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LUMS

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UNITED STATES MARINE CORPS
Marine Corps Base
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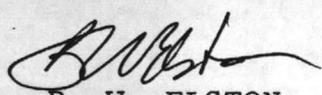
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From: Assistant Chief of Staff, Facilities, Marine Corps Base, Camp Lejeune

Subj: LUMS DRAFT DATA BASE SPECIFICATION

Encl: (1) LUMS Draft Data Base Spec prepared by ESRI dtd 4 Sep 87

1. We are providing the enclosure for your review and comments as needed. Please advise Mr. Bob Alexander, extension 3034, of any changes that you feel should be made in the LUMS data base document.


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TO: Assistant Chief of Staff, Logistics, Camp Lejeune

FROM: LUMP BRATT (M) (P)

SUBJECT: (1) LUMP BRATT (M) (P) (P)

We are providing the enclosure for your review and comment as requested. Please advise Mr. Lee Alexander, executive officer, of the 1st Marine Logistics Group, Camp Lejeune, North Carolina, of any comments you may have.

L. M. Bratt
Major

1st Marine Logistics Group
Camp Lejeune, North Carolina
28543-5000
Attention: Mr. Lee Alexander
Executive Officer

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Land Use Management System
Draft Data Base Specification

September 4, 1987

Prepared for:
Headquarters Marine Corps
Code LFL/Acock
Commonwealth Building
1300 Wilson Boulevard, Room 632
Rosslyn, VA 22209

Prepared by:
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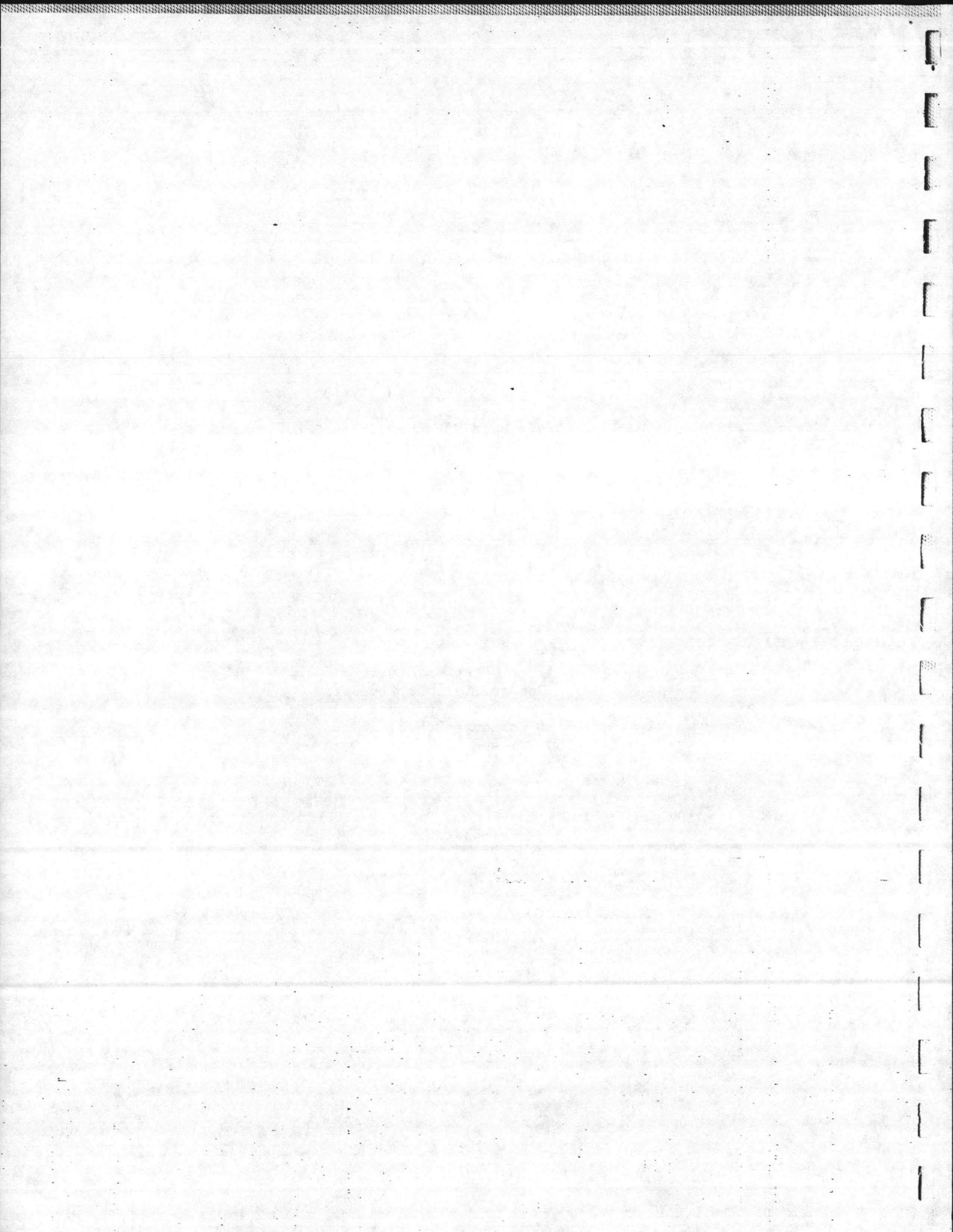


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1. GENERAL

Headquarters Marine Corps (HQMC) has initiated a program to develop a Land Use Management System (LUMS) to alleviate deficiencies in current land management/land use planning methodologies. These deficiencies are caused by increasingly intensive land use activities resulting from deploying new mobile weapons systems for training purposes combined with increasing levels of environmental protection legislation.

A major component of LUMS will be a computer-based Geographic Information System (GIS). A prototype GIS will be procured and installed at Marine Corps Base (MCB) Camp Lejeune, North Carolina (NC). This system will be carefully monitored during a period of initial use. The data and information from the monitoring effort will be used to evaluate the LUMS concept for potential Marine Corps wide deployment.

1.1 Purpose

The purpose of this Data Base Specification for the prototype LUMS is to describe the data base organization and to provide the basic design data necessary for construction of the system files, tables, dictionaries and directories.

1.2 Background

The need for the LUMS program is identified in the Land Use Management System Mission Element Needs Statement of 24 June 1984, reference (a). The conceptual requirements for the LUMS program are documented in the Land Use Management System Requirements Statement of 14 August 1984, reference (b). A summary of the LUMS concept development phase can be found in the Land Use Management System Decision Paper I of 30 September 1984, reference (c). Requirements and functional descriptions for the automated training area scheduling portion of LUMS are documented in references (d,e).

Specifications for the prototype LUMS are documented in the Land Use Management System Solicitation Document, reference (f). Requirements for selected custom software functions are contained in reference (g), Draft Land Use Management System Functional Description for Custom Marine Corps Macros. Requirements for the MCB Camp Lejeune prototype LUMS are documented in the Land Use Management System Prototype Requirements Statement of 31 March, reference (h).

1.3 Project References

The following references are applicable to this document.

- a. Land Use Management System Mission Element Needs Statement, U.S. Department of the Navy, Headquarters Marine Corps, Code LFL, Washington, DC, of 24 June 1984. This document identifies the inadequacies of the existing Marine Corps land use management

capabilities to meet future requirements, and establishes the initial requirements for LUMS.

- b. Land Use Management System Requirements Statement, U.S. Department of the Navy, Headquarters Marine Corps, Code LFL, Washington, DC, of 14 August 1984. This document describes problems associated with Marine Corps land management practices as well as the capabilities and performance criteria required to meet existing and projected needs.
- c. Land Use Management System Decision Paper I, U.S. Department of the Navy, Headquarters Marine Corps, Code LFL, Washington, DC, of 30 September 1984. This document summarizes all events that occurred during the concept development phase of Life Cycle Management for the LUMS project.
- d. Requirements Statement for Training Area Facilities Scheduling System, U.S. Department of the Navy, Information Systems Management Branch, Management Assistance Division, Marine Corps Base Camp Lejeune, NC, of September 1983. This document identifies user requirements for the scheduling of training area facilities at MCB Camp Lejeune.
- e. Functional Description for Training Area Facilities Scheduling System, U.S. Department of the Navy, Information Systems Management Branch, Management Assistance Division, Marine Corps Base Camp Lejeune, NC, of January 1984. This document presents system requirements which will serve as a basis for mutual understanding between the user and the developer. This Functional Description (FD) also provides information on performance requirements, preliminary design, user impacts, and criteria for the development of systems tests.
- f. Land Use Management System Solicitation Document, U.S. Department of the Navy, Headquarters Marine Corps, Code LBC-4, Washington, DC, of 10 May 1986. This document, with amendments, provides specifications for the procurement of the prototype LUMS for MCB Camp Lejeune.
- g. Land Use Management System Draft System/Subsystem Specification for Custom Marine Corps Macros, U.S. Department of the Navy, Headquarters Marine Corps, Code LFL, Washington, DC. This interim document expands upon the Final Functional Description. It identifies in GIS-specific programming terms the systems and subsystems which comprise macros 1-4 (see reference (q)).

- h. Land Use Management System Prototype Requirements Statement, U.S. Department of the Navy, Headquarters Marine Corps, Code LFL, Washington, DC, of 31 March 1987. The prototype Requirements Statement (RS) describes the requirements for the MCB Camp Lejeune Prototype LUMS.
- i. Land Use Management System Prototype Site Preparation Plan, U.S. Department of the Navy, Headquarters Marine Corps, Code LFL, Washington, DC, of 31 March 1987. This plan provides a common basis of understanding about the prototype LUMS sites among the LUMS project team, MCB Camp Lejeune personnel, and the vendor, and also includes preliminary information on preparing for the installation of LUMS equipment.
- j. Land Use Management System Draft Training and Training Equipment Plan, U.S. Department of the Navy, Headquarters Marine Corps, Code LFL, Washington, D.C., of 29 June 1987. This plan describes the training and training equipment available for functional users and data processing personnel involved in the prototype LUMS.
- k. Land Use Management System Final Functional Description for Custom Marine Corps Macros, U.S. Department of the Navy, Headquarters Marine Corps, Code LFL, Washington, D.C. (in preparation). This plan outlines the design specifications of application macros for the MCB Camp Lejeune LUMS.
- l. Land Use Management System Draft System Acceptance Test Plan, U.S. Department of the Navy, Headquarters Marine Corps, Code LFL, Washington, D.C., of 30 July 1987. This plan describes the system hardware and software testing for functional users and data processing personnel to implement the prototype LUMS at MCB Camp Lejeune.
- m. Land Use Management System Implementation and Milestone Plan, U.S. Department of the Navy, Headquarters Marine Corps, Code LFL, Washington, D.C., of 11 August 1987. This plan provides the necessary information to functional users and data processing personnel to implement the prototype LUMS at MCB Camp Lejeune.
- n. Land Use Management System Draft Site Preparation Plan, U.S. Department of the Navy, Headquarters Marine Corps, Code LFL, Washington, D.C., of 29 June 1987. This Site Preparation Plan provides MCB Camp Lejeune staff with guidelines for preparing the various LUMS locations in advance of system installation.
- o. Land Use Management System Draft Data Base Specification, U.S. Department of the Navy, Headquarters Marine Corps, Code LFL, Washington, D.C., of 21 August 1987. This document describes the content and structure of the data in the data base which is to be delivered with the LUMS system.

- p. Land Use Management Feasibility Study, U.S. Department of the Navy, Headquarters Marine Corps, Code LFL, Washington, D.C., of 30 September 1984. This study identified the most feasible alternative configuration for implementing the LUMS concept.
- q. Technical Proposal Best and Final Offer for the Land Use Management System (LUMS), Environmental Systems Research Institute, 380 New York Street, Redlands, CA 92373, of 12 March 1987. This document provides a preliminary conceptual design for both the LUMS data base and the macros to be developed.
- r. Environmental Systems Research Institute letter to James Lee, U.S. Marine Corps Contracting Officer, dated 1 September 1987.

1.4 Terms and Abbreviations

The following terms and abbreviations are used in this document.

a. Terms

- (1) "C" Team - Personnel from MCB Camp Lejeune who will participate in the LUMS implementation. This team consists of the personnel indicated in TABLE 4, Implementation Teams.
- (2) Communications Specialist - MCB Camp Lejeune personnel with extensive knowledge of existing telecommunications facilities on the Base.
- (3) Contract - A legal contract between the Marine Corps and a Vendor responding to the LUMS solicitation.
- (4) Contract Officer - Marine Corps personnel at HQMC/Code LBC-4 with the responsibility for handling all the legal and financial aspects of LUMS related contracting.
- (5) Cultural Resources Specialist - MCB Camp Lejeune personnel with extensive knowledge about the archaeological and historical resources on the Base.
- (6) Data Base Specialist - Vendor personnel with extensive GIS data base design and management experience.
- (7) Environmental Engineer - MCB Camp Lejeune Environmental Engineer.
- (8) Forestry Specialist - MCB Camp Lejeune Base Forester.

- (9) "H" Team - All Government personnel under the direction of HQMC whose primary responsibility encompasses the design, procurement, installation, and evaluation of the prototype LUMS. This team consists of the personnel indicated in TABLE 4, Implementation Teams.
- (10) Hardware - Automated Data Processing Equipment (ADPE).
- (11) Hardware Specialist - Vendor personnel with extensive ADPE experience.
- (12) ISMB Liaison - MCB Camp Lejeune personnel from the Information Systems Management Branch (ISMB) of the Assistant Chief of Staff (AC/S) Management office who coordinates Automated Data Processing (ADP) design and development functions on the Base.
- (13) Maintenance Specialist - MCB Camp Lejeune personnel with extensive knowledge about Base maintenance requirements.
- (14) Master Planning Specialist - MCB Camp Lejeune Base Master Planner.
- (15) Public Works Specialist - MCB Camp Lejeune personnel with extensive knowledge about public works requirements on Base.
- (16) Software - ADP computer programs.
- (17) Software Specialist - Vendor personnel with extensive GIS software experience.
- (18) Soil Specialist - MCB Camp Lejeune personnel with extensive knowledge of the soils on the Base.
- (19) System Manager - MCB Camp Lejeune (AC/S Facilities) individual responsible for managing the prototype LUMS.
- (20) Training Specialist - MCB Camp Lejeune personnel with responsibility for coordinating training requirements with AC/S Facilities staff.
- (21) "V" Team - Vendor personnel who will work on the LUMS project. The team is anticipated to include the personnel indicated in TABLE 2, Implementation Teams.
- (22) Vendor - The vendor (Environmental Systems Research Institute) who has been awarded the Contract to supply MCB Camp Lejeune with prototype LUMS equipment, software, and services (Contractor).

- (23) Water Quality Specialist - MCB Camp Lejeune personnel with extensive knowledge about water quality on the Base.
- (24) Wildlife Specialist - MCB Camp Lejeune personnel with extensive knowledge about the fauna and flora on the Base including rare and endangered species locations.

b. Abbreviations and Acronyms

AC/S	-	Assistant Chief of Staff
ADP	-	Automated Data Processing
ADPE	-	Automated Data Processing Equipment
ANSI	-	American National Standards Institute
DAC	-	Days After Contract Award
DEM	-	Digital Elevation Model
DLG	-	Digital Line Graph
ESRI	-	Environmental Systems Research Institute
FD	-	Functional Description
FSSG	-	Force Service Support Group
GIS	-	Geographic Information System
HQMC	-	Headquarters Marine Corps
IP	-	Implementation Plan
ISMB	-	Information Systems Management Branch
LUMS	-	Land Use Management System
MARDIV	-	Marine Division
MC	-	Marine Corps
MCB	-	Marine Corps Base
MILCON	-	Military Construction
NA	-	Not Applicable
NC	-	North Carolina
NCEL	-	Naval Civil Engineering Laboratory
NREAD	-	Natural Resources and Environmental Affairs Division (of AC/S Facilities)
PEA	-	Preliminary Environmental Assessment
RASC	-	Regional Applications Service Center
RS	-	Requirements Statement
USGS	-	United States Geological Survey

2. DATA BASE DESCRIPTION

2.1 Introduction

This section describes a comprehensive geographic data base design based upon product and analysis requirements documented in reference (f). This section does not describe the data bases to be developed for use with the custom macros. These data bases will be developed separately. The data base discussed here will be used with the LUMS GIS package. Data required to support identified products have been reviewed, and an organizational structure has been developed for their capture and use with ARC/INFO. Source information for each layer is detailed in Appendix A.

The data base design has organized data required to support product and procedural requirements into twenty-one layers of cartographic data and one associated look-up table of expanded attribute codes into an ARC/INFO map library.

Before proceeding with a description of the design, it will be helpful to introduce some basic ARC/INFO concepts. Although these and many other concepts will be thoroughly covered during software training, an overview now is important for an understanding of the design.

2.1.1 Overview of ARC/INFO Concepts and Terminology

A map is a graphic display of spatially distributed geographic elements called map features. These are represented by graphic elements such as points (wells), lines (streams), and areas (soils). Characteristics of map features (i.e., their thematic data or attributes) are represented graphically. Special symbols, line widths and colors, and shading keyed to legends may all be used to define feature attributes.

The spatial relationship among features is represented graphically and perceived by the user through eye-brain functions. These relationships may be simple (e.g., determining that a stream is near a farm) or more complex (e.g., determining the distance crops must travel from farm to market).

In addition to map feature locations and their attributes, maps have characteristics including scale - the distance on a map equal to a comparable distance on the earth; projection - the system used to transform a curved surface to a plane; and a coordinate system - a system that provides the ability to describe feature locations based upon their distance and direction from other features.

ARC/INFO will be used to translate these map and attribute features into digital form for more efficient and effective analysis, display and management. In ARC/INFO, the digital analog of a map sheet is called a coverage. In a coverage, map features are stored as coverage features. Map feature attributes are described and stored separately in feature attribute

tables. Other map characteristics such as scale and projection are not explicitly stored.

Figure 1 illustrates several basic features of a coverage. These include:

arcs - represent line features and borders of area features. They can be topologically linked to their endpoints (nodes) or to areas (polygons) on each side of them.

nodes - represent arc endpoints and intersections of line features. A node may be topologically linked to arcs which meet at the node.

polygons - represent area features. They are defined topologically by the arcs which compose its borders and by one or more label points inside its border.

label points - represent point features and are also used to associate attributes with polygons.

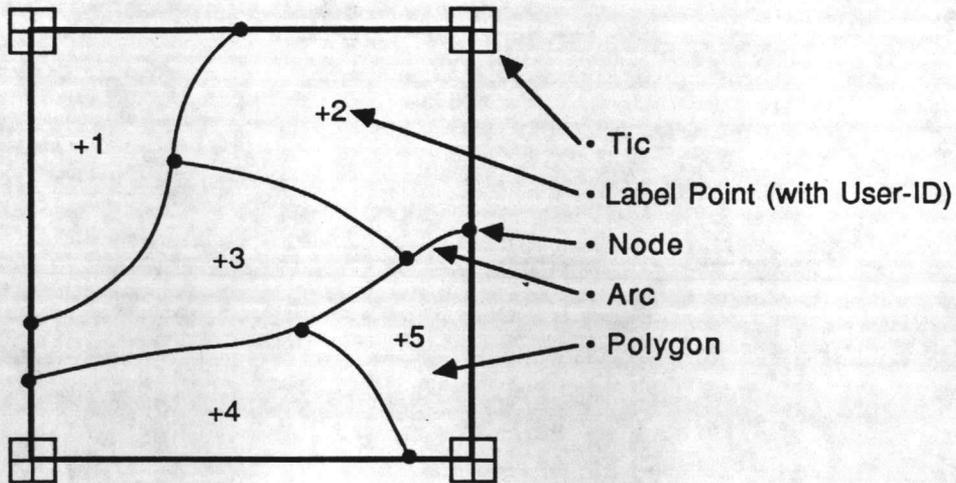
tics - are registration or geographic control points for a coverage. They are used to register all coverage features to a common coordinate system (e.g., UTM meters, Jamaican state plane).

