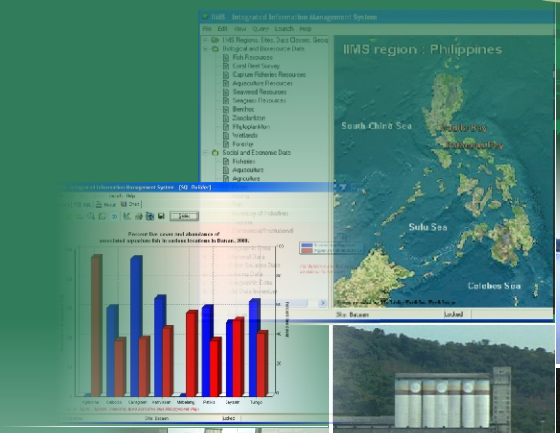
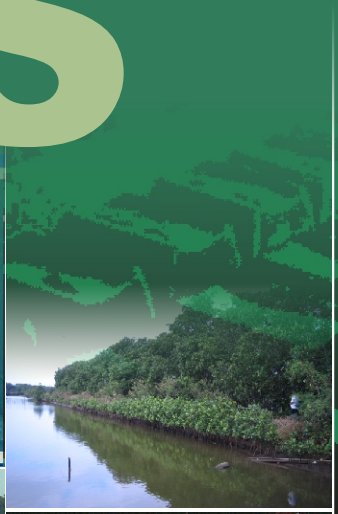
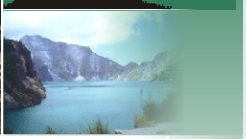
Integrated Information Management System for Coastal and Marine Environment

Guide to Establishing

IIMS







GEF/UNDP/IMO Regional Programme on Building Partnerships in Environmental Management for the Seas of East Asia

Integrated Information Management System for Coastal and Marine Environment

Guide to Establishing IIMS

GEF/UNDP/IMO Regional Programme on Building
Partnerships in Environmental Management
for the Seas of East Asia

Guide to Establishing Integrated Information Management System

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MISSION STATEMENT

The Global Environment Facility/United Nations Development Programme/International Maritime Organization Regional Programme on Building Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) aims to promote a shared vision for the Seas of East Asia:

> "The resource systems of the Seas of East Asia are a natural heritage, safeguarding sustainable and healthy food supplies, livelihood, properties and investments, and social, cultural and ecological values for the people of the region, while contributing to economic prosperity and global markets through safe and efficient maritime trade, thereby promoting a peaceful and harmonious co-existence for present and future generations."

PEMSEA focuses on building intergovernmental, interagency and intersectoral partnerships to strengthen environmental management capabilities at the local, national and regional levels, and develop the collective capacity to implement appropriate strategies and environmental action programs on self-reliant basis. Specifically, PEMSEA will carry out the following:

- build national and regional capacity to implement integrated coastal management programs;
- promote multi-country initiatives in addressing priority transboundary environment issues in sub-regional sea areas and pollution hotspots;
- reinforce and establish a range of functional networks to support environmental management;
- identify environmental investment and financing opportunities and promote mechanisms, such as public-private partnerships, environmental projects for financing and other forms of developmental assistance;
- advance scientific and technical inputs to support decision-making;
- develop integrated information management systems linking selected sites into a regional network for data sharing and technical support;
- establish the enabling environment to reinforce delivery capabilities and advance the concerns of nongovernmental and community-based organizations, environmental journalists, religious groups and other stakeholders;
- strengthen national capacities for developing integrated coastal and marine policies as part of state policies for sustainable socioeconomic development; and
- promote regional commitment for implementing international conventions, and strengthening regional and sub-regional cooperation and collaboration using a sustainable regional mechanism.

The twelve participating countries are: Brunei Darussalam, Cambodia, Democratic People's Republic of Korea, Indonesia, Japan, Malaysia, People's Republic of China, Philippines, Republic of Korea, Singapore, Thailand and Vietnam. The collective efforts of these countries in implementing the strategies and activities will result in effective policy and management interventions, and in cumulative global environmental benefits, thereby contributing towards the achievement of the ultimate goal of protecting and sustaining the life-support systems in the coastal and international waters over the long term.

Dr. Chua Thia-Eng
Regional Programme Director
PEMSEA

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Preface

The Integrated Information Management System for Coastal and Marine Environment (IIMS) was developed in response to the problems encountered by the Regional Programme during its pilot phase, known as Phase 1 (GEF/ UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas) with regards to data access and quality. The development of the system was based on the information needs of the PEMSEA demonstration and parallel sites, and was enhanced as new tools for integrated coastal management (ICM) and risk assessment (RA)/ risk management (RM) are improved or developed during the second phase (PEMSEA).

The first version of the IIMS was developed in partnership with Seaconsult Marine Research Ltd between 1998 and 1999. With the improvement on the ICM and RA/RM frameworks, the information needs of the PEMSEA sites increased. With this, the RPO decided to further enhance the IIMS using in-house resources in 2000. Since then, RPO's IIMS Technical Support Group refined IIMS from a database to a user-friendly decision-support system by improving its functionalities on querying, linking with external software, web-based access, and translating it to national languages. With these enhancements, the applications of IIMS have been expanded, not only for PEMSEA sites but also for other areas. Networks, using IIMS as a common database platform, are being developed at the sites to promote access of information/data among stakeholders and foster their cooperation to maintain a system that would provide them timely and quality data/information that would facilitate a decision-making process.

IIMS would play a crucial role in providing the growing need for reliable information in attaining goals of sustainable coastal development not only at the local government level but also at the regional level such as the implementation of the Sustainable Development Strategy for the Seas of East Asia.

The IIMS package comes with the IIMS software in CD, *Guide to Establishing IIMS, IIMS User Manual* and Web-based IIMS. Several training programs are also offered by PEMSEA on the operation of the system.

Acknowledgements

IIMS was developed and enhanced from the earlier work of the Seaconsult Marine Research Ltd through the concerted efforts of many individuals from conceptualization, programming and finalization of the system, including the development of training programs and manuals. Without their tireless efforts and dedication, IIMS development would not have been a success. The efforts of the following are gratefully acknowledged:

The RPO's IIMS Technical Support Group in developing, enhancing and finalizing the system consisting of Mr. Edmond Calderon, former GIS assistant; Mr. Noel Robles and Mr. Alexis Fabunan, former GIS technicians; Mr. Elson Aca, former programmer; Mr. Albert Cariño, programmer; and Ms. Bresilda M. Gervacio, technical officer;

All RPO staff and Dr. Teng Seng Keh (Coastal Management Center) who contributed in the enhancement of the encoding software by providing technical inputs, testing the system and editing the *Guide to Establishing IIMS* and the *User Manual*;

The IIMS team of PEMSEA sites (Manila Bay Environmental Management Project, Bohai Sea Environmental Management Project, Bali ICM Demonstration Project, Chonburi ICM Demonstration Project, Danang ICM Demonstration Project, Port Klang ICM Project, Nampho ICM Project, Bataan ICM Parallel Site, Sihanoukville ICM Demonstration Project) for their tireless efforts in testing the software;

PEMSEA's senior programme officers: Mr. S. Adrian Ross, Dr. Huming Yu, and Dr. Jihyun Lee for their technical and managerial advice; and the unfailing support of Dr. Chua Thia-Eng, regional programme director.

1. Background

1.1 Scope

This Guide to Establishing Integrated Information Management System for Coastal and Marine Environment (IIMS) provides an easy-to-follow instruction and user manual for environmental managers involved in integrated coastal management (ICM) and pollution hotspot sites of PEMSEA. It is a generic guide, and users are advised to make modifications according to local situations. The intention is not to prescribe ways but help system coordinators, administrators and data collectors on establishing IIMS. It discusses some basic requirements in establishing IIMS.

1.2 Integrated Information Management System for Coastal and Marine Environment

The IIMS is a software that enables storage, retrieval and analysis of data that will provide decisionmakers and other stakeholders with information about the environment and its interconnections with human activities.

It is a comprehensive database covering habitats and biological resources, demography, institutional profiles, socioeconomic activities, pollution sources, environmental quality and physiographic characteristics.

It is a decision-support system that transforms data into vital information to help policymakers and managers arrive at well-informed solutions to environmental problems.

1.3 Rationale and Objectives of IIMS

Experiences in planning, environmental assessment and management show that there is a lack of data, that data required are not readily available, or that there is inadequate interpretation of available data. Data, should it be available, are often not in uniform format that one can readily use. Data handling issues and problems encountered by the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS, the

pilot phase of PEMSEA) are summarized as follows:

- no standard and uniform data collection and recording;
- substandard quality and uniformity of data collected; and
- lack of a common software for timely and cost-effective analysis.

PEMSEA's IIMS aims to address these major issues. The IIMS would bring the information required not only for the participating institutions of PEMSEA but also to external users and other stakeholders of the coastal and marine environment.

IIMS is useful in various aspects of environmental planning, management and assessment. Among its applications are environmental profiling, strategic environmental planning, risk assessment, environmental impact assessment and environmental monitoring. These aspects of environmental management and assessments are not only undertaken by government institutions but also by academic, industrial, commercial sectors and consulting firms, hence, these sectors also benefit from IIMS.

Some of the benefits derived from IIMS:

- Access of timely, reliable and cost-effective information that would aid in planning, management and assessment
- Organization of data in a uniform manner that would cut down cost in data gathering for environmental planning, management and assessments
- Decision-support system for coastal managers, planners, policymakers and stakeholders in handling environmental issues
- Exchange of data in a timely and cost-effective manner between/among ICM and pollution hotspot sites, and the PEMSEA Regional Programme Office (RPO)
- Networking backbone for the PEMSEA sites and for other users, which is essential in implementing the Sustainable Development Strategy for the Seas of East Asia

2. Basic Components/Requirements in Establishing IIMS

To establish an IIMS, one must take into consideration the IIMS software (encoding and querying), hardware, human resources and available data.

2.1 IIMS Encoding Software

The IIMS encoding software was initially developed during the pilot phase of the GEF/UNDP/IMO Regional Programme for the Prevention and Management Marine Pollution in the East Asian Seas (MPP-EAS) and was refined during its second phase (PEMSEA). The encoding software allows someone to encode data based on the requirements of IIMS. It has various categories and will store the data according to categories. Figure 1 shows the IIMS main menu. (See the *IIMS User Manual* for details). For linking IIMS with a geographic information system (GIS), a GIS software is required.

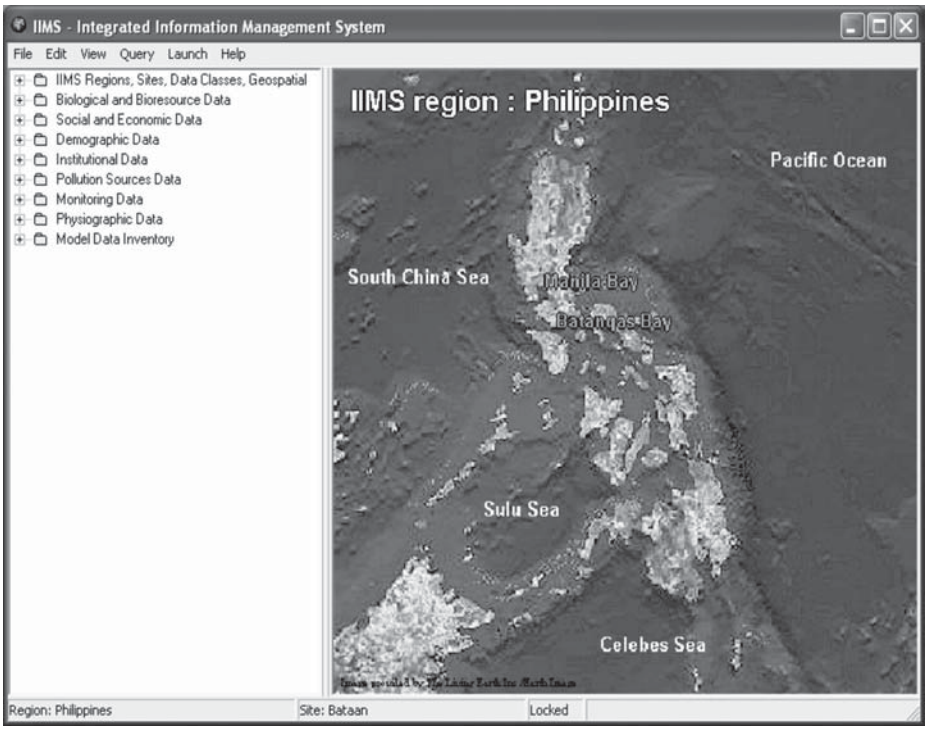


Figure 1. IIMS Main Menu

2.2 Hardware

The required equipment for IIMS includes: Central processing unit (CPU); Monitor (minimum 15”); Keyboard and mouse; Printer; and Scanner or digitizer.

The minimum specifications for the hardware for IIMS are:

- Pentium III
- Intel motherboard
- 256 MB SDRAM
- 20 GB HDD
- 1.44 MB FFD
- CD-ROM Drive
- CD Writer
- 10/100 MBps D link LAN Card
- External drive

2.3 Other Software

- MS Office – MS Word, MS Excel
- Paradox
- GIS software

2.4 Data To Be Collected

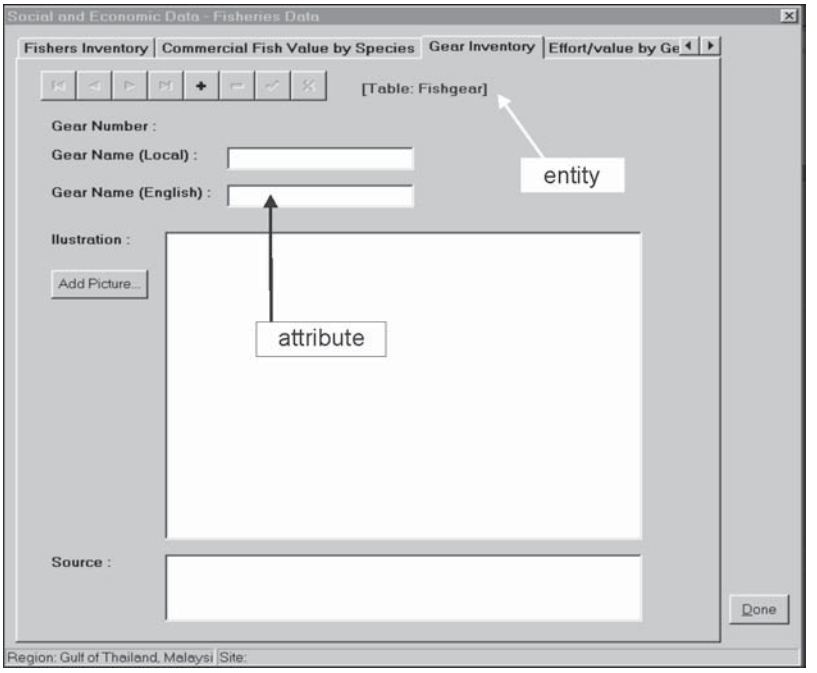
One of the necessary steps in database management is data collection. The quality of information that will be generated from the system will depend on the quality of data collected and encoded. Data collection is, therefore, a crucial step in building a quality information management system. This section deals with data required based on the structure of IIMS and baseline information required for GIS establishment. To assist data gatherers and IIMS operators/administrators, some data requirements are defined and illustrated in Annex: IIMS Entry Forms and Data Requirements.

Just like any relational database, the foundation of IIMS are tables. Each table has an entity, and each entity contains several attributes. These attributes are the data that are stored about the entity and are tabulated in a table. Each row identifies a record and each column corresponds to a field or the relation. A relational database tells how data must be stored and how data are related. A table has a primary key, the unique identifier for each record or each row.

An example of a table is represented in Figure 2. In this example, the entity is Fishing Gear and its attributes are Gear Number, Gear Name (Local), Gear Name (English) and Illustration.

For each attribute, a unit of measure using the metric system is also defined. In collecting data, the unit of measure required by IIMS should be noted. Other units should be converted to the one required by IIMS. It is, therefore, important to note the conversion used (e.g., kilogram to metric ton, mile to kilometer, etc.) for future reference. At the data classification stage, it is important to consider the data precision required for each attribute.

Figure 2. IIMS Encoding Form Sample.



2.5 Organization of IIMS Tables

The IIMS relational environmental database starts at the highest level of the region table, with a primary key identifying each region. A site table contains a list of all individual IIMS database sites. A unique site code is assigned to each administrative IIMS unit, which serves as the primary key. This table is distinct from the region in that a region may have more than one IIMS site, but each site is unique to one region. The site table is related to the region table with the region number serving as a common field. The region table and the site table are common to all the IIMS sites.

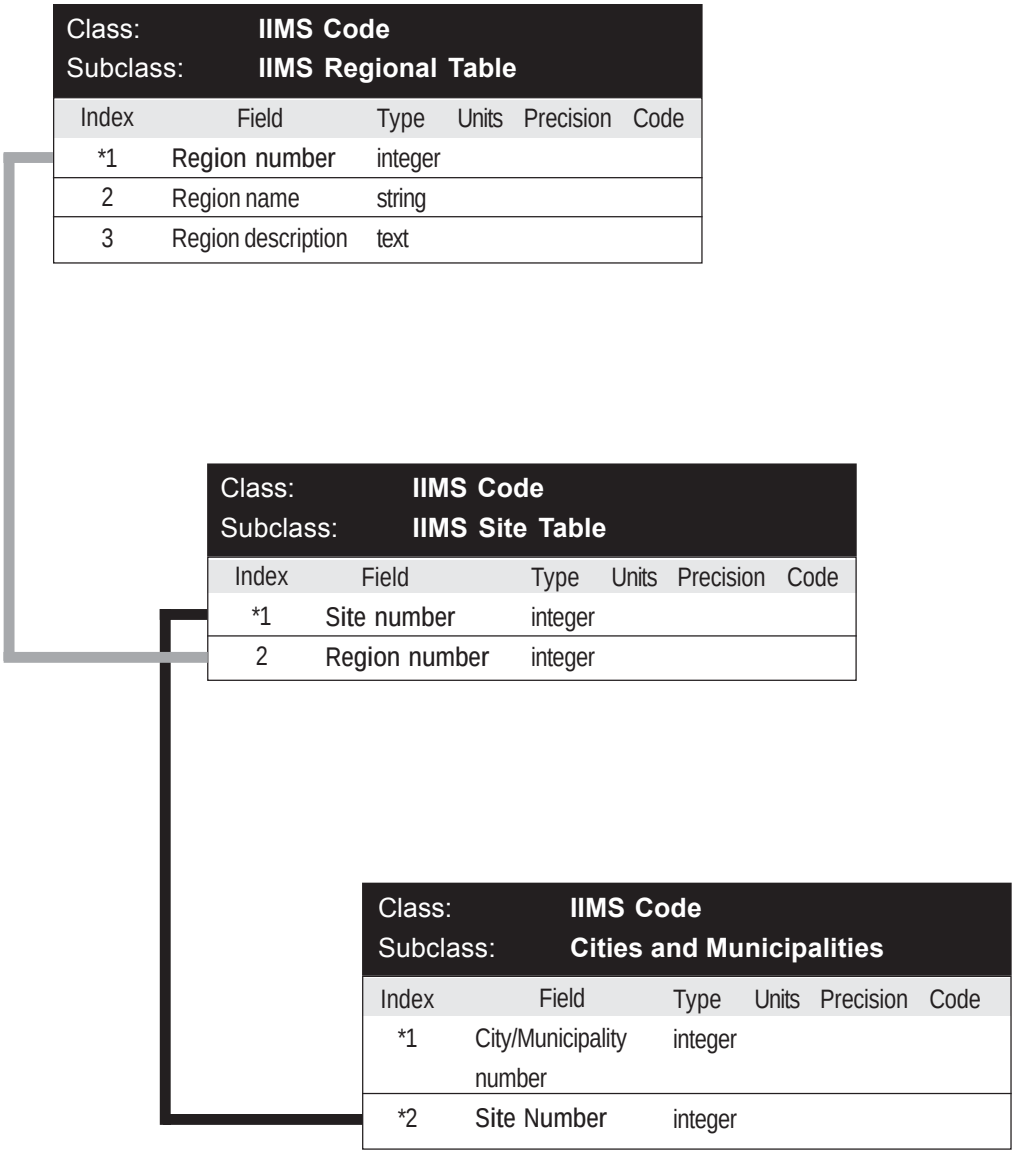
The regional codes, data codes and spatial codes category is another high level key. The category represents a hierarchical view of the various data classifications. The data category (top level) defines general categories of information to be included in the relational environmental database.

Below the category table is a class table. Individual categories are subdivided into classes and stored in the data class table. Each data class is assigned a unique number, which serves as primary key. The class table is related to the category table through the common category field.

Classes are further subdivided into subclasses, and these types are stored in a subclass table. Each subclass is assigned a unique number that serves as a primary key. The subclass table is related to the category table through the common category field number.

An example of relationships and links of the various levels of tables is presented in Figure 3.

Figure 3. Relationship between Entry Forms in IIMS.



2.6 Human Resources

One of the key steps in establishing IIMS is to organize an IIMS team that shall be responsible for system management. Team activities include hardware and software installation, data collection, encoding and systems maintenance. They will also ensure the quality of the data encoded and the integrity of the system.

Cooperation among the team members and clear-cut responsibilities are important factors for the effectivity and success of the IIMS. Box 1 shows the suggested composition of an IIMS team.

Box 1. Recommended Composition of an IIMS Team.

The IIMS Team may consists of, but is not limited to the following:

- System administrator — responsible for the overall performance and integrity of IIMS
- Encoders — responsible for entering data into the IIMS database and generation of reports required by users
- Data collectors — responsible for gathering data
- Technical staff — provides advise to the team on technical matters; validate data to be encoded and information to be disseminated; determine information to be generated as requested by users
- GIS technician—responsible for maintaining the integrity of the GIS database; conducts spatial analysis and produces outputs required by users.

To ensure that the team is equipped with necessary skills for IIMS operations, various training programs are given by the Technical Support Group of the RPO. These include:

- IIIMS establishment and application;
- IIMS query system and linkage with external software such as GIS; and
- Uploading IIMS database into the Internet.

3. Various Classes of

Required Data

The categories, classes and subclasses of data are discussed briefly in the following sections. The details on data format, precision and description of required data are shown and explained in Annex: IIMS Entry Forms and Data Requirements, which should serve as a guide in collecting data.

3.1 Regional Codes, Data Codes and Geospatial Category

This category contains a listing of IIMS regions and sites, data classifications, geospatial data, rivers, bodies of water and maps. Most of the classes and subclasses in this category are linked with the classes and subclasses of the other categories.

3.2 Biological and Bioresources Data Category

The Biological and Bioresources Category deals with habitats and biological resources of a site. Under this category, the subclasses are coral reef, fish and shellfish resources, benthos, wetlands, plankton, aquaculture resources, seaweed, seagrass, and forest resources.

3.3 Socioeconomic Category

The Socioeconomic Category contains data on various socioeconomic activities that have impact on the coastal and marine environment in the site or area. This includes primary and secondary industries, commercial and institutional establishments and utilities, fisheries, mining and forestry. Each class under this category is divided into two subclasses: inventory and production. Under inventory, basic data includes type of activity, function, location, contact details, capacity of the industry, employment (broken down into sex: male and female) and site description. For production, data includes volume and value of production/services in a given year by municipality.

3.4 Demographic Category

This category includes data on population with subclasses on census, income, vital health statistics, waterborne diseases, education,

religious affiliation and poverty incidence. Sex-segregated data, when available, should be collected.

3.5 Institutional Category

This category includes data on institutional aspects such as government, various plans related to coastal and marine areas, and sectors whose functions and jurisdiction cover the marine and coastal environment. This category stores textual data.

3.6 Pollution Sources Category

This category deals with data on sources of pollution: land- and sea-based sources. The land-based sources include industrial, commercial, household and agricultural activities. Water or sea-based sources include those from oil spills from ships, oil production platforms and chemical spills.

3.7 Monitoring Data Category

This category deals with data on parameters necessary in environmental monitoring. Classes include water quality, sediment quality, groundwater quality and tissue analysis. These are subdivided into subclasses looking at conventional parameters, heavy metals, organic chemicals, nutrients and harmful algal bloom, and criteria/standards for parameters and contaminants.

3.8 Physiographic Data Category

This category deals with oceanographic data, hydrology and geological data, which are important inputs in hydrodynamic modeling, ecological and pollutant fate modeling.

3.9 GIS Baseline Information

The IIMS can be linked with a geographic information system (GIS) in order to perform spatial analysis. Thematic maps (in scale of 1:50,000) needed in establishing a GIS are:

Administrative boundaries – shows the jurisdiction of various

administrative units such as provinces, municipalities and the smaller units.

Base map – contains geographic features used for locational reference. Roads, for example, are commonly found on base maps.

Bathymetry – a map of an ocean, sea or lake showing the contours related to the datum of the mean water sources, depicting the relief of its floor.

Elevation – shows the height/altitude above some particular level (e.g., above-sea level).

Forest cover – shows extent and type of vegetation of a forest area.

Geology map – shows the history, composition, structure and processes of the earth.

Land-use map – shows the various uses of a certain area. It is surveyed and mapped in a series of categories.

Physiography or geomorhology – shows the scientific interpretation of the origin and development of the landforms of the earth.

Remotely-sensed data/Imagery or aerial photograph of the project area – data captured through satellite such as SPOT, a French unmanned satellite orbiting the earth in the 1980s, and LANDSAT, an unmanned satellite of NASA orbiting the earth, or from an aerial photogrammetry.

River network – shows the river systems that drain into the area or bay under consideration.

Road network – shows the road network of a location.

Soil map – shows a thin surface layer on the earth; describes the type of soil for each area in the site.

Topographic map – shows contour intervals, which is the distance between two contour lines.

Zonation – shows different zoning/uses in a certain area, either in water or land.

4. Considerations in Collecting Data

4.1 Inventory Available Data

For a systematic approach in data collection, it is important to know all available data based on those described in the IIMS tables. An inventory requires the review of available data and those that could be readily acquired from government agencies in the site, academic institutions that have conducted research in the area, the private sector or commercial establishments providing or selling information. Availability of digital data would reduce time in encoding.

Check if there are existing information management systems maintained and if these are useful in IIMS based on the data they store. Determine possible linkages or mechanisms to be developed to access such databases.

4.2 Identify Gaps and Ways of Filling in Gaps

Upon completing the data inventory, identify data gaps based on the requirements of IIMS tables. Possible gaps include unavailable data from any of the agencies; or available but not organized data (as required by IIMS); or data requiring special arrangements (permits) before enabling access. Data acquisition alternatives should be identified since ease in data acquisition may vary.

4.3 Note Sources of Data

It is always important to list data sources for acknowledgment, clarification (if needed) and determining data quality. This should include author, date of data, date of publication, document title and publisher.

4.4 Consider Quality, Reliability and Timeliness of Data

Data quality determines the quality of output generated by the system. Among the ways to determine the quality of data is the identification of sources of information. If it is known, for instance, that data from a certain survey or agency is erroneous or faulty, then refrain from using the data. Search for various agencies that may be handling

similar data. Identify sources that can become basis for comparing for inconsistencies in data. One should not be satisfied with one data source. Explore all possible sources to gauge consistency of data.This is one way to determine data quality. The more consistent the data from several sources is, the better the quality of data. It is important to identify which among the data holders are reliable sources of information.

Timeliness of data is an important element and it also determines the data quality. One of the purposes of IIMS is to provide timely data for use in planning, management and decisionmaking. In data gathering, it is important to collect the most recent information. It is suggested that the IIMS database contain environmental monitoring, socioeconomic and demographic data during the last five years. Data on physiography and biological resources may be older. However, the IIMS software can store data starting from year 1900. One should be diligent in determining the timeliness of data to be gathered based on what purpose they may serve.

One way of ensuring the quality of data at the encoding stage is to ensure that the data to be encoded are correct and reliable. It is important to develop a procedure of approving data to be encoded, as well as a procedure to validate that encoded data are correct and error-free.

In generating information, a procedure for checking the outputs for dissemination should also be developed to make sure that information is acceptable in terms of data quality.

4.5 Organize Data Collection and Establish Linkages with Data Holders

In carrying out data-gathering activities, one should also consider what administrative or organizational support, e.g., staff and coordination with data holders, is needed.

4.5.1 Assignment of Staff and Delineation of Functions

It is important to organize a team and assign specific tasks among members to pinpoint responsibility and

accountability. A timetable for data gathering should be properly worked out and should be consistent with site activities requiring input from IIMS.

4.5.2 Coordination with Sources of Information or Data Holders

Upon confirmation of agencies or institutions who are holders of information, it is necessary to consider whether these agencies will be involved merely as data providers or whether a more formal linkage is required. This will determine whether a memorandum of agreement (MOA) is necessary or if data can be acquired through outright purchase. Agencies who have an existing information management system that could be used in IIMS may require a more formal link such as MOAs.

5. Classifying, Collating and Standardizing Data

While collecting data, and after the collection, the team should check the types of data they have collected so they can focus on aspects that need attention.

In preparation for data encoding, the following activities maybe required:

5.1 Sorting Data

Data should be sorted according to category/class and subclass. This is not only helpful in data encoding but also provides an indication of lacking or problematic data.

5.2 Organizing and Standardizing Data for Encoding

This deals with preparing data for encoding. This includes converting data into units of measure and level of data aggregation (e.g., city/ municipality, province or site) required by IIMS to make the data format consistent. In converting data, it is important to make a record of the conversion used for future reference.

6. Encoding Data

After organizing the data and measurement conversion has been accomplished, encoding into the IIMS software is the next step. Refer to the *IIMS User Manual* for details in encoding. Develop a procedure of approving data for encoding and validation of encoded data, such as going through a series of validation by staff with expertise in the subject matter.

7. Querying and Generating Reports

After encoding the necessary data into the IIMS encoding software, report generation can now be done. The basic steps in querying and report generation are presented in the *IIMS User Manual.*

8. Maintaining and Updating the System

Maintenance and updating of IIMS will be done by the IIMS team. Updating of the system should be done periodically or when new data are acquired. However, one should be cautious when updating and, as in encoding, quality control and protocols should also be observed. The source of information should always be noted. Facilities and accessories need to be maintained regularly.

9. Linking with IIMS within and among PEMSEA Sites

The levels of linking IIMS are:

9.1 Within a Site

IIMS workstations can be linked through a local area network. In this case, IIMS software and database reside in a server. Each workstation can access the software and database through the server. This can facilitate encoding and querying of data.

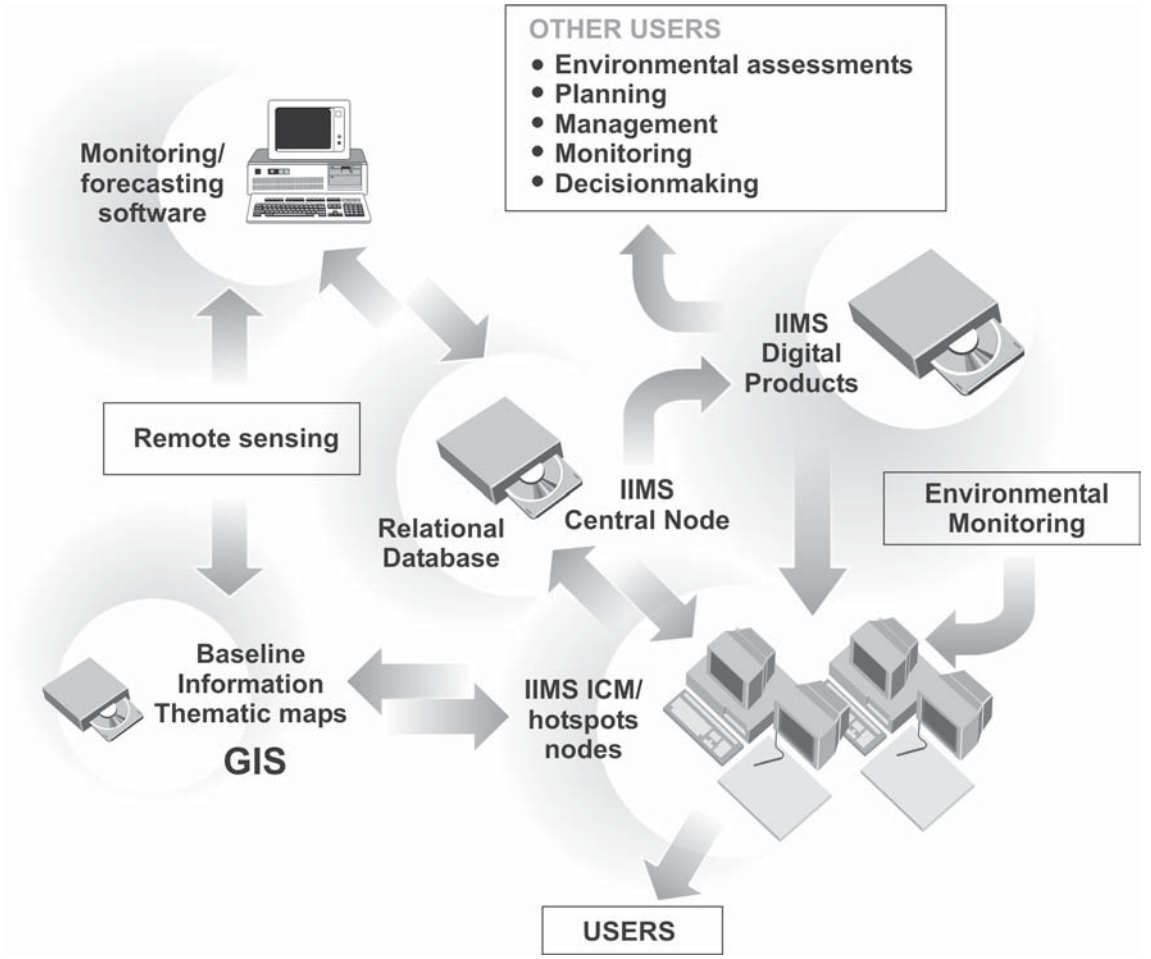
If there is more than one office maintaining IIMS, IIMS nodes can be linked through the Internet. This can facilitate updating, querying and sharing of data among the nodes through the Internet. The web-based IIMS will be employed in this kind of linking.

9.2 Between and Among Sites

This linkage can be done through the Internet. Sites can upload their respective databases in the Internet and allow access of data/information by other sites. In doing this, the confidentiality laws of each country or site should be considered. Only those data that are not confidential will be shared. Figure 4 illustrates the linkage between sites.

When linking IIMS, security and integrity of the system is one of the considerations. The use of passwords and the development of procedures or protocols are necessary steps.

Figure 4. Linkage of IIMS Nodes between and among Sites.



10. Definition of Terms

Attribute — a discrete element of data; not usually broken down into a smaller unit; it describes an entity and contain the entity's data to be stored; and it becomes a column in a table.

Data — a general term meaning the numbers, facts, letters and symbols processed by a computer or a communication system to produce information.

Database — an organized collection of related files or tables for a common purpose.

Entity — something in the real world that is represented in a data model and about which data must be stored. It is a basic building block in a data model.

Information — data transformed into form and content relevant to a particular situation.

Instance — a particular occurrence of an entity.

Many-to-many relationship — A relationship between two entities in which one instance in the first entity can be related to many instances in the second entity, and one instance in the second entity can be related to many instances in the first entity.

One-to-many relationship — A relationship within a single entity in which one instance in the entity can be related to many instances in the same entity.

Primary key — an attribute selected as a unique identifier of a row in a table. Usually, it is one or more of the attributes of an entity that uniquely distinguishes that entity.

Relational database — a database consisting of relations or tables.

Relational database management system — a software that organizes, manipulates and retrieves data stored in a relational database.

Annex

IIMS Entry Forms and Data Requirements

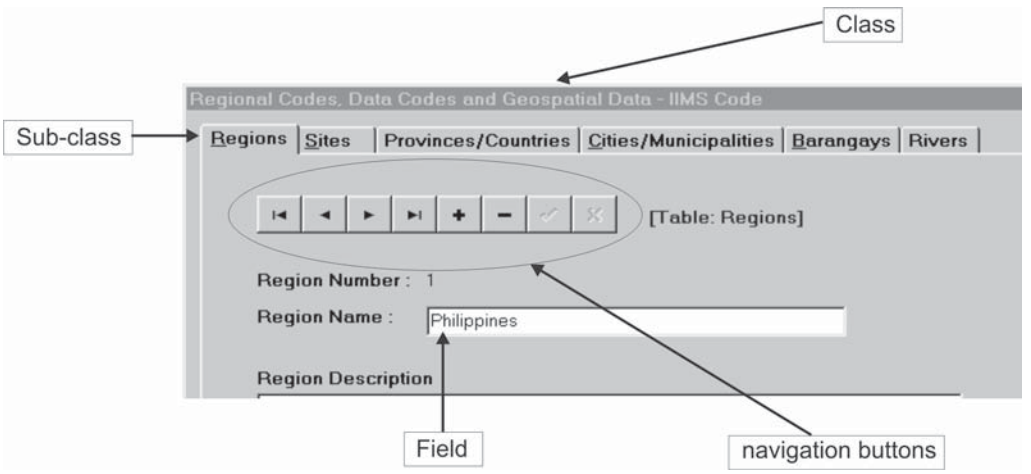
Introduction

This section describes the various data forms and data requirements of the IIMS encoding software. The forms will guide data administrators, researchers and encoders in data collection and encoding. Specifically, the forms provide:

- guide in data collection, collation and standardization. IIMS requires eight major categories of data. The forms will specify these categories and data required, including format, unit of measure and precision for each datum.

