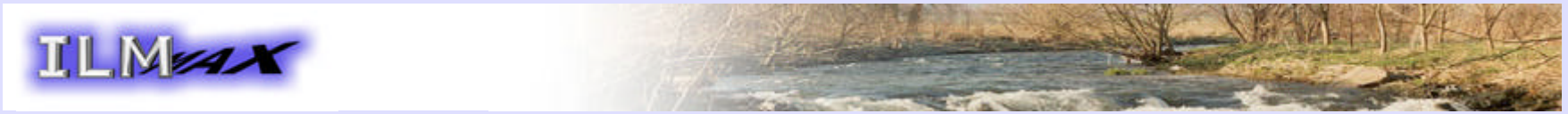

ILMAX:
A System for Managing Experience Knowledge in a long-term study of stream ecosystem regeneration

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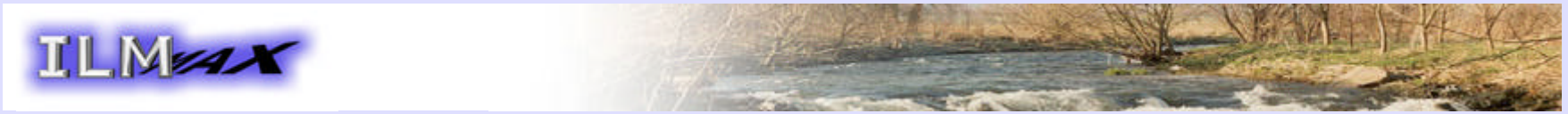


Introduction

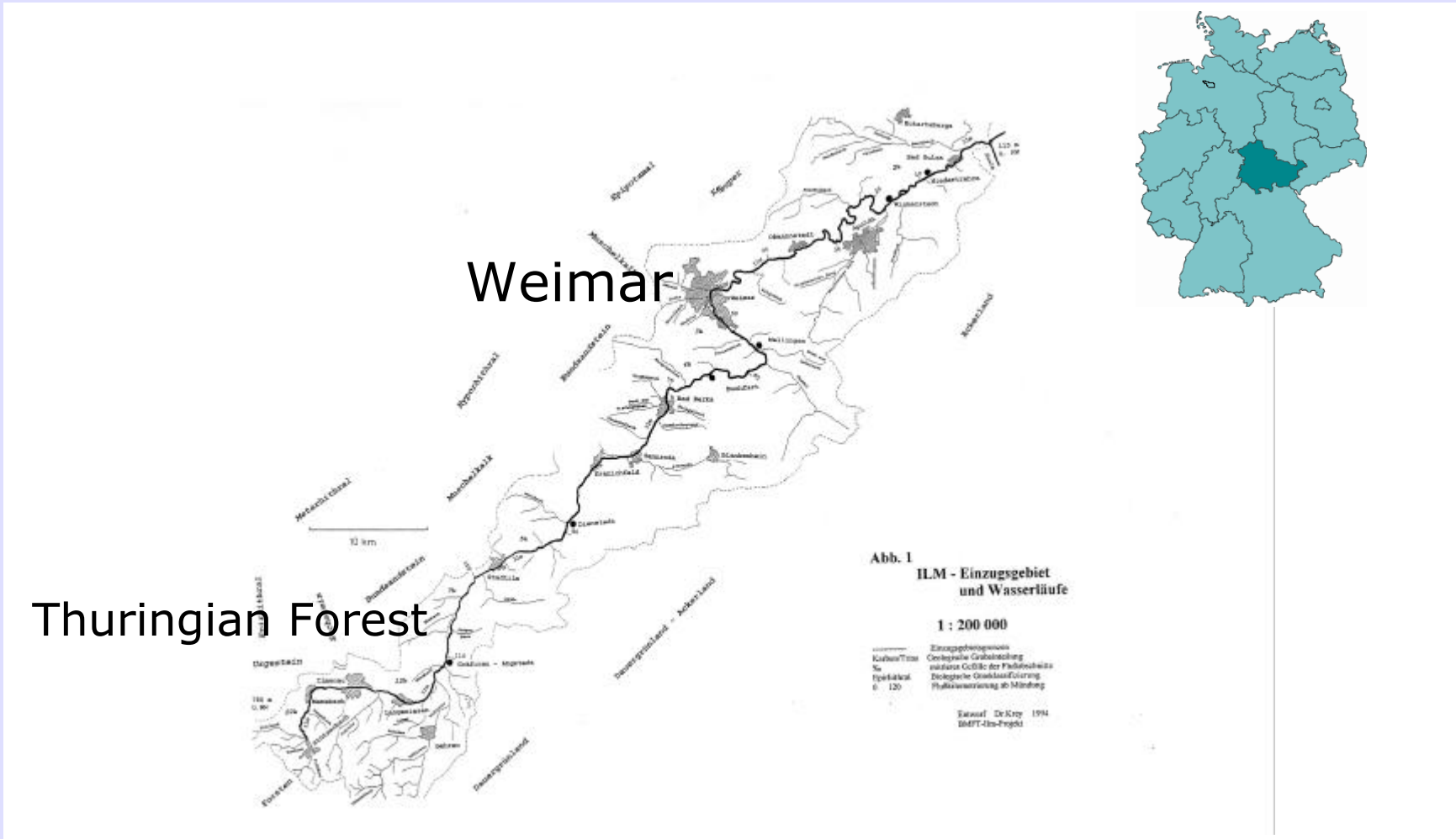
- Online content management system
- Developed with iZone
- Collects informal knowledge from a long-term ecological investigation
- Structure, retrieve, and manage the experience knowledge about the regeneration of the river ILM
- Provide new knowledge for conceptual model

