

THE DESIGN AND IMPLEMENTATION OF THE LAKE RUKWA BASIN INTEGRATED PROJECT (LRBIP) ENVIRONMENTAL INFORMATION SYSTEM DATABASE



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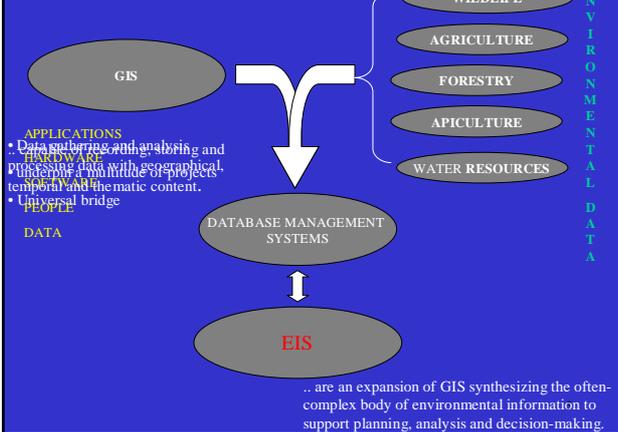
Department of Surveying and Geomatics
Midlands State University
Gweru, Zimbabwe

FIG Working Week
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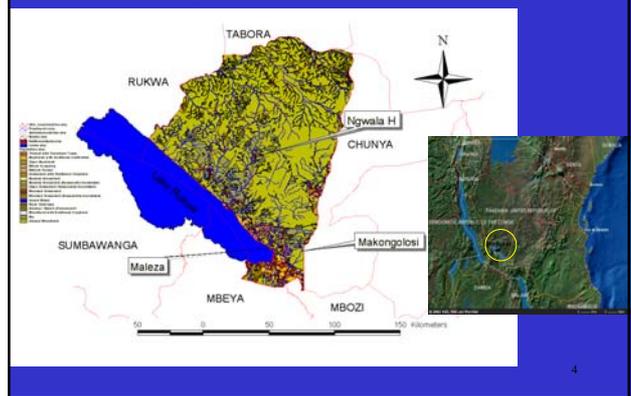
Overview of presentation

1. Introduction (EIS)
2. Background (LRBIP)
3. LRBIP-EIS User Needs Assessment
4. LRBIP-EIS Data Model
5. LRBIP-EIS Prototype Database
6. Evaluation and Recommendations

1. Introduction



2. Case Study Area – Lake Rukwa Basin



3. LRBIP-EIS Background

3.1 Location

- Tanzania – chosen because of availability of data to use

3.2 Environmental composition

- Fisheries
- Wildlife
- Apiculture
- Agriculture
- Forestry
- Mining

3.3 The need for an environmental database

- Sectoral approach to environmental management
- Fragmented information systems - redundancies and duplications
- Need to provide an information system that synthesizes environmental information to support planning, analysis and decision-making

4. LRBIP-EIS User Needs Assessment

4.1 FISHERIES

- Fish fisheries distribution
- Lake fish resources fragmented
- Fishermen village distribution is highly inconsistent
- Fish biological characteristics
- Fish production figures
- Fishing equipment
- Marketing data

4.2 APICULTURE

- Abundance of 'miombo' vegetation
- Cylindrical beehives made from tree barks
- Traditional methods of harvesting honey
- Beekeepers and honey traders
- Honey production figures
- Climate conditions

4.2 WILDLIFE

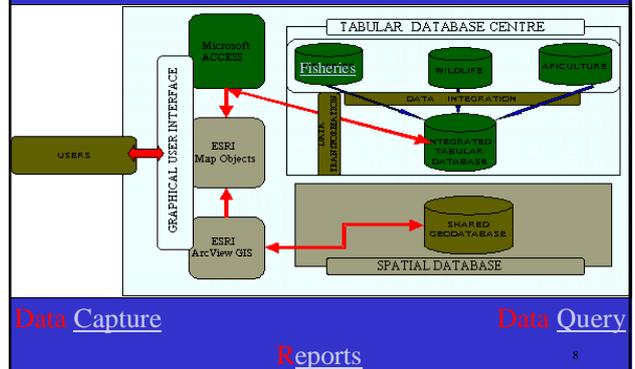
- Species distribution patterns
- E-Poaching problems
- Poaching activities not quantitatively determined
- Species composition
- Hunting and poaching activities
- Safari tour operators
- Data on venues

5. LRBIP-EIS Data Modeling

- Conceptual data models
 - Enterprise rules
 - Entity-relationship-diagrams
- Sector logical data models
 - Mapping to the relational data model
 - Skeleton tables and attributes
 - Normalized & checked for fan and chain traps
- LRBIP-EIS integrated data model

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6. LRBIP-EIS Prototype database



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8. Evaluation and Recommendations

- Evaluation
 - Data modeling confined to three sectors
 - Integration of four computing environments
- Recommendations
 - Develop prototypes for other sectors
 - Intranet development
 - Monitoring of fishing grounds by GPS