- screening mechanisms in encoding data. IIMS encoding software requires particular format of particular datum. Once the format is different, IIMS encoding software will not accept the data. For instance, the format for date should be year, month and day or for time, in hour and minutes (military time, e.g., 23:59).

The figure below shows the basic contents of a form:



The following sections show the classes and subclasses of each data category. Where necessary, data required in some fields are explained. For some, data sources are also indicated. The data description, format and precision are described in this document. The uses of some data are emphasized so that the systems administrators and technical staff would know their significance in coastal and marine management.

Every bit of data/information contained in the IIMS could be used in various activities in coastal and marine management. Studies or results of those activities will form part of a decision-support system that guides policymakers and decisionmakers come up with concrete actions. It is therefore important to collect data and complete the forms are much as possible.

Regional Codes, Data Codes and Geospatial Data Category

This category contains data on IIMS regions and sites, rivers, bodies of water, data classifications, geospatial data and maps. All categories of data under IIMS are linked with this category. It is advised that tables in this category be filled-in first before proceeding to other categories.

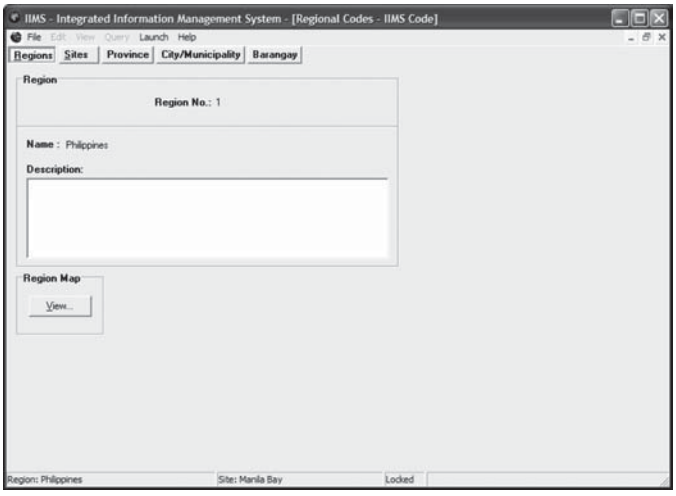
Regions, Sites

Regions

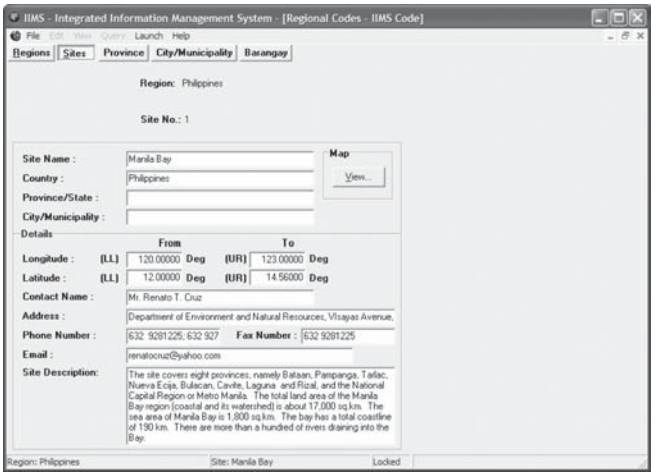
For convenience in handling data, the Seas of East Asia is divided into the following IIMS regions:

- Philippines
- Indonesia
- Malaysia, Thailand and Cambodia
- South China
- Bohai/Yellow Sea
- DPR Korea
- Vietnam
- Malacca Straits

The region subclass is a listing of the above-mentioned regions. Only the RPO can update this table. All sites have read-only copies.

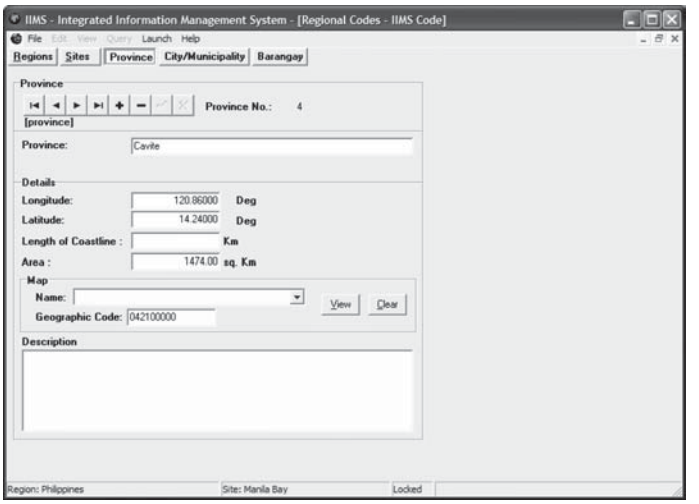


Sites refer to ICM and pollution hotspot sites. A region can contain more than one site (e.g., the Philippines has three sites: Batangas Bay ICM demonstration site, Manila Bay pollution hotspot and Bataan ICM parallel site). Each site maintains its own IIMS node. This table contains site description common to all data tables pertaining to a demonstration site. The site is linked to the regional table with a region number.



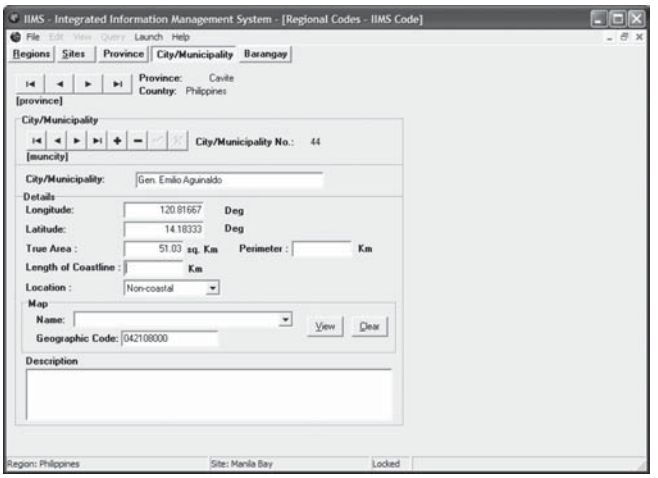
Provinces/Countries requires input on the description of provinces/ countries covered by a site. A geographic code is needed to be able to link with a geographic information system.

In some countries, the census agency usually uses code in every level of administration such as provinces, municipalities/ cities and villages. These codes can be used if they are also used in GIS. In

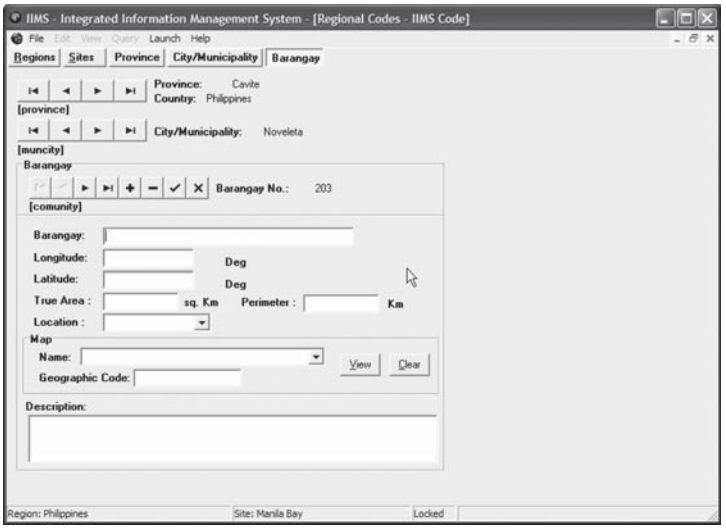


the absence of codes, any eight alphanumeric characters could be designated/assigned as code. Maps required should be encoded under the class 'maps'.

Cities/Municipalities requires data on municipalities in a certain province. The map must be encoded under class **Maps**. Location describes whether the city or municipality is located in a coastal or non-coastal area.

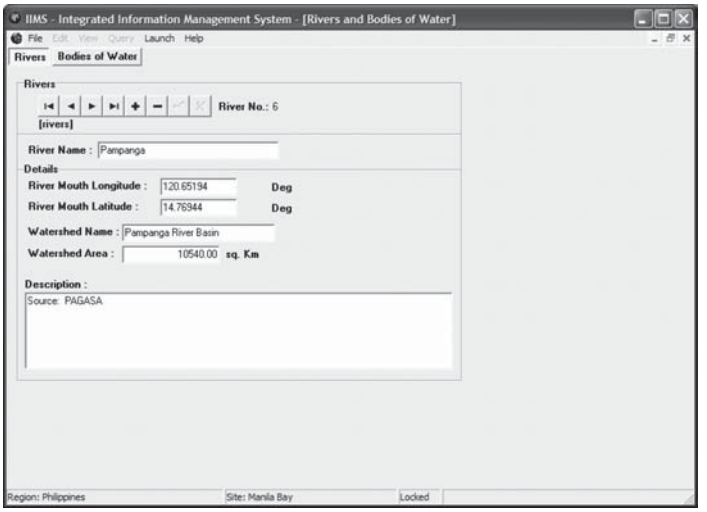


Community or Smallest Administrative Unit refers to the description of the smallest administrative unit in a certain municipality or city, often called a district or a village. It is called a *barangay* in the Philippines, a *kecamupaten* in Bali, and a *quan* or *huyen* in Danang. Data required are similar to those of the municipalities and cities. This can be customized in 'grouping' under the data classes.

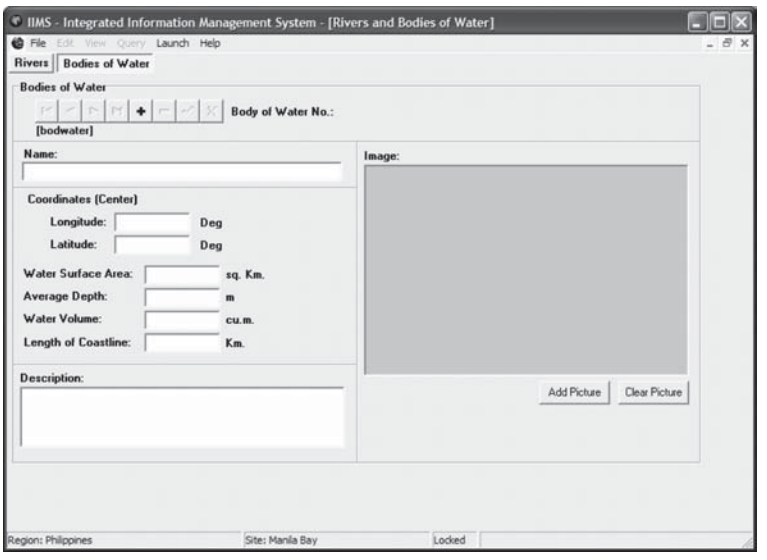


Rivers and Bodies of Water

Rivers contains data on rivers found in the specific site. The location of the river mouth is expressed in longitude and latitude (decimal degrees). (See format under geospatial data). Watershed name refers to the area that drains into the river. Data encoded in this form will be used under pollution sources/river pollution and physiographic data category for river stream flows.



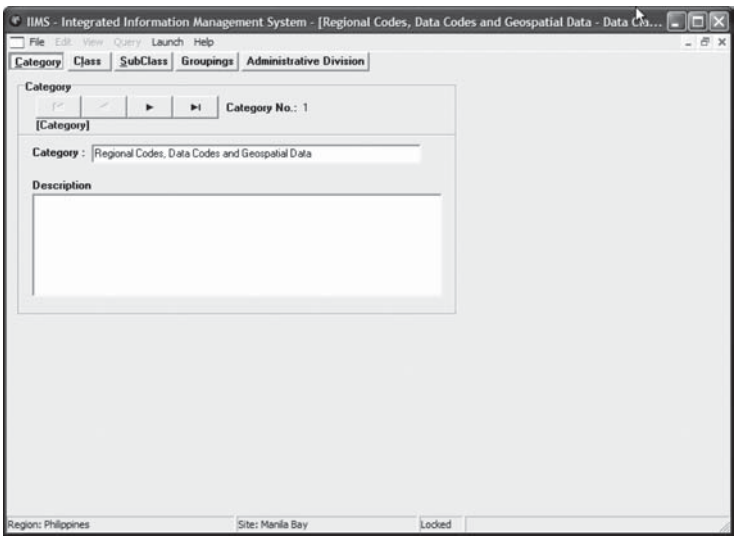
Bodies of Water describes the bodies of water that are found in the site such as bays and lakes, but excluding rivers.



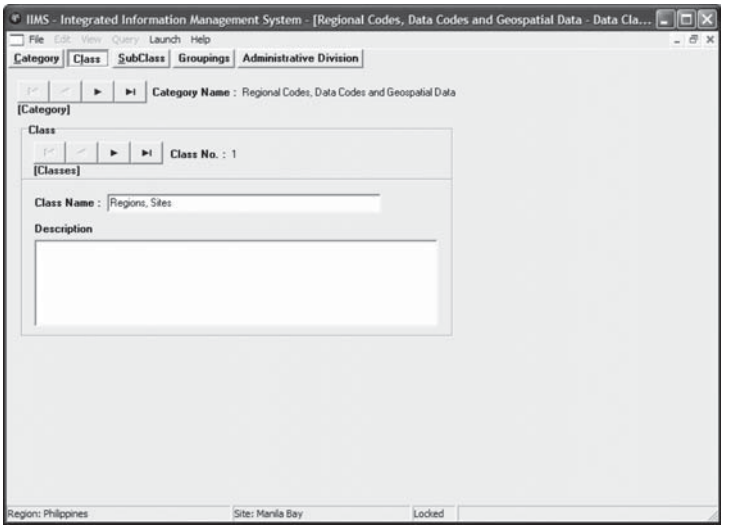
Data Classes

Category refers to the various data that are contained in the database. There are nine categories namely:

- Regional codes, data codes and geospatial data
- Biological and bioresources data
- Demographic data
- Socioeconomic data
- Institutional data
- Pollution sources data
- Monitoring data
- Physiographic data
- Model data inventory (for some versions only)

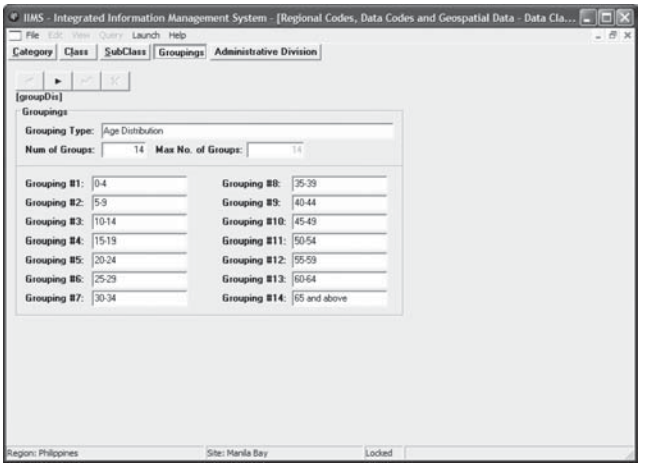


Class and subclass are the sub-categories of data classified according to nine categories of IIMS. IIMS consists of 41 classes and 202 subclasses. This form maintains the integrity of the system and formats, units of measure and precision of data. Only the RPO can edit this form.



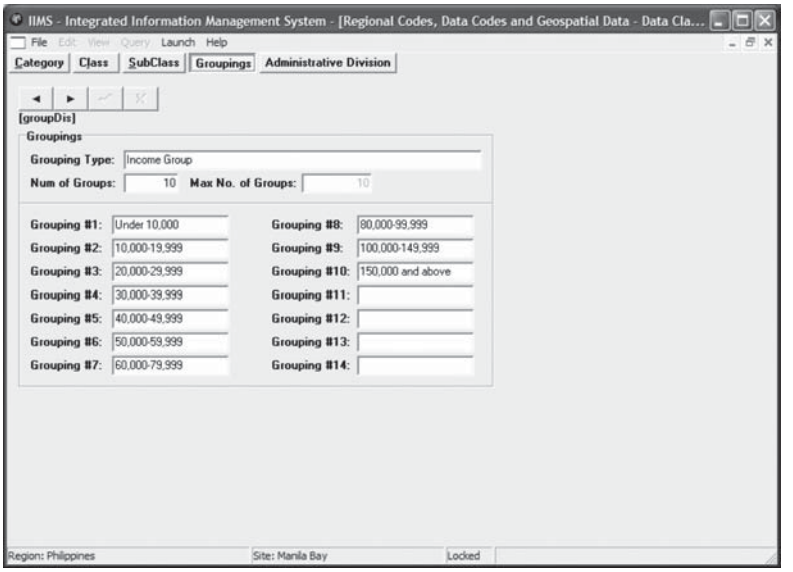
Groupings

Age Distribution refers to the age ranges used in census tables. Each site or country uses different age ranges. For instance, Manila Bay and Bali use the same ranges while Danang uses a lesser number of age ranges but wider ranges between age groups. This table has to be populated before populating the tables in the demographic category.

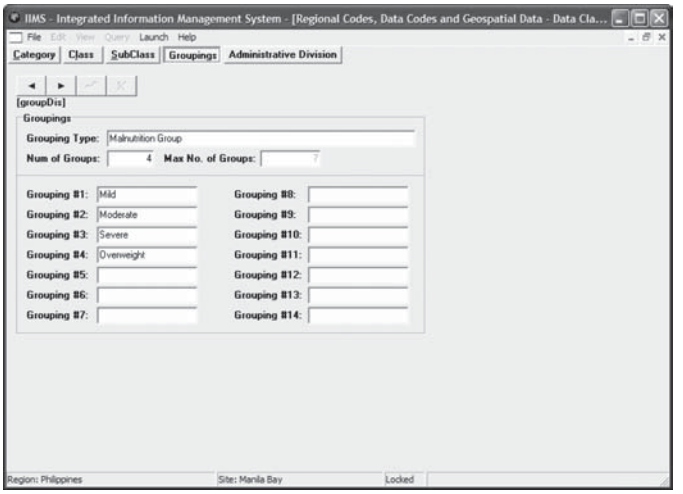


Income Distribution

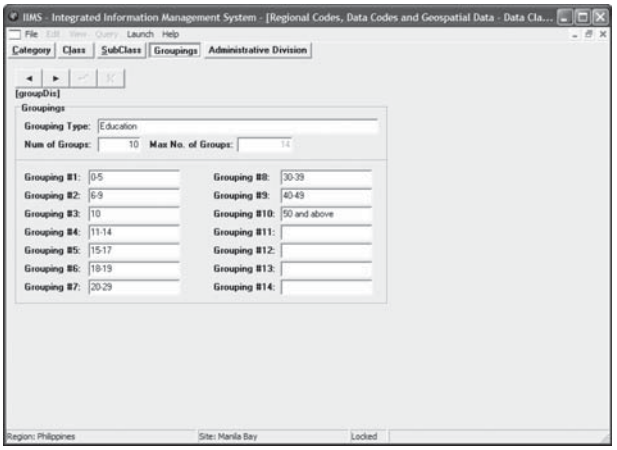
Income ranges are identified in this form to classify income per household in a given area. This should be filled in first before the table on income distribution.



Malnutrition refers to the classifications used in describing the status of malnutrition in a site.

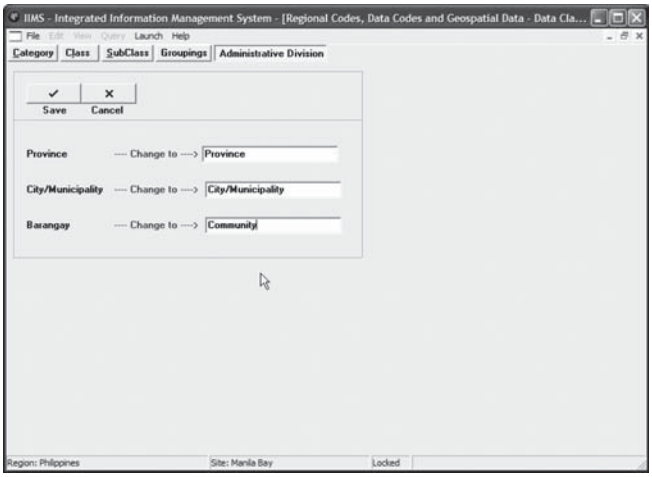


Education refers to the age groups of male and female population per level of education.



Administrative Division

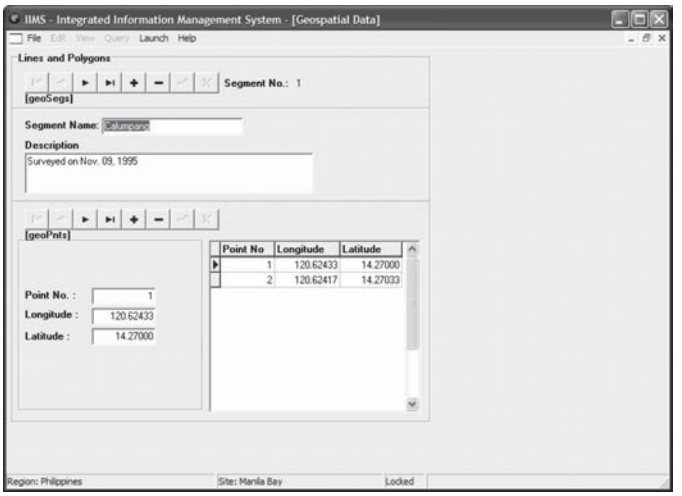
The hierarchy of administration (the level of administration) is usually the basis for determining the level of aggregation of data to be encoded. For instance, by default, census data are at the community level. However, if the site has no data at the community level, it may opt to encode the data at the municipal or city level. The lowest level of administration should then be changed to municipality.



Geospatial Data

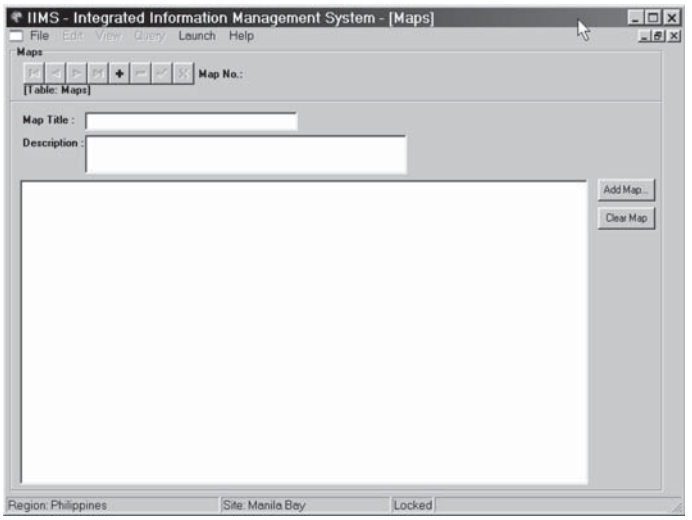
Lines and Polygons includes segments or areas where surveys were/are to be conducted. This requires technical descriptions of the area or the segment. Data from this form are required in other forms such as those in the biological and bioresources category.

Longitude and latitude are expressed in degrees: with negative values for S and W and positive values for N and E. If a coordinate is given in degrees, minutes and seconds, it needs to be converted to degrees with up to four decimal places.



Maps

This form allows the storing of images of maps into the system. A short map description is required. Descriptions may be limited to those not contained in the map. Source(s) of the map must be included in the description. The file format of maps/ illustrations to be added in this form should be in bitmap or jpeg, with jpeg being more advisable since smaller spaces are occupied compared to bitmaps.



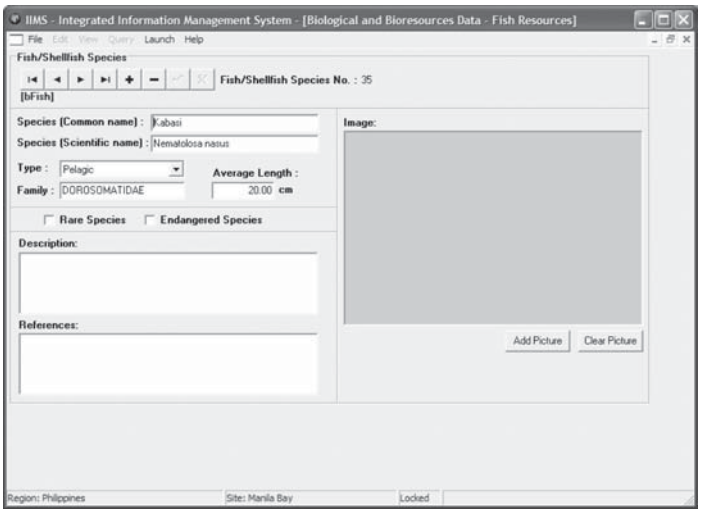
Biological and Bioresources Data Category

The biological and bioresources category describes what habitats and biological resources are present in the site. This category includes coral reef, fish and shellfish resources, benthos, wetlands, plankton, aquaculture, seaweed, seagrass, and forest resources. Results of surveys concerning resources and habitats, types of species and their abundance and area covered are some of the data that can be captured under this category.

This category requires data on the various habitats and resources that are available in the area. The data that will be generated under this category are used for environmental profiling, risk assessments, SEMP formulation, resource valuation and studies in biological resources. Changes over time in terms of distribution and abundance of species can also be recorded in this category.

Fish and Shellfish Resources

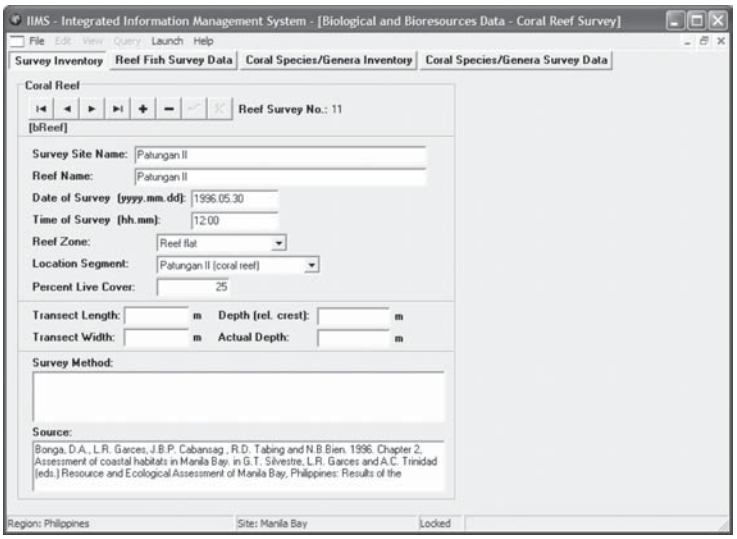
Fish and Shellfish Species requires inputs on species name (common and scientific), type (demersal or pelagic), family, average length, production (capture or non-capture), picture and morphological description. This table is linked with various tables in the socioeconomic and monitoring data categories and with coral fish and capture fisheries survey tables/forms.



Coral Reef

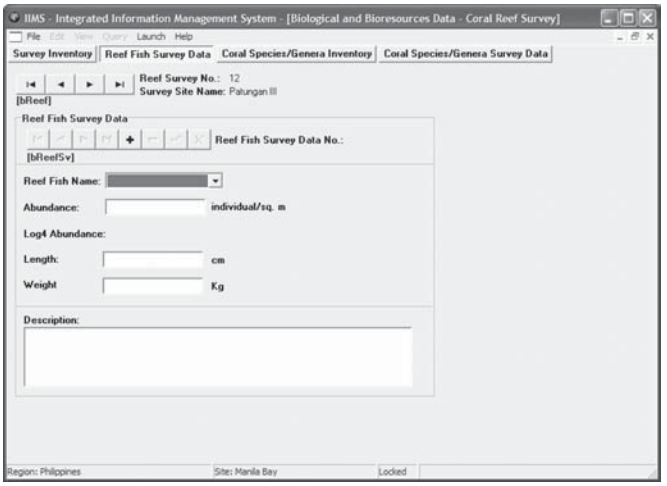
Survey Inventory includes information such as location, date of survey and survey methods used. Reef zone can be a reef flat, crest or slope.

The location segment is the area where the survey was conducted. This is encoded into the geospatial data form under the category on region and sites.

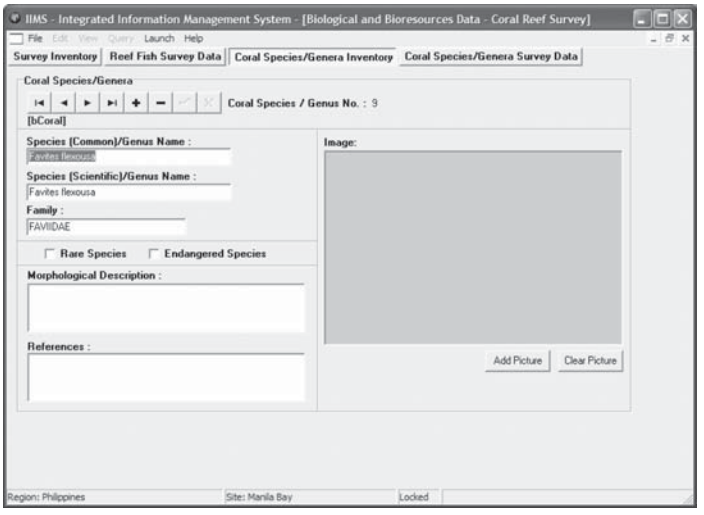


Reef Fish Survey Data

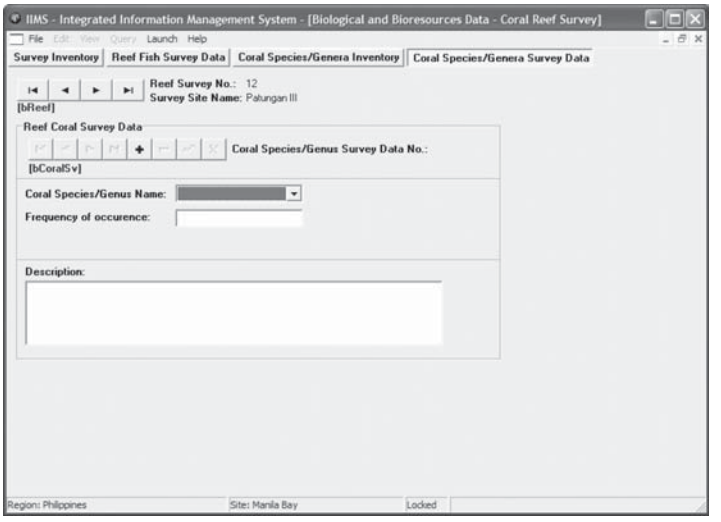
Information on coral reef fish species found within the location segment under 'survey inventory' can be included here. Included in the form are information on abundance, length and weight of a reef fish species. The length is either total or forked length. Use the total length if species have a pointed, rounded and truncated caudal fins. Total length is the measurement from the snout to the end of the caudal fin. Fork length is the measurement from the tip of the snout to the shortest median caudal ray.



Coral Species Inventory lists the genera of corals species, if available, that were observed during the survey inventory. This form requires name of species (scientific and common name) if available, or genus, family, morphological description and a picture. If the common name is unknown, input the scientific name or genus instead.

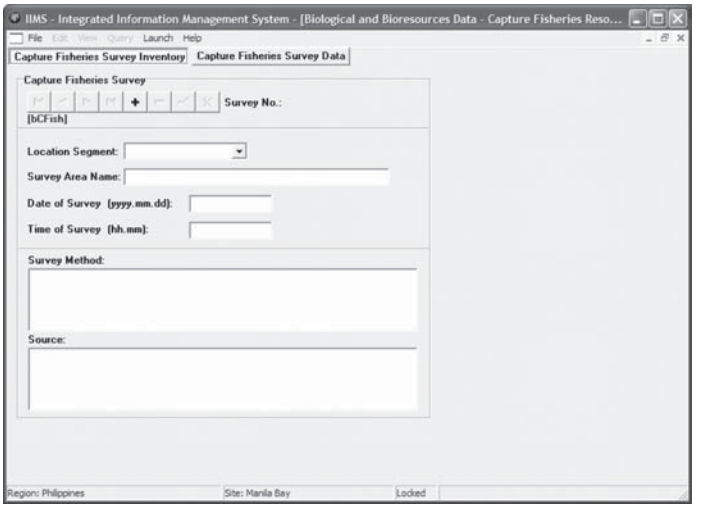


Coral Species Survey Data provides information on abundance and frequency of occurence of the species within the surveyed area or location segment.

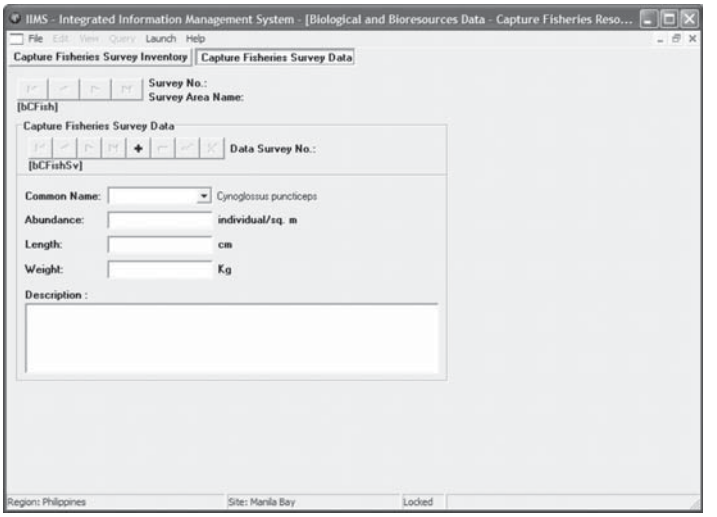


Capture Fisheries Resources

Capture Fisheries Survey Inventory provides information on the survey of capture fisheries in the site. It requires the location segment (encoded under Region: Geospatial class), date and time of survey, and methods used.

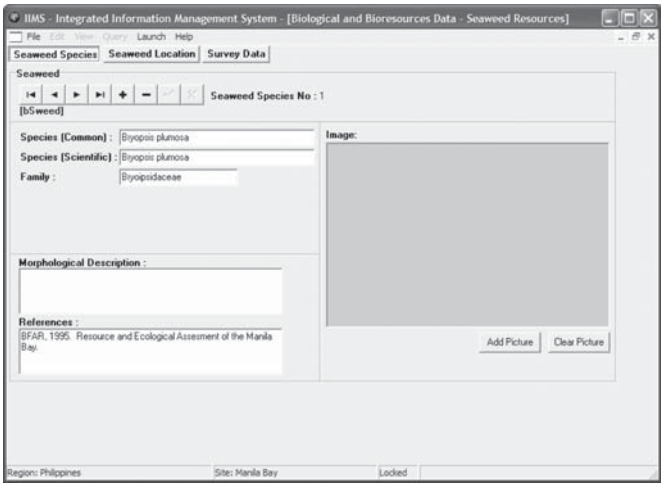


Capture Fisheries Survey Data lists the various finfish species that are observed in the survey, including their abundance, average length, weight and other descriptions.

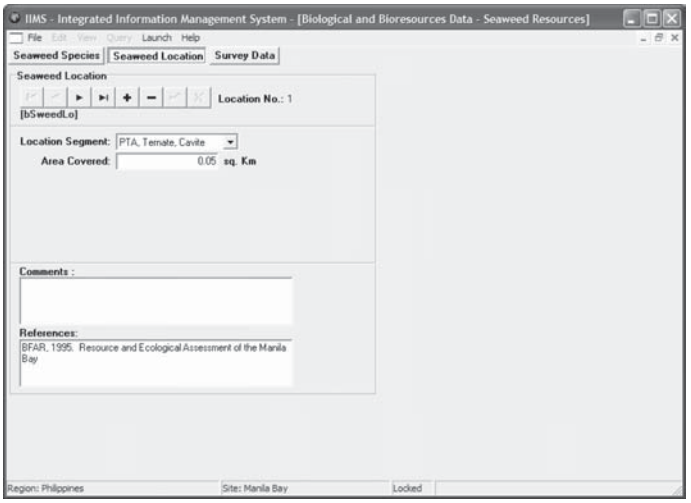


Seaweed

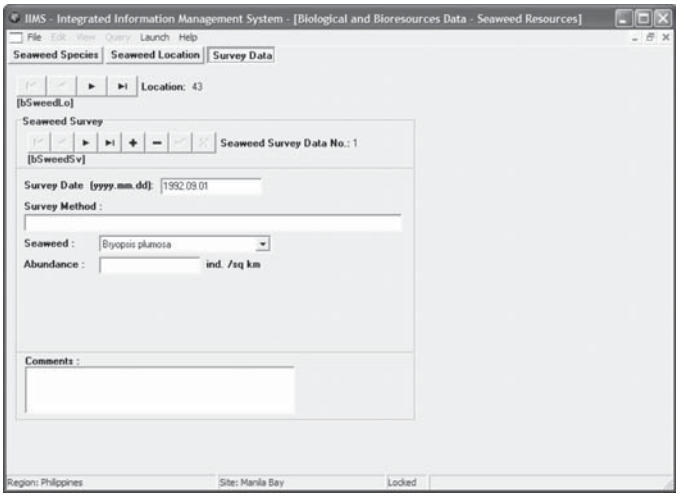
Seaweed Species and their respective morphological descriptions are encoded in this form. A picture for each species is required.



