Data Management for Kruger National Park

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Roadmap

- Data collected at Kruger
- Benefits of comprehensive metadata
- Kruger National Park Data Repository
- Morpho: entering metadata at KNP
- The Knowledge Network for Biocomplexity

Kruger Data are heterogeneous

- Bone density and Calcium and Phosphorus content of the giraffe (*Giraffa camelopardalis*) and African buffalo (*Syncerus caffer*) skeletons
- Effects of large mammalian herbivore exclusion on the physiognomy, species composition and boundary dynamics of woody vegetation, across a vlei/upland boundary
- KNP Ranger Diaries
- Kruger National Park ecological aerial survey data
- Responses of herbaceous vegetation to reduced disturbance on the northern plains
- A GIS Model of Bovine Tuberculosis in the African Buffalo (*Syncerus caffer*) Population of Kruger National Park, S. Africa

KNP Data origins

- Ongoing park monitoring
- Independent research projects in the park

Data are Distributed

- Data are distributed among:
  - Independent researcher holdings
  - Kruger staff databases
- So, these data are largely inaccessible
  - Benefits would accrue if data were available for Kruger NP science and management

Lack of Documentation

- Most ecological data are undocumented
  - May be impossible to understand data without contacting the original researchers
  - Inhibits data preservation and re-use
- Documentation conventions widely vary
  - Requires large time investment to understand each data set
- Data loss
  - Huge investments in research unavailable to future researchers

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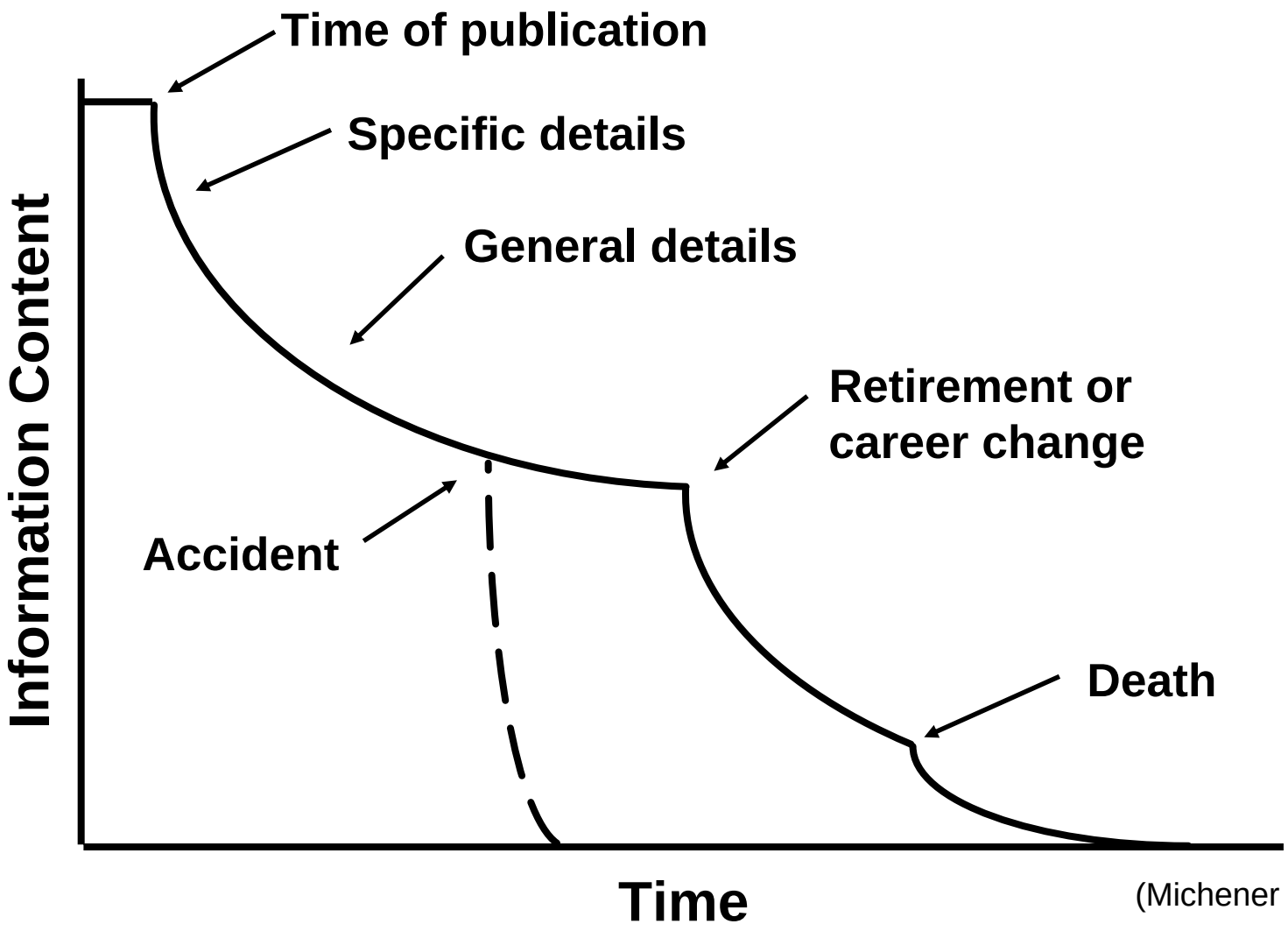
Data Entropy



(Michener et al. 1997)

Metadata allow data interpretation

Metadata

Data

	Date (YYYYMMDD)	Temp (°C)	Precip. (mm)
Obs. #1	**20040928**	**29.4**	**18.4**
Obs. #2	**20040929**	**29.7**	**4.2**
Obs. #3	**20040930**	**28.9**	**21.3**

What are “Metadata”?

- Information about data
- Data description
- Data about data

“higher level information that describes the content, quality, structure, and accessibility of a specific data set”

Michener et al., 1997

Metadata answer the following…

- What relevant data exist?
- Why were those data collected and are they suitable for a particular use?
- How can these data be obtained?
- How are the data organized and structured?
- What additional information is available that would facilitate data use and interpretation?

