2.1 LEGACY DATA: THE SEARCH PROCESS

Using the same approach that was used during the original Sandpan and subsequent Southwest Florida Gulf Coast projects, URS and CPE conducted an exhaustive literature search for relevant applicable data. This included all previous reports, core logs, sediment sampling data, isopach maps and other geotechnical, geophysical, bathymetric or sedimentological data available that specifically identified or studied the distribution of offshore sand resources of the Florida Southeast Atlantic coast. This information was obtained from the BBCS, the Florida Geological Survey, the University of Florida, the University of South Florida, the Florida State University, the U.S. Army Corp of Engineers, the U. S. Geological Survey, the Minerals Management Service, and from previous studies conducted by various consultants contracting with the BBCS.

Additionally the Florida Atlantic Coast Sand Search presented opportunities that were not available in the Panhandle and Southwest Gulf Coast sand searches, chief of which was the effort individual counties extended with their own beach management programs. This led to the development of expertise among these entities that was used as an aid to determine the types and amounts of data in the region, as well as to contribute in the development of the sand resource and geological conceptual model.

As of this report date, 41 datasets have been added to ROSS for the Northeast Phase III region. This brings the number of datasets to 256. These include theses, dissertations, Government reports and Consultant reports. Approximately 1,131 samples, 617 cores, and 1,321 miles of geophysical data have been added during this phase of the project. This has increased the database to approximately 14,000 sand samples, 4,600 cores, 220 jet probes and over 8,800 miles of geophysical data in the form of sub-bottom profile images.

2.2 DATA SELECTION PROCESS FOR ROSS

With the need to focus on data which enhances the database without diminishing storage capacity, and therefore slowing down the search and retrieval process, URS and CPE developed a Data Acquisition and Entry Plan. This plan was used as the framework for deciding what data would be incorporated into ROSS and what data would be archived outside of the database for the Southeast project. An example of this selection process could include data from a previous study of a borrow site. If there were a series of cores taken from a site that was subsequently developed, storing all the sample data from these cores could be unnecessary. Taking a representative sample of the cores which adequately describes the area would be adequate. Storing only this data would save space, as well as limit the return hits from the database, consequently speeding up the query process. The original individual records would be kept in an electronic archive, but they would not be in the database or on the associated ftp site.

2.3 THE DATABASE

2.3.1 Data Types

Two basic types of data are stored in the database. The first is tabular data used to store information about sediment properties. The original Sandpan database schema consisted of thirteen data tables that include three associated look-up tables. These tables contained data related to the sediment sample itself. Included were fields for sediment grain size, texture, mineralogy, both Munsell and descriptive color, organic content, shell content, heavy mineral content, collection method, location information, core layer information, the analytical methods used in analysis, and both Wentworth and USC classification schemes. Project information like project name, managing agency, contact names, project date, driller and collection methods were also included. Several other geologic parameters like sphericity, angularity, and gradation were also been recorded.

The new ROSS database schema is an expansion of the Sandpan schema and currently includes thirty-three relational data tables. The database has been expanded and enhanced to allow for a more comprehensive search and comparison function than previously available. Several new tables were added so that searches could be structured that would return data on the descriptive properties of sediment layers found within cores. Included are tables, which store layer structure, lithology, and textural qualifiers. The capabilities for using descriptive information about sediment and sediment layer properties have been enhanced by adopting the U.S. Army Corps of Engineers standard core description procedures for characterizing sediments and core layers.

With the addition of the more project-focused analysis that includes storing data on core layers, the expanded database now contains these column headings:

AGENCY_ID
AGENCY_NAME
ANALYTICAL_METHOD_ID
ANALYTICAL_METHOD_NAME
ANALYTICAL_METHOD_DESCRIPTION
ANGULARITY_ID
ANGULARITY
PK_BIBSUMMARY
AUTHOR
AUTHOR_LAST_NAME
AUTHOR_INITIALS
TITLE
KEYWORDS
PAPER_YEAR
ABSTRACT
PUBLISHER
CALCULATION_METHOD_ID
CALCULATION_METHOD_NAME
CALCULATION_METHOD_DESCRIPTION
COLLECTION_METHOD_ID
COLLECTION_METHOD
COLLECTION_METHOD_DESCRIPTION
COLOR_DESCRIPTOR_ID
COLOR_DESCRIPTOR
COLOR_MATRIX_ID
CT_COLOR_TONE_ID
CD_DESCRIPTOR_ID
COL_COLOR_ID
COLOR_TONE_ID
COLOR_TONE
COLOR_ID
COLOR
CONTACT_ID
CONTACT_NAME
CONTACT_PHONE
CORE_LAYER_QUALIFIER_ID
CL_CORE_LAYER_ID
STX_SOIL_TEXTURE_ID
SD_SOIL_DESCRIPTOR_ID
ST_SOIL_TYPE_ID
L_LITHOLOGY_ID
S_SORTING_ID
QUALIFIER
CORE_LAYER_ID
CORE_CORE_ID
LS_LAYER_STRUCTURE_ID
USCS_USCS_CLASSIFICATION_ID
CMTX_COLOR_MATRIX_ID
BOTTOM_OF_LAYER_INTERVAL
TOP_OF_LAYER_INTERVAL
MUNSELL_HUE_WET
MUNSELL_VALUE_WET
MUNSELL_CHROMA_WET
CORE_LAYER_COMMENTS
CORE_LAYER_IDENTIFIER
CORE_ID

COLOR_TONE_ID
CM_COLLECTION_METHOD_ID
PRJ_PROJECT_ID
DRL_DRILLER_ID
COLLECTION_DATE
CORE_TOP_ELEVATION
CORE_LENGTH
CORE_DIAMETER
X_COORD
Y_COORD
STATE_X
STATE_Y
STATE_ZONE
LONGITUDE
LATITUDE
LORAN_X
LORAN_Y
PENETRATION_DEPTH
RECOVERED_LENGTH
DIRECTION
OVERBURDEN
DEPTH_RX
GROUNDWATER_ELEVATION
PERCENT_RECOVERED
CORE_IDENTIFIER
DRILLER_ID
DRILLER_NAME
DRILL_TYPE
AGN_AGENCY_ID
GUEST_NAME
PK_GUESTBOOK
GUEST_ORG
GUEST_EMAIL
GUEST_DATE_VISIT
GUEST_COMMENT
GUEST_EMAIL_UPDATE
LAB_ID
LAB_NAME
LAB_ADDRESS
LAYER_STRUCTURE_ID
SAMPLE_DATE
SAMPLE_COMMENTS
ANALYSIS_DATE
LAB_REMARKS
X_COORD
Y_COORD
STATE_X
STATE_Y
LAYER_STRUCTURE
LAYER_STRUCTURE
LITHOLOGY
HUE
VALUE
CHROMA
CMTX_COLOR_MATRIX_ID
PROJECT_ID
AGN_AGENCY_ID_POSSESSING
AGN_AGENCY_ID_MANAGING
CON_CONTACT_ID
PROJECT_NAME
PROJECT_DATE
PROJECT_LOCATION
HORIZONTAL_COORDINATE_SYSTEM
HORIZONTAL_DATUM
VERTICAL_DATUM
PROJECTION
SAMPLE_ID
PRJ_PROJECT_ID
LAB_LAB_ID
AM_ANALYTICAL_METHOD
SLU_SPHERICITY_ID
ALU_ANGULARITY_ID
CM_COLLECTION_METHOD_ID
USCS_USCS_CLASSIFICATION_ID
CMTX_COLOR_MATRIX_ID
MUNSELL_HUE_DRY
MUNSELL_VALUE_DRY
MUNSELL_CHROMA_DRY
MUNSELL_HUE_WET
MUNSELL_VALUE_WET
MUNSELL_HUE_WASHED
MUNSELL_VALUE_WASHED
MUNSELL_CHROMA_WASHED
MUNSELL_HUE_UNKNOWN
MUNSELL_VALUE_UNKNOWN
MUNSELL_CHROMA_UNKNOWN
SAMPLE_IDENTIFIER
CARBONATE_DISSOLVED
HEAVY_MINERALS_DISSOLVED
ORGANICS_REMOVED
SHELL_FRAGMENTS_REMOVED
PHI
USCS_COBBLE
USCS_COARSE_GRAVEL
USCS_FINE_GRAVEL
USCS_COARSE_SAND

