

Proceedings of the  
**AIS Database Summit**

September 12-14, 2005  
Stone Laboratory, Gibraltar Island, Ohio

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Prepared with the Support of:

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## **Executive Summary**

Several major databases for aquatic invasive species (AIS) are publicly funded through federal agencies, mainly NOAA (including Sea Grant), Smithsonian, and USGS. Representatives of the 10 primary federally-funded AIS databases met at Stone Laboratory in September of 2005 to (a) delineate missions, (b) assess gaps and overlaps and (c) develop a plan for increasing coordination and data sharing.

The Non-Indigenous Aquatic Species Database Working Group (NIASDWG) concluded that there was no significant overlap among these 10 databases when mission and scope are taken together and little to no overlap even when current plans for expansion are taken into consideration. NIASDWG members commit to coordination aimed at reducing duplication of effort in populating databases through actions including: sharing of bibliographic searches, joint data collection, and transfer of data subsets.

While distinction of mission/scope among the 10 NIASDWG databases became quite apparent during the course of Summit discussions, NIASDWG members acknowledge that this distinction has not previously been well understood by funding sources or the general public. NIASDWG members recommend that these distinctions be better and more formally articulated and communicated. To this end, NISC will host a web-based 'metapage' directory delineating the 10 databases and allowing access to each. NISbase will serve as a common search engine for the species databases and will work toward developing search capacity for the reference and project databases.

## **AIS Database Summit Background**

In recent years on-line resources, directories and databases relating to invasive species have proliferated. These include information on research programs, species biology and life history, policy, management and control and a variety of other information types. Several major databases for aquatic invasive species are publicly funded through federal agencies, mainly NOAA (including Sea Grant), Smithsonian, and USGS. Members of Congress have recently expressed concern over the proliferation of databases and have inquired as to the distinctions among these systems and as to what the agencies are doing to avoid duplication of efforts. The proliferation is also causing confusion for scientists, managers and educators trying to access the information (which databases have which types of information?).

In response, NOAA's National Center for Research on Aquatic Invasive Species (NCRAIS) organized an Aquatic Invasive Species (AIS) Database Summit involving the three database developers listed above (plus the International Joint Commission and National Invasive Species Council), as a first step in assuring coordination across federally-sponsored programs at the national scale. The goals of the Summit were:

- 1) to familiarize participants with the variety of database projects/programs while delineating the mission of each as well as the type of information available through each system,
- 2) to identify both gaps and overlaps among the various databases, systems and audiences,
- 3) to explore the potential for database consolidation via distributed database systems, including outlining technical and political obstacles to integration, and
- 4) to establish or modify interagency agreements among the three agencies covering AIS database coordination, sharing and management.

## **Participating Databases**

Participation in the AIS Database Summit was limited to federally-sponsored (funded) on-line databases. This was done in order to keep the working group small and to focus efforts on coordination within the federal government. Participants included program managers and technical staff representing 10 federally funded databases as follows:

- 1) SERC – National Ballast Information Clearinghouse (NBIC)
- 2) SERC – National Exotic Marine & Estuarine Species Information System (NEMESIS)
- 3) SERC – Aquatic Invasions Research Directory (AIRD)
- 4) USGS – Nonindigenous Aquatic Species Database (NAS)
- 5) NOAA/NCRAIS – Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS)
- 6) NOAA/Sea Grant – National Aquatic Nuisance Species Clearinghouse (Clearinghouse)
- 7) NOAA/Sea Grant – Sea Grant Nonindigenous Species Site (SGNIS)
- 8) NOAA/Sea Grant – Projects Inventory (SG)

- 9) NOAA/NOS – Aquatic Species National Inventory and Introduced Species Early Warning System (EDIS)
- 10) IJC/CGLRM – Great Lakes – St. Lawrence Research Inventory (GLSLRI)

In addition, the three species databases are members of a distributed database system (NISbase). NISbase allows simultaneous searching of the 3 species databases (and several others internationally) by common name, scientific species name and by geography.

