

# **Inventory Of Tourism In Cross River State, Nigeria, Using Geographical Information System (GIS)**

**Ekpo EFFIONG, Felix IYIOLA, Phillip IBE, Adedayo ALAGBE, Mary LIWHU,  
Nigeria**

**Key words:** Tourist Sites, GIS, Database

## **SUMMARY**

Tourism in Cross River state is geared towards the diversification of the state based industry as well as providing an alternative means of improving the state internally generated revenue. It is expected that the construction and maintenance of huge tourism and travel facilities as well as the provision of accompanying services would be an important incentive for economic growth and development of the state. One of the most remarkable technologic innovations in tourism planning and decision making is Geographic Information Systems (GIS). Tourism is an activity highly depended on environmental resources. It is also a phenomenon, which in the event of a lack of planning and management is likely to erode its environmental base, hence, the strength of tourism planning and decision making can be enhanced by GIS technology, which can provide a toolbox of techniques and technologies of wide applicability to the achievement of sustainable tourism development. This technology has been integrated in this research with the aim of creating an inventory map showing all the important tourist sites within the state that can serve as a guide for the intended tourists. Methodology adopted included database design, acquisition of geometric data through handheld GPS, acquisition of attribute data, database creation, and spatial analyses. The study made recommendations on how tourism can be used for improving internally generated revenue in the state.

## **ABSTRACT**

This research was initiated to identify important tourism sites in Cross-River state. Tourism has been considered to be one of the crucial industries in the world due to it being source of income. It enables people from different cultures to interact with each other. Cross River State is blessed with a lot of tourism sites which are yet to be discovered. For the purpose of this work, the technology of Geographic Information System has been deployed to capture the inventory of the tourist sites within the state to make it known and readily accessible so that people can have information about them. Each state in Nigeria must be conscious of her tourism potentials and make use of GIS to manage tourism effectively. Every local government should advertise her history, architectural characteristics of buildings and the spectacular sites in other to make them known all over. These details can be obtained in a spatial search by forming a spatial connection with GIS. Complementing tourism sites are hotels; complementing tourism service is police post. The positional values of the tourist sites were acquired through handheld GPS while the secondary data was the existing map of Cross River state. The existing map of Cross River state was converted to digital form. The spatial database was created in ArcGIS 9.3. The analyses incorporated in this research included

network analysis, and spatial search operation. The products generated will enable tourism authority to plan for security, enable government officials to have electronic records of the attractions offered by each tourism site and thereby enable tourists have an overview of tourism resources within the state.

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## **1. INTRODUCTION**

The success of tourism in any state or country depends on the ability of that state to sufficiently develop, manage and market the tourism facilities in that state. Tourism is one of the industries with the strongest effect on the economy because it helps in developing other sectors. "Tourism is a composite of activities, facilities, services and industries that deliver a travel experience, that is, transportation, accommodation, eating and drinking establishments, entertainment, recreation, historical and cultural experiences, destination attractions, shopping and other services available to travelers away from home. GIS has been commonly used in different fields including tourism enabling people from different countries and cultures to interact with each other. Tourism is a way of conserving the environment, creating jobs/revenues and promoting cultures. Tourism has the potential of becoming the highest generator of foreign currency. Cross river is a state in Nigeria with various tourist attractions which can be identified, mapped, database designed and created for them if the tourist sites can be identified. Hence this paper demonstrates these capabilities of GIS for effective tourism inventory in Cross River state to make it known and readily accessible so that people can have information about them.

## **2. STATEMENT OF PROBLEM**

The use of Geographic Information System for tourism inventory within Cross river state is pertinent because of the need for a current digital tourism database and lack of up to date information for proper utilization of the tourist sites.

## **3. AIM OF THE STUDY**

The aim of the study is to create an inventory for tourism in cross river state by applying the technology of Geographic Information System (GIS).

