National Biological Information Infrastructure

# *The National Biological Information Infrastructure*

Mike Frame
USGS Center for Biological Informatics
May 3rd, 2000

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# *Topics*

- What is the NBII
- Where we are going
- Technology Initiatives
- Future Research Efforts

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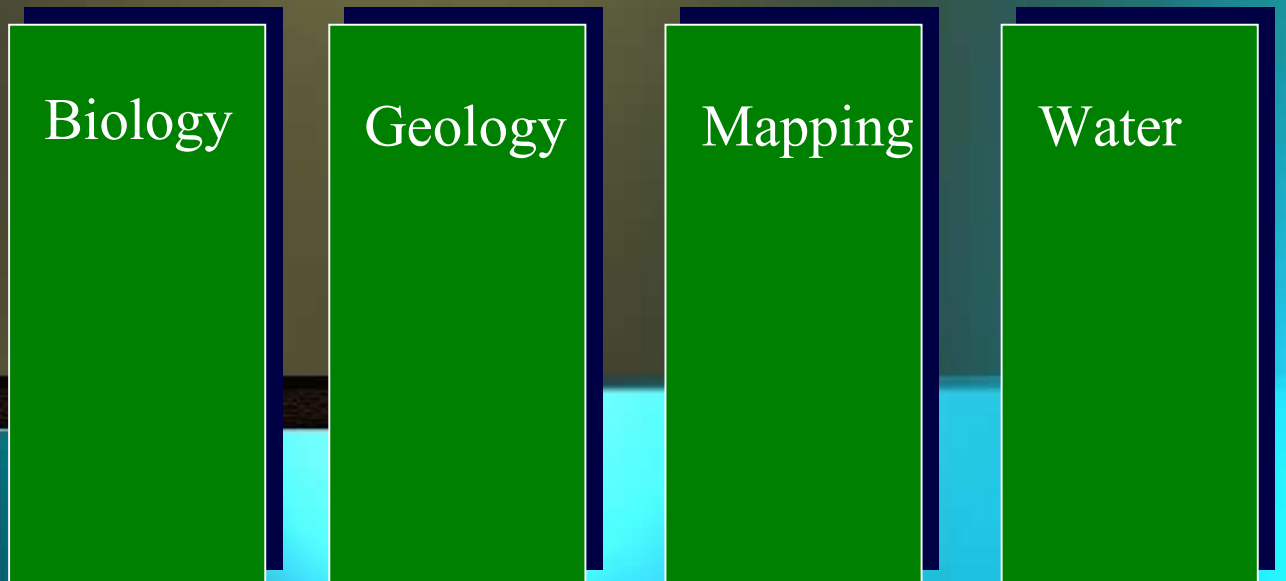
# The USGS

- Vision - USGS is a world leader in the natural sciences through our scientific excellence and responsiveness to society's needs.



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# The NBII

The NBII is an electronic gateway to biological data and information maintained by federal, state, and local government agencies; private sector organizations; and other partners around the nation and the world.

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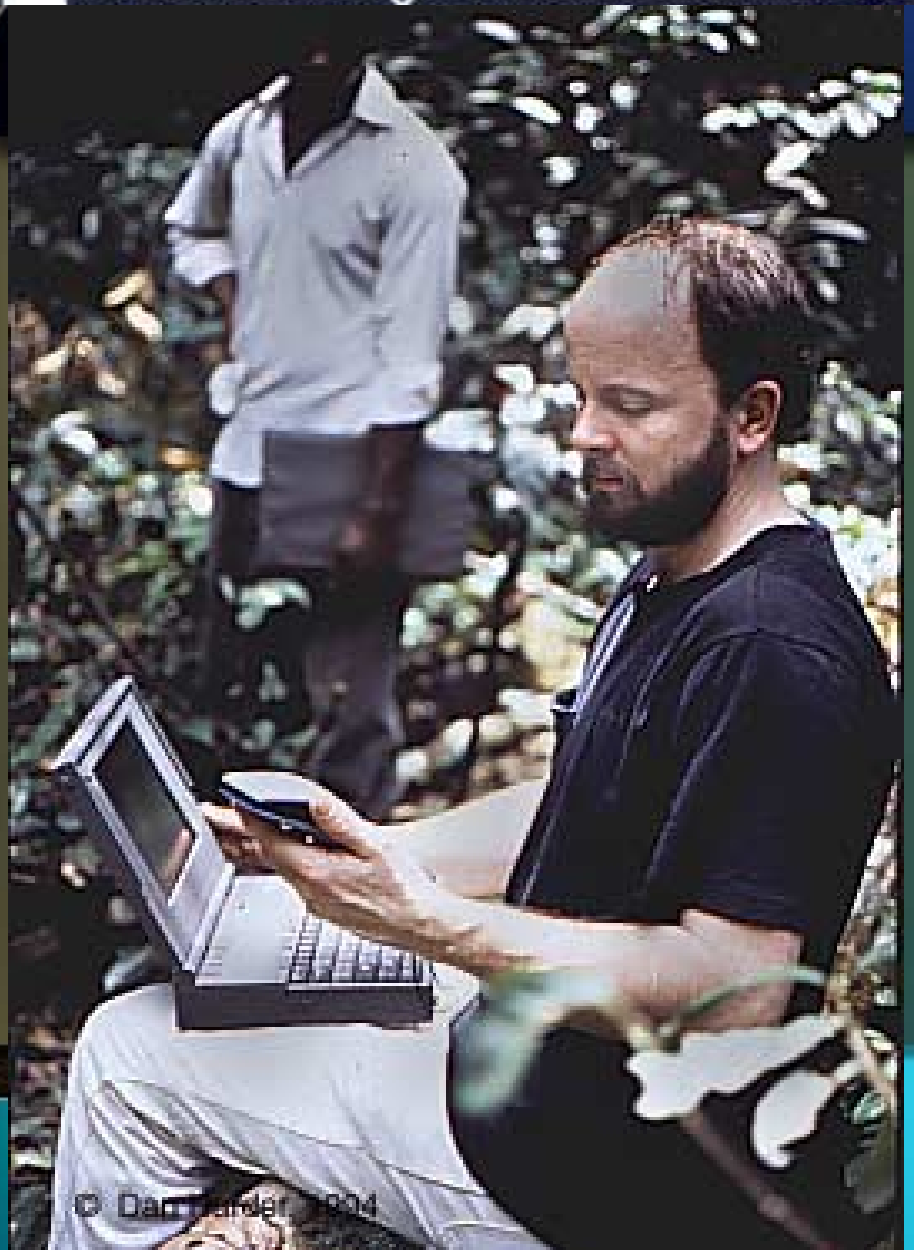


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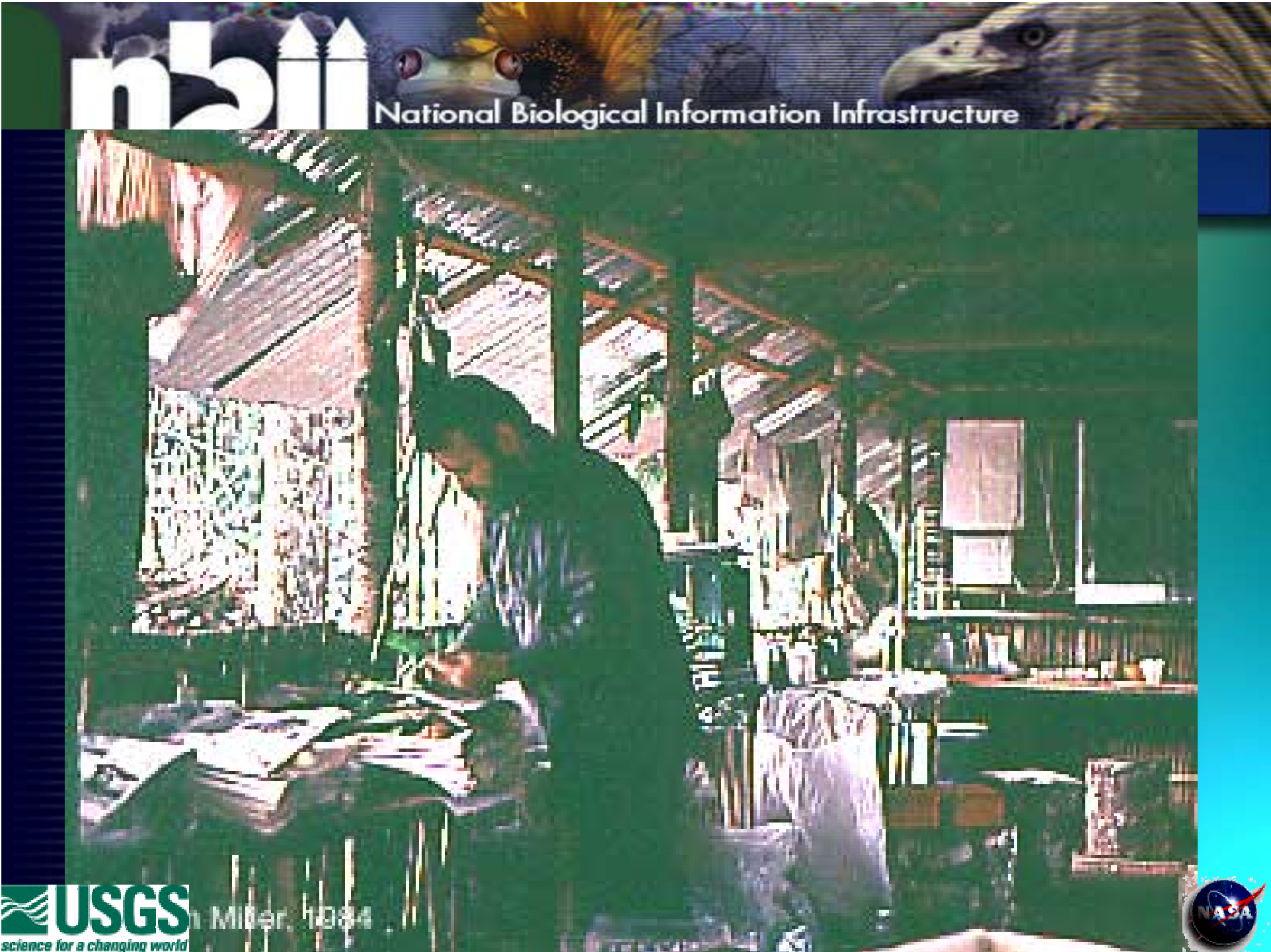
NASA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Miller, 1984