Benefits of using metadata

- Increases data longevity
- Promotes data reuse and sharing
- Enhances system interoperability
- Enables data synthesis and integration

But also some costs

- Personnel costs
  - time for learning and training
  - additional effort
- Long-term stewardship and curation

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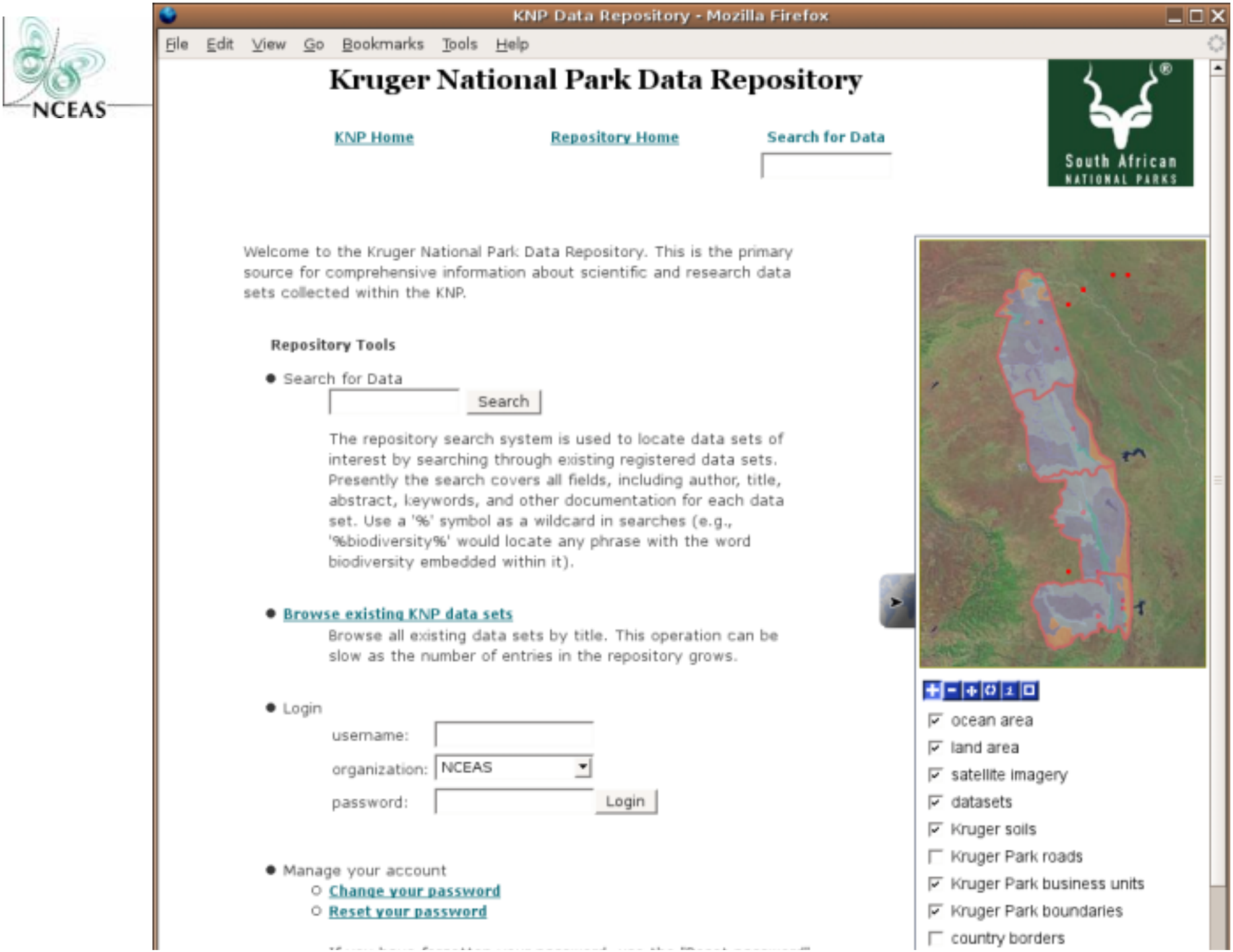
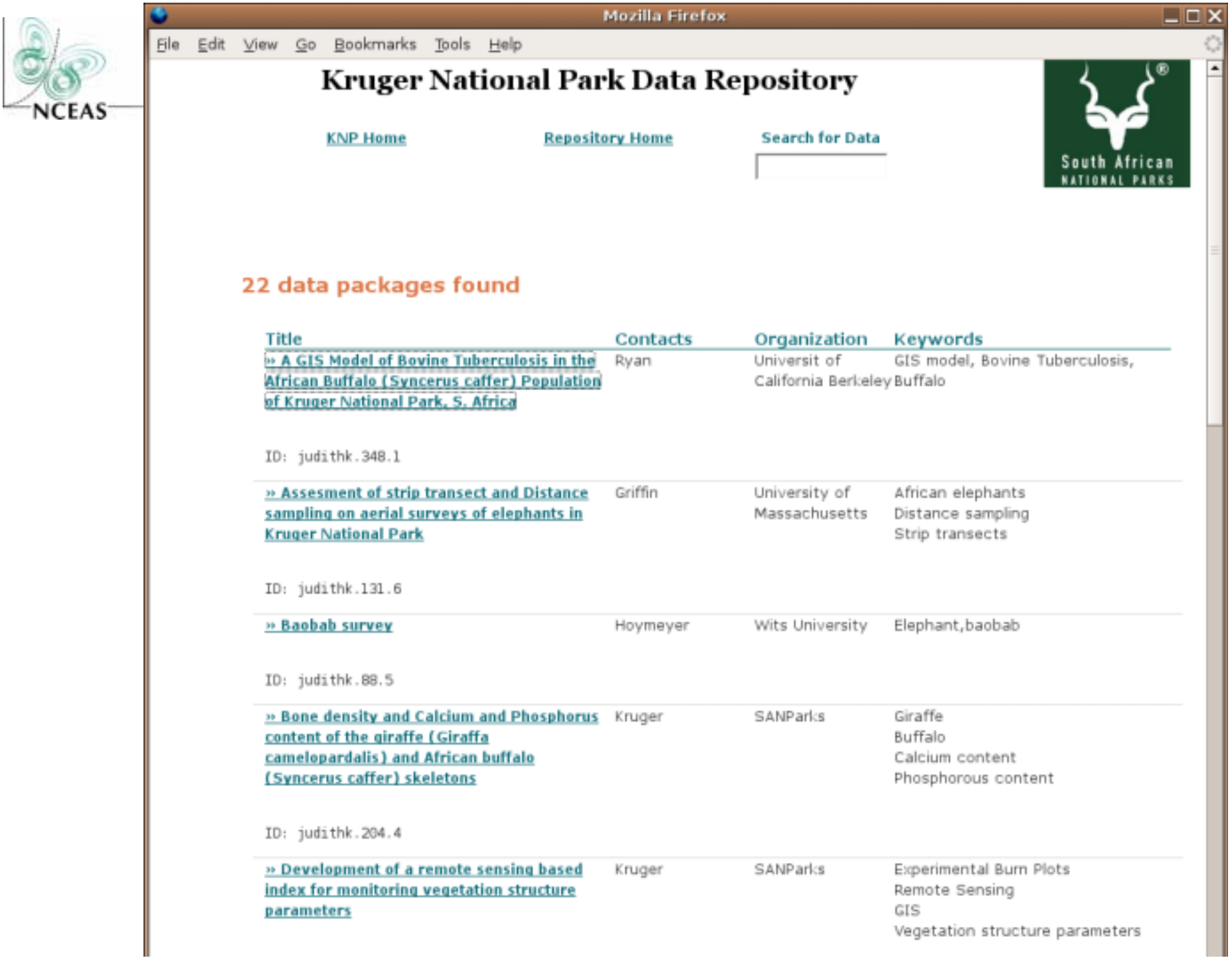
Kruger Data Repository