Seaweed Survey Location includes information regarding the survey location conducted to assess seaweed resources. The location segment is encoded in the entry table for geospatial data.



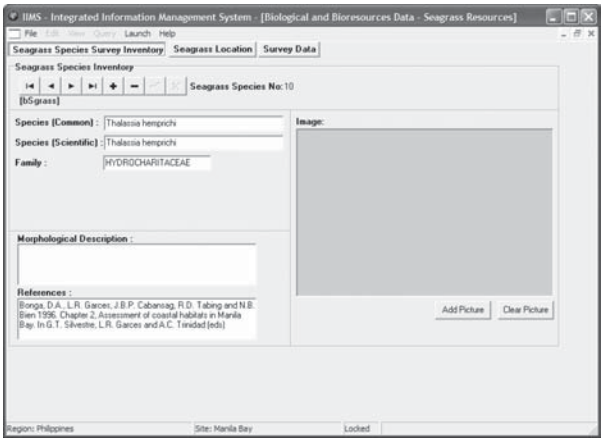
Seaweed Survey Data provides information on the survey of seaweed species, area covered and percent cover.



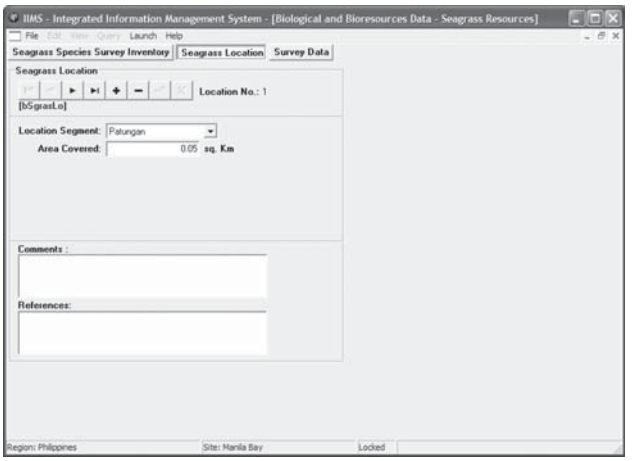
Seagrass

Seagrass Species

Seagrass species/genus and their respective morphological descriptions should be encoded in this form. A picture for each species is required.

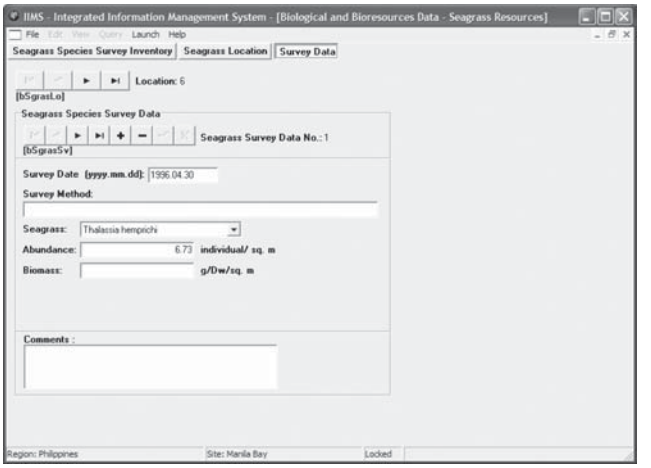


Seagrass Survey Location includes details from an assessment undertaken. The location segment is encoded in the entry table for geospatial data.



Survey Data

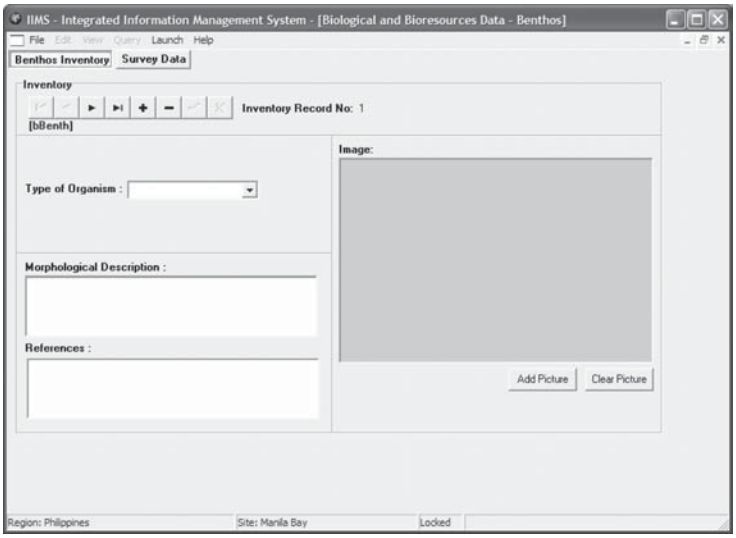
Fields for information on seagrass species, their abundance and biomass acquired during the survey should be placed in this form.



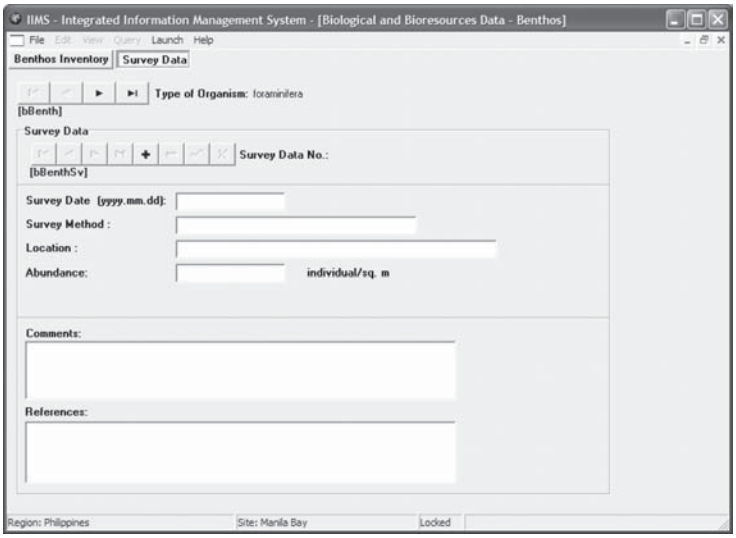
Benthos

Benthos Inventory provides information on the types of benthos in the site. Benthos are classified as:

- foraminifera
- crustaceans
- mollusca
- sipuncula
- polychaeta
- ascidinus
- bryozoa
- sponges
- cnidaria
- echinoderms



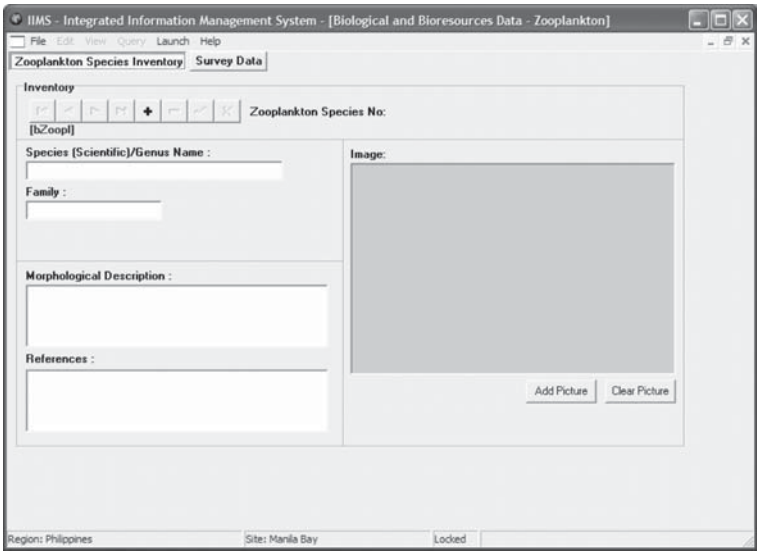
Survey Data provides details on each type of organism found in each survey. Information on survey data and location, abundance for each type or organism are required.



Zooplankton

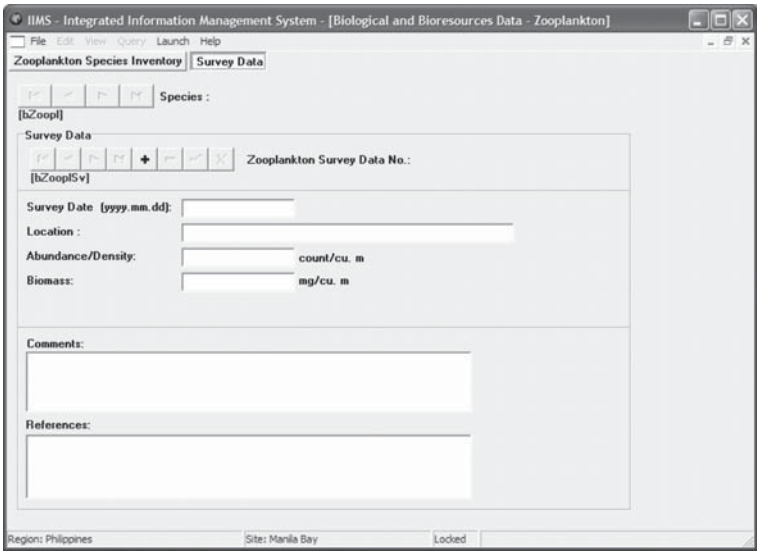
Zooplankton Species Survey

Information on various species of zooplankton can be encoded in this table.



Survey Data

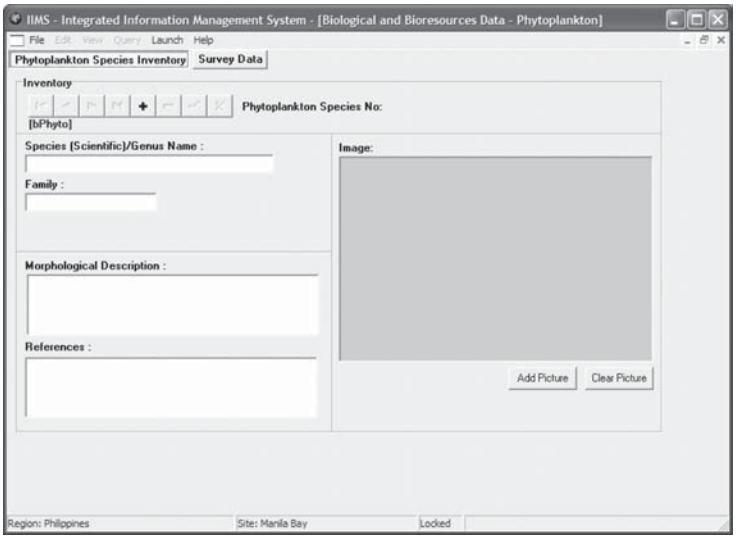
Information on each species based on surveys conducted, as well as other details should be included in this form.



Phytoplankton

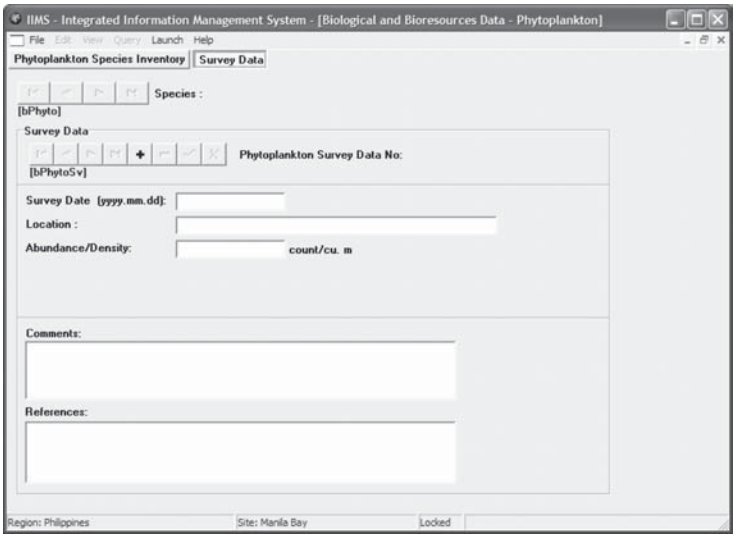
Phytoplankton Species Inventory

Details on various species of phytoplankton in the site are required in this form.



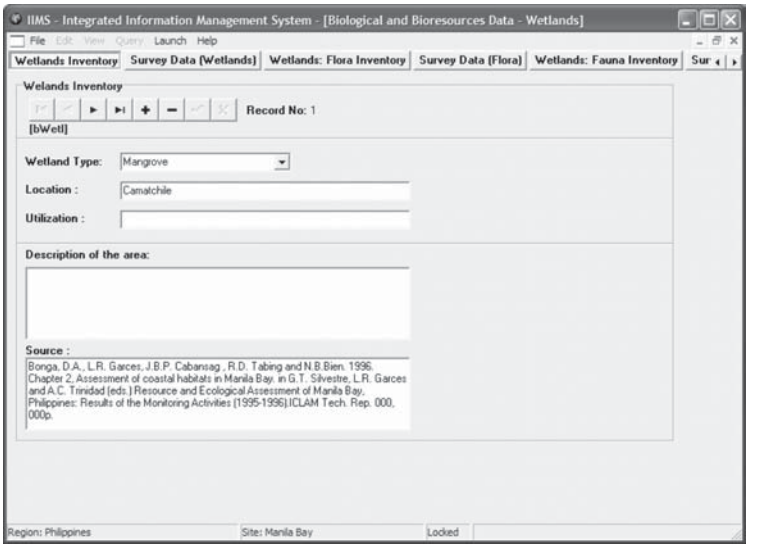
Survey Data

Information on each species based on surveys conducted should be provided in the form.



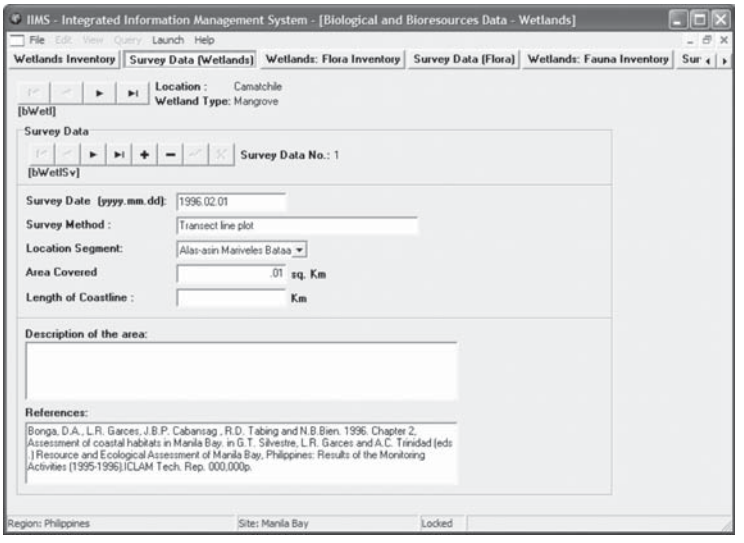
Wetlands

Wetlands Inventory details the area, coastline occupied by coastal wetlands (swamp, mudflats, mangrove, beach, etc.) and other data in the site.

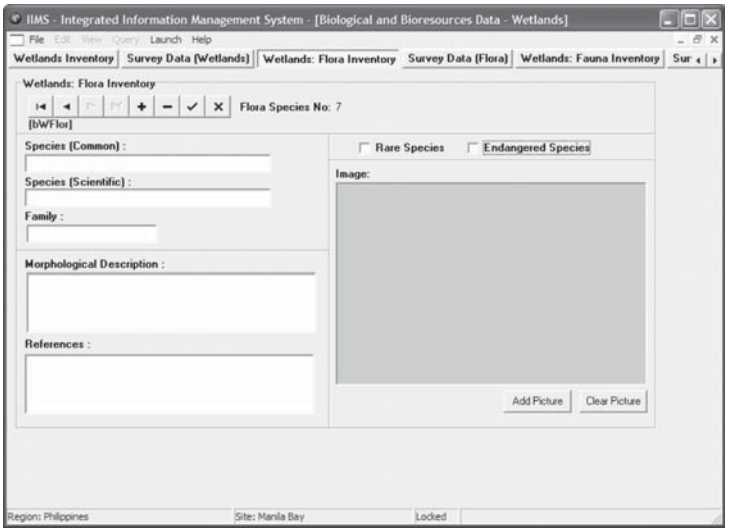


Survey Data

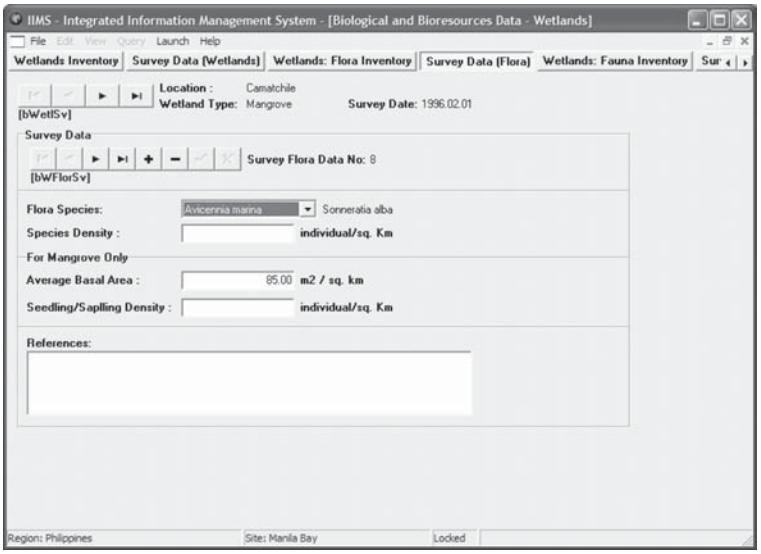
Details on the area and length of coastline, survey methods, description of the area and references should be provided in survey data form. If wetland type is mudflat, include the depth of the mudflat.



Flora Inventory stores the name of various plants found in a given wetland. The details required include name of species (common and scientific), family, morphological description and picture.

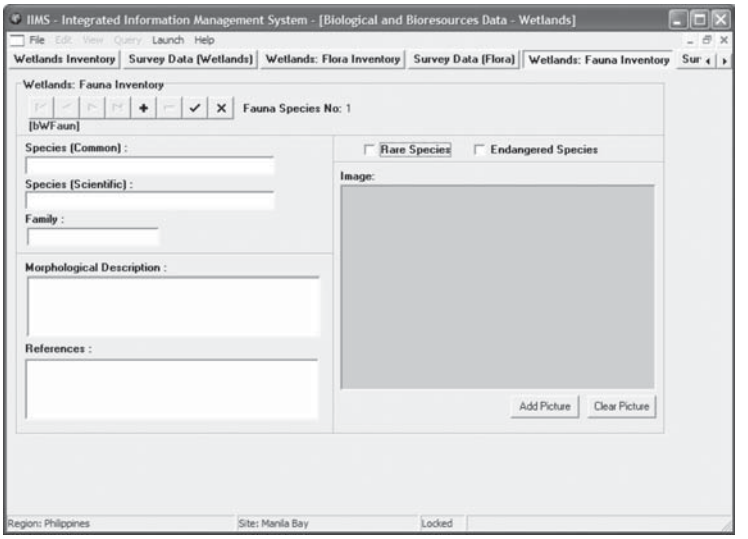


Flora Survey Data can store the stocking or density of species in a given area. If the wetland type is a mangrove, average basal area of each species, stocking of seedlings/saplings and a description of the stand are required.



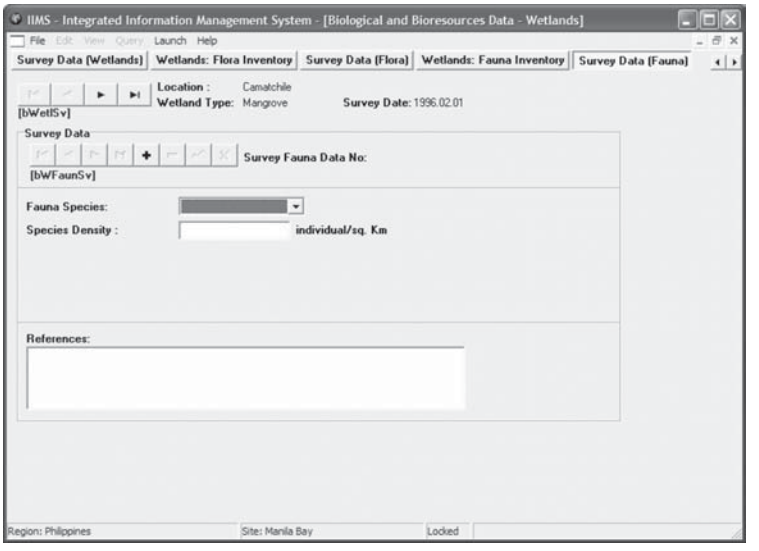
Fauna Inventory

Details on the fauna found in a given wetland, such as name of species (common and scientific), family, morphological descriptions and pictures, should be included in this form.



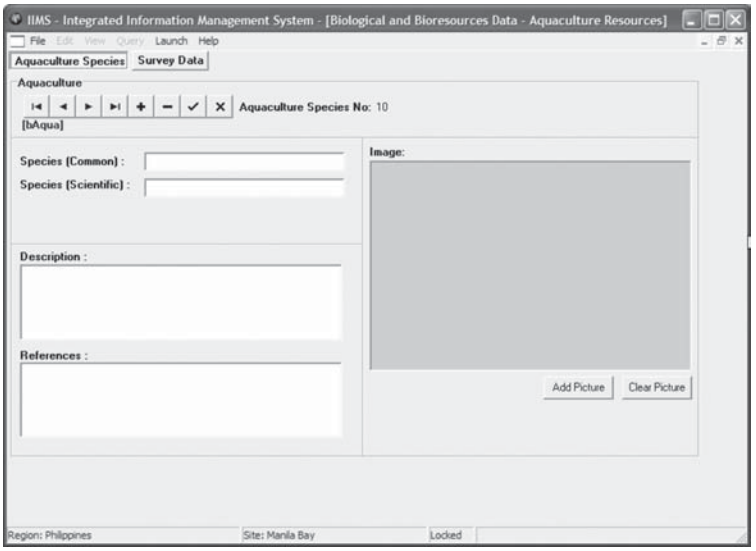
Fauna Survey Data

The density of certain species of fauna in a given area and the survey methods used are the data required in this table.



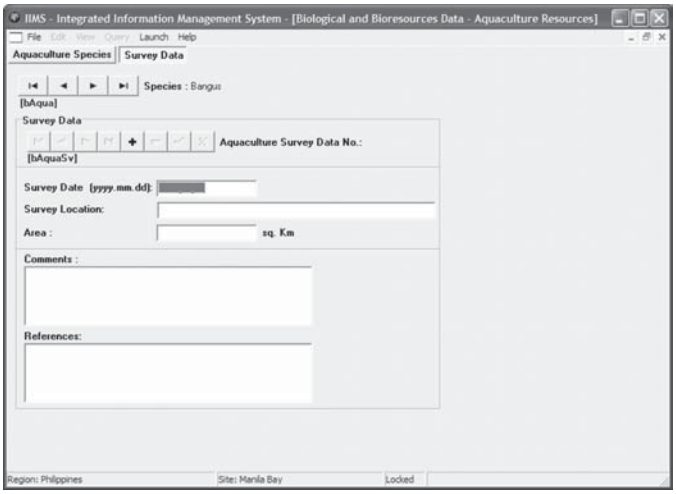
Aquaculture

Aquaculture Species can contain information such as the name of species (scientific and common) grown in an aquaculture farm, morphological descriptions and a picture of each species.



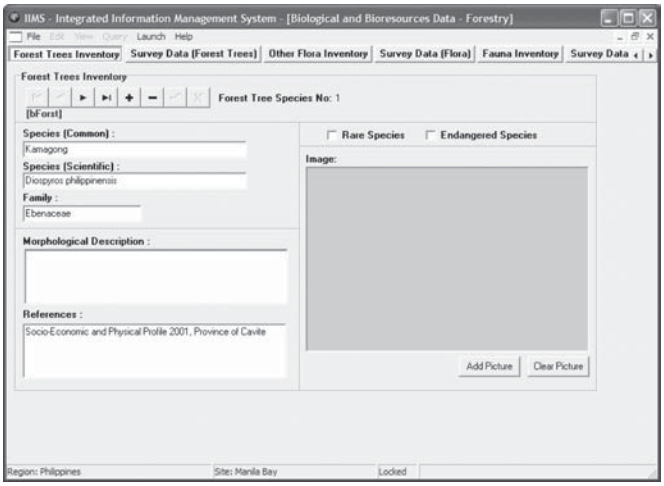
Survey Data

Required information on each species grown in an aquaculture farm include survey data, location, area and abundance.



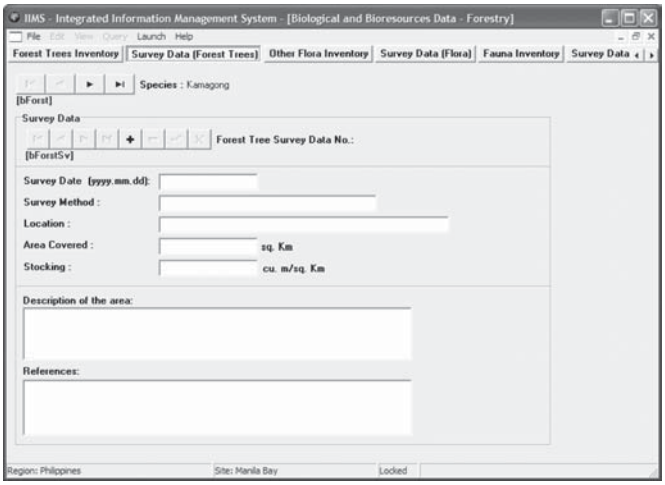
Forest

Forest Inventory requires information on the forest tree species and other forest species (e.g., rattan) within the site, including species name (scientific and common), family, morphological descriptions and also picture. For the picture, show leaves, bark, flowers and fruits rather than the whole plant itself.

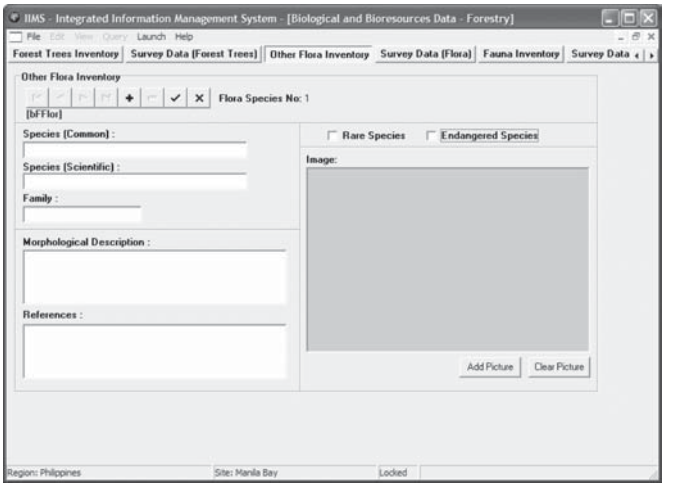


Survey Data (Forest Tree Species)

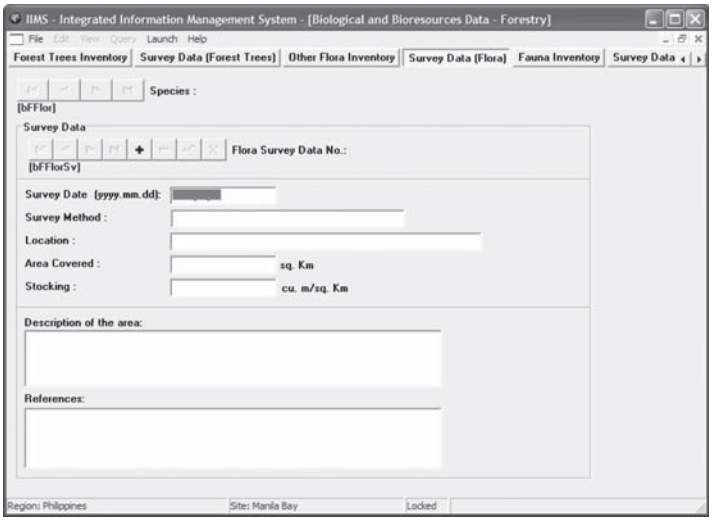
Data on survey conducted for each species should be filled in in this form.



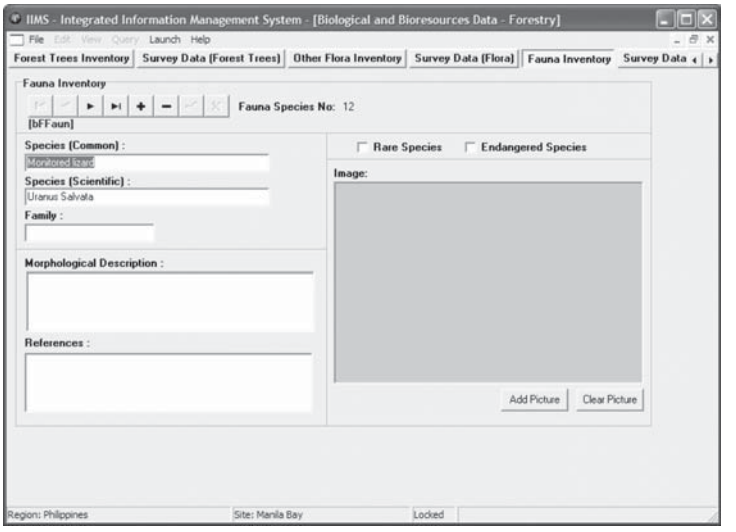
Other Flora Inventory provides information on survey conducted for each species.



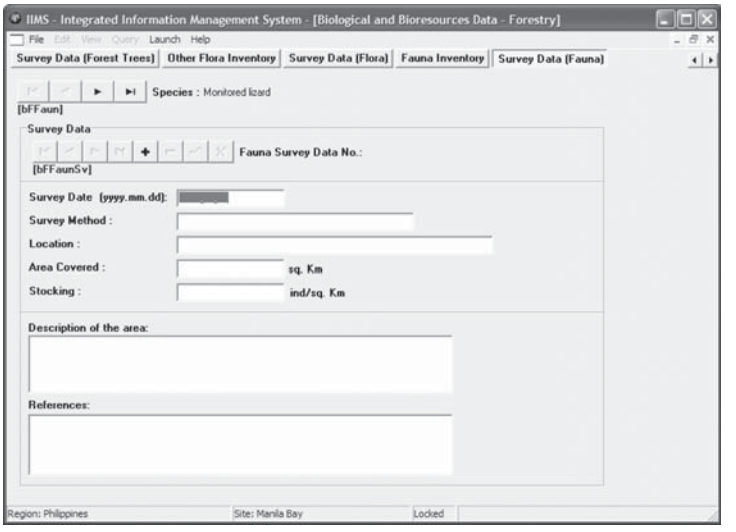
Survey Data (Flora) contains data on the survey conducted for each species in a given area.



Fauna Inventory lists the fauna species found in a given area along with details of the species.



Survey Data (Fauna) contains the survey conducted on fauna found in the area, inducing other details.



Socioeconomic Category

The category contains data on various socioeconomic activities that have impact on the coastal and marine environment in the site or area. This includes industries, commercial and institutional establishments and utilities, fisheries, mining, forestry and tourism. Each class under this category is divided into two subclasses: inventory and production. Under subclass inventory, basic data include type of activity, function, location, contact details, capacity of the industry, employment (broken down by sex: male and female) and site description. For subclass production, data includes volume and value of production/services.

The data formats under this category are indicated in the forms. The data precision (number of decimal places) is as follows:

- Two (2) for weight in metric tons (e.g., 12.25 metric tons);
- Two (2) for value in local currency and in dollar (e.g., PhP200,000.75 or US$2,000.50);
- Four (4) for longitude and latitude (120.9028 degrees, 14.5526 degrees); and
- The sex ratio (number of female per 100 males) is expressed in whole number.

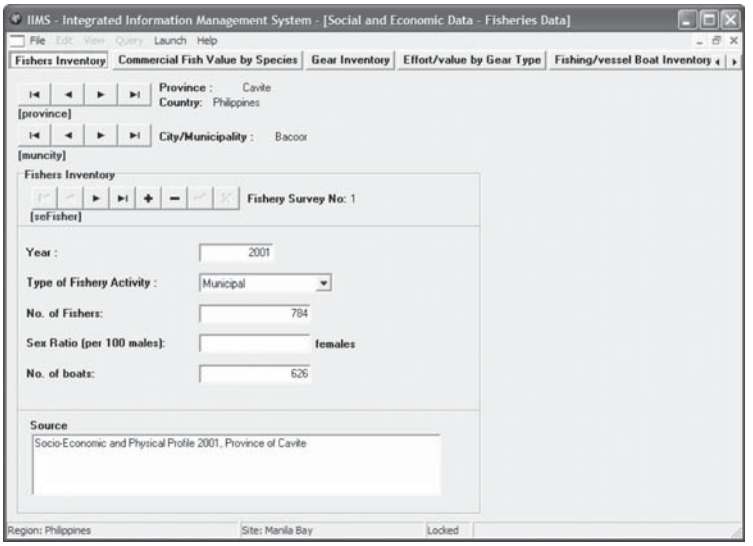
Most of the forms deal with inventory and value of production. For inventory forms, there are listings of activities, facilities, employment records and contact details. Product value deals with weight/volume and monetary values of the products.

The source of information is necessary since this is an indicator of data integrity and quality, and is a useful reference in the future.

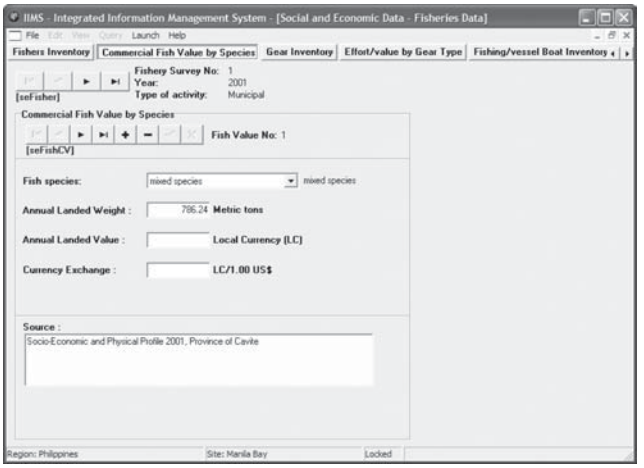
Information in this category can be used in environmental profiles, risk management, coastal strategies, resource valuation and cost-benefit analyses.

Fisheries

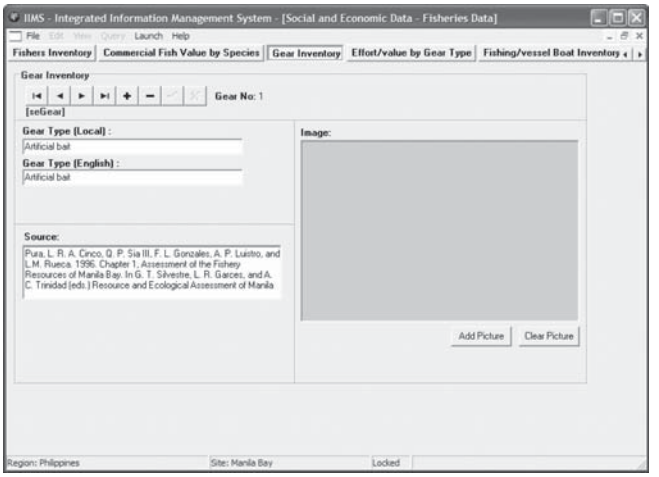
Fishers Inventory by Year and Type of Fishery Activity requires data on fishers in a certain site. Types of fishery activities include sustenance (fishing using personal and manual skills, which are often resource-oriented), commercial (large scale) and municipal (small scale). The sex ratio is expressed as the number of females per 100 males.



Fisheries Production by Species requires data on the annual landed weight and value of certain fish species.

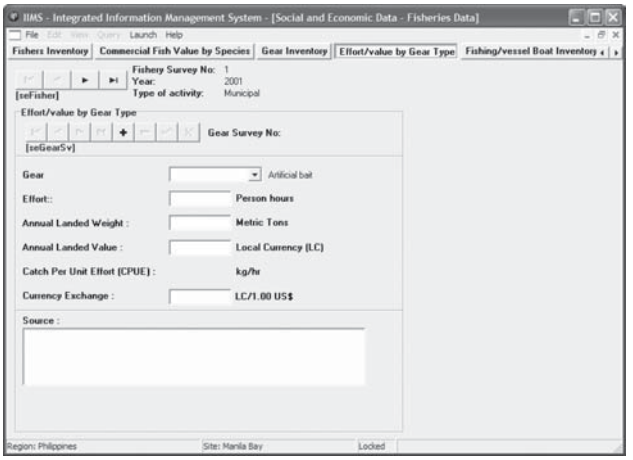


Gear Inventory requires data on the various gear types (local and English name, if any) and an illustration.