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© Missouri Botanical Garden

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science for a changing world
since 1884

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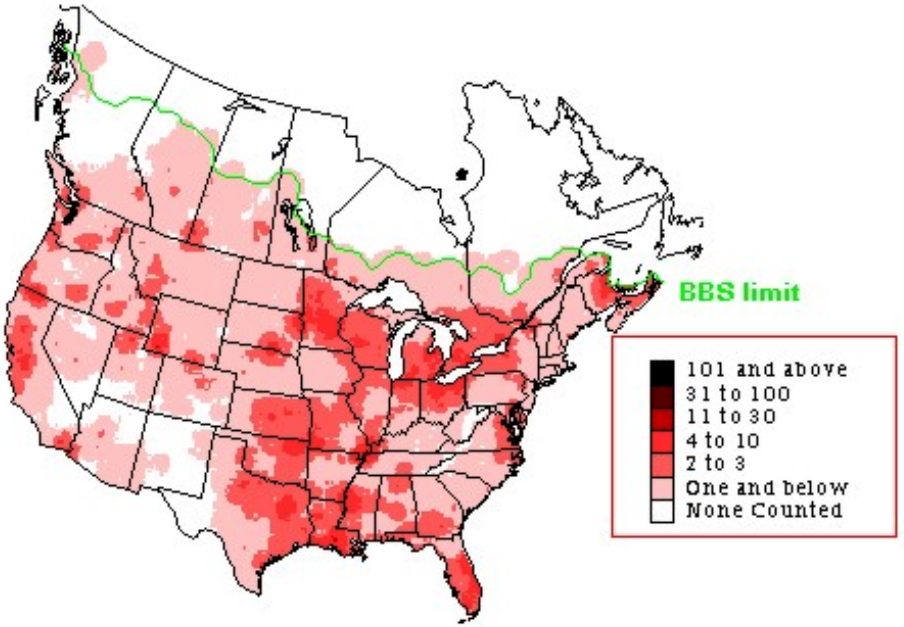
USGS Electronic | Biological Reso | Internet | Lookup | New&Cool

# Great Blue Heron *Ardea herodias*

## Summer Distribution Map



## Species Information:

- Life History Data
- Identification Tips
- Photograph
- Song
- Breeding Distribution Map (BBS Data)
- Winter Distribution Map (CBC Data)

http://www.mbr-pwrc.usgs.gov/bbs/htm96/map617/ra1940.html

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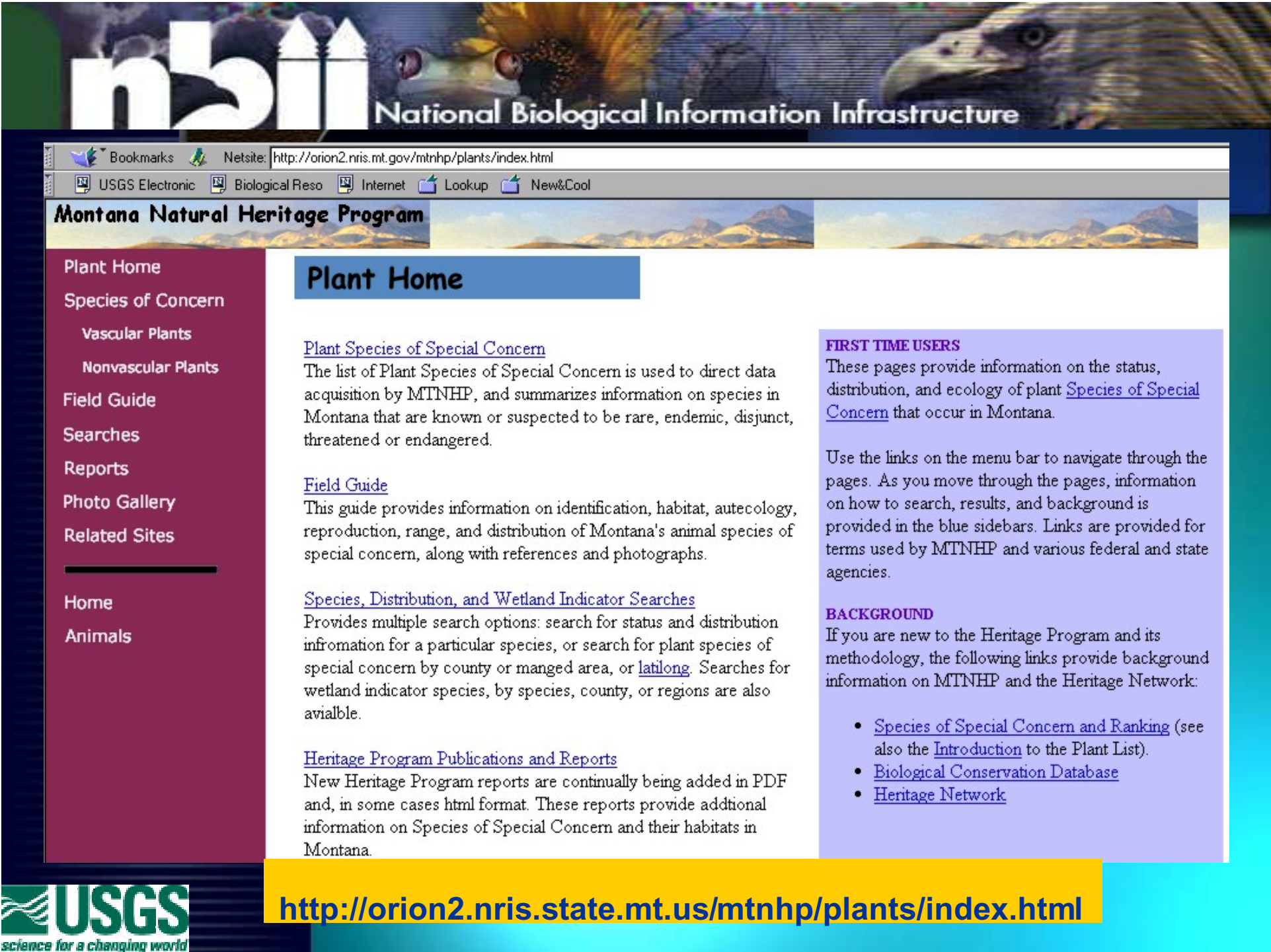


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http://orion2.nris.state.mt.us/mtnhp/plants/index.html

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**Florida Museum of Natural History**