- A system for storing and accessing data collected at Kruger National Park
  - Supports many different kinds of data
  - Rich metadata to interpret and preserve data
  - Enables researchers to share data
  - Preserves investment in data collection
  - Data becomes the foundation for managing Kruger's resources


KNP Data Repository - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
Kruger National Park Data Repository
KNP Home
Repository Home
Search for Data
South African NATIONAL PARKS
Welcome to the Kruger National Park Data Repository. This is the primary source for comprehensive information about scientific and research data sets collected within the KNP.
Repository Tools
Search for Data
Search
The repository search system is used to locate data sets of interest by searching through existing registered data sets. Presently the search covers all fields, including author, title, abstract, keywords, and other documentation for each data set. Use a '%' symbol as a wildcard in searches (e.g., '%biodiversity%' would locate any phrase with the word biodiversity embedded within it).
Browse existing KNP data sets
Browse all existing data sets by title. This operation can be slow as the number of entries in the repository grows.
Login
username:
organization: NCEAS
password:
Login
Manage your account
Change your password
Reset your password
ocean area
land area
satellite imagery
datasets
Kruger soils
Kruger Park roads
Kruger Park business units
Kruger Park boundaries
country borders


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
Kruger National Park Data Repository
KNP Home
Repository Home
Search for Data
South African NATIONAL PARKS
22 data packages found
Title
Contacts
Organization
Keywords
» A GIS Model of Bovine Tuberculosis in the African Buffalo (Syncerus caffer) Population of Kruger National Park, S. Africa
Ryan
Universit of California Berkeley
GIS model, Bovine Tuberculosis, Buffalo
ID: judithk.348.1
» Assesment of strip transect and Distance sampling on aerial surveys of elephants in Kruger National Park
Griffin
University of Massachusetts
African elephants
Distance sampling
Strip transects
ID: judithk.131.6
» Baobab survey
Hoymeyer
Wits University
Elephant,baobab
ID: judithk.88.5
» Bone density and Calcium and Phosphorus content of the giraffe (Giraffa camelopardalis) and African buffalo (Syncerus caffer) skeletons
Kruger
SANParks
Giraffe
Buffalo
Calcium content
Phosphorous content
ID: judithk.204.4
» Development of a remote sensing based index for monitoring vegetation structure parameters
Kruger
SANParks
Experimental Burn Plots
Remote Sensing
GIS
Vegetation structure parameters

Mozilla Firefox

File Edit View Go Bookmarks Tools Help

Kruger National Park Data Repository

KNP Home | Repository Home | Search for Data

Data Set Citation

Ryan S. . **A GIS Model of Bovine Tuberculosis in the African Buffalo (Syncerus caffer) Population of Kruger National Park, S. Africa**. judithk.348.1

Data Set Owner(s):

Individual: **SJ Ryan**
Organization: Universit of California Berkeley
Position: Department of Environmental Science, Policy, and Management,&The Museum of Vertebrate Zoology
Address: 137 Mulford Hall, University of California at Berkeley,
Berkeley, California 94720 USA
Phone: USA (510) 643 1227 (voice)

Abstract:

PROJECT GOALS &OBJECTIVES In my initial project registration, I outlined several main objectives as follows: Short-term To quantify demographic data collected within the Klaserie Private Nature Reserve (KPNR) by Christianne Knechtel and create a life-history model with climate sensitive parameters. To create a GIS of movement data collected by C. Knechtel to quantify daily movement rates, direction, route and range; to analyze and compare this data with ongoing data collection in the Satara region of KNP (P.Cross). To create comparable databases of climatic data for both KPNR and KNP; monthly rainfall and daily temperature data will be used. To compile databases of GIS information regarding habitat (satellite imagery, vegetation analyses, soil type, slope and aspect, hydrology) for both KPNR and KNP. Long-term To create a GIS model of buffalo response to climate and habitat, incorporating demographically driven age-structured disease transmission. Assess management strategies (vaccination, culling, exclusion zones) within this GIS modeled environment of Kruger National Park. To provide Kruger National Park with information and data regarding modeled strategies, habitat data and crucial demographic data for African Buffalo. In pursuing these goals and objectives, I sought to complement ongoing monitoring of bovine tuberculosis in the Satara region with studies of buffalo ranging and demography. Several studies of buffalo ranging, habitat selection and demography were undertaken with the overarching goal of describing the relationship between buffalo and their resources in a spatially explicit and temporally dynamic way.

Keywords:

Roadmap

- Data collected at Kruger
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- Kruger National Park Data Repository
- Morpho: entering metadata at KNP
- The Knowledge Network for Biocomplexity

What is Morpho?

- Morpho
  - Used to create and manage data and metadata
  - Is an application for your PC
  - Can be run on Windows, Linux and Mac OS
  - Is free and open source

Defining a ‘data package’

ExampleData.txt

Text lake	Text site	Text sampdate	Integers meter depth	Floating Point cubicMeter sampvol	Text species	Integers dimensionless count
Lake Erie	N1	10JUN2000	1	10	Daphnia pulex	78
Lake Erie	N1	10JUN2000	5	10	Daphnia pulex	71
Lake Erie	N2	10JUN2000	1	10	Daphnia pulex	74
Lake Erie	N2	10JUN2000	5	10	Daphnia pulex	81
Lake Erie	N3	10JUN2000	1	10	Daphnia pulex	87
Lake Erie	N3	10JUN2000	5	10	Daphnia pulex	77
Lake Erie	N1	10JUN2000	1	10	Daphnia magna	78
Lake Erie	N1	10JUN2000	5	10	Daphnia magna	70
Lake Erie	N2	10JUN2000	1	10	Daphnia magna	75
Lake Erie	N2	10JUN2000	5	10	Daphnia magna	75
Lake Erie	N3	10JUN2000	1	10	Daphnia magna	78
Lake Erie	N3	10JUN2000	5	10	Daphnia magna	79
Lake Erie	N1	10JUL2000	1	10	Daphnia pulex	96