STATE_ZONE
LORAN_X
LORAN_Y
LONGITUDE
LATITUDE
RANGE_MONUMENT
RM_TRANSECT_LOCATION
TOP_OF_SAMPLE_INTERVAL
BOTTOM_OF_SAMPLE_INTERVAL
GRAB_ELEVATION
MEAN
MEDIAN
STD
SKEWNESS
KURTOSIS
MEAN_ORIGINAL
MEDIAN_ORIGINAL
STD_ORIGINAL
SKEWNESS_ORIGINAL
KURTOSIS_ORIGINAL
CALC_CALC_METHOD_ID_MEAN
CALC_CALC_METHOD_ID_MEDIAN
CALC_CALC_METHOD_ID_STD
CALC_CALC_METHOD_ID_SKEW
CALC_CALC_METHOD_ID_KURT
PCT_FINES
PCT_PAN_FRACTION
PCT_CARBONATE
PCT_SHELL_FRAGMENTS
PCT_HEAVY_MINERALS
PCT_ORGANICS \
SAMPLE_DATA_YN
CORE_DATA_YN
DISPLAY_GROUP
SOIL_DESCRIPTOR_ID
SOIL_DESCRIPTOR
SOIL_TEXTURE_ID
OIL_TEXTURE
SOIL_TYPE_ID
USCS_MEDIUM_SAND
USCS_FINE_SAND
USCS_SILT
USCS_CLAY
WW_BOULDER
WW_COBBLE
WW_GRAVEL
WW_PEBBLE
WW_VERY_COARSE_SAND
WW_COARSE_SAND
WW_MEDIUM_SAND
WW_FINE_SAND
WW_VERY_FINE_SAND
WW_SILT
WW_CLAY
WW_COLLOID
SAMP_SAMPLE_ID
CL_CORELAYER_ID
VIRTUAL_SAMPLE
PK_SITEINFO
SITE_QUESTION
SITE_INFO
USERMAN
USERMAN_LOCATION
COLUMN_NAME
ALIAS
DESCRIPTION
DISPLAY_ORDER
DISPLAY_YN
PHI_RANGE
SOIL_TYPE
SORTING_ID
SORTING
STANDARD_DEVIATION
SPHERICITY_ID
SPHERICITY
USCS_CLASSIFICATION_ID
CLASSIFICATION_NAME
CLASSIFICATION_DESCRIPTION

The second type of data stored in the database is spatial data. Spatial features along with their accompanying attributes reside in the ORACLE relational database as Spatial Database Engine (SDE) layers. These spatial features are stored much like any other data types as a string of characters or as a number. This enables the end user to optimize the abilities of this corporate database management system to manipulate large datasets and to relate them to geographic locations on the earth.

Important issues that users need to understand are the restrictions and caveats involved with any of the data sets. To accomplish this goal, metadata (or data about the data) have been created for each data set and for each spatial layer. These metadata conform to the Federal Geographic Data Committee (FGDC) requirements. The FGDC coordinates the development of the National Spatial Data Infrastructure (NSDI). The NSDI encompasses policies, standards, and procedures for organizations to cooperatively produce and share geographic data. The 17 federal agencies that make up the FGDC are developing the NSDI in cooperation with organizations from state, local and tribal governments, the academic community, and the private sector. For more information, see www.fgdc.gov.

2.3.2 Accessing the Database

Access to the ORACLE database is possible using one of three methods. The most direct is to click on the Query Builder link found on the ROSS homepage (Figure 2-1). This link will take you directly to the online Enhanced Query Builder page (Figure 2-2).

The Enhanced Query Builder is a custom-built application that allows the user to create Structured Query Language (SQL) statements. These SQL statements access real-time data from the ORACLE relational database. Unique WHERE clause statements may be constructed by the user that could be added to an SQL statement one criteria at a time. These SQL statements are what tell the computer to retrieve all of the data for which the set of conditions are true. These statements may be set to return data from all of the thirty-three tables residing in the ROSS database. Once the query is executed, the data matching the search criteria are returned on the Sand Sample Query Results page.

At the bottom of the Sand Sample Query Results page there are three other options provided to the user. These are accessed by clicking on one of the three buttons found at the bottom of this page. These will enable the user to either "Download Data", in a Tab delimited format, "Go Back" to the Enhanced Query Builder to perform another query, or spatially "View in ArcIMS" the data that was returned by the query. A detailed Users Guide for the Enhanced Query Builder can be found in Appendix 1.

The second way to access the ROSS database is through the online Internet Map Service (IMS) which is accessible through the ROSS homepage ArcIMS link. The IMS site was initially developed using the ESRI "out of the box" ArcIMS software. Appendix 2 contains the users guide for the ROSS Interactive Mapping site.

Figure 2-3 is a screen capture of the on-line mapping page within the ROSS Web site. On the left side of the image are folders, which contain the many different "layers" with which the user may interact. These layers are the spatial representations of the tabular data residing in the Oracle database. Most of these layers have been created especially for this project, with data generated by this project. However, some of these layers, including the Artificial Reefs, Sea Grass Beds, and others, were downloaded from other sites and incorporated into the ROSS on-line mapping. This illustrates the versatility of on-line mapping. Designers can combine data and information accessed over the Internet with local data for display, query, and analysis. For instance, environmental issues in potential renourishment areas are a concern. As an on-line search of state government spatial data repositories was conducted many shapefiles dealing with environmental issues were found at the Florida Geographic Data Library (FGDL). These shapefiles were subsequently downloaded from the FGDL site, re-projected and added to the ROSS site.

The third way to access data residing in the ROSS database is to download the data directly to the users own workstation. By using the Downloads link on the ROSS homepage the user is taken to a location where all the data residing in the database is available for quick and easy download (Figure 2-4).

This data is stored as SDE layers in both spatial and tabular format. Spatial data is in shapefile format therefore allowing the user to add these to their own Geographic Information System (GIS), combining them with other shapefiles that the user may have developed or received from other sources. Shapefiles contain data from a relational database management system (RDBMS). The RDBMS may be pulled out of the shapefile as a stand-alone portable format to be used with the ArcView software on a local machine. Downloading the tabular data is accomplished through the Enhanced Query Builder. This data may be downloaded in a Tab delimited format compatible with several analytical and graphing software packages. The user may download all or part of the data.