## **4. OBJECTIVES OF THE STUDY**

The objectives of the study include:

- i. Database design
- ii. Geometric data acquisition
- iii. Attribute data acquisition using social survey
- iv. Database creation
- v. Spatial analyses
- vi. Information presentation

## 5. STUDY AREA

Crossriver State is located within latitudes  $4^{\circ} 15'N$  and  $7^{\circ} 00' N$  and longitudes  $7^{\circ} 15'E$  and  $9^{\circ} 30' E$ . It is made up of 18 LGAs with its capital in Calabar. It derives its name from the cross river which transcends along the state and empty into the Atlantic ocean.

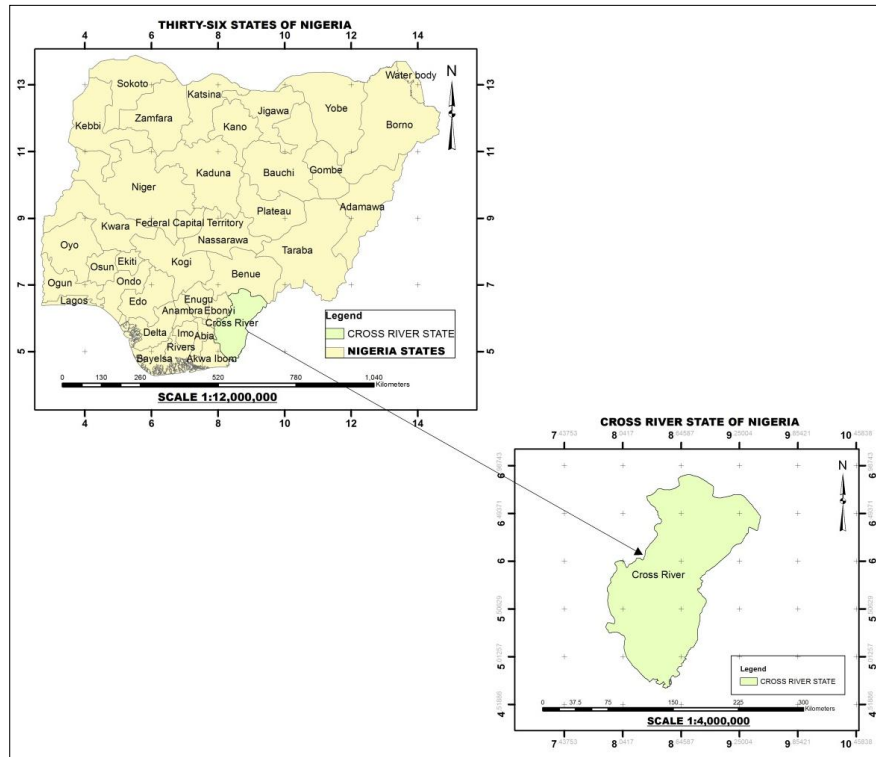


Figure 1: Location of the study area

## 6. METHODOLOGY

This section deals with database design, collection of geometric and attribute data and database creation.

### 6.1 Database Design

Digital database design is one of the core tasks in developing any GIS application, it is also called data modeling which is the process by which the real world entities and their inter-relationships are analyzed and modeled in such a way that maximum benefits are derived while utilizing a minimum amount of data Kufoniyi (1998). Database design comprises of three interrelated phases and these are: Conceptual, Logical and Physical designs.

**Conceptual Design:** This has to do with the representation of human conceptualization of reality and the objective is to determine the basic entities, the spatial relationships among the entities and attributes of each entity. To accomplish the objectives of the research the

following entities have been identified: Tourist sites, Road Network and Tourist facilities.