Other coverage features will be identified during software training. Attributes of coverage features are stored in feature attribute tables. Feature attribute tables may be developed for arcs (AAT - arc attribute table), label points (PAT - point attribute table), and polygons (PAT - polygon attribute tables). Rows of the tables are called records, and columns called items. There is one record for each coverage feature. An example polygon attribute table (PAT) is included in Figure 1.

In the name "ARC/INFO," "ARC" refers to the topological data structures used to define feature locations, and "INFO" refers to the tabular data structures used to define feature attributes. "ARC/INFO" refers to the composite data model and associated processes. For example, an arc can be considered a boundary between two polygons or part of a path which connects two other arcs. Topological structures allow features such as polygons to be stored by their topological relationships rather than as a series of coordinates.

In ARC/INFO, coordinates are explicitly stored for arcs and label points. Polygon nodes can be defined topologically in terms of arcs and label points (see Figure 2). Polygons are defined by the arcs that make up their border and label points inside of them. Nodes are defined by arc endpoints or the set of arcs which meet at each node. Once polygons and nodes are defined topologically, they may also be used to define their relationship to arcs and label points in topological form (see Figure 2).

Figure 1
Example ARC/INFO Coverage

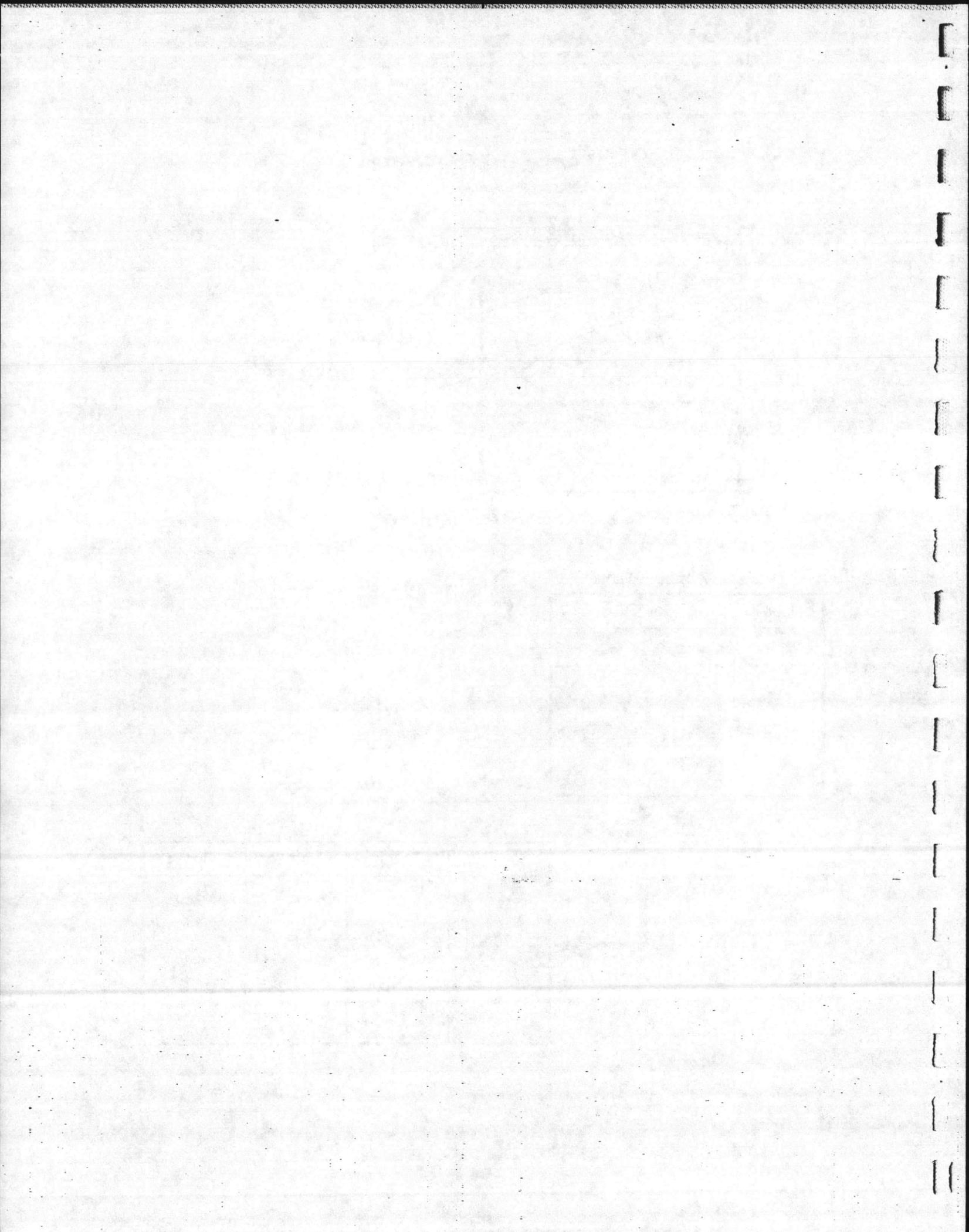


Polygon Attribute Table

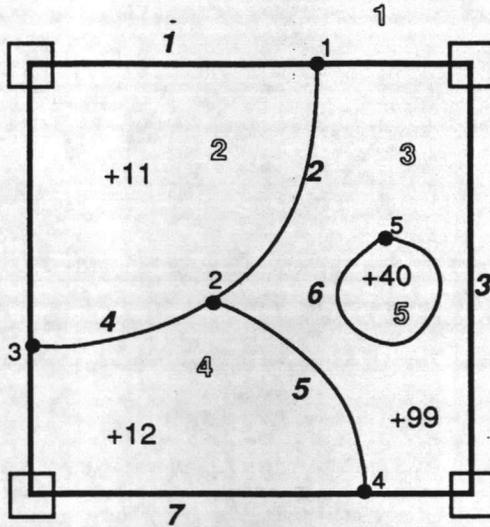
User-ID	Soil Type
1	4
2	77E
3	29A

Soil Type Look-Up Table

Soil Type	Texture	Drainage	Depth
4	01	1	24
29A	03	4	12
77E	12	2	18



**Figure 2
Coverage Topology**



- Node
- 2 Node Internal Number
- 2 Arc Internal Number
- 2 Polygon Internal Number
- +12 Label Point User - ID

Polygon Topology

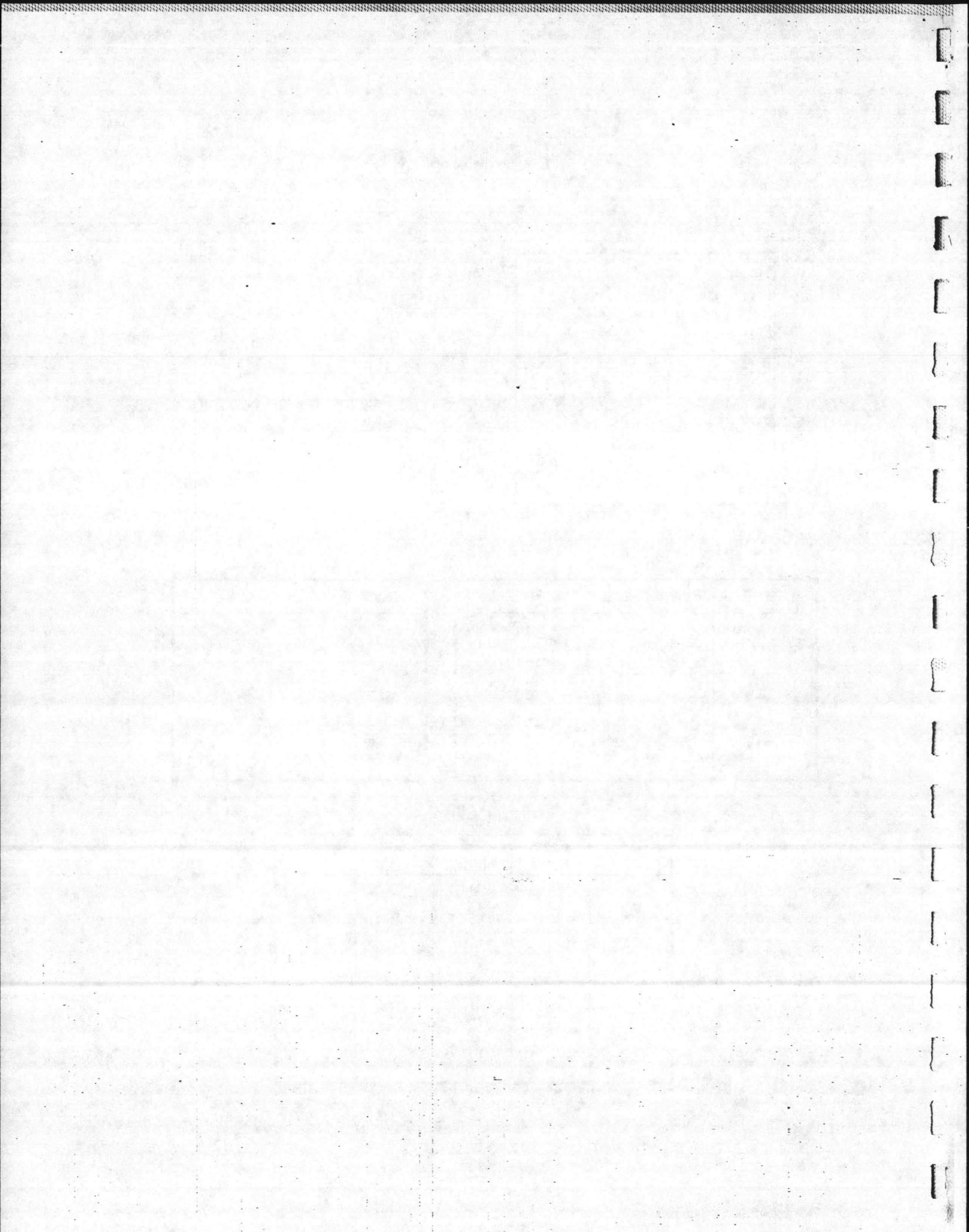
User-ID	Polygon #	Arc #
	1	1,3,7
11	2	1,2,4
99	3	3,5,2,0,6
12	4	5,7,4
40	5	6

Node Topology

Node #	Arc #
1	1,2,3
2	2,4,5
3	1,4,7
4	3,5,7
5	6

Arc Topology

Arc #	From Node	To Node	Left Poly	Right Poly
1	1	3	2	1
2	2	1	2	3
3	1	4	1	3
4	2	3	4	2
5	2	4	3	4
6	5	5	3	5
7	3	4	4	1



2.1.2 Geographic Data Base Design

The design of a geographic data base differs from the classical tabular data base design process because it involves both tabular and spatial data considerations. All the interrelationships between a wide range of geographic information had to be considered in the development of the MCB Camp Lejeune data base design presented here. In addition, how these data are to be used to support a variety of applications can impact the design.

There were two phases in development of the LUMS data base design including manuscript design and automated data base design. The first phase involved evaluating all the data and laying out a schema and procedures for integrating all the data to a common geographic base. This process results in related data (i.e., those sharing a high incidence of common boundaries) being manually remapped to a common "manuscript map." Aerial photointerpretation is used to support the integration process. For the second phase, following automation of the manuscript maps, data are separated out to cartographic "layers" and associated files and structured to support efficient application.

The geographic coverage for the initial Camp Lejeune LUMS data base includes portions of eight United States Geological Survey (USGS) 1:24,000 scale topographic quadrangle map sheets. Six of the sheets cover the base proper and two cover the proposed expansion area. All the selected data variables are being mapped for the base area proper. Within a 1/4 mile buffer surrounding the base only wetlands and existing land use are being mapped. Within the expansion area the data being mapped include land use, soils, and wetlands (as available). Exceptions to the above include impact areas, river sectors, and controlled airspace which extend off base into the then river and ocean areas and a few landing zones, and control points which do the same. The geographic study area and its sub-components are illustrated in Figures 3a, 3b, and 3c. Contain data in an organized way in order to support actions such as browsing to find available information, extracting information from the library, and inserting new information into it.

In an ARC/INFO map library, coverages are simultaneously organized in two dimensions -- by subject or content into layers and by location into tiles (see Figure 4). Pending further evaluation, the Camp Lejeune data base may require only one tile. Each layer in a map library, once subdivided into tiles, consists of a set of individual units called map sections. Each map section is a coverage and acts as the unit for storing data in a map library.

Functions which operate on a map library include creating a map library and inserting data into it, reporting on and managing the data in it, and extracting data from it for various user applications.

The material presented here addresses both phases of the design effort. The manuscript schema and associated classifications provide the paperwork for

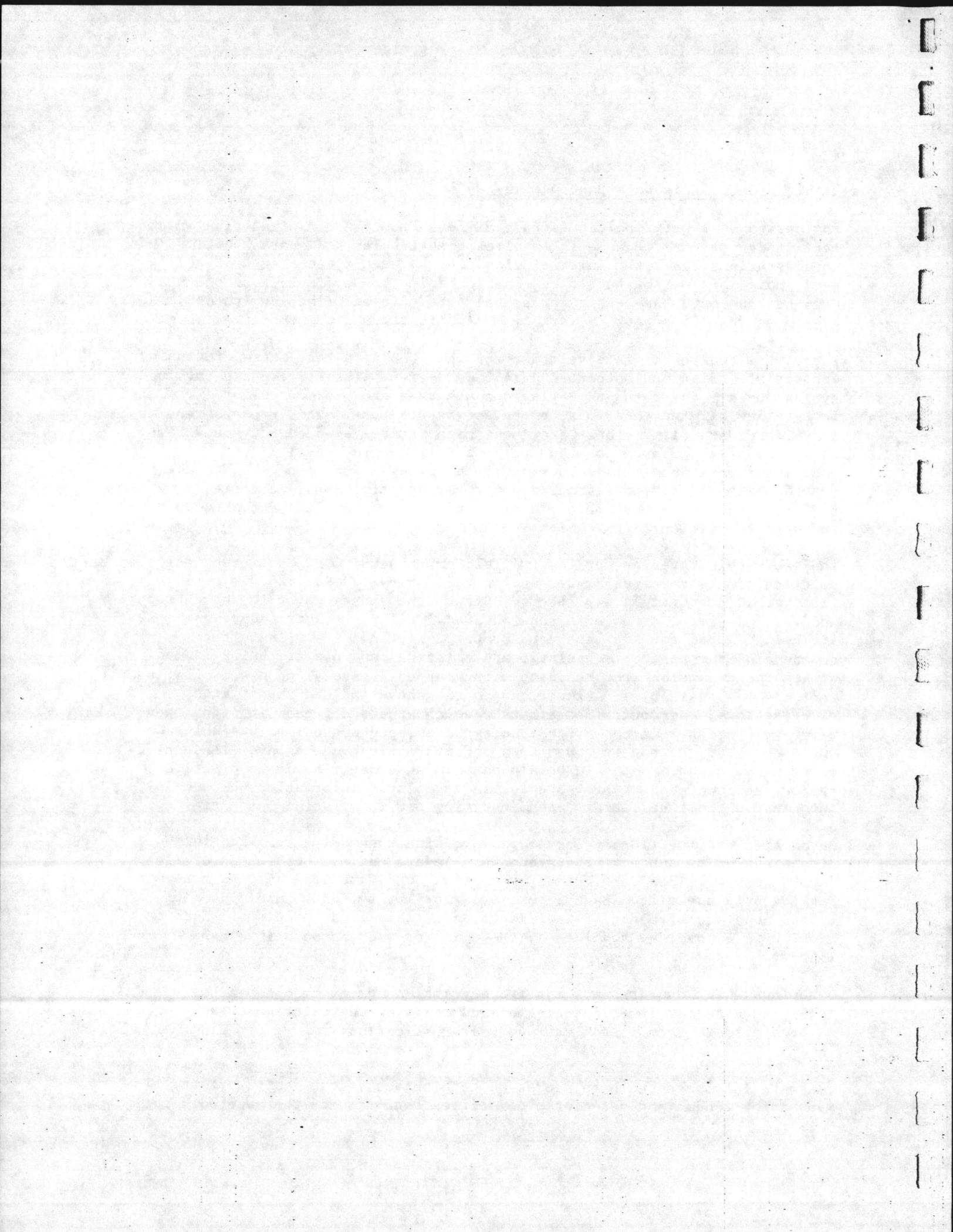
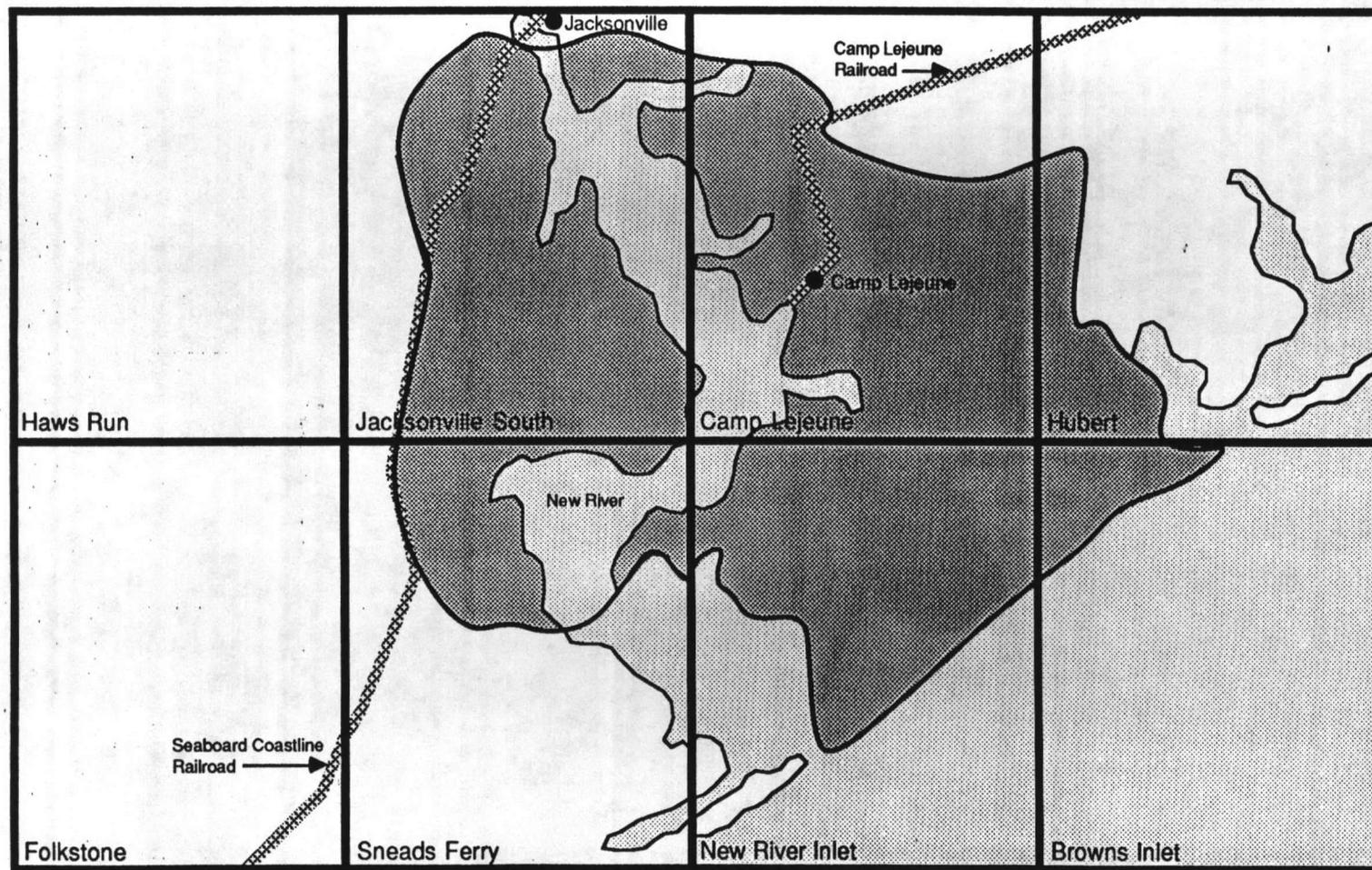