Raw Data

Data Set Description

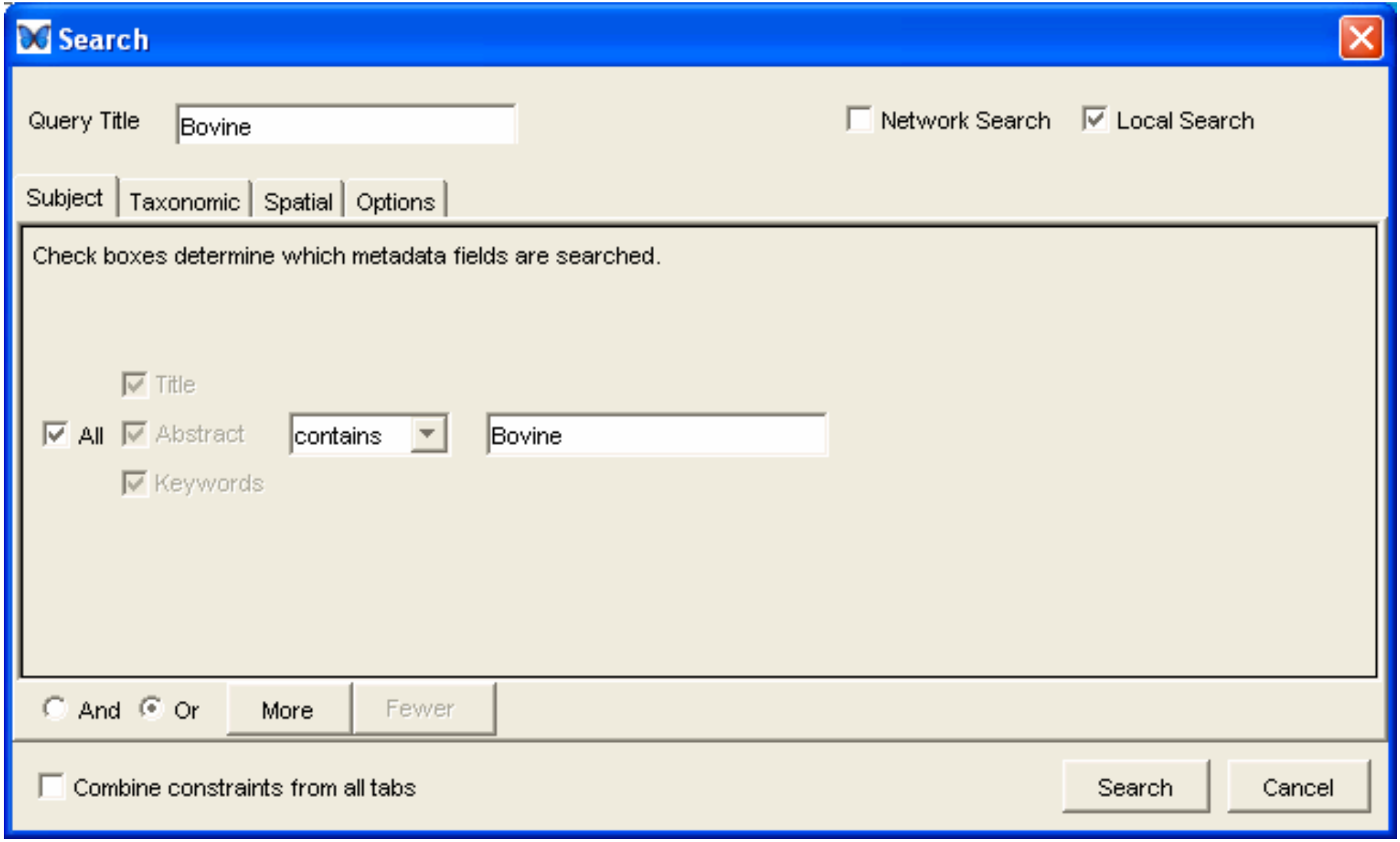
Identifier:	jscientist.7.1
Catalog System:	knb
Title:	**Population sampling data for zooplankton in the Great Lakes, 2000**
Data Set Owner(s):	
Individual:	**Joe Scientist**
Address:	Marine Science Institute, Santa Barbara, CA 90024 USA
Phone:	(310) 206-1984
Email Address:	jsci@msi.ucsb.edu
Associated Party:	
Individual:	**Joe Scientist**
Address:	Marine Science Institute, Santa Barbara, CA 90024 USA
Phone:	(310) 206-1984
Email Address:	jsci@msi.ucsb.edu

Metadata

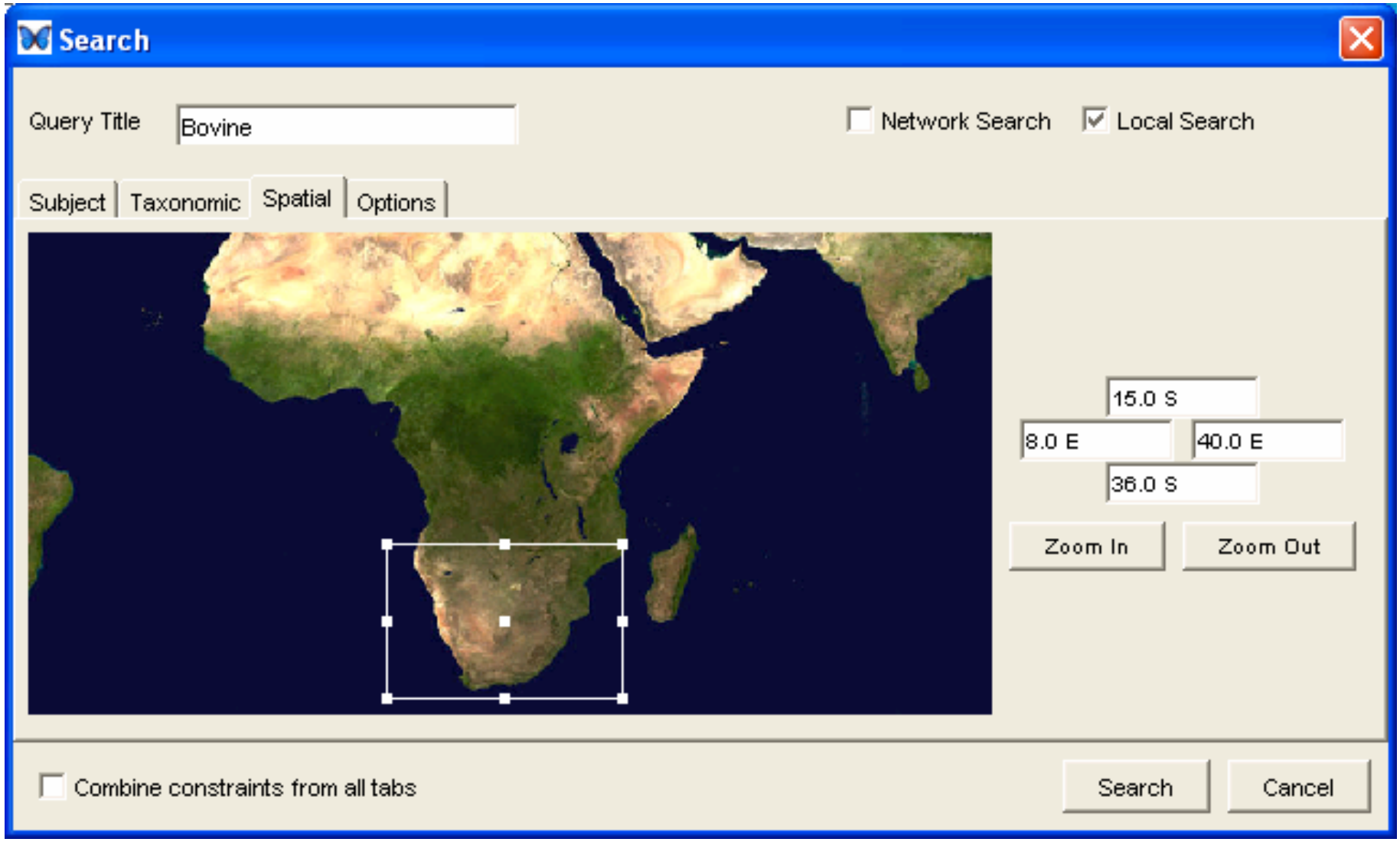
What can Morpho do?