# Herpetology

- FLMNH Herpetology Collection
  - Type Specimens in the FLMNH Herp Collection NEW
- UF and FLMNH Herpetology Programs, Faculty and Students
- Guide to the Venomous Snakes of Florida
- Checklist of Florida Amphibians and Reptiles
- An Online Bibliography of the Herpetofauna of Florida
- Crocodilians Natural History & Conservation
- Crocodile Specialist Group
  - Action Plan for Crocodile Conservation
  - Crocodilian Photo Gallery
- Crocodilian, Tuatara, and Turtle Species of the World: An Online Taxonomic and Geographic Reference
- Florida Caribbean Science Center Herpetology Project
- A Bibliography of the Loggerhead Sea Turtle *Caretta caretta*
- Gopher Tortoise Council
- The Pigmy Rattlesnake Homepage
- Sea Turtle Online Bibliography, Archie Carr Center for Sea Turtle Research
- Florida Herp League
- All Florida Herp Conference
- Amphibian and Reptile WWW Sites

http://www.flmnh.ufl.edu/natsci/herpetology/herpetology.htm#Top

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Bookmarks Location: http://www.nbii.gov/tred/

BRD - USGS | USGS Intranets | Lookup | New&Cool

# Taxonomic Resources and Expertise Directory

NBII Home

Search NBII

Metadata

Contact Us

The **Taxonomic Resources and Expertise Directory (TRED)** is a directory of *taxonomic specialists* for the biota of North America (North of Mexico). This directory is developed and maintained through a partnership between the **Association of Systematics Collections (ASC)** and the **U.S.G.S. Biological Resources Division (BRD)** and was developed in part to support the **National Biological Information Infrastructure (NBII)** and the **Integrated Taxonomic Information System (ITIS)**.

The **TRED Database** currently contains information submitted by **921** taxonomic specialists.

Click here if you want to complete the TRED questionnaire for taxonomic specialists. This questionnaire is maintained at the ASC homepage.

Click here if you want to update your record within the TRED Database. The TRED Database is maintained by ASC.

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http://www.nbii.gov/tred

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USGS Electronic
Biological Reso
Internet
Lookup
New&Cool
NBII Home
Search NBII
Metadata
Contact Us
User Survey
Online Tools for Environmental and Ecological Analysis
These tools provide for online analysis of environmental and ecological data. No downloading or setup of software is involved.
Breeding bird survey and analysis.
Programs for estimating (and plotting) population changes for bird species over space and time and for determining time interval trends, display of annual indices of abundance for any species in any region, and calculation of estimates of mean abundances of bird species.
VegSpec
Creates vegetative practice designs for a variety of sites and vegetative problems
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http://www.nbii.gov/tools/online_tools.html

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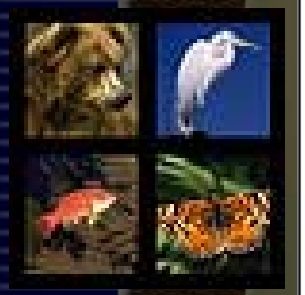
# NBII Topical Issues



The NBII: Building Knowledge through Partnerships

- NBII Home
- Biology in the News
- Emerging Biological Issues
- Biological Disciplines
- Geographic Perspectives
- Education
- Data & Information Products
- Search
- Contact Us

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Invasive Species | Amphibians | Biodiversity | Pollinators

## Emerging Biological Issues

The National Biological Information Infrastructure (NBII) <http://www.nbii.gov> is a broad, collaborative program to provide increased access to data and information on the nation's biological resources. The NBII links diverse, high-quality biological databases, information products, and analytical tools maintained by NBII partners and other contributors in government agencies, academic institutions, non-government organizations, and private industry. NBII partners and collaborators also work on new standards, tools, and technologies that make it easier to find, integrate, and apply biological resources information. Resource managers, scientists, educators, and the general public use the NBII to answer a wide range of questions related to the management, use, or conservation of this nation's biological resources.

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# *Current Challenges*

- Distributed Data Sets
- Vast Amounts of Information
- National Focus of NBII
- Varying Customers & User capabilities
- Limited Resources
- Bridging the IT & Biological communities

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# *Where is the NBII Headed?*

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# *Next Generation NBII*

- **Definition:**

  NBII-2 is to be considered a fully digital, distributed, and interactive system that allows a vast community of users access to the nations biological holdings.

  PCAST

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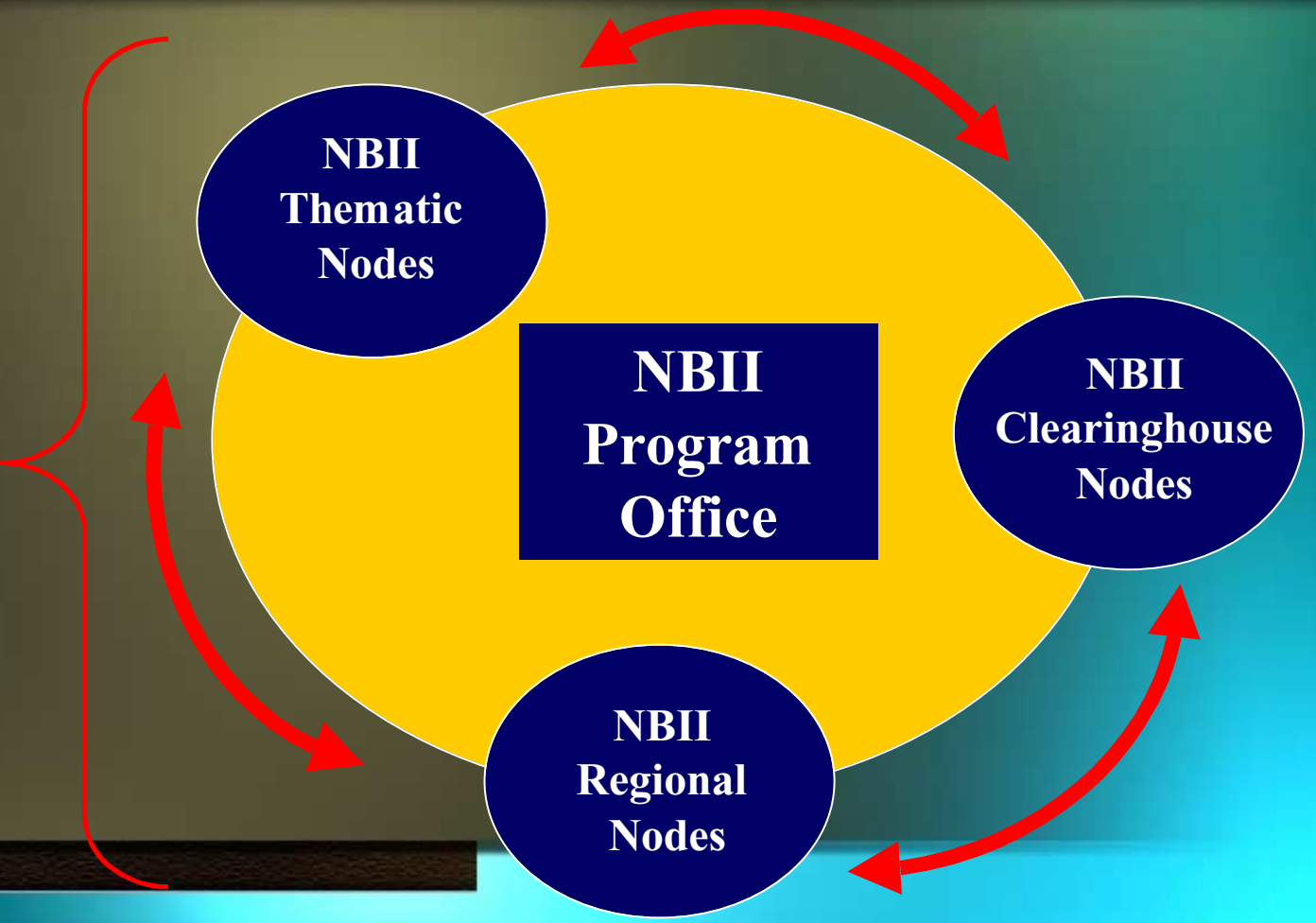
# NBII Vision

- National Laboratories
- Universities
- Centers of Expertise
- NGO s
- Societies
- Private Industry
- Federal Agencies