Figure 3a

**MCB Camp Lejeune LUMS
Database Geographic Coverage
(Basemap Quadrangles)**



▨ MCB Boundary
▬ Stream/Water

xxxxxx Railroad
▬ Quadrangle Boundary

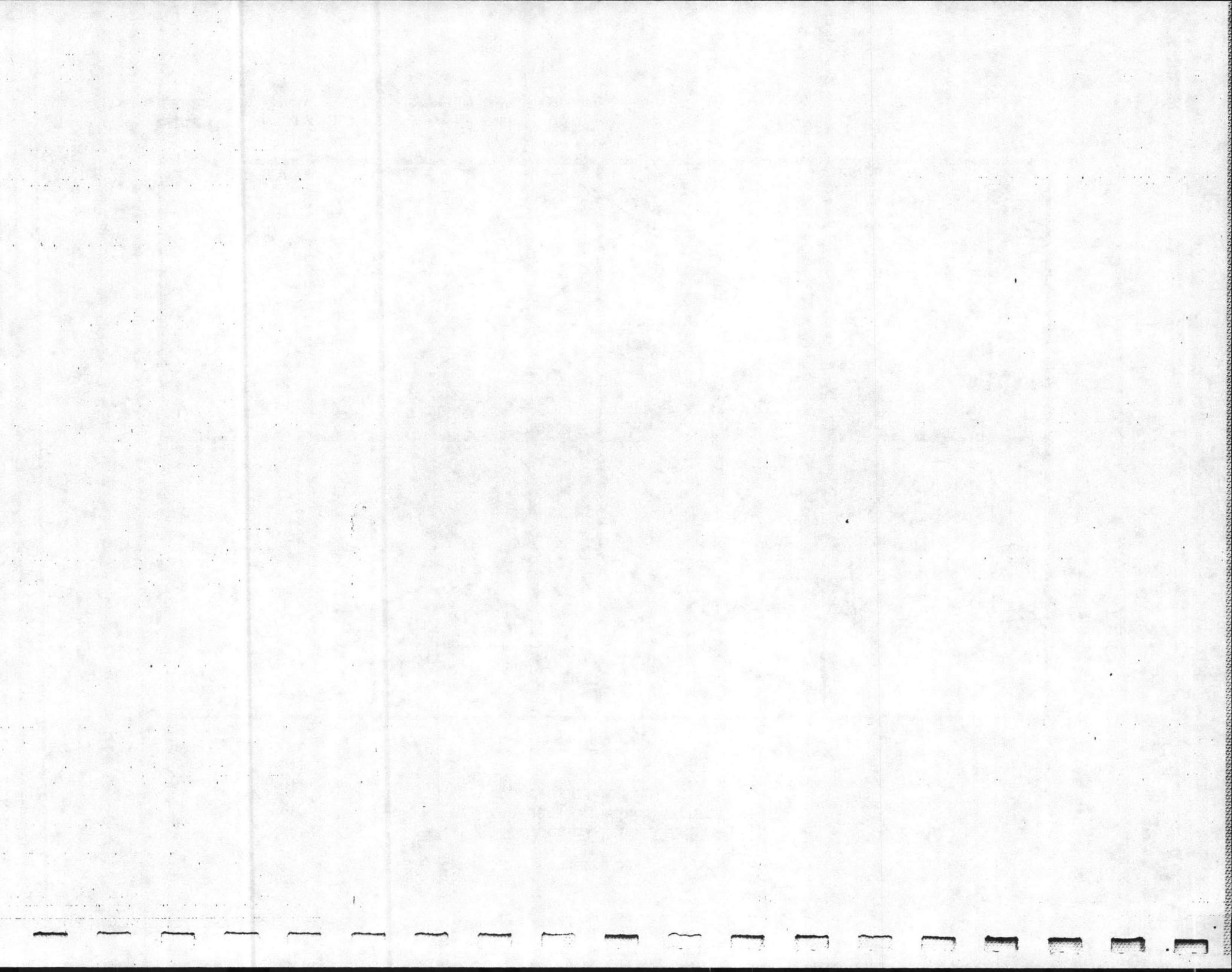
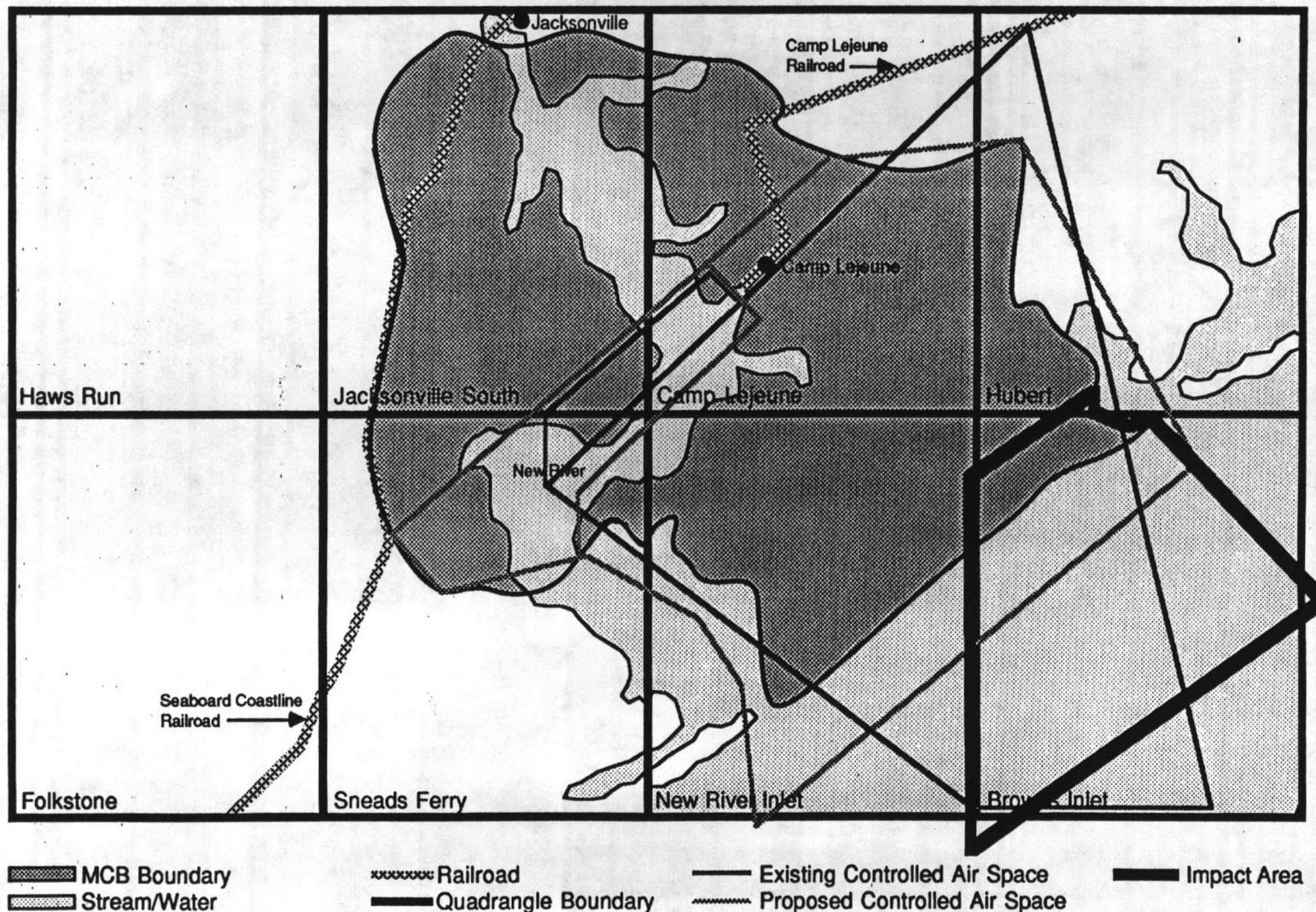


Figure 3c

**MCB Camp Lejeune LUMS
Database Geographic Coverage
(Controlled Airspace, Impact Area)**



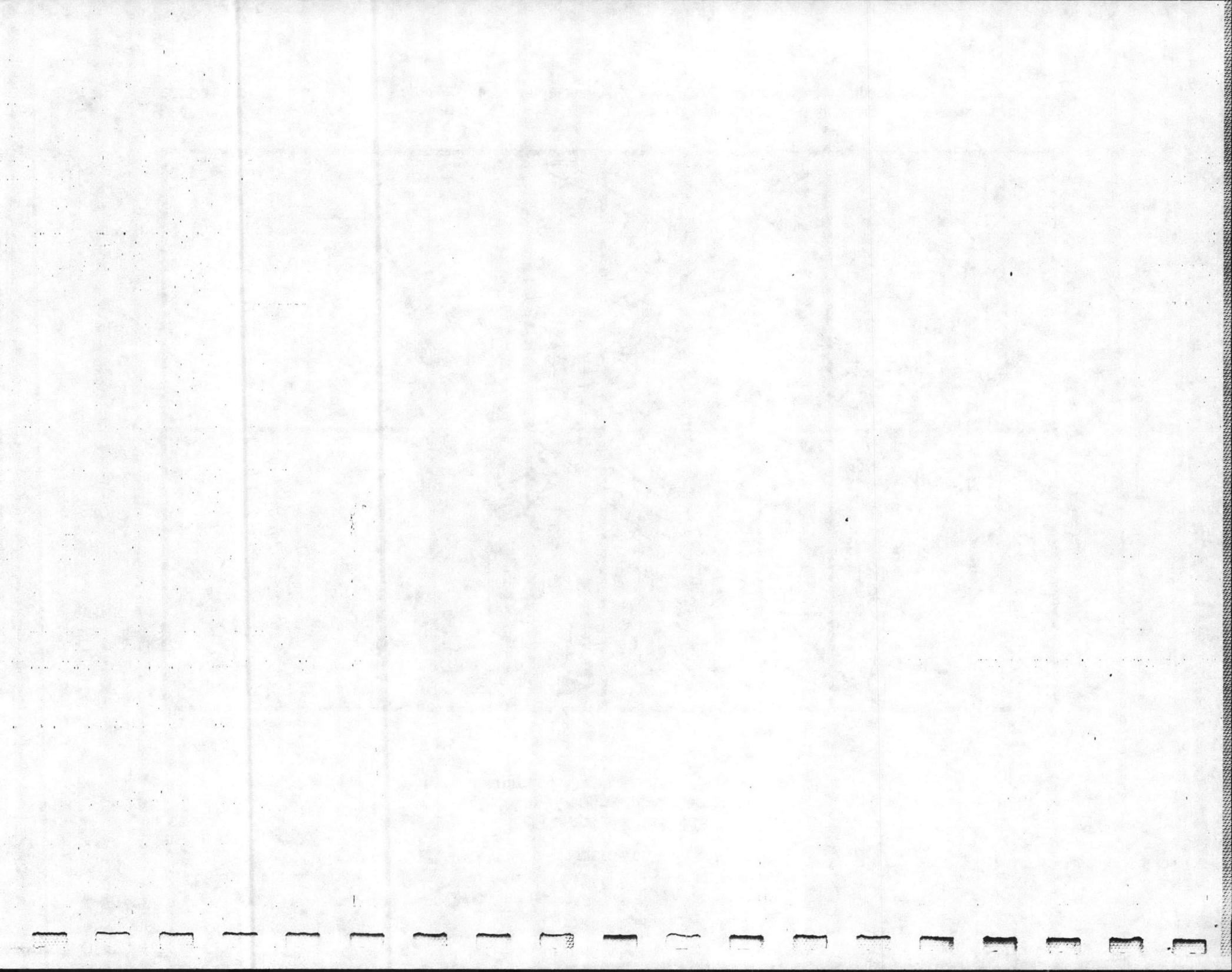
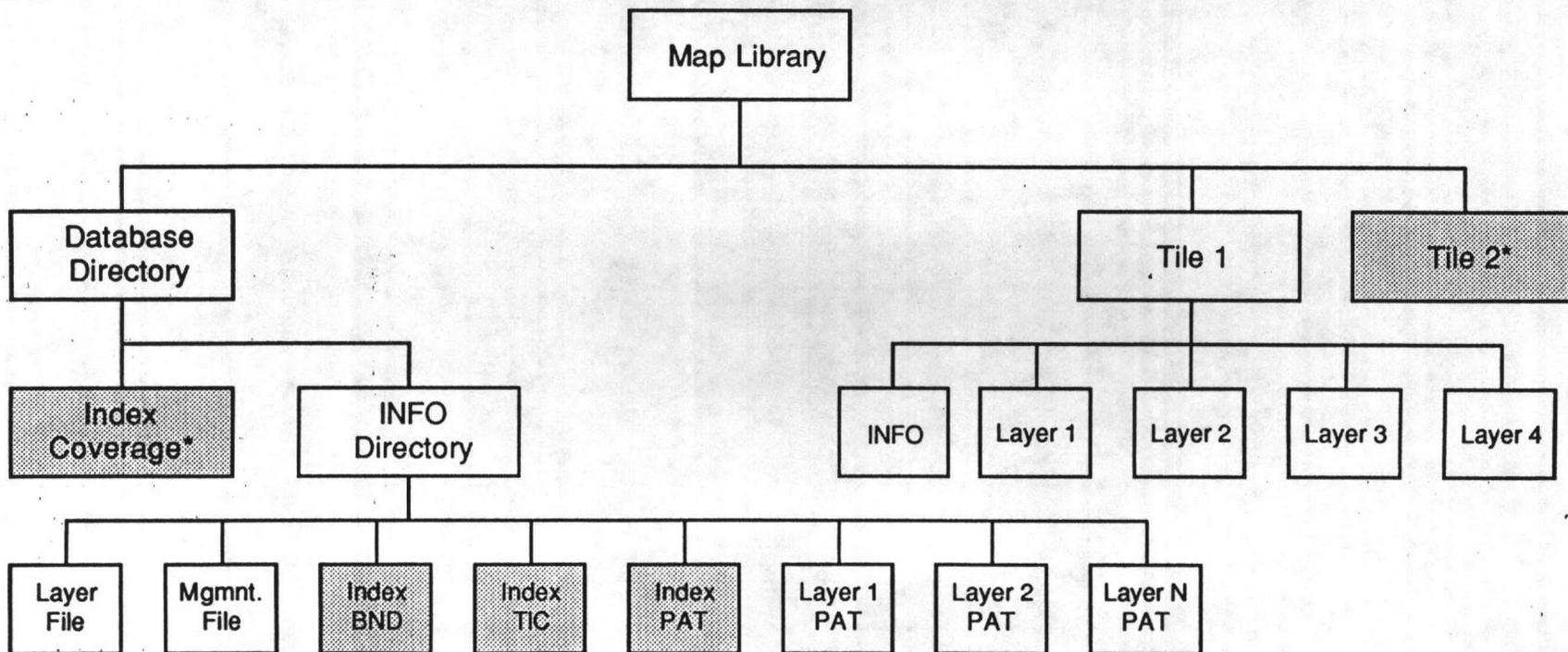
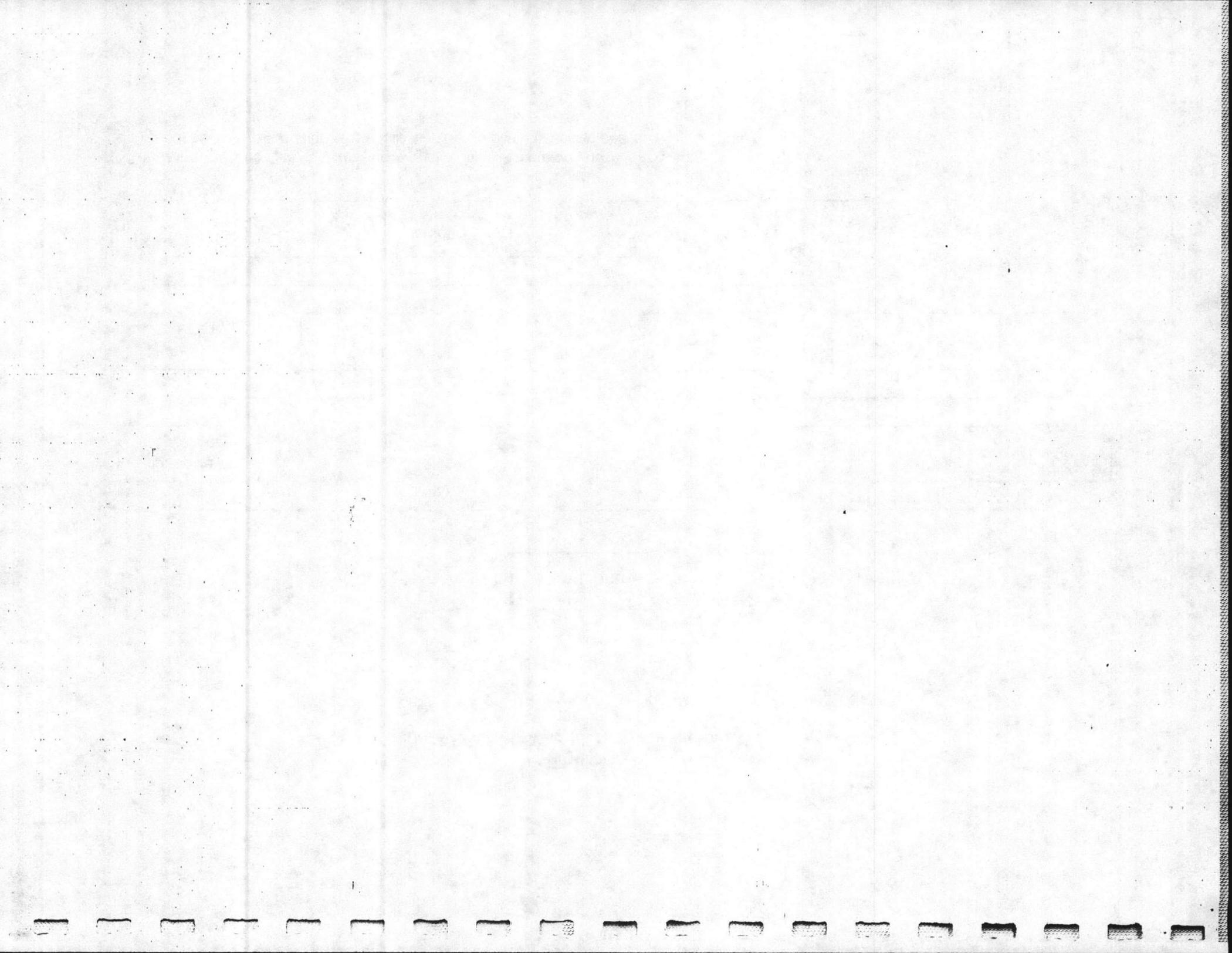


Figure 4
Initial ARC/INFO Map Library Layout for LUMS



2-9

* The Camp Lejeune data base may only require one tile, therefore, no index coverage will be required. This will be determined during the application macro physical design phase.



remapping and integration of the Government provided data. An initial layout for the automated data base is also provided, although this will more likely undergo later modification to facilitate macro development and other applications as these become better defined.

