

*Remigiusz Straś<sup>1</sup>*

remo12@o2.pl

## **The Usage of GIS Systems in Organizing Tourism in Bieszczady Mountains**

### **Introduction**

Geographic Information Systems is now recognized widely as a valuable tool for managing, analyzing, and displaying large volumes of different data pertinent to many local and regional planning activities. Due to the complex nature of tourism planning issues, the potential of GIS is increasingly acknowledged. This paper will discuss some of the problems and potential of GIS applications in tourism planning. Generally, GIS applications in tourism have been limited to recreational facility inventory, tourism-based land management, visitor impact assessment, and recreation-wildlife conflict. Using the example of recreation facility mapping, this paper highlights application of GIS in tourism planning in Bieszczady mountains. The paper concludes that with long-term visitor use data and other tourism related spatial information, GIS applications in this field will grow significantly.

Geographic Information Systems and tourism share a common characteristic, that is, both cross the boundaries of disciplines and application areas. GIS has been applied in many disciplines including geography, forestry, urban planning, and environmental studies. Similarly, tourism has been a subject of interests to geographers, economists, business, environmental planners, anthropologists, and archaeologists. As such, the potential for GIS applications in tourism is significant. GIS is now recognized widely as a valuable tool for managing, analyzing, and displaying large volumes of various data pertinent to many local and regional planning activities. Its use in environmental planning is rapidly increasing. Tourism is an activity highly dependent 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. GIS can be regarded as providing a toolbox of techniques and technologies of wide applicability to the achievement of sustainable tourism development. In order to evaluate the value and scope of GIS in tourism planning and development, this paper will review existing GIS application which are pertinent in tourism planning; discuss some methodological limitations in applying GIS in tourism; and identify some potential areas of applications in Bieszczady Mountains.

---

<sup>1</sup> Graduate of University of Silesia, Faculty of Computer Science and Materials Science.



<b>Functional capabilities of GIS</b>	<b>Tourism Application</b>
Data entry, storage and manipulation	Tourism Resource Inventories
Map production	Identify most suitable locations for development
Database integration and management	Measure tourism impacts
Data queries and searches	Visitor management/flows
Spatial analysis	Analyze relationships associated with resource use
Spatial modeling	Assess potential impacts of tourism development
Decision support	

**Table 1. Capabilities of GIS**

### **Contents of database**

Each group of objects storing in database has different information. Information can be stored in 4 groups:

- General information (location, district, village);
- Information about measurement of routs, areas, basins;
- Public information about owners of estates;
- Additional information (describes, photos);

Using this information it is possible to have complete vision of all objects We are interested in.

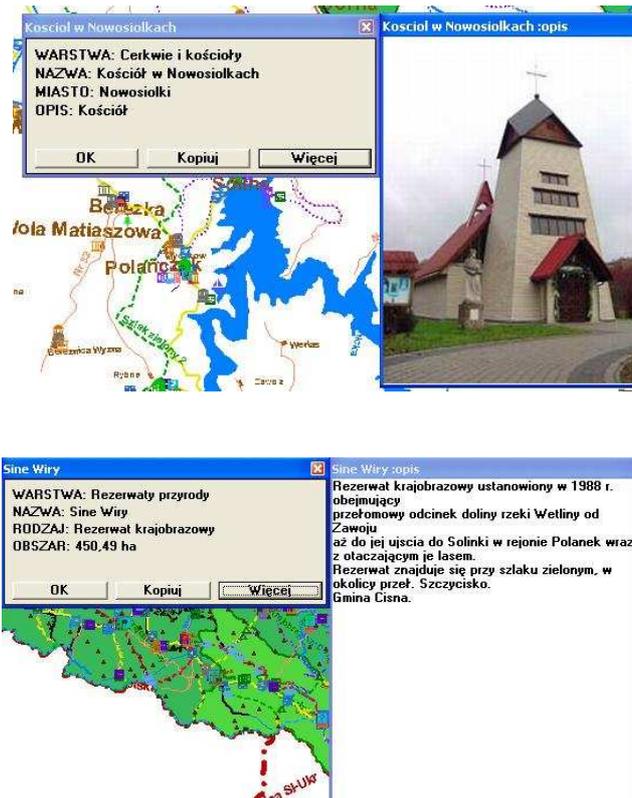


Fig. 2 The example of information storing in database.

Many tourist information systems serve information for tourists. However, policy decision support systems in tourism field are a few. The system includes four major databases such as tourism resources (tourist attractions), statistics, laws, and investments. In addition to these four major databases, GIS layers in this system have topographical map, transportation map, land use map and natural environment map.