Participants

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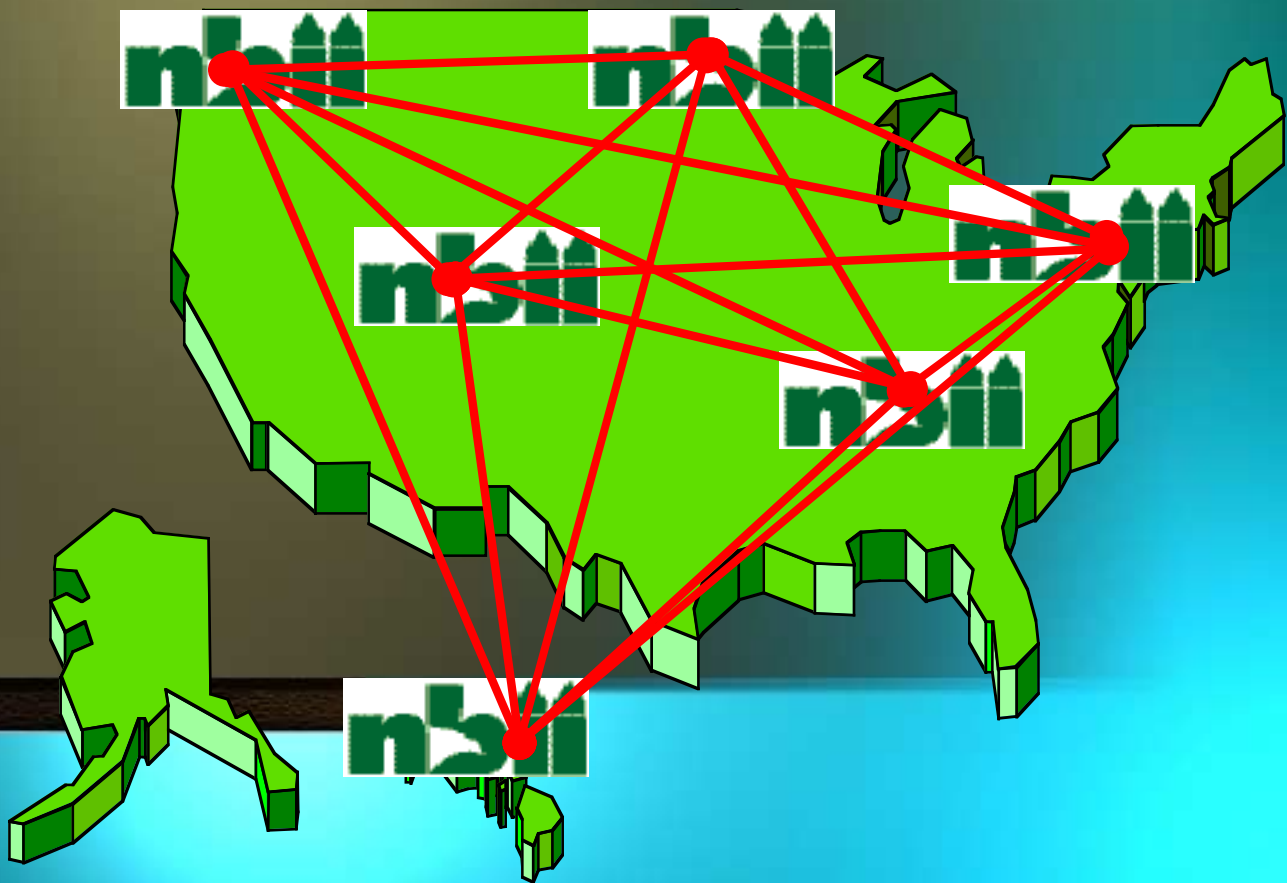
# NBII-2 Nodes: An Enabler of Research

## Node activities:

- Analytical capabilities
- Technology support
- Synthesis capabilities
- Data warehousing
- Data mining
- Collaboratium
- Training



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# *Technology Initiatives*

http://www.nbii.gov/biobot

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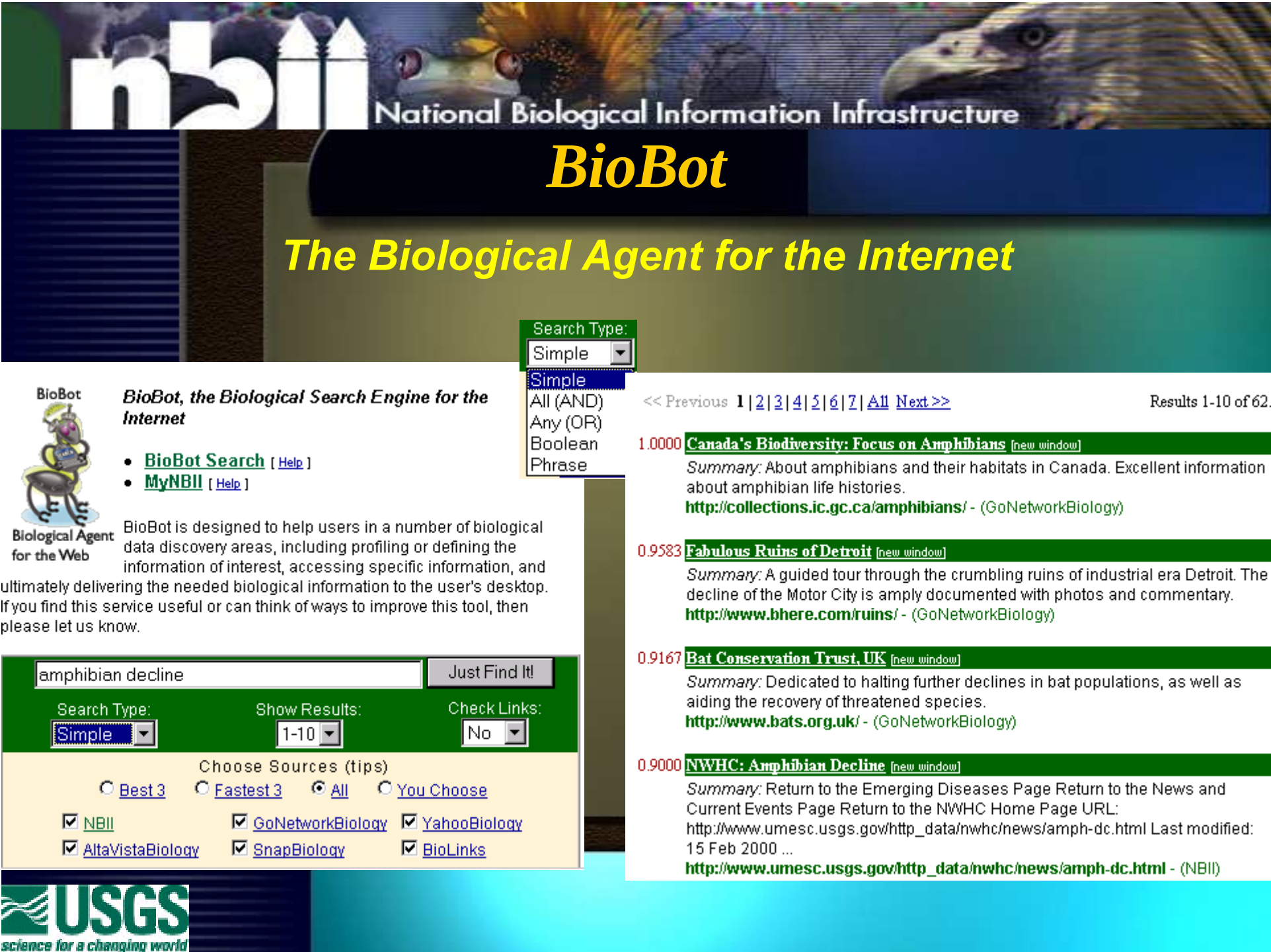
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BioBot
The Biological Agent for the Internet
Search Type:
Simple
Simple
All (AND)
Any (OR)
Boolean
Phrase
BioBot
Biological Agent for the Web
BioBot, the Biological Search Engine for the Internet
BioBot Search [ Help ]
MyNBII [ Help ]
BioBot is designed to help users in a number of biological data discovery areas, including profiling or defining the information of interest, accessing specific information, and ultimately delivering the needed biological information to the user's desktop. If you find this service useful or can think of ways to improve this tool, then please let us know.
amphibian decline
Just Find It!
Search Type:
Simple
Show Results:
1-10
Check Links:
No
Choose Sources (tips)
Best 3
Fastest 3
All
You Choose
NBII
GoNetworkBiology
YahooBiology
AltaVistaBiology
SnapBiology
BioLinks
<< Previous 1 | 2 | 3 | 4 | 5 | 6 | 7 | All Next >>
Results 1-10 of 62.
1.0000 Canada's Biodiversity: Focus on Amphibians [new window]
Summary: About amphibians and their habitats in Canada. Excellent information about amphibian life histories.
http://collections.ic.gc.ca/amphibians/ - (GoNetworkBiology)
0.9583 Fabulous Ruins of Detroit [new window]
Summary: A guided tour through the crumbling ruins of industrial era Detroit. The decline of the Motor City is amply documented with photos and commentary.
http://www.bhere.com/ruins/ - (GoNetworkBiology)
0.9167 Bat Conservation Trust, UK [new window]
Summary: Dedicated to halting further declines in bat populations, as well as aiding the recovery of threatened species.
http://www.bats.org.uk/ - (GoNetworkBiology)
0.9000 NWHC: Amphibian Decline [new window]
Summary: Return to the Emerging Diseases Page Return to the News and Current Events Page Return to the NWHC Home Page URL: http://www.umesc.usgs.gov/http_data/nwhc/news/amph-dc.html Last modified: 15 Feb 2000 ...
http://www.umesc.usgs.gov/http_data/nwhc/news/amph-dc.html - (NBII)
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# BioBot