2.2 Organization of the Data Base

While coverages provide a consistent structure for storing geographic data, they contain only one set of features for one area. That is, a coverage will have the soil polygons for one map sheet. Therefore, ARC/INFO contains the LIBRARIAN subsystem which allows collections of coverages to be organized into a map library. A summary of the initial manuscript layout is shown in Table 1. A discussion of the INFO relational data base model and physical data base files is provided in Section 3.2.

2.3 Data Rectification and Integration

2.3.1 Rectification

Figure 5 shows the variety of data sources for the manuscripts. The sources are in different formats, which may make rectification necessary.

Because the various collateral items are often originally prepared using a variety of cartographic techniques and mapping formats, it is necessary to rectify each data item to a common topographic basemap. This rectification assures that each data item is shown in its proper location and configuration according to the new projection. This is accomplished by carefully re-registering the data map with the basemap and available aerial imagery and comparing observable points or lines common to both, such as waterbodies, roads, buildings, ridges, or stream course lines, etc. The rectified information is drafted onto a pin registered mylar overlay of the basemap. The resulting overlay displays the scale, format, and projection of the basemap and is suitable for use in subsequent data integration steps. Common maps requiring rectification are soil and vegetation maps originally drafted on non-planimetric photos.

2.3.2 Integration

Another technical procedure involved in a standard inventory project is the integration of multiple thematic maps onto a single sheet. This process is most commonly used in the integration of thematic natural resource polygon maps such as soils, vegetation, slope, landform and geology (Figure 6).

This technique has been called integrated mapping, terrain unit mapping and integrated terrain unit mapping or ITUM. Table 1 shows the ITUM variables used in this project.

As mentioned, a composite of each of the previously prepared parameter maps or thematic map compilation sheets onto a single map sheet results in the

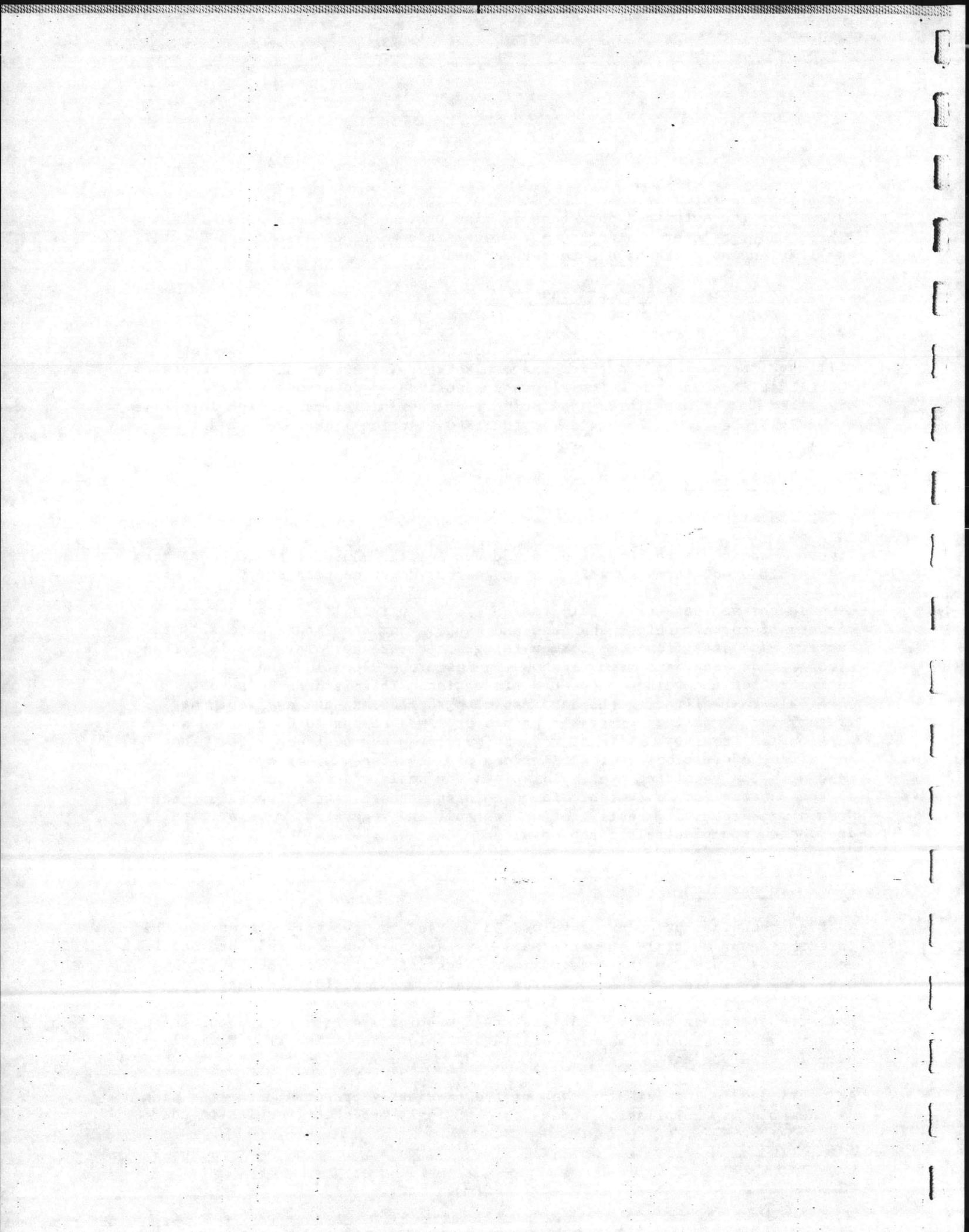


Table 1
Initial Manuscript Layout

<u>Manuscript Name</u>	<u>Form</u>	<u>Variables</u>
1. Integrated Terrain Unit Map (ITUM)	Polygon	Soils Timber Compartments Land Use Wetlands Training Areas Wildlife Units Wildlife Management Facilities Controlled/Prescribed Burn Areas Natural Areas Tactical Landing Zones
2. Flood Prone Areas	Polygon	Flood Prone Areas
3. Range Fans	Polygon	Range Fans
4. Historic/Archaeological Site	Polygons and Points	Historic/Archaeological Sites
5. NACIP Sites	Polygons	NACIP Sites
6. Controlled Air Space	Polygon	Controlled Air Space
7. Point Map	Points	Wildlife Opening Osprey Nest Wood Duck Box 1987 Alligator Sitings Managed Fish Ponds Loggerhead, Sea Turtle Nest Sites 1987 Red Cockaded Woodpecker Habitat Violations Red Cockaded Woodpecker Trees Landing Zones Shellfish Sampling Site Initial/Control Point Gun Position Fire Tower
8. River Sectors	Polygon	River Sectors

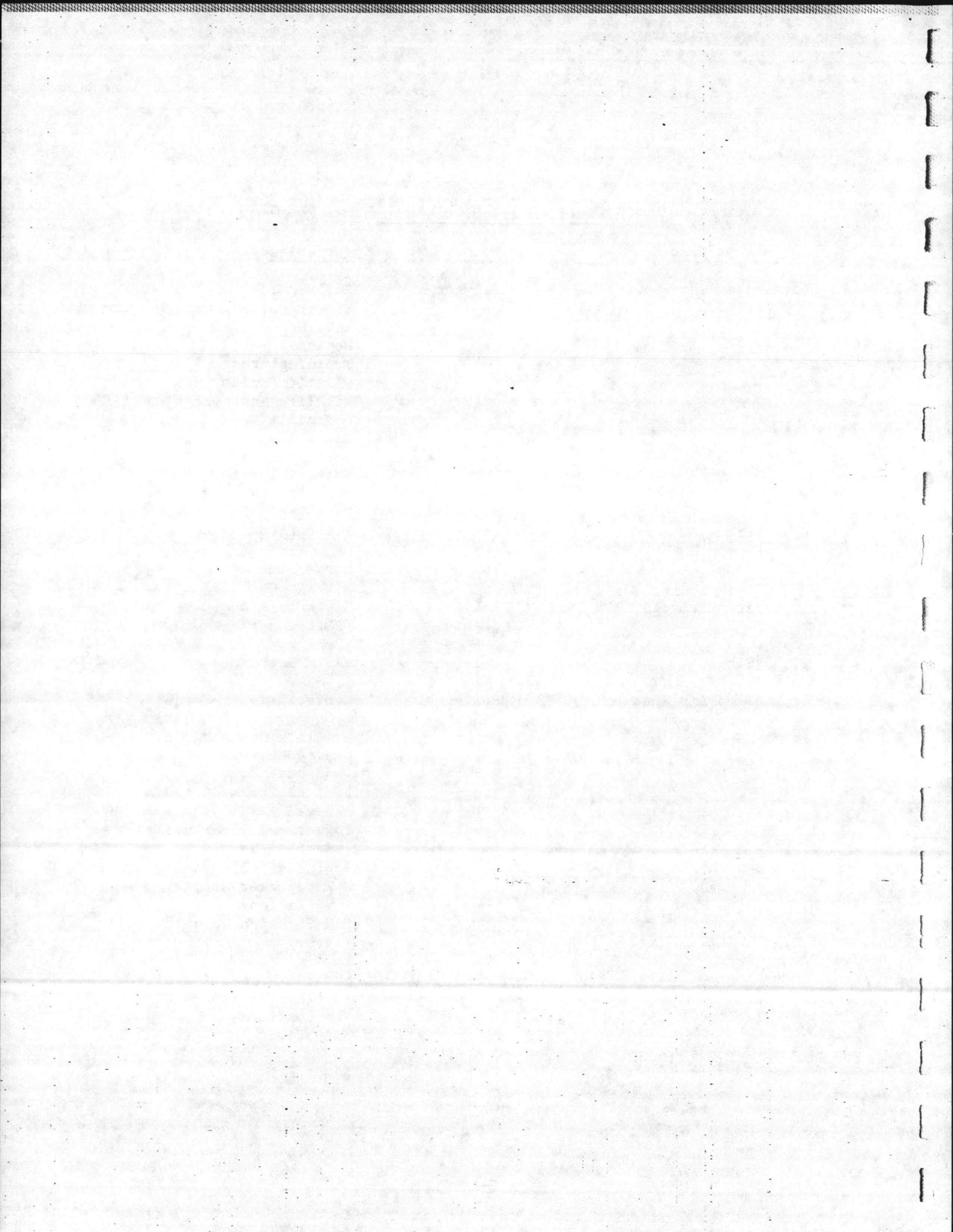


Table 1 (Continued)

<u>Manuscript Name</u>	<u>Form</u>	<u>Variables</u>
9. Impact Areas	Polygon	Impact Areas
10. Surface Water Wetlands	Polygon	Surface Water Wetlands
11. Shrimp Nursery Water	Polygon	Shrimp Nursery Water
12. USFS CFI Plots	Point	USFS CFI Plots

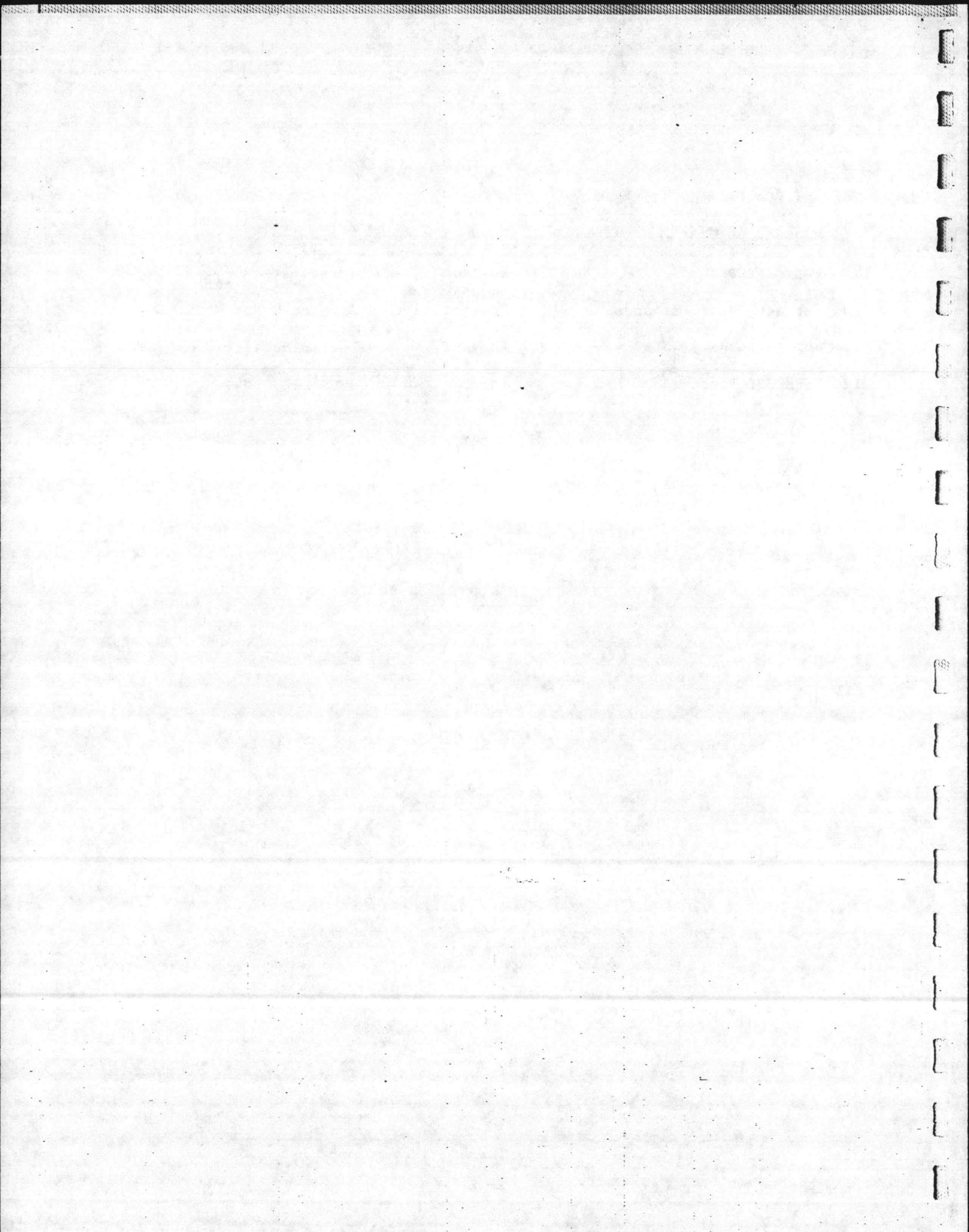


Figure 5
Primary Data Sources

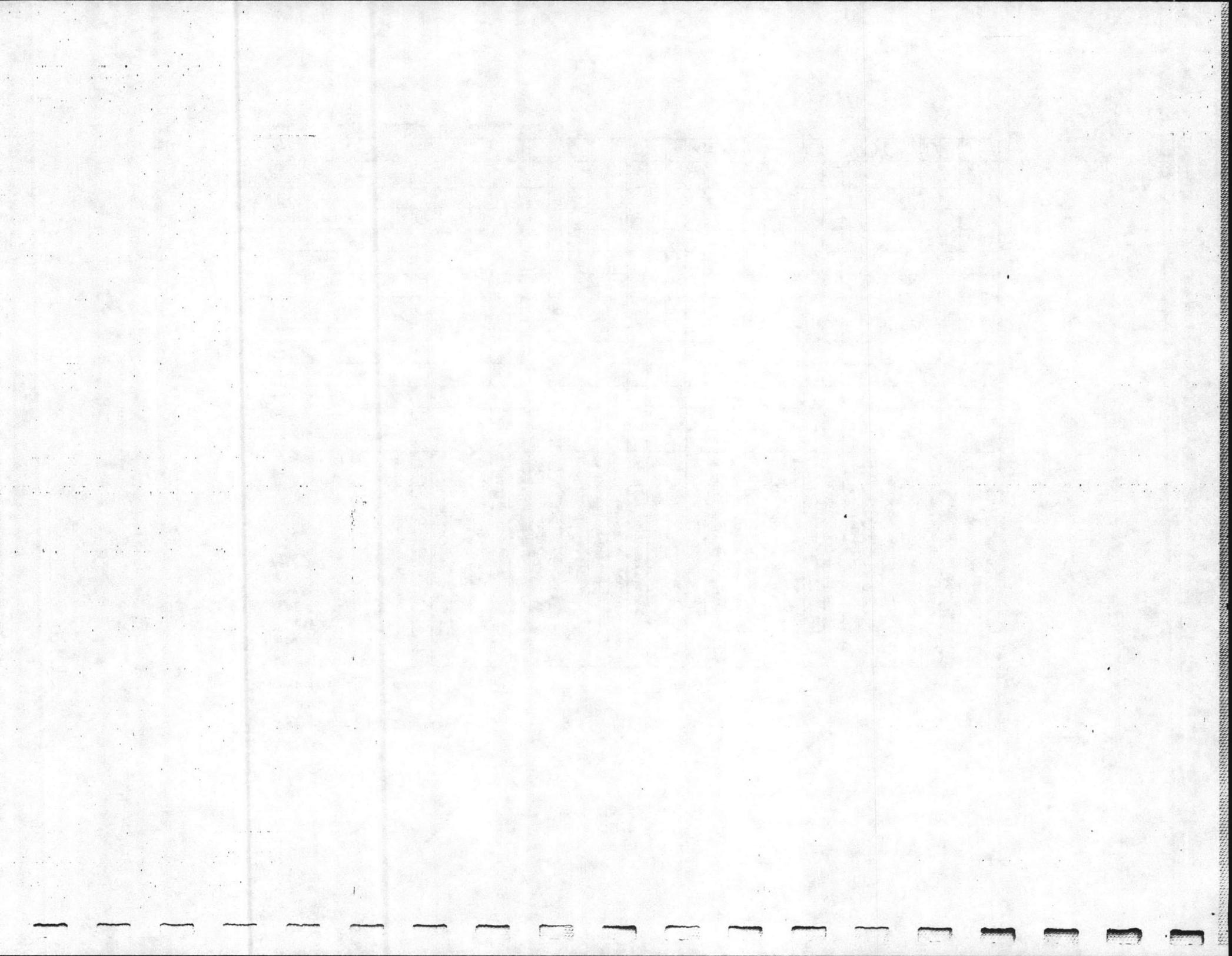
- Source Map
- Not Mapped*
- ⊗ Not Manuscripted (Existing File Conversion)
- Automatically Generated
- Reference Material Not Automated
- ⊗ Superseded by Updates
- Source and Reference Map