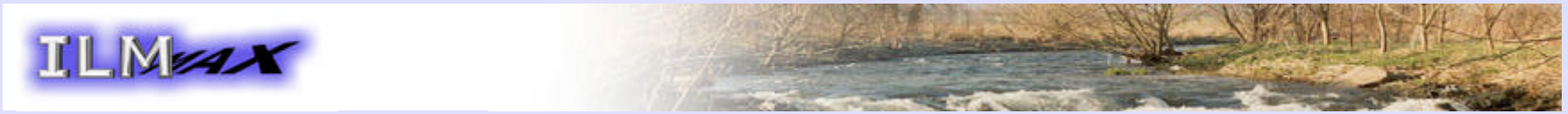
- http://www.ilmax.de

The river Ilm

- Spring in Thuringian Forest (Thüringer Wald)
- Mouth into river Saale
- 130 km long
- Catchment area 1035 km^2
- Normal water at the mouth: 5,9 $m^3 s^{-1}$

Catchment area



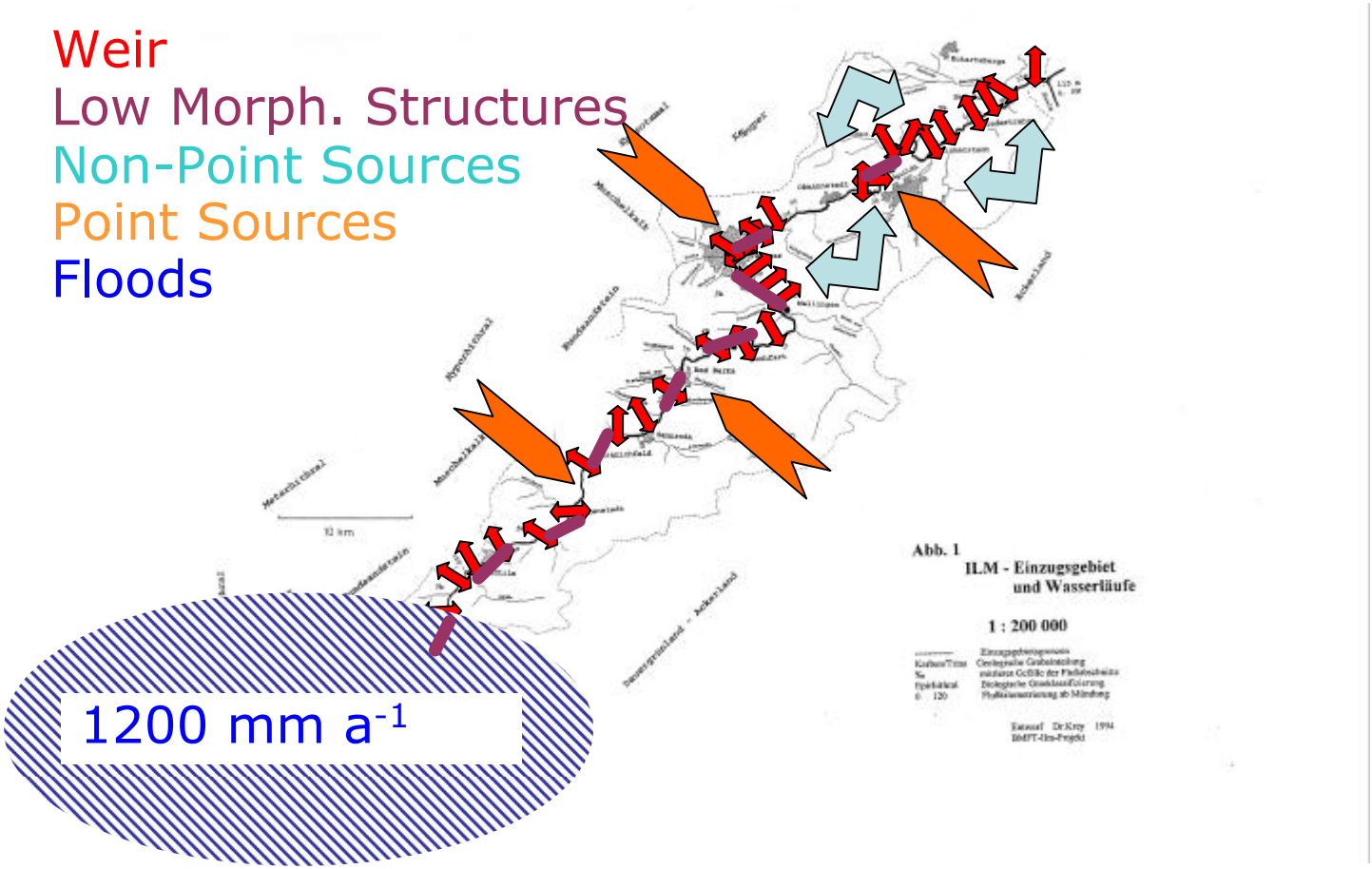


The available knowledge

- Long-time investigations of the river Ilm by the BMBF-Project (1991-1994) and the Graduated Research Group (1996 – 2005)
- Contamination
- Degradation
- Disturbance

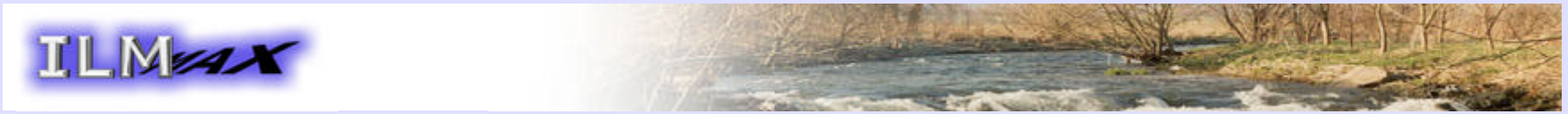
Disturbances of the ecosystem

Weir
Low Morph. Structures
Non-Point Sources
Point Sources
Floods



The available knowledge

- Long-time investigations of the river Ilm by the BMBF-Project (1991-1994) and the Graduated Research Group (1996 – 2005)
- Contamination
- Degradation
- Disturbance
- Status of the ecosystem
- Situation is improving dramatically since the reunification of Germany
- Regeneration of the ecosystem

