

09050

# **The Health of Lake Kasshabog Today and Tomorrow**

Includes:  
**Final Research Report**

**By Shawn Seawright**

Completed for:

Terry Rees at the Lake Kasshabog Residents' Association  
Supervising Professor: Graham Cogley, Trent University  
Trent Centre for Community-Based Education

Department: Geography  
Course code: GEOG 440  
Term: Fall/Winter 2002-2003  
Date of project submission: April 2003

Project ID: 430

**Call Number:** 570 Sea

## **The Health of Lake Kasshabog**

**Abstract:** An author generated executive summary is available

**Keywords:** Lake Kasshabog, Geographic Information System (GIS), mapping, residents association, ecology, health of lakes, Fanwort, shoreline modifications, ecosystem, fish, cottage, Graphical User interface, GUI, ArcView 3.2a,

The Health of Lake Kasshabog  
Today and Tomorrow

For Partial Completion of Honours  
Bachelor of Science Geography Degree  
Trent University

By: Shawn Seawright  
For: Professor Cogley and Terry Rees (LKRA)

## Executive Summary

The Lake Kasshabog Residents Association (LKRA) presently does not have the ability to represent their data in a digital format. Currently only paper maps and field data are available to residents on the lake. A digital representation of the lake and of issues pertaining to it would greatly assist the LKRA in presenting ecological findings to the inhabitants of the area. Ultimately an interactive model of Lake Kasshabog is needed to convey to the public the effects that shoreline developments are having on the ecology of the lake.

The LKRA would like to develop a tool, using a Geographic Information System (GIS), which would be accessible to certain members of the association. With this tool they would be able to describe the extent of damage that shoreline modifications, invasive plant species, fishing practices, etc. are causing to the lake.

Using Microsoft Access, a database of field data has been created which has been attached to a digital map of the area, created using ArcView 3.2a. The essential preliminary steps have been taken in this project. However it is something that will be ongoing and maintained by the LKRA. ArcView has been modified to incorporate the types of applications that will be important to users of this project. They will be able to identify the problems on the lake easily and the results returned to them will be easy to understand and relevant to their research.

The tools provided with this application allow the user to manipulate the data into a visual representation and to see exactly what is happening to the ecology of Lake Kasshabog. It will be a useful aid for any study done on the lake, and for determining if the lake is improving over time.

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY.....</b>	<b>II</b>
<b>TABLE OF CONTENTS.....</b>	<b>III</b>
<b>LIST OF FIGURES.....</b>	<b>IV</b>
<b>LIST OF APPENDICES.....</b>	<b>V</b>
<b>1.0 INTRODUCTION.....</b>	<b>6</b>
1.1 The Client.....	6
1.2 The Problem.....	6
1.3 Background Information/Study Area.....	7
1.4 Objectives.....	8
<b>2.0 METHODOLOGY.....</b>	<b>11</b>
2.1 Importing and Modifying the Data.....	11
2.2 Creating the Themes.....	11
2.3 Creating and Linking the Database.....	13
2.4 Displaying the Data in a 3D Scene.....	13
2.5 Graphic User Interface (GUI) Development.....	15
<b>3.0 PROJECT RESULTS.....</b>	<b>16 - 18</b>
<b>4.0 DISCUSSION AND CONCLUSIONS.....</b>	<b>20</b>
4.1 Risk Assessment.....	20
4.2 Limitations of the Project.....	21
4.3 Potential Improvements of the Project.....	23

## LIST OF FIGURES

Figure 1: Study Area in Relation to Peterborough.....	9
Figure 2: Characteristics of Fanwort.....	10
Figure 3: Digital Map Layers Clipping Procedure .....	12
Figure 4: ArcView 3D Theme.....	14
Figure 5: ArcView GUI.....	15
Figure 6: Fanwort Density Map.....	18
Figure 7: Kasshabog Cottage Map .....	19
Figure 8: Sample Lake Kasshabog Maps .....	22

## LIST OF APPENDICES

APPENDIX 1: List of ArcView Files .....	24
APPENDIX 2: ArcView Digital Map Matching Paper Maps.....	26
APPENDIX 3: ArcView (GUI) Scripts .....	42
APPENDIX 4: Metadata .....	47
APPENDIX 5: Original Completion Dates/Project Goals .....	49

## **1.0 INTRODUCTION**

### **1.1 The Client**

The client is the Lake Kasshabog Residents Association (LKRA). The contact there is Terry Rees, who can be contacted at the following location:

Terry Rees  
Lake Kasshabog Residents Association  
68 Sophia Street, Peterborough, Ontario  
K9E 1E1  
Telephone: 705-768-0555  
Email: Trees@nexicom.net

### **1.2 The Problem**

The aim of the project is to develop a digital representation of Lake Kasshabog and to design a project that will be easy to use for those who are unfamiliar with GIS (Geographic Information Systems). The essential questions that need to be answered for this project are:

1. Are shoreline developments and shoreline modifications affecting the ecosystem of Kasshabog Lake?
2. What is happening to the different species of fish in the lake?  
What is being done to keep the lake habitable for fish?
3. Are invasive species such as fanwort affecting fish spawning areas and other plant species in the lake?
4. What can be done to prevent the spread of invasive plant species such as fanwort? Are measures already being taken to prevent spreading? Why or why not?
5. How can GIS be used to help the LKRA? How will it answer the above questions?



### **1.3 Background Information/Study Area**

The LKRA wishes to determine whether or not human modification of the shoreline is affecting the ecological structure of Lake Kasshabog. They hope to examine different aspects of the lake (mainly the invasive plant species, fanwort) to determine whether or not the observed changes are anthropogenic. Lake Kasshabog is located in the village of Havelock and in Belmont-Methuen township, and is not part of the Trent Severn Waterway (see Figure 1.).

Fanwort is currently of major concern to the LKRA. Since 1999 an increasing amount of this invasive species has been observed in the lake. It is an aquatic plant, native to the southern United States, but has been transported to Lake Kasshabog through aquarium dumping, boat transport, water garden escapes, and animals (see Figure 2.). By mapping the location of fanwort on the lake the LKRA will be able to determine if the problem is getting worse or better as time goes by.

## 1.4 Objectives

1. Import the digital files obtained from the federal MNR (Ministry of Natural Resources) topographic database (031C12) into ArcView and extract the relevant data.
2. Develop the database, from the analogue information (such as paper maps, hand written descriptions of cottages, density of fanwort, fish spawning records, etc.). This database will then be attached to the ArcView Project.
3. Create the layers for the map, based on information present on the Lake Kasshabog paper maps and above information.
4. Develop a Graphical User Interface (GUI) that will enable users to derive information on the necessary characteristics of the lake easily.
5. Develop a user manual for future additions or changes to the project.
6. Document the process fully, including any scripts within Avenue (ArcView's computer programming customization language), database modifications, etc.

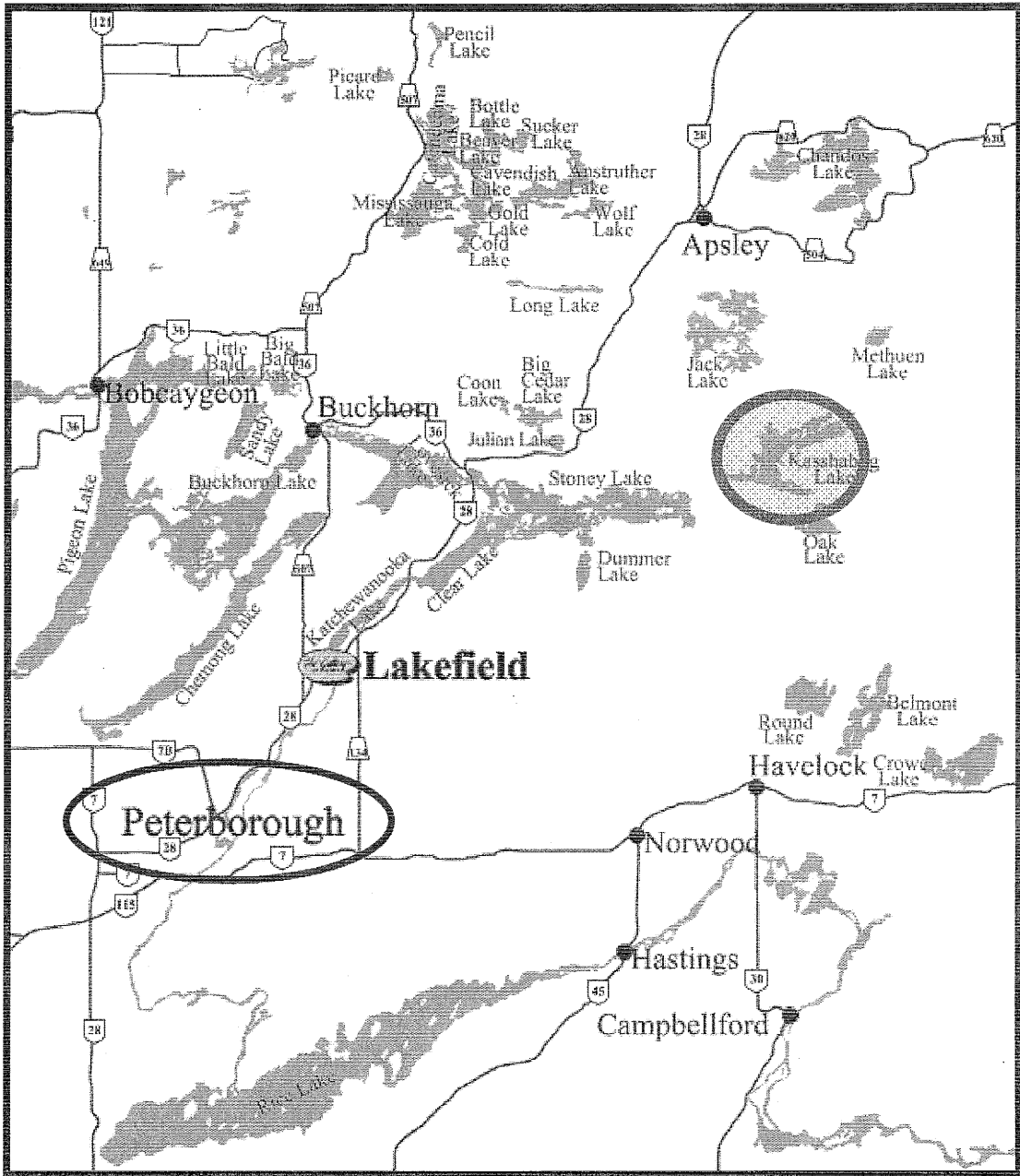


Figure 1. Study Area in Relation to Peterborough

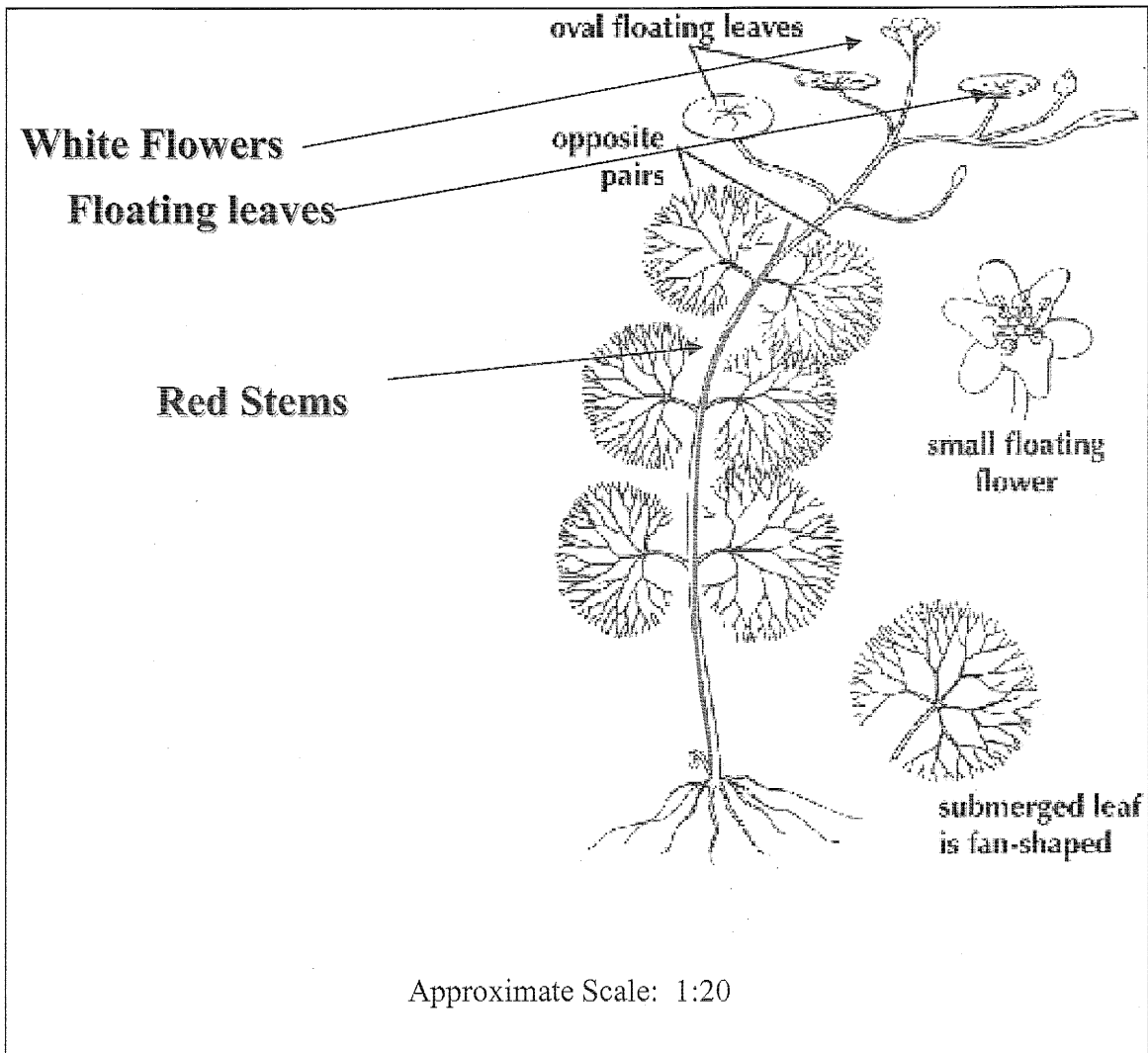


Figure 2. Characteristics of Fanwort

## **2.0 METHODOLOGY**

### **2.1 Importing the Data**

A digital map was obtained from the Ministry of Natural Resources (MNR). It consisted of several layers, each depicting one of the attributes that would be found on a paper topographic map. The national topographic survey number for the area was 031C12. From the original data, Lake Kasshabog had to be extracted and a new map was created confined to the area around Lake Kasshabog. This process was automated in ArcView using the clip feature associated with the program's geoprocessing extension and graphic user interface. This had to be done for each of the relevant layers in the map, including: buildings, contours, roads, highways, water, wetlands, soil deposits, mining, railroads, drainage, and vegetation. (See Figure 3. for clipping procedures)

### **2.2 Creating New Map Layers**

New map layers were created for fanwort density, fish spawning areas and the distribution of cottages.