Maps

Manuscript	ID#**	Source Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	21	22-24	25	26	27	28-30	31-36	37	38	39-43	44	45				
1. Integrated Terrain Unit Map	○	1. USGS Topographic Maps	●	●	●	●	●	●	●	●												●					●												
2. Flood Prone Areas	○	2. SCS Soil Surveys											●																										
3. Range Fans		3. Timber Maps																	●																				
4. Historic / Archeologic Sites	○	4. Training Areas Maps													●																								
5. NACIP Sites	○	5. Wildlife Units Map																●																					
6. Controlled Airspace		6. Wetlands Maps																																					
7. Point Data	○	7. Existing Land Use Maps								●												●		●	●														
8. River Sectors	○	8. Landing Zones Maps																																					
9. Impact Areas	○	9, 10. Impact Areas Maps									●																												
10. Surface Water Wetlands	○	11. Flood Prone Areas Map																																					
11. Shrimp Nursery Water	○	12, 13. Historic/Archeolog. Sites Map														●																							
12. USFS CFI Plots		14. Shrimp Nursery Water Map																																					
13. Hypsography, Transportation, Hydrography		15. NACIP Sites Map																																					
14. Other		16, 17. Range Fans Maps																																					
		18. Woodpecker Habitat Map																																					
		19. Shellfish Sampling Sites Map																																					
		20. Natural Areas Maps																																					
		21. Gun Positions Map																																					
		21. Control Points Map																																					
		22-24. Controlled Air Space Maps																																					
		25. Crossing Pads Map																																					
		26. NRMUMP Map																																					
		27. Fire Towers Map																																					
		28-30. Roads Maps																																					
		31-36. Utilities Maps																																					
		37. Camp Lejeune Special Map																																					
		38. Forestry Mgmt. Cycle Map																																					
		39-43. Controlled/Prescribed Burn Maps																																					
		44. Aerial Photographs																																					
		45. NRMUMP Updated Wildlife Maps																																					

* Not available for inclusion in initial LUMS data base.

** See Appendix A.



**Figure 5
Primary Data Sources (cont'd.)**

- Source Map
- Not Mapped*
- ⊗ Not Manuscripted (Existing File Conversion)
- Automatically Generated
- Reference Material Not Automated
- ⊗ Superseded by Updates
- ▣ Source and Reference Map

	Reports											Files	
	1. SCS Soil Survey Report	2. Timber Stand Inventory Report	3. MCB Master Plan	4. Historic/Archaeological Site	5. Shellfish Sampling Site Locations	6. Sea Turtle Inventory	7. Survey Control Data	8. MCB Water Quality Stations	9. Onslow Beach Barriers	10. Compartment Prescriptions	11. Forestry Projections	1. USGS DLG Files	2. UTM Coordinates
Manuscript	ID#**	Source Name											
1. Integrated Terrain Unit Map			○										
2. Flood Prone Areas													
3. Range Fans													
4. Historic / Archeologic Sites				○									
5. NACIP Sites													
6. Controlled Airspace													
7. Point Data					○								
8. River Sectors													
9. Impact Areas													
10. Surface Water Wetlands												⊗	
11. Shrimp Nursery Water													
12. USFS CFI Plots													■
13. Hypsography, Transportation, Hydrography												⊗	
14. Other		○	○			○	□	□	□	□	□		

* Not available for inclusion in initial LUMS data base.
 ** See Appendix A.

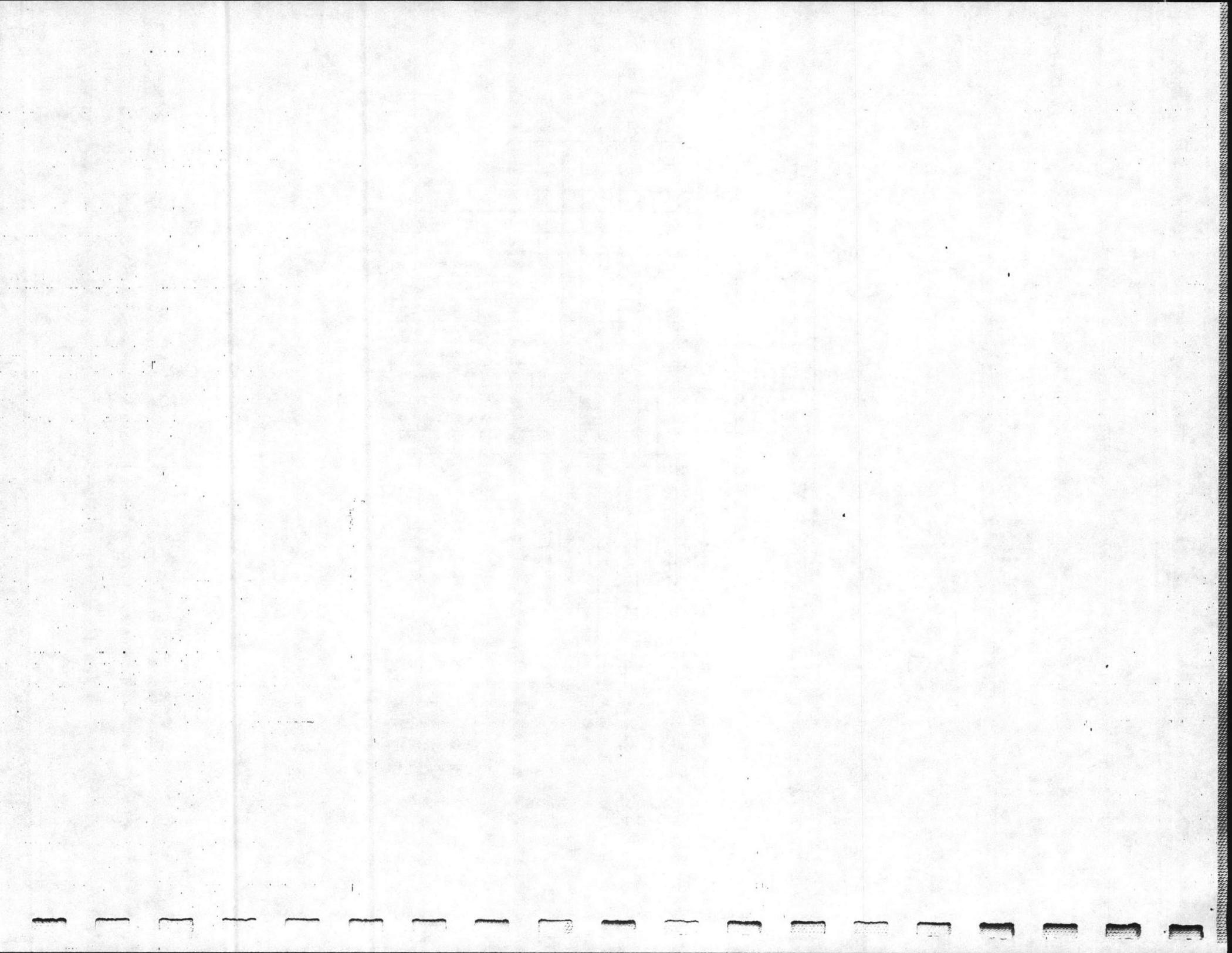
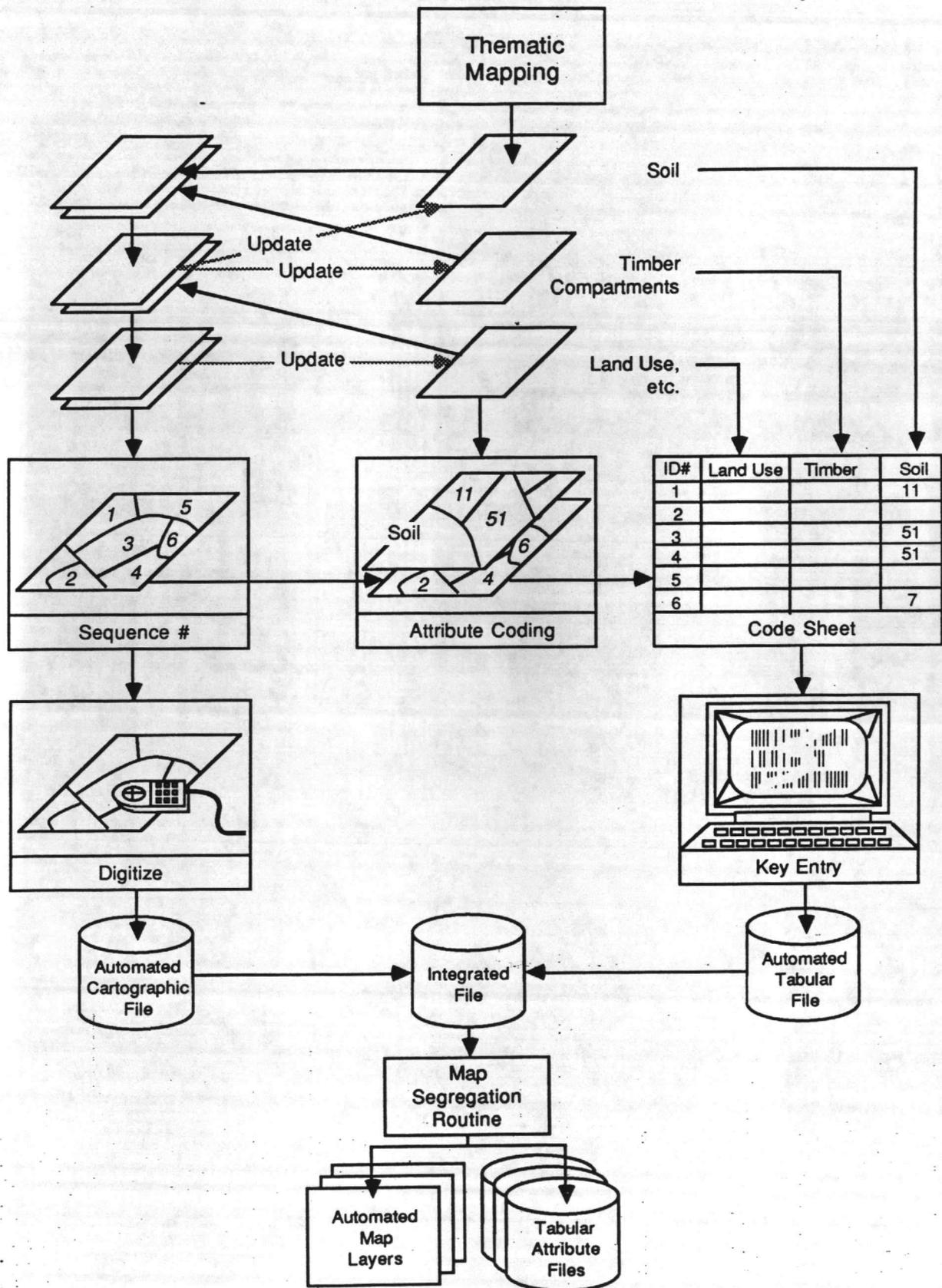
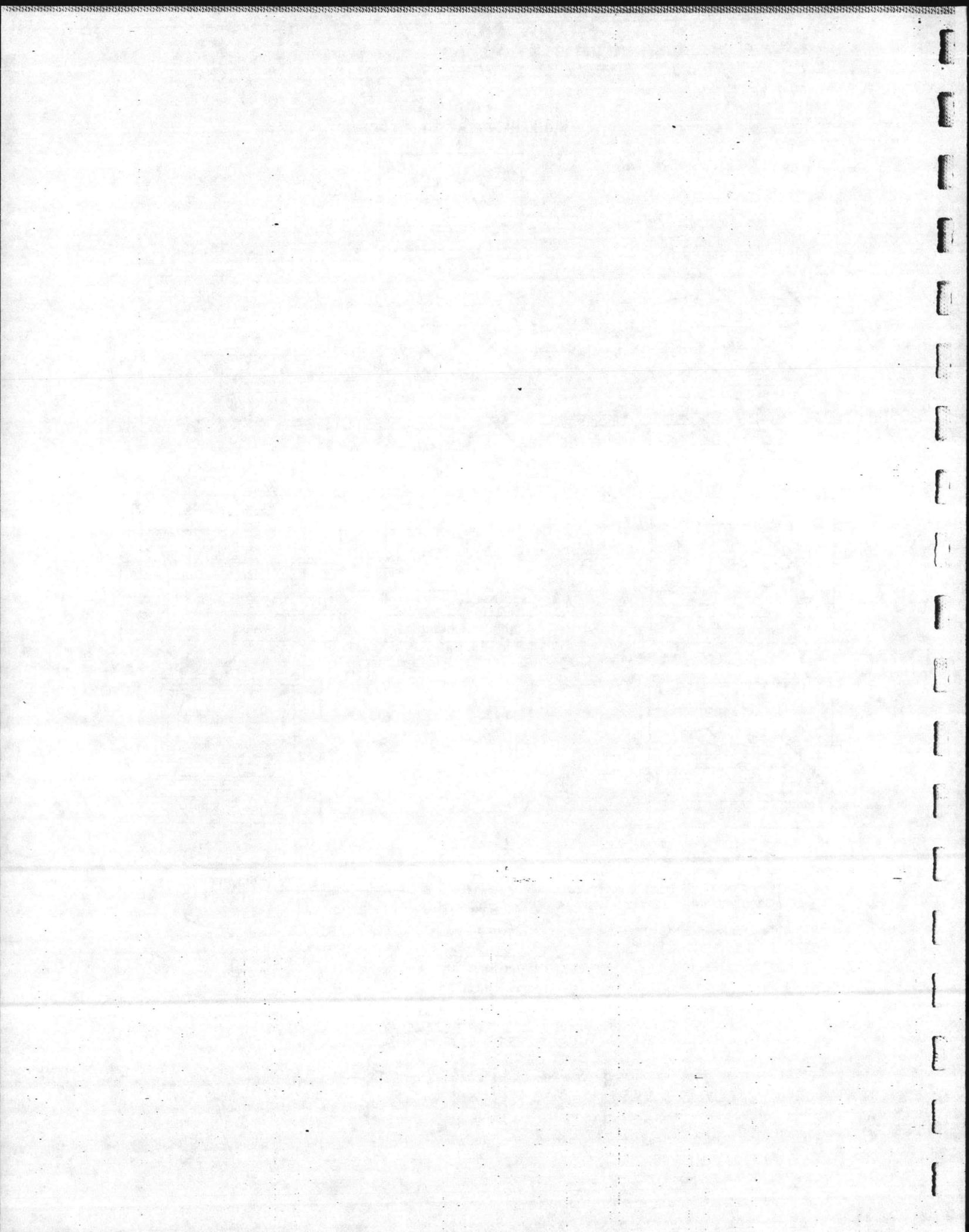


Figure 6
Map Integration Process





creation of numerous splinter polygons which may be meaningless, confusing, and lead to substantial data management problems if automated. The mechanical process of integration involves the manual merging of data shown on the thematic map compilation sheets by comparison to remote sensor images, topographic basemaps and each other to yield a single manuscript on which no unnecessary or confusing polygons are drawn. The attribute values on the thematic map compilation sheets are associated with the spatial units (polygons) on the integrated map through the use of sequential coding lists.

Integration begins by registering the two most reliable yet complex thematic map compilation sheets to the basemap at one time. A new mylar overlay is placed on top of the set which becomes an attribute code sheet, the integrated form of the compilation sheet. At the end of integration, each thematic map compilation sheet has a corresponding code sheet.

Integration involves making judgments about the correlation among variables, variable reliability and registration, deciding which lines will be used to form the final terrain unit polygons. The integrators match one compilation sheet with the others, register and compare them to the images and the basemap, and decide where to draw the polygon boundaries on the attribute code sheet. For example, a geologic unit may be identified as an old terrace deposit, a corresponding soil type may be described as forming on old terrace deposits. Therefore, the units should have coincident boundaries. Slight adjustments to the lines drawn around the unit can be made using imagery and basemaps as guides.

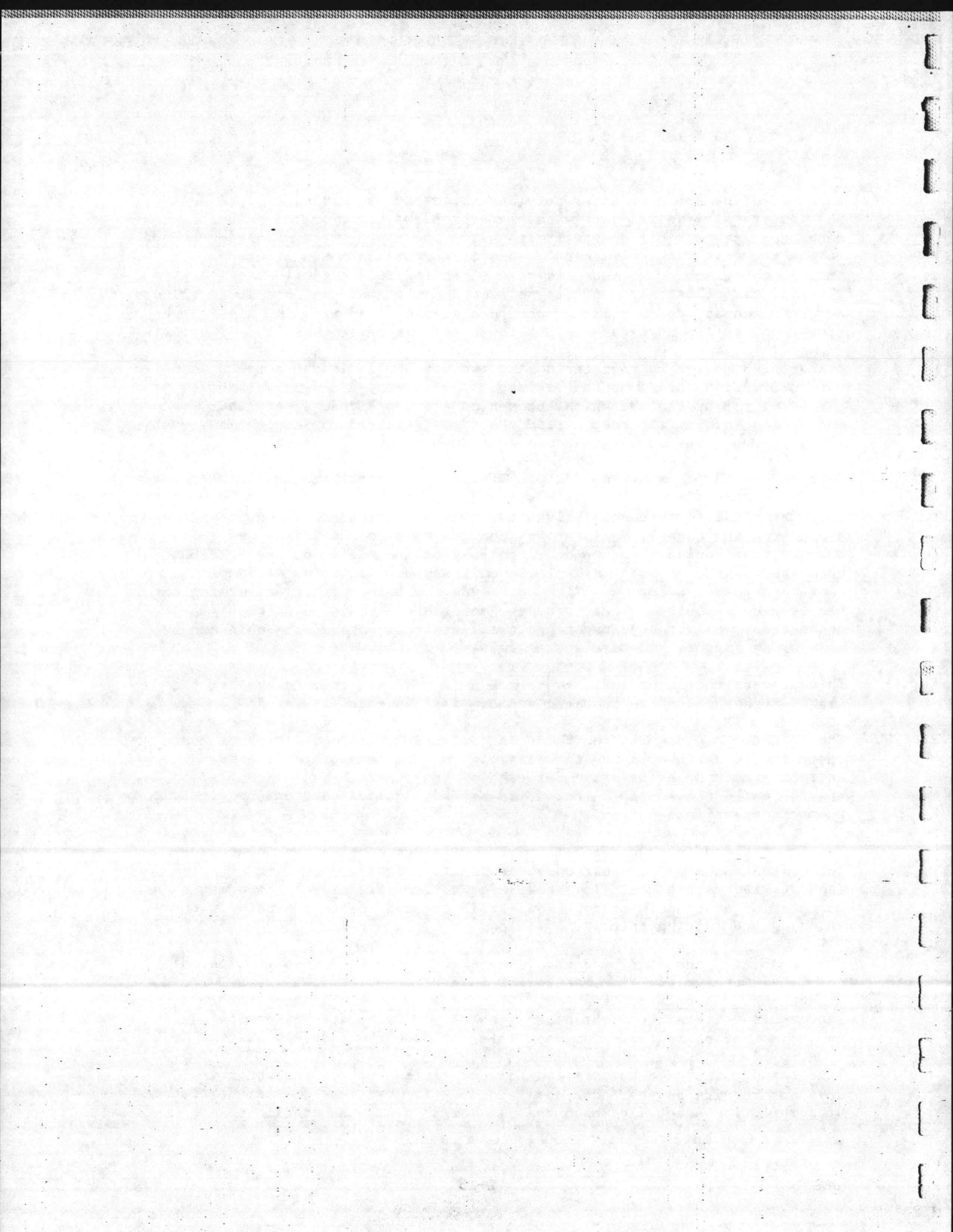
This process continues until every map unit had been checked against the images, basemap and the thematic map compilation sheet.