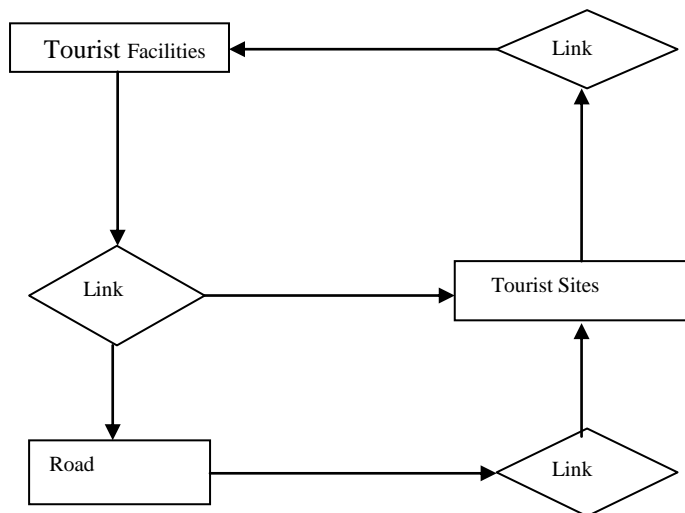


Figure 2: Entity Relationship diagram of the study area

**Logical Design:** It is the representation of the data model, designed to reflect the recording of data in computer system. The phase translates the conceptual design in to data structure using relational data model.

Table 1 Facility table and attributes

ATTRIBUTES NAME	DESCRIPTION
Fa_Id	Facilities identity
Fa_type	Facilities type
Fa_location	Facilities location

Table 2 Tourist site table and attributes

ATTRIBUTES NAME	DESCRIPTION
TS_Id	Tourist centre identifier
TS_Location	Tourist centre location
TS_S Name	Tourist sites name

Table 3 Road table and attributes

ATTRIBUTES	DESCRIPTION
Ro_Id	Road identifier
S_L	Speed limit
Ro_type	Road type
Ro_status	Road status

## 6.2 Dataset Required

Primary data were acquired using Handheld GPS. Secondary data used was existing the map of Cross River state.

### 6.2.1 Physical Design

This stage has been described by Kufoniyi (1998) as the representation of the data structure in the format of the implementation software and it is usually done at the beginning of the database creation.

Table 4 Tourist facility table and data declaration

ENTITY	FIELD	TYPE	WIDTH	DECIMAL
FACILITIES	Fa_id	Short integer		0
	Fa_type	Text	20	0
	Fa_location	Text	20	0

Table 5 Tourist Site table and data declaration

ENTITY	FIELD	TYPE	WIDTH	DECIMAL
TOURIST SITE	Tc_id	Short integer		0
	Tc_type	Text	20	0
	Tc_location	Text	20	0

Table 6 Road table and data declaration

ENTITY	FIELD	TYPE	WIDTH	DECIMAL
ROAD	Ro_type	Text	20	0
	Ro_id	Short integer		0
	Ro_status	Text	20	0
	S_L	Text	20	0

## 6.3 Database Creation

The tables were created and populated in ARCGIS 9.3 and the attribute tables were linked with geometric data.

Table 7: Sample of Tourist Site table created in ArcGIS 9.3

Attributes of Site_2						
OBJECTID *	SHAPE *	Site_2	TSite_Class	Activities_Type	Tsite_ID	Tsite_Location
4	Point	Tinapa	Artificial	Premier buiness and Leisure Resort	202	Cal_municipal
5	Point	Ceramic,p	Natural	Creativity	201	Itigidi_in_Abi
6	Point	Ceramic,p	Natural	Creativity	201	Ediba_in_Abi
7	Point	Lake	Natural	Fishing,waterfun etc	201	Ebom_in_Abi
9	Point	National p	Natural	Ecotourism Biodiversity(plants and animals)	201	Oban_in_Akamkpa
10	Point	Water fall	Natural	Waerfall	201	Mkpat_in_Akampa
11	Point	Oasis Hot	Artificial	Eco_logges	202	Uyanga_in_Akamp
12	Point	Game Res	Natural	Gorilla mountains,Wildlife sanctuary,Pandrilus	201	Kanyang_in_Boki
15	Point	Agbo wat	Natural	Waterfall with different colours	201	Agbokin_in_Etug
16	Point	Beach	Natural	Water fun	201	Ikoni
19	Point	Ranch Re	Natural	Temperate climate,Cable car,water park etc	201	Obanliku
20	Point	Sandy be	Natural	Waterfun	201	Obubra
21	Point	Mary Sle r	Artificial	Residencial house	202	Akpap_Odukpani
22	Point	Leboku fe	Artificial	Ekpe and yam festival	202	Ugep_Yakurr
23	Point	Marina re	Natural/Artificial	Historical slave trade, Boat regatta	203	Cal_South
24	Point	Dam	Artificial	Fishing and waterfun	202	Obudu
25	Point	Beautiful, l	Natural	Pinic,	201	Ogoja