- Create data packages
- Import data in to a data package
- Save the data package – locally and over the network
- Search for data packages – locally and over the network
- Open and edit data packages
- Export data packages to use in other applications

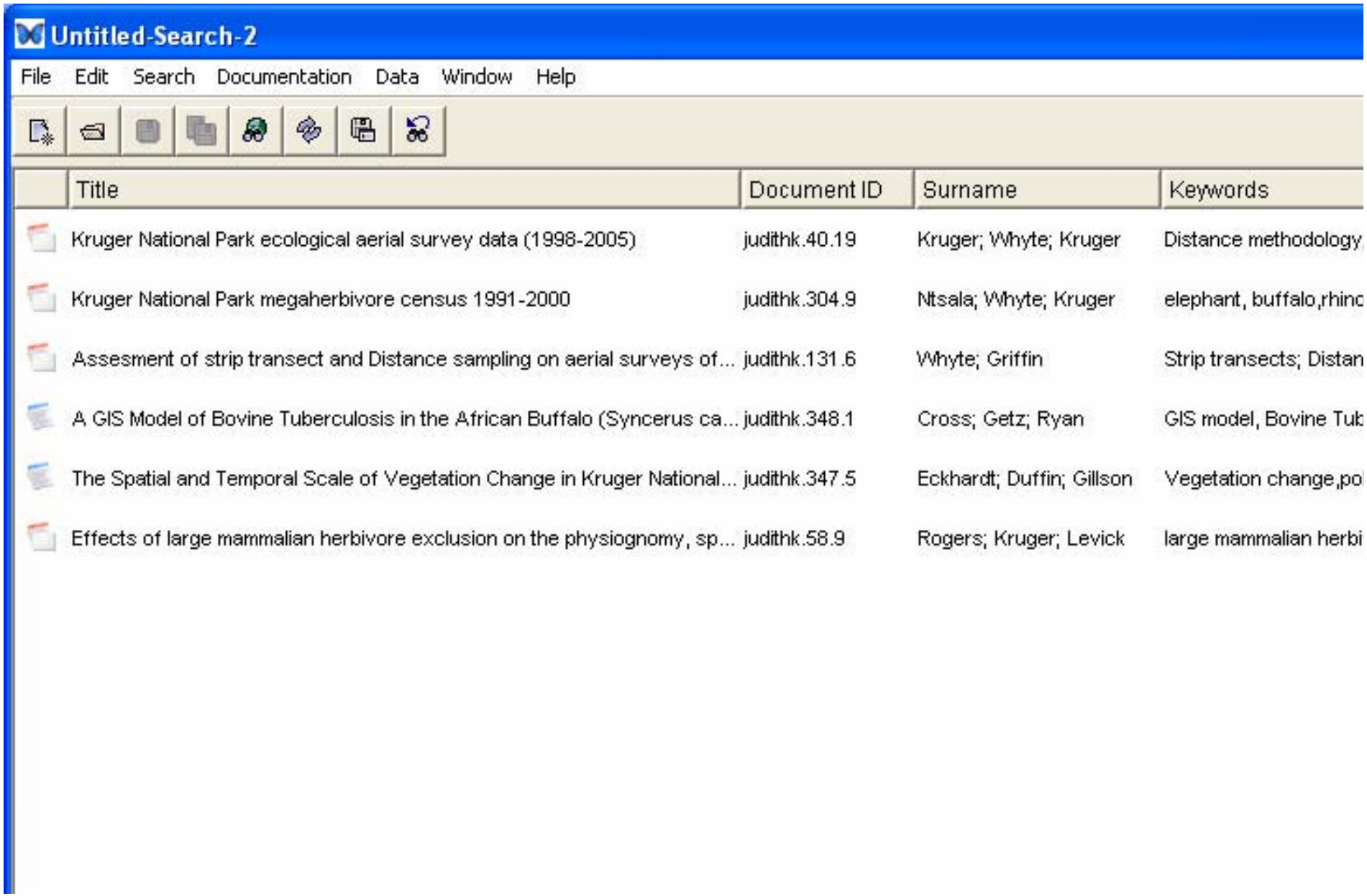
Morpho keyword search



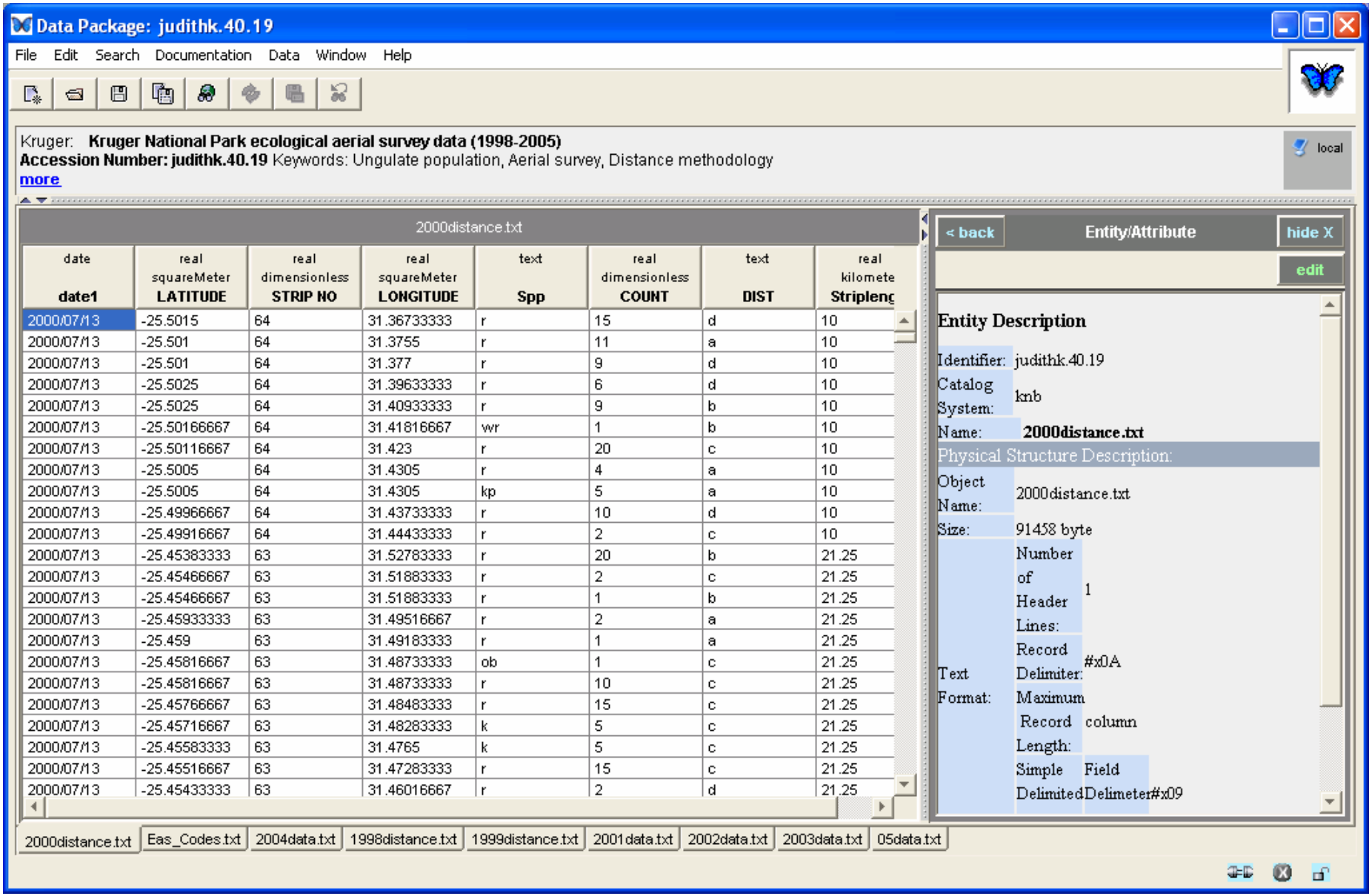
Morpho spatial search