Many problems arose with accuracy when creating these new map layers. The data were available only in paper format and the accuracy of the paper maps was very poor, moreover the transition from paper to digital map introduced additional error. For instance, the fanwort areas on the lake were drawn roughly based on someone's interpretation of the area and from that the digital layer was created with a new interpretation, introducing uncalculated errors.

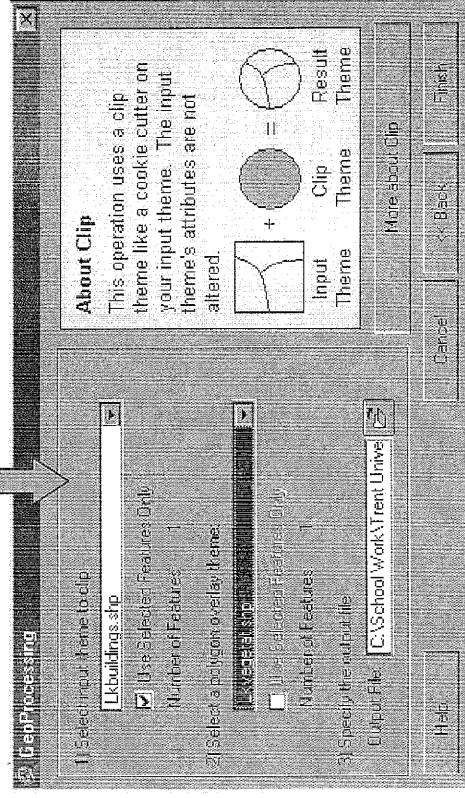
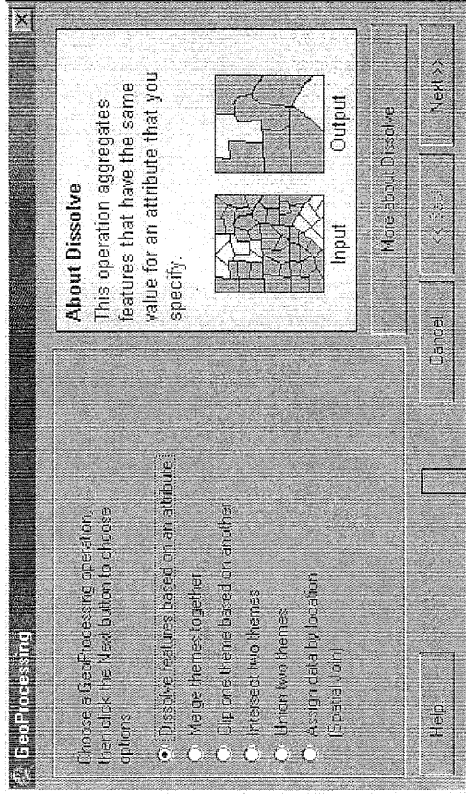
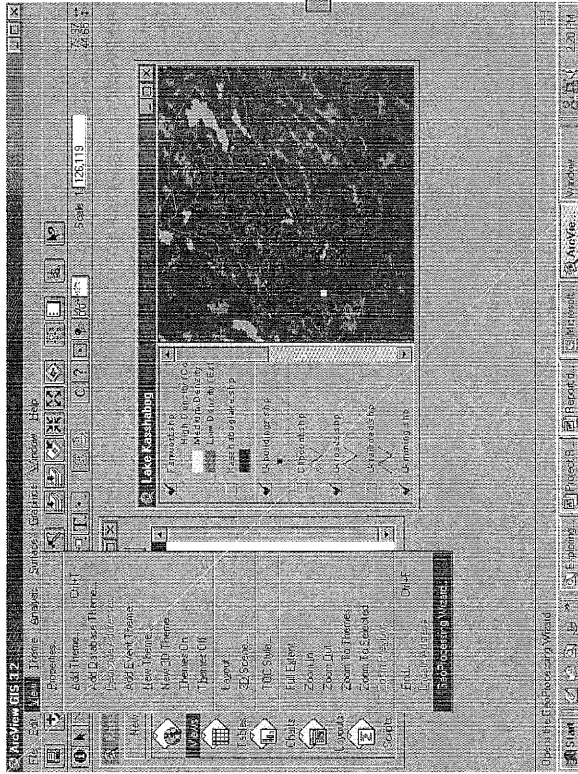


Figure 3. ArcView Project Clipping Procedure

## **2.3 Creating and Linking the Database**

Priority was placed on getting all of the information that the LKRA had available in paper format into a digital database. These were the building blocks for the rest of the project. This was done using Microsoft Access and, after identifying the major attributes that the LKRA wanted to have associated with their digital map, three tables were created:

- Cottages
- Fanwort
- Fish Spawning

These three tables were then linked to the digital map through a Structured Query Language (SQL) connection in ArcView. The attributes of these tables include: ID, Associated Paper Map, Cottage number on Paper Map, Shoreline type, dock, boathouse, objects in water, dock type, tree type, modified shoreline, modified yard, cottage size, soil type, environmental issues.

## **2.4 Displaying the Data in a 3D Theme**

A three – dimensional “theme” of the land topography was created from the contour layer of the digital map. A three – dimensional view of the lake was desirable to illustrate the relief of the area, which might account for some of the problems that are associated with the ecological structure of the lake. For example, poor drainage, due to low elevation, might account for some of the problems that the lake is having with fish spawning areas. (See Figure 4.)

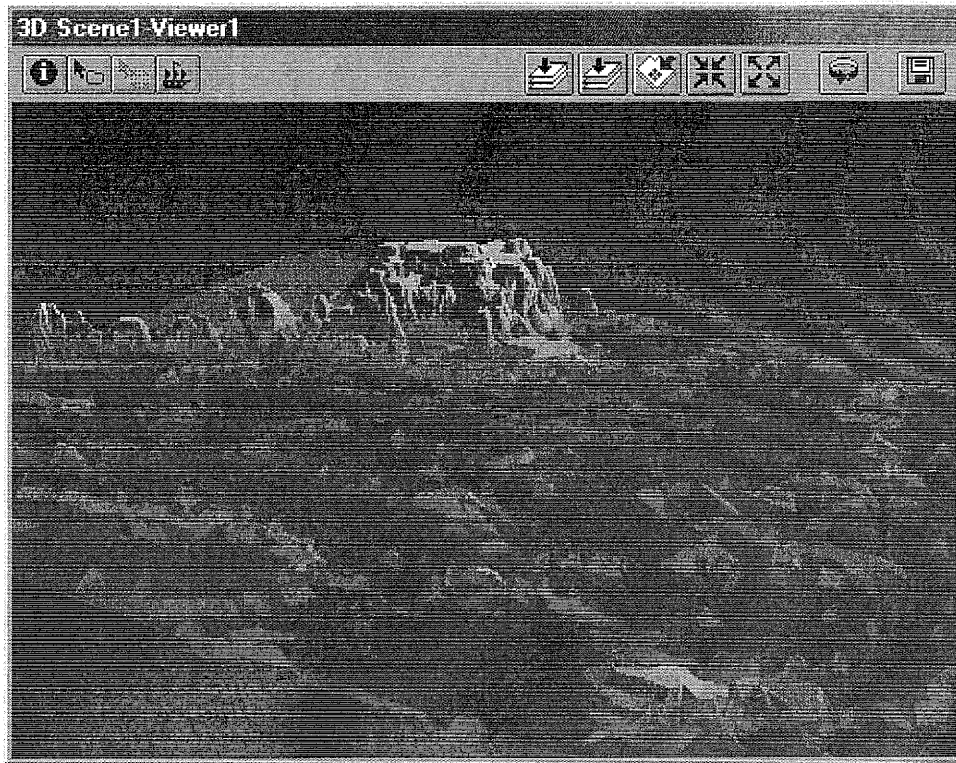


Figure 4. ArcView 3D Theme

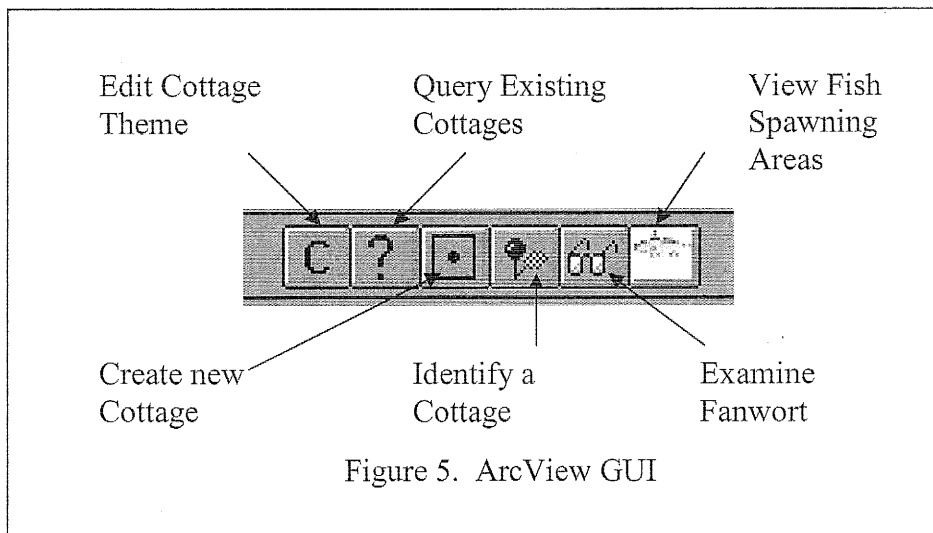


## 2.5 Graphical User Interface (GUI) Development

ArcView has a customization language, called Avenue, which allows the users of the program to modify any of the applications that it runs or change the appearance of the interface. A Graphical User Interface (GUI) can be created to enable a user to modify the original GUI and make buttons that would run specific applications used in their project.

The design of the GUI is in the form of buttons on the ArcView interface. Buttons were added to describe certain aspects of the lake that would be of interest to the LKRA, as well as enable them to add new information to the digital map by simply clicking a few buttons (see Figure 5. for a description of each button).

Having buttons available for the user to perform these types of operations would make it possible for the project to be continued by someone who is not familiar with Geographic Information Systems. (See Figure 4)



### 3.0 PROJECT RESULTS

The LKRA database was created so that all of the information that is available in paper format would be available in an easy to understand, digital format. This made it possible for someone with little experience in Geographic Information Systems to manipulate the data and use the digital map to get the information that they need.

The steps that have been outlined in this paper are the beginning phases of this project; the LKRA will later use this digital information, and adapt it to demonstrate more clearly the effects that anthropogenic impacts are having on the lake.

In addressing the problems of the project the following results were found:

- Development and modification on and around the shoreline are having a major impact on the ecology of the lake. Fish habitats and spawning areas are being diminished by structures built too close to the water line and modifications that destroy the natural shoreline.
- The issue of the fanwort in the lakes is one of major concern for the residents of the lake. Any contact with the plant could spread it to another location. Currently it is only in a few of the bays around the lake but future interaction with the plant species might spread it all over the lake. Precautions are being taken to try and prevent this spread but it is nearly impossible to keep the plant confined.
- Other than the spreading, fanwort is having a major impact on fish habitat and fish spawning areas. As more and more of the plant grows, it decreases the

amount of available space for fish to spawn. Because it grows in shallow sandy areas (the perfect spawning locations for most fish species) this is becoming a major concern.

- Fish stocking records show that many species of fish are being introduced into the lake, but for some reason are dying off quickly. Although the lake is a major fishing destination, over-fishing the waters is not the problem. Upon completing this study I have concluded that one of the main factors contributing to this is the elimination of suitable spawning areas by fanwort.

Sample results of the database inputs, the 3-dimensional and 2-dimensional maps, fanwort density maps, and cottage maps can be found in the following figures. Figure 6 is a sample of a fanwort map that could be produced by the LKRA to demonstrate how the density of fanwort is increasing from year to year. Figure 7 is a map of the cottages on the lake. It is possible to add cottages to the map using the GUI interface as well as to get information on the cottages around the lake.

# Lake Kasshabog Fanwort Density



Figure 6. Fanwort Density Map

# Lake Kasshabog Cottages



## LEGEND

- Cottage
- Kasshabog Lake
- ▬ Roads
- ▬ Mining
- ▬ Highways
- ▬ Rivers
- ▬ Wetland Areas
- ▬ Vegetation

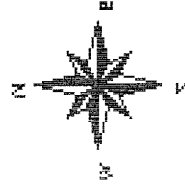


Figure 7. Cottage Map

## **4.0 DISCUSSION AND CONCLUSIONS**

### **4.1 Risk Assessment**

The most risky component of this project was the processing stage because edits had to be made, both to ArcView and to the LKRA database. These corrections included the renaming of files and the SQL connection to the ArcView project. The risk is that the client's minimal experience with GIS applications might hinder how efficiently the project is used.

Reducing the risk in the project was fairly simple but very time-consuming. A project user manual was developed to try and help the LKRA use, and adapt, the project in the future. Backup files of all of the data were also created in case any of the data became corrupted or unstable and unusable to the LKRA.

## 4.2 Limitations of the Project

One of the major problems encountered in this project was that the original data were presented in paper format, both maps, as well as written descriptions and personal assumptions. Conversion to digital format might have introduced a wide variety of errors.

The paper maps had written descriptions for each cottage and a certain amount of error could have arisen when trying to take those descriptions and associate them with the same cottage on the paper map. This greatly reduces the accuracy and usefulness of the project but is something that could not be avoided. In the future the LKRA will try to reduce this error and make sure that all of the information that was on paper is the same as the information that is in the database and that all of the cottages on the paper maps are present on the digital map.

Beyond this, errors could arise with actual geographic positioning of new cottages as well as the current locations of fanwort in the lake. Having a digital map that is not georeferenced, as well as other data which does not contain longitudinal or latitudinal information, will make uncertain the actual position of the cottage, or fanwort, relative to their positions on the surface of the Earth.

Accuracy could be improved greatly by surveying the entire lake with a Geographic Positioning System (GPS) and bringing that georeferenced data into the ArcView project. This would however be a very time consuming and expensive method for the LKRA to attempt.