## The Biological Agent for the Internet

BioBot

Biological Agent for the Web

***BioBot, the Biological Search Engine for the Internet***

- BioBot Search [Help]
- MyNBII [Help]

### MyNBIIFilter Home Page

Options: Add Query | Delete All | Help | Sign Off

| | Query String | Edit Options | View Results | Delete Query | Rerun Now |
|---|---|---|---|---|---|
| 1 | marine bacteria* | Edit | View | Delete | Rerun |
| 2 | invasive species | Edit | View | Delete | Rerun |
| 3 | marine bacteria* | Edit | View | Delete | Rerun |
| 4 | serotonin receptors | Edit | View | Delete | Rerun |

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**Results Listings**

| Rank | Title |
|---|---|
| 1. 1.0000 New! | **Matchmaker.com - Find your match by cit ...** [new window] |

*Summary:* Get acquainted with the different endangered species that exist throughout the world. Track the latest developments of profiled species through communications with others.Kids try their "Adventure Story" !
**http://transfer.go.com/cgi/aftransfer.pl?name=65480&srvc=gros&gui d=E23985F8-039C-11D4-8E0F-0090273025CD&context=33938&goto=http://www.matchmaker.com/** (GoNetworkBiology)

Relevant?: (•) Yes ( ) No [ Found on: 2000-03-26 ]

| | |
|---|---|
| 2. 1.0000 New! | **EE-Link: Endangered Species** [new window] |

*Summary:* Endangered species lists, current news and action alerts. Features organizations database, species photos and links for laws and policies.
**http://eelink.net/EndSpp/** (GoNetworkBiology)

Relevant?: ( ) Yes (•) No [ Found on: 2000-04-04 ]

| | |
|---|---|
| 3. 0.8800 New! | **CERES Info by Theme: Natural Environment: Invasive ...** [new window] |

*Summary:* This document contains links and/or information regarding invasive species especially pertaining to California.
**http://ceres.ca.gov/theme/invasives.html** (NBII)

Relevant?: (•) Yes ( ) No [ Found on: 2000-04-14 ]

| | |
|---|---|
| 4. 0.8300 New! | **http://www.nemw.org/fund_invspecies.pdf** [new window] |

*Summary:* Funding for National Invasive Species Programs ($ in millions) Program Fiscal Fiscal President's National 1999 2000 Request letter Subcommittee on Agriculture, Rural Development and Related Agencies Agriculture Research ...
**http://www.nemw.org/fund_invspecies.pdf** (NBII)

Relevant?: (•) Yes ( ) No [ Found on: 2000-04-14 ]

# NBII Vocabulary

***The Biological thesaurus for the Internet***

- **Vocabulary Development**
  - ~1000 Entry Terms
  - http://ceres.ca.gov/theme
- **Thesaurus Networking**
  - Networking Standard
  - ITIS Connection
  - http://ceres.ca.gov/thesaurus/protocol.html
- **Software Development**
  - Java Client
  - RDF Tool Development

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# Thesaurus Applications

Keywords

Indexing:

Retrieval

Powered by ProFusion

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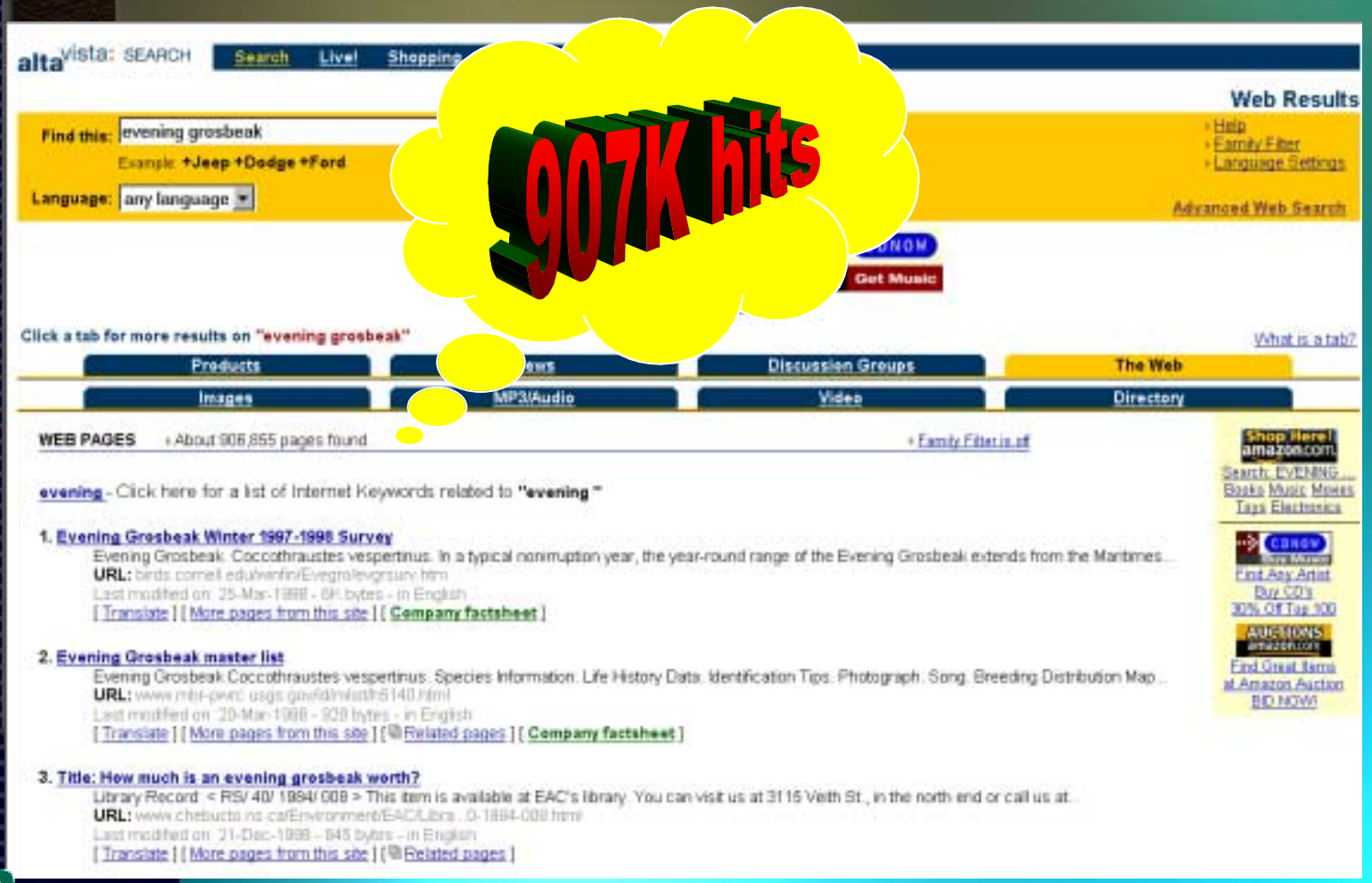
# Typical Search - AltaVista

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# *A Simple Solution….*

| Collection | # Sites | # URL s | # Documents | # Directories | # Hops |
|---|---|---|---|---|---|
| NBII | 3,303 | 24,342 | 21,965 | 20 | 2 |
| Topic: General Species | 2 | | 3,133 | | |

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ultraseek server

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# NBII Search Results:

Start new search Search these results

Search:

"Hesperiphona vespertina" "Hesperiphona ve

seek Help Advanced

for case-
Otherwise, an
ed.
PARCstation

**Results for:** "Hesperiphona vespertina" "Hesperiphona **Document count:** "Hesperiphona vespertina" (12)
vespertina brooksi" "Hesperiphona vespertina montana" "evening grosbeak" (18)
"Hesperiphona vespertina vespertina" "evening
grosbeak"

**15** results found, sorted by relevance sort by date hide summaries 1-10

**Grosbeaks, Finches, Sparrows, and Buntings** 41%
Regular permanent resident. Distribution: Fairly common (locally common) resident of the Western Upland. Uncommon to rare in the Central Plain, and rare and local in the Northern Highland. ... 28 Jan 00
*http://www.npwrc.usgs.gov/resource/1998/stcroix/fringill.htm - size 70.6K* Find Similar