Database Summit participants recommended formalization of the working group (Summit participants representing the 10 databases and NISbase) under the rubric Non-Indigenous Aquatic Species Database Working Group (NIASDWG). NIASDWG will meet on an ad hoc basis. NISbase has volunteered use of an on-line forum to promote regular communication and both Sea Grant (Jeff Reutter for the AIS Theme Team) and NOS-NCCOS (Michelle Harmon for the NOAA Invasive Species Program) have volunteered to sponsor conference calls. NIASDWG members recommend that among its first actions the group should develop a ‘Vision Statement’ for use in defining the group and in development of joint proposals.

Initially, NIASDWG members will concentrate on coordination within subsets (species databases, reference databases, and project databases) with the goal of better coordination among all 10 databases. Once better coordination is achieved within NIASDWG and the internal recommendations outlined in these proceedings have been accomplished, NIASDWG members commit to working with the ANSTF and NISC to achieve broader adoption of our model(s) and simultaneously broaden to include more direct partners.

### **Database Inventory – Mission/Scope Overlap**

NIASDWG undertook an assessment of existing databases along the axes of Mission and Scope. Assessment of scope included both the current database focus as well as immediate plans for expansion. NIASDWG concluded that there was no significant overlap among the databases when mission and scope are taken together and little to no overlap even when current plans for expansion are taken into consideration.

Database missions subdivide into four basic categories. Within each category the databases are clearly delineated by scope.

- 1) Project/Researcher Databases –
  - a. AIRD – international, AIS researchers
  - b. SG – US agency, AIS projects
  - c. GLSLRI – Bi-national Great Lakes, projects related to the Great Lakes Water Quality Agreement (GLWQA)
- 2) Reference Databases –
  - a. SGNIS – electronic references
  - b. Clearinghouse – card catalog to a lending library
- 3) Species Databases –
  - a. NEMESIS – International marine and estuarine

- b. NAS – US freshwater
  - c. GLANSIS – Great Lakes node of NAS
  - d. EDIS – taxonomic lists of native and non-native species by region
- 4) Ballast Databases –
- a. NBIC – ship traffic and ballast information

NIASDWG members commit to maintaining the distinctions of their mission/scope “projecting complementarity and coordination.”

### **Articulation of Database Distinctions**

While distinction of mission/scope among the 10 NIASDWG databases became quite apparent during the course of Summit discussions, NIASDWG members acknowledge that this distinction has not previously been well articulated among ourselves, much less to funding sources or to the general public. NIASDWG members recommend that these distinctions be better and more formally articulated and communicated. To this end NIASDWG recommends the following specific actions:

- 1) Distinctions among the databases should clearly be laid out in a white paper (this proceedings document).
- 2) Jeff Reutter will share this white paper with the Sea Grant AIS Theme Team.
- 3) Melissa Pearson will share this document with NOAA Invasive Species Program.
- 4) Phil Andreozzi will share this document with NISC.
- 5) NCRAIS will transmit this document to Congress.
- 6) Mark Einstein will draft a metapage (Web-of-Webs style webpage) which outlines the distinctions among databases (mission/scope and audience) and includes links to each of the 10 databases as well as NISbase. This page can be used as a ‘partners’ or ‘more information’ link by each of the NIASDWG members as well as NISbase, NISC (invasivespecies.gov) and other government websites.

### **Data and Process Overlaps**

NIASDWG concluded that some overlap and potential for overlap does exist in the data and data collection processes.

- 1) Within the projects databases, any Sea Grant researchers and research projects may currently be listed in all three (AIRD, SG, GLSRI) databases – this overlap may expand with the expansion of the SG database to include all NOAA researchers and research projects.
- 2) Within the reference databases, overlap may occur for particular species (those included in both SGNIS and the Clearinghouse collections) when both electronic and paper copies of research publications are available. This overlap may expand as species are added to each database and as more publications become readily available in electronic format.