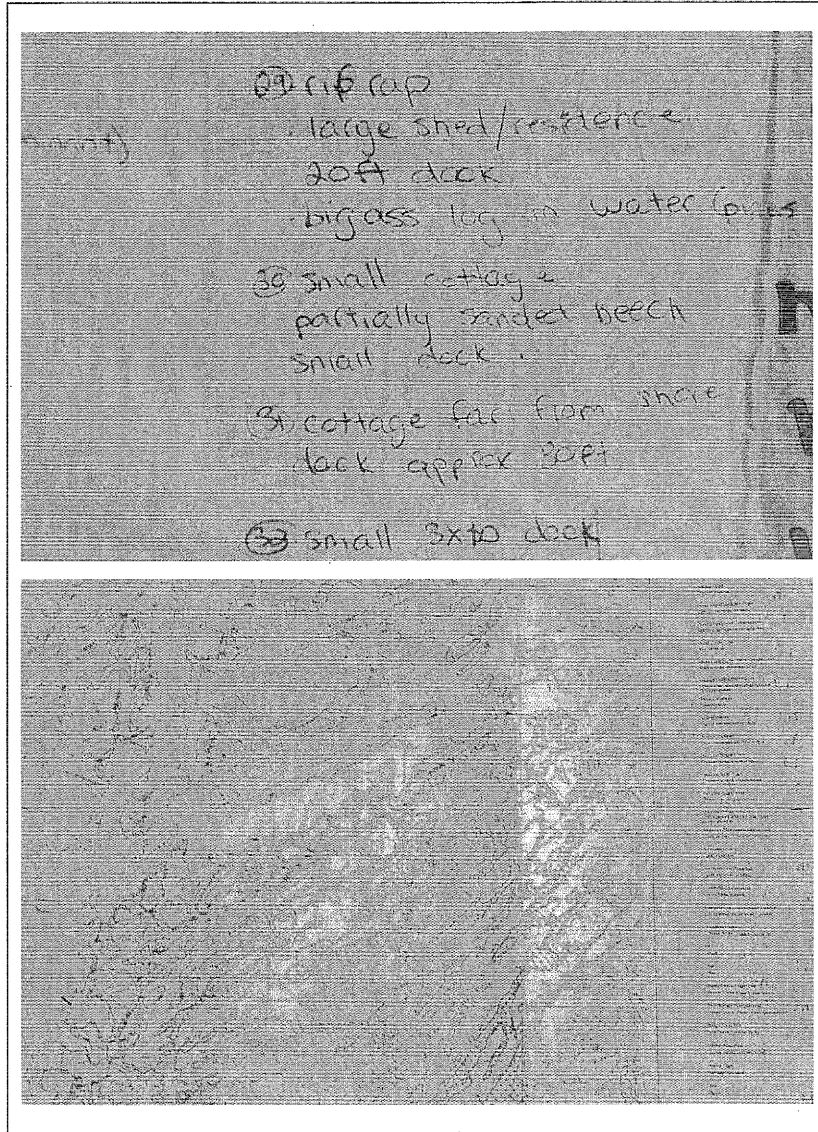


Figure 8. Sample Lake Kasshabog Maps



### **4.3 Potential Improvements of the Project**

One of the potential improvements of the project would be to make its information available to any resident on the lake, instead of to just a few members equipped with GIS software. To do this the LKRA might want to consider putting the map and database information on their website in an interactive format. WebGIS is becoming a very popular tool for spreading information to a large number of people and this could greatly improve the usefulness of the project.

Better data collection techniques could also be put in place to reduce errors when converting analogue information into digital format. A specified collection method must be put in place in order to prevent misallocation of the physical data.

**APPENDIX 1: List of ArcView Files**

<b><u>Shape Files</u></b>	<b><u>Database Files</u></b>	<b><u>SHX Files</u></b>
Fanwort.shp	Fanwort.dbf	Fanwort.shx
Lkbuildings.shp	Lkbuildings.dbf	Lkbuildings.shx
Kasshaboglake.shp	Kasshaboglake.dbf	Kasshaboglake.shx
Clipcont.shp	Clipcont.dbf	Clipcont.shx
Lkroads.shp	Lkroads.dbf	Lkroads.shx
Lkrailroad.shp	Lkrailroad.dbf	Lkrailroad.shx
Lkmining.shp	Lkmining.dbf	Lkmining.shx
Lkhighways.shp	Lkhighways.dbf	Lkhighways.shx
Lkdrainage.shp	Lkdrainage.dbf	Lkdrainage.shx
Lksoildep.shp	Lksoildep.dbf	Lksoildep.shx
Lkwetlands.shp	Lkwetlands.dbf	Lkwetlands.shx
Lkwater.shp	Lkwater.dbf	Lkwater.shx
Lkvegetat.shp	Lkvegetat.dbf	Lkvegetat.shx
Kasshabogtin.shp	Kasshabogtin.dbf	Kasshabogtin.shx
3dbuildings.shp	3dbuildings.dbf	3dbuildings.shx
3dwater.shp	3dwater.dbf	3dwater.shx

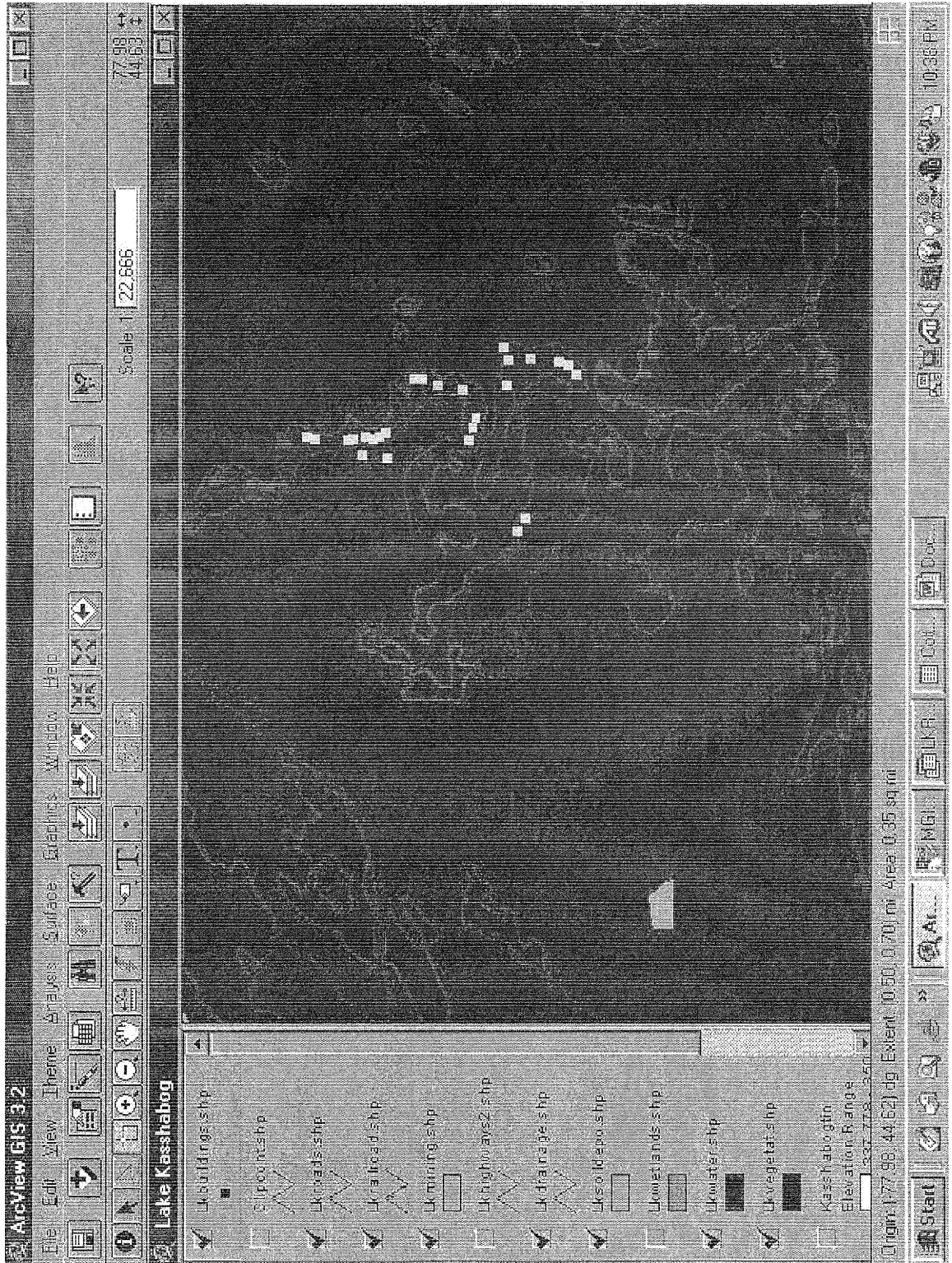
## **APPENDIX 2: ArcView Digital Map Matching Paper Maps**

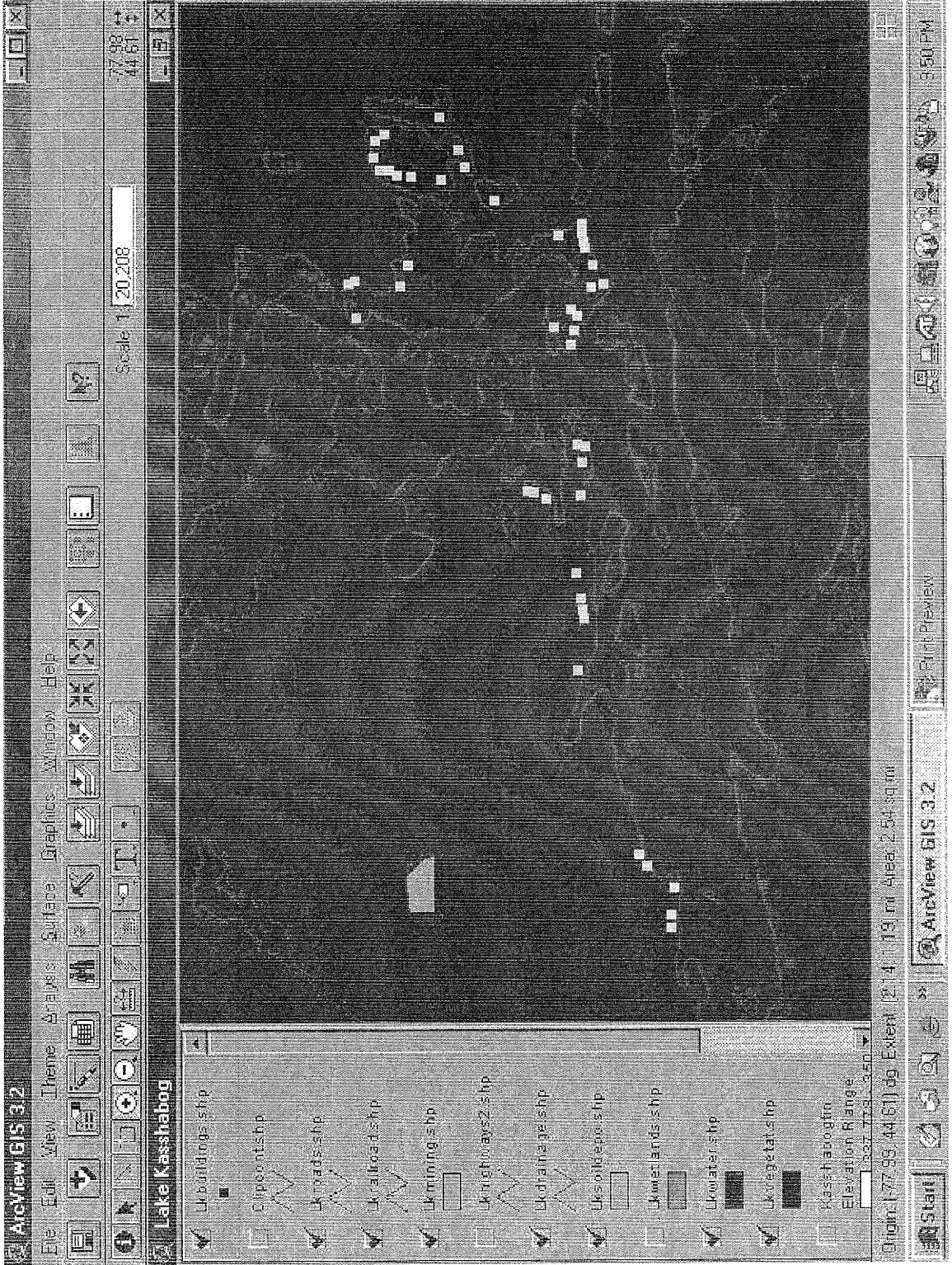
These maps were created using the original paper map and documentation that was found on those maps. The original maps have had numbers written on the back that correspond to the numbers on these digital maps.

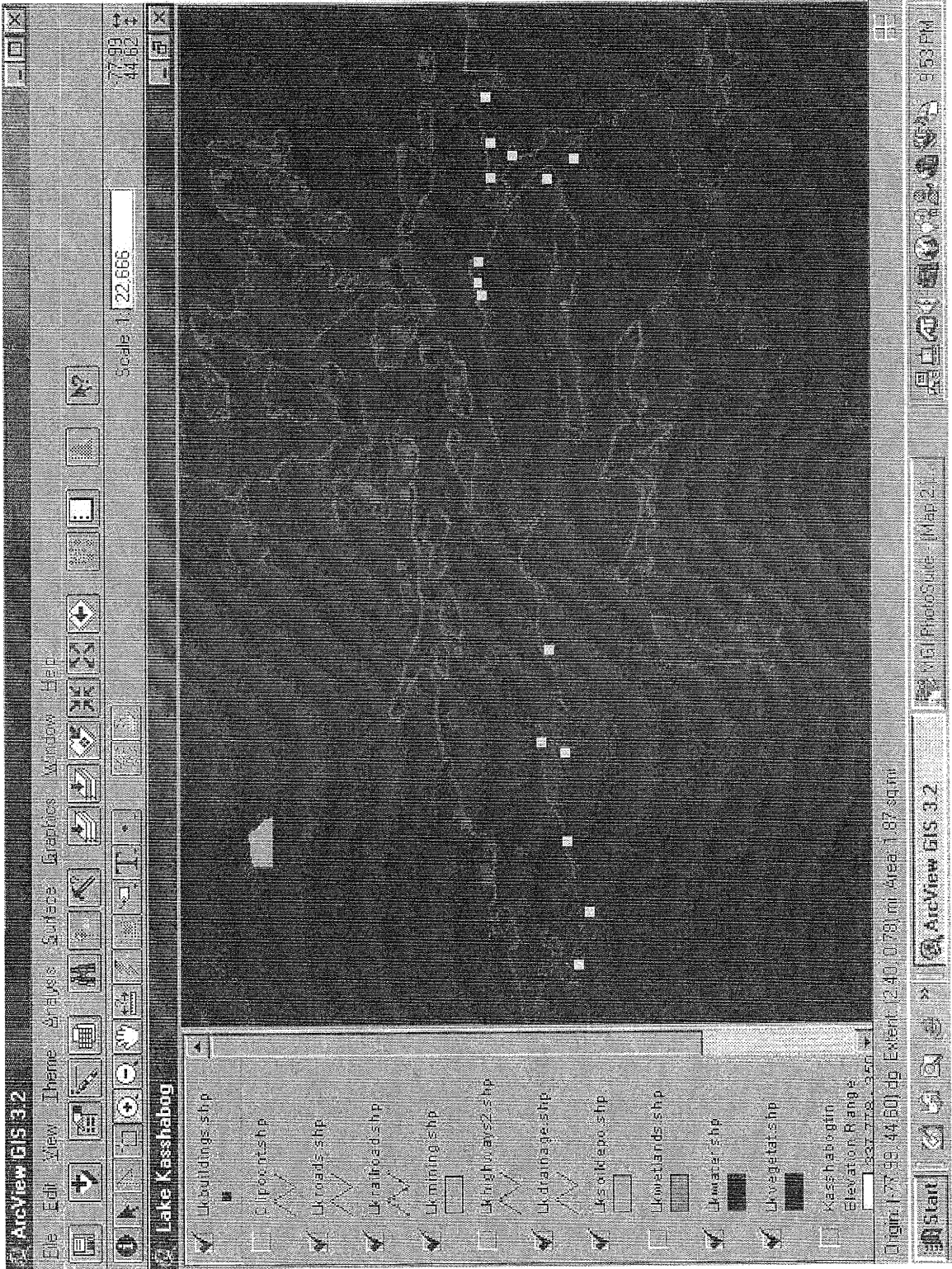
The yellow squares that are on these digital maps represent those cottages that were included on the paper map. Black squares represent cottages that were not on the corresponding paper map but may have been found on a different map.