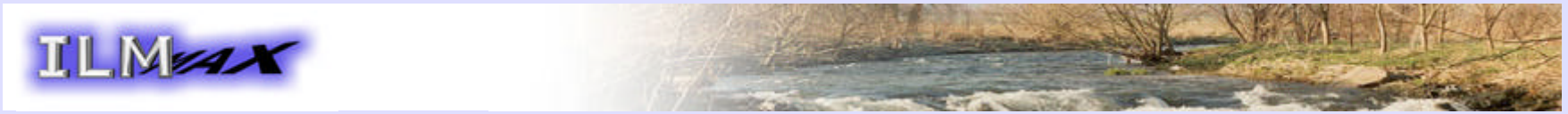


Problem

- Data and knowledge partitioned from 21 PhD studies since 1991
- Content informally available as text documents, scientific figures, data sheets, multimedia files, or expert knowledge
- Need a tool to support storage, retrieval, and visualization
- Integrate scientists that left the project
- Content should be available to everybody involved in the project

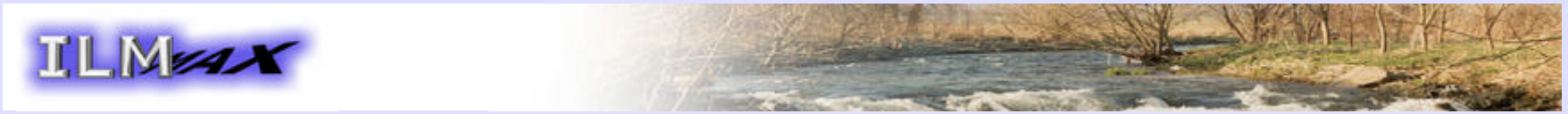
Community aspects

- Online, access via internet
- Common user interface
- Personalized, login for all participants
- Initializing phase with a knowledge champion
- Authoring online or offline
- Validation of content
- Rating the usefulness of content
- Commenting or annotating of content
- Push-facility to notify by email



Organizing heterogeneous content

- Conversion of content to standard format is time consuming
- Enrich content with meta-information for retrieval purpose
  - Categorization
  - Summary
  - Keywords
- Index of authors; lexicon for terms and synonyms