## 6.4 SPATIAL OPERATIONS

Spatial Analytical functions of Geographical Information System (GIS) distinguishes it from other information systems. The main objective of spatial data analysis is to transform and combine data from various sources into useful information for decision makers. The analyses performed in this research include Spatial Search and Network Analysis. The composite map of the study area is illustrated in Figure 3

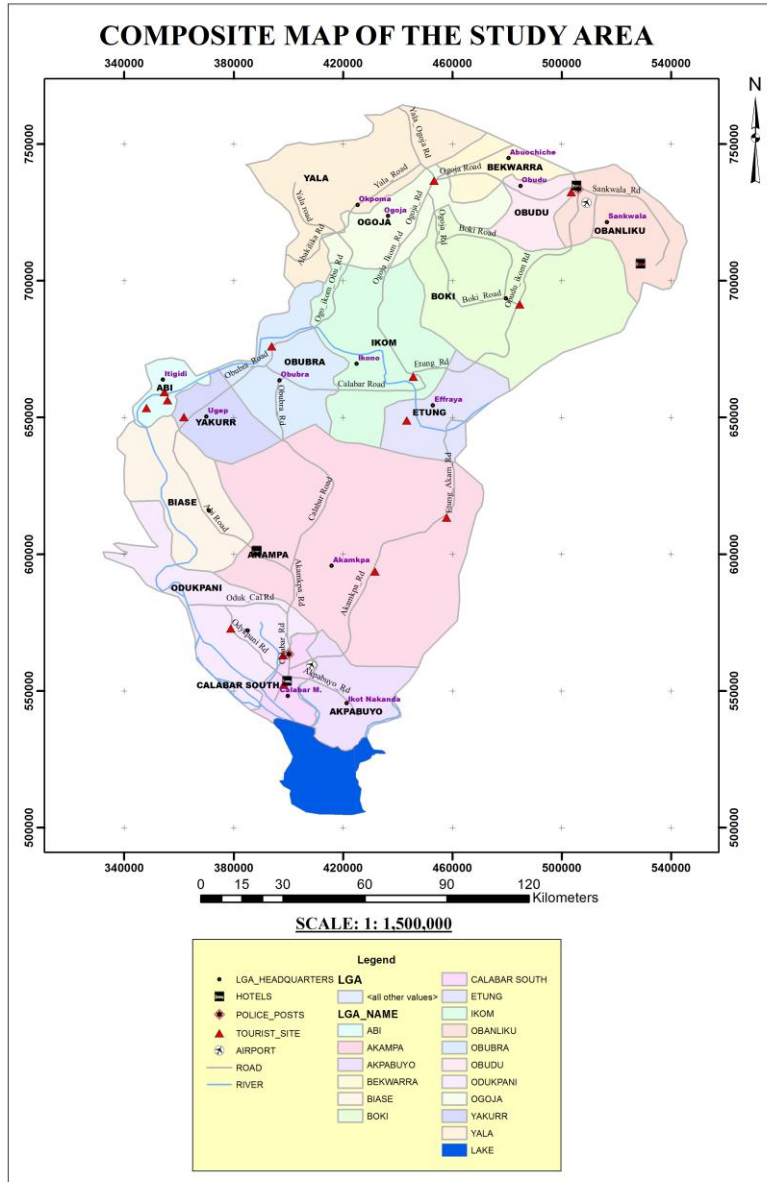