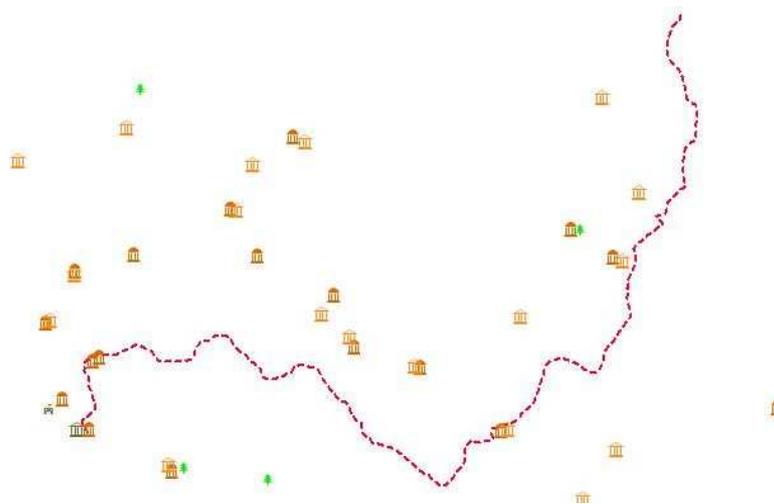
The tourism resources are divided into 3 highest classifications such as “culture”, “nature”, “place & facilities“.

The conceptual role of GIS in this system is supporting decision by serving various real time statistical thematic maps. For example, it serves tourism resources (attractions) distribution thematic map by user defined classification for establishing resources management plan conducted by government officials and developing travel products sold by travel agencies. In addition, it serves GIS based tourism statistics databases that can be spatially reference such as exit & entry statistics, attraction visitor statistics. For tourism laws, there is no spatially referenced information except for local-government regulations and it was considered that it is easier to search by text based. For now, the tourism laws have no connection with GIS, but we have a plan for the laws to be linked as secondary information that can be viewed as one of the items related tourism resources and investments database. Lastly, tourism investment databases have been built polygon as a spatial database and texts and images as an attribute database.

The core policy of information-oriented society is to furnish information seeker with not just a single field information but total information of concerned field including sharing information between related organizations. In the same concept, tourism database should be designed to serve comprehensive information through linkage or sharing between related databases. For example, usually local tourist information system serves only about inside their administrative district. Therefore, if a trip route spread over more than two districts, information seeker has to search all homepages separately. For the officers in charge of tourism business at the local government, even if they try to design travel products or set up tourism policies, they have a difficulty to get information, because of a variety type of data format and a different kinds of systems.

### **Using GIS for Supporting Decision-Making in Tourism**

For the effective management of tourism resources (tourist attractions such as resort, mountain, river, valley, temples etc.), in the process of planning, execution and evaluation the right information reflecting characteristics and status about tourism resources is very important for policy makers, local administrators, specialists and the interested parties. However, surveying, monitoring, information management are conducted by each organization or project, so it is not easy to use survey result systematically. In addition, rational decision based on scientific data such as terrain, land use and attributes is hard to make. GIS has a spatial and attribute data. There is a linkage between spatial and attribute in a database of GIS. It means that searching, editing, analyzing the data is very efficiency. In addition, GIS data has a topology in spatial features, so feature layer overlay, analyze, search, select by theme are possible. These kinds of characteristics make us use GIS as a tool of decision support such as location analysis, land use plan, tourism development plan.



**Fig. 3 The example of tourism planning**

## Major Support Tool for Decision-Making

- **Layers Overlay Analysis** - Mapping where things are lets us find places that have the features you are looking for and to see where to take action. GIS can have various layers such as topographical layer, geological layer, soil layer, environmental layer, land registration layer etc. Based on these thematic maps (or layers), GIS lets us be able to overlay layers and figure out hidden meaning that we can not recognize before overlaying layers.

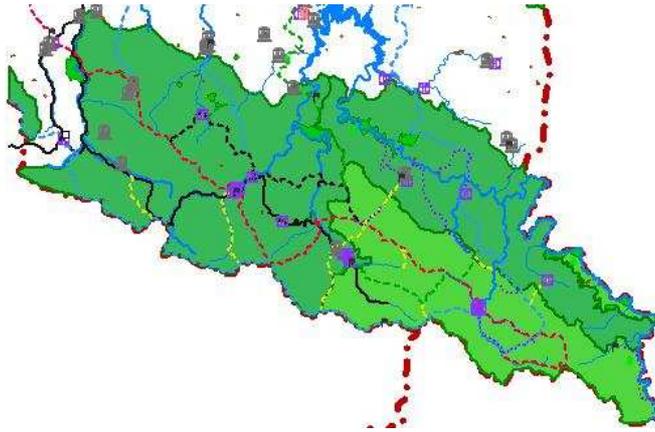


Fig. 4 The example of map without most of layers

- **The Tourism Resources and GIS** - Tourism resources databases is mainly for managing tourism resources by federal government and serving the source to local governments in order to building tourist information system. The detail items that the tourism resources database contains are name, investigation date, investigator, reviewer, history, transportation, location, size, shape and additional note etc.
- **The Tourism Statistics and GIS** - Major contents of tourism statistics are visit statistics for tourist facilities. GIS for the tourism statistics allows users to browse visit statistics by area. Real-time statistical thematic maps based on world map show an inbound tourist statistics by visit purpose, the length of stay, an age bracket, nations, entrance port etc. Likewise, outbound tourist statistics can be created using GIS. Additional data in the statistics are designated resort, tourism industry, and world tourism statistics etc. Among these data, spatially related data such as an international conventions record by area, domestic tourist visit by area use maps for generating the thematic maps.
- **The Tourism Investments and GIS** - Three major contents of tourism investment database have spatial data as a polygon and its attributes. Generally, investors are interested in