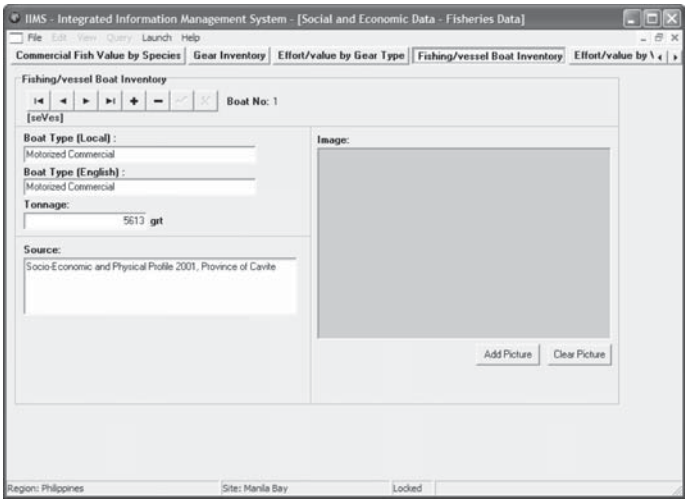
Fishing Production by Gear Type

Data required in this form include average fishing effort of a person (in person-hour) during a given year. The catch unit per effort (CPUE) is generated by the system once fields for fishing effort and annual landed weights are filled in. Currency exchange rate refers to average currency exchange rate for the given year.



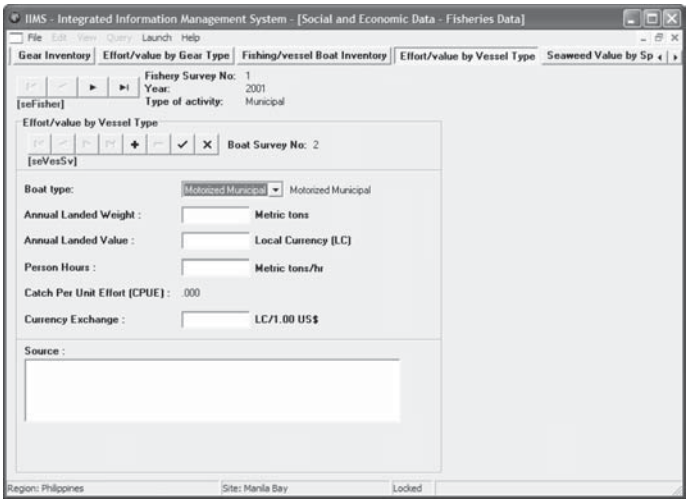
Fishing/Vessel Boat Inventory

Fishing vessels/boats operating in the area are listed in this form, as well as their capacity in terms of gross tonnage.

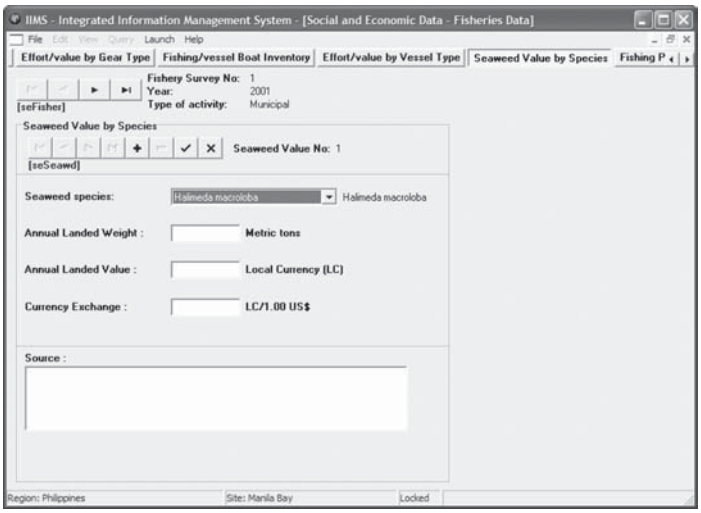


Fishing Production by Vessel Type

The boat types are those encoded in the fishing vessel/boat inventory form. This form describes the annual landed weight and value for each boat type per year.



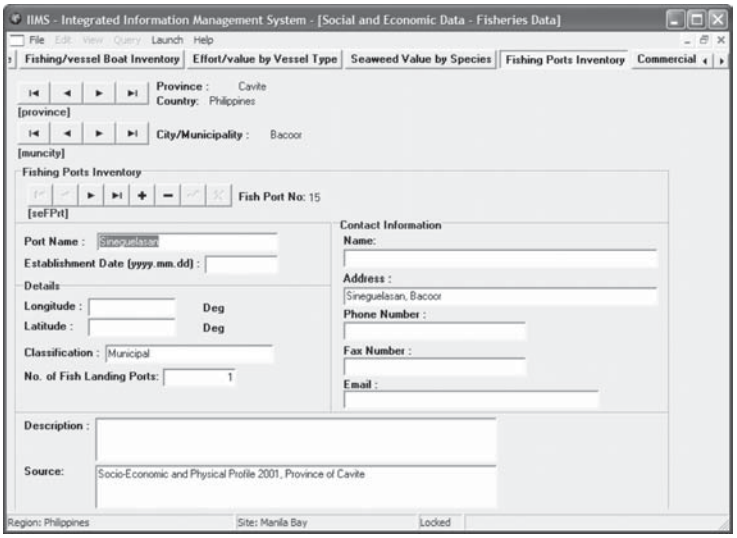
Seaweed Production by Species describes the annual landed weight and value of seaweed harvested in the site.



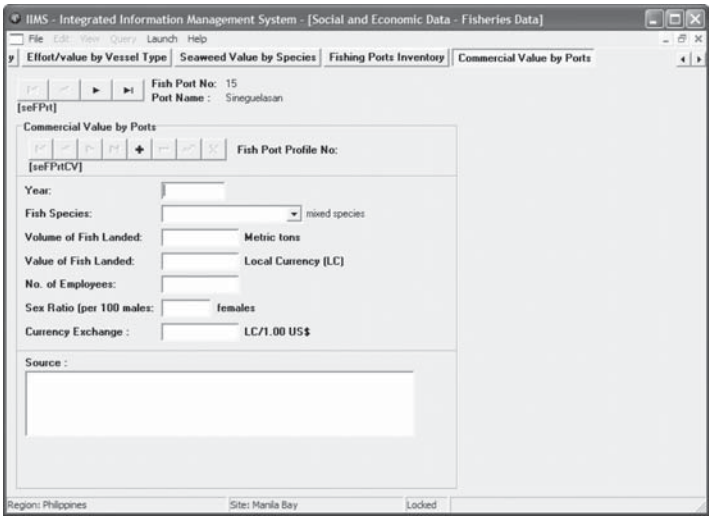
Fishing Port Inventory

The various fishing ports, with vital information for each port, in a given coastal municipality are listed in this form.

Classification of port refers to regional fish ports and municipal fish ports, although other countries may have variations of this classification.



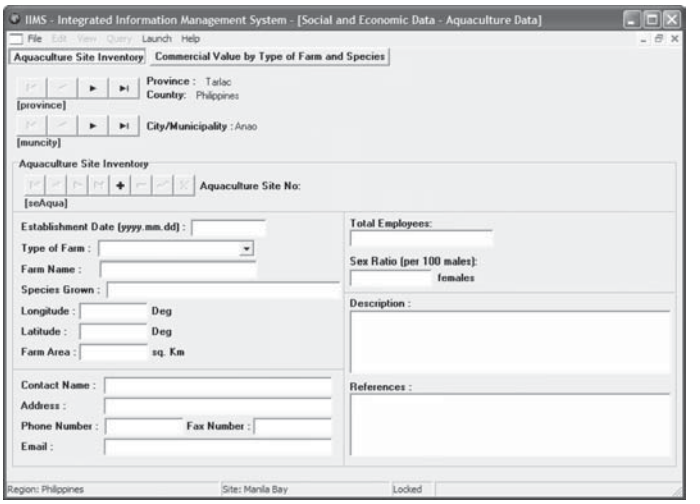
Commercial Value by Ports refers to the value and volume of fish landed in a fish port along with employment records.



Aquaculture

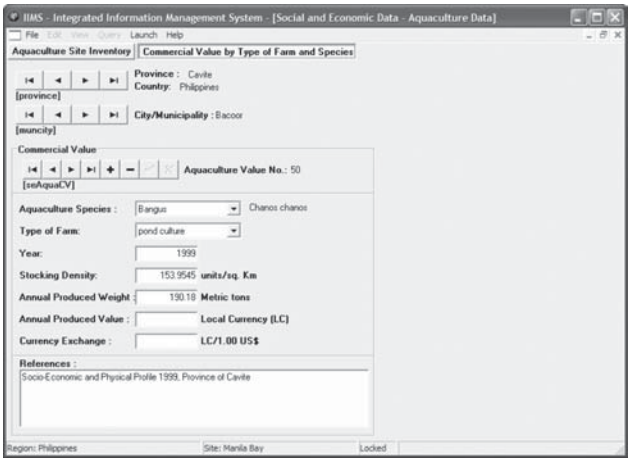
Aquaculture Site Inventory

Aquaculture farms in the area are listed in this form. Type of farm refers to the production methods, (e.g., pond culture, floating cage, hatchery or tank farm). Other specific data are also required.



Commercial Value by Type of Farm and Species refers to the annual production and value per aquaculture species and type of production per municipality or city.

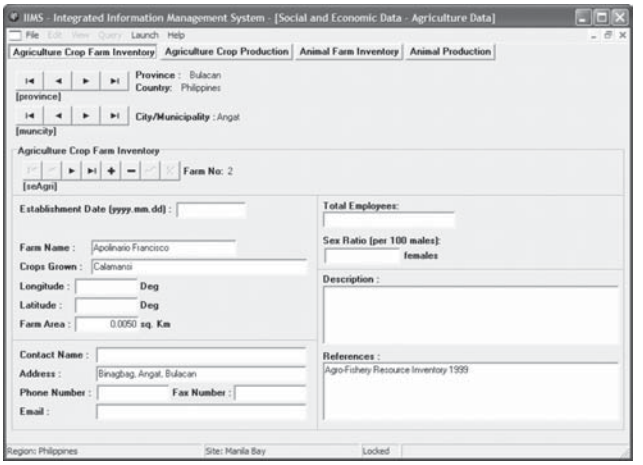
Stocking densities per type of farm are as follows: pond culture – metric ton/km^2.; floating cage – metric ton/km^2; hatchery, number of fry/sq. m.; tank farm – kg/m^3.



Agriculture

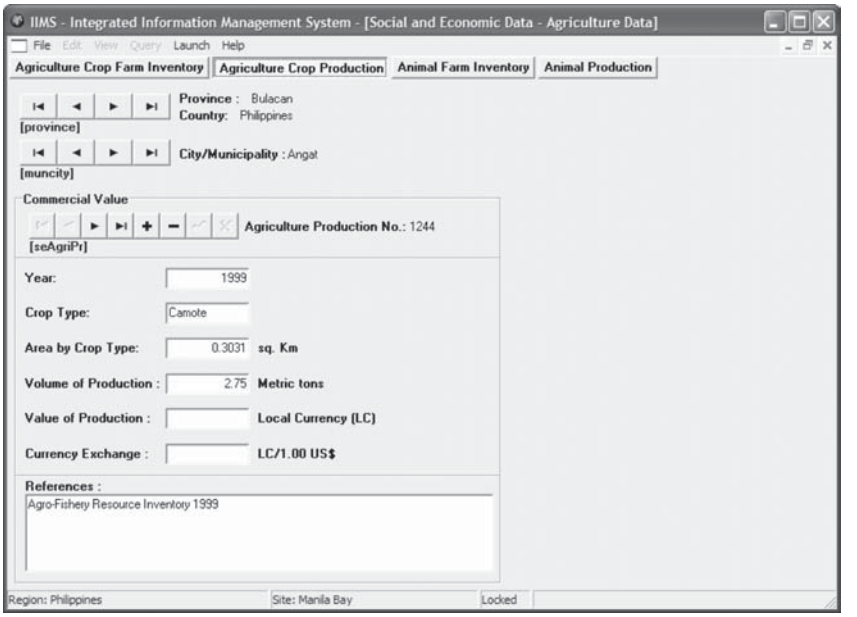
Agriculture Crop Farm Inventory

Information on each crop farm, species grown and contact details can be provided in this form.

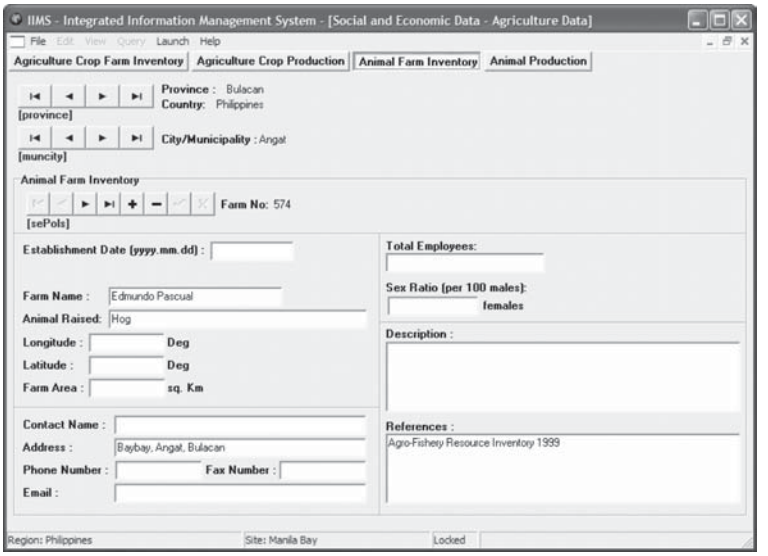


Agriculture Crop Production refers to the volume and value of agricultural crop production per type of crop per municipality. Crop type refers to the crop grown, such as rice, corn, sugarcane or other crops. Area of crop by type refers to the area devoted for growing rice, corn, sugar or any type of crop.

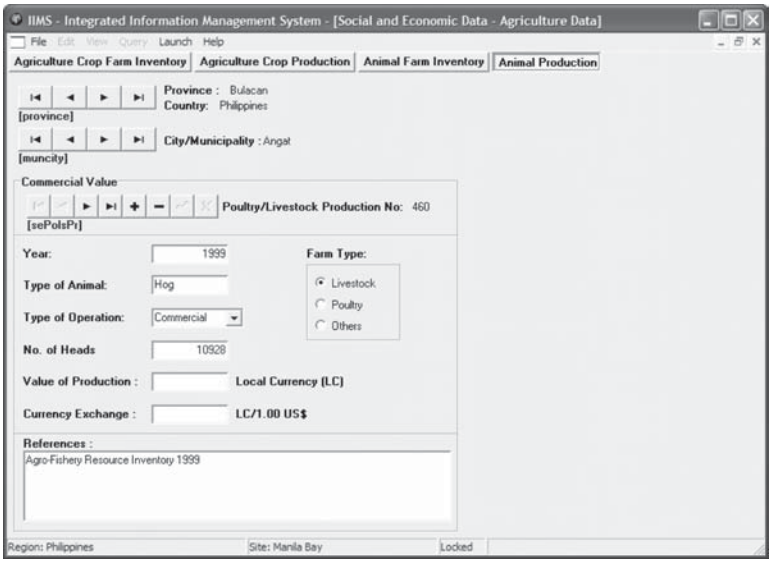
If crop rotation is being practiced (with the area being used for different crops, rotated after every harvest), the total area for all the crops will then be higher than the total area of the farm. A note should then be written in the reference field.



Animal Farm Inventory is for data on animal farms in the area.



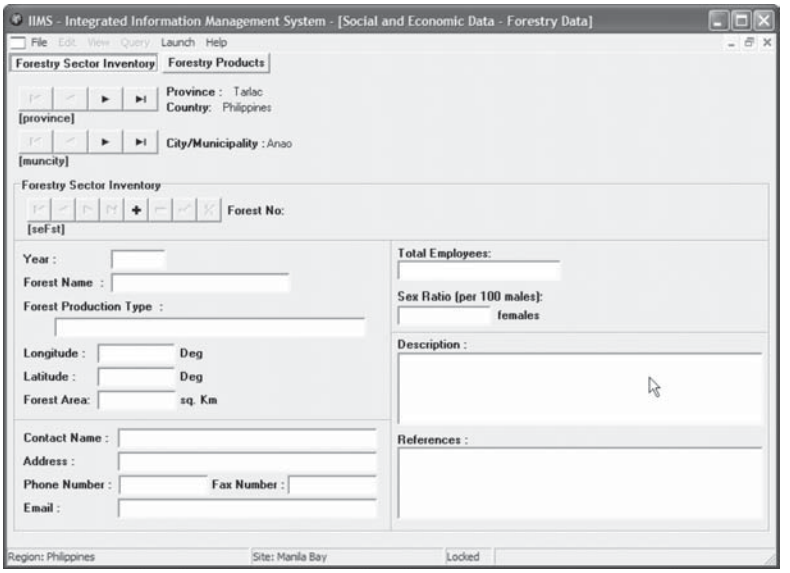
Animal Farm Production contains the value and volume of production by type of animal produced in a certain municipality.



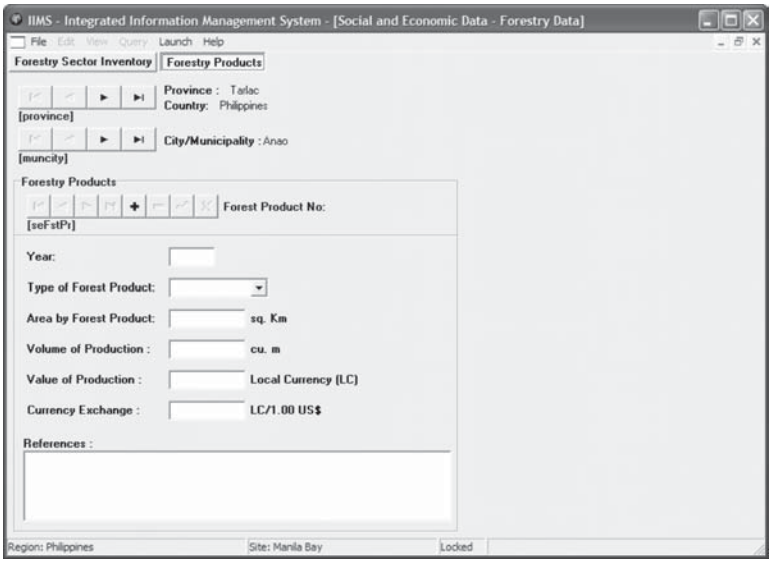
Forestry

Forestry Sector Inventory

Location, area and type of forest product in a given municipality are some of the data required in this form. The forest production type may include timber and non-timber products.



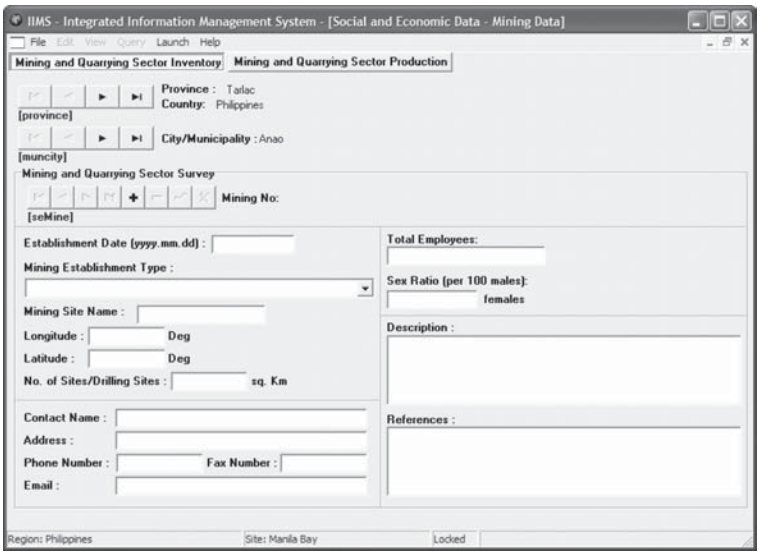
Forestry Products include data such as value and volume of a certain forest product per year per municipality.



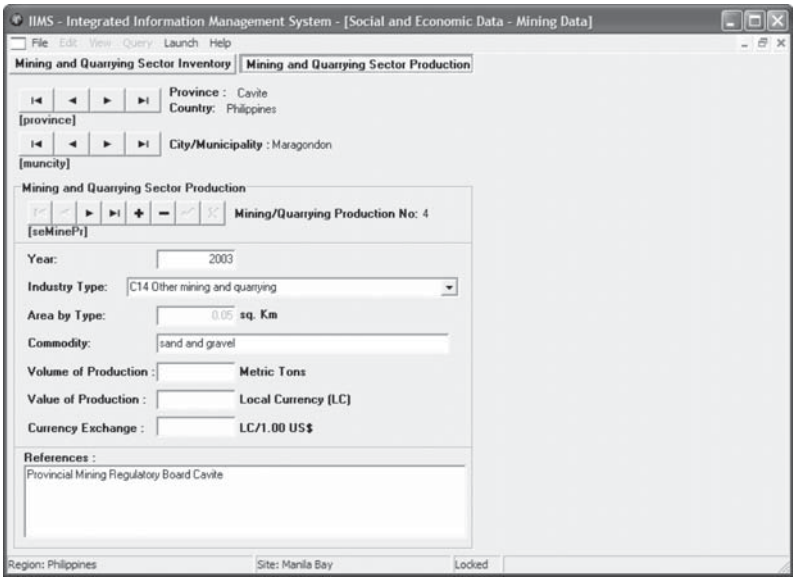
Mining

Mining and Quarrying Sector Inventory contains various data on mining establishments in a given municipality. Mining establishments are classified in accordance with the International Standard Industrial Classification (ISIC). These are:

C10 Mining of coal and lignite; extraction of peat
C11 Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction excluding surveying
C12 Mining of uranium and thorium ores
C13 Mining of metal ores
C14 Other mining and quarrying

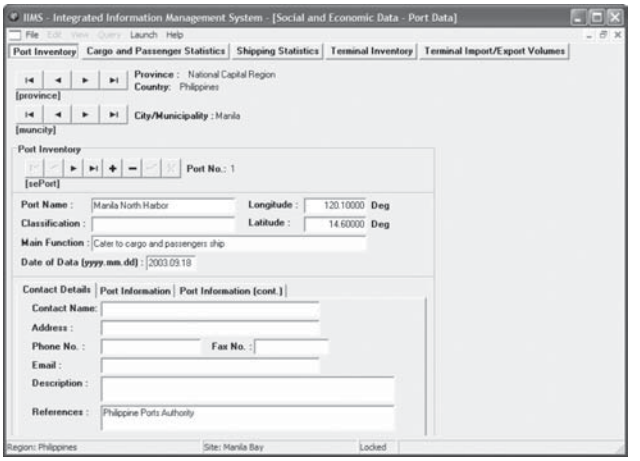


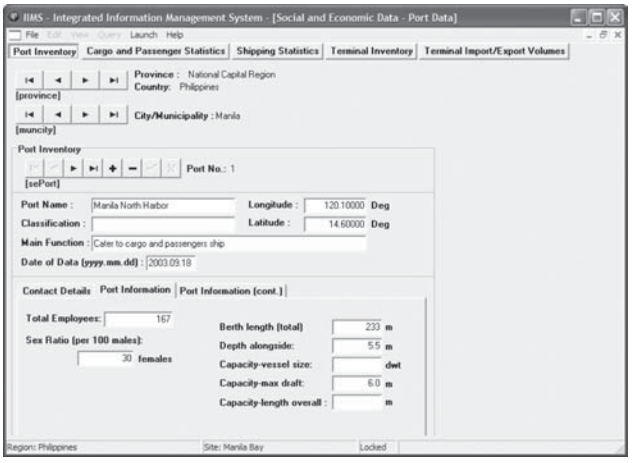
Mining and Quarrying Sector Production lists the value and volume of production in the mining and quarrying industry. The unit for extraction of crude oil is in barrels, while natural gas is in m^3.

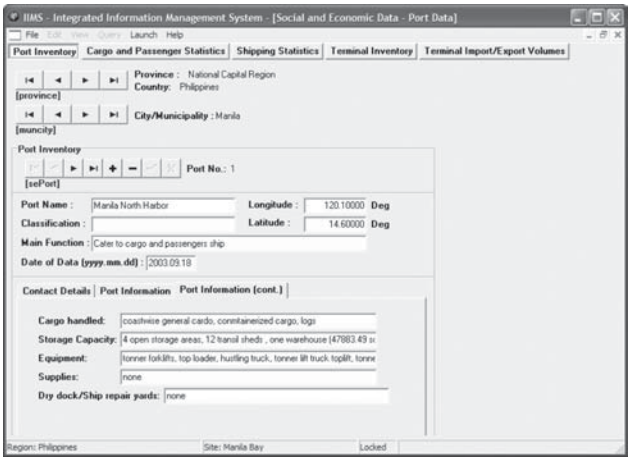


Ports

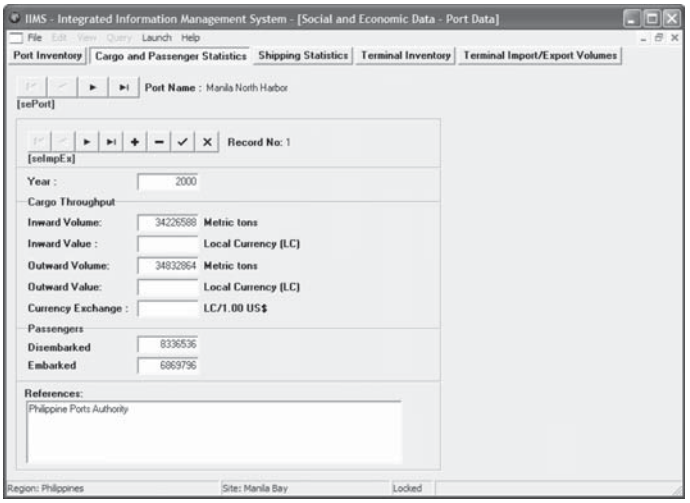
Port Inventory is for listing public and private ports and their descriptions as shown in the entry forms.



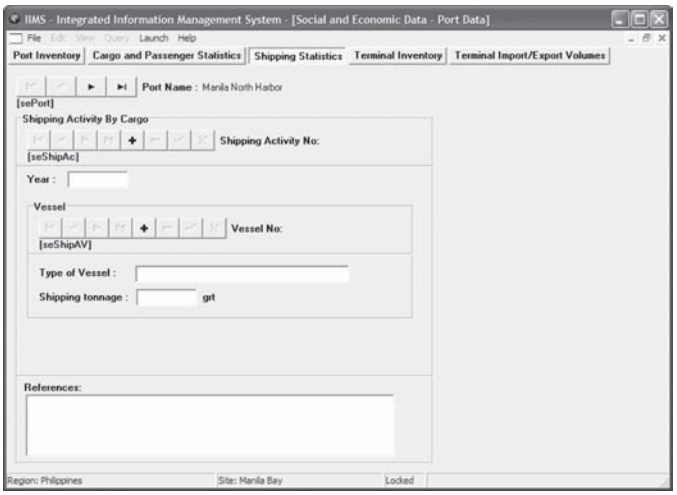




Cargo and Passengers Statistics pertains to annual cargo throughput and passengers statistics in a given port.

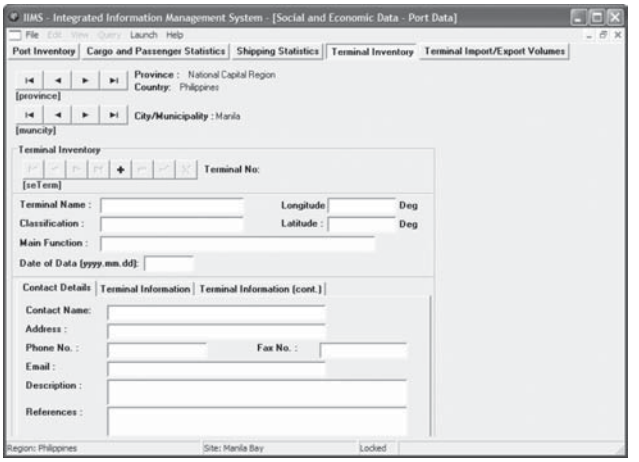


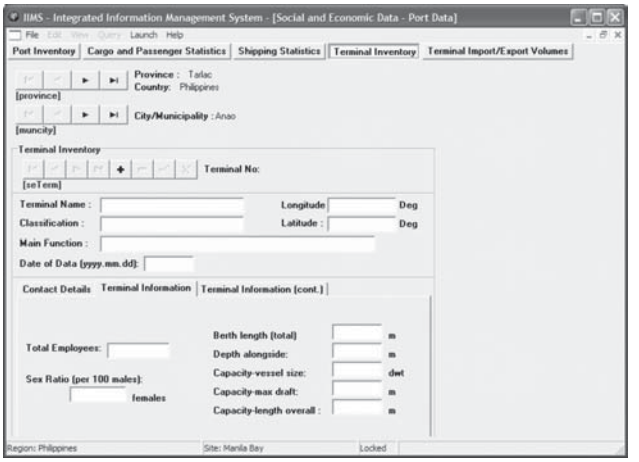
Shipping Statistics refer to data on shipping such as the type of vessel and tonnage per port in a given year.

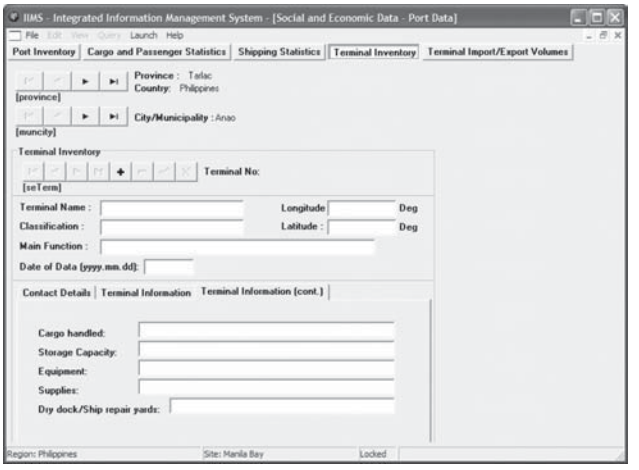


Terminal Inventory

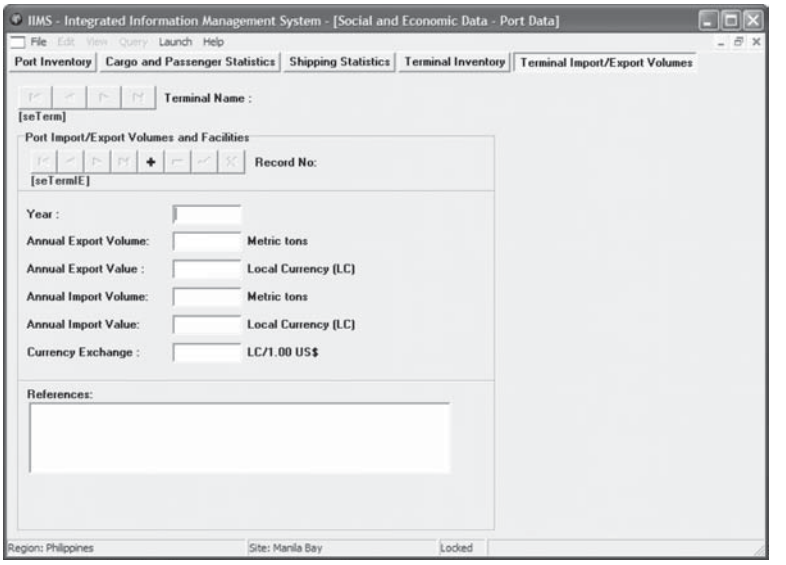
Data on terminals, such as contacts, employees, capacity of terminals, cargo handled and other services available, should be included in this form.







Terminal Import/Export Volume and Facilities includes data on annual values and volume of export and import in a given terminal.

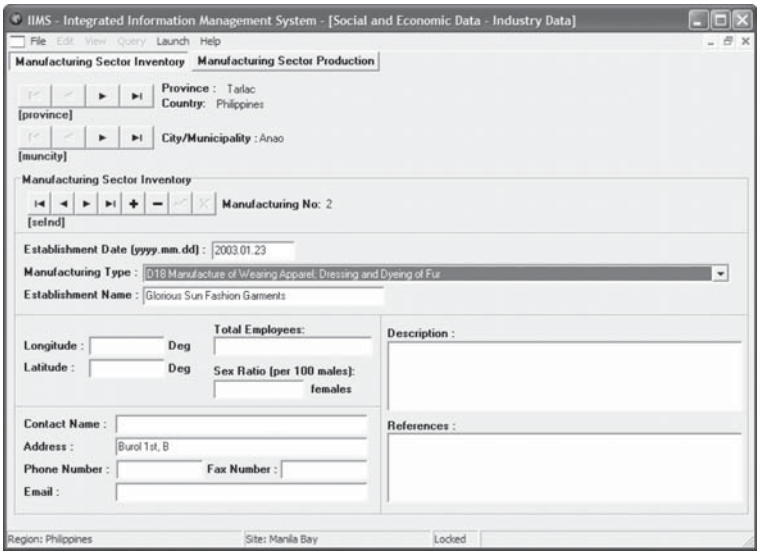


Industries

Manufacturing Sector Inventory

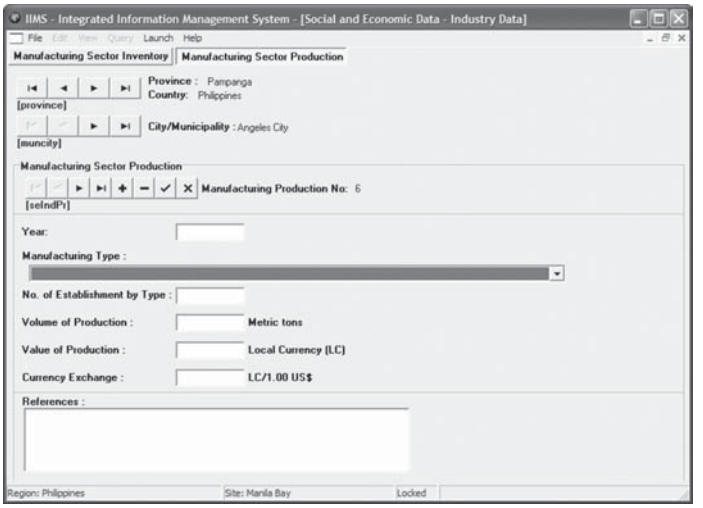
This form is for the listing of manufacturing establishments per type. The type of manufacturing sector follows the International Standard Industrial Classification (ISIC) which is as follows:

D15 Manufacture of food products and beverages
D16 Manufacture of tobacco products
D17 Manufacture of textiles
D18 Manufacture of wearing apparel; dressing and dyeing of fur
D19 Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
D20 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials



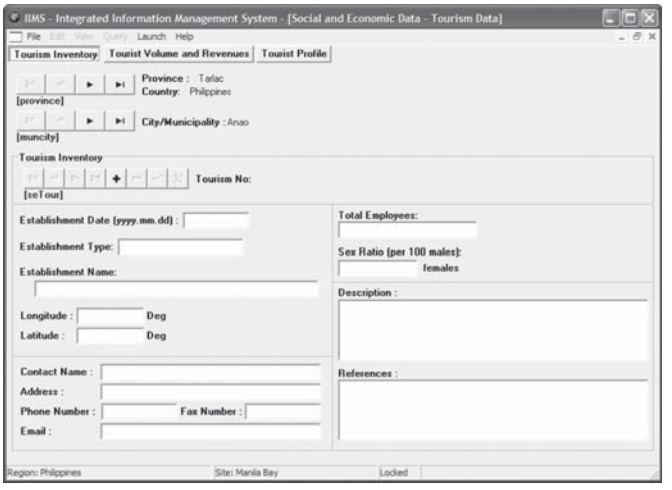
D21 Manufacture of paper and paper products
D22 Publishing, printing and reproduction of recorded media
D23 Manufacture of coke, refined petroleum products and nuclear fuel
D24 Manufacture of chemicals and chemical products
D25 Manufacture of rubber and plastics products
D26 Manufacture of other non-metallic mineral products
D27 Manufacture of basic metals
D28 Manufacture of fabricated metal products, except machinery and equipment
D29 Manufacture of machinery and equipment n.e.c.
D30 Manufacture of office, accounting and computing machinery
D31 Manufacture of electrical machinery and apparatus n.e.c.
D32 Manufacture of radio, television and communication equipment and apparatus
D33 Manufacture of medical, precision and optical instruments, watches and clocks
D34 Manufacture of motor vehicles, trailers and semi-trailers
D35 Manufacture of other transport equipment
D36 Manufacture of furniture; manufacturing n.e.c.
D37 Recycling

Manufacturing Sector Production is for the annual value and volume of production of the manufacturing sector per type of manufacturing establishment in a municipality.