The thematic map compilation sheet is replaced by the new attribute code sheet in the set overlaying the basemap. By the same process, a new attribute code sheet is drawn for each of the other thematic compilation sheets, using those polygon boundaries already decided on from the previous thematic sheet integration.

The process continues until all the thematic map compilation sheets are integrated and new attribute code sheets are created. Each attribute code sheet is checked for correct transfer of information and correlation among data items. The attribute code sheets are used in the encoding and editing step which follows.

When complete, the attribute code sheets are ready for consolidation onto the final manuscript. The manuscript is drafted by compositing all the code sheets onto a single mylar sheet, one at a time. Each polygon formed represents a terrain unit or other area of the landscape having its own unique set of characteristics separating it from the adjacent areas.

Linear and point data integration follows similar procedures but normally does not require new variable code sheets. In most cases, straight transfer of compilation sheet data onto the manuscript yields no conflicts.



3. DATA DEFINITIONS

3.1 General Description of Layers

This section includes a general description of each automated data layer with comments specific to the development of a layer where pertinent. Table 3 shows the relationship between data sources, manuscripts, and data layers. Further detail on data sources is included in Appendix A.

3.1.1 Integrated Terrain Unit

The ITUM variables are mapped on one manuscript because of the high coincidence of feature boundaries. The diverse source maps are of different formats and were used in the process of integration (described in Section 2.3.2) to produce one manuscript. Once automated, the ITUM will be separated out to its various thematic layers. An expansion table of soil attributes will be associated to the automated soils coverage.

3.1.2 Flood Prone Areas

This manuscript contains documented flood prone areas. The data were developed from USGS topographic maps (1:24,000) and a USGS/HUD-FIA flood prone area map, which in turn was compiled from 7.5-minute USGS topographic maps. The mapped areas include overflow areas adjacent to documented areas, automated in one data layer.

3.1.3 Range Fans

This manuscript contains artillery/firearm range data. It was mapped from a special topographic map (1:50,000 scale) of Camp Lejeune and a mylar overlay to that map. This manuscript will be subdivided into four sheets to reduce overlapping of fan-shaped polygons caused by mapping adjacent range areas which could cause confusion during digitizing. Once automated these will be combined to a single layer.

3.1.4 Historical/Archaeological Sites

This manuscript contains North Carolina State documented historic and archaeological site locations in the study area. The data were mapped to USGS topographic maps (1:24,000 scale), a historic sites map (1:24,000) and an archaeological sites map (1:24,000). The manuscript will be automated in three layers containing polygon, point, and line data.

3.1.5 NACIP Sites

The manuscript contains data on sites identified in the Naval Assessment and Control of Installation Pollutants (NACIP) Program. The source map was a 1:24,000 scale map of NACIP sites. The data will be automated in one layer.

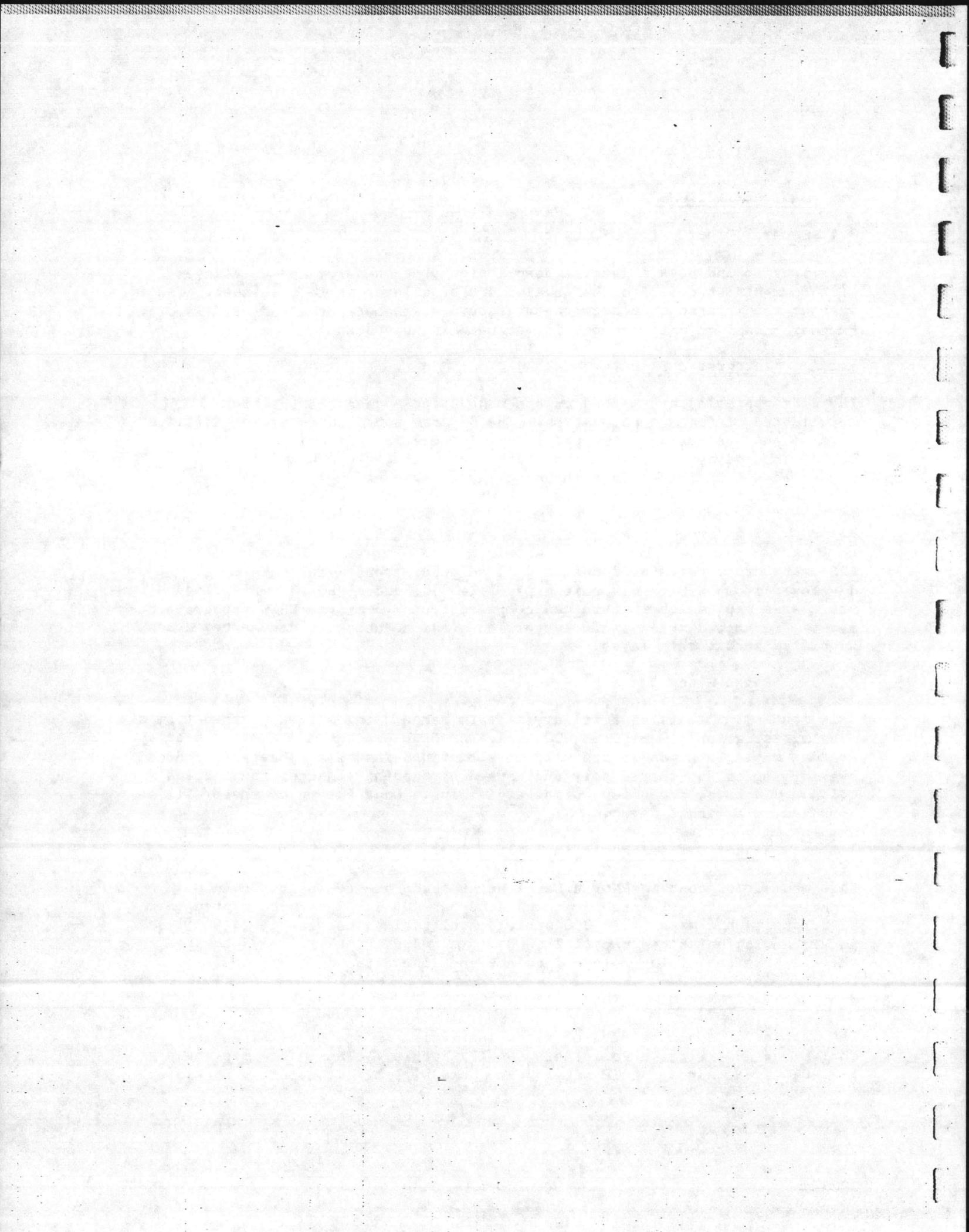


TABLE 3. SOURCES OF MANUSCRIPTS USED IN DATA LAYER DEVELOPMENT

<u>Source Maps</u>		<u>Manuscript</u>	<u>Layer</u>
<u>ID No.</u>	<u>Name</u>		
		Integrated Terrain Unit	
2	SCS Soil Surveys		Soils
3	Timber Maps		Timber Compartments
4	Training Areas Map		Training Areas
5	Wildlife Unit Maps		Wildlife Units
45	NRMUMP Updated Wildlife Maps		Wildlife Management
6	Wetlands Maps		Wetlands Facilities
7	Existing Land Use Maps		Land Use
8	Landing Zones Map		Tactical Landing Zone
20	Natural Areas Maps		Natural Areas
26	NRMUMP Map		
37	Camp Lejeune Special Map		
39-43	Controlled/Prescribed Burn Maps		Controlled/Prescribed Burns
		Flood Prone Areas	
11	Flood Prone Areas Map		Flood Prone Areas
16,17	Range Fans Maps	Range Fans Designation 1 Range Fans Designation 2 Range Fans Designation 3 Range Fans Designation 4	Range Fans
37	Camp Lejeune Special Map		
		Historic/Archaeologic Sites	
12,13	Historic/Archaeologic Sites Maps		Historic/Archaeologic Sites (Polygon) Historic/Archaeologic Sites (Point)
15	NACIP Sites Map	NACIP Sites	NACIP Sites
22,24	Controlled Air Space Maps	Controlled Air Space	Controlled Air Space
37	Camp Lejeune Special Map		
		Point Data	
8	Landing Zones Map		Point Type
19	Shellfish Sampling Sites Map		
21	Gun Positions Map		

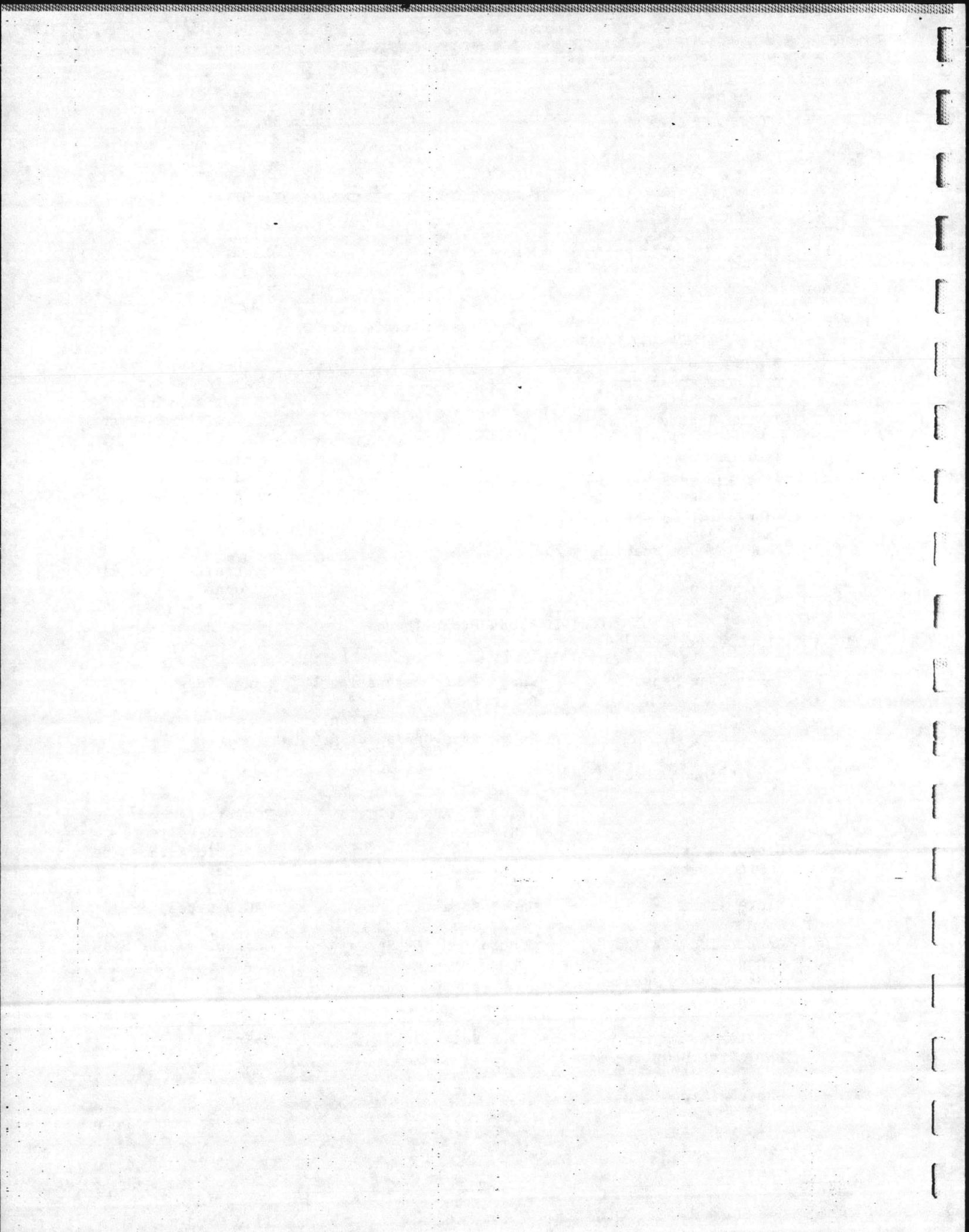
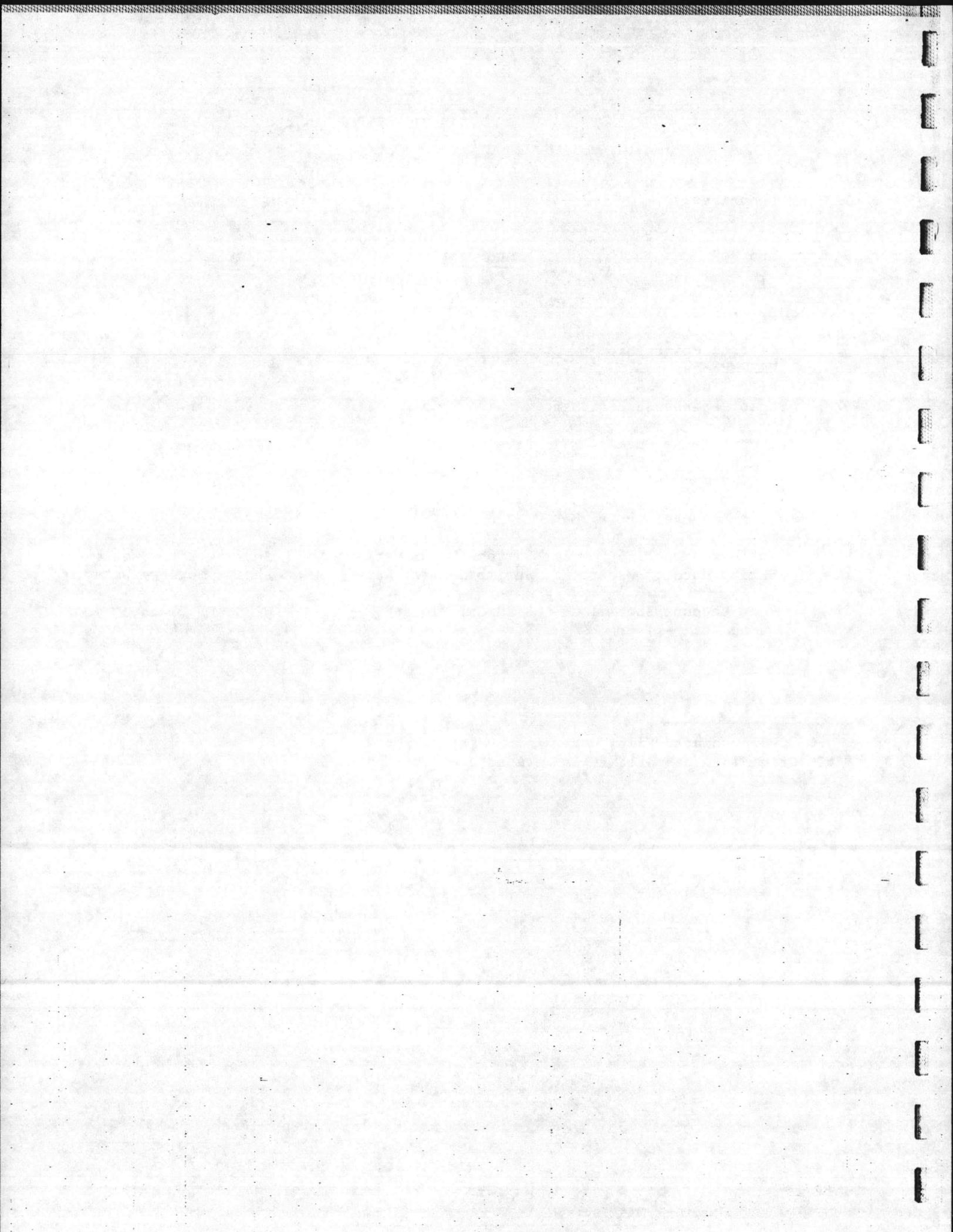


TABLE 3 (continued)

<u>Source Maps</u>		<u>Manuscript</u>	<u>Layer</u>
<u>ID No.</u>	<u>Name</u>		
22	Control Points Map		
26	NRMVMP Map		
27	Fire Towers Map		
37	Camp Lejeune Special Map		
37	Camp Lejeune Special Map	River Sectors	River Sectors
9,10	Impact Areas Map	Impact Areas	Impact Areas
37	Camp Lejeune Special Map		
6	Wetlands Maps	Surface Water Wetlands*	Surface Water Wetlands
14	Shrimp Nursery Water	Shrimp Nursery Water	Shrimp Nursery Water
37	Camp Lejeune Special Map	USFS CFI Plots**	USFS CFI Plots

*USGS DLG Automated Files were also a data source.

**UTM Grid Plot automated files were also a data source.



3.1.6 Controlled Air Space

This manuscript contains data on controlled air space areas. The data will be developed from two 1:50,000 scale maps, one of existing controlled air space and one of proposed controlled air space. The data will be automated in one data layer.

3.1.7 Point Data

The Point Data Manuscript was developed from different thematic data with the same feature type (points). This was done for efficiency in automation and may result in one initial data layer. The thematic point data may be separated out to several layers, similarly to the ITUM layers.

3.1.8 River Sectors

This manuscript contains data on river sectors where military impacts take place. It was developed from USGS 1:24,000 scale topographic maps and a Defense Mapping Agency map of Camp Lejeune. The data will be automated in one layer.

3.1.9 Impact Areas

This manuscript contains data on areas where military impacts take place. It was developed from a 1:50,000 scale Impact Area map. The data will be automated in one layer.

3.1.10 Surface Water Wetlands

This manuscript was developed from two 1:24,000 scale wetlands maps giving full coverage of the study area and existing automated files of Digital Line Graph data. It will result in one layer.

3.1.11 Shrimp Nursery Water

This manuscript was developed from a 1:24,000 scale map of protected shrimp nursery water areas. The data will be automated in one layer.