**Songbirds Of North Dakota** 31%
Finches belong to the family Fringillidae, taken from the Latin word fringilla, meaning "small bird". These birds are seed eaters and have strong triangular bills that are used for cracking seeds. ... 28 Jan 00
*http://www.npwrc.usgs.gov/resource/distr/birds/songbird/fringill.htm - size 2.4K* Find Similar

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# *Meta-tags*

## General Metatags

**Keywords**

**Description**

**Author**

**Title**

**Distribution**

**Ratings**

**Classification**

## Unique Species Metatags

**Organization**

**Species Scientific Name**

**Species Common Name**

**Species Location**

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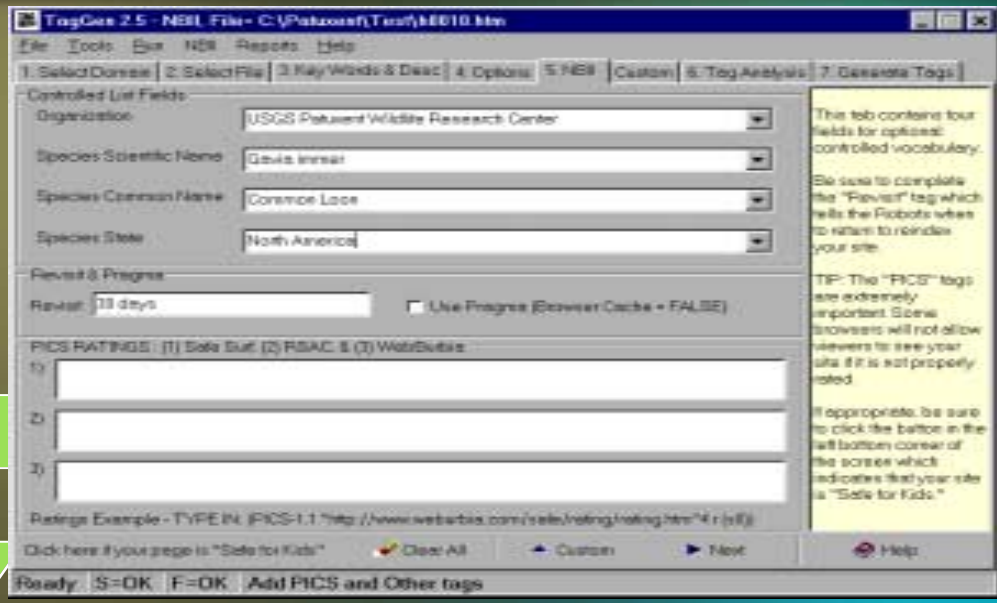
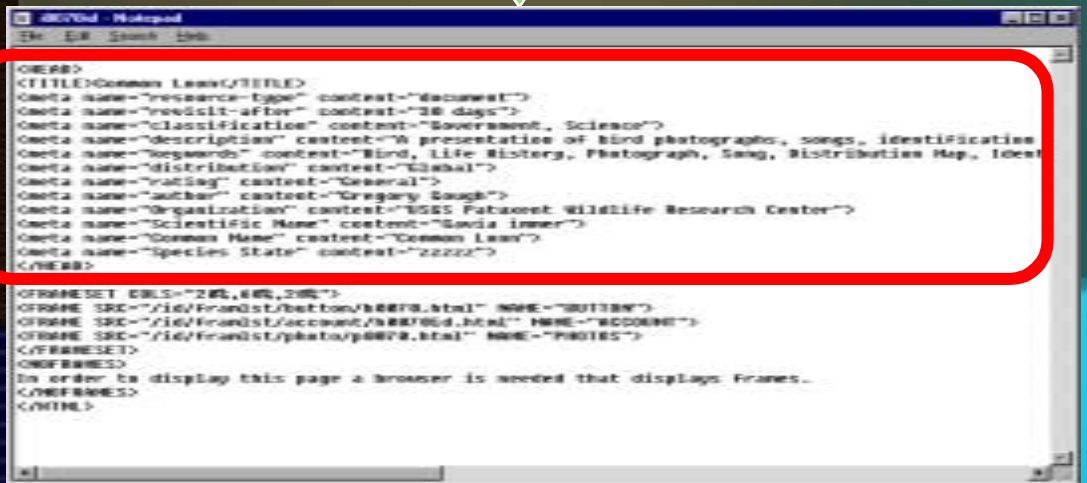
# *Using COTS*

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HiX

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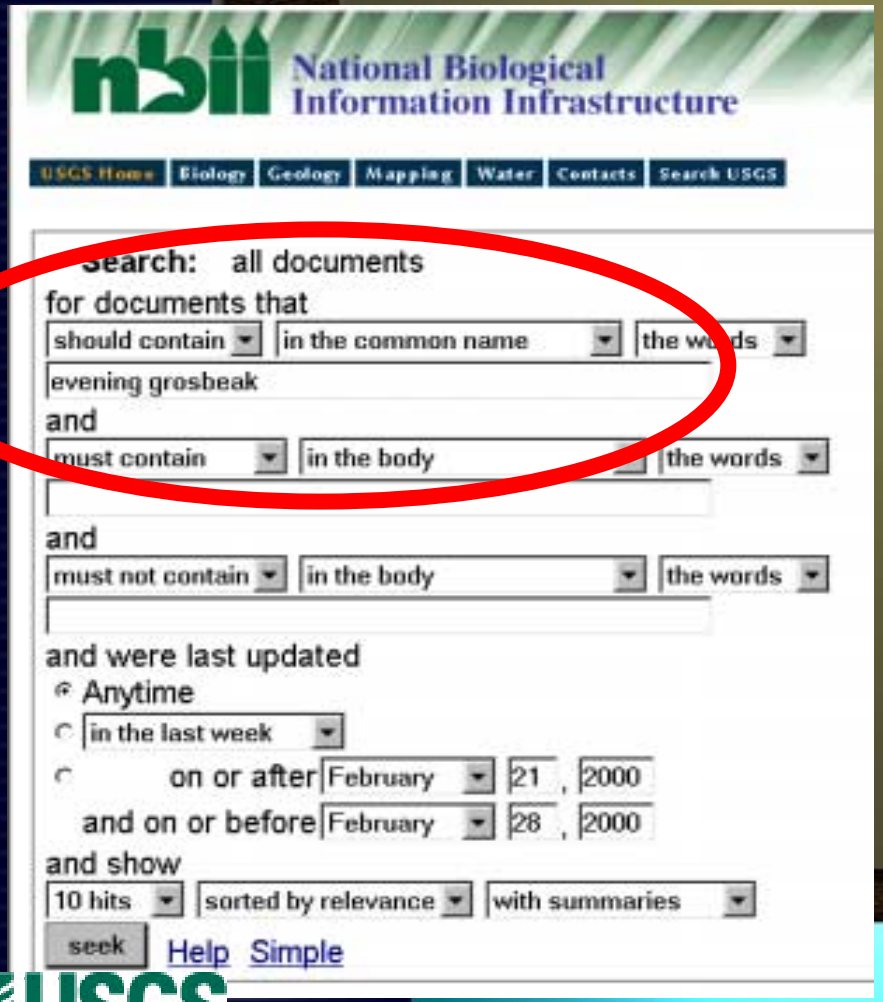
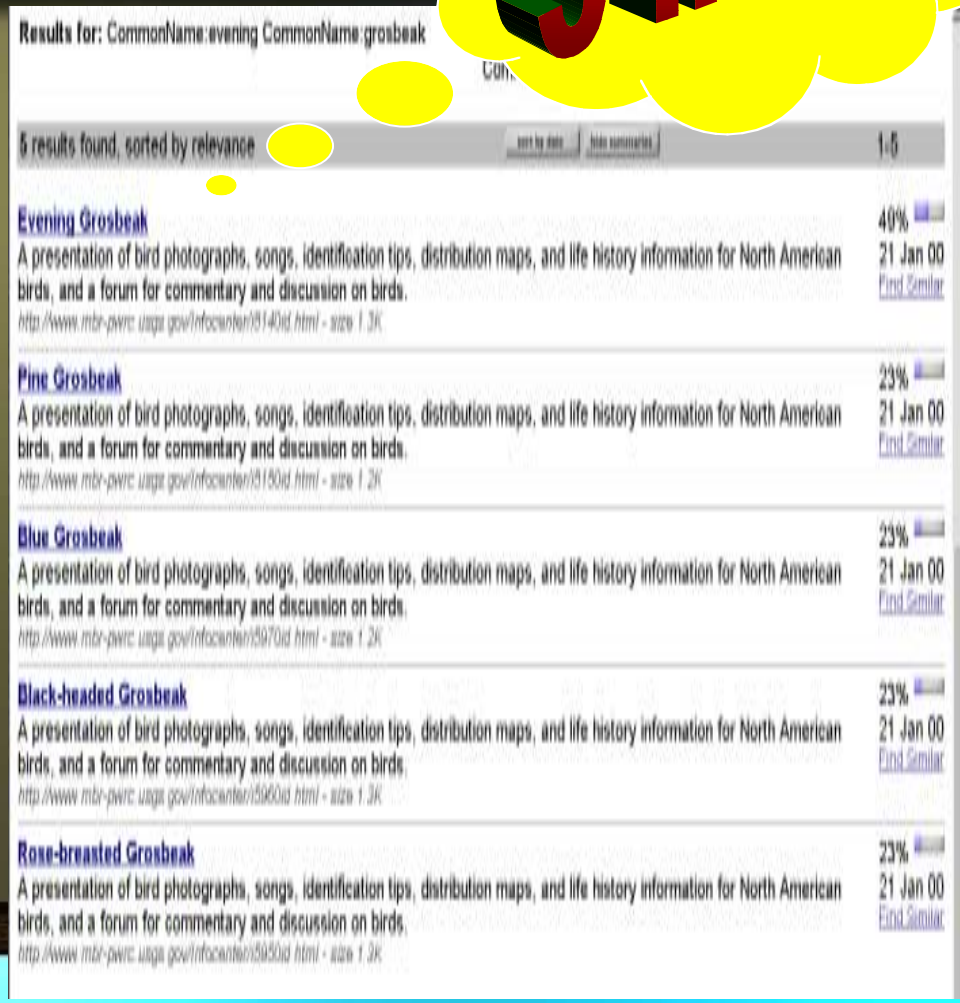
# Using Meta-tags