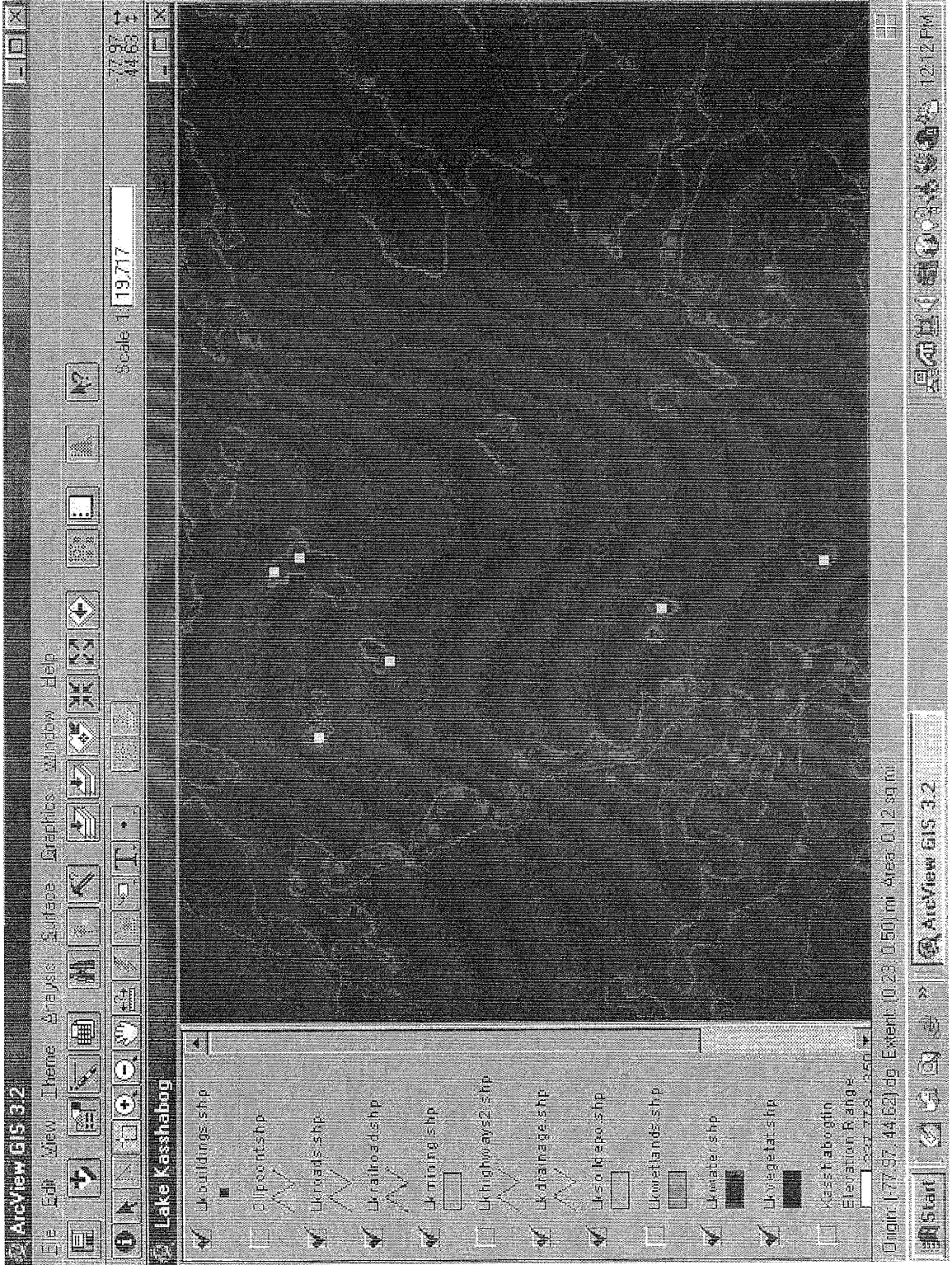
The Maps and Corresponding Paper maps are giving the following Codes, and are presented in numerical order:

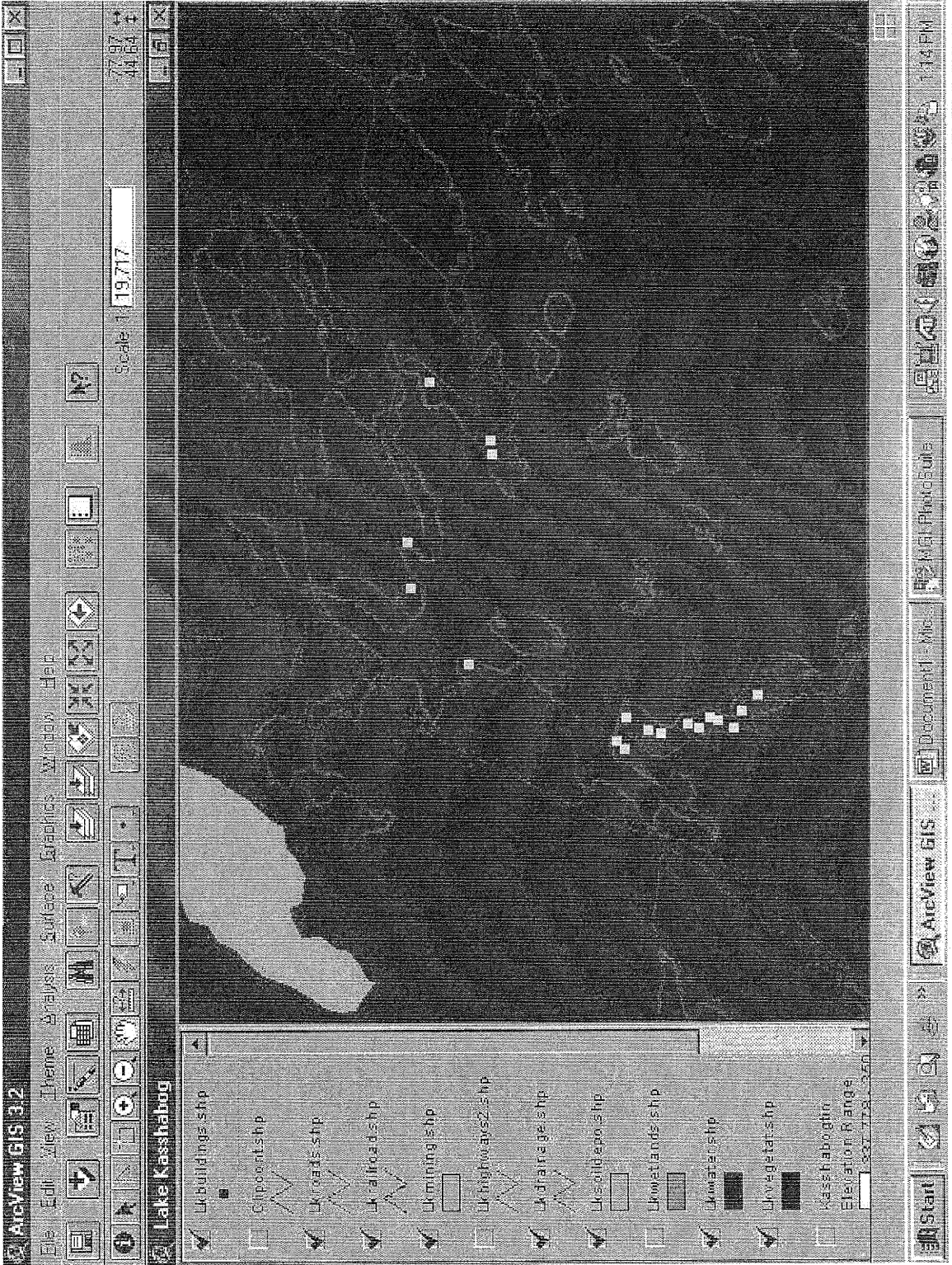
Map 1  
Map 2  
Map 3  
Map 4  
Map 5  
Map 6a  
Map 6b  
Map 7  
Map 8  
Map 9  
Map 10  
Map 11  
Map 12a  
Map 12b