3.1.12 USFS CFI Plots

This data layer will contain the U.S. Forest Service Continuous Forest Inventory (CFI) sample plots. It will be derived from automated data files containing UTM coordinates to be associated with point locations of CFI sample plots. A table of USFS CFI Identifiers will be associated to the automated coverage. This CFI id will allow these points to later be associated with any attribute information collected about these points as it becomes available.

3.2 Physical Characteristics of INFO Attribute Tables

3.2.1 The INFO Relational Data Base

A discussion of ARC/INFO concepts is contained in Section 2.1.1, and may be useful to refer to in regard to the INFO Relational data base.

The INFO relational data base model represents data as a set of "flat" logical tables where columns represent attributes and each row contains the attribute values for each feature. In the example feature attribute table in Figure 2, the first column holds the User-ID, the second holds the polygon number, and the third holds the arc number.

Attribute data for coverage features are not restricted to the feature attribute table. They can be stored in any number of additional INFO tables. Links can be established between various tables through a common data item in each table. The establishment of such a link is known as relating data files. In other words, an item in one table can be used as a key to information stored in another table. These additional attribute tables are often called look-up tables.

For each INFO file there is a corresponding definition for reading items within the records. Several INFO terms used in the table and throughout the design include:

Item Name: This is the name assigned to each tabular attribute in the data base. It can be any name up to 16 characters in length.

Alternate Item Name: This is an abbreviated name for each item.

Item Width: The number of spaces used to store item values. For example, a 3-digit soil code such as 77E would have a 3-column item width.

Output Width: The number of spaces used to display item values, often the same as item width.

Item Type: Four types are used in the design: B = Binary, C = Character, D = Date, F = Internal Floating Point, I = Integer, and N = Numeral.

Item width, output width, and type are summarized in Table 2.

TABLE 2. DATA BASE ITEM DEFINITIONS

<u>Variable</u>	<u>Columns</u>	<u>Defined Item Name</u>	<u>Info Item Definition</u>
<u>MANUSCRIPT: INTEGRATED TERRAIN UNIT (Polygon)</u>			
1. <u>SOILS</u>			
Feature ID	1-5		
Soil Unit (Series/Phase)	6-7	Soil	2,2,I
2. <u>TIMBER COMPARTMENTS</u>			
Timber Compartment Number	8-9	TC#	2,2,C(I)
Timber Stand Number	10-11	TS#	2,2,I
Timber Stand Inclusion	12	TSI	1,1,I
3. <u>LAND USE</u>			
Land Use/ Land Cover Type	13-16	LU	4,4,I
4. <u>WETLANDS</u>			
Wetlands System/ Subsystem	17-18	S/SS	2,2,C
Prominent Wetlands Class/Subclass	19-21	C/SC1	3,3,C
Other Wetlands Class/Subclass	22-24	C/SC2	3,3,C
Wetlands Modifiers	25-30	MODIFIERS	6,6,C
5. <u>TRAINING AREAS</u>			
Base Sector Designation	31	BSD	1,1,C
Training Area Designation	32	TAD	1,1,C
6. <u>WILDLIFE UNITS</u>			
Wildlife Unit Number	33-34	WU#	2,2,I
Wildlife Unit Type	35	WUT	1,1,I

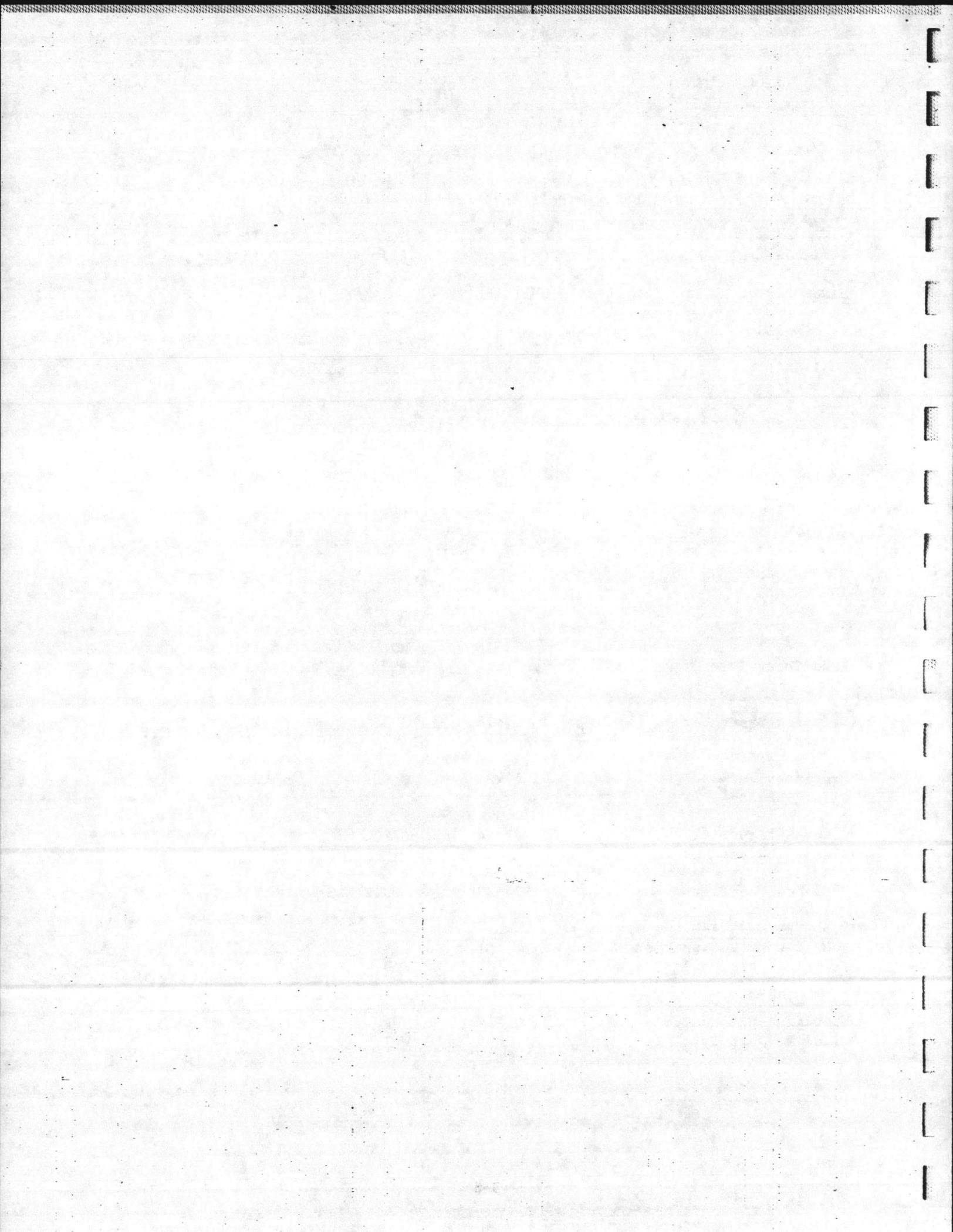


TABLE 2 (Continued)

<u>Variable</u>	<u>Columns</u>	<u>Defined Item Name</u>	<u>Info Item Definition</u>
7. <u>WILDLIFE MANAGEMENT FACILITIES</u>			
Wildlife Management Facility Type	36	WMF	1,1,I
8. <u>CONTROLLED/PREScribed BURN AREAS</u>			
Burn Area Type	37	BAT	1,1,I
Burn Area Designation	38-42	BAD	5,5,C
9. <u>NATURAL AREAS</u>			
Natural Area Name	43	NATURAL	1,1,I
10. <u>TACTICAL LAND ZONES</u>			
Tactical Landing Zone Name	44-45	LZN	2,2,I
Tactical Landing Zone Type	46	LZT	1,1,I
MANUSCRIPT: <u>FLOOD PRONE AREAS (Polygon)</u>			
Feature I.D. Number	1- 4	<COV>-ID	4,5,B
1. Flood Prone Area Type	5	FP/TYPE	1,1,I
MANUSCRIPT: <u>RANGE FANS MAP</u>			
Feature I.D. Number	1- 5	COV-ID	4,5,B
Range Fan Designation 1	6- 7	RFD1	2,2,I
Range Fan Designation 2	8- 9	RFD2	2,2,I
Range Fan Designation 3	10-11	RFD3	2,2,I
Range Fan Designation 4	12-13	RFD4	2,2,I
MANUSCRIPT: <u>HISTORIC/ARCHAEOLOGICAL SITES (Polygon, Line, Point)</u>			
Feature I.D. Number	1- 5	COV-ID	4,5,B
Site Documentation Status	6	STATUS	1,1,I
N.C. State Documentation Number Prefix	7-10	PREFIX	4,4,C
Site Number	11-13	SITE#	3,3,I

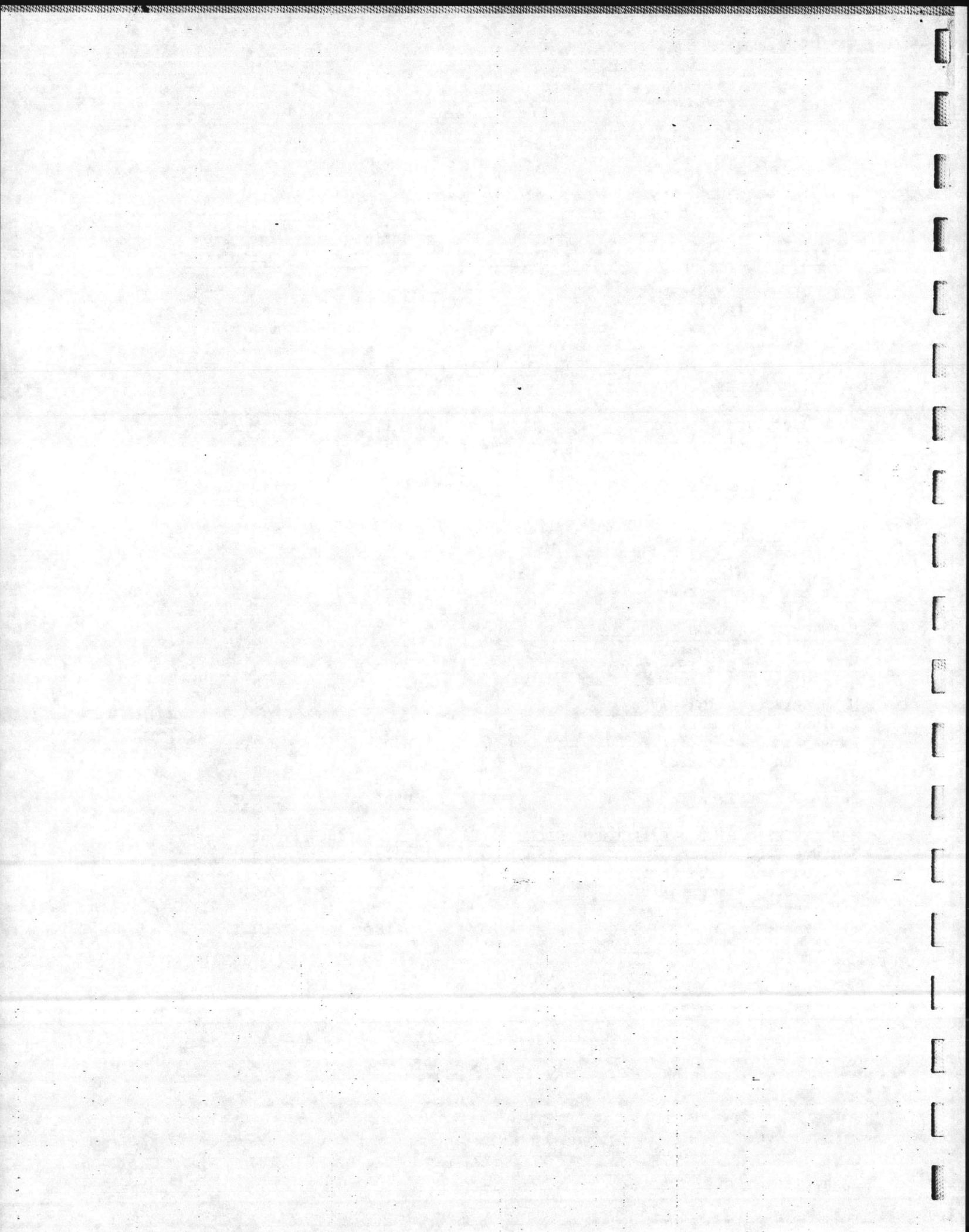


TABLE 2 (Continued)

<u>Variable</u>	<u>Columns</u>	<u>Defined Item Name</u>	<u>Info Item Definition</u>
<u>MANUSCRIPT: NACIP SITES (Polygon)</u>			
Feature I.D. Number	1- 5	COV-ID	4,5,B
NACIP Site Number	6- 7	NACIP#	2,2,C
<u>MANUSCRIPT: CONTROLLED AIRSPACE (Polygon)</u>			
Feature I.D. Number	1- 5	COV-ID	4,5,B
Controlled Airspace Existing Status	6	CAE	1,1,I
Controlled Airspace Proposed Status	7	CAP	1,1,I
Controlled Airspace Designation	8-14	CAD	7,7,C
<u>MANUSCRIPT: POINT DATA (Point)*</u>			
Feature I.D. Number	1- 5	COV-ID	4,5,B
Point Type	6- 7	PT	2,2,I
Point Designation	8-11	PD	4,4,I
<u>MANUSCRIPT: RIVER SECTORS (Polygon)</u>			
Feature I.D. Number	1- 5	COV-ID	4,5,B
River Sector Name	6- 7	RSN	2,2,I
<u>MANUSCRIPT: IMPACT AREAS (Polygon)</u>			
Feature I.D. Number	1- 5	COV-ID	4,5,B
Impact Area Status/Type	6	IAST	1,1,I
Impact Area Designation	7	IAD	1,1,I

 *The variables listed in Table 1 will be included in this layer as point attributes and may be separated into several layers.

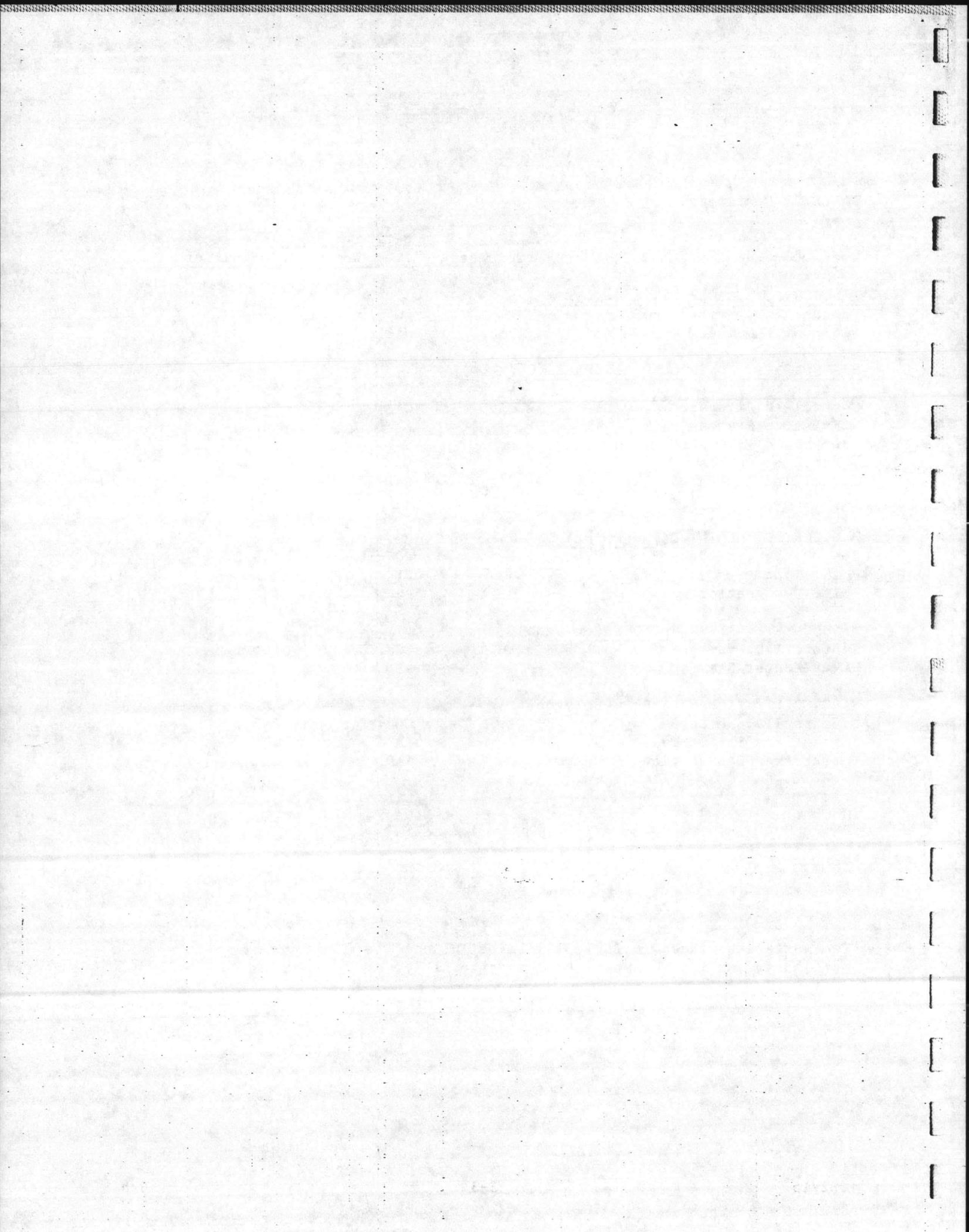
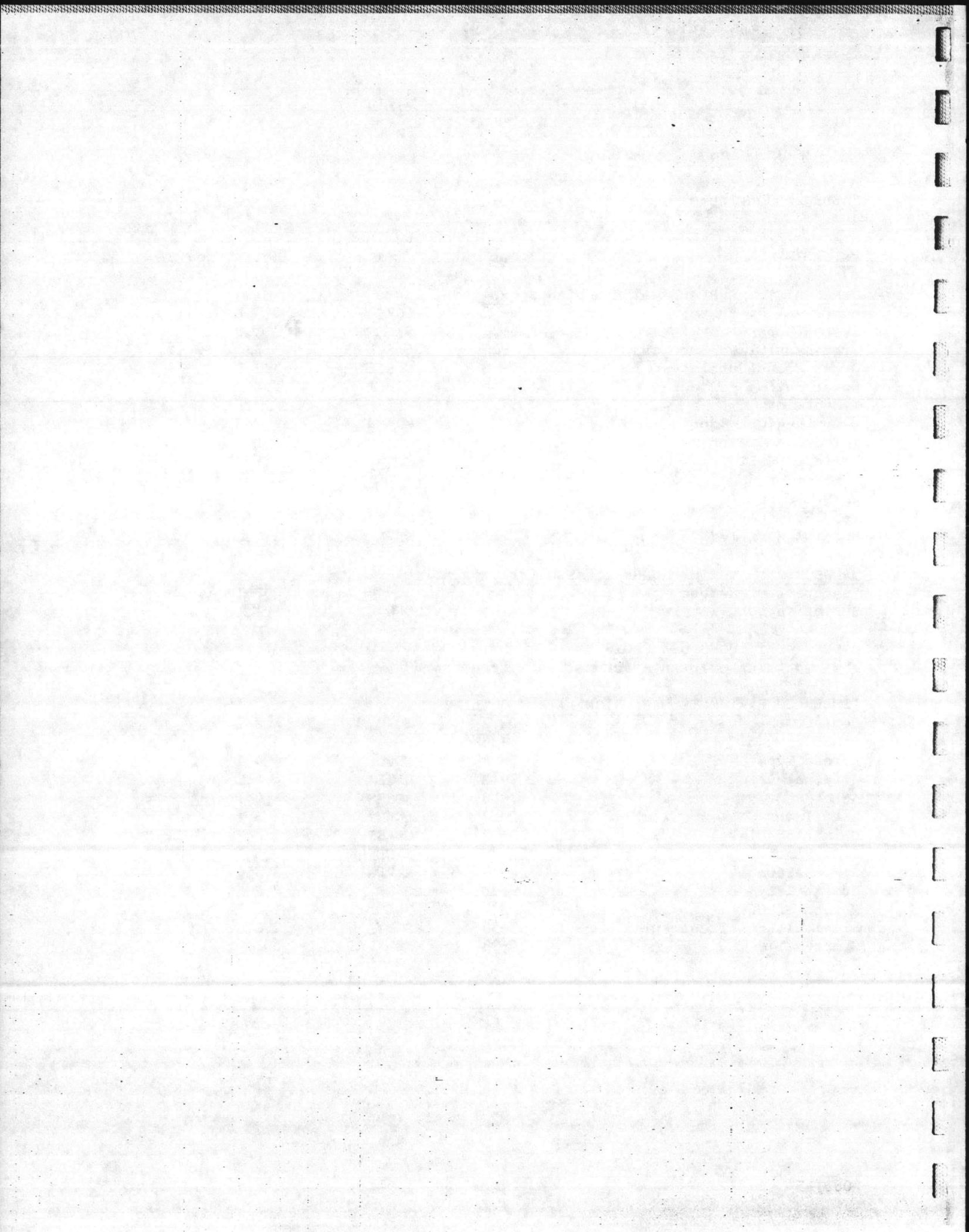