By design, the ROSS site currently does not include tools used for composite statistical analysis. The reason is that the BBCS does not desire to constrain the design professional to any particular suite of analytical products. The intent of this project web site is to allow the user to view the data spatially over the Web, to be able to query the data on several different levels and to download this data to their own workstation for advanced analysis.

2.4 DATA ENTRY

To accommodate the various entities that will supply data for inclusion into the ROSS database, two separate data entry tools will be made available. The first is a purpose-built Microsoft Access front end and the second is the commercially available software gINT.

The Microsoft Access front end is a customized data entry form that makes use of a user-friendly graphical user interface or GUI. From the main page of the front end the user will be able to access the appropriate page for data input (Figure 2-5).

A PROJECT INFORMATION page includes places to enter pertinent information on the project (Figure 2-6). This includes Project name, location, managing agency, and contacts.

Project level parameters are also defined. These parameters are entered in fields that define the projection information and horizontal and vertical datums. There is a Grade Scale field that allows the user to select which of three grain size-recording measures were used, phi, millimeter, or sieve size. For example by choosing phi, as shown in Figure 2-6, the user then checks the appropriate boxes for the phi values used. This information will later determine, in the Add a Sample page data entry form, which fields will be available for data entry. This acts as a quality control feature to help eliminate incorrect data entries.

Once Project Information is recorded, the user may proceed to enter data. If there have been cores collected in the project the user needs to click on the CORES button on the main page of the front end, pulling up the Core Entry page. Here data relative to the collection location, elevation, penetration, recovery and other detailed information of the core is entered (Figure 2-7).

After data on the core is entered, information on the actual core layers may be added. This is a new feature of the *enhanced* ROSS database. In the old Sandpan design, only the core location information was stored. With the ROSS design the user may add data describing the core layers themselves. Click on the Add Layer Information For This Core button and the Core Layer Information page appears (Figure 2-8). On this page a user will be able to enter layer structure, composition, texture, lithology and sediment type. There is also a comments field for use in adding any other information the user finds pertinent.

The next step in entering data is to input individual sample information. This data entry tool recognizes two Sample types, Samples from a Core and Grab Samples. To enter information about a Core Sample, click the Add Sample To This Core button on the Core Entry form. To enter information about Grab Samples, click the Grab Samples button on the Main Page. The Sample Entry Page (Figure 2-9) is used for adding data related to the individual sample. Included are fields for all data columns residing in the database relating to sediment samples. On the bottom portion of the page is a series of boxes of which some are shaded out.

The open boxes with values beside them are the same ones set as the phi ranges on the Project Information page. When the user originally set up the project and chose the phi sizes, these were then transferred to this page, therefore only allowing data to be input into the correct fields. This eliminates the likelihood of the user placing data values in the wrong category.

The second data entry tool was chosen because of its multi-faceted abilities. This is the commercially available gINT software. The data output formats for core logs and various other engineering and geological tools from the gINT software have been adopted by the Jacksonville District Army Corps of Engineers (ACOE). The developers of gINT have taken the database table structure created for the ROSS database and incorporated it into a commercially available software for contractors. Contractors will then be able to input data into this structure and deliver it to BBCS for almost seamless entry into the ROSS DATABASE.

2.5 OTHER FEATURES AND TOOLS

2.5.1 The Annotated Bibliography

Another feature of the ROSS Web site is the searchable Annotated Bibliography (Figure 2-10). There are currently over 900 references in the database covering topics on sediments found on the continental shelf, sedimentary processes, sea level curves and fluctuations, and the resulting changes in the shoreline over the last 12,000 years.

A large portion of these references are theses, dissertations and reports not readily accessible. The Annotated Bibliography page is designed so the user can search by the Author's last name, title of the paper or key word(s). There may also be an accompanying summary or abstract of the paper provided, copyrights permitting.

Web Site (ross.urs-tally.com)

The ROSS Web site is the means to an end. By navigating through the Web site, all the ROSS data, on-line interactive mapping, query builders to access the database, data downloads, reports, shapefiles and the annotated bibliography are available at the touch of a button. There is a New Users page with frequently asked questions that may help in understanding the functions of this Web site. New questions and answers will be posted as they are received and answered.

The ROSS database and Internet Map Service were created to provide a wide variety of users online access to both spatial and tabular data. This site will enable BBCS staff, coastal engineers, the academic community and the general public the ability to view and download all relevant data from historical, current and future studies conducted around the state of Florida.

The ROSS Web site was designed with three intentions. The first was to allow users to view data spatially over the web and be able to download this data in both tabular and shapefile format to a personal workstation for advanced analysis. The second was to give the coastal engineering community the ability to cut the cost of an initial design and permitting phase of a beach nourishment project. By compiling all the available data together in one easy to use location, a more detailed evaluation of sand deposits needed for these projects may be conducted. Finally, the database has located and digitally preserved a large portion of data that once resided in perishable formats.