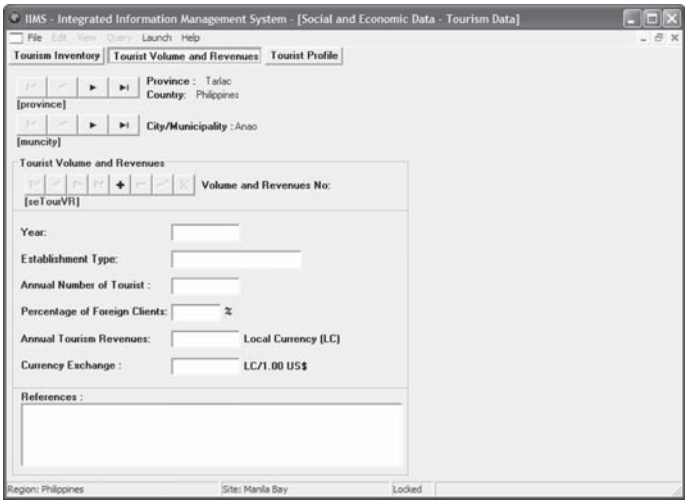


Tourism

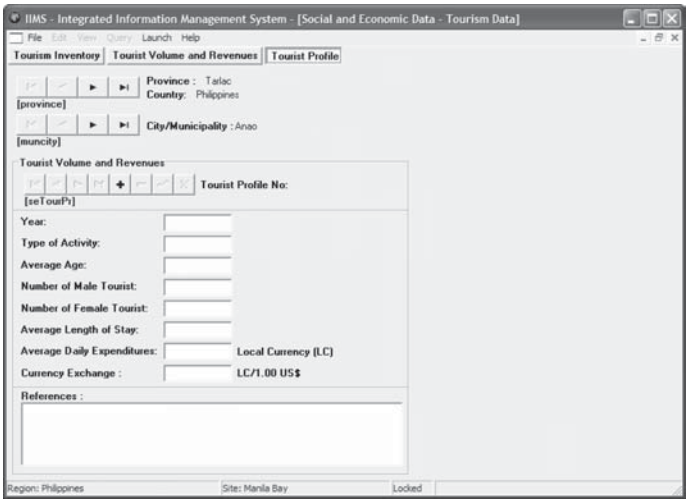
Tourism Inventory includes types of establishments such as hotels, resorts, restaurants and others that cater to tourists.



Tourists Volume and Revenues is for storing the number of tourists that visited a certain type of establishment and the revenue generated per type of establishment.

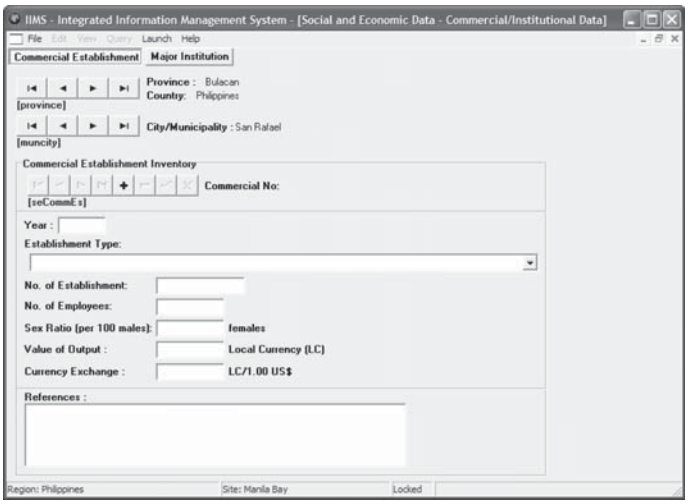


Tourist Profile is for data on types of tourist activities, average expenditures and lengths of stay. Type of Activity includes diving, boating, surfing, etc.



Commercial/Institutional Establishments

Commercial Establishments



This refers to commercial establishments in a given city/municipality including the number per each establishment type, employees and value of services. Types of establishments are in accordance with the ISIC. These are:

E – Electricity, gas and water supply
- 40 Electricity, gas, steam and hot water supply
- 41 Collection, purification and distribution of water

F – Construction
- 45 Construction

G – Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods
- 50 Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel
- 51 Wholesale trade and commission trade, except of motor vehicles and motorcycles
- 52 Retail trade, except for motor vehicles and motorcycles; repair of personal and household goods

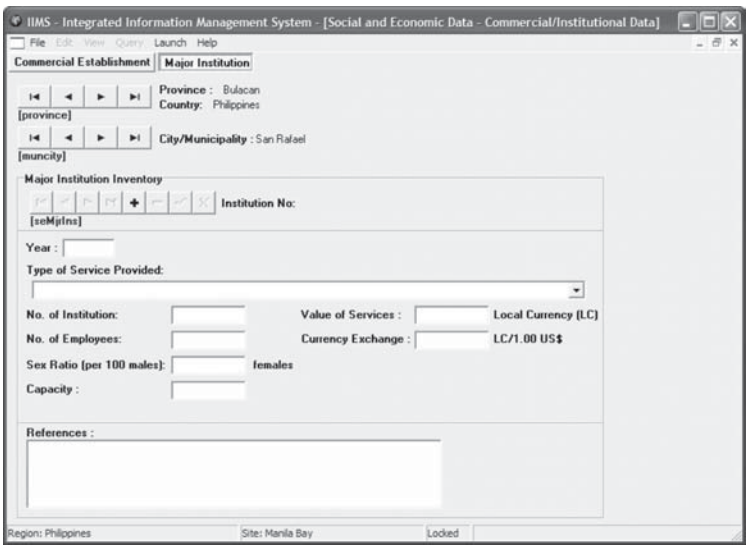
H – Hotels and restaurants
- 55 Hotels and restaurants

I – Transport, storage and communications
- 60 Land transport; transport via pipelines
- 61 Water transport
- 62 Air transport
- 63 Supporting and auxiliary transport activities; activities of travel agencies
- 64 Post and telecommunications

J – Financial intermediation
- 65 Financial intermediation, except insurance and pension funding
- 66 Insurance and pension funding, except compulsory social security
- 67 Activities auxiliary to financial intermediation

K – Real estate, renting and business activities
- 70 Real estate activities
- 71 Renting of machinery and equipment without operator and of personal and household goods
- 72 Computer and related activities
- 73 Research and development
- 74 Other business activities

Major Institution refers to institutions in a certain municipality.

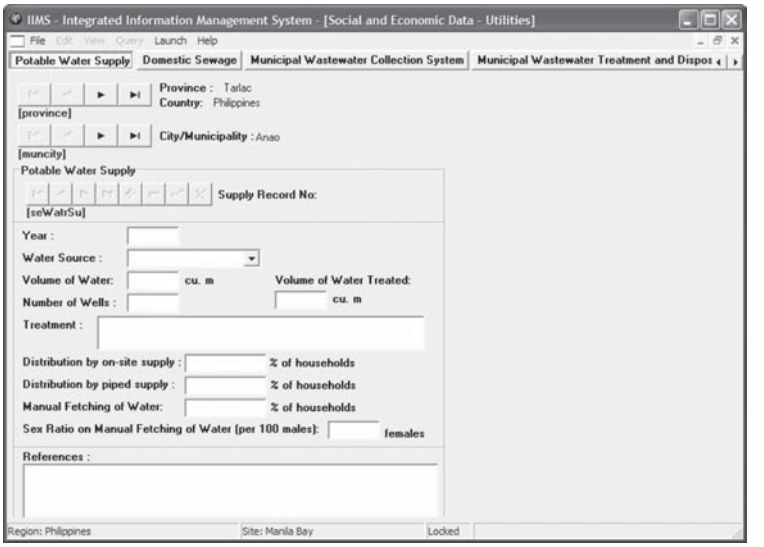


The types of institutions include:

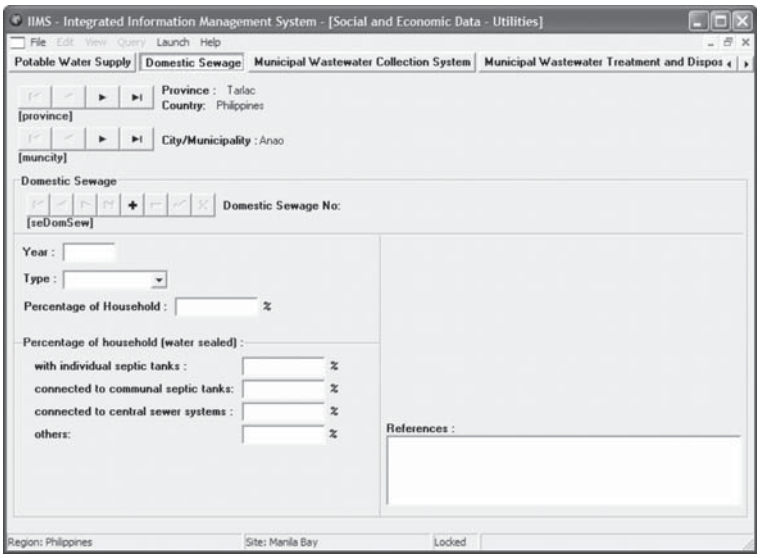
L – Public administration and defence; compulsory social security
  75 Public administration and defence; compulsory social security
M – Education
  80 Education
N – Health and social work
  85 Health and social work
O – Other community, social and personal service activities
  90 Sewage and refuse disposal, sanitation and similar activities
  91 Activities of membership organizations, n.e.c.
  92 Recreational, cultural and sporting activities
  93 Other service activities

Utilities

Portable Water Supply refers to data on the sources, volume and distribution of potable water, treatment and methods of distribution at a given municipality or city.

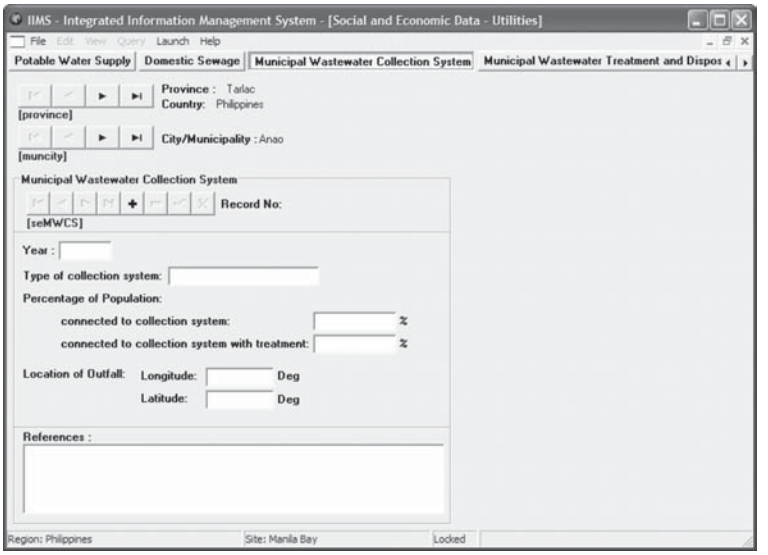


Domestic Sewage is for data on domestic sanitation facilities and the number of households served in a given municipality or city. Type refers to toilet types such as water sealed, closed open pit and others.



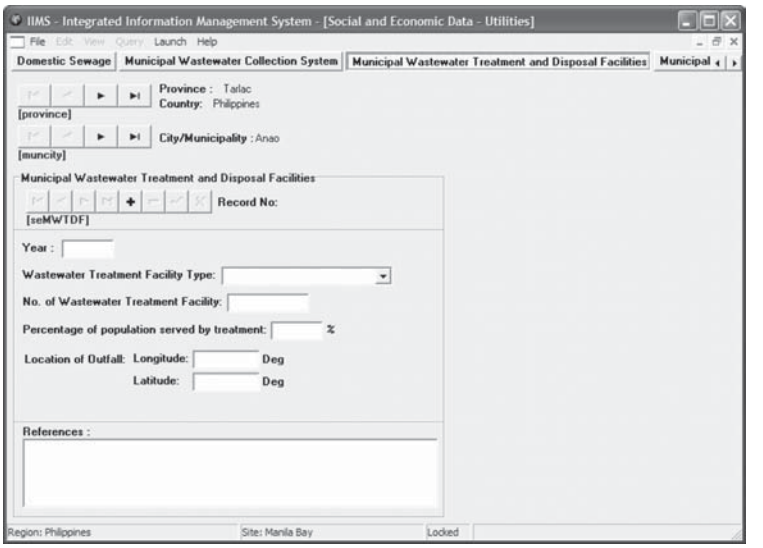
Municipal Wastewater Collection System

Data on the sewerage system of a given municipality or city, its capacity in terms of population served and the location of outfall should be included in this form.

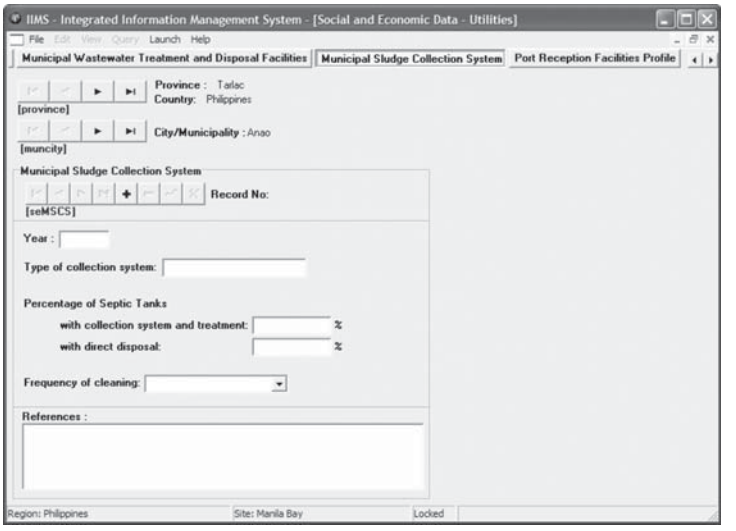


Municipal Wastewater Treatment and Disposal Facilities

Some fields in this form are the types of municipal wastewater treatment facilities (MWTF) and percentage of establishments with or connected to wastewater treatment facilities.

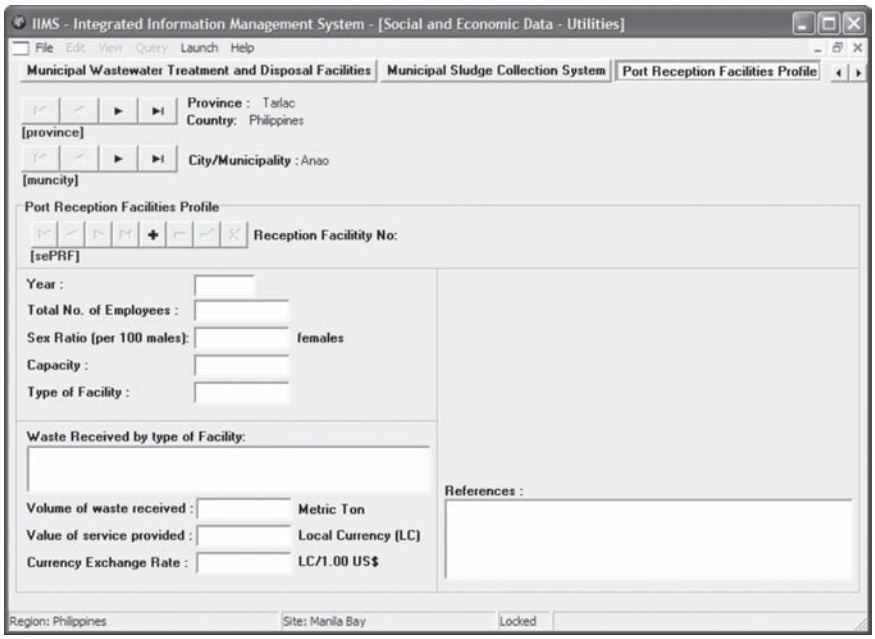


Municipal Sludge Collection System identifies various types of sludge collection systems available in a given municipality or city and frequency of cleaning in a given period of time (0–2 years; 2–5 years; and 5–10 years).



Port Reception Facility Profile

The reception facilities in a certain municipality or city, their capacity and the value of services provided are some of the data needed in this form.



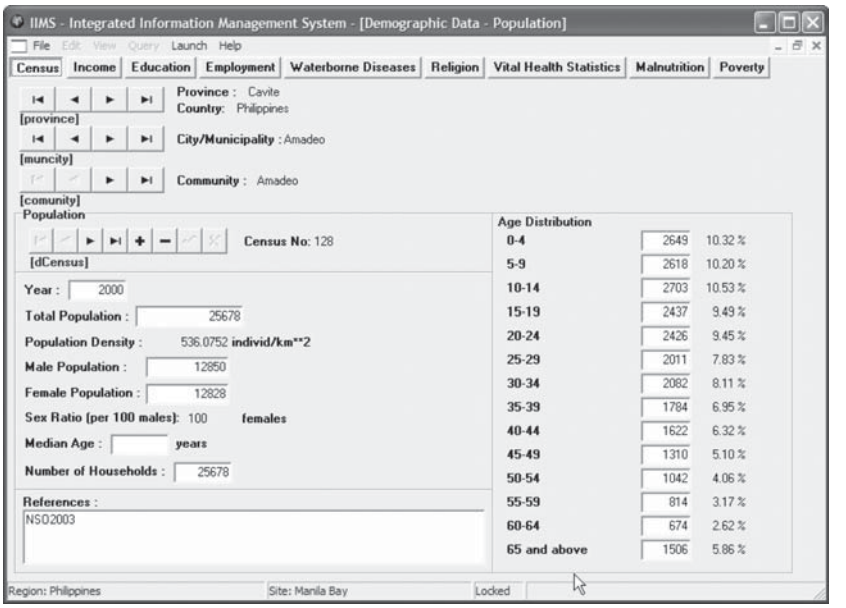
Demographic Category

This category includes data on population categorized into census of population, income, vital health statistics, waterborne diseases, education, religious affiliation and poverty incidence. The data on census are aggregated at the community level, but others may be at municipal and site levels.

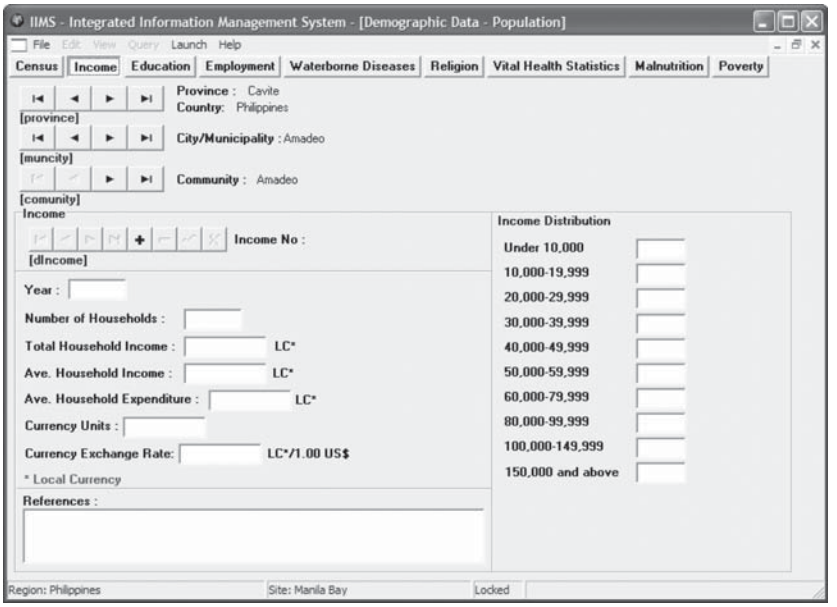
Population

Census

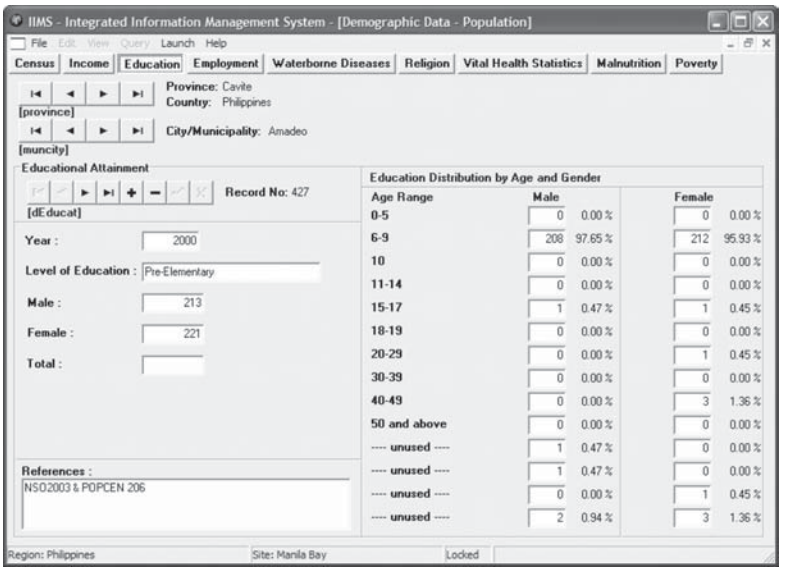
Population in this form is by administrative unit, with the community as the default administrative unit. However, this can be changed by modifying the administrative division entry form in the IIMS regional codes category.



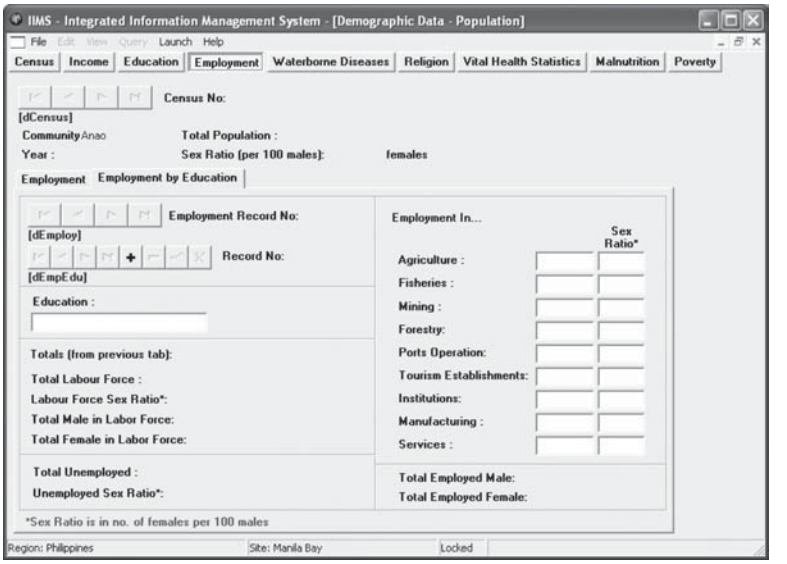
Income is by administrative unit (designated here by *barangay* or the smallest administrative unit in a site, e.g., village).



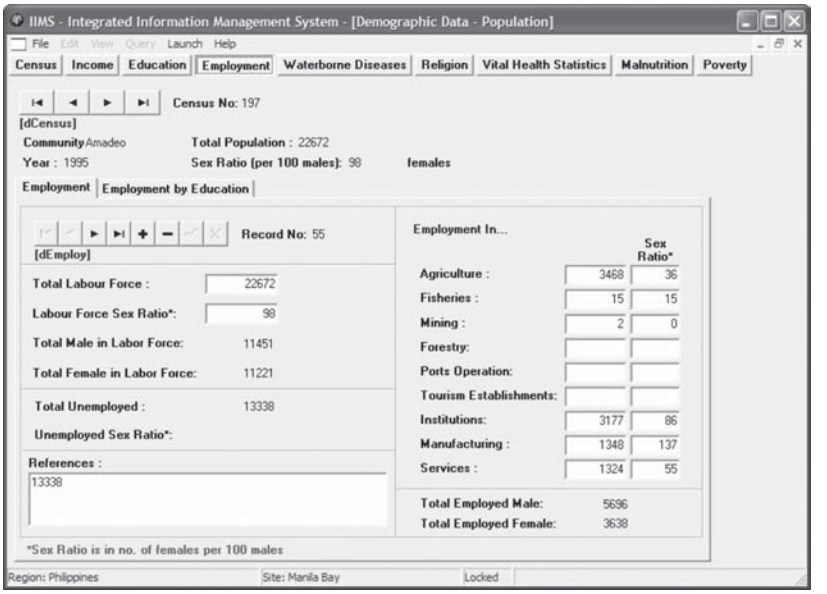
Education table refers to the distribution of the male and female population per level of education attained. The level of education refers to pre-school, primary, secondary, vocational, tertiary and others (no education or no education stated during the census).



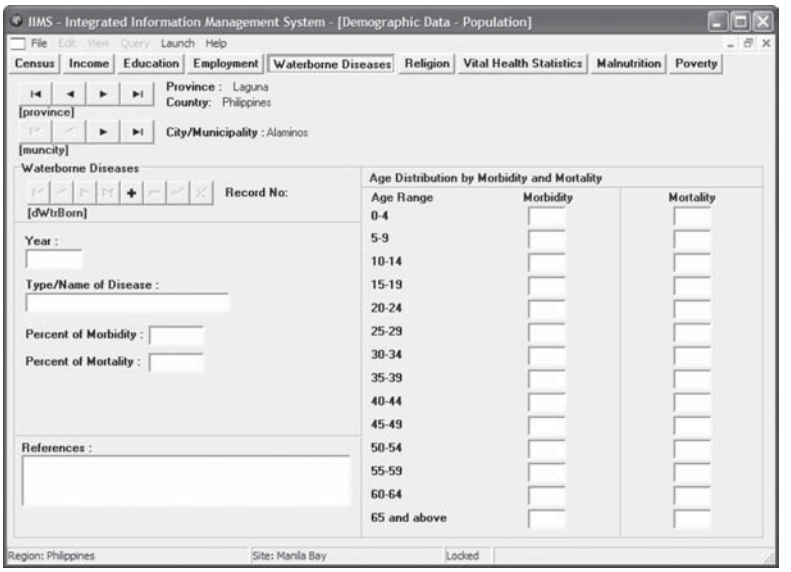
Employment refers to the data on labor force distributed per gender and sector.



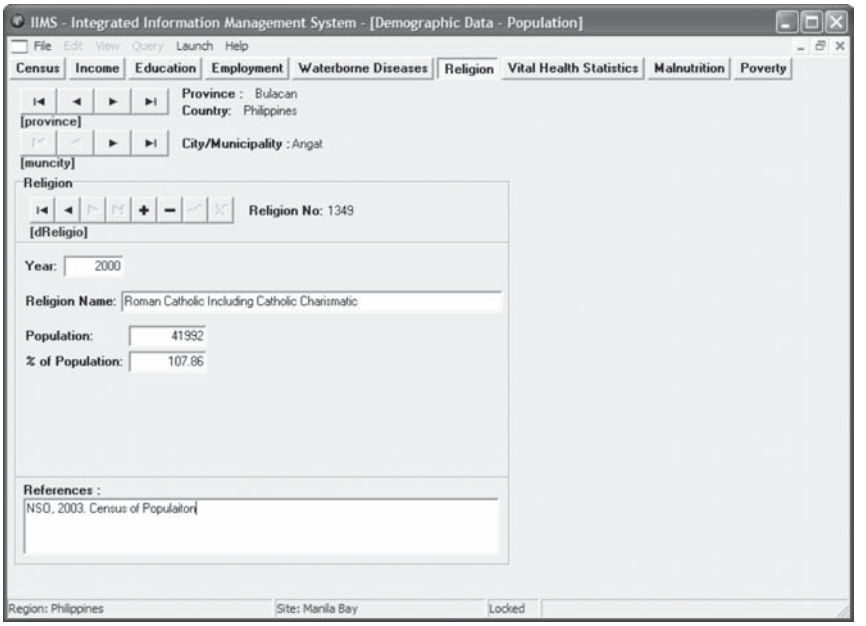
Employment by Education refers to the distribution of employed population per level of education and sector.



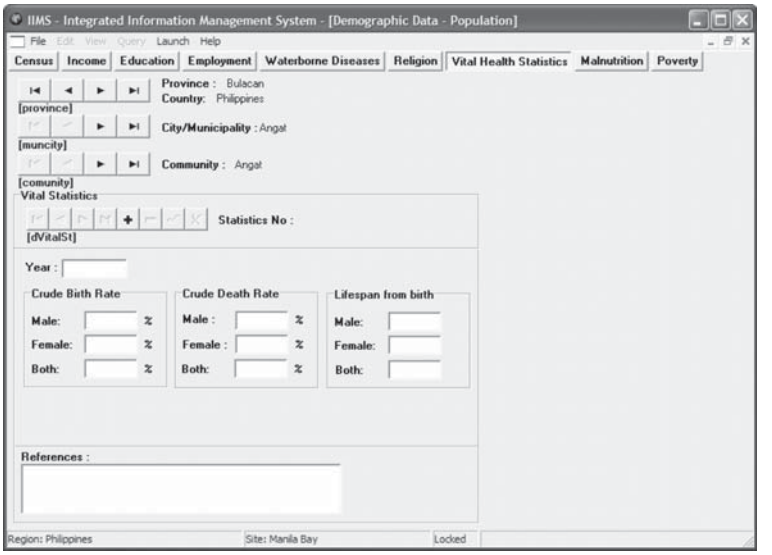
Waterborne Diseases refers to the morbidity and mortality rates caused by waterborne diseases. The percent distribution refers to the percentage of an age group over the whole population of a municipality.



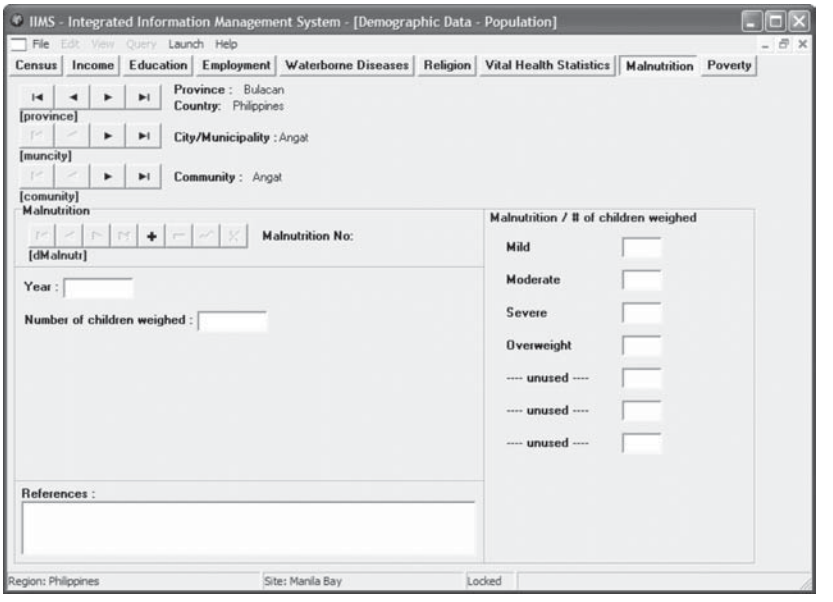
Religion refers to the distribution of population by religion.



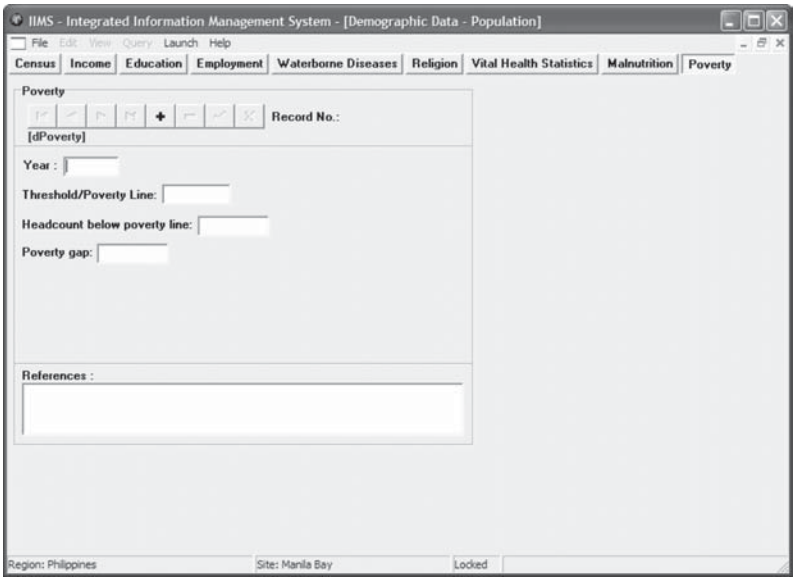
Vital Statistics contains crude birth rates; the crude death rate; and lifespans of the male and female population.



Malnutrition includes incidence of malnutrition in various age ranges as well as other related data in a given area.



Poverty contains data on its incidence in a given area, including poverty threshold/poverty line, head count below poverty line and poverty gap.



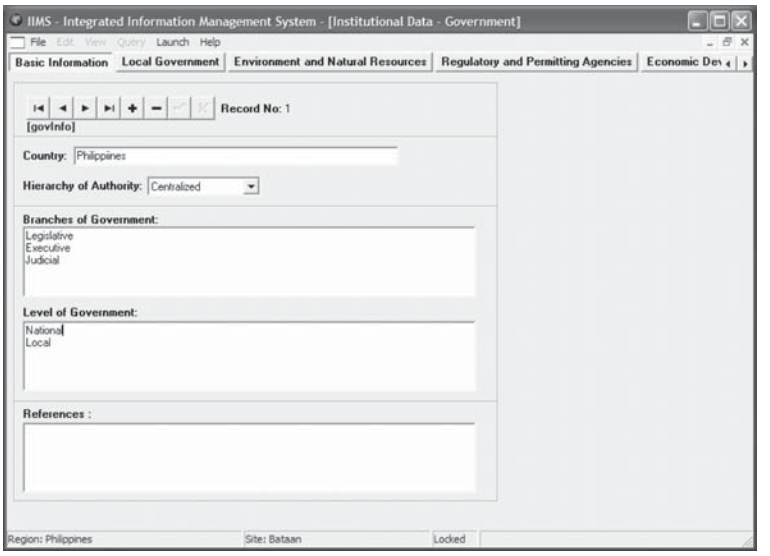
Institutional Category

The category includes data on institutional aspects such as government, various plans related to coastal and marine management and sectors whose functions and jurisdiction cover the marine and coastal environments. This category stores textual data.

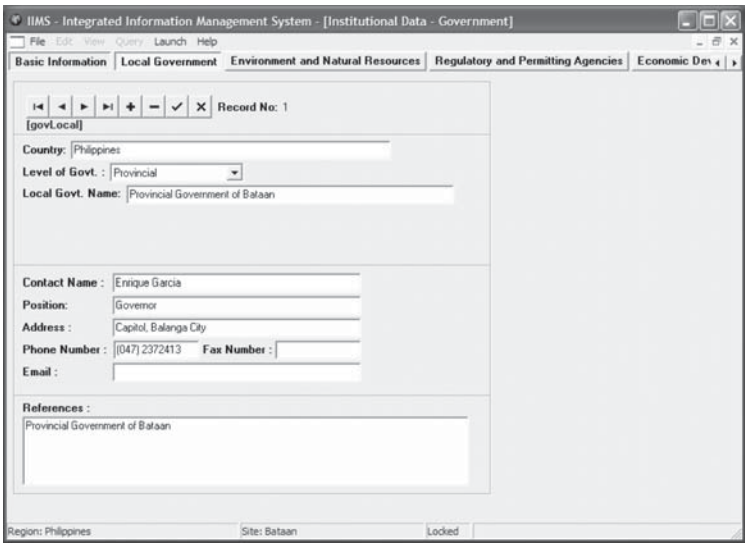
The institutional category describes the various government agencies and various regulations pertaining to environmental management, the sectors involved and the plans available for a given municipality, province or country.

Government

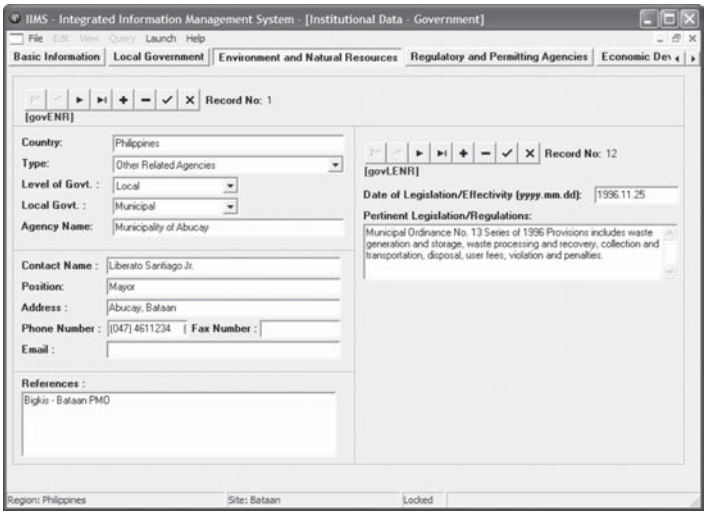
Basic Information is for describing whether the government is centralized, federal or has other forms of national/local government coordination. A brief explanation of the branches of government (e.g., the judicial, executive and legislative branches) and the levels of government (e.g., national, provincial, city or municipal) is required.