5 hits

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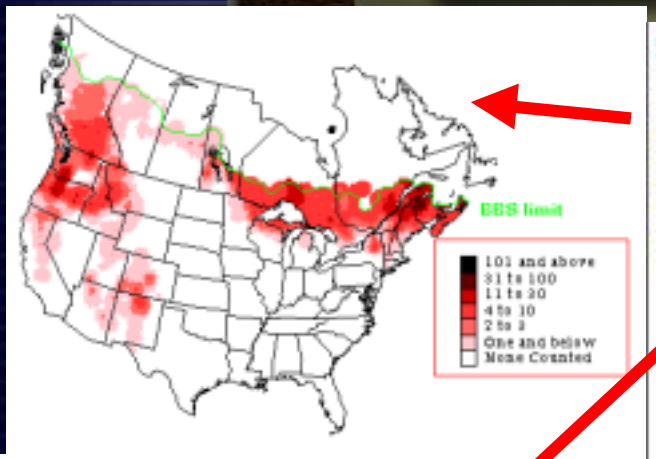
# *Integrated & Authoritative*




ITIS Integrated Taxonomic Information System
Biological Names

ITIS HOME
NBII HOME
TRED –

**Coccothraustes vespertinus**

Author: **(Cooper, 1825)**

Common Name: **evening grosbeak**

Synonym(s):
**Hesperiphona vespertina**
**Hesperiphona vespertina brooksi**
**Hesperiphona vespertina montana**
**Hesperiphona vespertina**

Kingdom: **Animalia**
Phylum: **Chordata**
Subphylum: **Vertebrata**
Class: **Aves**
Order: **Passeriformes**
Family: **Fringillidae**
Genus: **Coccothraustes**

PREVIOUS

USGS
- ID Tips
- Life History
- BBS Map
- CBC Map
- Song
- Taxonomy(ITIS)
- Glossary
- Back to List

## Evening grosbeak *Coccothraustes vespertinus*

### Identification Tips:

- Large, pale, conical bill
- Short tail
- Distinctive call note often given in flight
- Frequently gathers in flocks

**Male:**

- Yellow forehead, supercilium and body
- Brown head and upperback
- Black wings and tail
- Large white patch in wing

**Female:**

- Gray upperparts
- Pale gray underparts
- Black wings and tail
- White patches in wings

**Similar species:**

The male Evening Grosbeak is instantly recognizable. Females have large bills, short tails and distinctive call notes.

Patuxent Bird Population Studies
Patuxent Bird Identification InfoCenter

Male

Female

Juvenile male

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# BioBot Integration

ITIS Integrated Taxonomic Information System

Biological Names

ITIS HOME

NBII HOME

TRED – Taxonomic Reports

BioBot Biological Agent for the Web

PREVIOUS

## Coccothraustes vespertinus

Author: (Cooper, 1825)

Common Name: **evening grosbeak**

Synonym(s):
**Hesperiphona vespertina**
**Hesperiphona vespertina brooksi**
**Hesperiphona vespertina montana**
**Hesperiphona vespertina vespertina**

Kingdom: **Animalia**
Phylum: **Chordata**
Subphylum: **Vertebrata**
Class: **Aves**
Order: **Passeriformes**
Family: **Fringillidae**
Genus: **Coccothraustes**

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BioBot Biological Agent for the Web

*BioBot, the Biological Search Engine for the Internet*

- BioBot Search [ Help ]
- MyNBII [ Help ]

**Search options for your query "Coccothraustes vespertinus" "evening grosbeak" "Hesperiphona vespertina" "Hesperiphona vespertina brooksi" "Hesperiphona vespertina montana" "Hesperiphona vespertina vespertina"**

"Coccothraustes vespertinus" "evening grosbeak" | Just Find It!

Search Type: Simple | Show Results: 1-10 | Check Links: No

Choose Sources (tips)

Best 3 | Fastest 3 | All | You Choose

☑ NBII ☐ GoNetworkBiology ☐ SnapBiology

☐ YahooBiology ☐ BioLinks ☐ AltaVistaBiology

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# NBII Portals

- **Portal -**
  - A Doorway, entrance, or gate
  - An entrance or a means of entrance; the local library, a portal of knowledge
  - A powerful means to business knowledge
  - User-defined, customizable
  - Integrates diverse sources of knowledge

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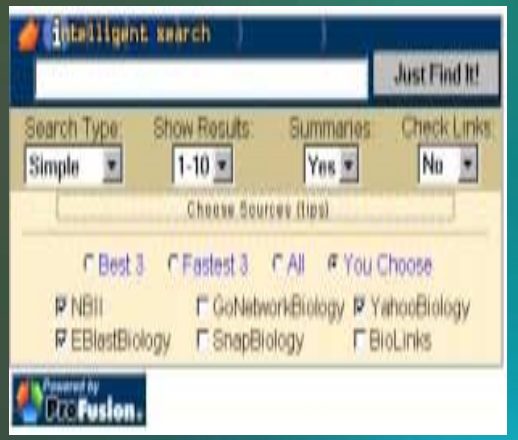
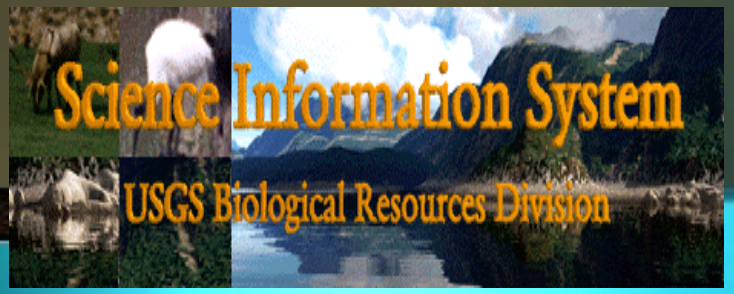
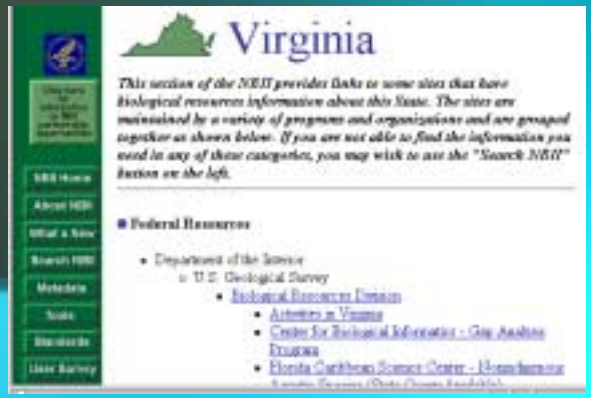
# NBII Prototype Portal