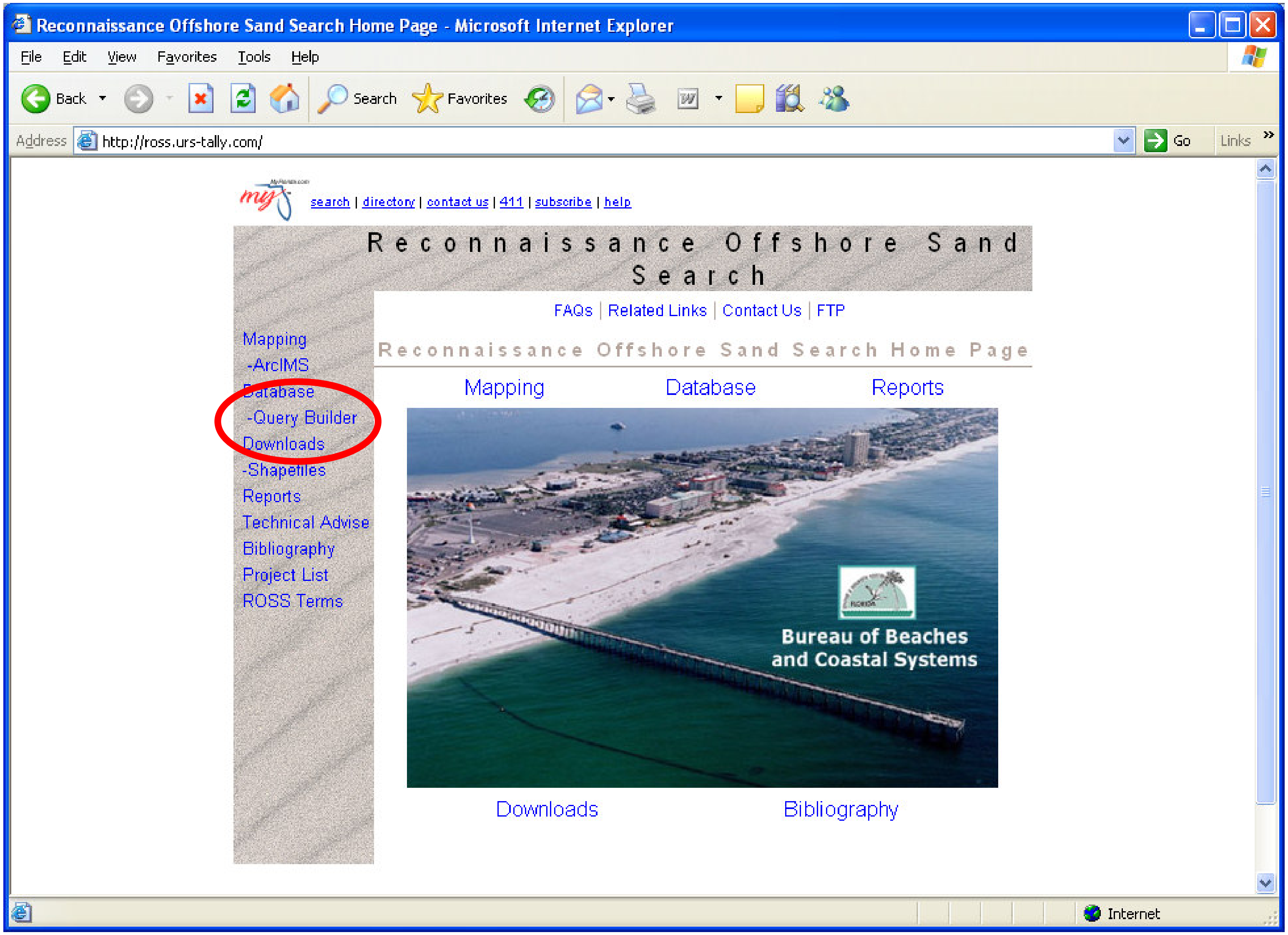

Figure 2-1. The ROSS home page showing the Query Builder link.

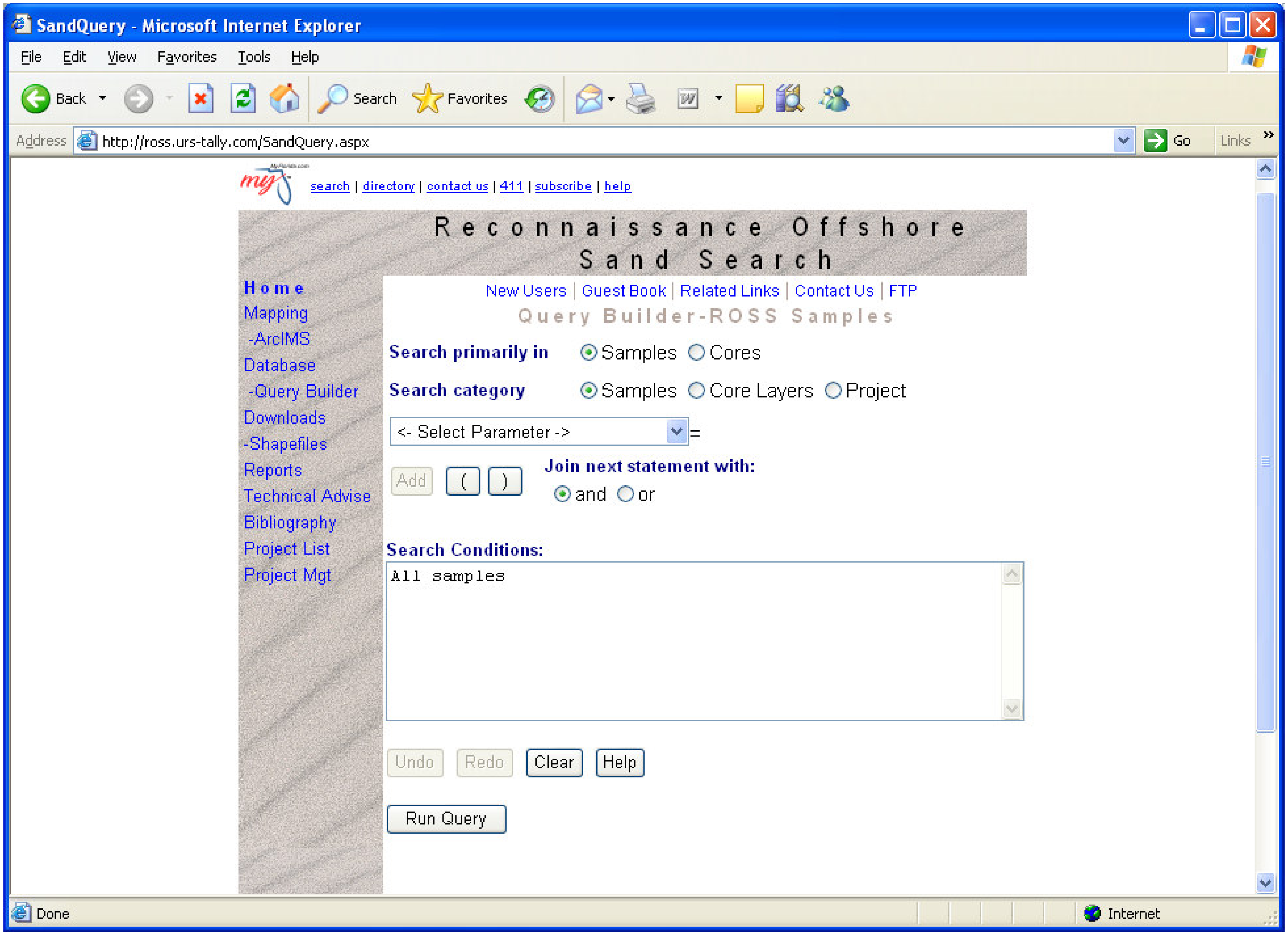

Figure 2-2. The Enhanced Query Builder page.