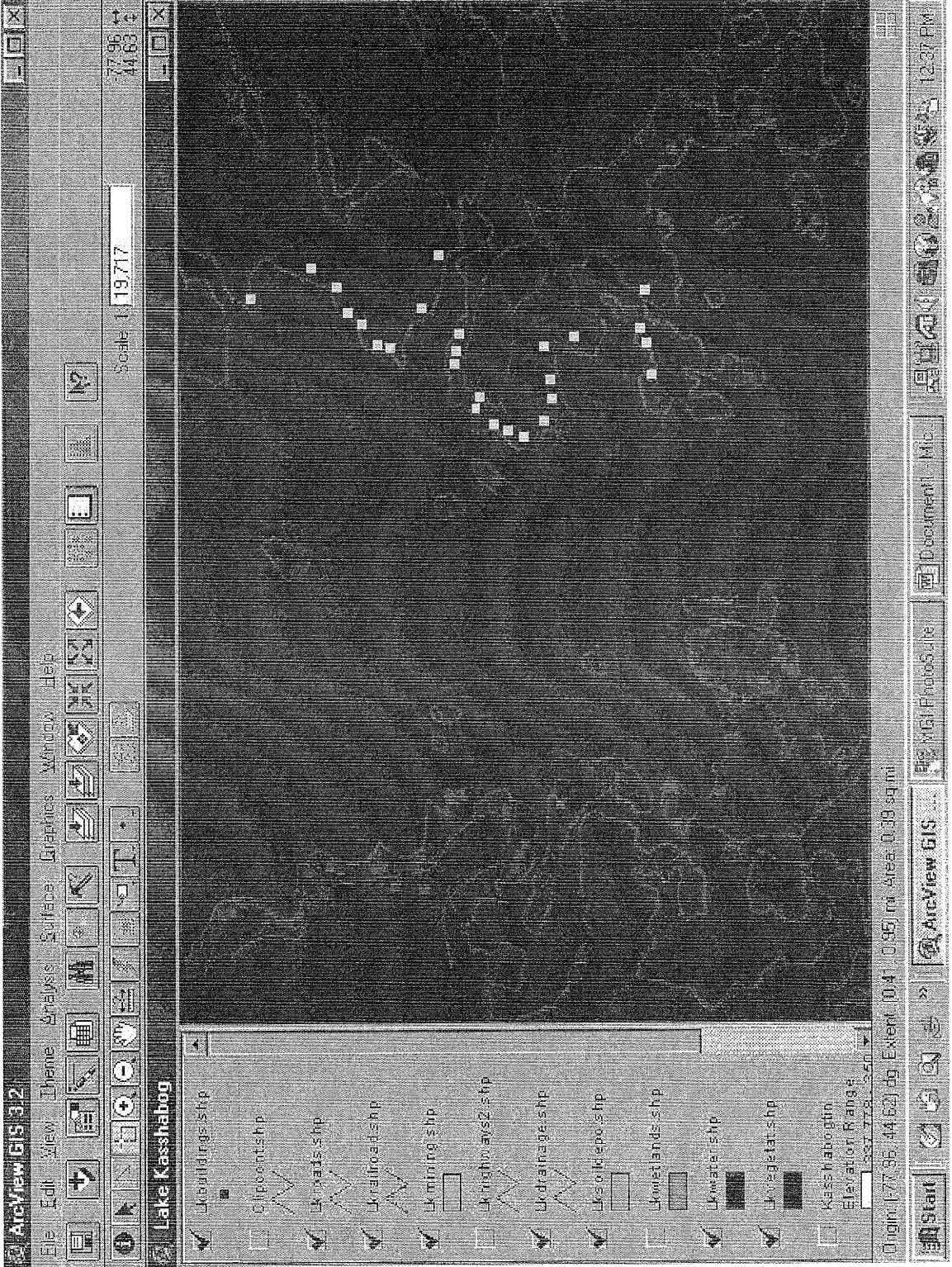




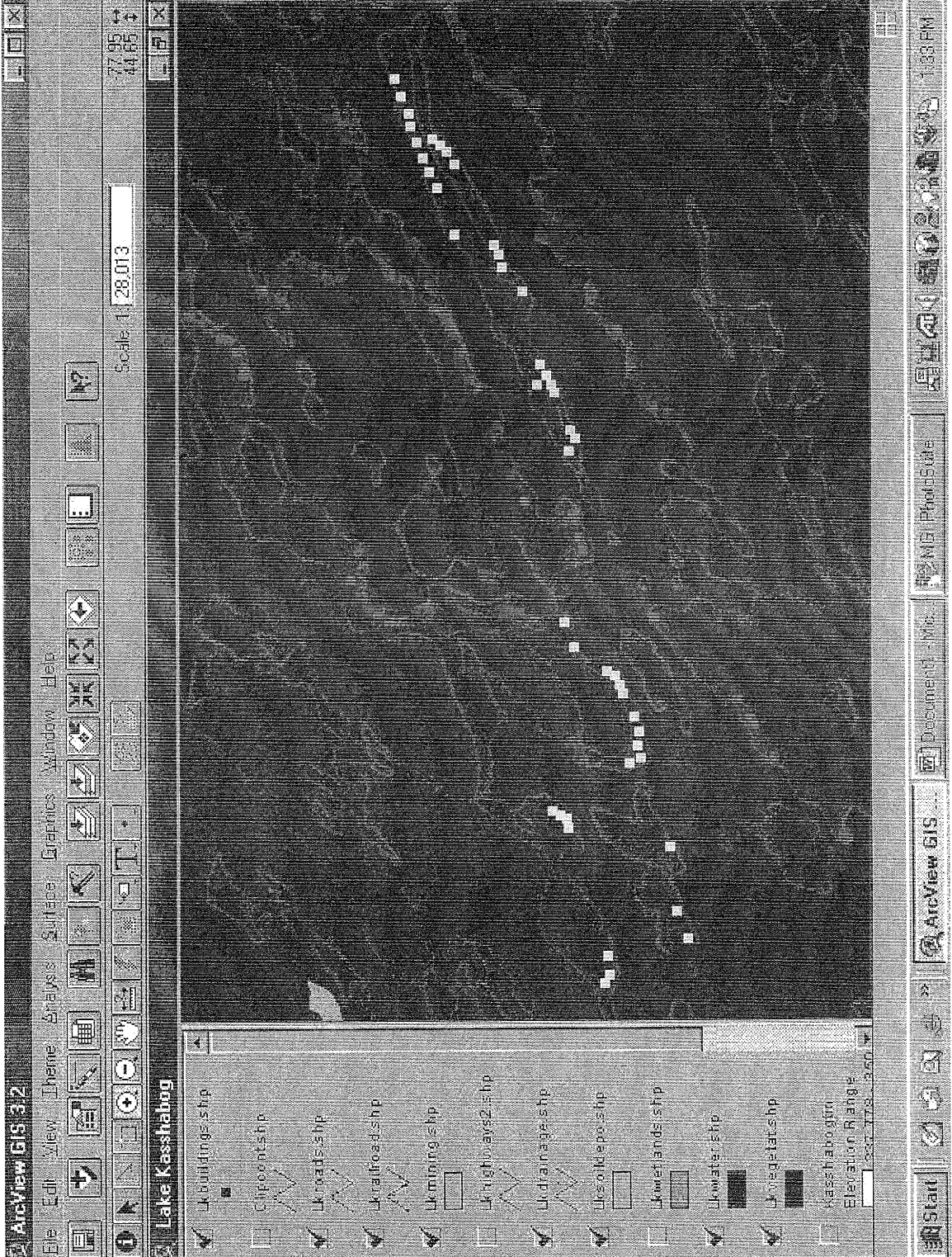


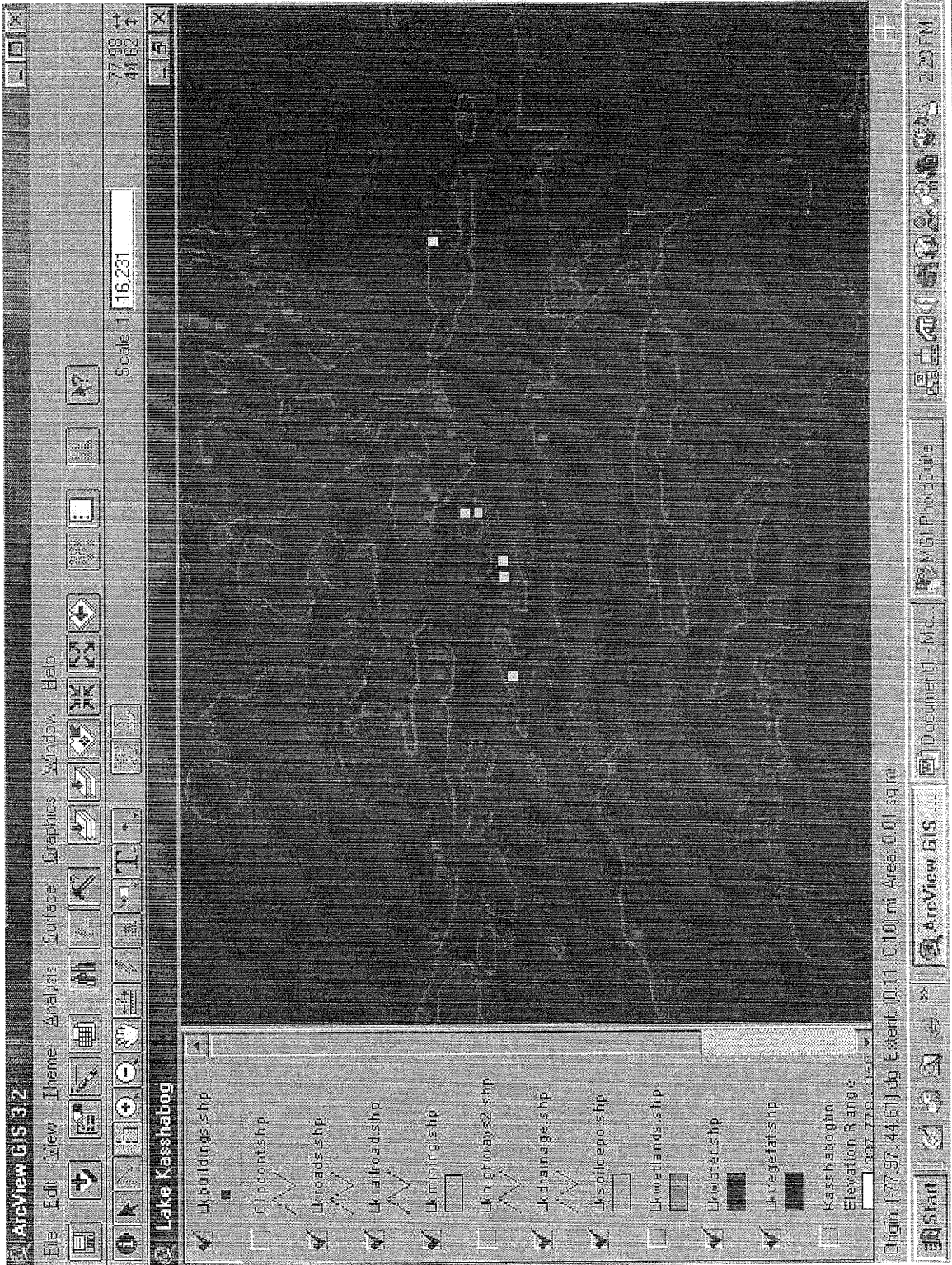


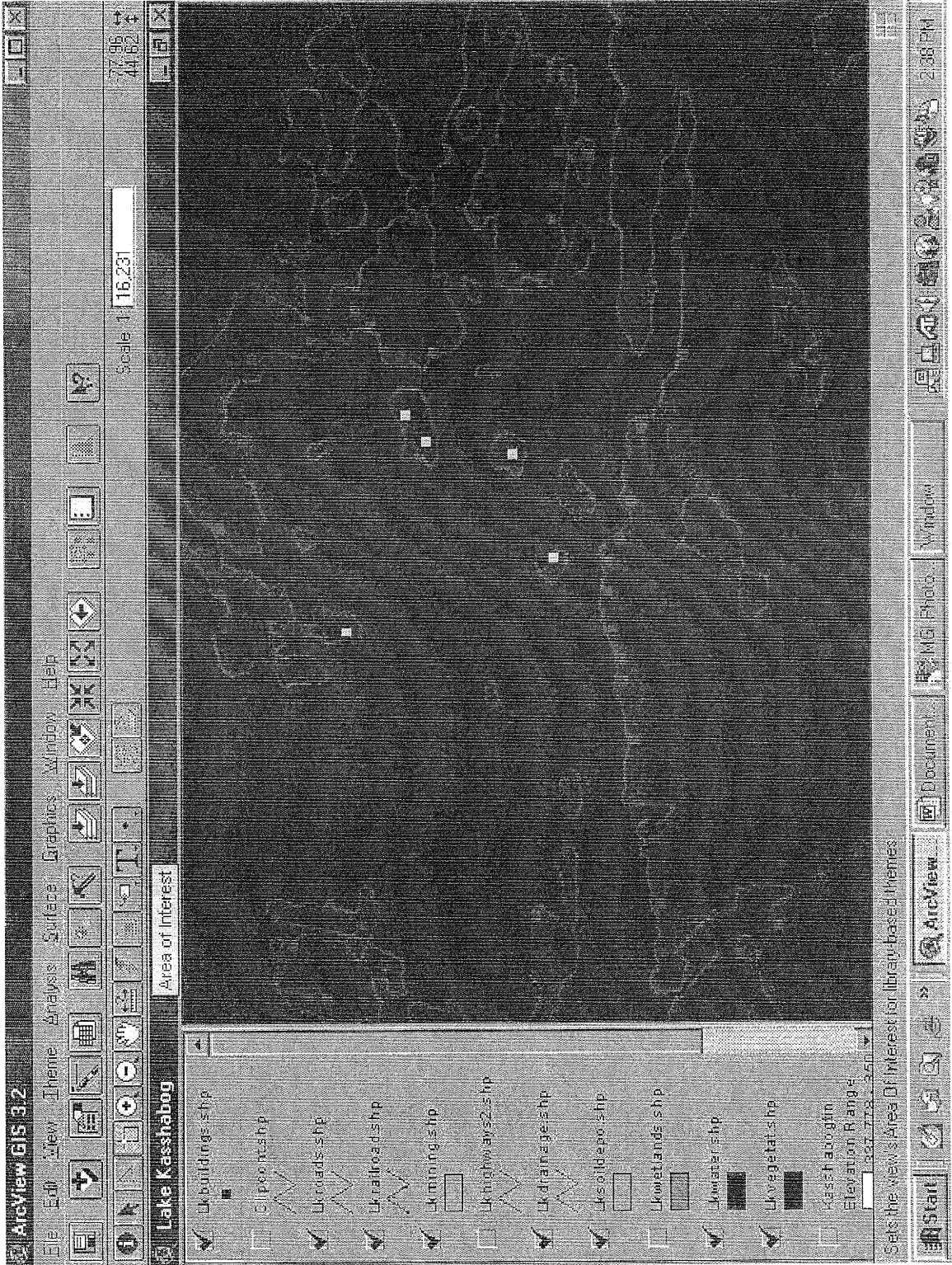


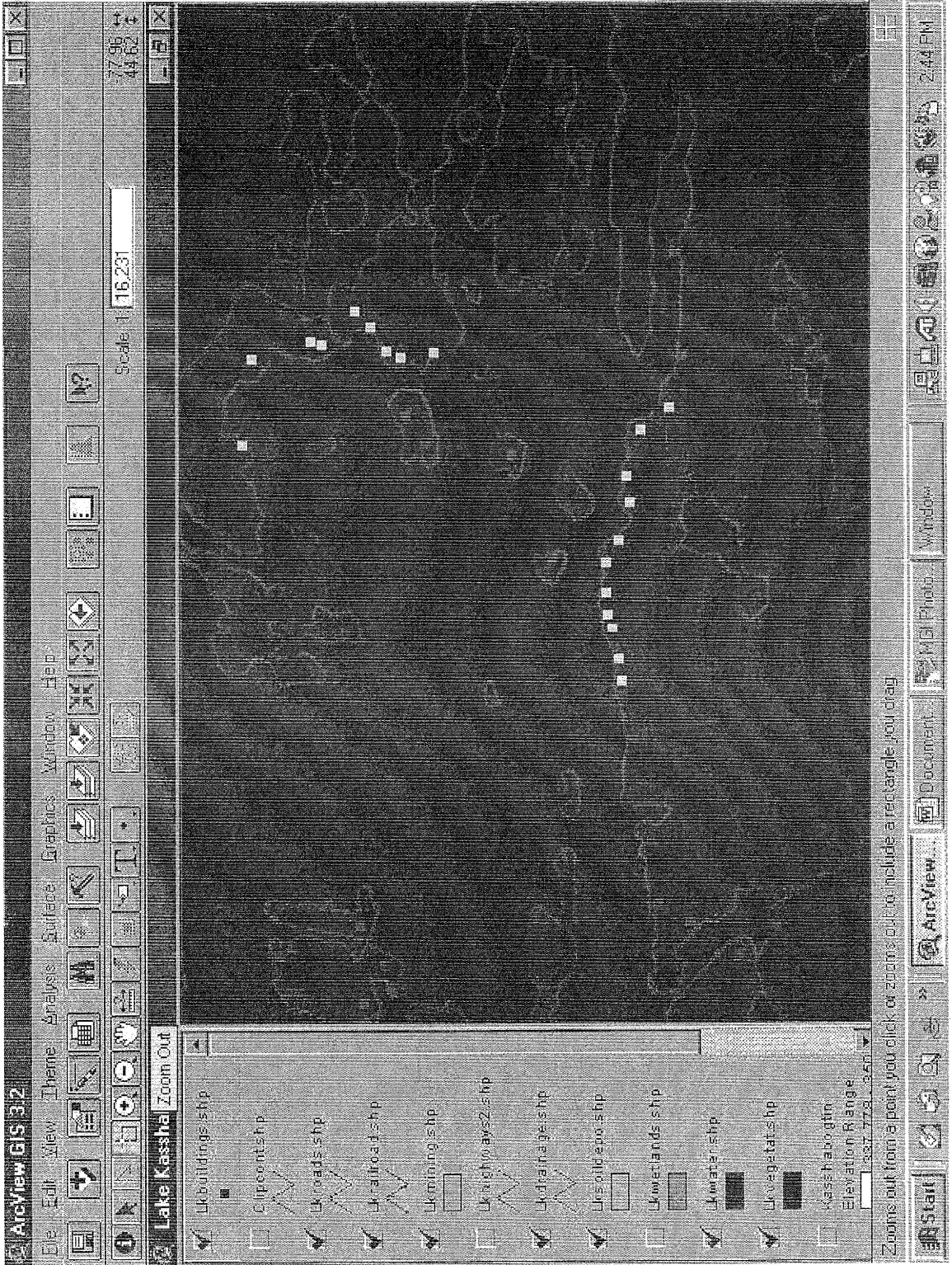


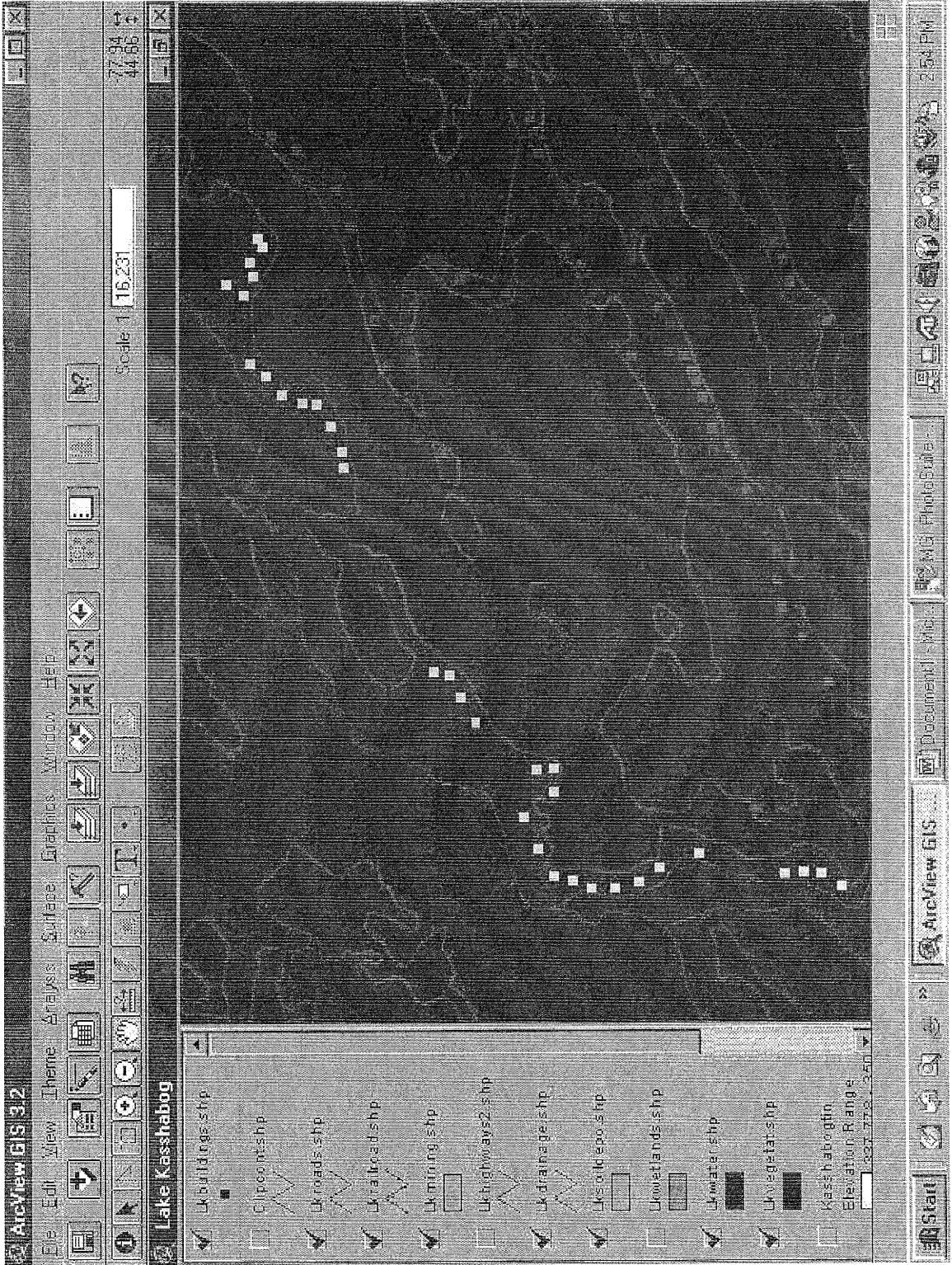


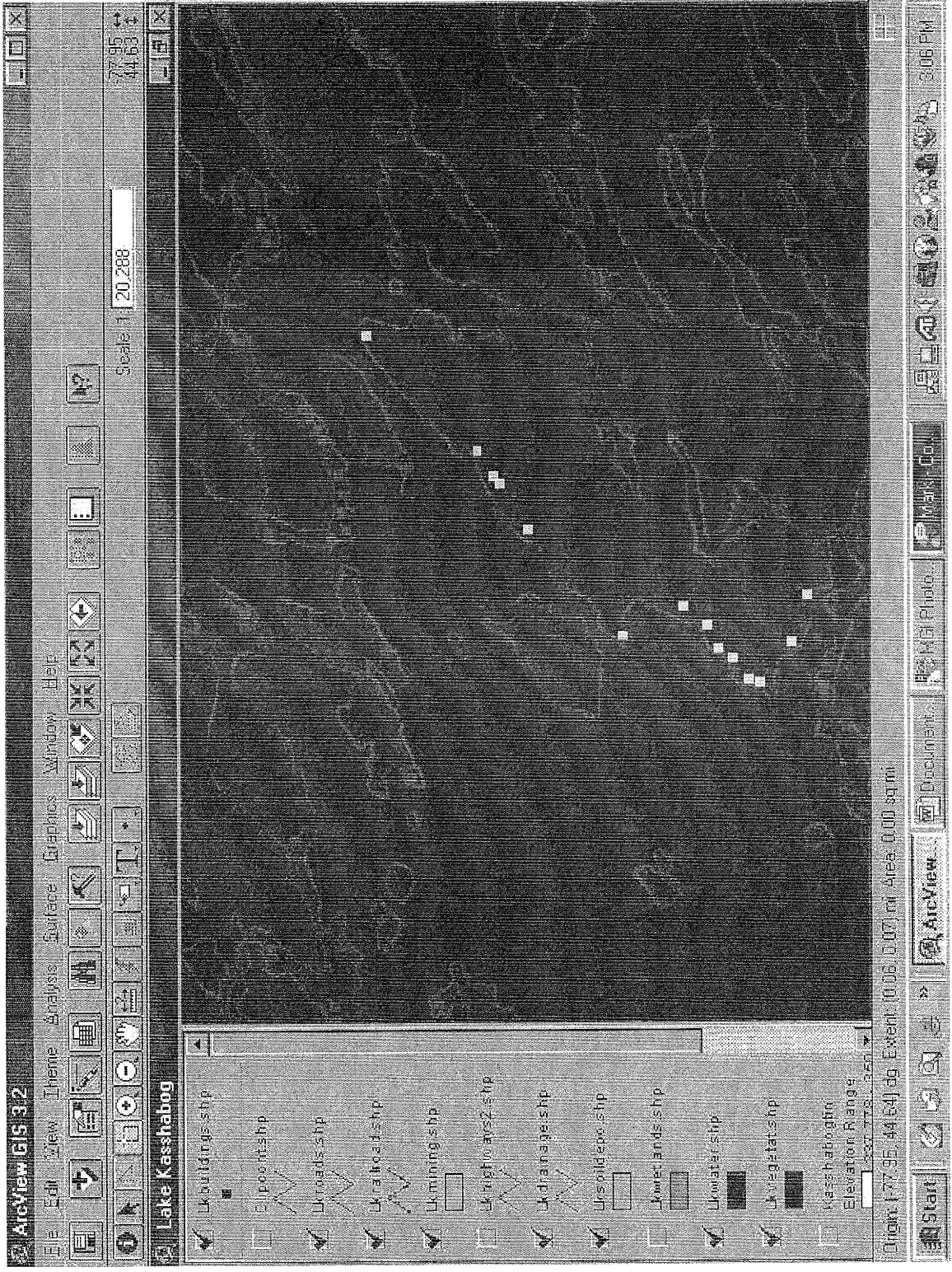




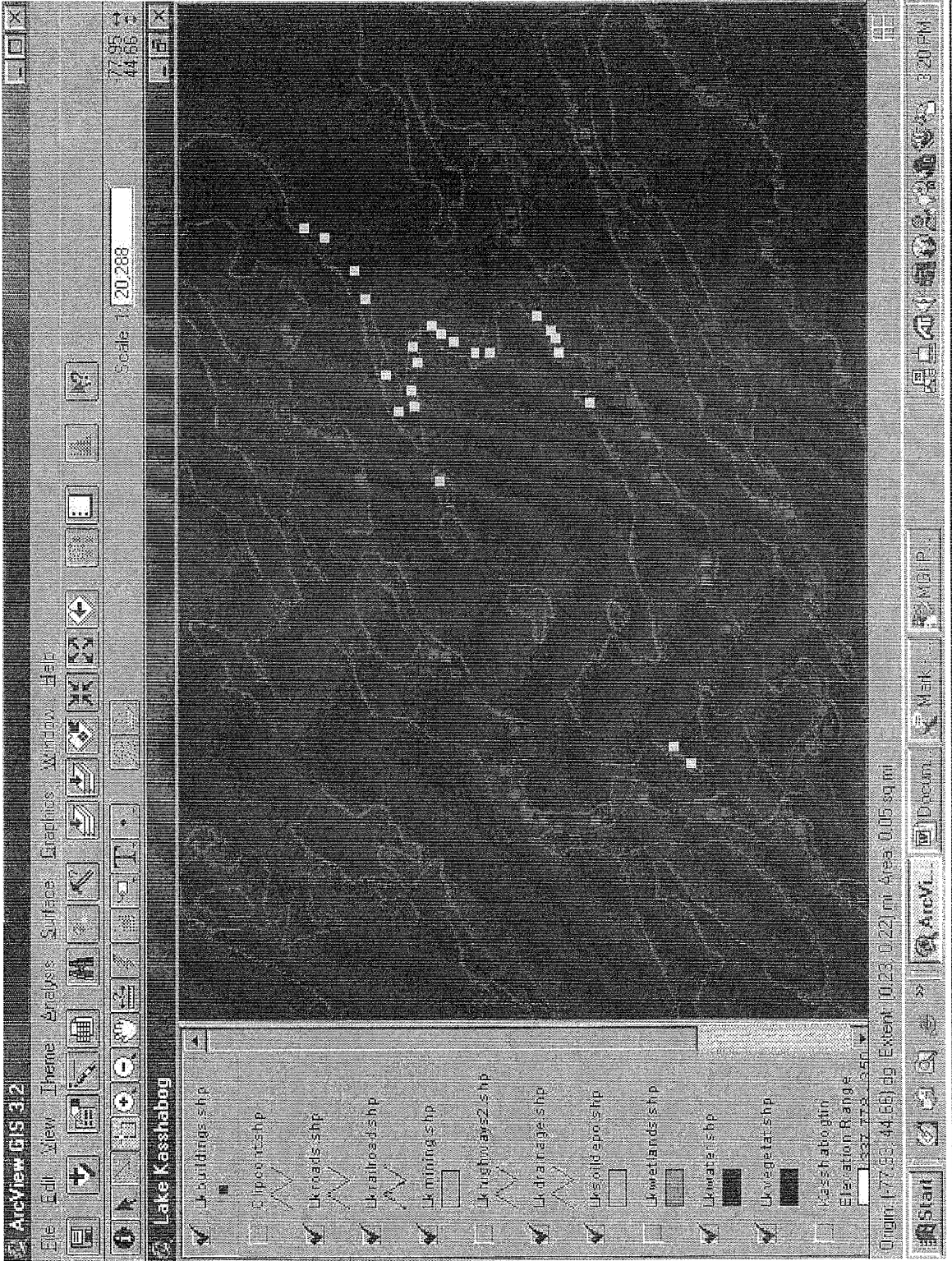












### **APPENDIX 3: ArcView (GUI) Scripts**

When run these scripts will automatically perform tasks that will make someone, unfamiliar with GIS, to quickly create new cottages, reposition existing cottages as well as query cottages and other lake information. They can be accessed by clicking on the scripts icon in the Project window of the ArcView Program and then by double clicking the script that you wish to look at.

### Cottage Query Tool

```
theView = av.finddoc ("Lake Kasshabog")
theTheme = theView.findtheme("lkbuildings.shp")
thetheme.setactive(true)
if (theTheme.HasAttributes) then
  theTheme.BuildQuery
end
```

### Cottage Select Tool

```
theView = av.GetActiveDoc
found = FALSE
p = theView.GetDisplay.ReturnUserPoint
for each t in theView.GetActiveThemes
  if (t.CanFindByPoint) then
    thmClass = t.GetClass.GetClassName
    scriptName = thmClass+".Identify"
    if (av.FindScript(scriptName) <> nil) then
      found = av.run(scriptName, {p,t,found})
    else
      keys = t.FindByPoint(p)
      for each key in keys
        found = TRUE
        idlabel = t.GetName++"- "
        f = NIL
        if (t.CanLabel) then
          f = t.GetLabelField
        end
        if (f = NIL) then
          if (key.Is(Number)) then
            idlabel = idlabel++key.SetFormat("d").AsString
          else
            idlabel = idlabel++" X :"+key.GetX.AsString++" Y :"+key.GetY.AsString
          end
        else
          s = t.ReturnValueString(f.GetName, key)
          idlabel = idlabel++s
        end
        t.Identify(key, idlabel)
      end
    end
  end
end
end
end
if (not found) then
  System.Beep
```

end

### Fanwort Select Tool

```
theView = av.FindDoc ("Lake Kasshabog")
found = FALSE
p = theView.GetDisplay.ReturnUserPoint
for each t in theView.GetActiveThemes
  if (t.CanFindByPoint) then
    thmClass = t.GetClass.GetClassName
    scriptName = thmClass+".Identify"
    if (av.FindScript(scriptName) <> nil) then
      found = av.run(scriptName, {p,t,found})
    else
      keys = t.FindByPoint(p)
      for each key in keys
        found = TRUE
        idlabel = t.GetName+++"-"
        f = NIL
        if (t.CanLabel) then
          f = t.GetLabelField
        end
        if (f = NIL) then
          if (key.Is(Number)) then
            idlabel = idlabel++key.SetFormat("d").AsString
          else
            idlabel = idlabel++" X :"+key.GetX.AsString++" Y :"+key.GetY.AsString
          end
        else
          s = t.ReturnValueString(f.GetName, key)
          idlabel = idlabel++s
        end
        t.Identify(key, idlabel)
      end
    end
  end
end
end
```

### Cottage Create Tool

```
theView = av.FindDoc("Lake Kasshabog")