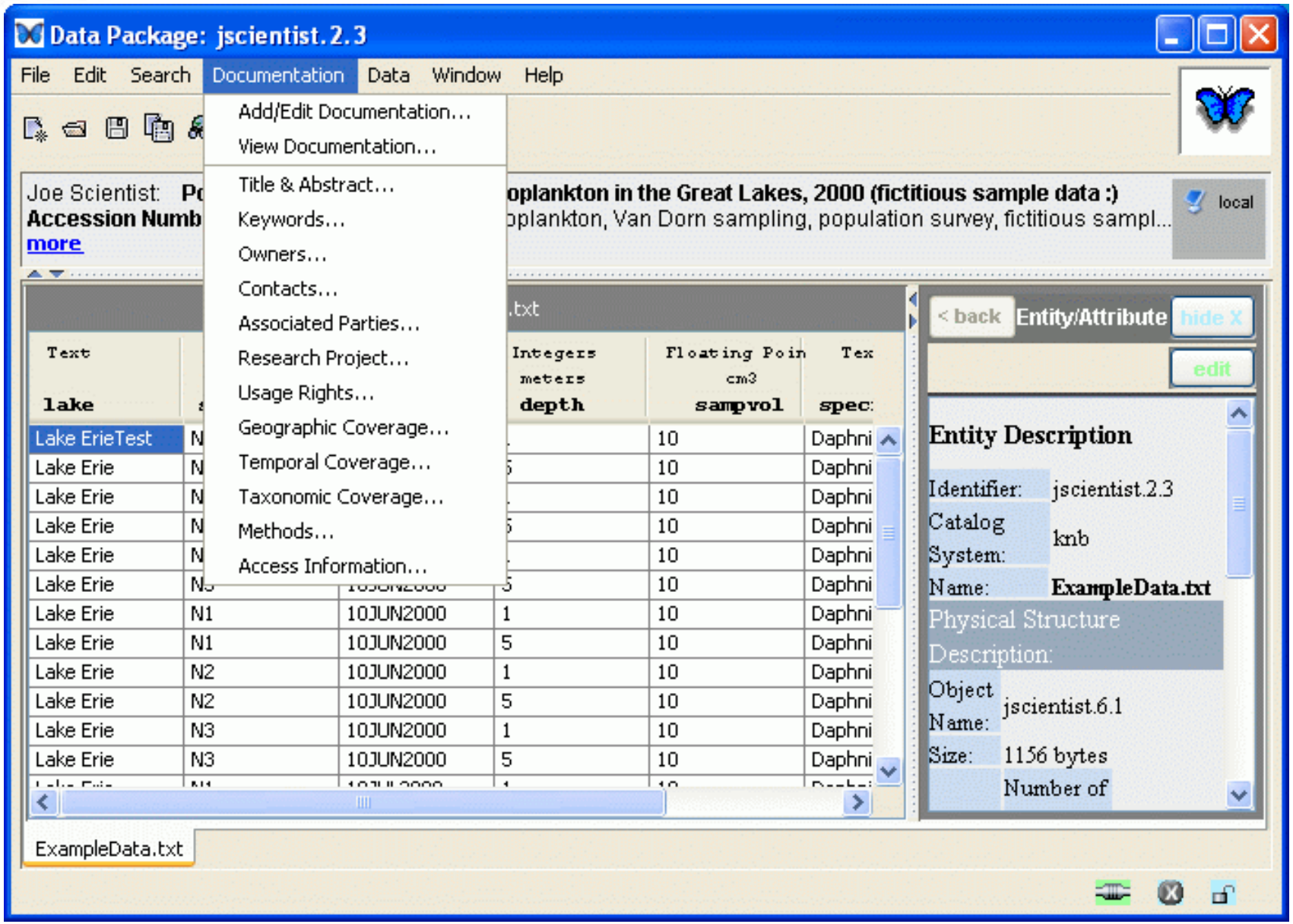
Morpho search results



Morpho data package



Editing metadata in Morpho



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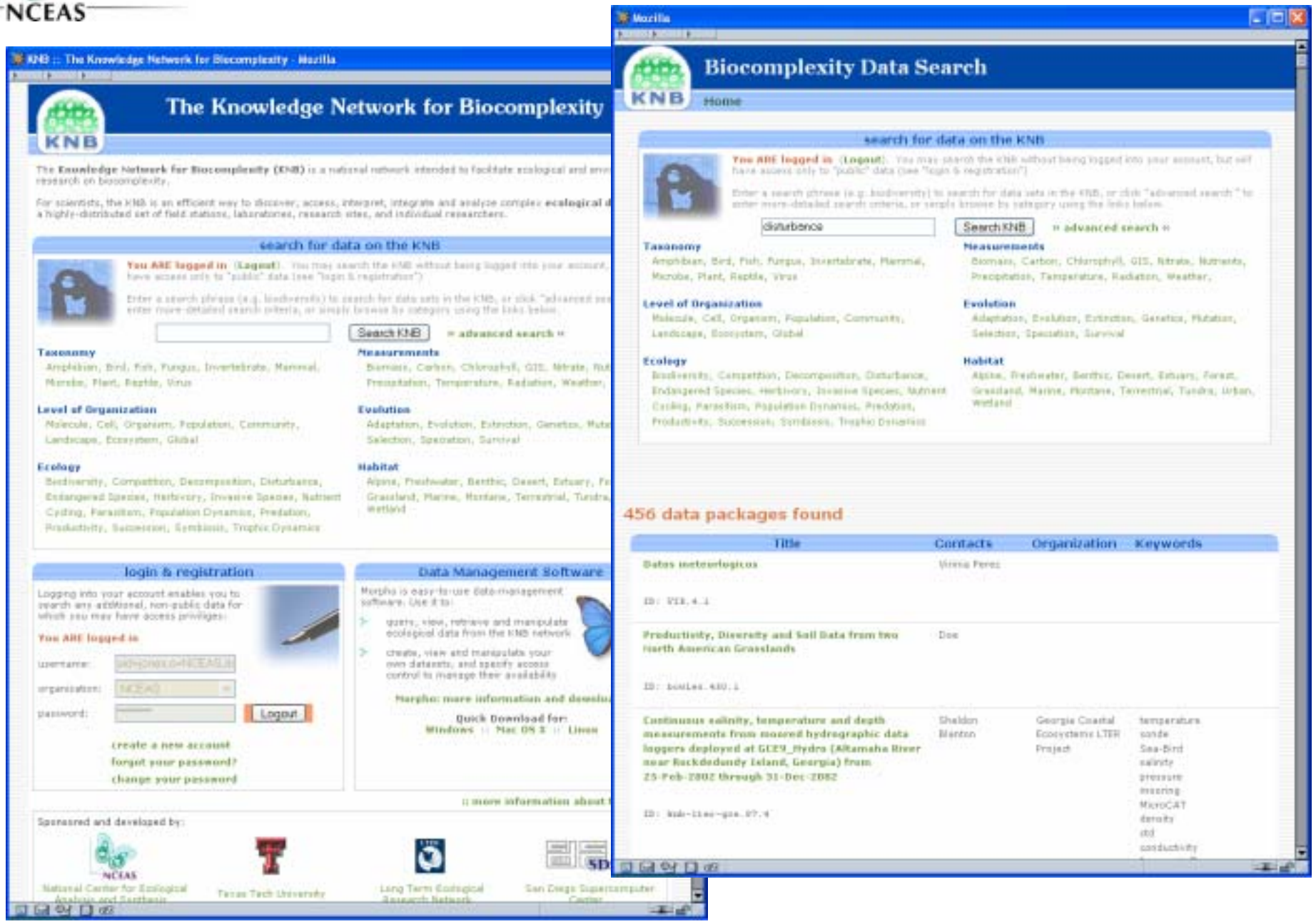
Knowledge Network for Biocomplexity



Building a Community

- Access control by individuals
- Data maintenance by individuals
- Automatic forwarding of changes
- Simple data sharing