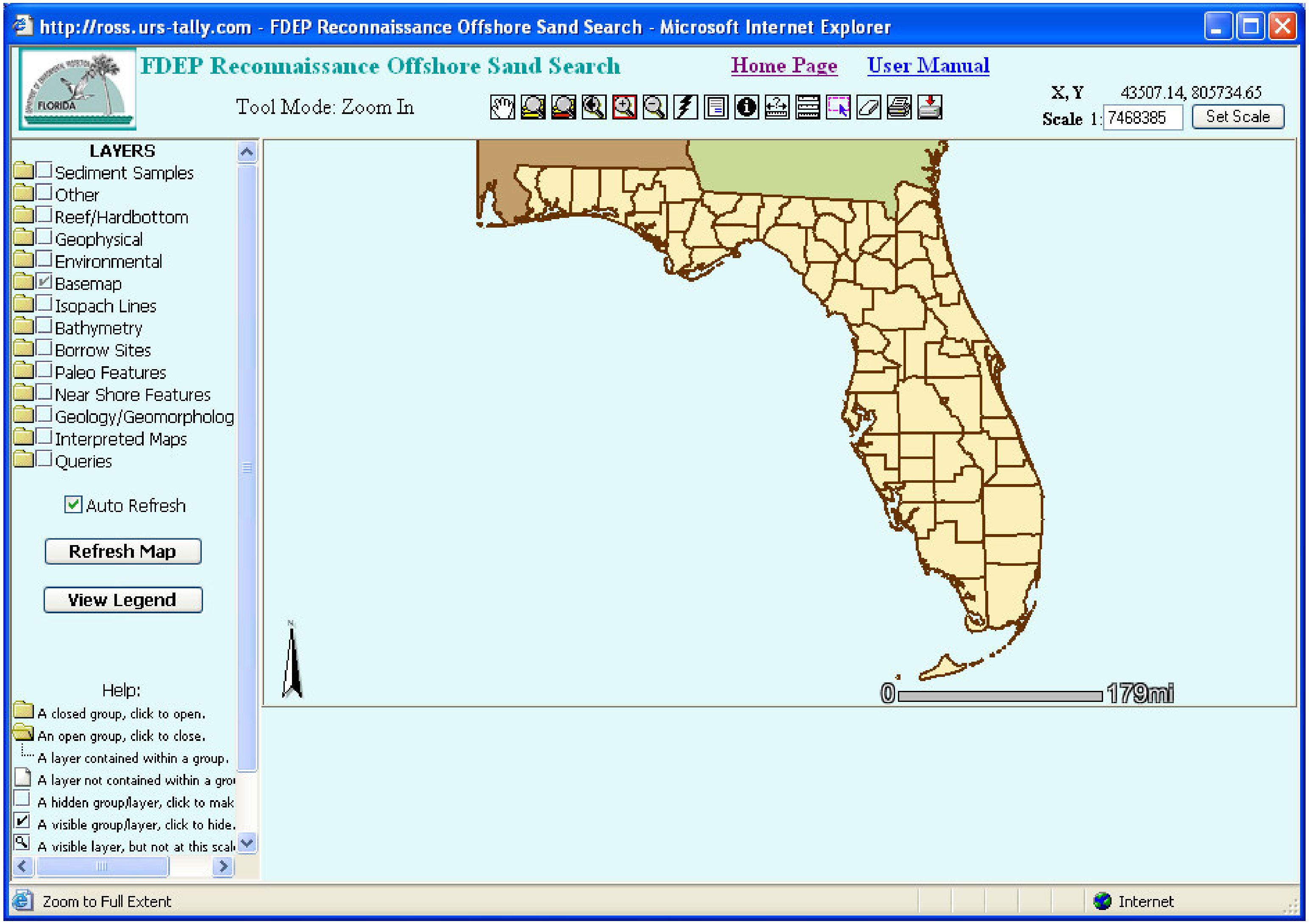

Figure 2-3. The ROSS on-line mapping page.

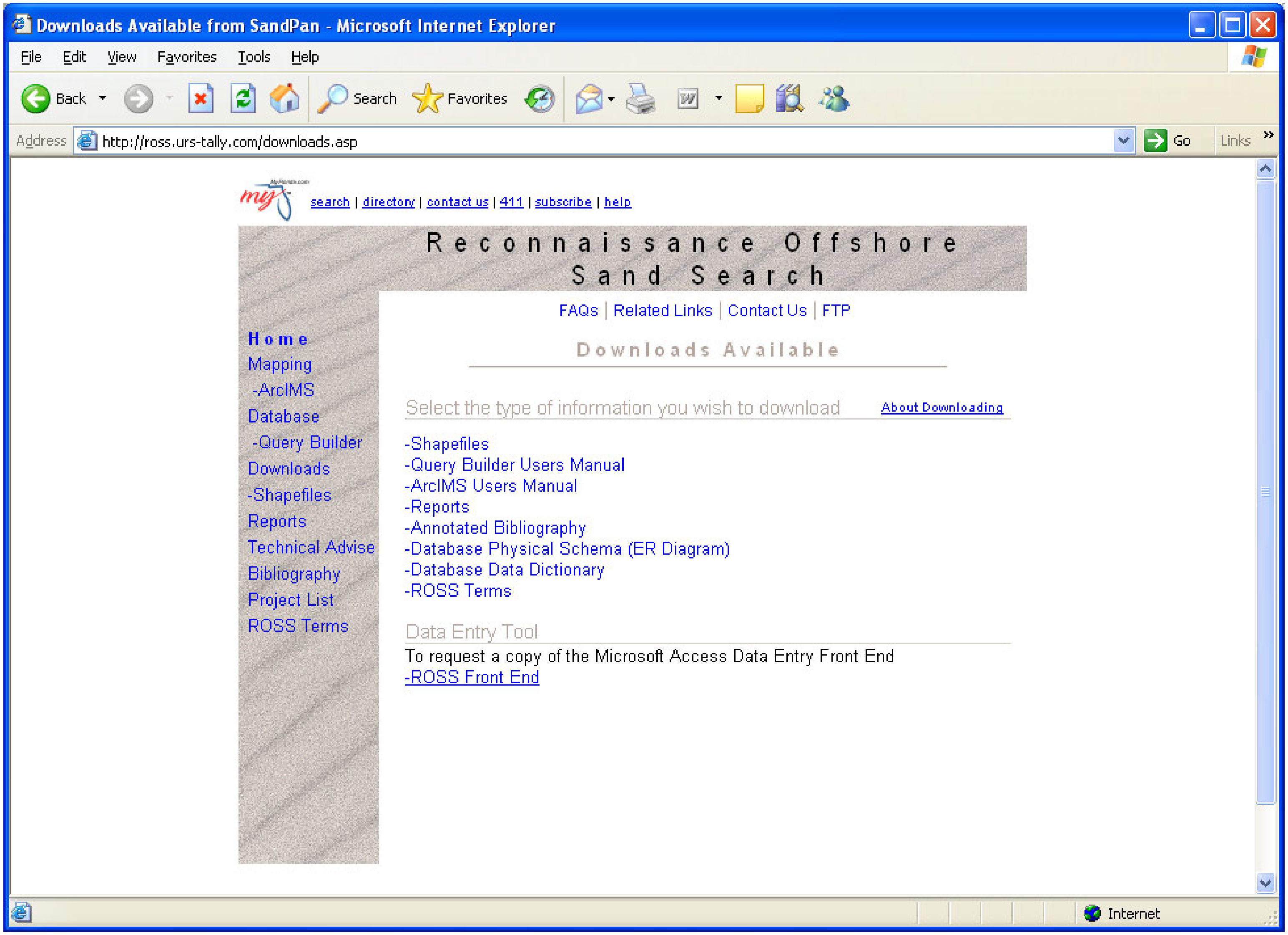

Figure 2-4. The ROSS Downloads page.