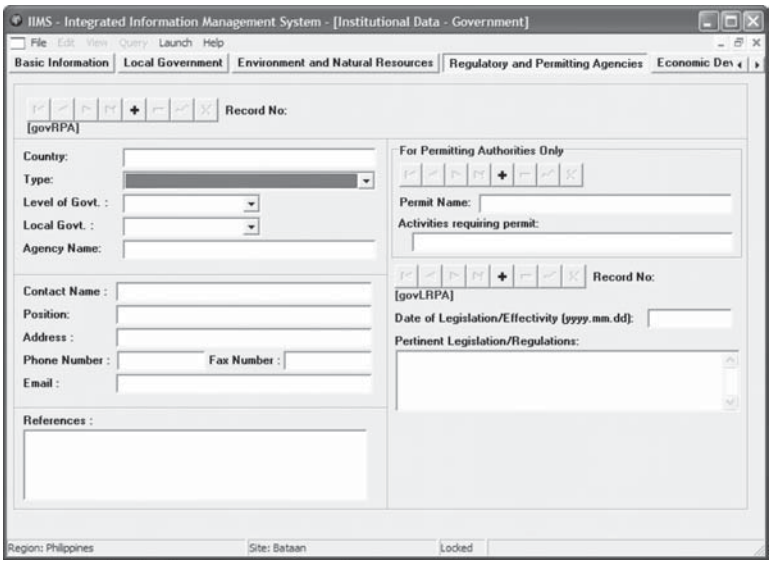
Local Government refers to the various local government units (LGUs) in the site. The level of government refers to either provincial or municipal.



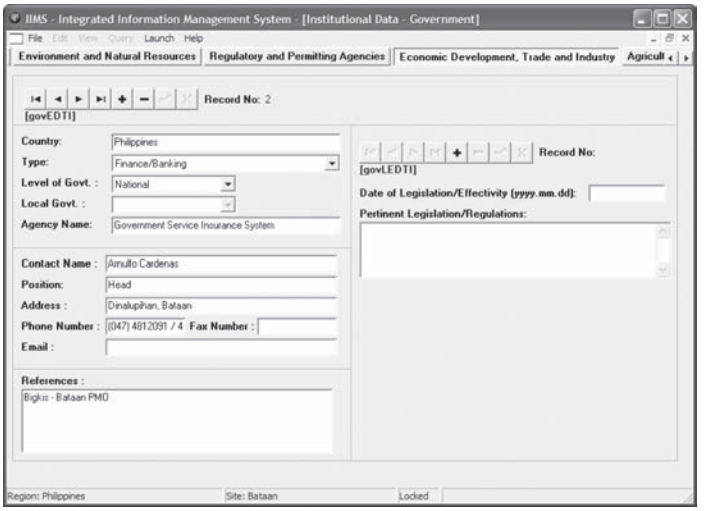
Environment and Natural Resources refers to government agencies that implement laws, rules and regulations on environmental impact assessment (EIA) and evaluate EIAs for projects in the area; natural resources such as minerals, coastal and forestry resources, and other agencies concerned with the environment and natural resources.



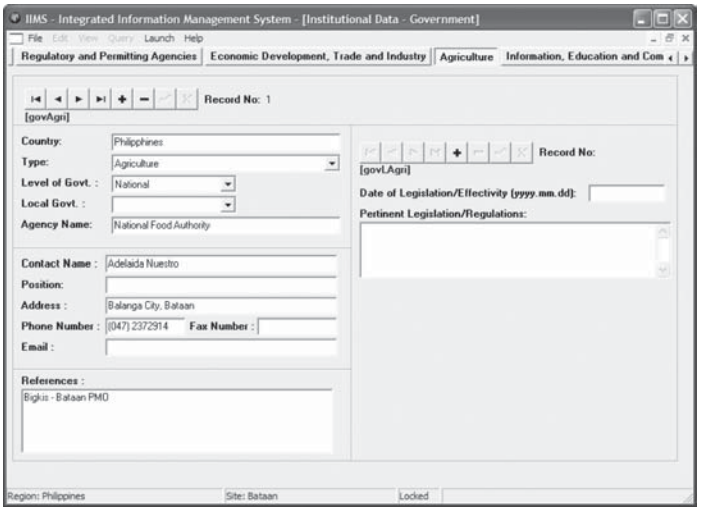
Regulatory and Permitting Agencies contains data on national and local government agencies that issue permits for activities within the site.



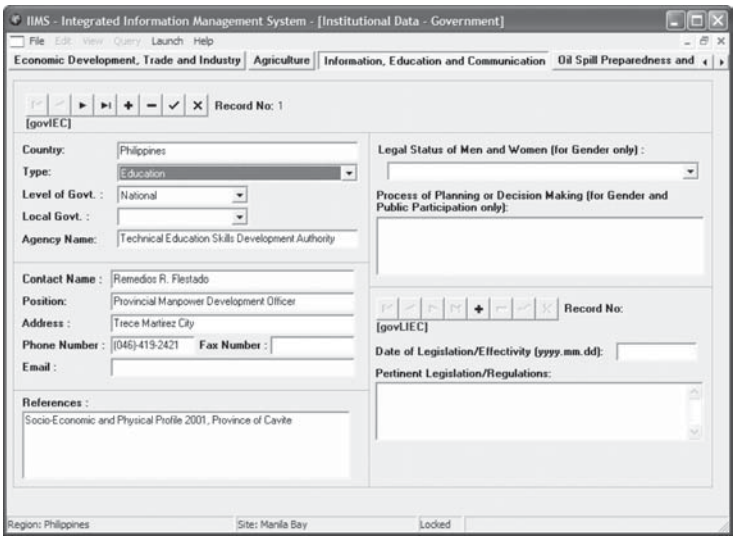
Economic Development, Trade and Industry refers to government agencies responsible for economic planning and development, energy, trade and industry, port and shipping, tourism, highways and public works and mining at the national and local government levels.



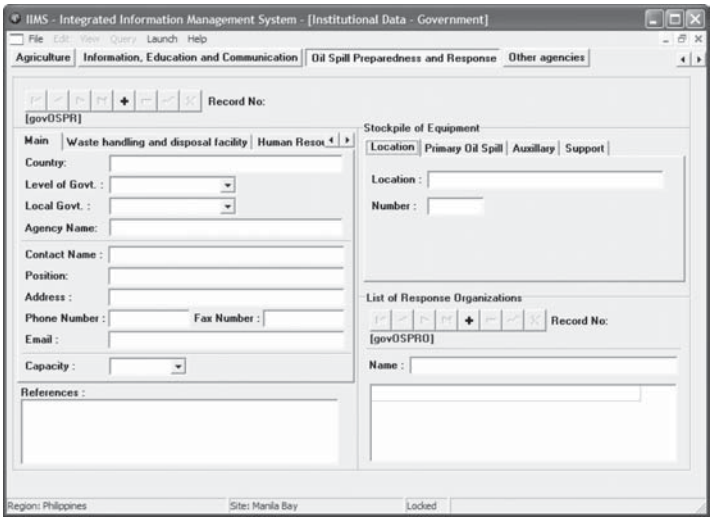
Agriculture refers to government agencies responsible for agriculture, fisheries and others at national and local levels.



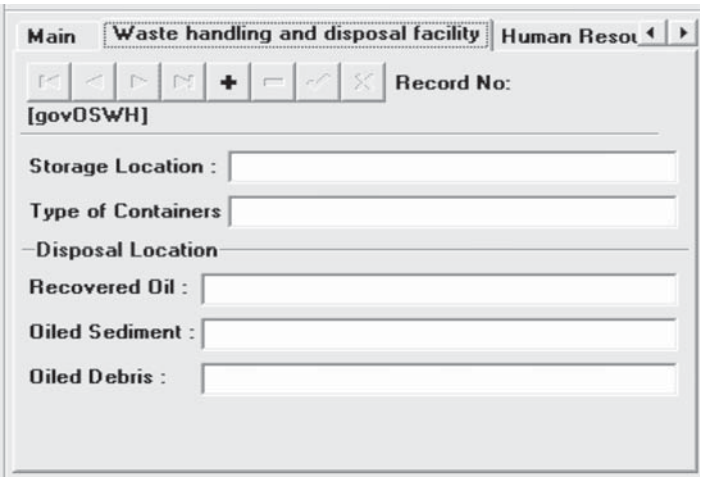
Information, Education and Communication refers to government agencies that are responsible for information, education, public participation, gender and others.



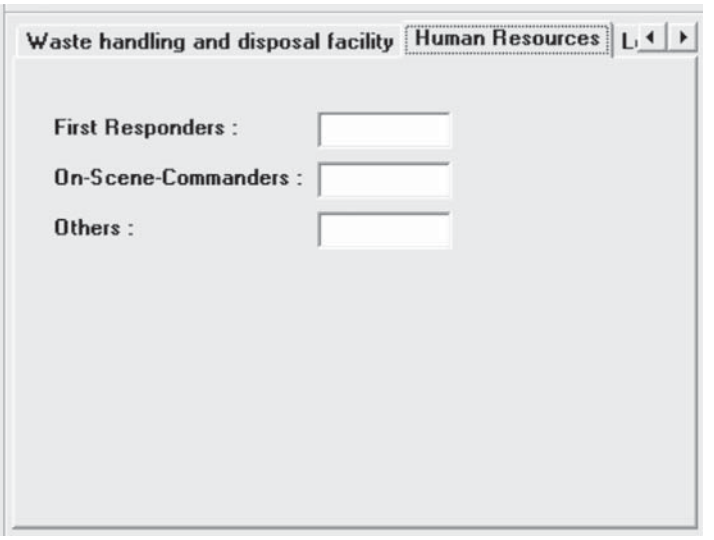
Oil Preparedness and Response entry form requires data on the agencies responsible for oil spill preparedness and response, stockpile of equipment and list of response organizations.



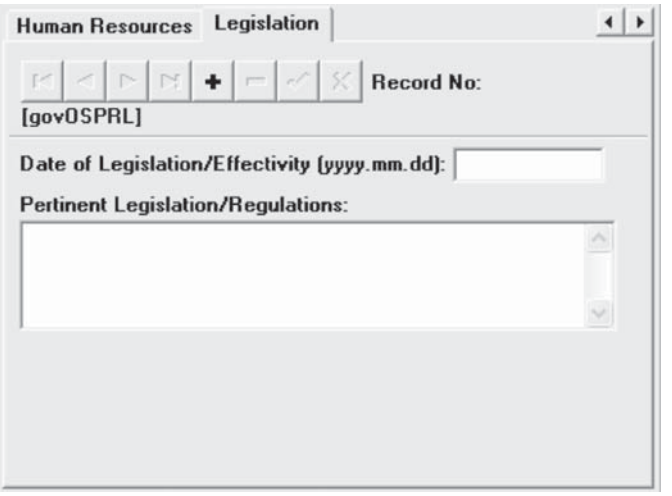
It includes fields for waste handling and disposal facilities, such as storage location of recovered debris and type of containers used.



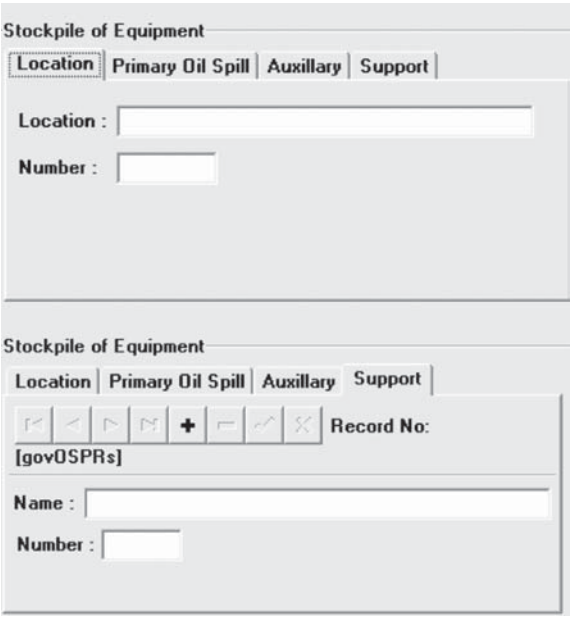
Details on human resources such as on-scene commanders, first responders and other staff are also required.



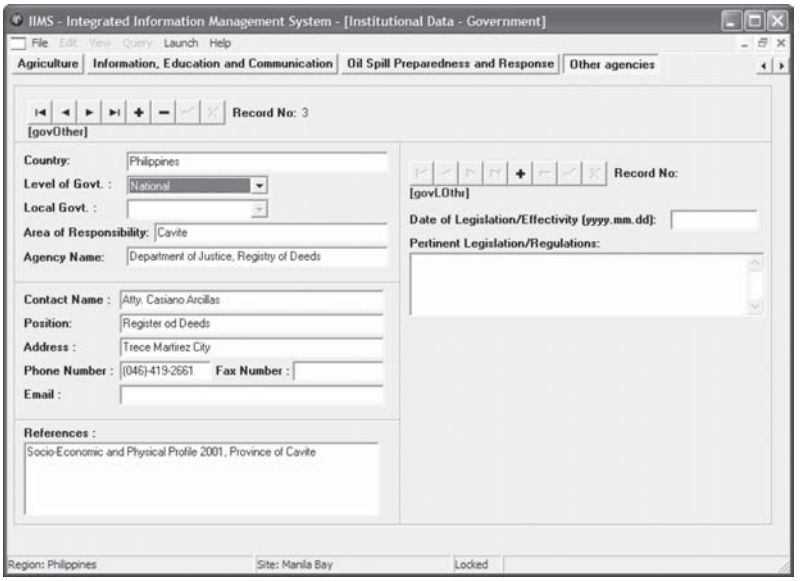
Legislation related to oil spill preparedness and response and other related matters are likewise required.



The list of stockpile of equipment, location and number are stored in this table. Details required are: equipment for primary oil spill, auxillary or support equipment.



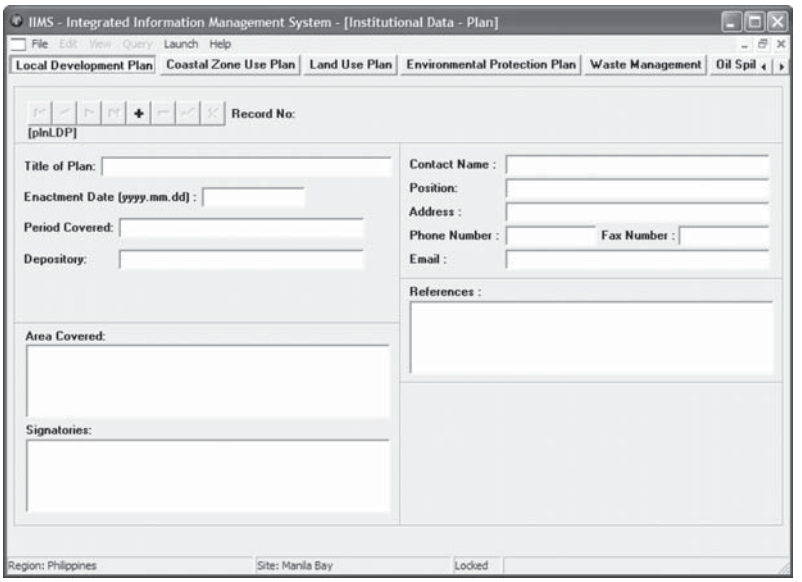
Other Agencies refers to government agencies involved in the management of coastal and marine environment in a given site that are not captured in the previous forms.



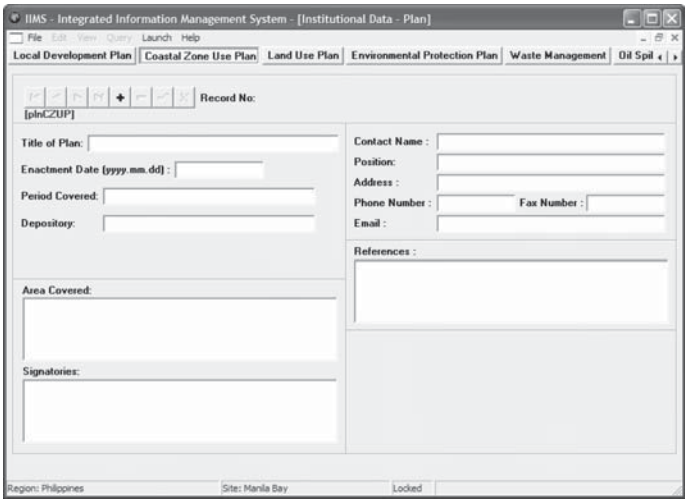
Plans

This refers to various plans covering local development, land-use, environmental protection, waste management, oil spill preparedness and response, and others that are related to the management of coastal and marine environment. These plans could be at the national and local levels. The following forms require data on the various plans, such as title, period, area covered and contact details.

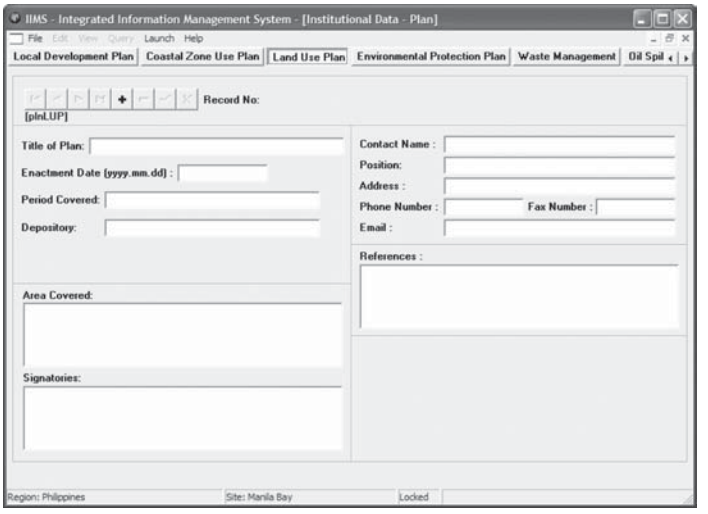
Local Development Plans cover the overall development of a province, municipality or city. These could be long, medium and short-term plans.



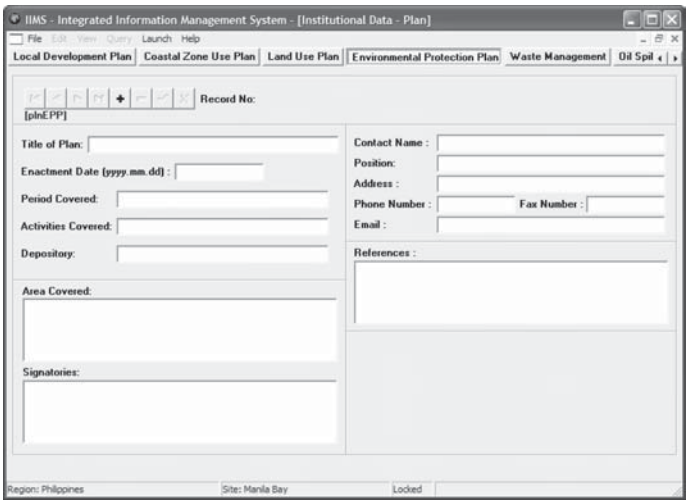
Coastal-Use Plan designates the spatial use of land and water covering the coastal area.



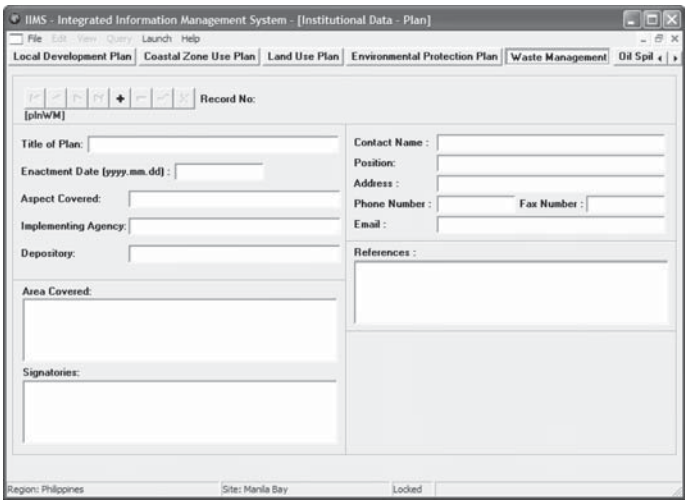
Land-Use Plan shows the different uses of terrestial areas based on criteria set.



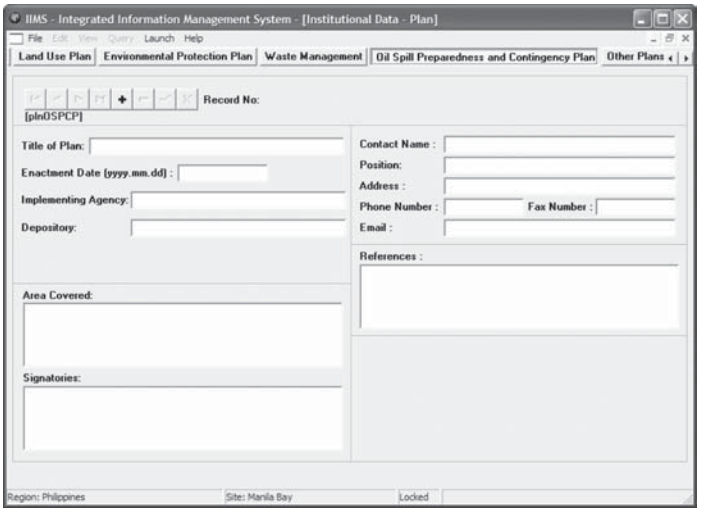
Environmental Protection Plan refers to plans that deal with the protection and conservation of habitats or specific areas such as national parks, marine sanctuaries and other areas of ecological significance.



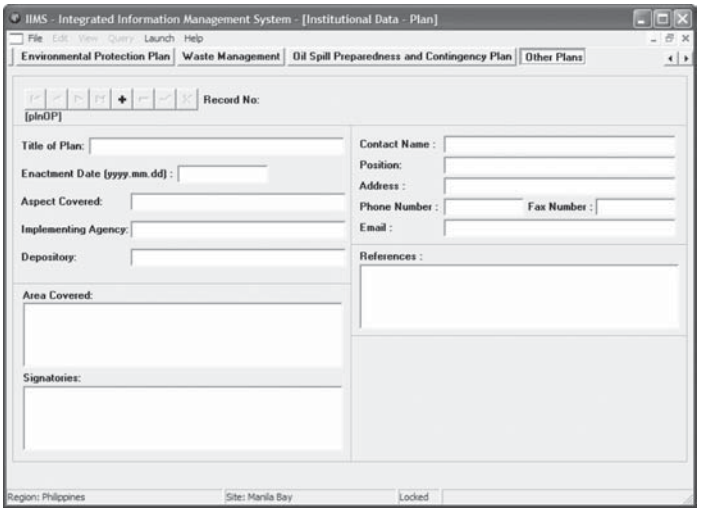
Waste Management Plan refers to plans on dealing with effective management of various types of waste, including reduction, reuse and recycling, and disposal.



Oil Spill Preparedness and Contingency Plan includes plans that deal with combating accidental oil spills.



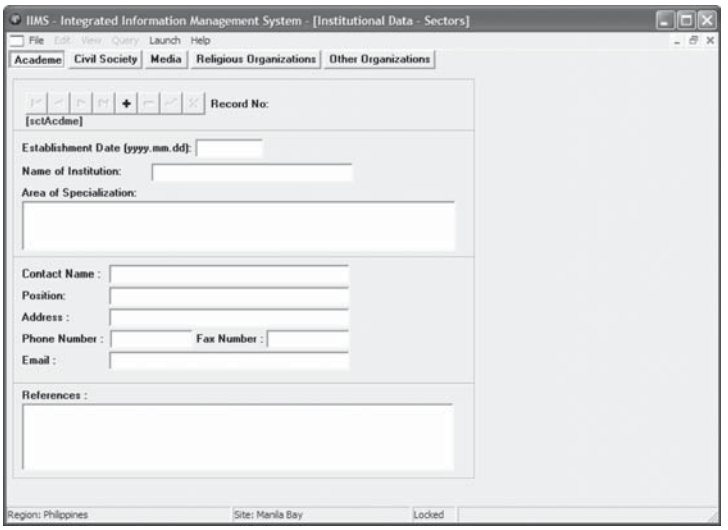
Other Plans include plans related to environmental management such as tourism development plans, watershed management plans, etc.



Sectors

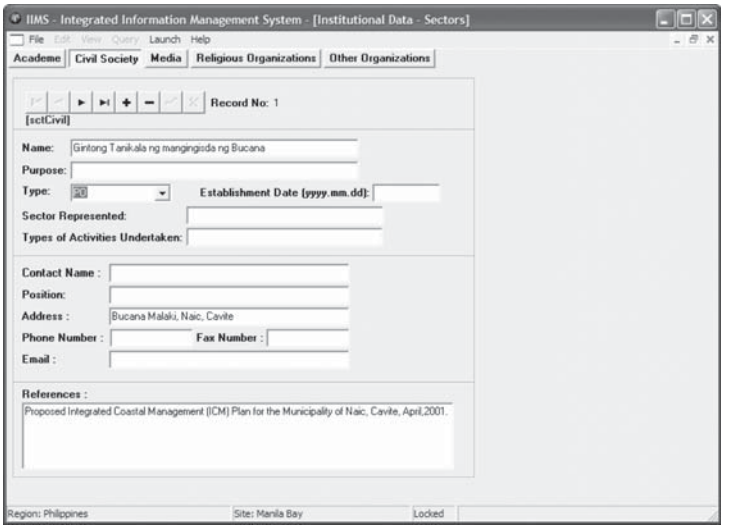
This refers to the various sectors, aside from government agencies involved in the management of coastal and marine environments in the site. The data required include name of institution, specialization and contact details.

Academe refers to the academic organizations that have mandates or roles in environmental management.

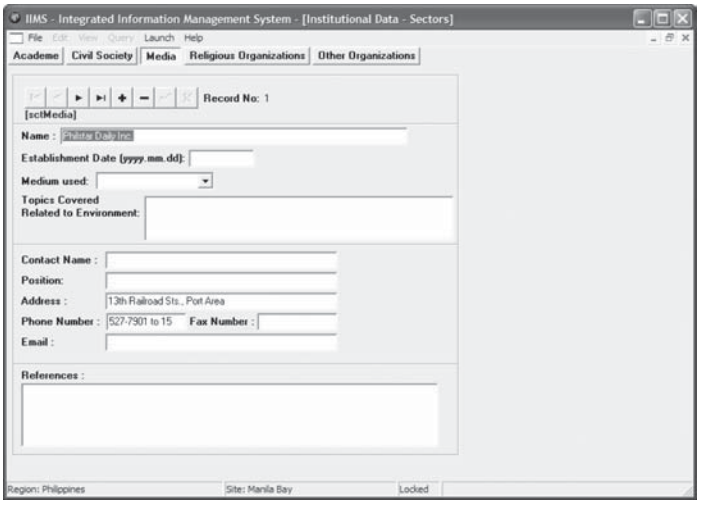


Civil Society includes national or local nongovernmental organizations (NGOs) organized for the advancement of a particular purpose that relates, directly or indirectly, to the coastal area and with organized groups living in the coastal area who unite for a common purpose (people's organization or POs). POs are distinguished from NGOs in that the former are mass-based, as opposed to NGOs which usually have external support. NGOs include conservation and advocacy organizations, as well as local civic organizations. Less organized groups, such as subsistence resource users,

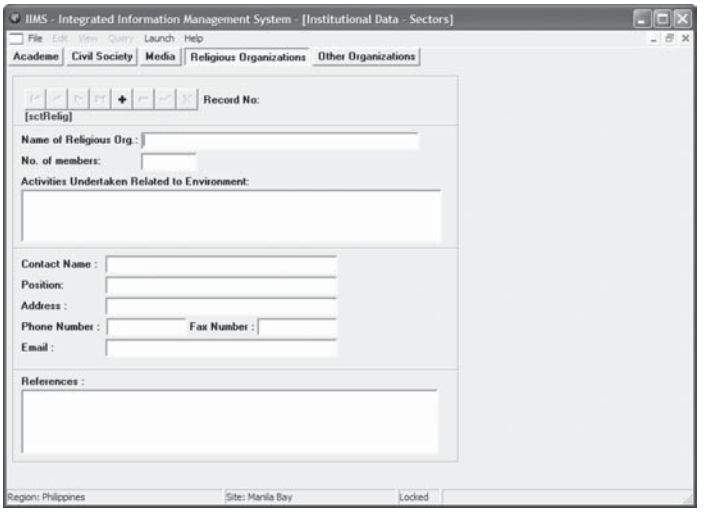
landowners and ethnic groups, should also be included. Indicate which sector is represented (e.g., fisherfolk, resort owners or small-scale miners, etc.).



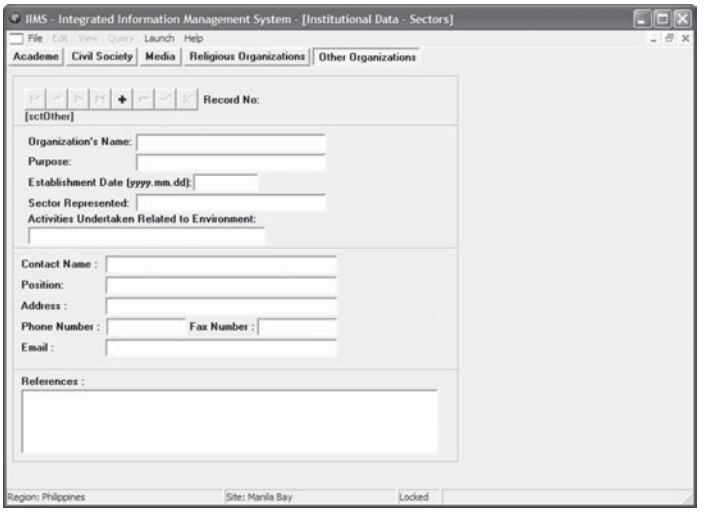
Media refers to print and broadcast media that publish, write or cover topics related to the environment. They could be national or local in scope.



Religious Organizations refers to religious organizations that are undertaking activities or advocating matters related to the environment.



Other Organizations includes organizations not stated in other entry forms but which deals with activities that are related to the environment.



Pollution Sources Category

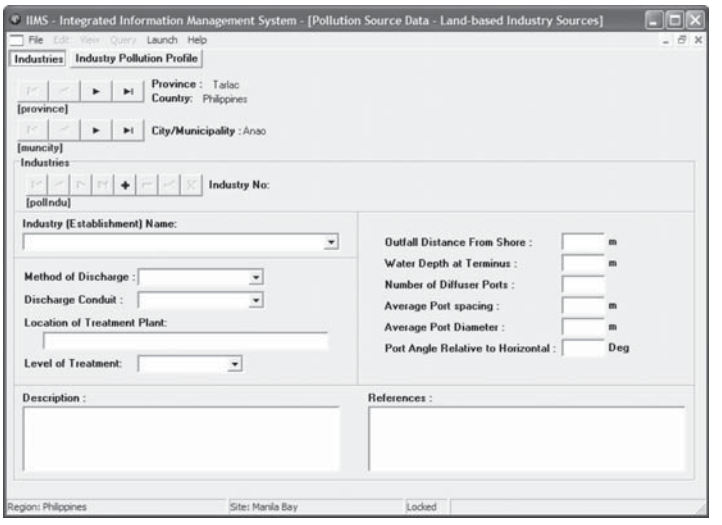
The pollution sources category deals with data on sources of pollution from land-based or sea-based sources. Land-based sources include industrial, commercial, household and agricultural activities, and river pollution. Water or sea-based sources include those from oil spills, oil production platforms and chemical spills.

Land-based Sources

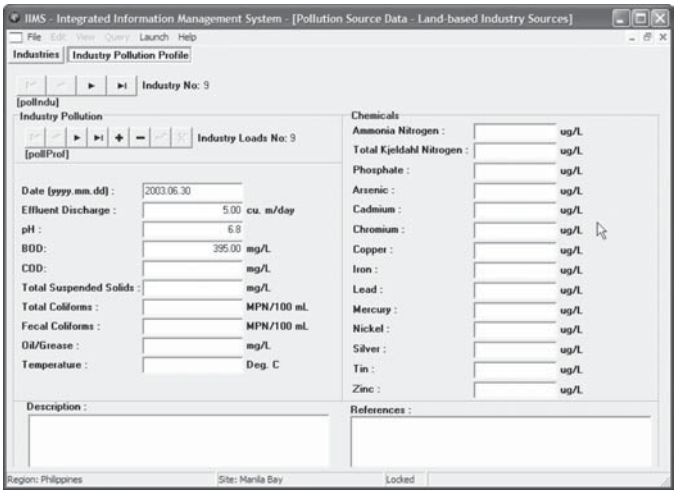
Industries not only contains data on industry, but an associated text file provides further descriptive information such as history, production levels relevant to the industry type, levels of treatment and additional information on the method of discharge. For example, if the discharge is intermittent, typical durations and frequencies of discharge should be described. If the discharge is by a ditch over the intertidal zone, provide some description of the channel and containment distance out from the high tide line.

If a marine outfall is used, specify the distance from shore and the water depth at the end of pipe. If the outfall does not have a diffuser, the number of ports is one and port diameter is the outfall pipe diameter.

This entry form is linked with the Industry entry form under socioeconomic category.



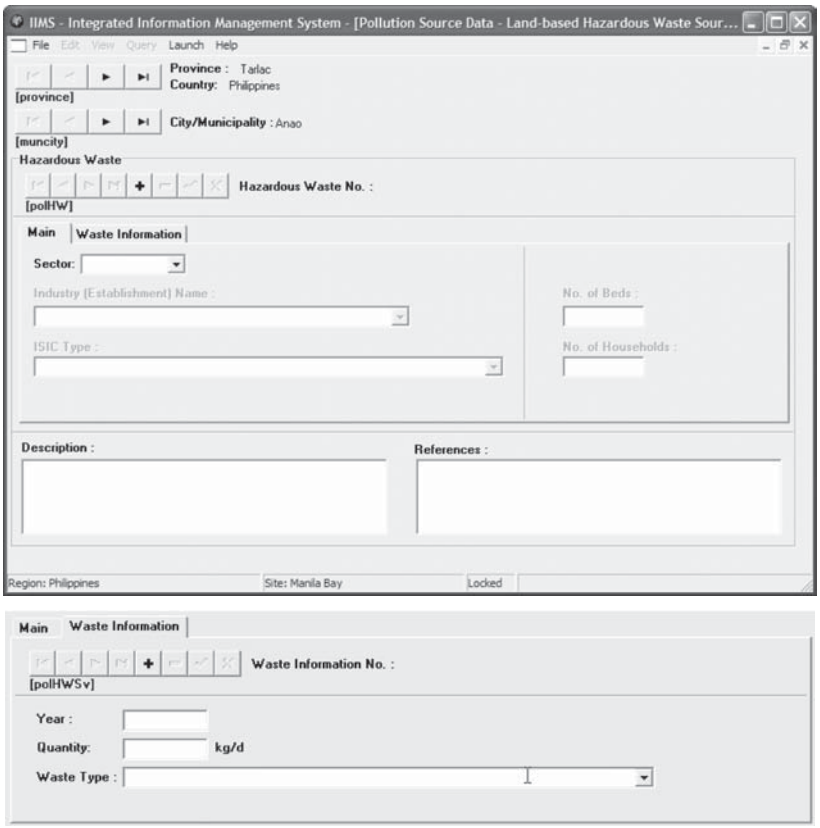
Industry Pollution Profile inventory contains data on parameters, particulate and chemical contaminant concentrations discharged by the industry and effluent discharge measured at time of sampling or daily mean discharge on the day of sampling.



If contaminants are available in a weight measure such as metric ton per day, convert these values to their equivalent concentrations using the mean discharge rate before entering the data into the form. For example, if the biological oxygen demand (BOD) load is 2 mt/d at a discharge = 1 m^3/s, then the BOD concentration is:

BOD = 2 t/d $\times$ 1,000 kg/t $\times$ 1,000 g/kg $\div$ (86,400 d/s $\times$ 1 s/m^3) = 23.15 g/m^3 = 23.15 mg/L.

Hazardous Wastes refers to an inventory of hazardous waste generated by various sectors such as industry, agriculture, hospital, institutional establishments and household.



