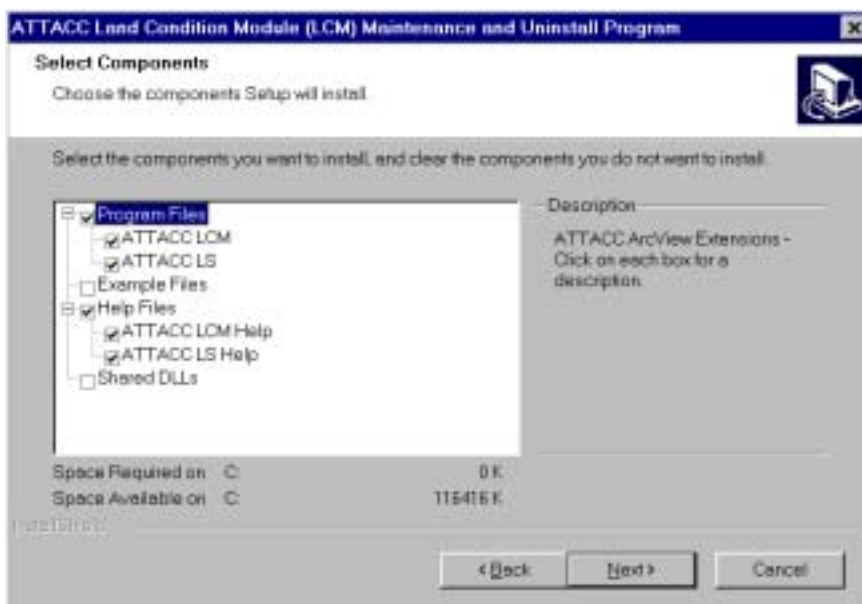


Figure A16. ATTACC LCM installation program maintenance and uninstall dialog box.

The Setup Status dialog box will appear as your remove/update options are processed (Figure A17). You will see this dialog box regardless of the remove/update options selected.

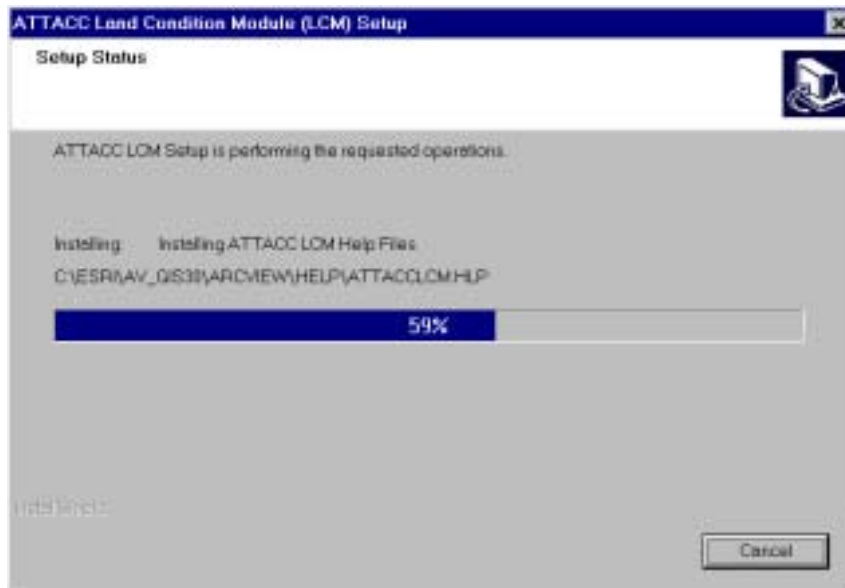


Figure A17. ATTACC LCM remove/update program status dialog box.

When you see the ATTACC LCM remove/update program completion dialog box, the remove/update is complete (Figure A18). Select the <Finish> button to exit the ATTACC LCM remove/update program.

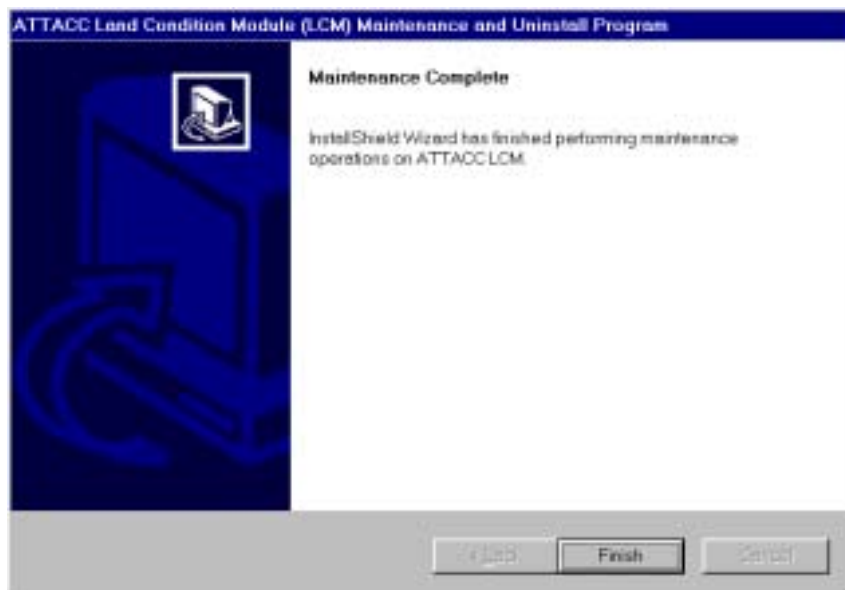


Figure A18. ATTACC LCM remove/update program finish dialog box.

Appendix B: Installation Information Infrastructure Architecture (I3A) Technical Review Process for ATTACC Land Condition Module

The Army CIO instituted the I3A Technical Review Process to ensure that all systems being fielded on Army installations are coordinated and reviewed for infrastructure and communications impacts. Program Managers were asked to coordinate their system designs with the U.S. Army Information System Engineering Command (ISEC) to ensure that the proposed fielded system fits within the Army's installation architecture. The ATTACC LCM version 1.0 systems architecture information was submitted for system approval and was ISEC approved (Anderson et al. 2001). During the release of ATTACC LCM version 2.0, it was determined by ISEC that continued upgrades to the software that did not change the system architecture were also considered approved systems (personal communications, Gordon Weith, ATSC).

The LS Factor Calculator software was developed to the same system architectural standards as the ATTACC LCM software. As such the LS Factor Calculator meets the ISEC system architecture guidelines.

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14. ABSTRACT Army Training and Testing Area Carrying Capacity (ATTACC) is the standard Integrated Training Area Management (ITAM) methodology for estimating training land carrying 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). The Land Condition Model (LCM) is an ArcView GIS-based software application that estimates changes in land condition associated with mission activity. LCM automates the ATTACC methodology for generating land condition curves. To implement the LCM, an LS factor data layer is required that adequately represents complex landscapes typically found on military installation. The ATTACC LS Factor Calculator automates the development of LCM-required LS Factor data. The ATTACC LS Factor Calculator is an ArcView extension.					
15. SUBJECT TERMS Army Training and Testing Area Carrying Capacity (ATTACC), military training, Integrated Training Area Management (ITAM), carrying capacity, user manual, Land Management Systems (LMS), modeling, land management					
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