- 3) Within the species databases, overlap between NAS and NEMESIS may occur when species tolerances cross the brackish threshold (i.e., species that can tolerate both fresh and saltwater may be found in both databases).
- 4) Within the species databases, EDIS currently overlaps NEMESIS for names of nonindigenous species in Hawaiian waters – this overlap may expand as EDIS goes national.
- 5) Across all database types, significant overlap may occur in bibliographies (reference lists) and literature searches used to populate the database fields.

NIASDWG concluded in each of these cases that *maintenance* of separate (overlapping) data in the individual databases was necessary in order to maintain the individual functionality of the databases, address individual database missions and support database-specific analyses. However, NIASDWG members acknowledge the need to minimize duplication of effort in the generation of these data.

NIASDWG members commit to coordination aimed at reducing duplication of effort in populating databases. Specifically:

- 1) NEMESIS, NAS and GLANSIS have data-sharing agreements in place which cover sharing of searches, references, and baseline data.
- 2) EDIS, which is in the pilot stage development, will work closely with NEMESIS and NAS to share information on species distributions.
- 3) AIRD, GLSRI and SG will work to eliminate duplicate requests to researchers and will establish data-sharing agreements.
- 4) SGNIS and SG will coordinate with the National Sea Grant library in making one request to individual Sea Grant programs for project information and permissions.
- 5) GLSRI is currently working on ‘back-loading’ projects into their database. They will coordinate with SG to facilitate transfer of the relevant subset of Sea Grant information into the GLSRI database and to ensure that Sea Grant data collection meets GLSRI needs.
- 6) The Clearinghouse and SGNIS will make their bibliographic searches available – including elements not (yet) in their public holdings.
- 7) SERC will establish a forum (hosted by NISbase) for communication among NIASDWG members.
- 8) NIASDWG will facilitate an internal discussion of how searches are conducted (e.g., scope of the search, keywords, databases searched).

### **Data Access**

Accessing on-line information relating to non-indigenous aquatic species is currently a complex process in which the user must first identify and locate the relevant databases, determine which are most likely to contain information relevant to their needs, and search each database one-by-one. NIASDWG members recommend development of a ‘common face’ for distribution of federal AIS data on 3 levels.

(1) NIASDWG members recommend that the working group move beyond working group status toward integration into a Network. This will involve greater coordination of processes and data-streams, formalization of data-sharing agreements, and development of joint proposals for database expansion. Members recommend that this be a gradual process undertaken first within each theme area (species, projects and references).

(2) NIASDWG members recommended development of a metapage (web of webs) to serve as a public face for the Network. The metapage will articulate database distinctions and direct users to the appropriate databases as first step in meeting the need for a common face (see *Articulation of Database Distinctions* - above). This metapage should reside on the NISC website.

Members agreed that the metapage concept does not go far enough in meeting the user need for one-stop-shopping for relevant information. While it serves as a directory, the metapage does not allow simultaneous searching of multiple databases along common parameters. (3) NIASDWG members recommend development of a common search portal for data access and agree that NISbase should (at least initially) serve as that portal. To meet this goal, NIASDWG members agreed to the following specific actions:

- A. NIASDWG members whose databases are searchable along species parameters (all but NBIC, AIRD and GLSRI) will become members of NISbase, allowing their databases to be selected for inclusion in NISbase searches. Brian Steves indicates that staff time to set this up is minimal (a day or two).
- B. NISbase currently has funding to develop an AIS References portal (NISbase-Ref) for NISbase. This is currently under development. The ANS Clearinghouse and SGNIS will work with SERC to ensure their databases become accessible through this portal.
- C. In expanding the SG database to a National NOAA scale, Ohio Sea Grant will consider whether distributed database technology (e.g., each line office maintains their own subset with a common structure) offers promise for minimizing redundancies of data collection, entry and maintenance.
- D. A subcommittee composed of Melissa Pearson, George Oomen, Mark Burrows, Brian Steves, and Shawn Dalton will develop a strategy and outline parameters for creation of a projects portal (NISbase-Projects). The committee will develop a consensus as to datafields to be included in searches (e.g., by researcher, by project title, by agency), develop an estimate of cost for portal development and write a proposal to fund development of this portal. The International Joint Commission will be approached as a potential funding source for development of this portal.
- E. Communication of 'database news' (such as addition of new species or distribution expansions) is currently fragmented (from the user perspective) with each database maintaining its own 'news' page. NIASDWG members each commit to developing rss feeds for their news – which will allow any related database subset to easily incorporate news relating to their partners into their respective news pages. NISbase will incorporate all rss feeds from NISbase partners into their news webpage.

## **Data Product Development:**

NIASDWG concluded that several of the databases produce similar analytical and outreach products (e.g., maps and fact sheets). In many cases these products are customized for particular audiences (e.g., scientists, managers, educators, general public) or particular geographic regions (e.g., Great Lakes, Gulf, inland lakes), but contain much of the same basic information. Coordinated development of these products may result in reductions in duplication of effort. Further, use of distributed database technology to effectively combine datasets should result in potential for development of high-quality products which could not have been produced from any of the current databases working in isolation. NIASDWG recommends coordinated development of such ‘deliverables’ based on merged databases (i.e., things that could not have been produced from the separate databases).

SERC is leading development of merged fact sheet technology – this technology will allow automatic compilation and sorting of data fields from separate databases into a single report. Because they are generated ‘on the fly’ merged fact sheets would automatically update to the latest information. Merged fact sheet technology could be employed both in the generation of technical fact sheets (as currently produced separately by the NAS and NEMESIS systems) and outreach fact sheets (as currently produced by SGNIS).

NIASDWG recommends that *current* time series species distribution maps be considered the highest priority product for development. Such distribution maps should be generated ‘on the fly’ from data derived from multiple sources with users able to select the geographic region of interest. Outreach products which incorporate distribution maps should be developed in an electronic format which would automatically incorporate the latest map.

NIASDWG members commit to reducing duplication of effort in development of database-derived products. Specifically:

- 1) SERC (NISbase) will continue as lead in development of merged fact sheet technologies and capacities.
- 2) In developing Great Lakes-specific maps derived from the NAS and GLANSIS databases, GLANSIS will explore the potential for dynamic generation of regionally-specific mapping capability.
- 3) SGNIS will explore potential for converting static elements of current fact sheets to dynamic elements which could be used in development of outreach-oriented merged fact sheets.
- 4) NIASDWG will facilitate discussion of elements (data fields) most appropriate for merged fact sheet technology.
- 5) NIASDWG will facilitate discussion of vetting, quality control, and resolution of discrepancies necessary for development of merged fact sheets



- 6) NIASDWG will facilitate discussion of the technological obstacles to development of outreach products which take full advantage of merged and distributed technologies to generate products which are 'always up-to-date'.
- 7) NIASDWG will facilitate discussion of resources needed for product development, including potential sources for such resources and collaborative proposals.