Waste type refers to hazardous wastes based on the classification under the Basel Convention. These include the following:

Waste stream:

Y1 Clinical wastes from medical care in hospitals, medical centers and clinics

Y2 Wastes from the production and preparation of pharmaceutical products

Y3 Waste from pharmaceuticals, drugs and medicines

Y4 Wastes from the production, formulation and use of biocides and phytopharmaceuticals

Y5 Wastes from the manufacture, formulation and use of wood preserving chemicals

Y6 Waste from the production, formulation and use of wood preserving chemicals
Y7 Wastes from heat treatment and tempering operations containing cyanides
Y8 Waste mineral oils unfit for their originally intended use
Y9 Waste oils/water, hydrocarbons/water mixtures, emulsions
Y10 Waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs) and/or polychloronited terphenyls (PCTs) and/or polybrominated biphenyls (PBBs)
Y11 Waste tarry residues arising from refining, distillation and any pyrolytic treatment
Y12 Wastes from production, formulation and use of inks, dyes, pigments, paints, lacquer, varnish
Y13 Wastes from production, formulation and use of resins, latex, plasticizers, glues, adhesives
Y14 Wastes chemical substances arising from research and development or teaching activities which are not identified and/or are new and whose effects on man and/or the environment are not known
Y15 Wastes of an explosive nature not subject to other legislation
Y16 Wastes from production, formulation and use of photographic chemicals and processing materials
Y17 Wastes resulting from surface treatment of metals and plastics
Y18 Residues arising from industrial waste disposal operations

Wastes having as constituents the following:

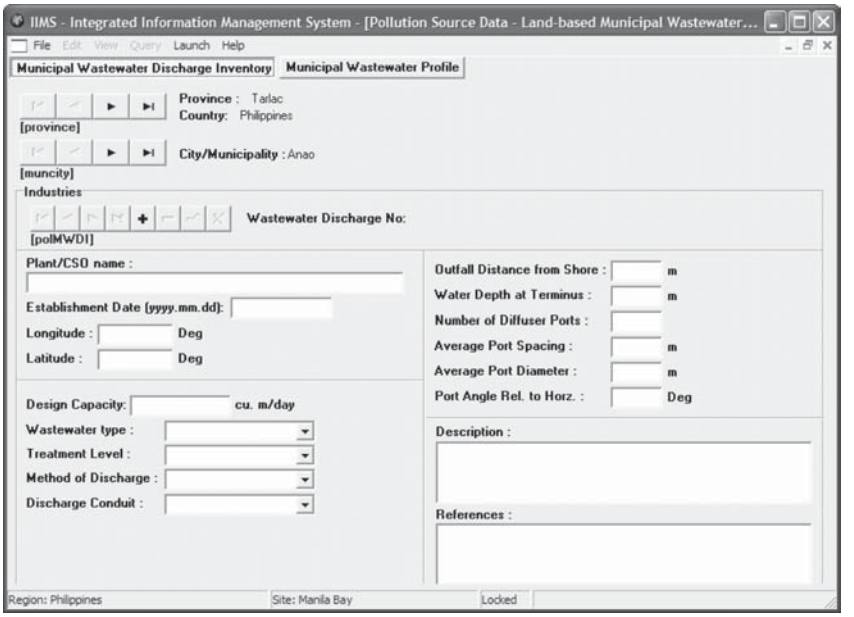
Y19 Metal carbonyls
Y20 Beryllium; beryllium compounds

Y21 Hexavalent chromium compounds
Y22 Copper compounds
Y23 Zinc compounds
Y24 Arsenic; arsenic compounds
Y25 Selenium; selenium compounds
Y26 Cadmium; cadmium compounds
Y27 Antimony; antimony compounds
Y28 Tellurium; tellurium compounds
Y29 Mercury; mercury compounds
Y30 Thallium; thallium compounds
Y31 Lead; lead compounds
Y32 Inorganic fluorine compounds excluding calcium fluoride
Y33 Inorganic cyanide
Y34 Acidic solutions or acids in solid form
Y35 Basic solutions or bases in solid form
Y36 Asbestos (dust or fibres)
Y37 Organic phosphorus compounds
Y38 Organic cyanides
Y39 Phenols; phenol compounds including chlorophenols
Y40 Ethers
Y41 Halogenated organic solvents
Y42 Organic solvents excluding halogenated solvents
Y43 Any congenor of polychlorinated dibenzo-furan
Y44 Any congenor of polychlorinated dibenzo-p-dioxin
Y45 Organohalogen compounds other than substances

Wastes requiring special considerations:

Y46 Wastes collected from households
Y47 Residues arising from the incineration of household wastes

Municipal Waste Discharge Inventory lists the plants and combined sewer overflows (CSO) that provide treatment and/or point-source effluent discharge to the coastal zone.



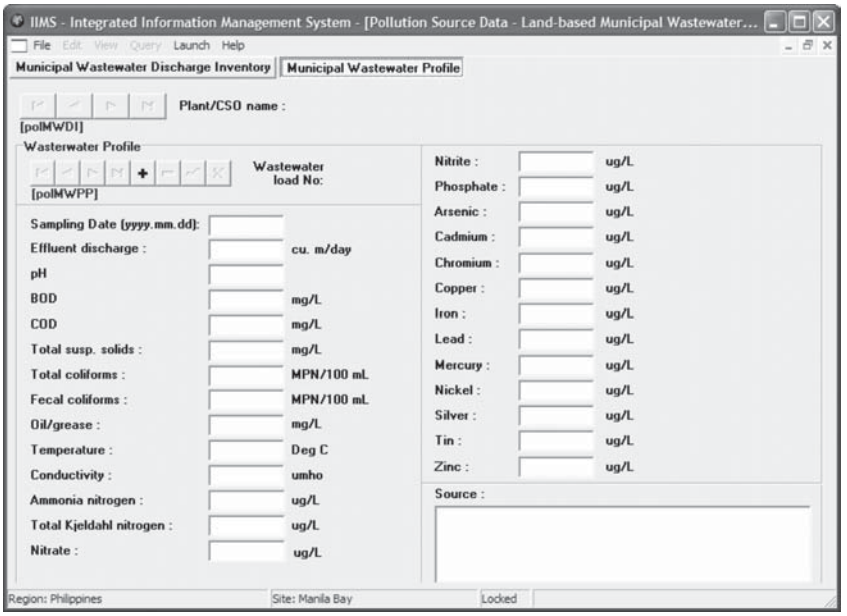
Wastewater type refers to sewage, sewage + storm water, or storm water. Treatment level refers to none, primary or secondary.

Method discharge refers to continuous or intermittent. Discharge conduit refers to outfall or ditch. If a marine outfall is used, specify the distance from shore and the water depth at the end of pipe. Determine if the outfall has a diffuser; if not, set the number of ports to 1. Port diameter is the outfall pipe diameter.

Descriptions may include the sewage collection system and treatment plant, its history and levels of treatment and additional information on the discharge method. For example, if the discharge is by a ditch over the intertidal zone, provide some description of the channel and containment distance out from the high tide line.

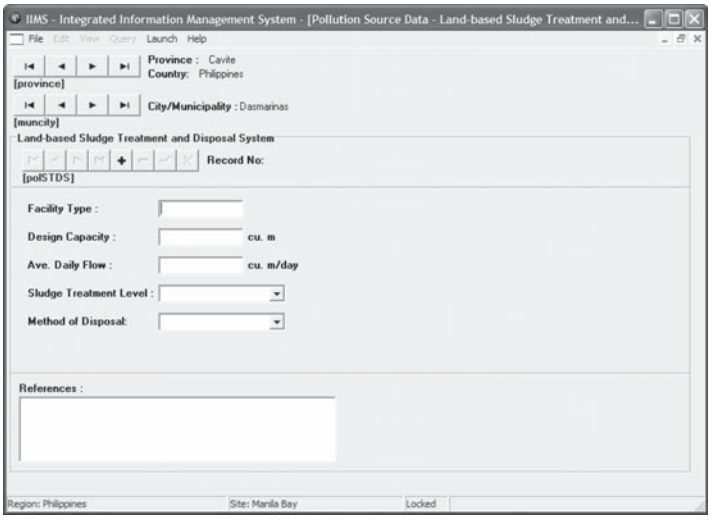
Municipal Wastewater Profile contains data on parameters, particulate and chemical contaminant concentrations discharged by the municipal wastewater discharges.

Data precision for fields with units in g/L or mg/L is up to four decimal places (e.g., 0.0023 g/L).

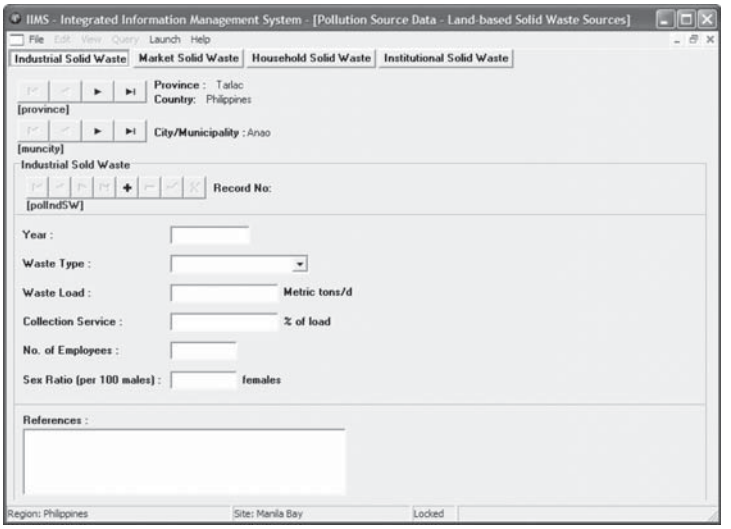


Sludge Treatment and Disposal System describes the sludge treatment and disposal system in the site in terms of type, capacity, treatment level and method of disposal.

Sludge treatment level is either none, biological, physical, physical-chemical and tertiary. Method of disposal means land, incineration and others.

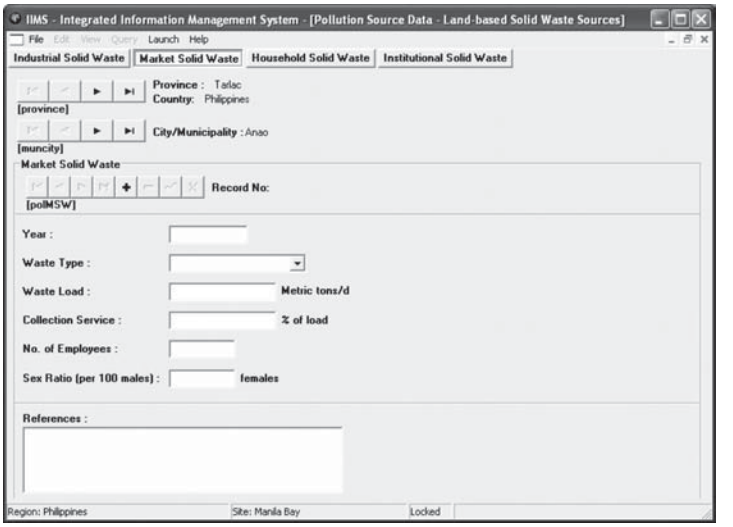


Industrial Solid Wastes refers to waste types and amounts generated at the city/municipality level. Waste type refers either to paper/cardboard, scrap iron, aluminum, glass, plastic, yard waste and others that have been identified.



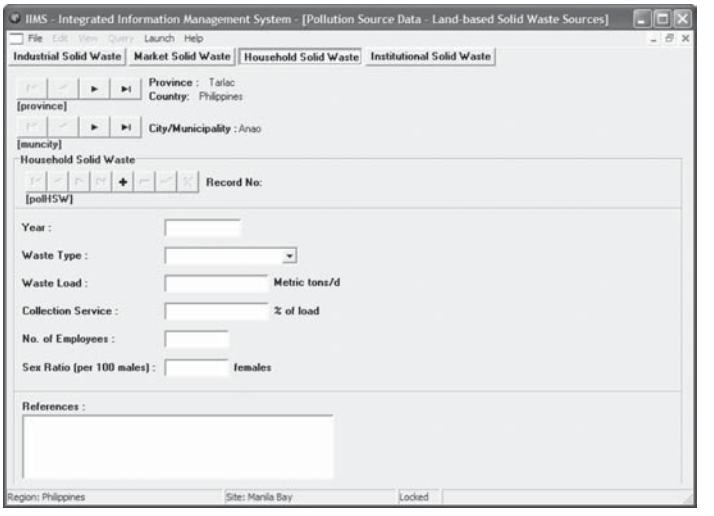
Market Solid Waste includes commercial/market solid waste types and amounts generated for each type at the city/municipality level.

Waste type refers either to paper/cardboard scrap iron, aluminum, glass, plastic, yard waste and others.

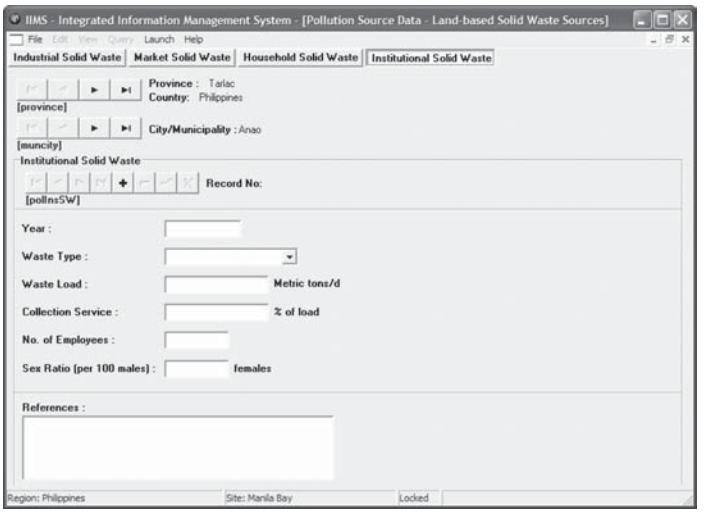


Household Solid Waste refers to waste types and amounts generated at the city/ municipality level.

Waste type refers either to paper, cardboard, scrap iron, aluminum, glass, plastic, yard waste and others.

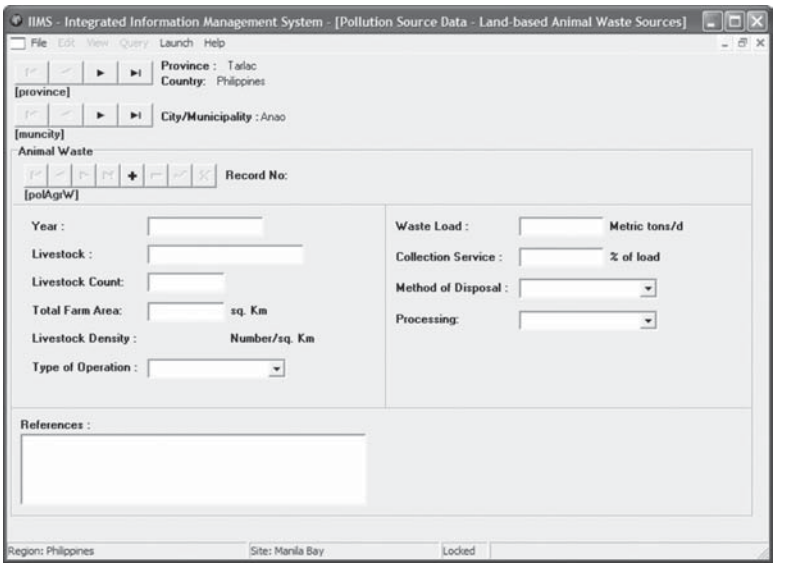


Institutional Solid Waste refers to waste types and amounts generated by institutional establishments such as hospitals, schools, administration offices, and others at the city/municipality level, excluding hazardous waste.



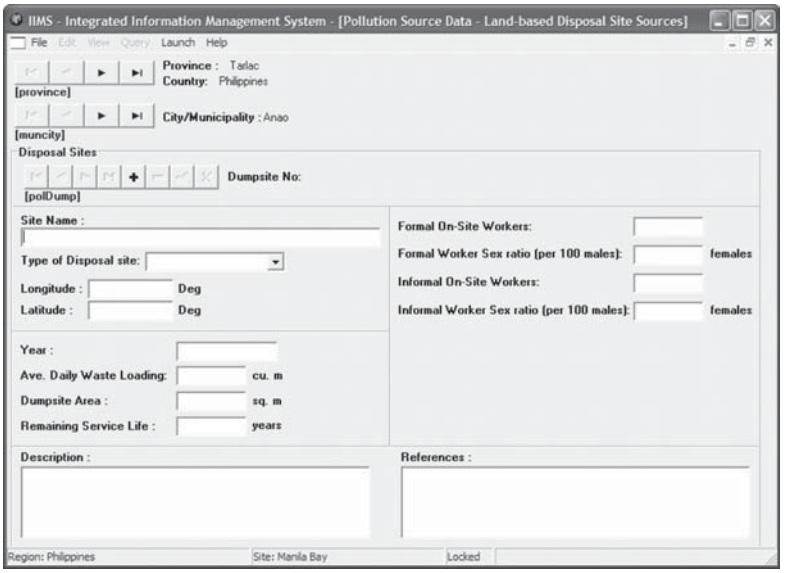
Agricultural/Animal Waste refers to waste types and amounts generated at the city/municipality level.

Livestock refers to poultry, hog, cattle or others. Type of operation refers to commercial or backyard. Method of disposal refers to discharge to open ditches, on site or spreading on land. Processing refers to none, aerobic, non-aerobic, decomposing or holding ponds.

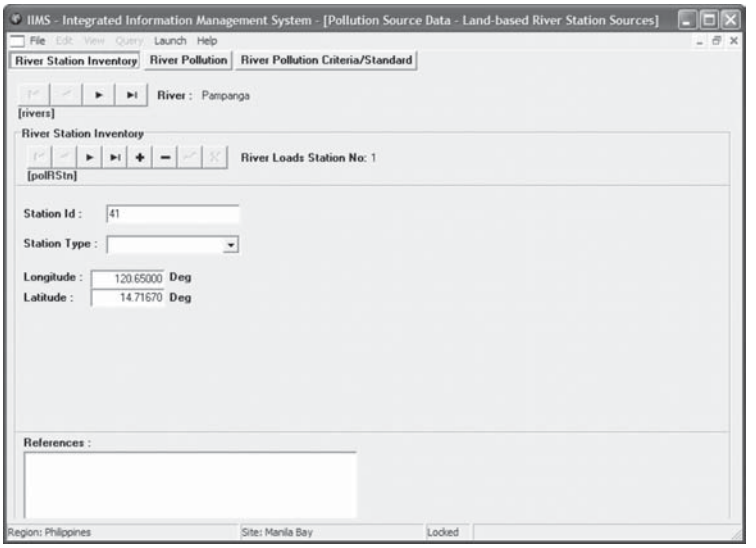


Disposal Site lists waste dumping sites by city/municipality, either they are controlled, uncontrolled or sanitary land fill.

Formal on-site workers refer to those hired either on a permanent or contractual status. Informal on-site workers refer to self-employed workers such as scavengers in the sites. Description should indicate the equipment available for waste burial and the degree of sanitary landfill compliance for normal operations.

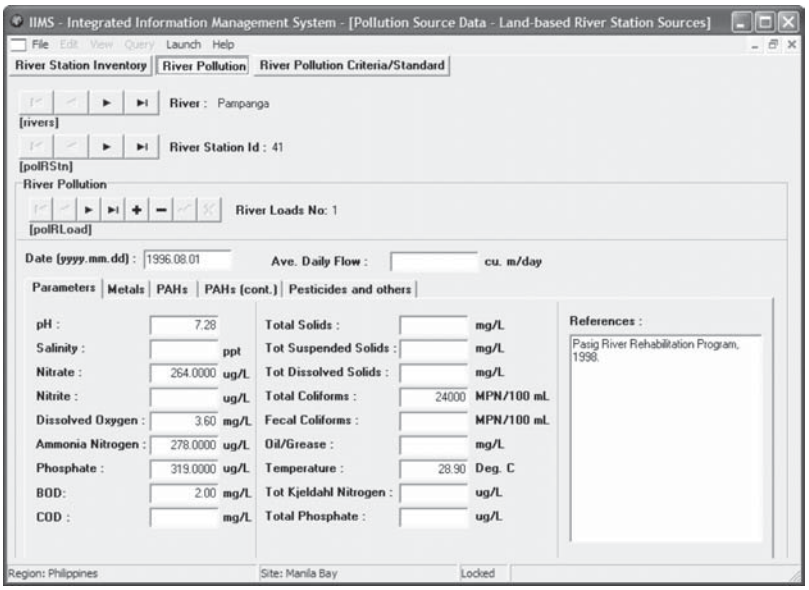


River Station Inventory lists river stations in a given river in the site. It includes location expressed in longitude and latitude. Station type refers to tidal and non-tidal.

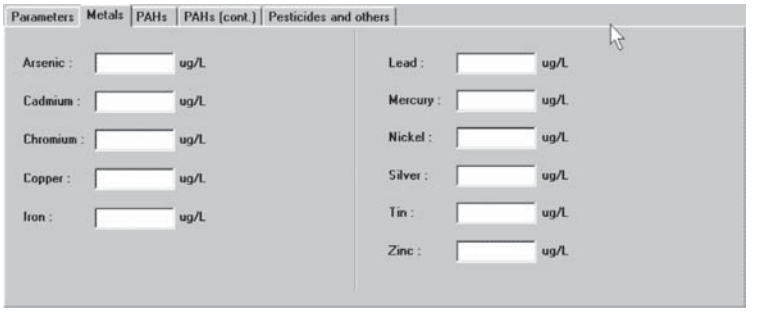


River Pollution contains data based on river discharge and pollutant concentrations measured near the coast, which affect the coastal zone. Data precision for field with mg/L and ug/L is up to four decimal places. For coliform, field precision is up to two decimal places.

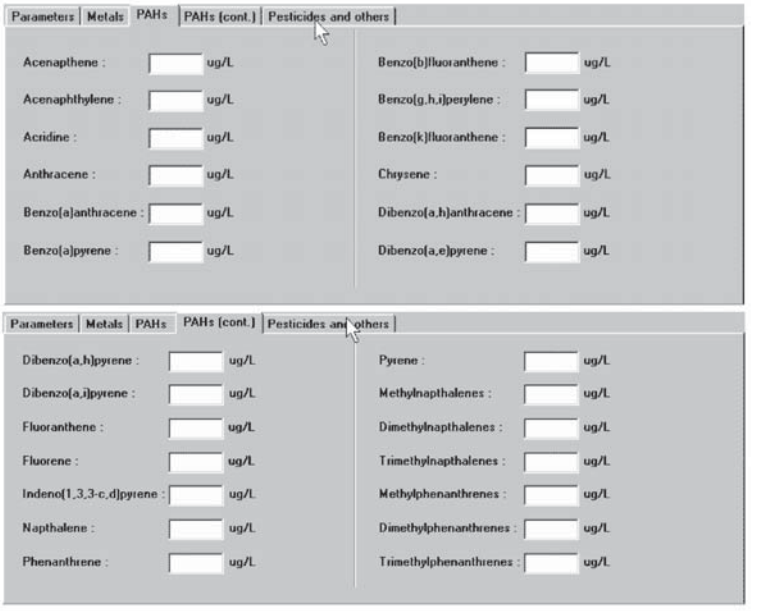
Parameters



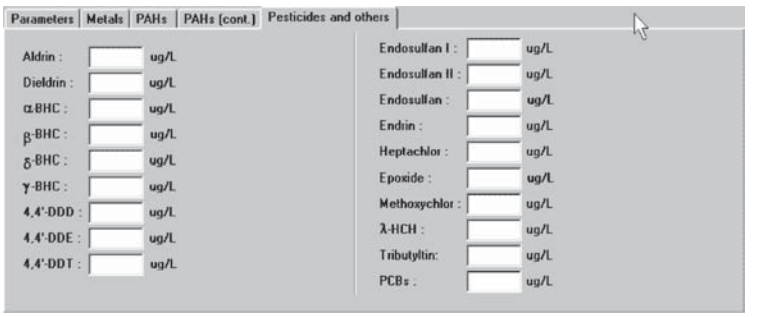
Metals



PAHs

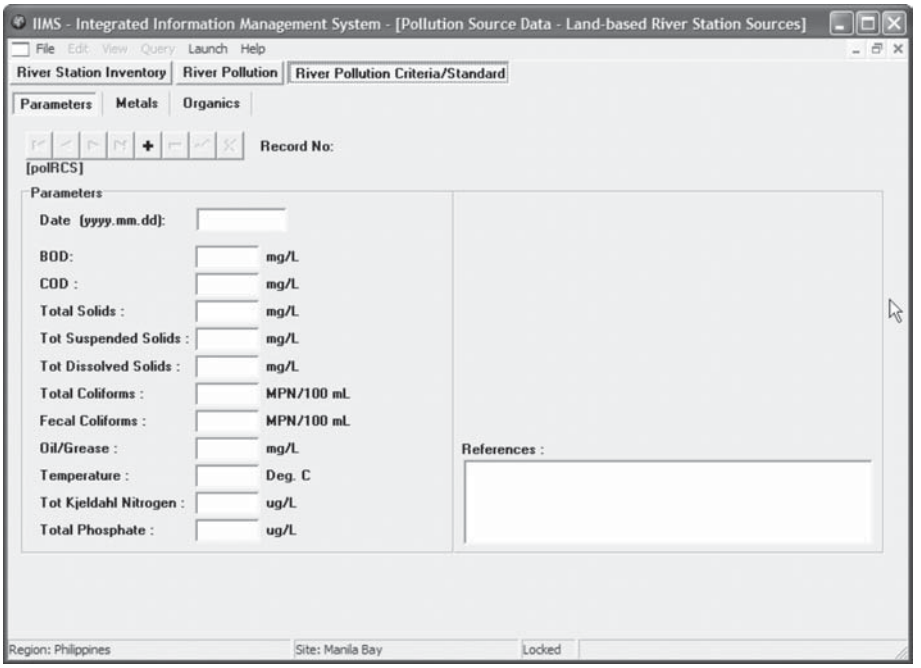


Pesticides and Other Organics

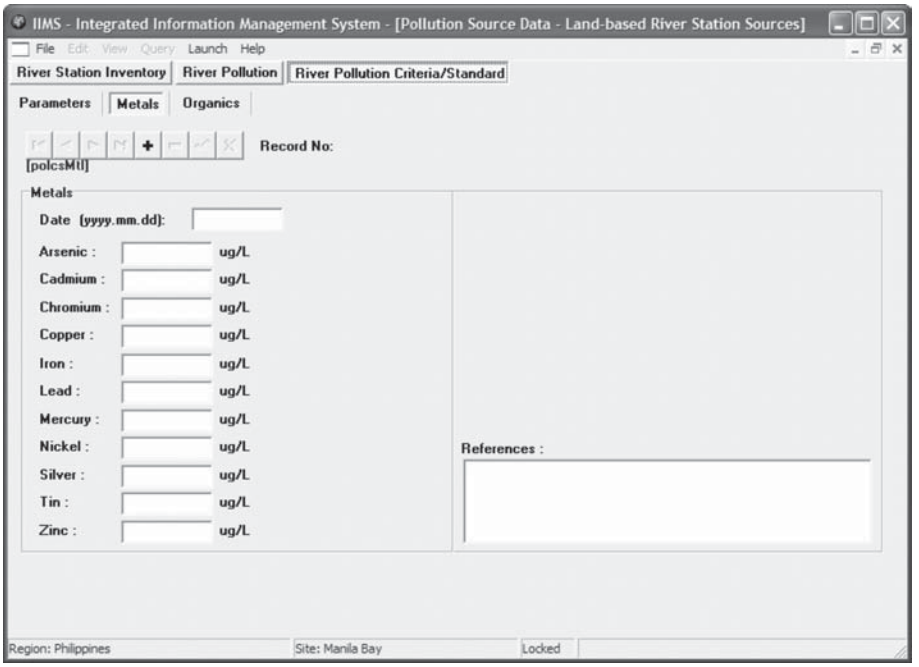


River Pollution Criteria

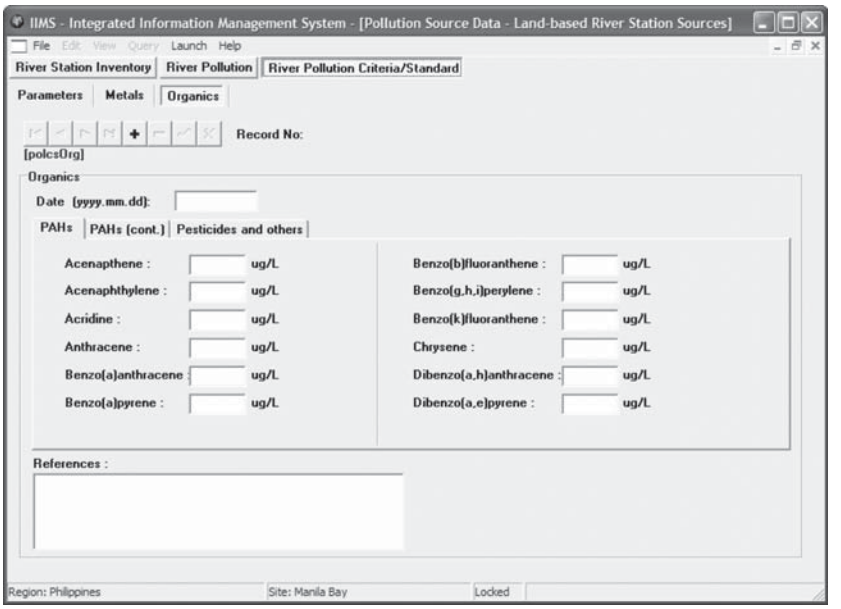
Conventional Parameters

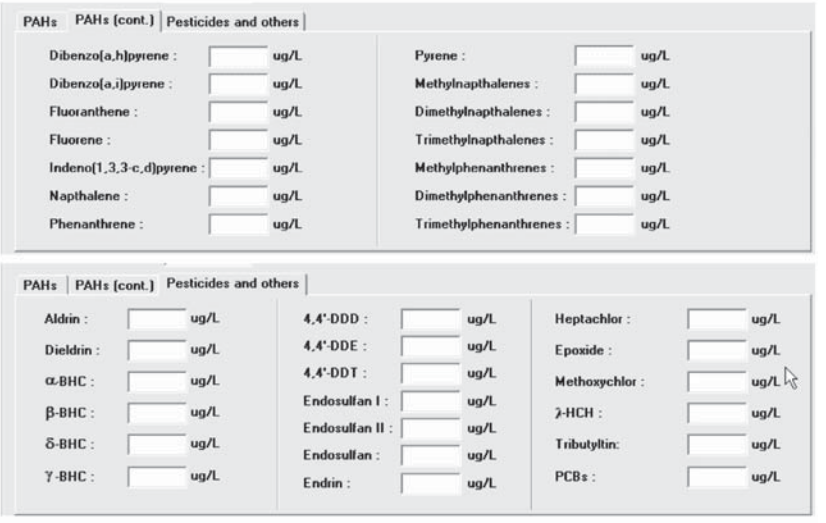


Metals



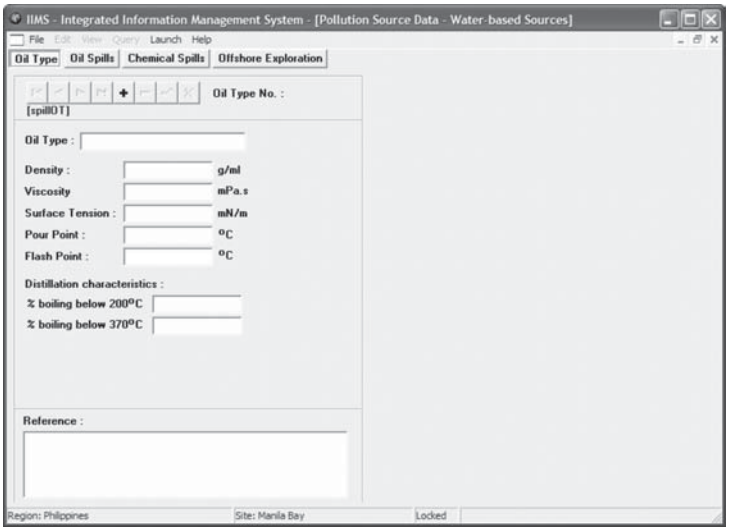
PAHs, Pesticides and Others is a series of tables containing criteria or standards for these parameters. In each table, references are necessary.



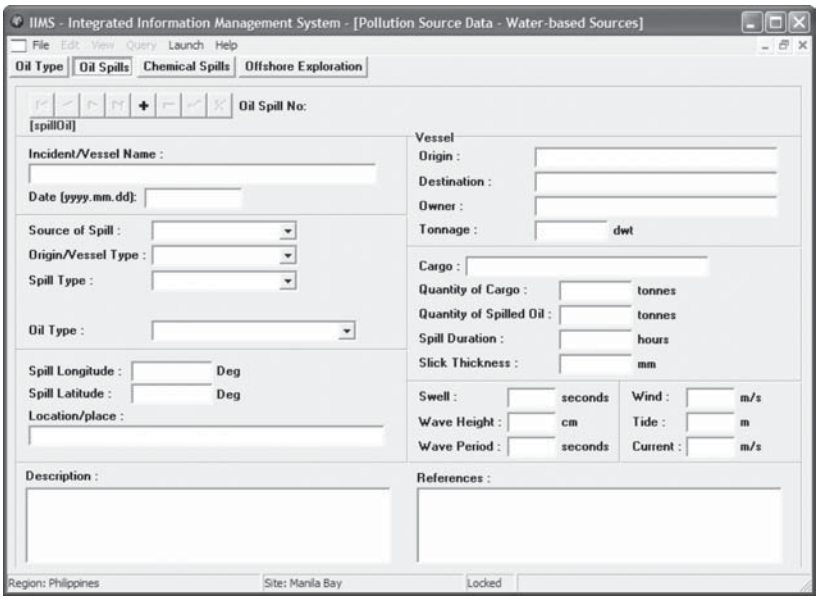


Water-based Sources

Oil Type refers to the properties of various oil types such as density, viscosity, surface tension, pour point, flash points and distillation characteristics. This is linked with the oil spill table.



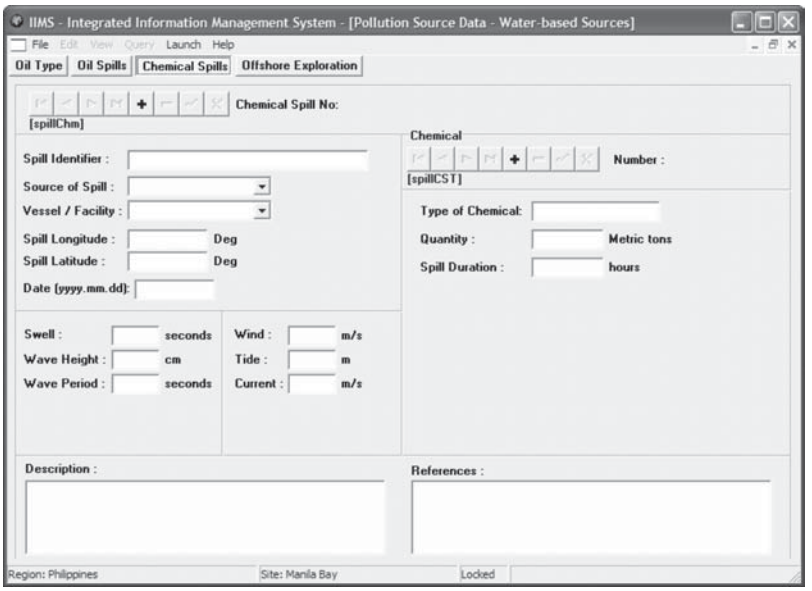
Oil Spills refers to data on oil spills (vessel and origin spills) occurring within the site, and includes data on crude and refined hydrocarbon products. These parameters can be used for oil spill contingency planning and risk assessments.



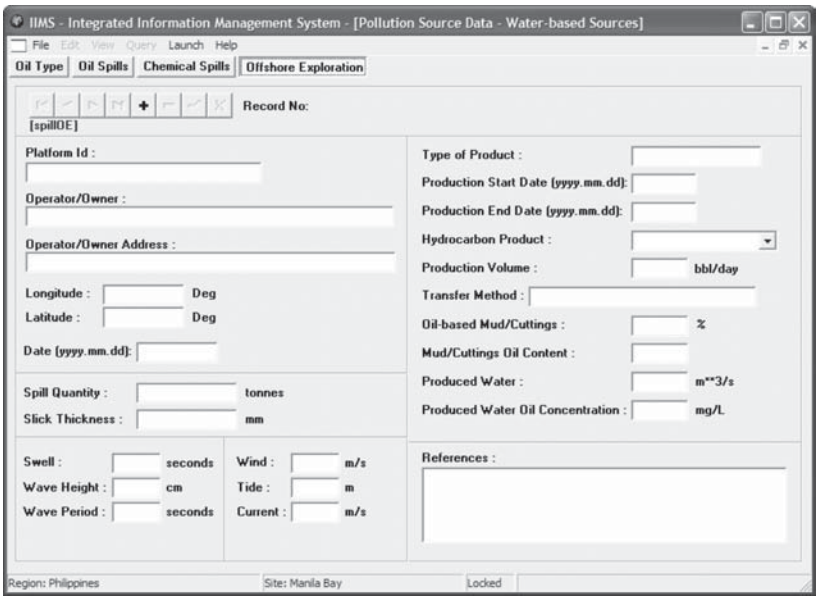
Origin spills refer to spills from a refinery, terminal or power plant. Vessel and barge spills refer to spills from anchored vessels in an offshore berthing area and to spills from vessels while underway. These generally belong to three categories: casualty (collision), striking or grounding. International databases include Lloyd's Maritime Information Services — "Casualty and Demolition Database" and "Tanker Casualties Resulting in Oil Pollution." These databases provide comprehensive information on vessel particulars, the type of casualty, severity of damage and cargo lost for propelled sea-going merchant ships. Data on spills associated with terminal operations, and from barges and other coastal vessels, are best obtained from port authorities and oil spill response organizations within each port jurisdiction.