Figure 3: Composite Map study area



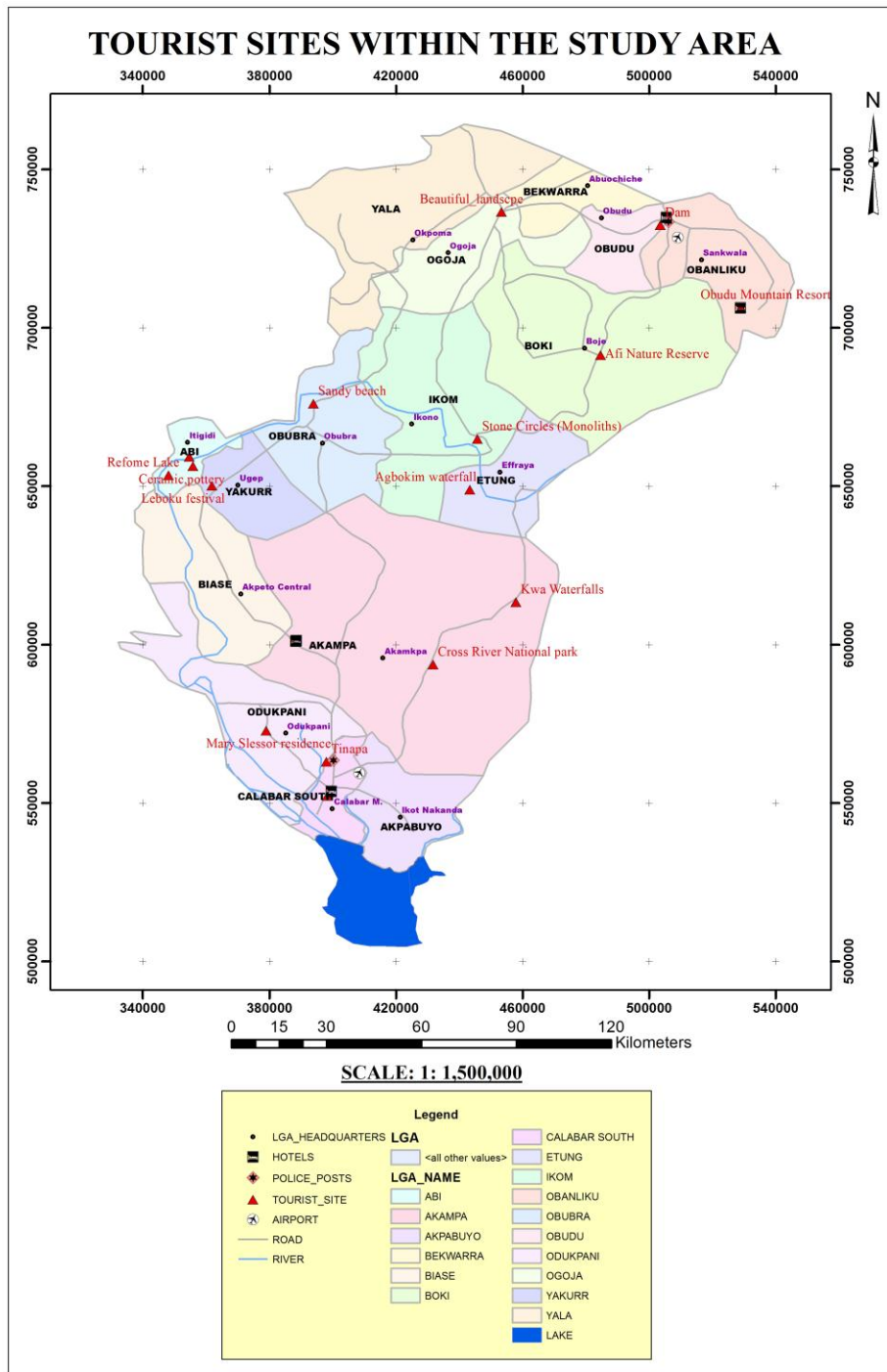


Figure 4: Tourist Sites of the Study area

#### 6.4.1 Spatial Search

Spatial search operations involves retrieving features selectively using user defined logical conditions. A spatial search operation was performed to retrieve all natural tourist sites within the study area

**Query 1:** Select natural tourist sites within the study area

Syntax: [TSite\_Class] = 'Natural'