surrounding environments both in artificial and in natural for investment and development. Therefore, present land use map, natural environment map, contour map and conservative area map are very useful for figuring out conditions for development by overlaying these maps.

- **The Tourism Laws and GIS** - The tourism laws prescribe promotion and regulations matters on development or company operation, Linkage between the laws and GIS is very restricted. However, local government's regulations can be browsed by regions, based on administrative boundary map. In addition, if the system contains urban planning map (or zoning map) that regulates development guidance in the future, the systems enable user to confirm what kind of facilities can be installed or not.

### **Bieszczady Tourism Highlights**

Bieszczdy Mountains as one of The most attractive touristic region in Poland has many of important places to visit and offer many ways of pleasant spending time.

Natural features:

- Alpine Polonia;
- natural and primeval mountain beech forest;
- peaks to climb e.g. the highest point of Bieszczady, Mount Tarnica (1346 m above sea level), the massif of Polonina Carynska and the massif of Polonina Wetlinska

Cultural sights:

- Greek-Catholic wooden churches (oin the buffer zone);
- The largest Polish open air museum of wooden folk architecture in Sanok;



**Fig. 5 Museum in Sanok**

- Medieval Jewish temple in Lesko;



**Fig. 6 Temple in Lesko**

- Historical narrow-gauge forest train (in the buffer zone)

Things to do:

- Mountain horseback riding;
- Hiking;
- Cross country skiing;
- Cycling;
- Natural photography.

## **Conclusion**

Tourism is a highly complex activity, and thus requires tools that aid in effective decision making to come to terms with the competing economic, social, and environmental demands of sustainable development. Applications of GIS in tourism and recreation planning illustrate that GIS is a strong and effective tool that can aid in tourism planning and decision-making. The power of GIS lies not only in the ability to visualize spatial relationships, but also beyond the space to a holistic view of the world with its many interconnected components and complex relationships. Impact assessment and simulation are increasingly important in tourism development, and GIS can play a role in auditing environmental conditions, examining the suitability of locations for proposed developments, identifying conflicting interests and modeling relationships. However, because of the highly data-driven applications of GIS, its use by tourism and recreation professionals have been very limited. This is mainly due to lack of long-term, comprehensive, and systematic data on tourism issues.

Currently, GIS application in tourism has been much restricted to inventory and case illustrations. With consistent spatial data on tourism locations, characteristics of these locations, and long-term visitor use data, its applications will grow significantly. The growing worldwide interests in tourism and recreation studies will certainly demand more sophisticated and complex applications of GIS in these fields.

## **Bibliography**

1. <http://www.geopublic.com>, 22.06.2005
2. <http://www.panparks.org/Network/OurParks/Bieszczady/Basicinfo>, 22.06.2005
3. [http://www.ruralgis.org/conference/2004proceedings/thurs/session3/thurs\\_3\\_13\\_30\\_files/frame.htm](http://www.ruralgis.org/conference/2004proceedings/thurs/session3/thurs_3_13_30_files/frame.htm)  
22.06.2005
4. [http://www.staypoland.com/bieszczady\\_tours.asp](http://www.staypoland.com/bieszczady_tours.asp). 22.06.2005
5. [http://www.teams.karpaty.edu.pl/karpaty/english\\_bieszczady.htm](http://www.teams.karpaty.edu.pl/karpaty/english_bieszczady.htm), 22.06.2005
6. Yapa L. S.: Is GIS appropriate technology. International Journal of Geographical Information Systems, 1991

## **The Use of GIS Systems in Organizing Tourism in Bieszczady Mountains**

### **Abstract**

This work deals with the problems of using Geographical Informative Systems (GIS) in planning and organizing tourism. It contains various questions concerning the GIS systems and it is enriched with many practical examples, which enable the users of application to understand the GIS systems. There is also some information about legal protection of databases.

The tourism and recreation movement in Bieszczady Mountains is presented here as an example. This is an interactive tourist guide comprising the necessary information about tourist pathways, monuments, hostels and other essential for the tourism objects. To achieve this purpose there was used the main advantage of GIS systems, which is clear placing of the objects and their accurate description. Text information is enriched with the pictures of the most interesting and the most willingly visited places. This application will undoubtedly be really useful to every tourism lover in Polish mountains.