## Appendix 1: NIASDWG Databases

Table 1: NIASDWG Databases at a Glance

Database	Mission	Current Focus	Planned Focus	Audience
Ohio Sea Grant Research Program	Electronic Project Reporting System	Ohio GL Sea Grant Projects	National AIS FW/Marine NOAA Projects	Grant/program managers researchers, general public (used for grant/program management)
IJC-CGLRM	Project listing, description, regional, all funding	Great Lakes All agency projects (voluntary)	Great Lakes All agency projects	Funding agencies, binational, researchers (used to assess spending toward meeting water quality objectives)
AIRD	PI listings (who is doing what, where) – not tied to funding source, networking tool	International FW/Marine Researchers	International FW/Marine Researchers	Researchers/program managers (used to identify potential collaborators)
National ANS Clearinghouse	Comprehensive lending library, hard copy, refereed journals	34 critters FW & marine English	50+ critters FW & Marine	Researchers & managers, water withdrawal infrastructure, international
SGNIS	Electronic distribution of research, education, & outreach products	27 species FW & marine	More species (especially marine) – impact prioritization	4 <sup>th</sup> grade through researchers
USGS-NAS	Specimen database (who, what, where, when) with supporting references, fact sheets and maps	Mostly freshwater, animals only, national		Researchers/managers, public/school
GLANSIS	Great Lakes Node for NAS	GL, FW, currently list	All Great Lakes, distribution and life history	Researchers, managers
NEMESIS	Marine & Estuarine	North American marine and	North & South America	Researchers, managers, public/school

	Species database, life history, ecological, traits, tolerances, locality, references	estuarine, plants and animals	(global?)	
NOS-EDIS	Baseline Species Inventory & Early warning system	Hawaii (marine/estuarine)	National	Managers, monitoring
NBIC	Ballast information	National	National	Coast Guard, regulatory

**Name of Database:** NEMESIS (National Exotic Marine and Estuarine Species Information System)

**Sponsoring Organization:** Smithsonian Environmental Research Center

**Contact(s):**

Technical: Brian Steves stevesb@si.edu

Content: Dr. Paul Fofonoff fofonoffp@si.edu

Administrative: Dr. Gregory Ruiz ruizg@si.edu

**Mission:** NEMESIS is a resource for information on non-native (or exotic) species that occur in coastal marine waters of the United States

**Primary Audience(s):** managers and researchers

**Data fields/types:** Broad range of taxonomy, invasion history, life history, ecology, impacts and references

**Technology specs:** Apache, JSP, ArcIMS, MySQL, MS Access data entry tool

**Current coordination/integration:** Member of NISbase

**Gaps/Needs:** images, point locality data

**Name of Database:** USGS NAS database (Nonindigenous Aquatic Species)

**Sponsoring Organization:** USGS

**Contact(s):** Pam Fuller, Shawn Dalton

**Mission:** Specimen database tracking U.S. distribution of all introduced freshwater aquatic nonindigenous species.

**Primary Audience(s):** Scientists, Managers, Public, School

**Data fields/types:** : Specimen records include 60 fields with the main ones being species, location, date, and source of information. NAS also has databases of fact sheets for more than 600 species, dynamically generated maps, references, alerts and photos

**Technology specs:** SQL, ASP, Windows 2003 server, ArcIMS

**Current coordination/integration:** Member of NISbase

**Gaps/Needs:**

**Name of Database:** GLANSIS (Great Lakes Aquatic Nuisance Species Information System)

**Sponsoring Organization:** NOAA NCRAIS

**Contact:** Dave Raikow

**Mission:** Provide Great Lakes specific information on nonindigenous species

**Primary Audience:** Scientists, Managers, Public, School

**Data fields/types:** Currently an on-line list. Database under construction – planned to match NAS fields.

**Technology Specs:** currently static web pages. Will be hosted at USGS NAS.

**Current coordination/integration:** Great Lakes Node for NAS. Member of NISbase

**Gaps/Needs:**

**Name of Database:** Aquatic Species National Inventory and Introduced Species Early Warning System (EDIS)

**Sponsoring Organization:** NOAA/NCCOS (National Centers for Coastal Ocean Science)

**Contact(s):** Karen Eason (karen.eason@noaa.gov, 301-713-3028 x159), Elaine Hoagland (elaine.hoagland@noaa.gov, 301-943-0497)

**Mission:** To provide tools to coastal managers and other concerned parties for the early detection and management of non-indigenous coastal aquatic organisms.