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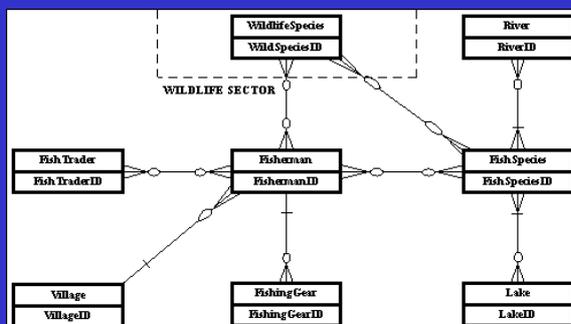
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- FIG LOC – registration and accommodation grants
- Midlands State University
- Dorte Rechendorff
- Markku Villikka

THANK YOU

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Fisheries Entity Relationship Diagram



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Fisheries enterprise rules

Fisherman - Fish Species
 A fisherman may catch many kinds of fish species
 A fish species may be caught by many fisherman

Fisherman - Fishing Gear
 A fisherman may own many fishing gears
 A fishing gear must be owned by one fisherman

Fisherman - Fish trader
 A fisherman may sell fish to many fish traders
 A fish trader may buy fish from more than one fisherman

Fish species - River
 A river may have one or many types of fish
 A fish species may be found in many rivers

Fish species - Lake
 A lake may support many types of fish
 A fish species may be found in more than one lake

Fisherman - Village
 A fisherman must reside in a village
 A village (settlement) may have many fisherman

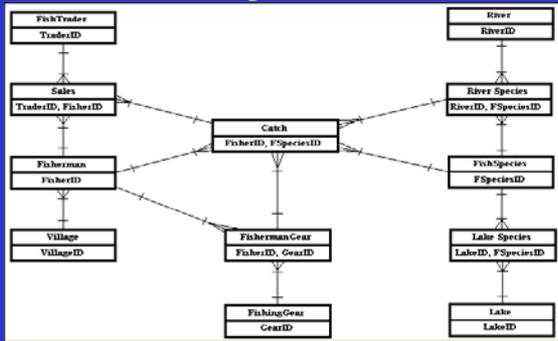
Fisherman - Wildlife species
 A fisherman may poach many kinds of wildlife species
 A wildlife species may be poached by more than one fisherman
 A fisherman may be attacked by more than one type of wildlife species
 A wildlife species may attack more than one fisherman

Fish species - Wildlife species
 A fish species may be consumed by more than one wildlife species
 A wildlife species may eat more than one type of fish species

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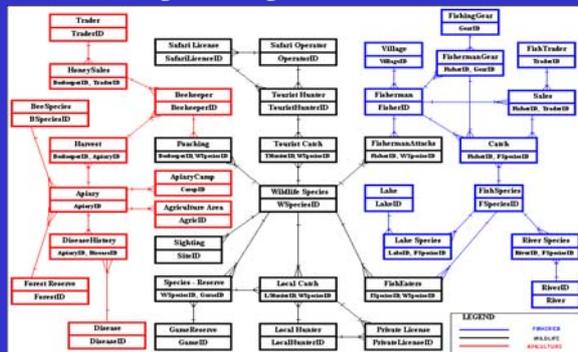
Fisheries logical data model



Fisherman (FishID), FishName, Age, Sex, Gender, MaritalStatus, ...
 River (RiverID), RiverName, Length

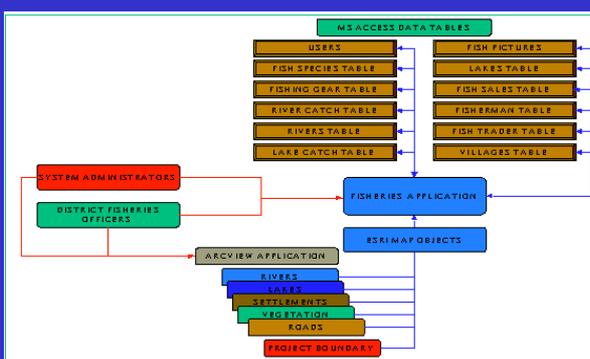
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Integrated logical data model



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Fisheries test database



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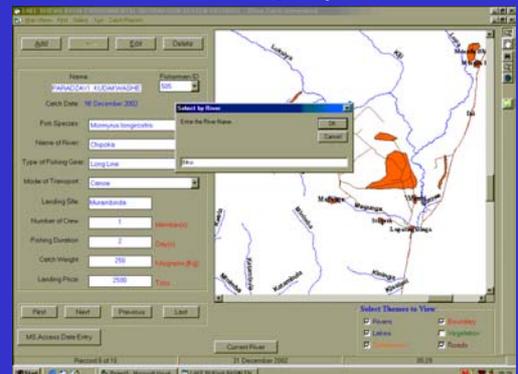
Data capture



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Data Query



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Reports

LAKE RUKWA BASIN INTEGRATED PROJECT EIS REPORTS

RIVER CATCH BY FISHERMAN as of: 30 December 2002

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Species Name	River Name	Transport	Fishing Gear	Catch Date	Weight in Kg	Landing Price
Fisherman: 100 Makonese Charles						
Protopterus	Ayungile	Foot	Other	23 Nov 2002	234.0	TZS34.00
Omochoerus	Chachambesi	Motorboat/Gilnet		10 Dec 2002	230.0	TZS2,300.00
					TOTAL	464.0 TZS2,334.00
Fisherman: 111 Ruhoto Charles						
Momyrus	Chambesi	Foot	Gillnet	01 Jan 2002	125.0	TZS2,540.00
					TOTAL	125.0 TZS2,540.00

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