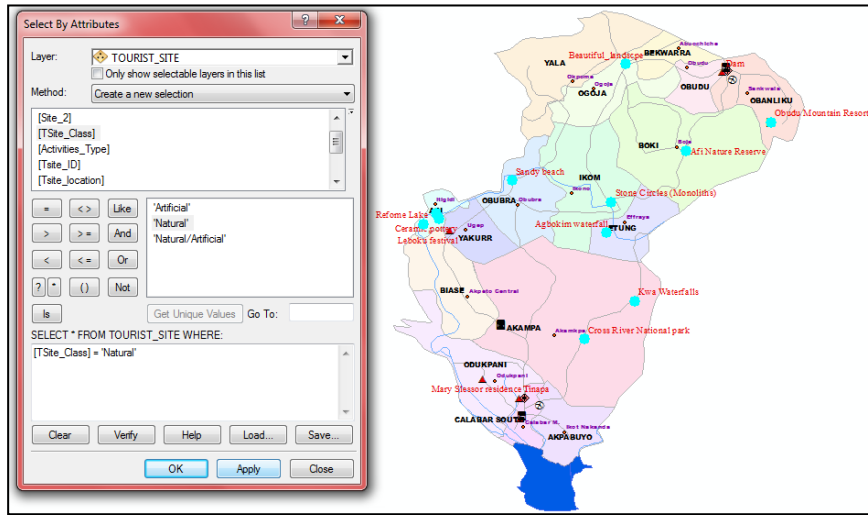


Figure 5: Query for natural tourist sites within the study area

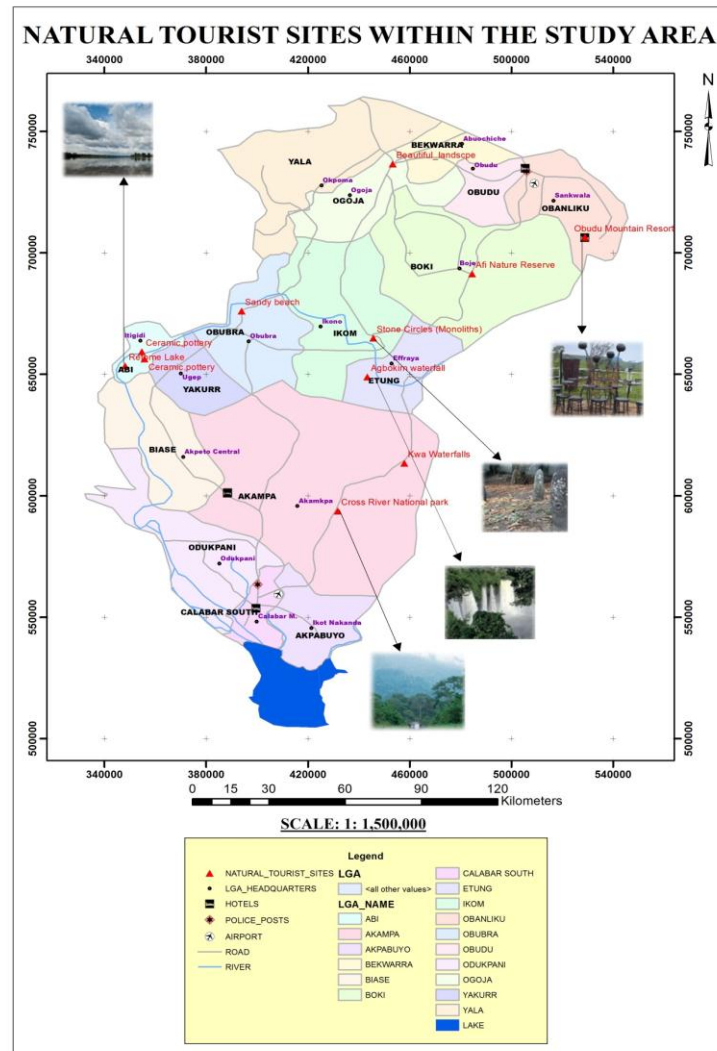


Figure 6: Map of natural tourist sites within the study area

## 6.4.2 Network Analysis

The network analysis too is a vital component of ESRI ArcGIS 9.3 Geographic Information System software. It is use in analyzing transportation line to determine shortest and fastest routes within the network Network analysis is carried out to determine the routes from point on the network to tourist's site. The first analysis here is to simulate the optimal route a tourist will take when moving within a network from Bebi A trp Airport to Cross River National park – a tourist site