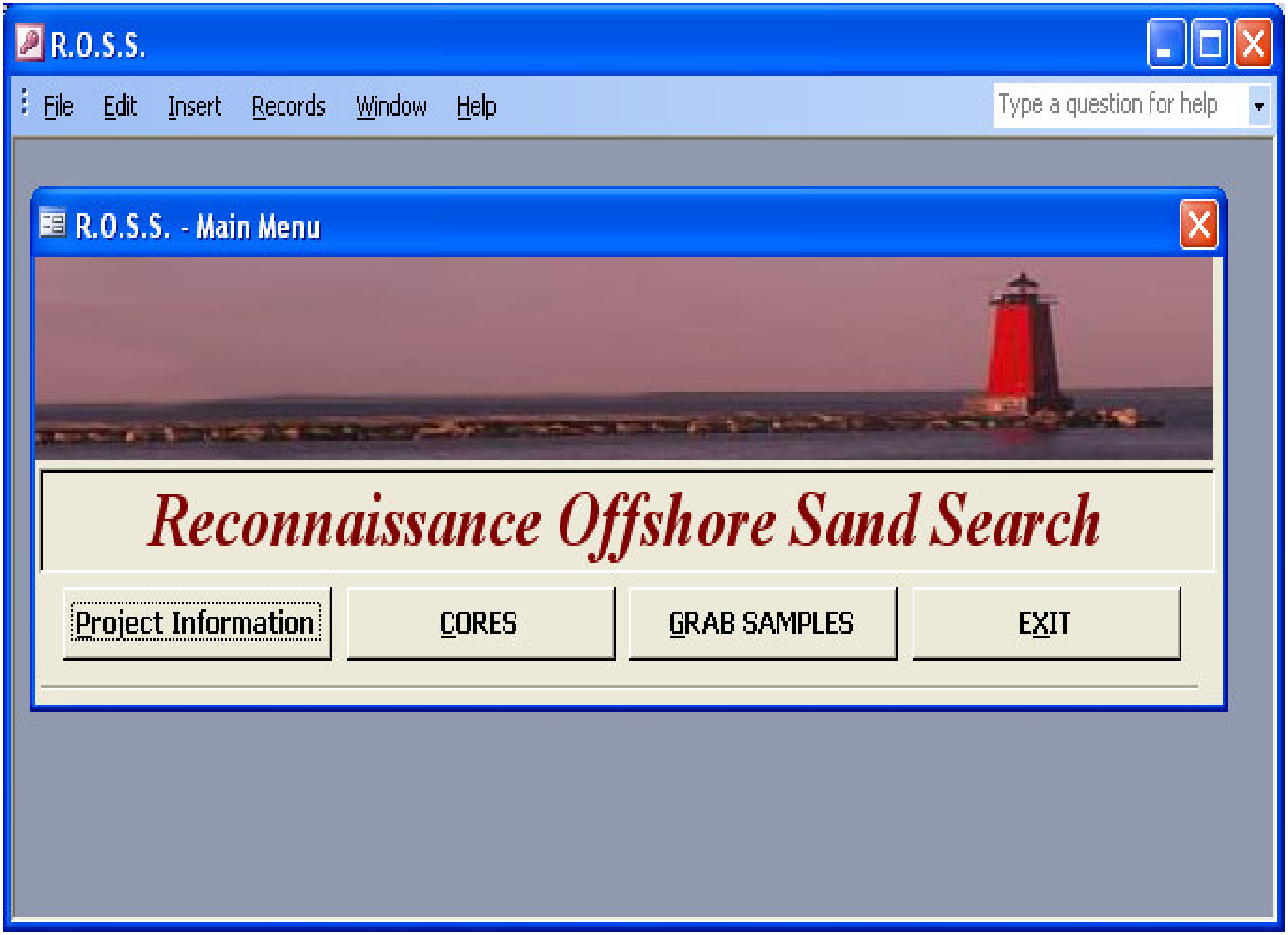

Figure 2-5. The ROSS Front End main page.

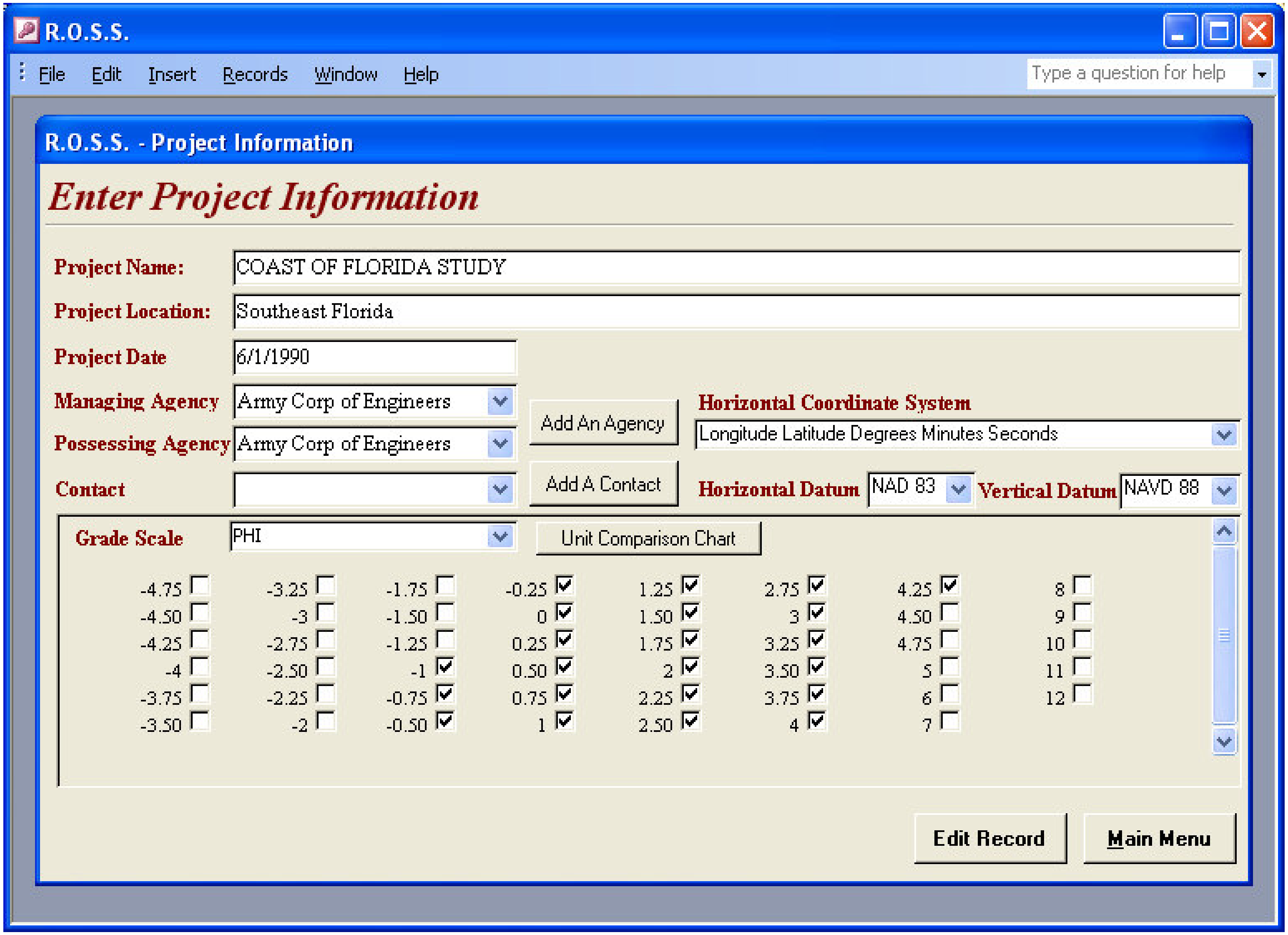

Figure 2-6. The ROSS Front End Project Information page.