active = theView.findtheme("lkbuildings.shp")
active.setactive(true)
editThm = theView.GetEditableTheme

if (editThm <> nil) then
  ' we need to stop editing this theme
```

```

doSave = MsgBox.YesNoCancel("Save Edits to "+editThm.GetName+
"?", "Stop Editing", true)
if (doSave = nil) then
    return nil
end
if (editThm.StopEditing(doSave).Not) then
    ' save failed, remain editing this theme
    MsgBox.Info ("Unable to Save Edits to "
        + editThm.GetName +
        ", please use the Save Edits As option", "")
    return nil
end
' save succeeded
theView.SetEditableTheme(NIL)

if (editThm = active) then
    ' user wanted to stop editing the active theme, were done
    return nil
end

end

```

```

if (active.GetFTab.IsBeingEditedWithRecovery) then

```

```

' user wants to edit the active theme in the view, but its
' table doc is already being edited - force the
' user to stop editing the table

```

```

doSave = MsgBox.YesNoCancel("Save Edits to the table for "+
active.GetName+"?", "Stop Editing", True)

```

```

if (doSave = nil) then
    return nil
end

```

```

if (active.GetFTab.StopEditingWithRecovery(doSave).Not) then

```

```

    MsgBox.Info ("Unable to Save Edits, please use the Save Edits As option", "")

```

```

    return nil 'unable to save, remain editing

```

```

end
end

```

```

' start editing the active theme
theView.SetEditableTheme(active)

```

## Copy Cottage Tool

```
'a.SelectCottageTool
theView = av.FindDoc ("Lake Kasshabog")
theTheme = theView.GetEditableTheme
if (theTheme = nil) then
  theView.Select
else
  theTheme.GetFTab.BeginTransaction
  theTheme.Select
  theTheme.GetFTab.EndTransaction
end
av.GetProject.SetModified(true)
```

#### **APPENDIX 4: Metadata**

This is simply the description of each of the variables that are found in the LKRA database.

Field Name	Data Type	Description
Cottage ID	Number	Cottage Location ID - This is from Arcview (Identify Each Cottage)
Associated Paper Map	Text	Paper map that Cottages are Found on
Number on Paper Map	Text	Number that is Assigned to Cottage on the Paper Map
Shoreline Type	Text	Type of Shoreline (i.e. Beach, Rock, etc. - Taken From Paper Map)
Boathouse	Yes/No	Is there a Boathouse or Multiple Boathouses?
Dock	Yes/No	Do they have a dock - Regardless of length
Dock Type	Text	Description of Dock - If Available from Paper Map
Objects in Water	Text	Are there any Objects Present in the Water (i.e. Poles, Hoses, etc. - From Paper Map)
Tree Type	Text	What Types of Trees are on the Shore - From Paper Map
Modified Yard	Text	Do they Cut Their Grass or is it Natural
Modified Shoreline	Text	I.E. Rock Walls, Gardens by the water, Fire Pits, etc. - From Paper Map
Cottage Size	Text	Small/Medium/Large - Based on Info From Paper Map Descriptions
Soil Type	Text	Characteristics of Soil - Description from Paper Map
Environmental Issues	Text	Any Problems with this Cottage in terms of Environmental Issues
Other	Text	Anything worth Mentioning

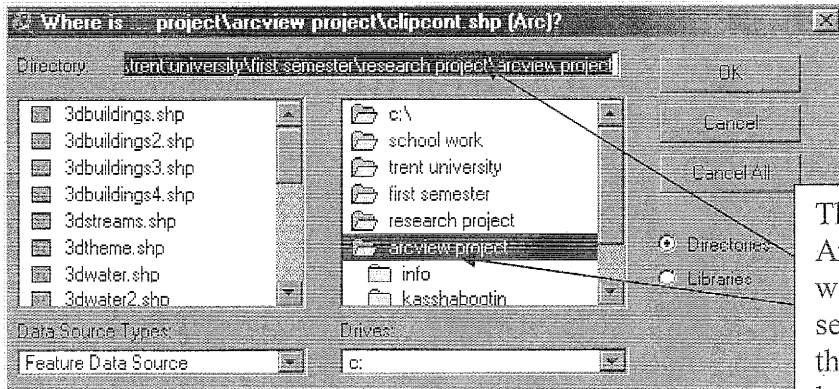
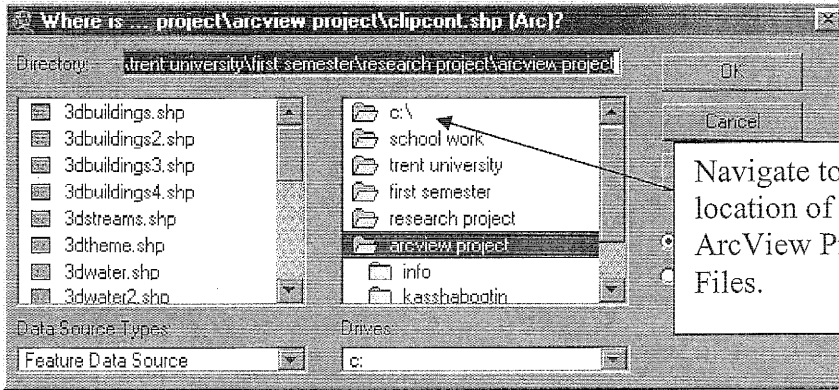