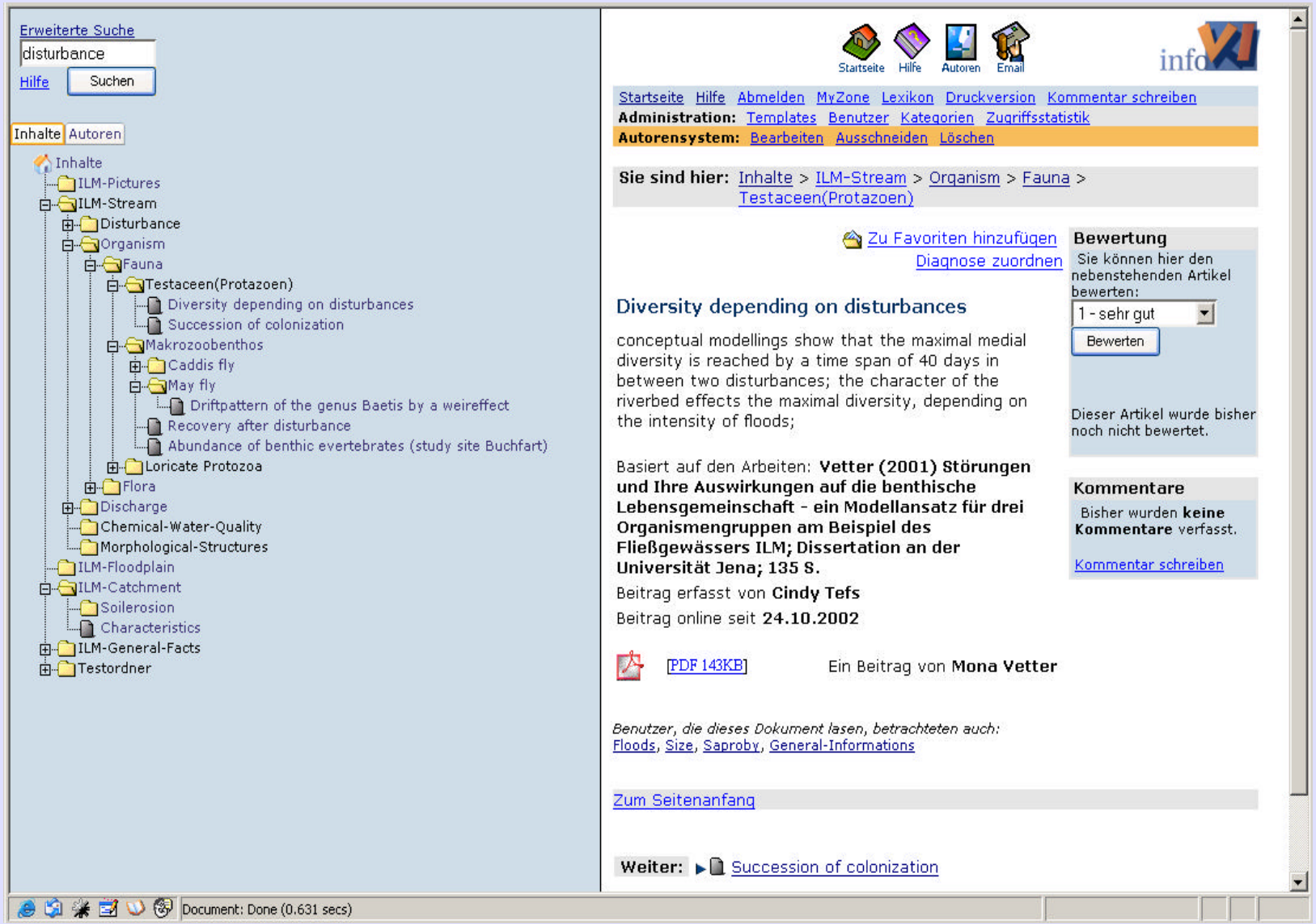
Organizing high level content

- Integration of data bases and expert knowledge as a special kind of content
  - data stored in data bases: viewing, editing, and indexing
  - knowledge-based systems: viewing, running cases, inferring solutions, extending the knowledge base
- Active linkage to other content
- Knowledge management system