## Potential Program Manager Portal .




AIMS

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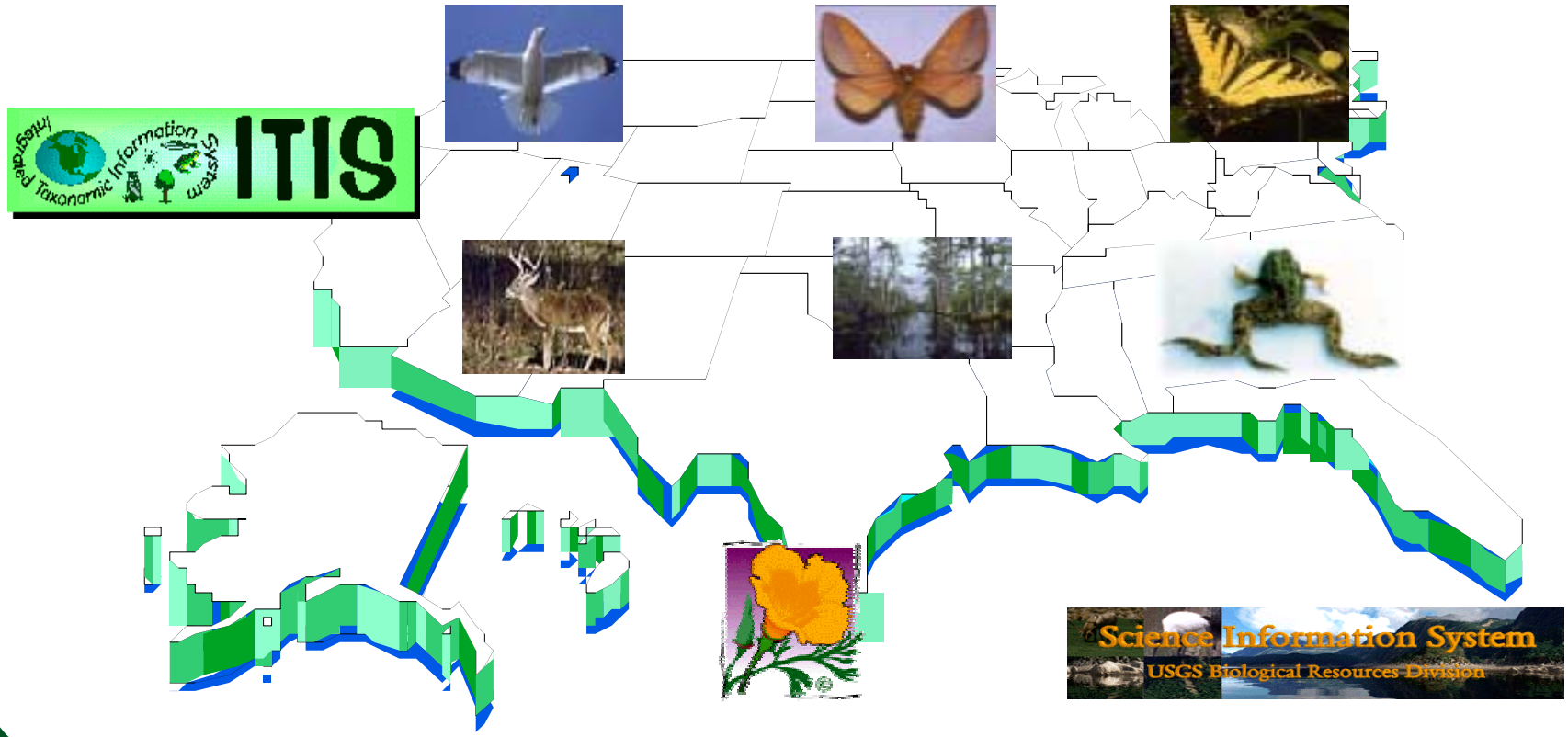
# *Place-based Systems*

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# *Prototype & R&D*

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# *Future Research Efforts*

- ¥ Research related to Wireless Application Protocol for biological data collection
- ¥ Expansion of BioBot
- ¥Portal implementation within NBII
- ¥ Research into gisting of biological information for indexing & retrieval
- ¥ Prototype visualization application
- ¥ Prototype NBII place-based interface
- ¥ Expand partner contributions (USDA, etc.)

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# Thank You

**Questions/Comments:**

Mike_frame@usgs.gov

(303 202-4260)

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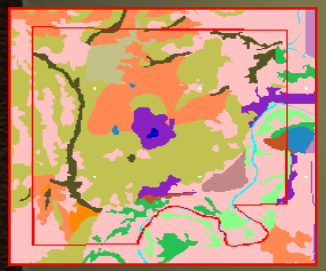
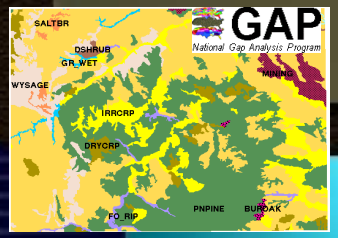
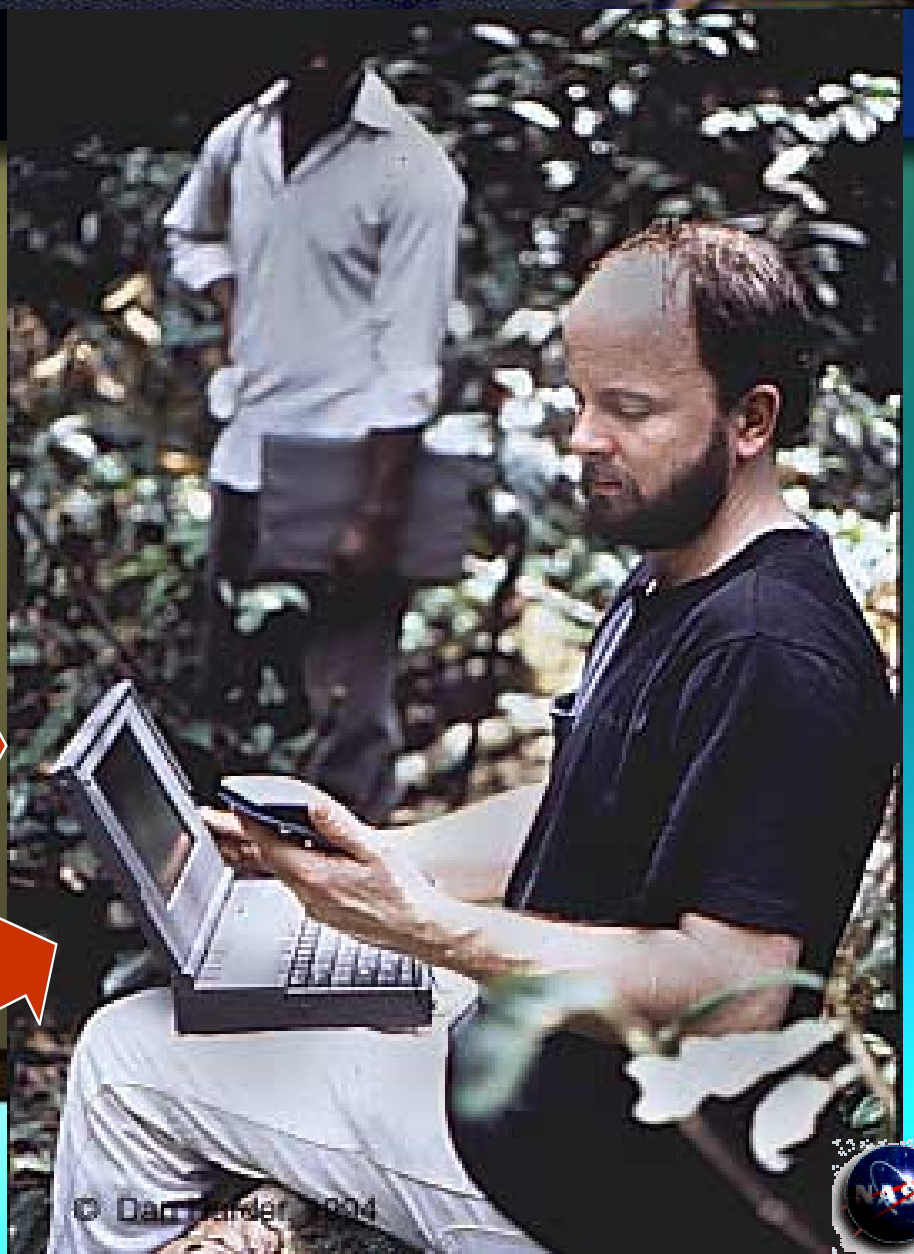
ID Tips



ITIS

LUHNA
Land Use History of North America

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