**Primary Audience(s):** Coastal Managers, research institutions, concerned citizens, anyone who may encounter introduced species.

**Data fields/types:** Under development. Currently includes ITIS-validated taxonomic names of species historically found in regional coastal surveys (i.e. Hawaii); fields include whether native or introduced. Also includes a taxonomic experts list and contact information. Environmental and refined biogeographical data are being examined for inclusion.

**Technology specs:** Under revision. We are interested in distributed database concepts.

**Current coordination/integration:** Hawaii Pilot Project with assistance from Bishop Museum, American Fishery Society (AFS); Coordination with SERC/USGS, hopefully leading to integration with their systems as the NCCOS system progresses beyond the pilot phase.

**Gaps/Needs:** This project is currently undergoing a major re-assessment. Gaps/needs are under evaluation. We recognize the need for early taxonomic information and are further strengthening our taxonomic expertise component.

**Summary statement:** Elaine Hoagland, Senior Consultant on the project, and Karen Eason, Invasive Species Specialist, were contracted to this project in mid-July 2005 with the tasks of conducting a thorough project assessment, moving forward with strategic planning, and initiating the next stages. Like everyone else involved in this database summit, NCCOS wants to avoid duplication. We are aware that since the NCCOS project began, several other groups have developed invasive species monitoring and early warning tools that NCCOS needs to consider. We have talked to some of the summit participants already about previous involvement in the project and overall impressions. We believe there are good opportunities for active, balanced partnerships here. To finalize our assessment, we need to have a broader view of what others are doing; particularly with an eye towards the future of this project and how we can participate in the most constructive way. We are hoping to gain this insight through participating in this summit.

**Name of Database:** SGNIS (Sea Grant NonIndigenous Species)

**Sponsoring Organization:** National Sea Grant College Program, Illinois-Indiana Sea Grant College Program, Wisconsin Sea Grant Institute

**Contacts:** Dr. Brian K. Miller, Dr. Phil Moy, Angela Archer, Matthew Tift, Mark Einstein, Robin Goettel, Helen Domske

**Mission:** The Sea Grant Nonindigenous Species Site (SGNIS) is a national information center that contains a comprehensive collection of research publications and education materials produced by Sea Grant programs and other research institutions across the country on zebra mussels and other aquatic nuisance species. Peer reviewed materials have appeared in professional science journals or have been through a rigorous

independent scientific review to ensure the quality of the information provided. Gray literature such as reports or proceedings that have not undergone peer review will be displayed with a gray background to distinguish it from the usual white background used for peer reviewed materials. Outreach contains science-based outreach products that have been reviewed for accuracy and are identified by a blue background. Links are provided to other sites that focus on nonindigenous species. “Nab the Aquatic Invader”, the newest addition to the site, is an educational section focusing on AIS and their impacts on the environment and the economy.

**Primary Audiences:** Researchers, Graduate/Undergraduates, Resource Managers, K-12 students and Educators.

**Data fields/types:** Title, Author(s), Organization, Date, Keyword, Product Type, User Type, URL, Review Type

**Technical Specs:** SGNIS is housed on a Window’s 2003 Server serving both static and dynamic html pages. The database is Microsoft Access and is ODBC compliant. Searches are written in vbscript.

**Current Coordination /Integration:** Illinois-Indiana Sea Grant College Program, Wisconsin Sea Grant Institute, New York Sea Grant Institute. SGNIS electronically distributes Sea Grant and other AIS products, and coordinates with the National Clearing House which handles the hard copy distribution of AIS products. SGNIS is in discussions with NCRAIS about coordinating the two websites. NCRAIS provides users with life history information and SGNIS provides electronic distribution of AIS products and publications. Matthew Tift is planning on cooperating with Dr. Dave Raikow to complement both web sites. SGNIS is collaborating with the National Clearing House and Aquatic Invasives Research Directory.