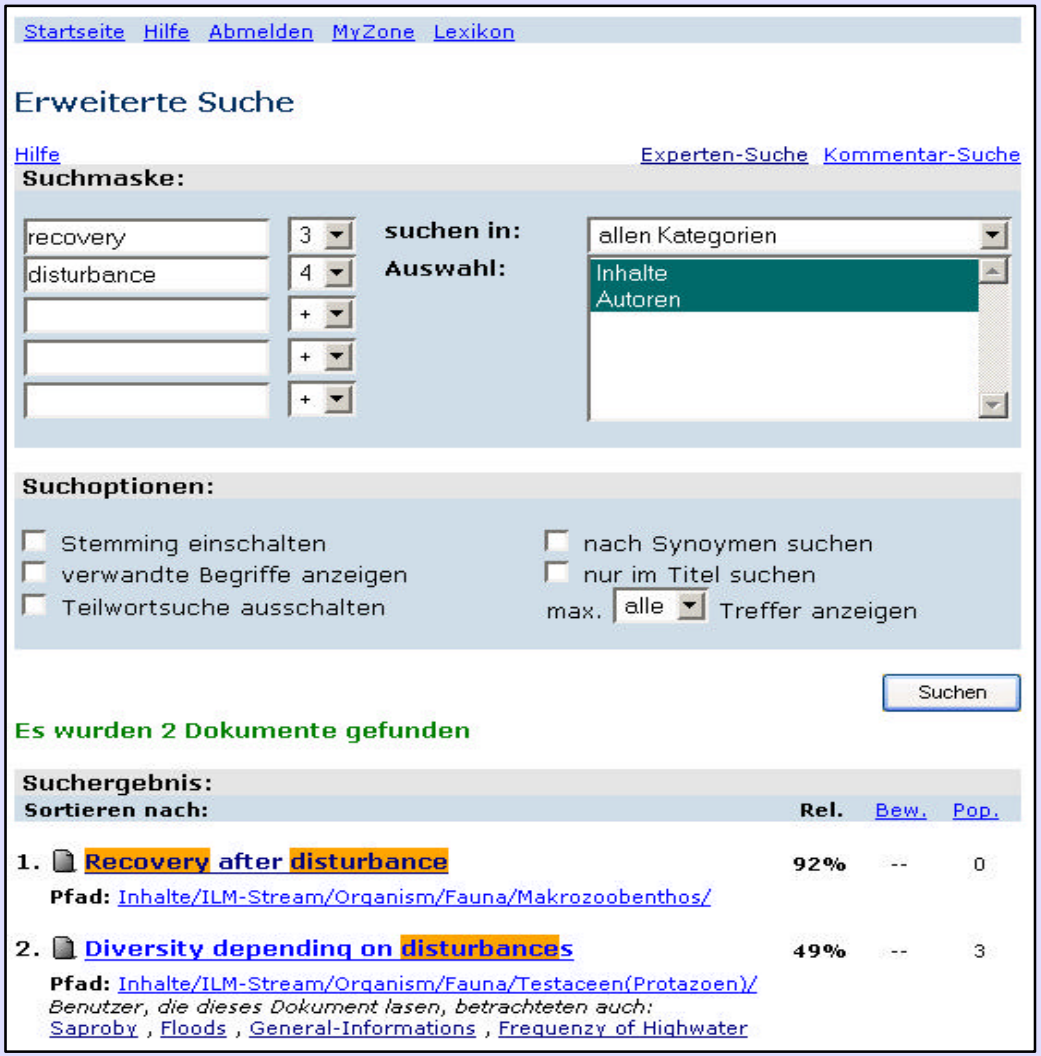
Information retrieval

- Easy and intelligent retrieval
- Browsing
  - Within the tree-structure
  - Heterarchical categories
- Searching
  - Words, boolean connectors, weights
  - Automatic generation of word vectors
  - Result ranked to degree of conformance
  - Requested words are highlighted

Online content management system iZone

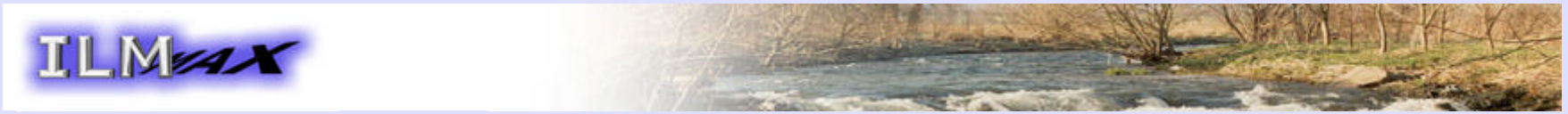


Search in iZone



Further use of knowledge

- Merge pieces of knowledge
- Incremental formalization of knowledge
  - Rules and conditions
  - Quantitative and qualitative Relations
  - Correlations
- Develop conceptual models or qualitative reasoning models
- Discover new conceptual ecological knowledge about the functioning and regeneration of degraded stream ecosystems

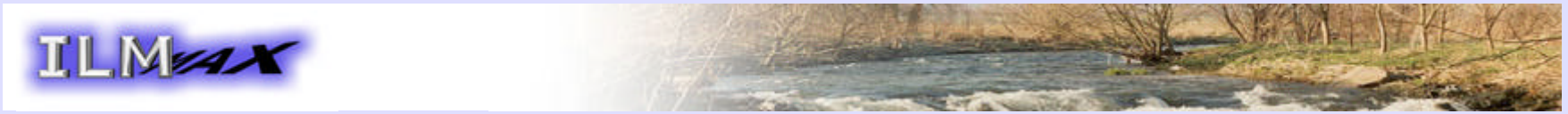


Summary

- Long term investigation of the recovery of river ILM
- Informal knowledge from separate investigations
- Structure this knowledge
- Formalize this knowledge and use it for qualitative reasoning

Conclusions

- In long-term ecological research projects the use of online content management systems can help to store, retrieve, and visualize experience knowledge
- The internet facilitates the process of knowledge capturing
- We recommend the start with a knowledge champion
- The knowledge can be used by all involved scientists
- The formalized knowledge can be used for an advancement



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