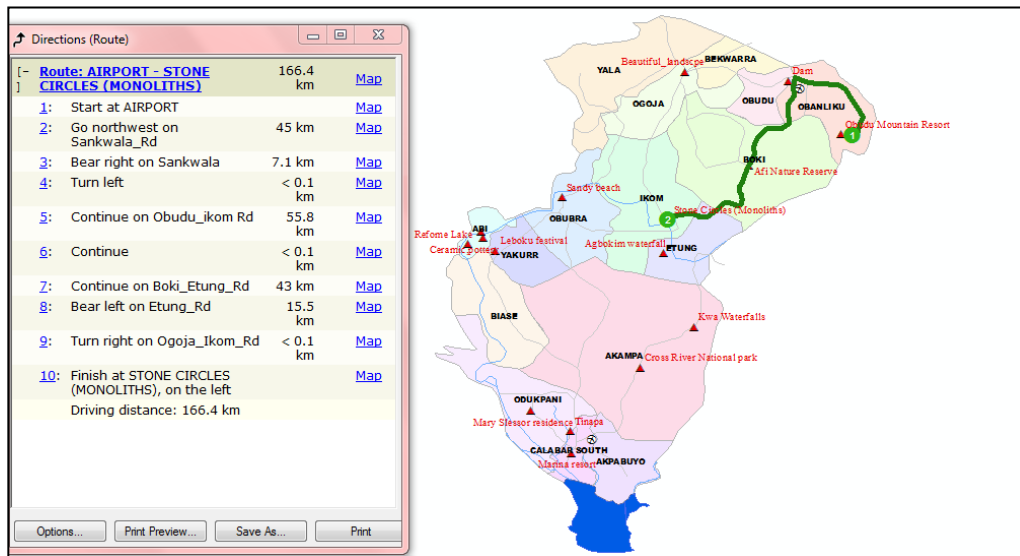


Figure 7: Best route analysis from Airport at Bebi A trp to Stone Circle Monoliths tourist site

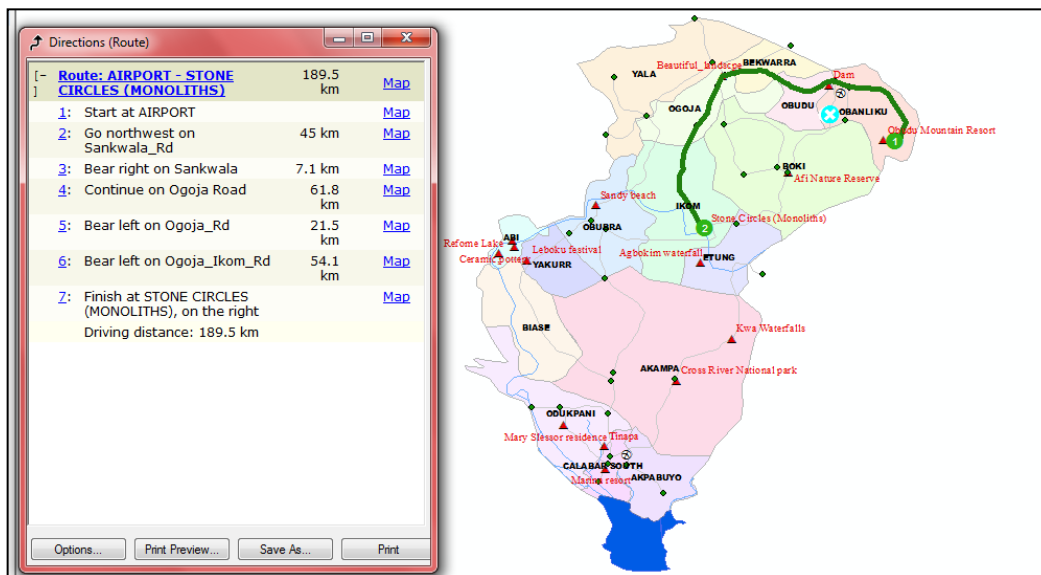


Figure 8: Alternative route analysis from Airport at Bebi A trp to Stone Circle Monoliths tourist site