**Gaps / Needs:** Extend information to include AIS in other regions of the United States. Expand “Nab the Aquatic Invader” section to include lessons and activities specifically related to AIS affecting regions of the East Coast, Gulf of Mexico and West Coast.

**Keywords:** All entries on this site are referenced to one or more of the following keywords: Aquatic\_plant\_management, Asian\_carp, Asiatic\_clam, Ballast\_water, Basic\_biology, Big\_Head\_carp, Bio-accumulation, Biological\_control, Bivalve, Black\_carp, Byssal\_attachment, Bythotrephes, Caulerpa\_taxifolia, Chemical\_control, Chinese\_mitten\_crab, Coatings, Colonization, Common\_Reed, Curly\_leaf\_pondweed, Dams, Dispersal\_mechanism, Disposal, Ecological\_interactions, Economic\_Impacts, Education, Electricity, Environmental\_Impacts, Eurasian\_watermilfoil, European\_green\_crab, European\_Rudd, Filters, Fishhook\_Waterflea, Frogbit, Grass\_carp, Hydrilla, Industry, Inland\_lakes/rivers, Monitoring, New\_Zealand\_mud\_snail, Nonindigenous, Ongoing\_Project, Outreach, Physical\_control, Policy, Population\_dynamics, Predators, Prevention, Purple\_loosestrife, Quagga\_mussels, Round\_goby, Ruffe, Rusty\_Crayfish, Sea\_lamprey, Silver\_carp, Veliger, Water\_Chestnut, Water\_Hyacinth, White\_Perch, Zebra\_mussel

**Products:** All entries on this site are categorized by one of the following product types: Bibliographies, Youth\_Education, Maps, Newsletters, Publication, Proceedings, Report, Sea\_Grant\_Zebra\_Mussel\_Update, Research Findings, Basic\_Biology, Control, Impact, Outreach, Extension\_Pub, Predicting\_the\_spread, Images, Multimedia

User Type: All entries are categorized in one of the following user types:  
General, Industrial\_and\_Municipal, Shore\_Property, Boating\_and\_Shipping,  
Resource\_Management, Education(K-University)

**PR:** – Every entry is classified as Peer reviewed, Gray, Outreach

**Name of Database:** National ANS Clearinghouse

**Sponsoring Organization:** New York Sea Grant

**Contact(s):** Chuck O’Neill

**Mission:** on-line card catalog for a lending library

**Audience(s):** University and government researchers, international.

**Data fields/types:**

**Technology Specs:**

**Current Coordination/Integration:**

**Gaps/Needs:**

**Name of Database:** AIRD (Aquatic Invasives Research Directory)

**Sponsoring Organization:** SERC

**Contact(s):** Greg Ruiz

**Mission:**

**Audience(s):** international research community

**Data fields/types:** researcher, geographic, species or specialty, contact

**Technology Specs:**

**Current Coordination/Integration:**

**Gaps/Needs:**

**Name of Database:** The Great Lakes – St. Lawrence Research Inventory

**Sponsoring Organization:** International Joint Commission; Council of Great Lakes  
Research Managers

**Contact(s):** Mark Burrows, International Joint Commission, Great Lakes Regional  
Office, 100 Ouellette Avenue, Windsor, ON N9A6T3 Phone: 519-257-6709 or (US) PO  
Box 32869 Detroit, MI 48232 Phone: 313-226-2170x6709 [burrowsm@windsor.ijc.org](mailto:burrowsm@windsor.ijc.org)

**Mission:**

- Provide an effective communication tool
- Identify researchers working on particular Great Lakes issues
- Improve networking among professionals
- Provide management data concerning research efforts; especially research related to the Great Lakes Water Quality Agreement
- Better inform the granting process, enhance coordination and reduce duplication of effort

**Audience(s):** Researchers, Public, Resource Managers, Commissioners

**Data fields/types:** Project title, project objective, project type, date, status, agency, funding type, funding amount, US/CAN currency, investigator email, investigator, home institution, AIS specific, monitoring specific, scope, scale, type of phenomena, geographic area, links, publications. Currently over 840 projects; more than 300 ANS projects.