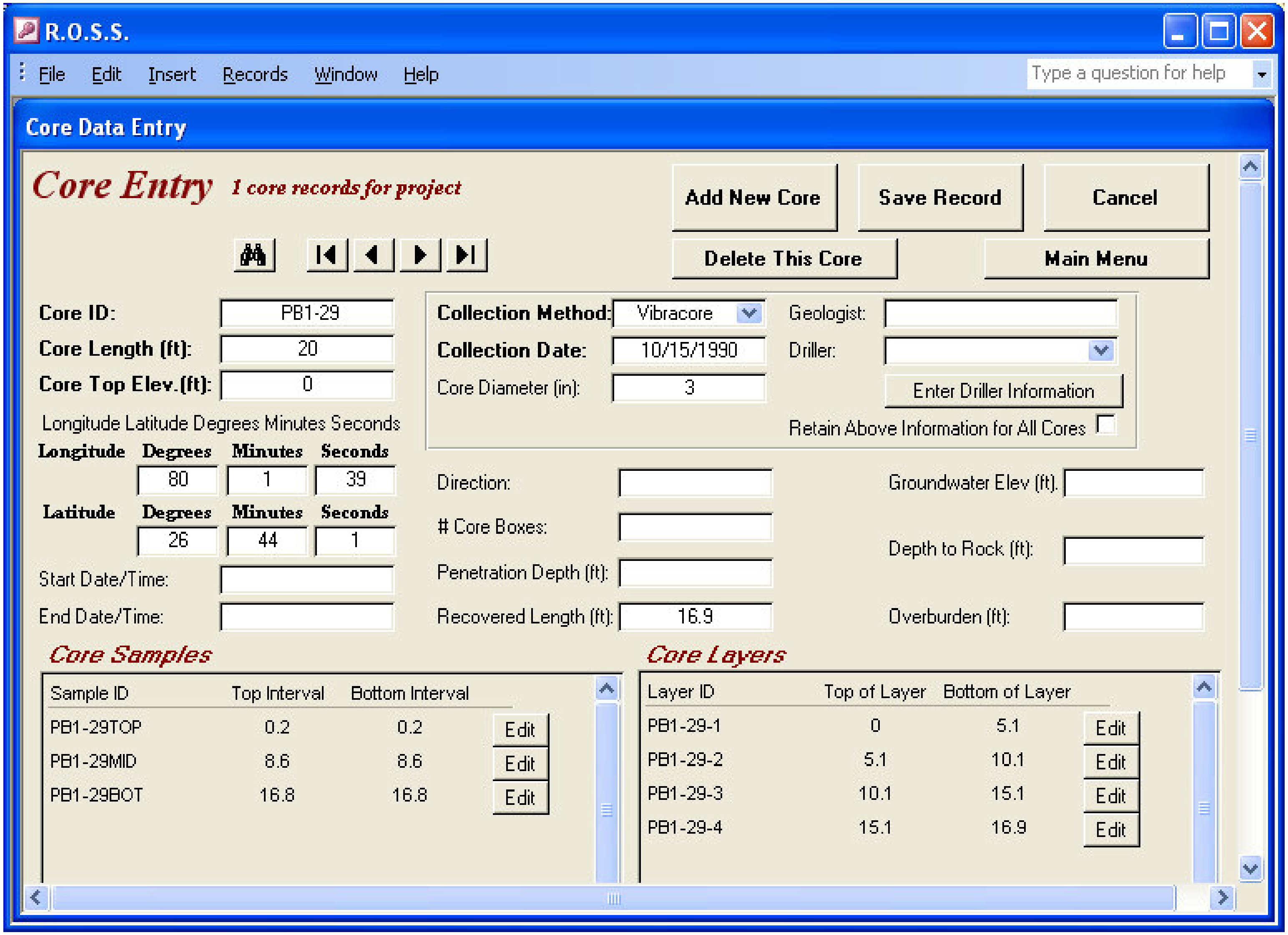

Figure 2-7. The ROSS core entry interface.

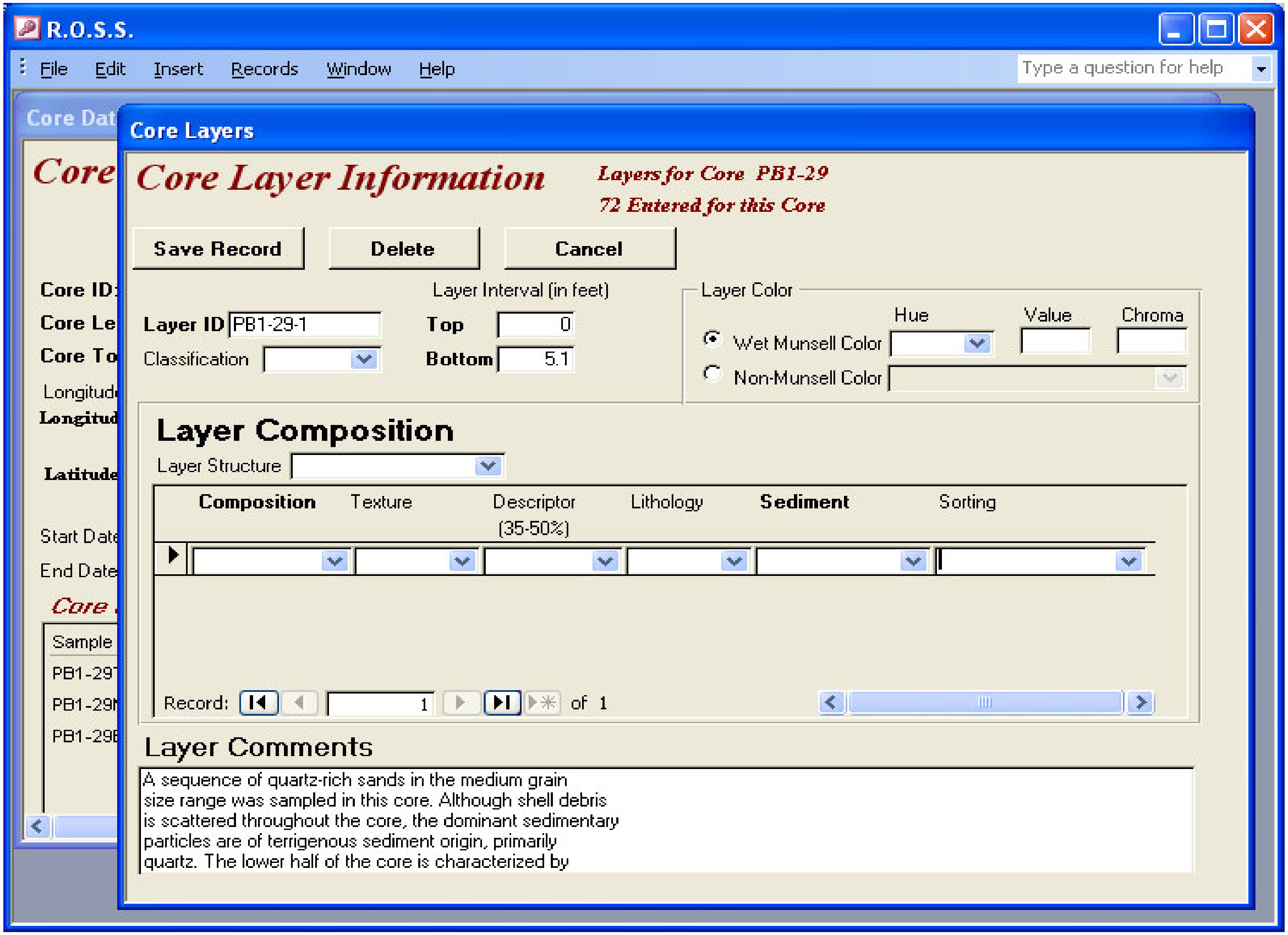

Figure 2-8. The ROSS core layer information interface.