**APPENDIX 5: Original Completion Dates/Project Goals**

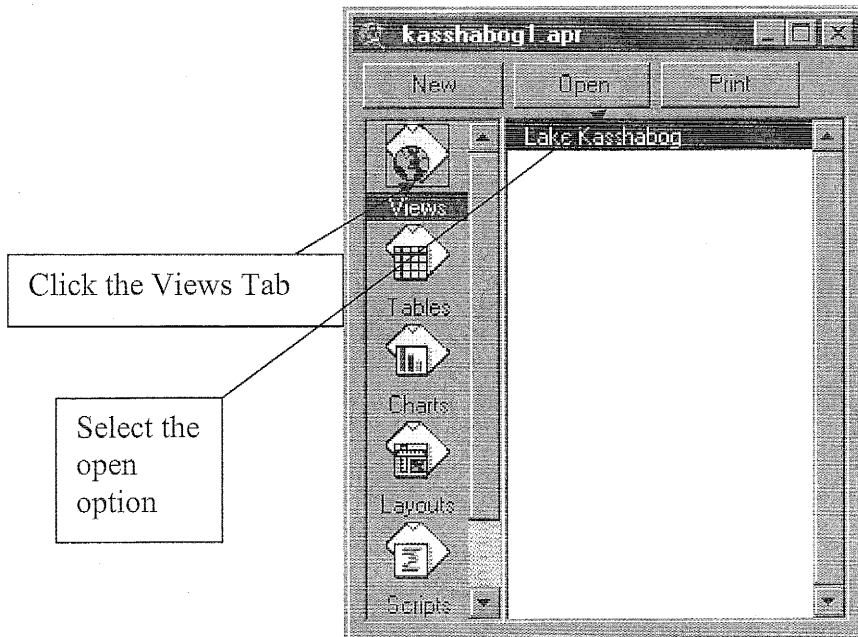
Task/Step	Objective	Time Req'd	End Date
Visit/meeting with supervisor	To get acquainted with the organization and understand what the LKRA is all about	1 hr.	Sept 23/02
Strategy meeting with supervisor	To learn about the project, introduce what data is available, set objectives and determine format.	3 hrs.	Sept 30/02
Review a paper map of the area	To determine the geographic location of Lake Kasshabog.	1 hr.	Sept. 30/02
Obtain digital topographic map of Lake Kasshabog from the MNR	Helpful in beginning work on the project	3 hrs.	Oct 18/02
Project Proposal: Outline the goals of the project to be assessed as first component of the final report.	To assess material appropriateness and effectiveness towards credit in Geography 440	5 hrs.	Oct 31/02
Read and review the LKRA information	To gather the needed information and try to apply it to the project as best we can	5 hrs.	Nov 1/02
Import digital map into ArcView shapefile	To be able to work with the data and the map, the files must be imported into ArcView	1/2 hr.	Nov 7/02
Decide what layers on the topographic map are going to be used and archive the rest	To determine the useful layers of the map and which ones will help to answer the key research questions of the project	8 hrs.	Nov 20/02
Review what other digital data may be available to help accomplish the management goals	Determine if there are any relevant data that can be used from the MNR data.	3 hrs	Nov 22/02
Determine what attributes are going to be used in the database	To get the proper data that will be used to answer the research questions	3 hrs.	Nov 28/02
Develop a database that will contain the tables that are relevant to the project	Create the tables that are going to hold the information gathered about the project	3 hrs.	Dec 5/02
Input the data into the tables that are in the database	Create the data that will eventually be linked to the map of the lake	25 hrs.	Jan 15/03
Create the new shapefiles to add to the map, based on some of the information in the database and paper maps	Create the new layers to add to the topographic digital map	25 hrs.	Jan 31/03
Link the Database to the ArcView Project	To be able to see the data when a specific area is clicked on the map	10 hrs.	Feb 10/03
Create maps that will help convey to the LKRA what is happening with the ecology of the lake due to human activity and other ecological influences	To show the LKRA what is going on at the lake	15 hrs.	Feb 27/03

**APPENDIX 6: User Guide/Help Manual**

This aid will allow the users of the project to quickly reference anything that they are not familiar with in the ArcView aspect of the project.



**Opening the Map in ArcView**



## Opening Theme Tables

Select the Theme whose table you want to

Click the open theme table button

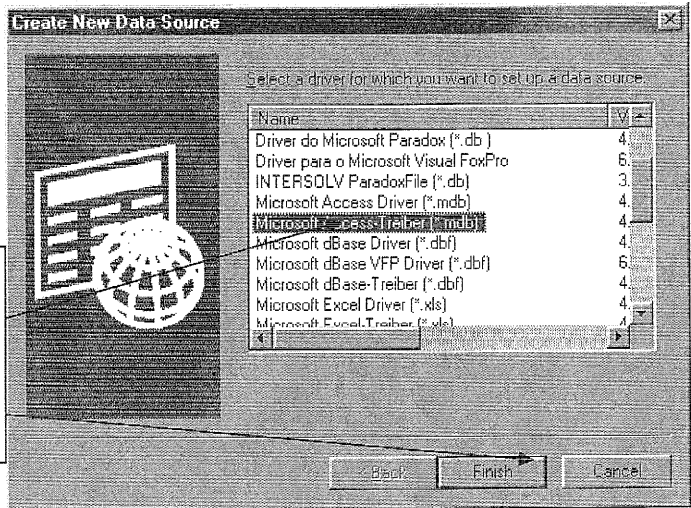
The screenshot shows the ArcView GIS 3.2a interface. The 'Open Theme Table' button is highlighted in the toolbar. A list of theme tables is visible on the left, including 'Buildings.shp', 'Kasshaboglake.shp', 'Lkpercent.shp', 'Lkroad.shp', 'Lkrrailroad.shp', 'Lkmining.shp', 'Lkhighways.shp', 'Lkdrainage.shp', 'Lkalltaps.shp', and 'Lkwetlands.shp'. The main map area shows a dark, textured map of Lake Kasshabog.

## Editing the Theme Table

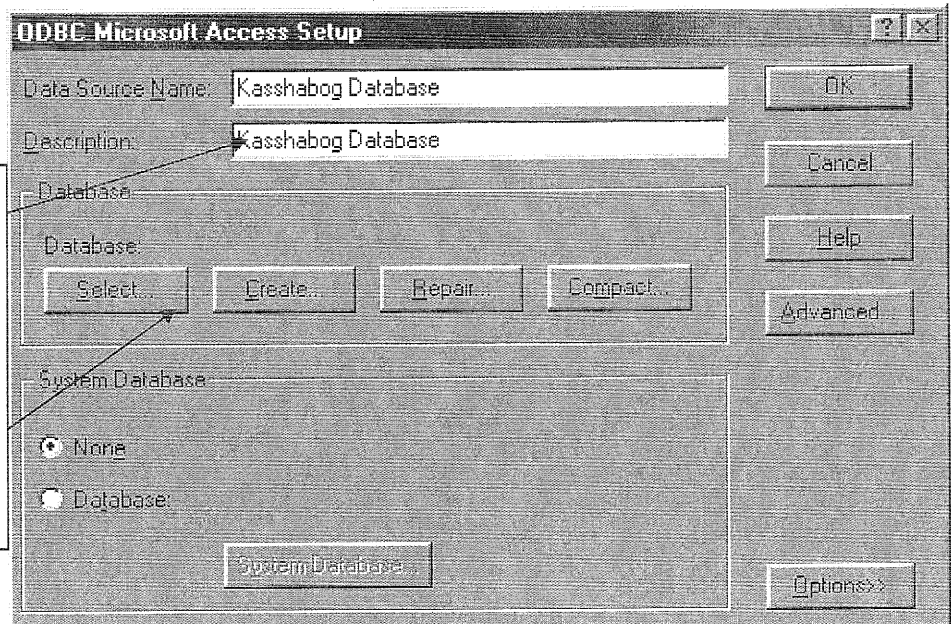
In the theme table click table in the menu bar then select "start editing"

The screenshot shows the ArcView GIS 3.2a interface with the 'Buildings' theme table selected. The 'Start Editing' option is highlighted in the 'Buildings' menu. The main map area shows a table of data for the 'Buildings' theme table.

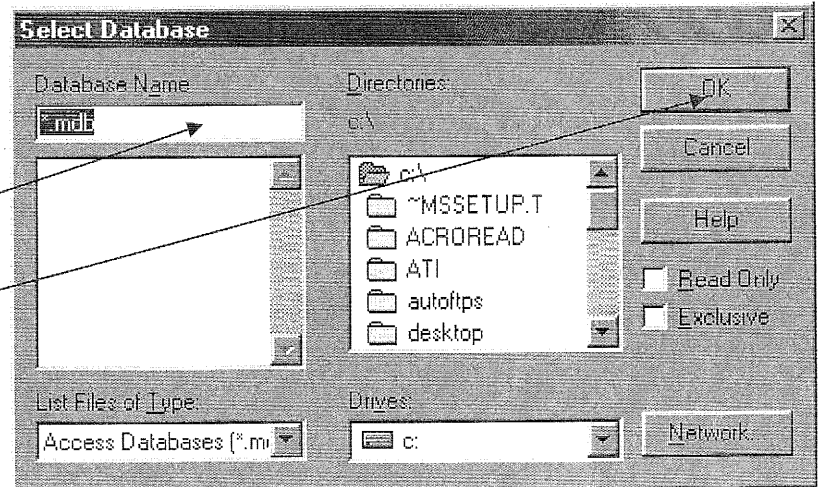
Shape	Number of Vertices	Number of Faces	Shapefile Type	Area	Units
Point	6			0	0
Point	136			0	0
Point	6		N/A	0	1 Permanent
Point	32			0	0
Point	24			0	0
Point	30			0	0
Point	21			0	0
Point	48			0	0
Point	28			0	0
Point	27			0	0
Point	25			0	0
Point	26			0	0
Point	27			0	0
Point	19			0	0
Point	17			0	0
Point	19			0	0
Point	75			0	0
Point	39			0	0
Point	4			0	0
Point	22			0	0
Point	10			0	0
Point	59			0	0
Point	6			0	0
Point	41			0	0
Point	69			0	0
Point	38			0	0



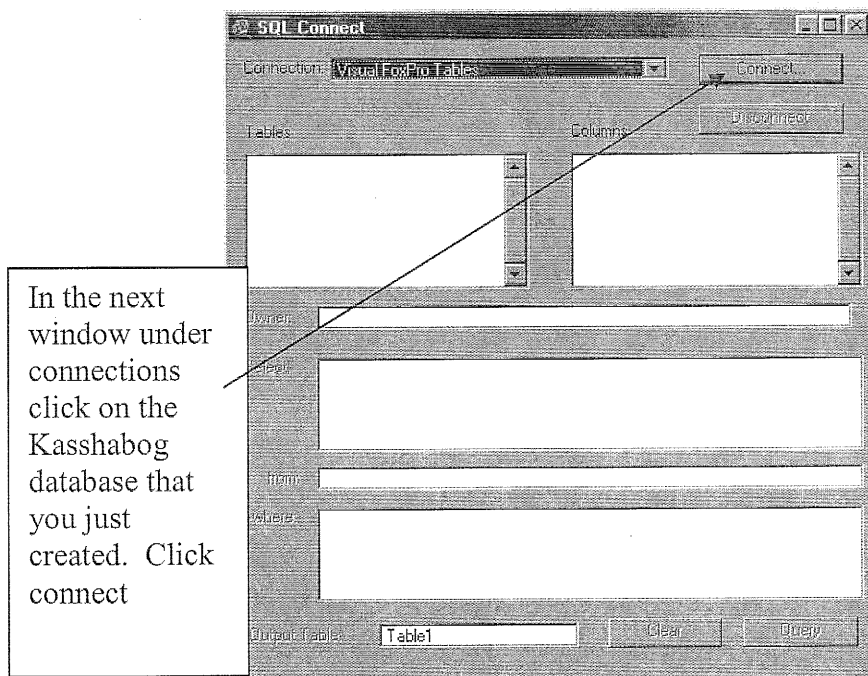
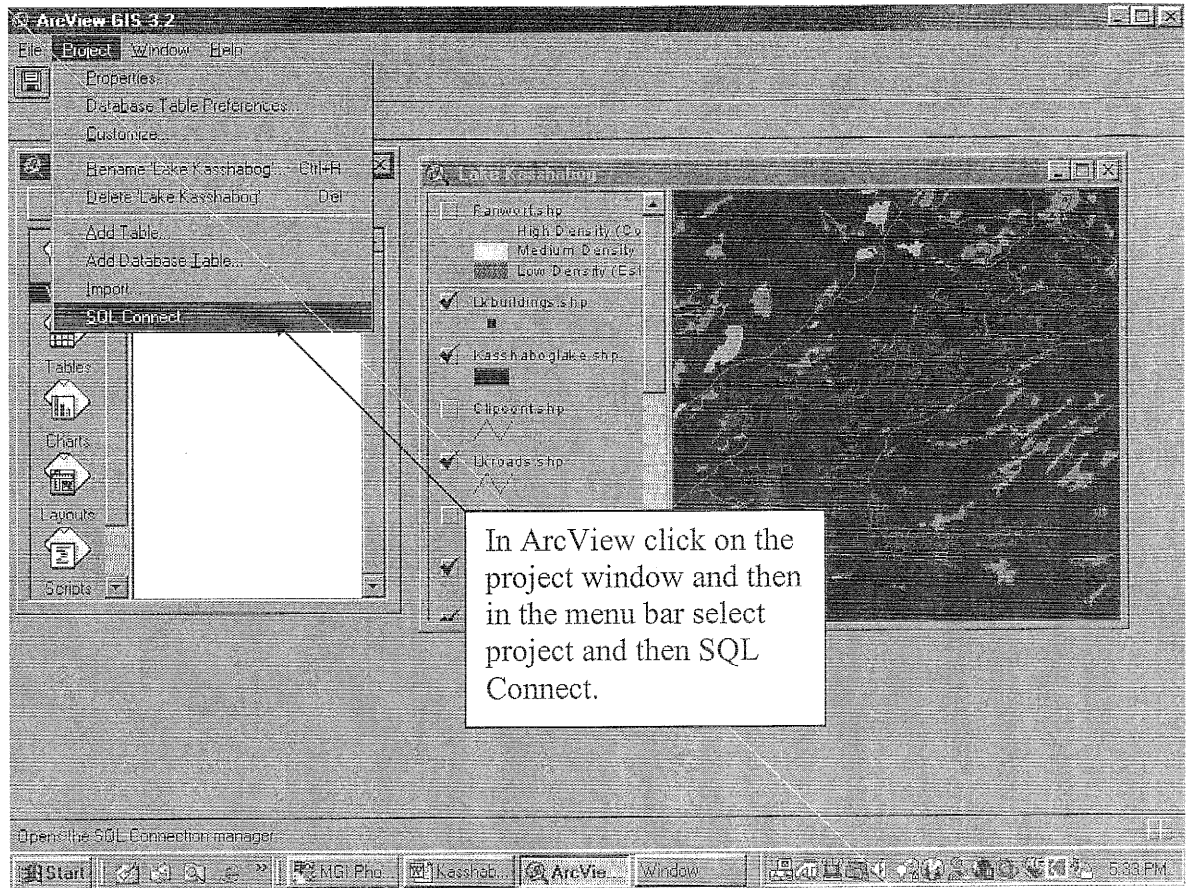
Select the Microsoft Access Driver Option and click finish