Kruger

KNB

NRS

PISCO

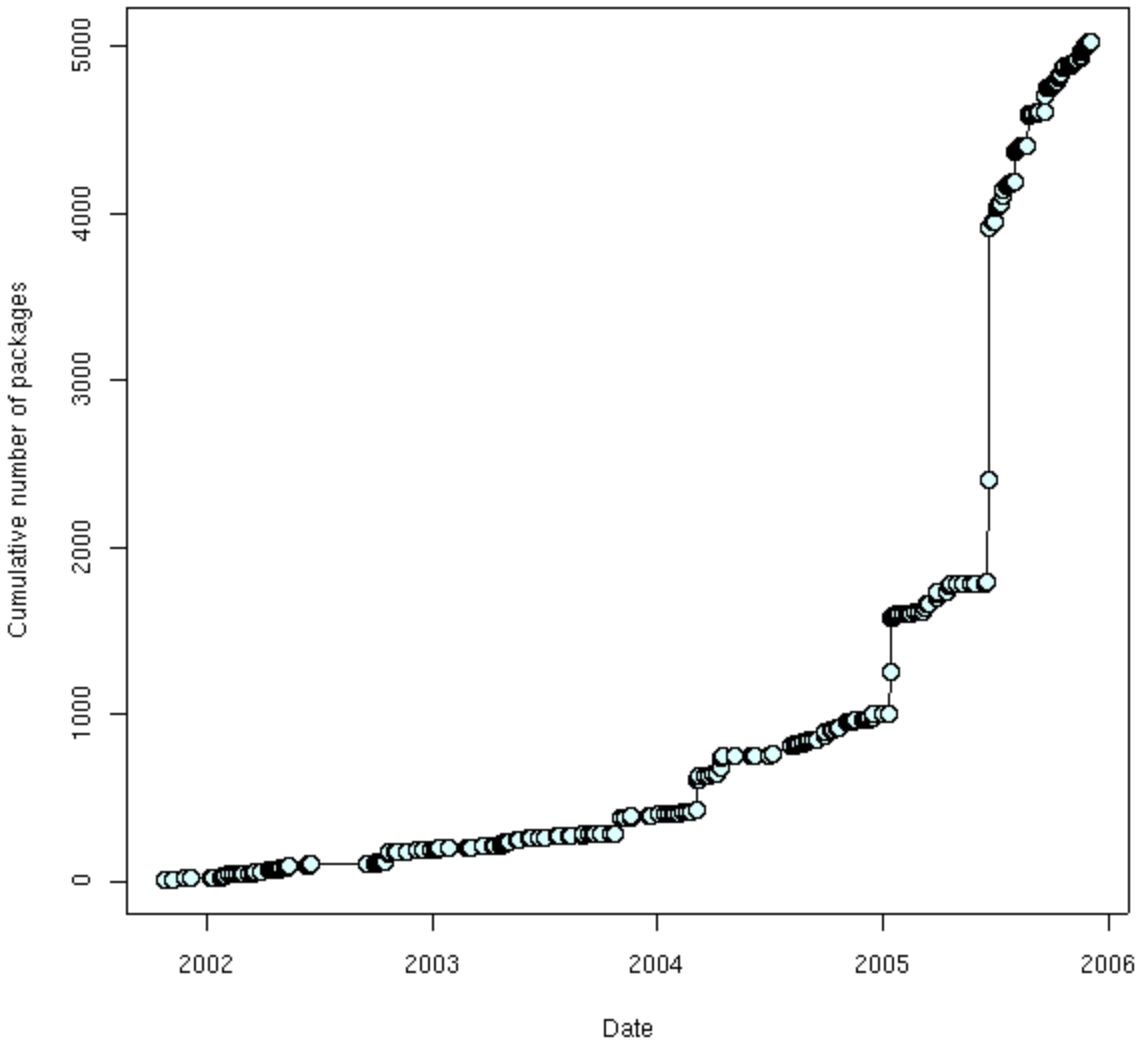
Key

Metacat Catalog

Morpho clients

Web clients

Data archived vs time

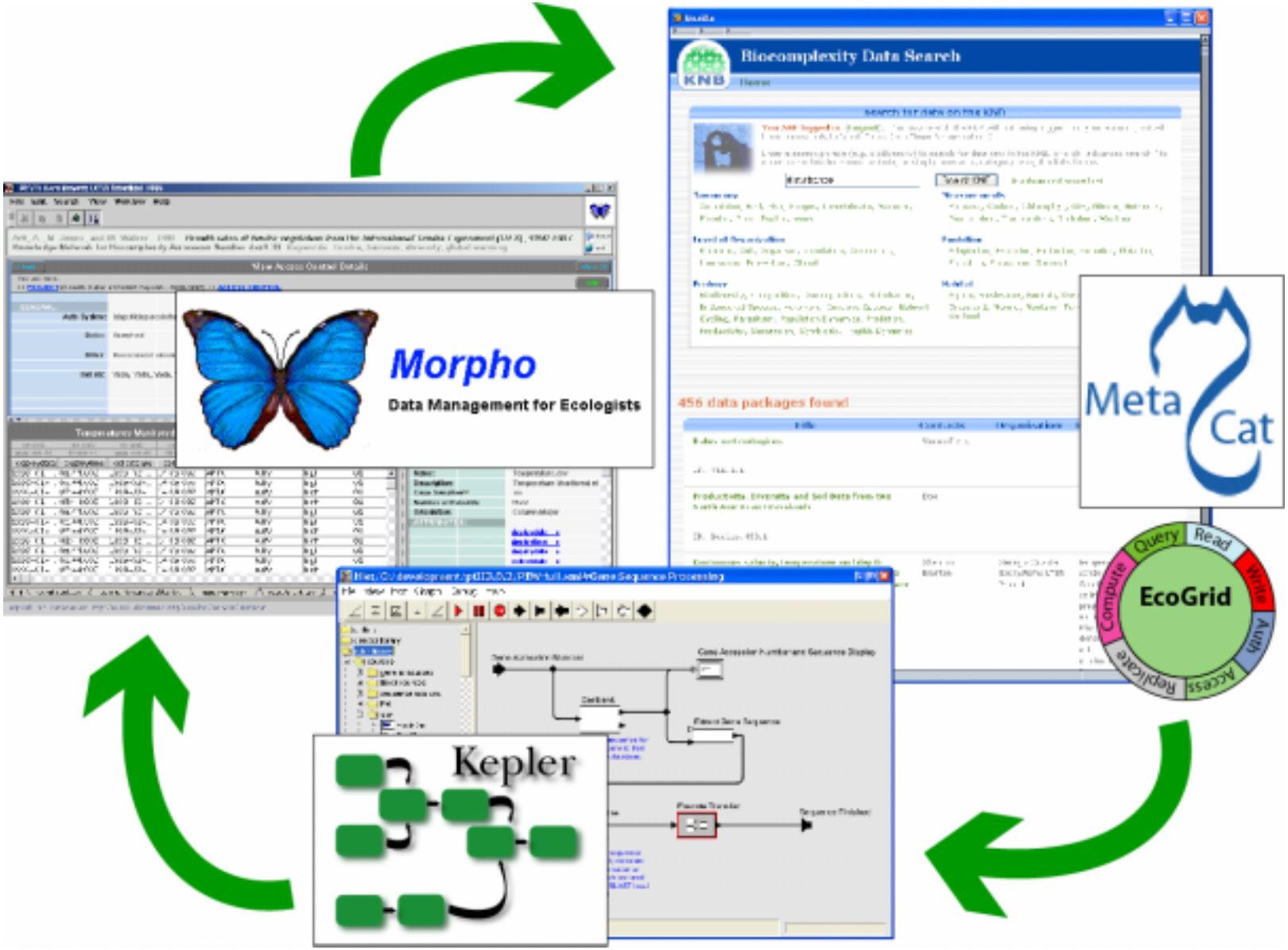



ESA Data Registry - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
Ecological Society of America Data Registry
ESA Registry | Register Data | Search for Data | My Submissions | Login
Welcome to the ESA Data Registry. This is a publidy accessible registry describing scientific data sets on ecology and the environment. The data sets registered here are associated with articles published in the journals of the Ecological Society of America. They are registered here in order to facilitate communication and data sharing by scientists. See individual registry entries for citation information as well as usage rights.
Registry Tools
Search for Data Sets
Search
Search only within the ESA Data Registry
Search entire Knowledge Network for Biocomplexity
Search Title, Abstract, Keywords, Personnel (Quicker)
Search all fields (Slower)
This tool allows you to search the registry for data sets of interest. When you type text in the box and click on the "Search" button, the search will only be conducted within the title, author, abstract, and keyword fields. Checking the "Search All Fields" box will search on these and all other existing fields (this search will take more time). Checking the "Search Knowledge Network for Biocomplexity" box will allow you to search the Knowledge Network for Biocomplexity (KNB) in addition to the ESA Data Registry. The KNB is an international data repository dedicated to facilitating ecological and environmental research. Click here for more information on the KNB.