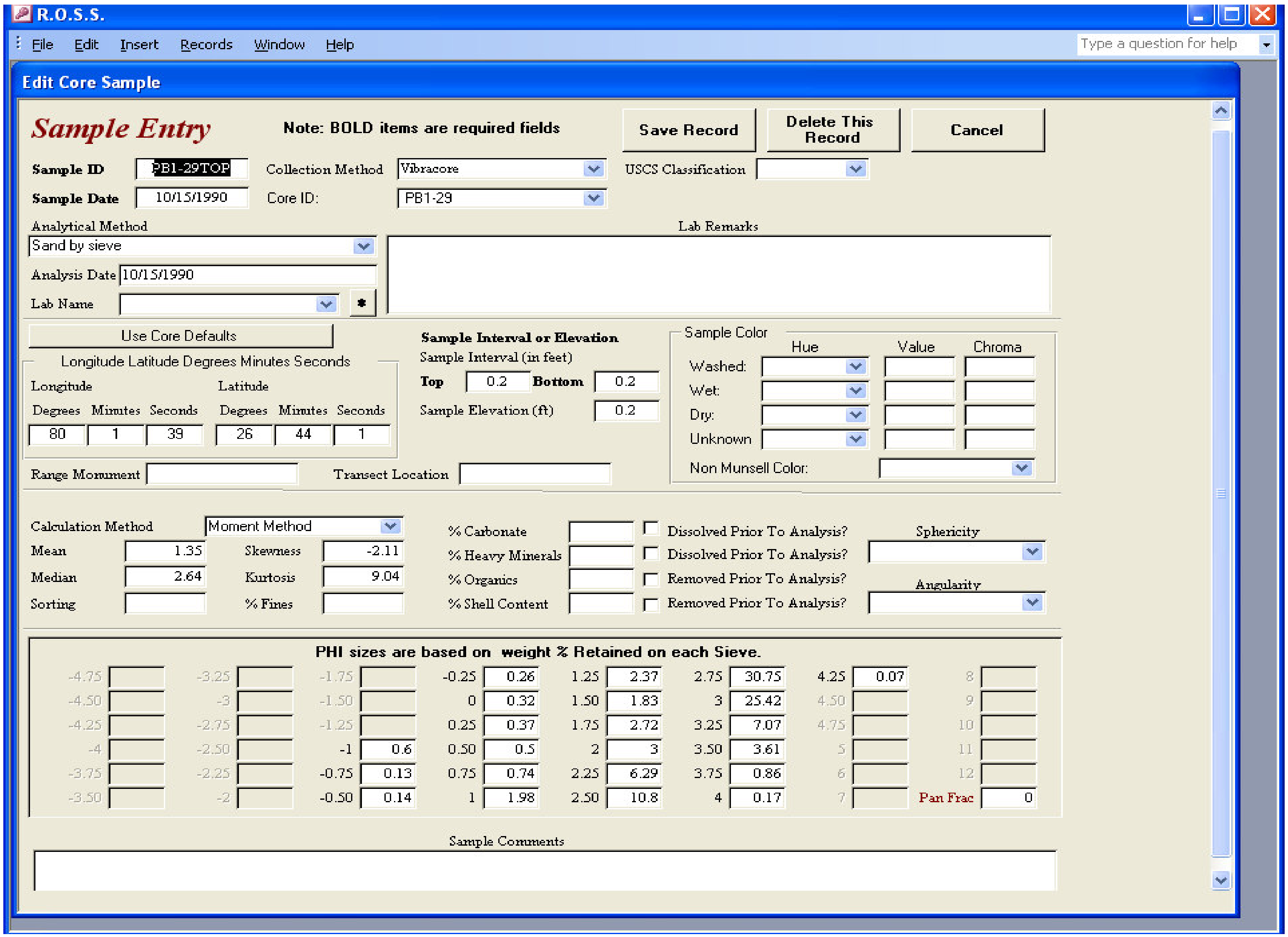

Figure 2-9. The ROSS sample information interface.

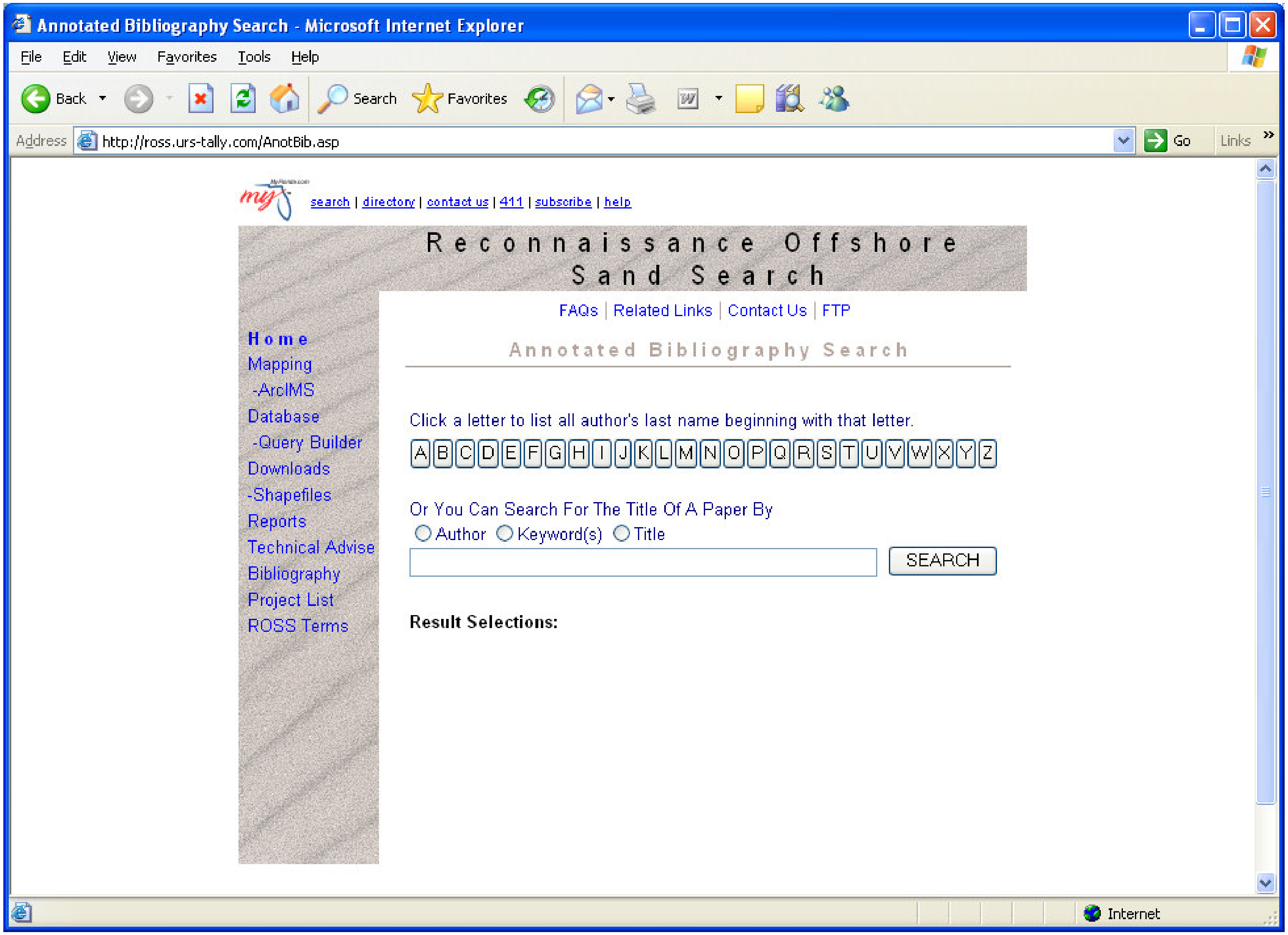

Figure 2-10. The Annotated Bibliography page.