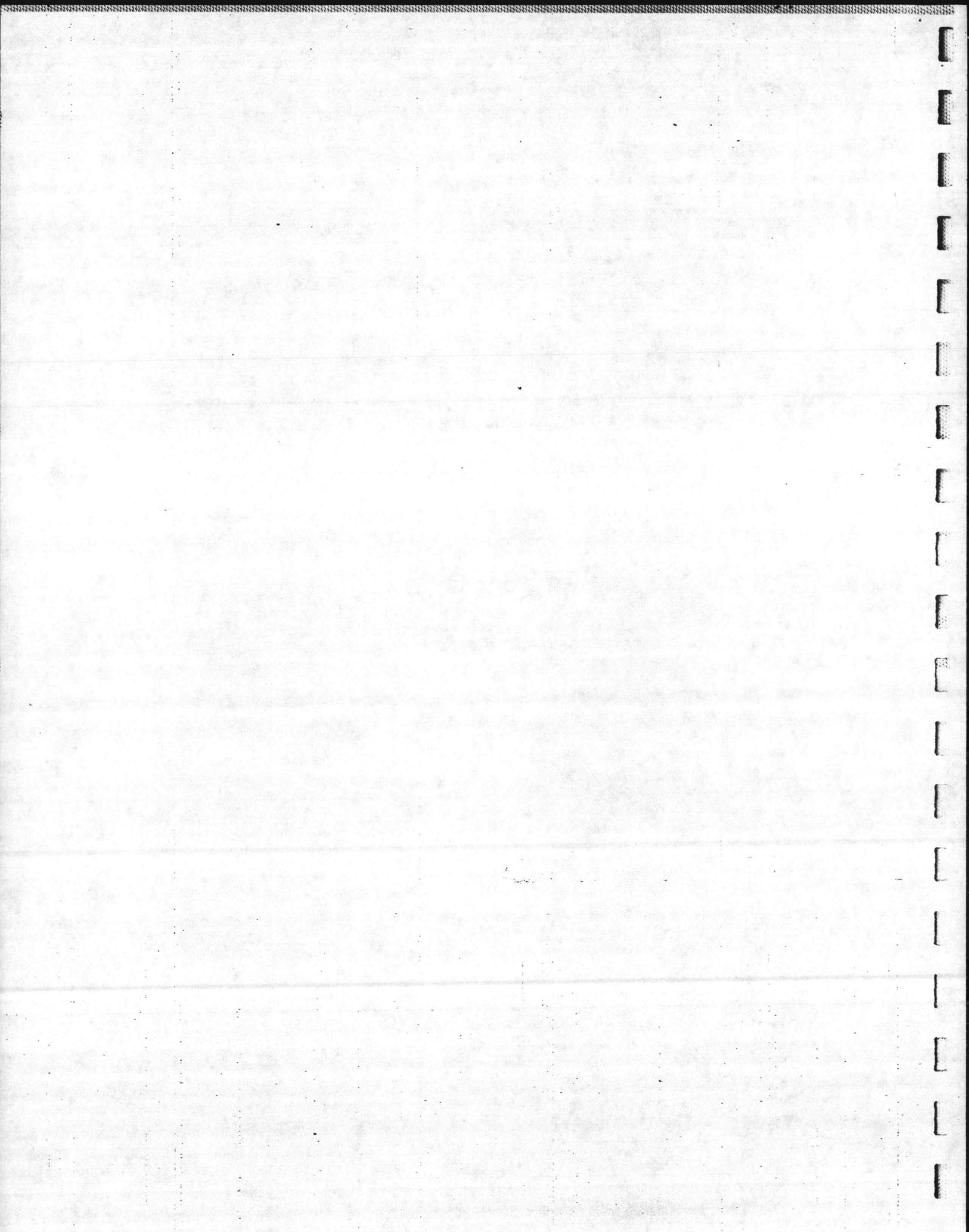
TABLE 2 (Continued)

<u>Variable</u>	<u>Columns</u>	<u>Defined Item Name</u>	<u>Info Item Definition</u>
<u>MANUSCRIPT: SURFACE WATER WETLANDS (Polygon, Line)</u>			
Feature I.D. Number	1- 5	COV-ID	4,5,B
System/Subsystem	6- 7	S/SS	2,2,C
Prominent Class/Subclass	8-10	C/SC1	3,3,C
Other Class/Subclass	11-13	C/SC2	3,3,C
Water Regime - Tidal Modifier	14	WRM/T	1,1,C
Water Regime - Non Tidal Modifier	15	WRM/NT	
Salinity/Halinity Modifier	16	S/H	1,1,C
pH Modifier	17	PH	1,1,C
Soil Modifier	18	SO/M	1,1,C
Special Modifier	19	SP/M	1,1,C
<u>MANUSCRIPT: SHRIMP NURSERY WATER (Polygon, Line)</u>			
Feature I.D. Number		1- 4	COV-ID 4,5,B
Shrimp Nursery Waters	5	SNW	1,1,I
<u>MANUSCRIPT: USFS CFI PLOTS</u>			
Not manuscripted - automatically generated			
<u>TIMBER COMPARTMENTS EXPANSION MATRIX OUTLINE</u>			
Compartment #	1- 2	TC#	2,2,I
Stand #	3- 4	TS#	2,2,I
Forest Type	5- 8	TYPE	4,4,I
Original Date	9-12	DATE	4,4,I
Acres	13-16	ACRES	4,4,I
Site Index	17-19	INDEX	3,3,I
Condition Class	20-22	CLASS	3,3,I
B.A. Pine	23-25	PINE	3,3,I
B.A. Hardwood	26-28	HARDW	3,3,I
Operability	29-30	OPER	2,2,I
Method of Cut	31	CUT	1,1,I
Silvicultural Treatment	32-33	SILVI	2,2,I
Remarks	34-93	REMARKS	60,60,C



Appendix A

Camp Lejeune MCB Source Document Listing



APPENDIX A

CAMP LEJEUNE MCB SOURCE
DOCUMENT LISTING

MAPS

1. USGS 7.5' Topographic Maps 8 Quadrangles
Scale: 1:24,000
Date: 1971-1981
No. Sheets: 32
Material: Paper
Comments: Project Basemap. Four copies of each quadrangle map provided.

- 2a. Soil Survey: Camp Lejeune, NC
Scale: 1:24,000
Date: December 1984
No. Sheets: 6
Material: Paper
Comments: None

- 2b. Soil Survey: Onslow County, NC
Scale: 1:24,000
Date: Unknown
No. Sheets: 9
Materials: Paper
Comments: None

- 3a. Timber Stand Location Maps
Scale: 1:15,840
Date: Unknown
No. Sheets: 55
Material: Paper
Comments: 2 black binders

- 3b. Timber Compartment Boundary Map
Scale: 1:50,000
Date: Unknown
No. Sheets: 2
Material: Paper
Comments: Camp Lejeune Special Map (CLSM) basemap

- 4a. Training Areas Map
Scale: 1:50,000
Date: Unknown
No. Sheets: 1
Material: Mylar
Comments: CLSM Overlay
5. Wildlife Units Map
Scale: 1:50,000
Date: Unknown
No. Sheets: 1
Material: Blueprint
Comments: None
- 6a. Wetlands Map
Scale: 1:24,000
Date: March 1986
No. Sheets: 5
Material: Blueprint
Comments: Complete MCB coverage between 6a and 6b
- 6b. Wetlands Map
Scale: 1:24,000
Date: March 1986
No. Sheets: 5
Material: Mylar
Comments: Complete MCB coverage between 6a and 6b
- 7a. Complex Existing Generalized Land Use Map
Scale: 1:48,000
Date: March 1987
No. Sheets: 1
Material: Blueprint
Comments: MCB Generalized Land Use from Base Master Plan
- 7b. Existing Land Use: Jacksonville/Onslow County
Scale: 1:96,000
Date: March 1987
No. Sheets: 2
Material: Mylar and Blueprint
Comments: City of Jacksonville and Onslow County from Base Master Plan
- 7c. Existing Conditions Maps (Master Plan)
Scale: 1:24,000
Date: May 1986
No. Sheets: 10
Material: Paper
Comments: From Master Plan

8. Landing Zones Map
 - Scale: 1:50,000
 - Date: Unknown
 - No. Sheets: 1
 - Material: Mylar
 - Comments: Camp Lejeune Special Map (CLSM) Overlay

9. CLSM Impact Areas Map
 - Scale: 1:50,000
 - Date: Unknown
 - No. Sheets: 1
 - Material: Mylar
 - Comments: CLSM Overlay

10. Impact Area Map
 - Scale: 1:50,000
 - Date: Unknown
 - No. Sheets: 1
 - Material: Paper
 - Comments: CLSM Base

11. Flood Prone Areas Map
 - Scale: 1:24,000
 - Date: 1973, 1975
 - No. Sheets: 5
 - Material: Paper
 - Comments: USGS/HUD-FIA compiled USGS base (7.5')

12. Historic/Archaeological Sites Map
 - Scale: 1:24,000
 - Date: Unknown
 - No. Sheets: 6
 - Material: Paper
 - Comments: DMA Base

13. Historic/Archaeological Sites Map (Index)
 - Scale: 1:50,000
 - Date: Unknown
 - No. Sheets: 1
 - Material: Paper
 - Comments: DMA Base

14. Shrimp Nursery Water Map
 - Scale: 1:24,000
 - Date: Unknown
 - No. Sheets: 4
 - Material: Paper
 - Comments: USGS 7.5' Base

15. NACIP Sites Map
Scale: 1:24,000
Date: Unknown
No. Sheets: 4
Material: Paper
Comments: USGS 7.5' Base
16. CLSM Range Fans Map
Scale: 1:50,000
Date: Unknown
No. Sheets: 1
Material: Paper
Comments: CLSM Base
17. Range Fans Map
Scale: 1:50,000
Date: Unknown
No. Sheets: 1
Material: Mylar
Comments: CLSM Overlay
18. Woodpecker Habitat Map
Scale: 1:24,000
Date: Unknown
No. Sheets: 1
Material: Mylar
Comments: CLSM Overlay
19. Shellfish Sampling Sites Map
Scale: 1:45,000
Date: Unknown
No. Sheets: 3
Material: Paper
Comments: None
20. Natural Areas Maps
Scale: 1:15,840
Date: Unknown
No. Sheets: 2
Material: Paper
Comments: Delineated on USGS Topo and Timber Stand Maps
21. Gun Positions Map
Scale: 1:50,000
Date: Unknown
No. Sheets: 1
Material: Mylar
Comments: CLSM Overlay

22. Control Points Map
 Scale: 1:50,000
 Date: Unknown
 No. Sheets: 1
 Material: Mylar
 Comments: CLSM Overlay
23. Controlled Airspace - Existing
 Scale: 1:50,000
 Date: Unknown
 No. Sheets: 1
 Material: Paper
 Comments: CLSM Basemap
24. Controlled Airspace - Proposed
 Scale: 1:50,000
 Date: Unknown
 No. Sheets: 1
 Material: Paper
 Comments: CLSM Basemap
25. Crossing Pads Map
 Scale: 1:50,000
 Date: Unknown
 No. Sheets: 1
 Material: Mylar
 Comments: CLSM Overlay
26. Natural Resource Multi-Use Management Plan
 Scale: 1:24,000
 Date: Unknown
 No. Sheets: 6
 Material: Paper
 Comments: 7.5' Quad, Orthophoto-base
27. Names and Fire Towers Map
 Scale: 1:50,000
 Date: Unknown
 No. Sheets: 1
 Material: Mylar
 Comments: CLSM Overlay: names used for annotation and not automated
28. Base Maintenance Roads Map
 Scale: 1:50,000
 Date: Unknown
 No. Sheets: 1
 Material: Paper
 Comments: "Primary and Secondary Paved Roads," CLSM Base

29. Existing/Proposed Roads and Trails
Scale: 1:24,000
Date: Unknown
No. Sheets: 6
Material: Paper
Comments: USGS 7.5' Base
30. Roads and Trails Map
Scale: 1:50,000
Date: Unknown
No. Sheets: 1
Material: Mylar
Comments: CLSM Overlay
31. Capital Improvements Plan Site Locations, Sheet G-7
Scale: 1:2,400
Date: July 1984
No. Sheets: 1
Material: Blueprint
Comments: Example; 1 of 73 Sheets
32. Steam Condensate Existing Conditions, Sheet A-2
Scale: 1:2,400
Date: July 1984
No. Sheets: 1
Material: Blueprint
Comments: Example; 1 of 73 Sheets
33. Wastewater Collection System Existing Conditions, Sheet A-2
Scale: 1:2,400
Date: July 1984
No. Sheets: 1
Material: Blueprint
Comments: Example; 1 of 73 Sheets
34. Water Distribution System Existing Conditions, Sheet A-2
Scale: 1:2,400
Date: July 1984
No. Sheets: 1
Material: Blueprint
Comments: Example; 1 of 73 Sheets
35. Electrical Distribution Existing Condition, Sheet A-2
Scale: 1:2,400
Date: July 1984
No. Sheets: 1
Material: Blueprint
Comments: Example; 1 of 73 sheets

36. Index - 200' Scale Maps Steam Condensate Distribution System
Scale: 1:48,000
Date: July 1984
No. Sheets: 1
Material: Blueprint
Comments: Index to Large-Scale Maps
37. Camp Lejeune Special Map
Scale: 1:50,000
Date: September 1976
No. Sheets: 5
Material: Paper
Comments: Extra Copies for Reference
38. Forestry 11-Year Management Cycle
Scale: 1:15,840
Date: Unknown
No. Sheets: 16
Material: Paper
Comments: None
39. Prescribed Burning Red-Cockaded Woodpecker Habitat
Scale: 1:50,000
Date: Unknown
No. Sheets: 1
Material: Paper
Comments: CLSM Base
40. Red-Cockaded Woodpecker Habitat Burning
Scale: 1:15,840
Date: Unknown
No. Sheets: 7
Material: Paper
Comments: Detail Maps
41. Annual Range and Impact Area Controlled Burning and Wildlife Prescribed
Burning (Index)
Scale: 1:50,000
Date: Unknown
No. Sheets: 1
Material: Paper
Comments: CLSM Base
42. Wildlife (Quail Management) Prescribed Burning Map
Scale: 1:50,000
Date: Unknown
No. Sheets: 1
Material: Paper
Comments: Detail Maps

43. Annual Range and Impact Area Burning

Scale: 1:15,480 and 1:50,000

Date: Unknown

No. Sheets: 6

Material: Paper

Comments: Detail Maps

44. HRMUMP (NREAD update) Map

Scale: 1:24,000

Date: July 1987

No. Sheets: N/A

Material: 1 Copy

Comments: Orthophoto-based Miscellaneous Wildlife Facilities

45. Aerial Photographs

Scale: 1:24,000

Date: February 1984 and May 1986

No. Sheets: N/A

Material: N/A

Comments: 1 Roll of CIR Transparencies

REPORTS

1. Soil Survey: Camp Lejeune, NC
Scale: N/A
Date: December 1984
No. Pages: 227
Material: 1 Copy
Comments: SCS/USMC Survey
2. Timber Stand Inventory Reports
Scale: N/A
Date: Unknown
No. Pages: 55
Material: 1 Copy
Comments: 2 Black Binders
3. MCB Master Plan
Scale: N/A
Date: March 1987
No. Pages: N/A
Material: 1 Copy
Comments: Includes Various Maps, Capital Improvements Plan
4. Historic/Archaeological Sites Descriptions
Scale: N/A
Date: Unknown
No. Pages: 52
Material: 1 Copy
Comments: Table 4.2, Known Cultural Resources with State Numbers
5. Shellfish Sampling Site Locations Descriptions
Scale: N/A
Date: Unknown
No. Pages: 3
Material: 1 Copy
Comments: None
6. Sea Turtle Inventory for Sum/Fall 1986
Scale: N/A
Date: Unknown
No. Pages: N200
Material: 1 Copy
Comments: None

7. Survey Control Data - Camp Lejeune and Vicinity

Scale: N/A
Date: Unknown
No. Pages: Unknown
Material: 1 Copy
Comments: Third Order Survey

8. MCB Water Quality Stations

Scale: N/A
Date: Unknown
No. Pages: Unknown
Material: Unknown
Comments: None

9. Onslow Beach Barriers

Scale: N/A
Date: Unknown
No. Pages: Unknown
Material: Unknown
Comments: None

10. Compartment Prescriptions

Scale: N/A
Date: Unknown
No. Pages: Unknown
Material: Unknown
Comments: None

11. Forestry Projections

Scale: N/A
Date: Unknown
No. Pages: Unknown
Material: Unknown
Comments:

EXISTING FILES

1a. USGS DLG Files (Hypsography)

Scale: 1:24,000
Date: Various
No. Pages: N/A
Material: Automated File
Comments: Topographic Contours

1b. USGS DLG Files (Misc.)

Scale: 1:24,000
Date: Various
No. Pages: N/A
Material: Automated File
Comments: Administration, Hydrographic, Infrastructure

2. UTM Grid Coordinates

Scale: 1:24,000
Date: Various
No. Pages: N/A
Material: Automated File
Comments: None