You can use the '%' character as a wildcard in your searches (e.g., '%biodiversity%' would locate any phrase with the word biodiversity embedded within it).
Browse data sets
Browse all existing data sets by title. This operation can be slow as the number of entries in the registry grows.
Register a new data set
The ESA Data Registry form is for registering data sets associated with articles published in the journals of the Ecological Society of America. Other Ecological data sets can be registered with the Knowledge Network for Biocomplexity (KNB).
Steps for registering an ESA data set
Step 1: Create an Account
Create an account by registering with the KNB. Many scientists will already have accounts in the KNB, especially those from institutions like NCEAS and LTER. If you already have an account please use that existing account rather than creating a new one.
Step 2: Login
Login to the ESA Registry website with the account you created. Fill out the ESA Data Registry Form.
Step 3: Register Data

KNB Objectives

- Access to ecological and environmental data
  - Promote data discovery, sharing & re-use
  - Maintain local autonomy for data management
- Data preservation
  - Long term data description
  - Provide archiving capabilities
- Analysis and Synthesis
  - Promote cross-cutting analysis by developing analytical tools
  - Address data heterogeneity issues
- Build an active informatics community
  - Enable more rapid IT advances through collaboration
  - Promote formal interactions with ecological researchers
  - Break down barriers to data sharing

Metadata-driven analysis cycle



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