Table 6 Comparison between best and alternative route

LOCATION	BEST ROUTE	ALTERNATIVE ROUTE	DIFFERENCE
Bebi Airport to Stone Circle Monolith tourist site	166.4km	189.5km	23.1km

## 6.5 Analysis of Results

Figure 3 shows the composite map of the study area and it depicts the features of interest in the study which are the road networks, tourist sites and tourist sites facilities such as Police Posts, Hotels, Hospitals e.t.c The tourist sites mapped in this study are both the natural and artificial tourist attractions which are illustrated in figure 4. Spatial search operation was performed to identify the natural tourist's site attractions within the study area. The result is depicted in figure 6. The best route analysis was performed from Bebi Airport to Stone Circle Monolith Tourist site. This analysis is necessary to determine road network at which a tourist will have to travel. Alternative route analysis was also performed should in case there is a barrier along the route – See figures 7 and 8. The spatial analytical capability of GIS can be used for tourist inventory applications and this has been demonstrated within the study area.

## 7.0 CONCLUSION

This research has been able to demonstrate the dynamic capacities of Geographic information system application in mapping, analysis and modeling of Geographic phenomenon. This will aid tourism planning authorities, tourists, and government agencies to visualize, plan, monitor, manage and access various tourist sites in Cross River State. It will enable tourism authority to plan for security, enable government official to have electronic records of the locational attraction offered by each tourism site and there by enable tourist have an overview of tourism resources

## 7.1 Recommendations

- Detailed information about tourism activities should be easily available and accessible from the tourism database to aid tourist and decision/policy makers.
- The tourism database should be made to cover the road network of Cross river and updated from time to time in other to capture new developing areas with the facilities that are present.

## REFERENCES

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## BIOGRAPHICAL NOTES

**Ekpo EFFIONG** is a Senior Lecturer at Federal School of Surveying, Oyo, Nigeria. He is the Head of Department of Geoinformatics of the school. He holds B.Sc. Hons. (Surveying), PGD (Remote Sensing) and M.Sc. (Surveying and Geoinformatics). He is a registered surveyor, full member of Nigerian Institution of Surveyors (mnis) and member of Nigerian Environmental Society (mnes).

**Felix IYIOLA** is a Lecturer at Federal School of Surveying, Oyo, Nigeria. He is the Coordinator of SIWES and Practicals Unit of the school. He holds the following qualifications: PGD (GIS), PGD (Surveying and Geoinformatics) and Msc (Surveying and Geoinformatics in view). He is a registered surveyor and full member of Nigerian Institution of Surveyors (mnis).

**Phillip IBE** is a Principal Lecturer at Federal School of Surveying, Oyo, Nigeria. He is the Head of Department of Surveying of the school. He holds B.Sc. Hon. (Geography and Regional Planning), PD (Surveying), PGD (Remote Sensing) and M.Sc.(GIS) and Master in Environmental Management and Control. He is a registered surveyor, full member of Nigerian Institution of Surveyors (mnis).

**Adedayo ALAGBE** is a Lecturer at Federal School of Surveying, Oyo, Nigeria. He holds B.Sc. Hon. (Esate Management), PGD (GIS) and M.Sc. (Information Science). He is a registered member of Nigerian Environmental Society (mnes).

**Mary LIWHU** is an Instuctor in Cartography at the Borno State Polytechnic, Maiduguri. She holds a Higher National Diploma in Cartography and a Post Graduate Diploma in Geographic Information System. She is a memeber of the Nigerian Cartographic Association

## CONTACTS

### **Ekpo Effiong**

Department of Geoinformatics  
Federal School of Surveying, Oyo, Nigeria.  
Mobile: +234 805 2322 164  
e-mail: [ekpoeff@yahoo.com](mailto:ekpoeff@yahoo.com)

### **Felix Iyiola**

Department of Geoinformatics  
Federal School of Surveying, Oyo, Nigeria.  
Mobile: +234 803 3955 301  
e-mail: [felixiyiola@yahoo.com](mailto:felixiyiola@yahoo.com)