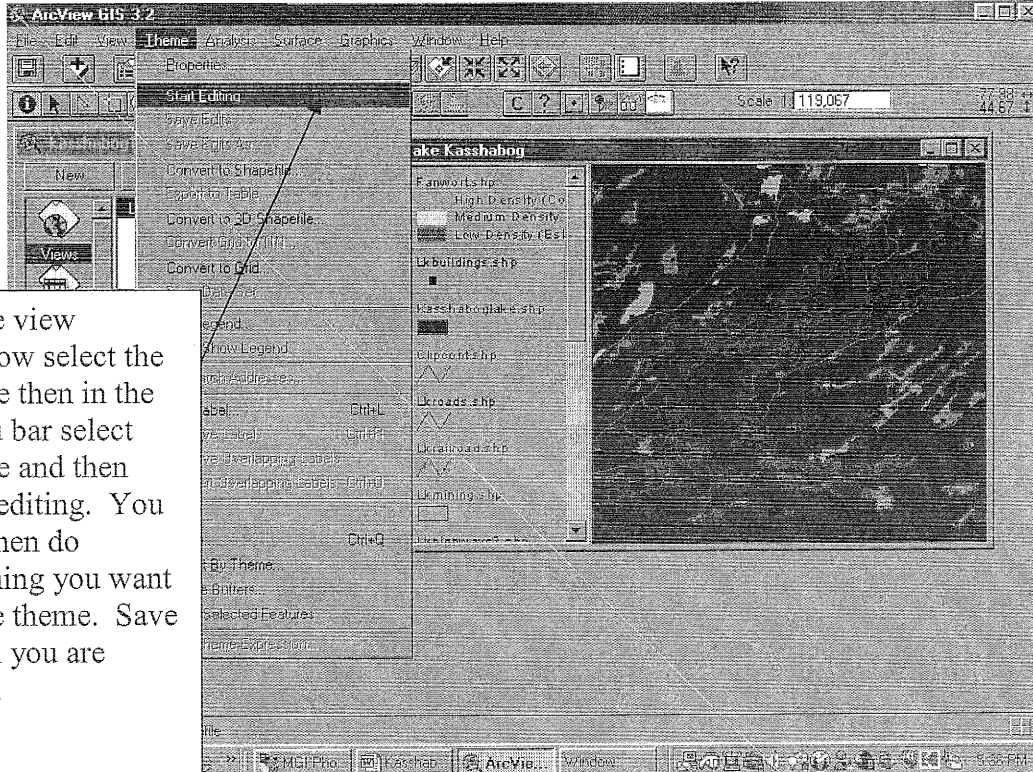
Input the Data Source Name and the Description of the Database.  
Click the Select Button



Select the location of the Database and click OK

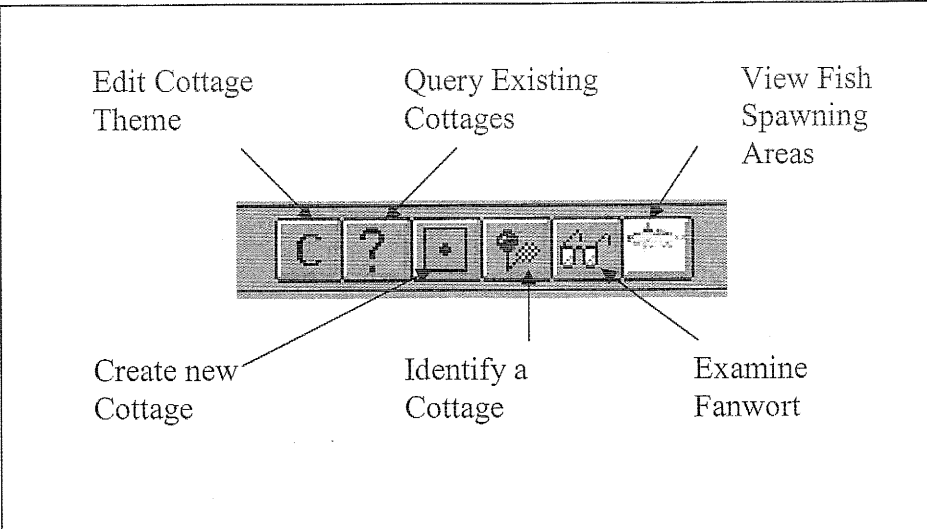


## Editing the Theme



In the view window select the theme then in the menu bar select theme and then start editing. You can then do anything you want to the theme. Save when you are done.

## Customized tool Bar



Edit Cottage Theme

Query Existing Cottages

View Fish Spawning Areas

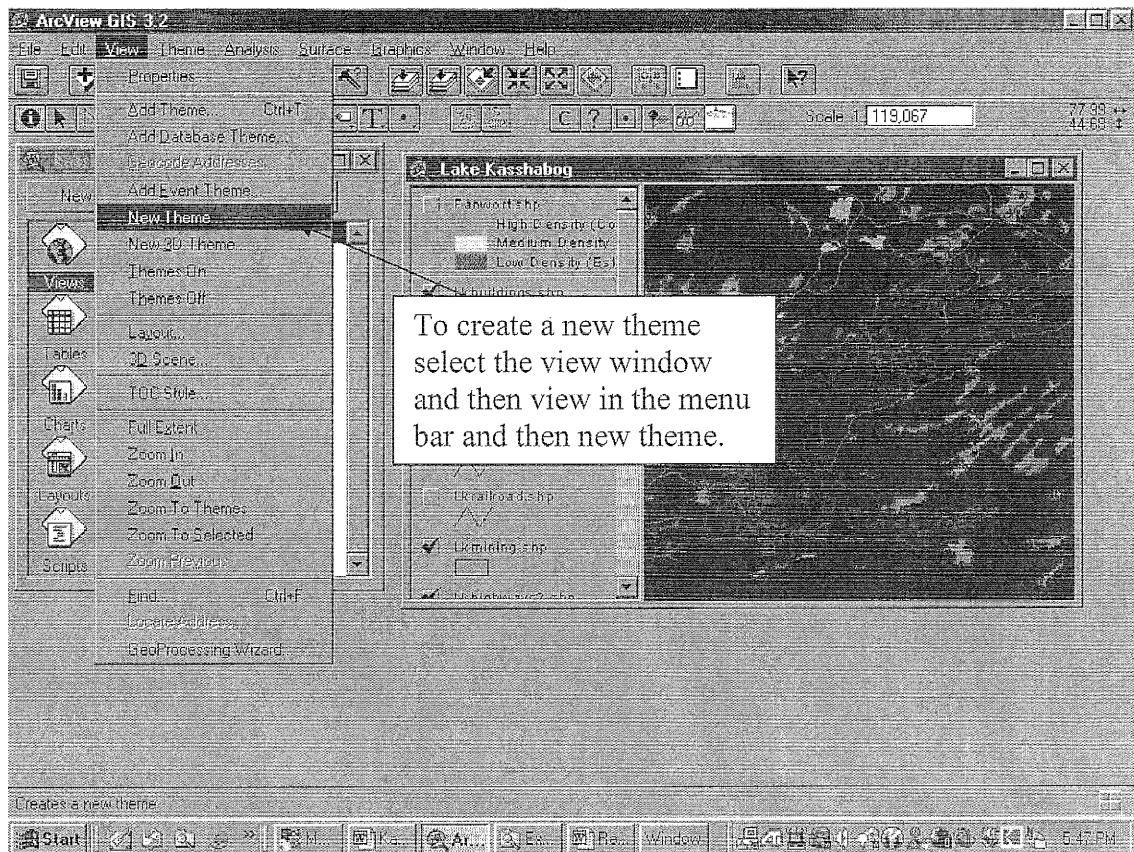
Create new Cottage

Identify a Cottage

Examine Fanwort



## Creating new Maps



## Creating the new Fanwort Areas

- To create new areas of fanwort select the fanwort theme and then start editing the theme as described above. Draw the new areas of fanwort on the map, then go into the table, start editing it and give it a new code based on the density type.

## Creating the New Cottages

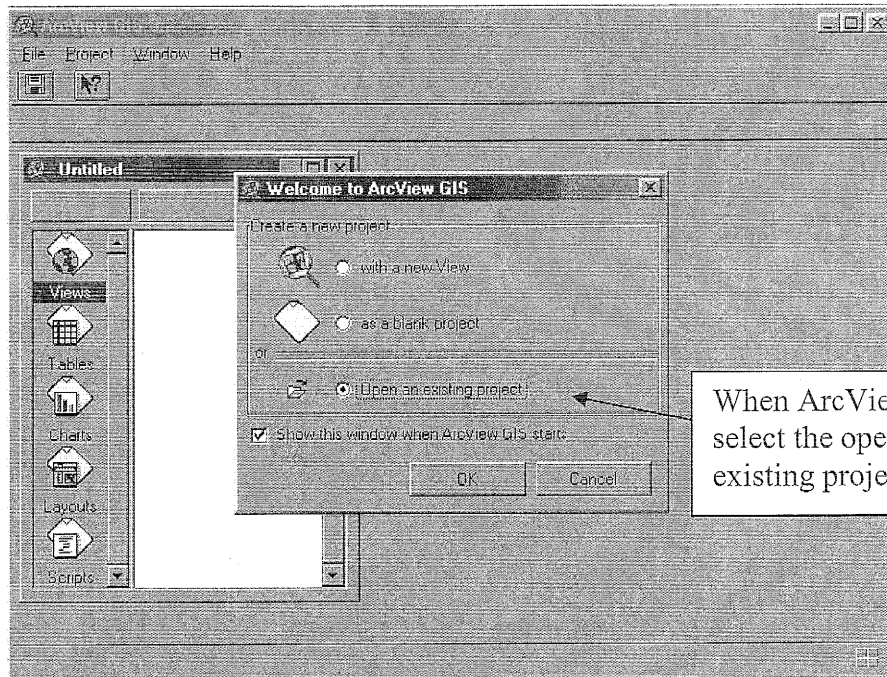
- Start editing the cottage theme and then select one of the cottages and copy and paste it somewhere in the map and then drag it to its new location.
- Once done make sure that the save is completed and then go into the theme table and start editing it and give the newly created cottage the next ID number in the sequence of ID numbers.

For any extra help please refer to the Getting to Know ArcView GIS tutorial CD accompanied with this manual.

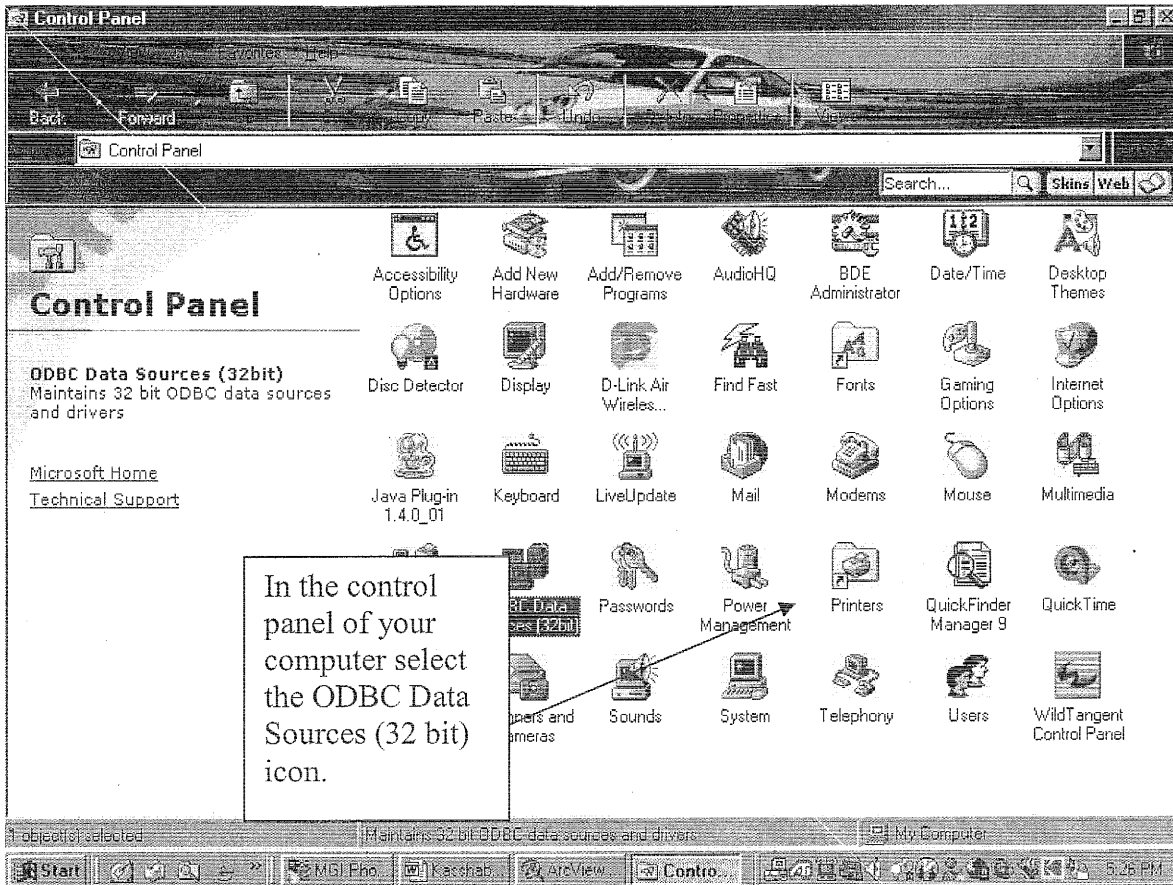
Final Report: Prepare a Presentation on the project for Geography 440 class	To present the material researched for the project on Kassarabog Lake	10 hrs.	March 3/03
Final Report: Presentation due			March 13/03
Final Report: Outline an implementation strategy for the findings of the research project	To provide direction on how to implement action on Kassarabog lake development	10 hrs.	March 14/03
Final Report: Draft Final Report	Compile all other components of the project to be presented as a final report for Prof. Cogley (instructor), LKRA (Client) and TCCBE	10 hrs.	March 20/03
Final Report: Due			April 3/03

# Kasshabog User/Help Manual

## Opening the ArcView Project



## Linking the Database to the Project



Select the MS Access Database XP option and click the add button.