**Technology Specs:** Server Operating System is Microsoft Windows based, Web Server and Database run on the same server. Database is MS SQL, Cold Fusion is used to integrate databases and web pages. The database contains 29 tables with over 60 different fields. Currently over 748 projects, 168 flagged as ANS.

**Current Coordination/Integration:** Collection/analysis of AIS project data with Hugh MacIsaac, Integration with BEC monitoring inventory ([Brad.hill@ec.gc.ca](mailto:Brad.hill@ec.gc.ca)), data exchange with LEMN inventory.

**Gaps/Needs:** Upkeep and Analysis, Participation, Marketing, Linkages.

**Name of Database:** National Sea Grant AIS Projects Directory

**Sponsoring Organization:** OH Sea Grant

**Contact(s):** Jeff Reutter, Jill Jentes, George Oomen

**Mission:** Facilitate collection and analysis of program and grant management information, provide information to the research community and the public about currently funded AIS research.

**Audience(s):** grant managers, agency HQ

**Data fields/types:** project, researcher, geographic, species or specialty, contact

**Technology Specs:**

**Current Coordination/Integration:**

**Gaps/Needs:**

**Name of Database:** NBIC

**Sponsoring Organization:** SERC

**Contact(s):** Greg Ruiz

**Mission:** to gather information on ballast discharge patterns for regulatory and research purposes

**Audience(s):** Coast Guard, Congress, research community

**Data fields/types:**

**Technology Specs:**

**Current Coordination/Integration:**

**Gaps/Needs:**



National Oceanic and Atmospheric Administration  
National Sea Grant College Program

Development of a site architecture plan for information exchange on aquatic invasive species.

Invasive species are those non-native species whose introduction into an ecosystem threatens the environment or human welfare. Invasive species threaten all US ecosystems, with ecological damage and control costs for all areas in excess of \$130 billion/year. Invasions in aquatic ecosystems are a critical subcomponent of this problem, with estimated economic damages to our natural resources of upwards of \$8.9 billion a year. In addition to economic damages to commercial interests, invasive species also cause ecological damage, with impacts from invasive species contributing to approximately 40% of aquatic species extinctions. To date, a lack of infrastructure for effective information transfer between federal agencies and to stakeholders and end users has hampered effective federal action in this field. The participants in this project will work to design a web-based format to more easily distribute invasive species information, using the subset of information on aquatic invasive species as the case study.

The federal government stores a large volume of information on invasive species at [www.invasivespecies.gov](http://www.invasivespecies.gov) and the site receives over 2 Million hits a year, however navigating to particular information within the site can be difficult. Underlying the Web site are 600 or more flat HTML files with more than 12,000 links to external resources. Continuing to manage the Web site as a series of flat files is inefficient and does not allow for dynamic and customized delivery of information. It is accepted that the site needs to move to a database structure – while preserving high level access to content by search engines (approximately 70% of users are first time users, who arrive at the site using an internet search engine). The Web site is undergoing a major redesign to meet federal and departmental requirements for content organization and presentation.

This is an opportune time to design a distributed-systems information architecture that will integrate information on aquatic invasive species from multiple sources using methods or technologies that are cost effective and ultimately applicable to the whole site. The project will evaluate user needs and technical capabilities. Project participants will work with representatives from numerous federal agencies (including NOAA, EPA, Department of Agriculture, Fish and Wildlife Service, U.S. Geological Survey, Coast Guard, Navy and others), and private entities to determine 1) their efforts in invasive species, 2) existing databases of information, 3) their own information needs, and 4) common information requested from them by stakeholders and end users. This information will then be used to design an appropriate interface architecture for implementation at the [www.invasivespecies.gov](http://www.invasivespecies.gov) site.

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