Sea conditions during the spill are also recorded in this form.

Chemical spills contain data on spills occurring within the site boundaries. Spills that occur from vessels/moorings on water and that occur at shore terminals are also included.



Offshore exploration data are contained in this file. Exploratory platforms are not to be included because they are generally at one site for less than one year. If it is desirable to include exploratory drilling platforms then they should be noted. The parameters are used for mud/cuttings and water impact assessments.



Monitoring Data Category

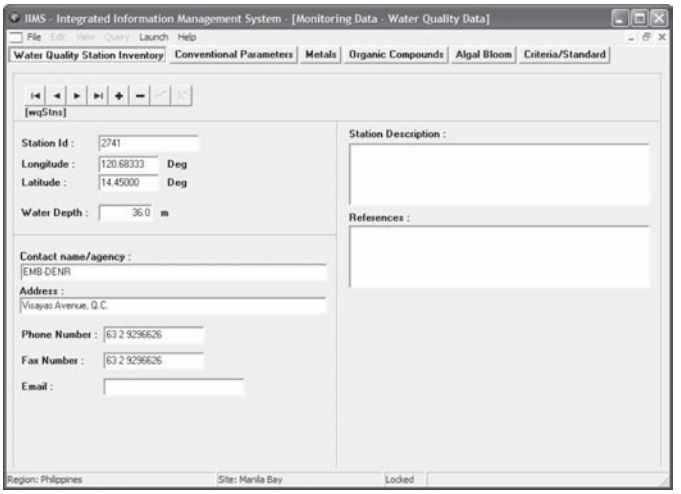
This category deals with data on parameters that can be collected through environmental monitoring. Classes for this category include water quality, sediment quality, groundwater quality and tissue analysis of fish and shellfish. Classes are further subdivided into conventional parameters, heavy metals, organic chemicals, nutrients, tissue analysis and harmful algal bloom. Criteria/standards for each parameter or contaminant are also stored under each subclass. The unit of measure for each parameter or contaminant is indicated in the forms.

In terms of data precision, the system allows the following:

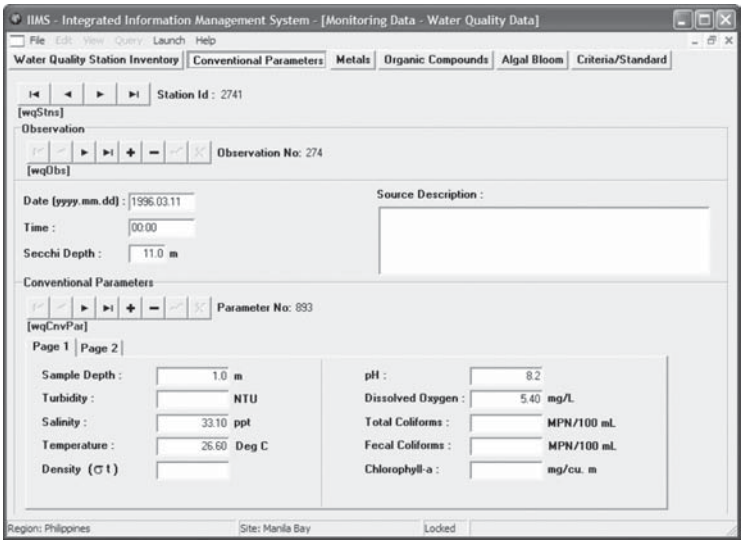
- Longitude and latitude – four decimal places and converted into degrees (e.g., 120.4537 degrees)
- Water depth, sample depth – two decimal places (e.g., 6.25 m)
- Coliform, DO, TSS – two decimal places (e.g., 5.25 mg/L)
- Contaminants, chemicals – four decimal places (nitrate -0.2314 ug/L N)
- Temperature, salinity and turbidity – two decimal places (26.45 0C)

Water Quality

Water Quality Station Inventory maintains an inventory of monitoring stations and basic data describing each station.

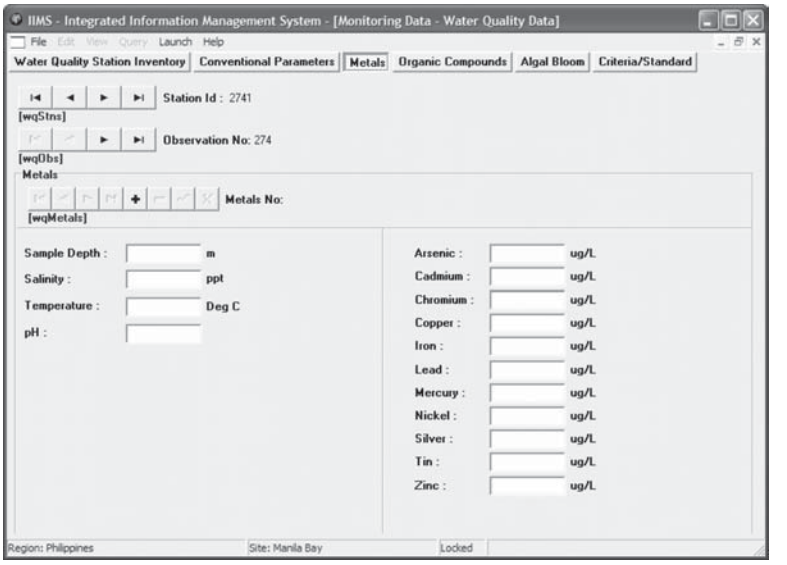


Conventional Parameters refers to physio-chemical data obtained from a marine water sample, which were further analyzed in a laboratory.



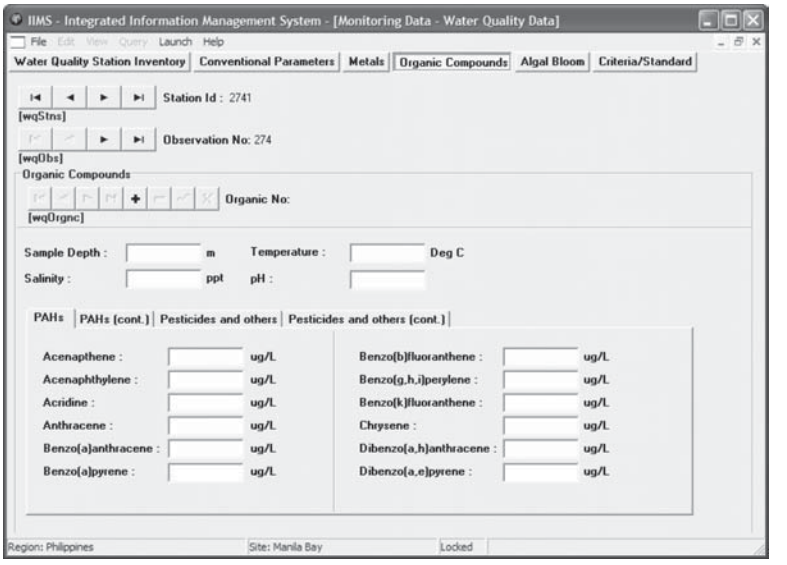
Quality control (QC) and quality assurance (QA) are required and information on the QC/QA procedures followed by the field investigators and laboratories should form part of the background documentation (covering sample preparation, sample preservation, chain-of-custody documentation, handling times, instrumentation specifications and laboratory certification). The source text description should identify the specific source and contact, coordinates or published reference for the data and note the degree of QC/QA documentation that is available without duplication of information provided in the station inventory table.

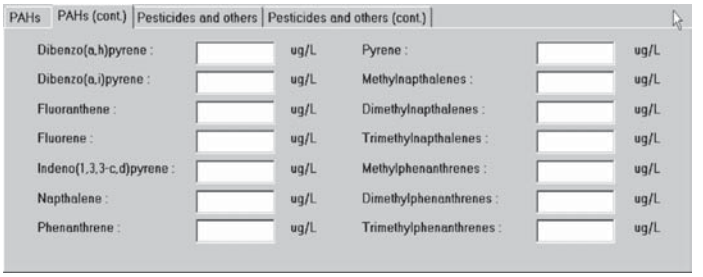
Metals contains data on total metals in a marine water sample.



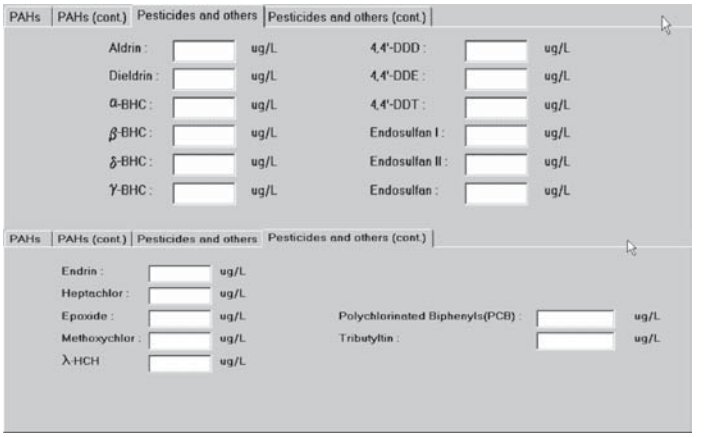
Organic Compounds

PAHs contains data on organic compounds present in a marine water sample.

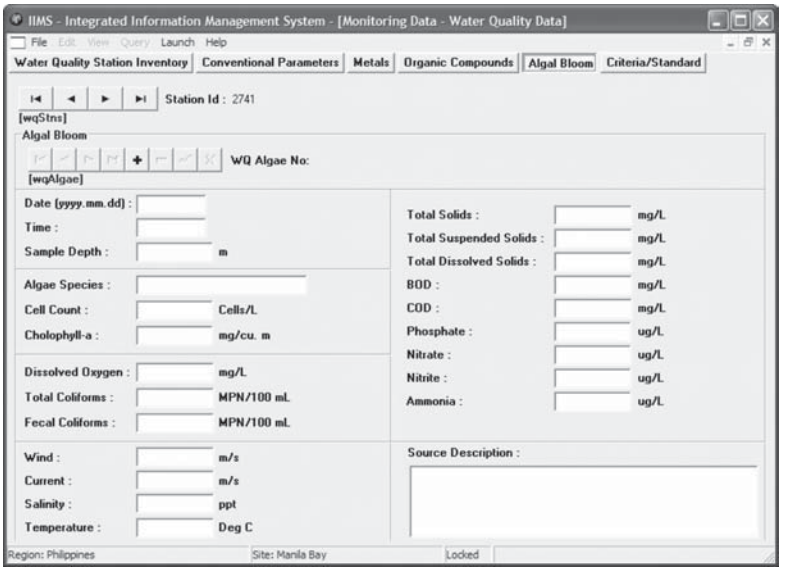




Pesticides and Others includes pesticide residue that contaminates the water column.

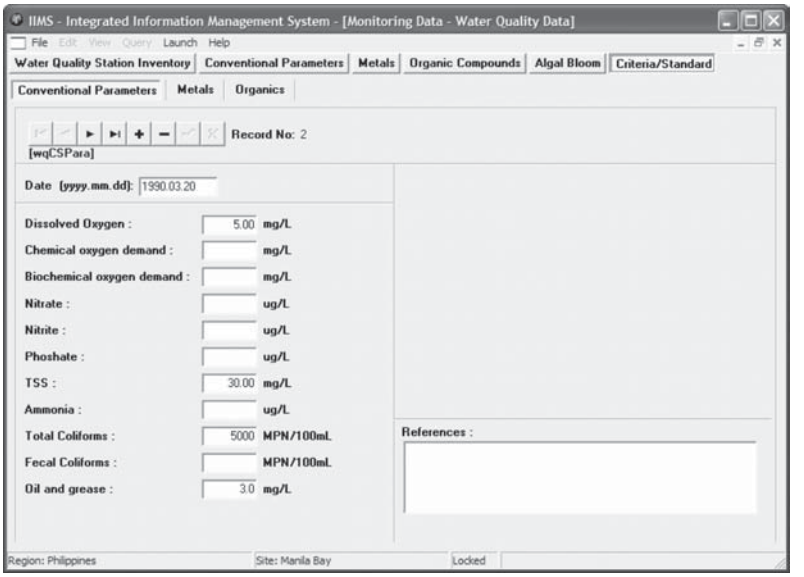


Algal Bloom refers to conventional parameters, chlorophyll-a, species of algae contained in a water sample.

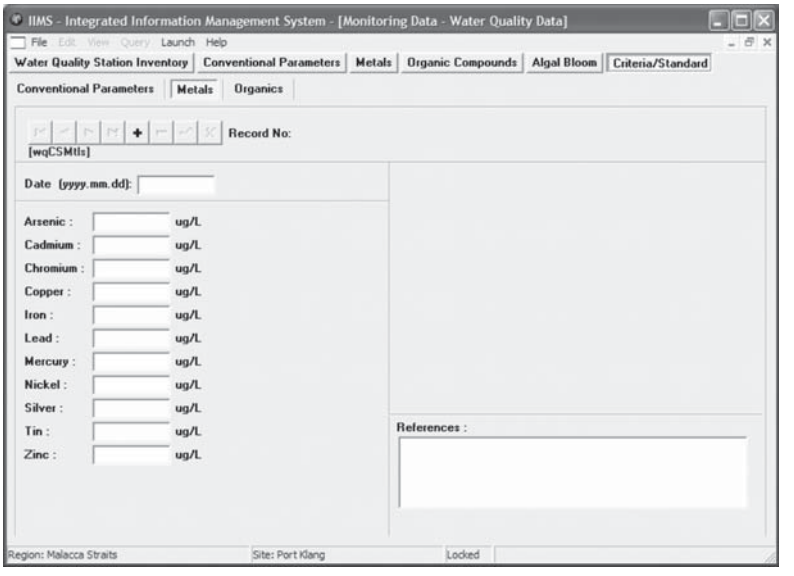


Criteria/Standards are important in environmental risk assessments. The dates required in the following forms refer to the date of adopting such standards through laws, orders and ordinances.

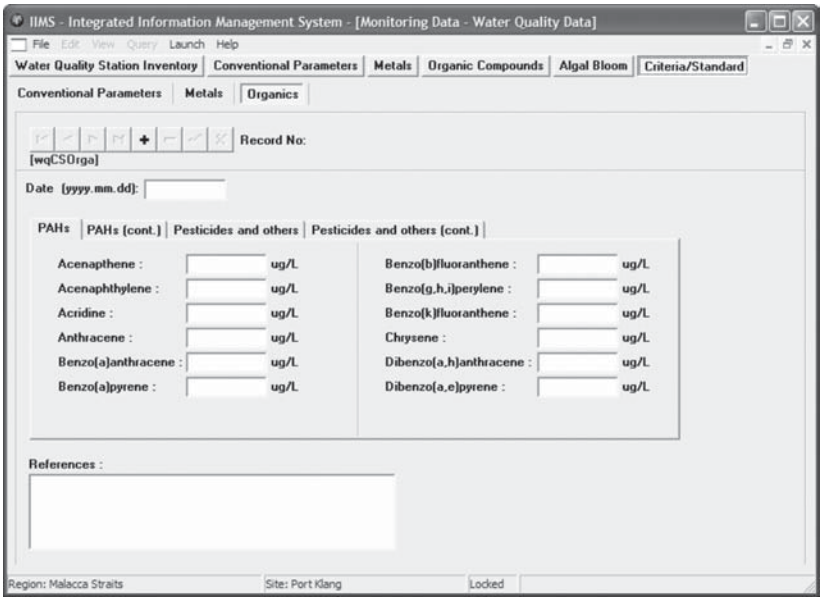
Conventional Parameters

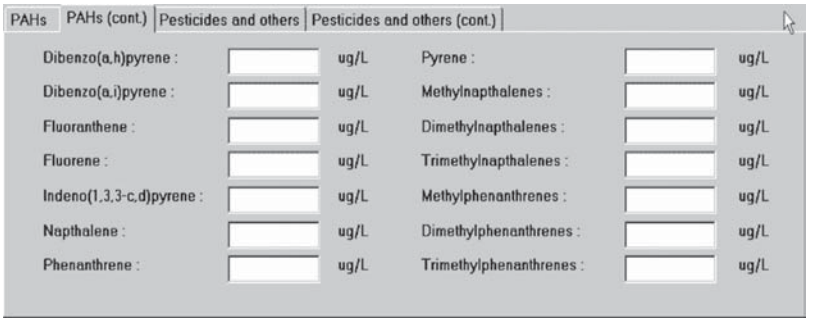


Metals

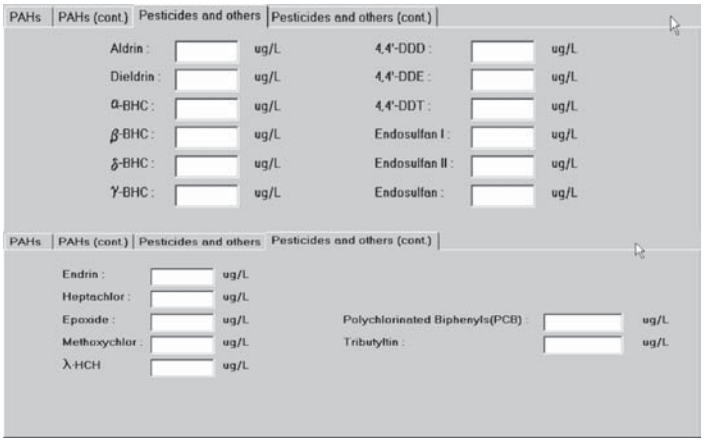


Organic Compounds – PAHs



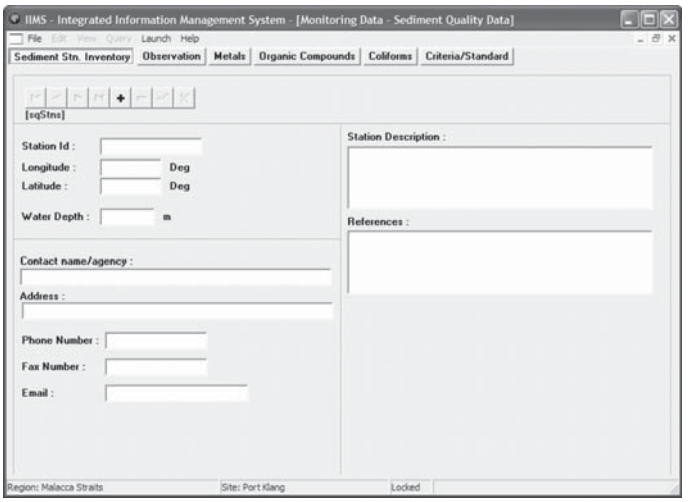


Organic Compounds – Pesticides and Others

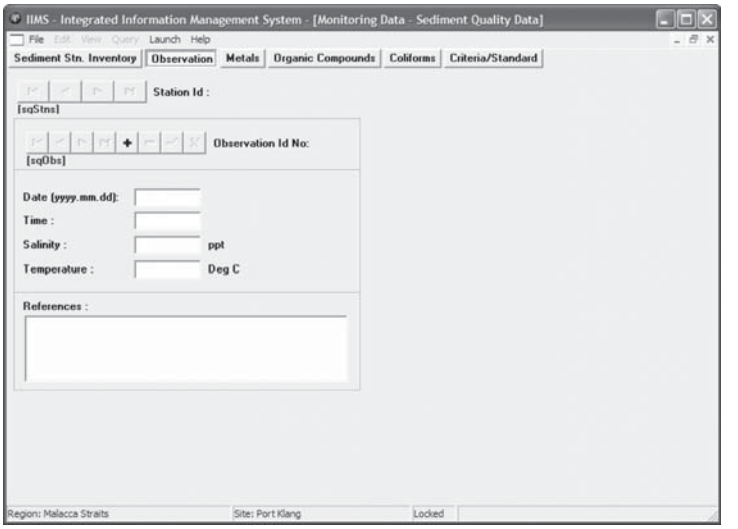


Sediment Quality

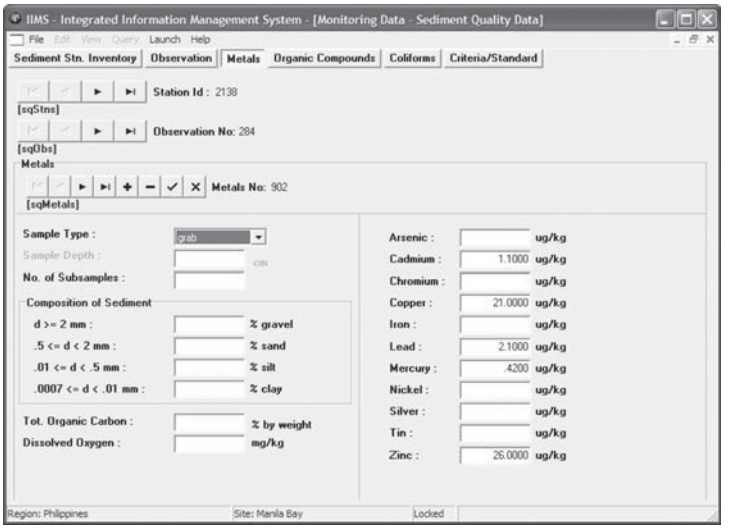
Sediment Station Inventory contains data on monitoring stations and basic data describing the stations.



Observation refers to the date and time the samples were taken. It also includes the salinity and temperature of the water in the station during the survey.

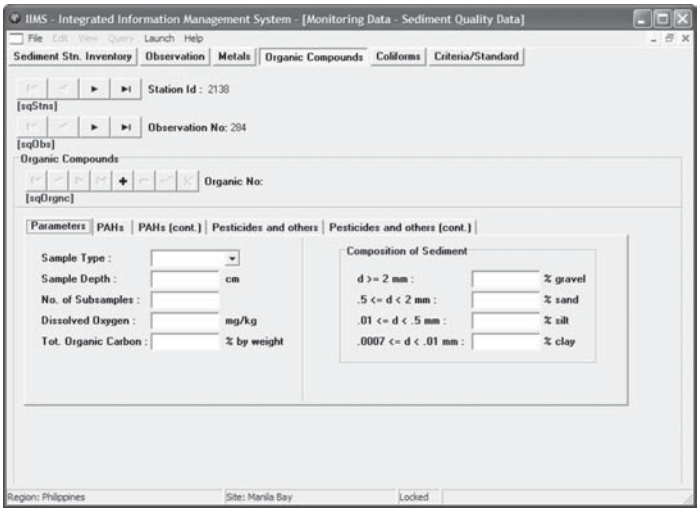


Metals contains physical and chemical data obtained from a marine or estuarine sediment sample.

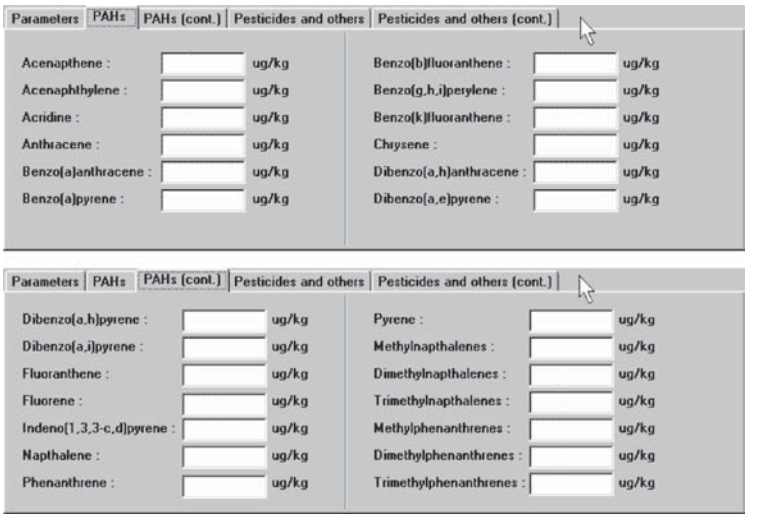


Organic Compounds and Composition of Sediments

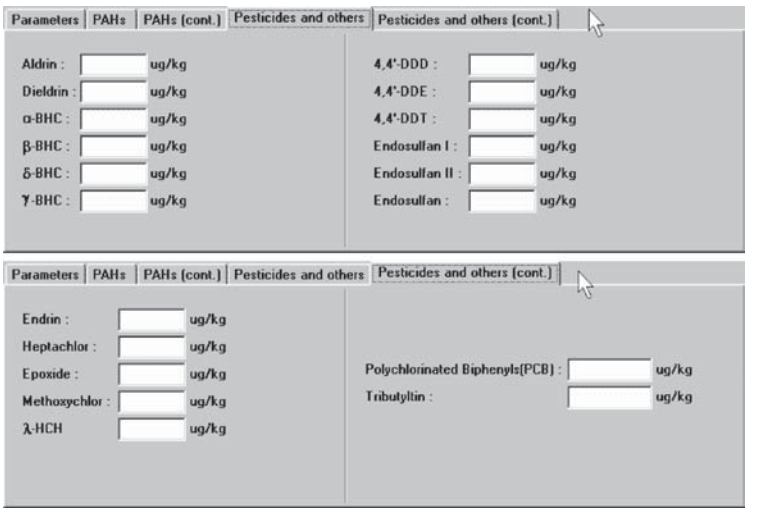
Conventional Parameters describes the composition of sediments and organic compounds found in a marine or estuarine sediment sample.



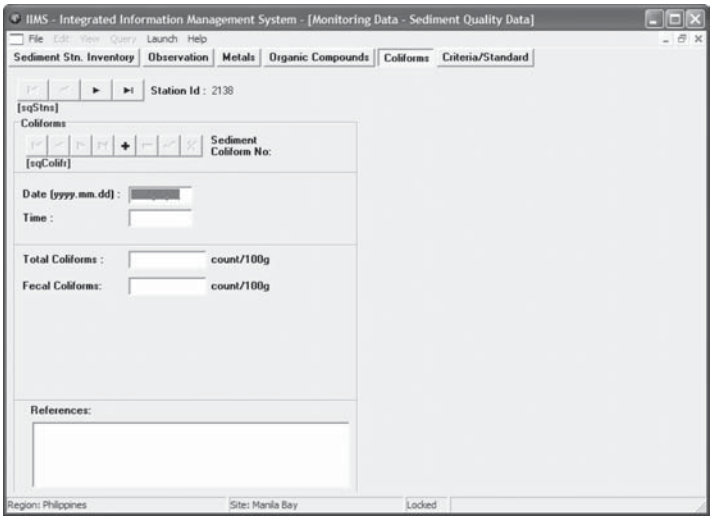
PAHs



Pesticides and Others

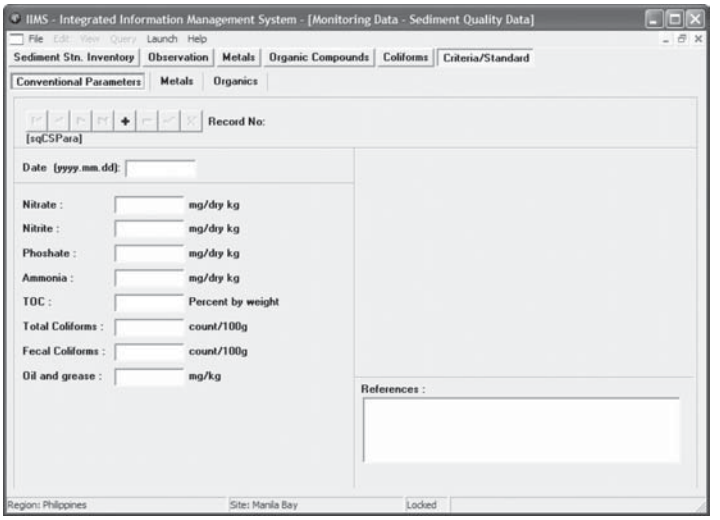


Coliform refers to coliform counts contained in a sediment sample.

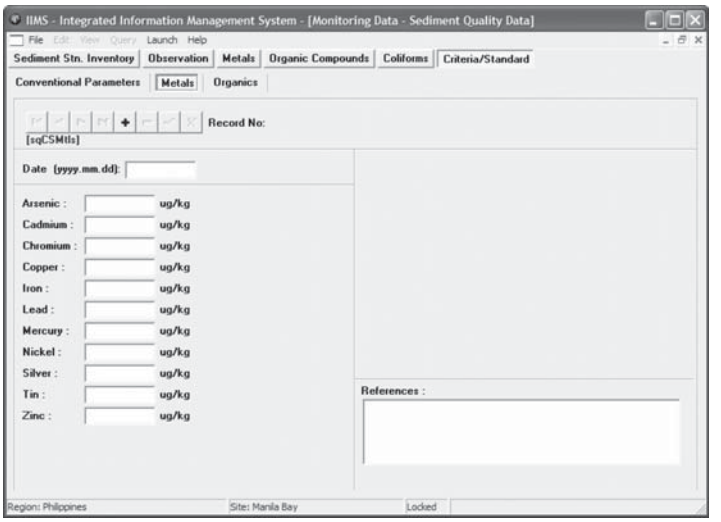


Criteria/Standards should contain current data. The date refers to the date adopting such standards/criteria either through laws, ordinances and orders.

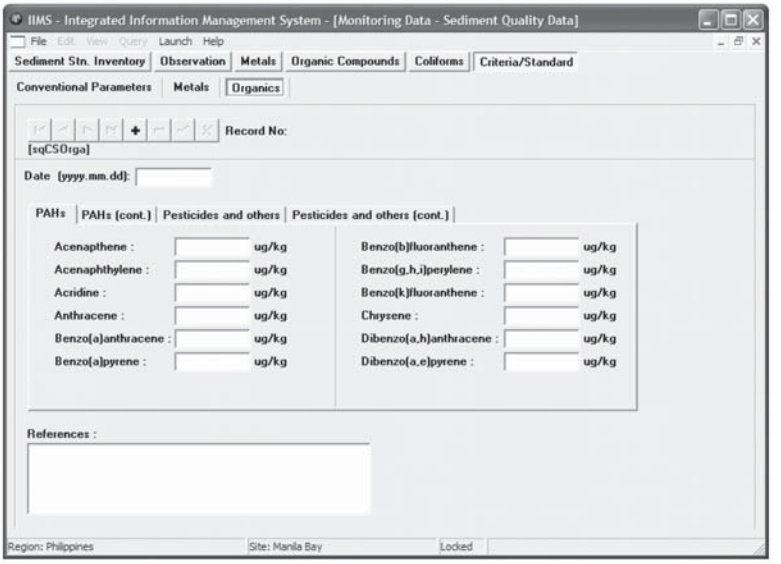
Conventional Parameters contains criteria/standards set for various conventional parameters applicable to the site.

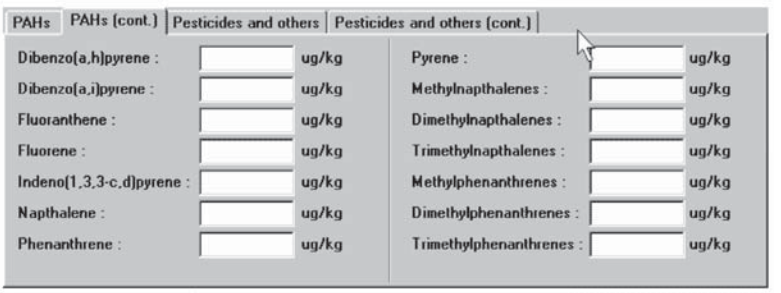


Metals contains criteria/standards set for metals in sediments, which are applicable to the site.

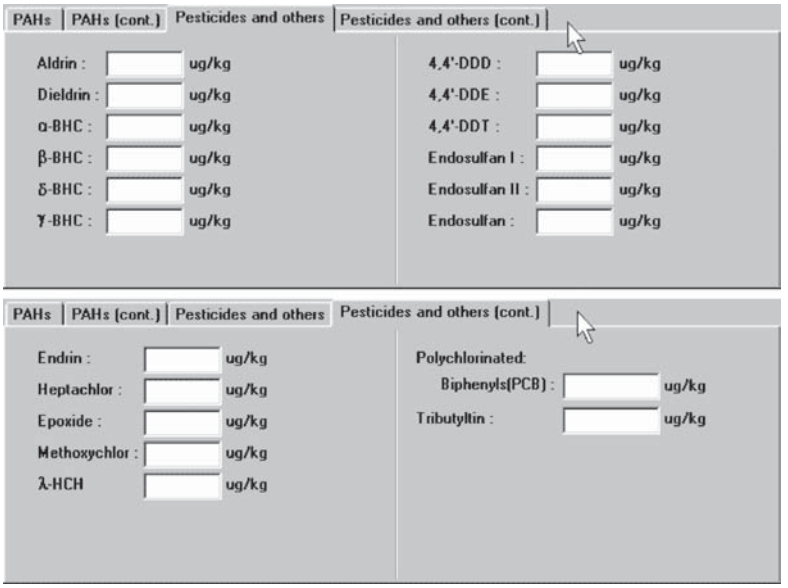


Organic Compounds – PAHs contains criteria/ standards set for organic compounds in sediments, which are applicable to the site.



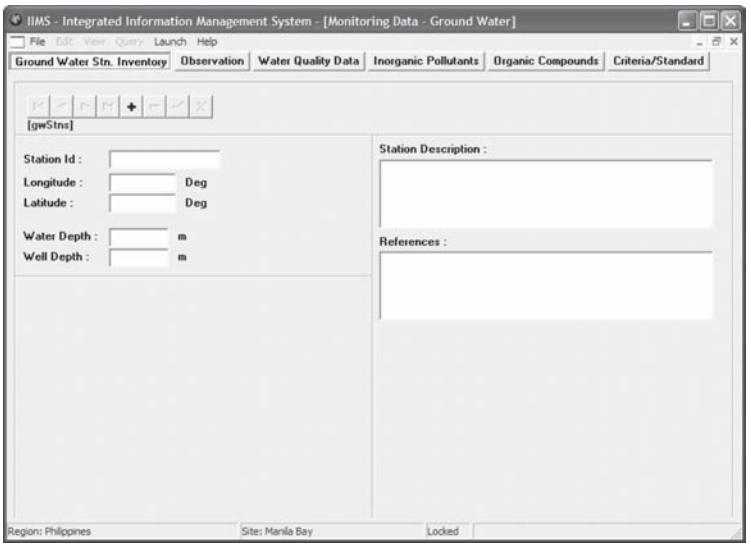


Organic Compounds – Pesticides and Other Contaminants contains criteria/standards set for organic compounds in sediments, which are applicable to the site.

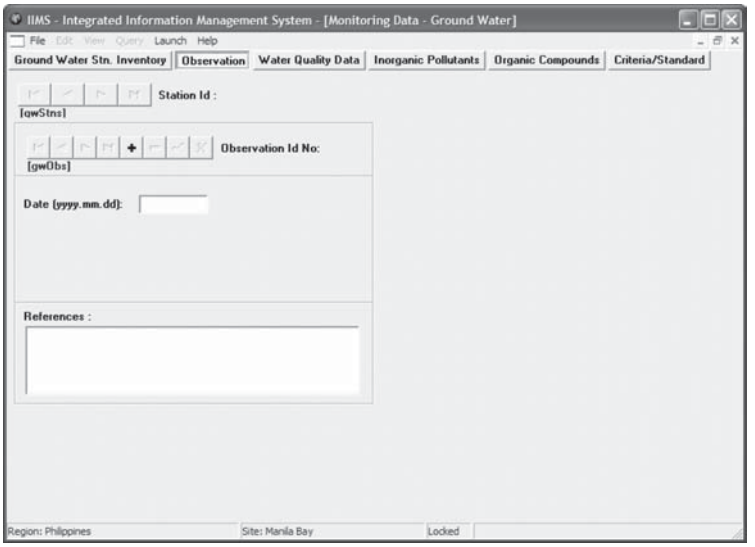


Groundwater Quality

Groundwater Quality Station Inventory includes groundwater stations in a certain site, their location and description.

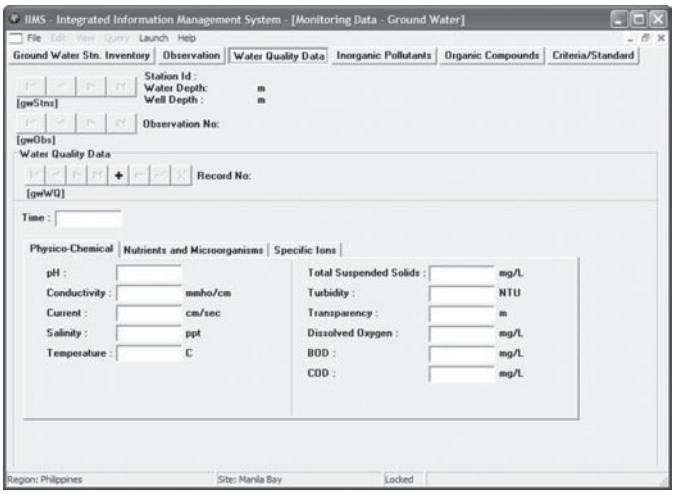


Observation

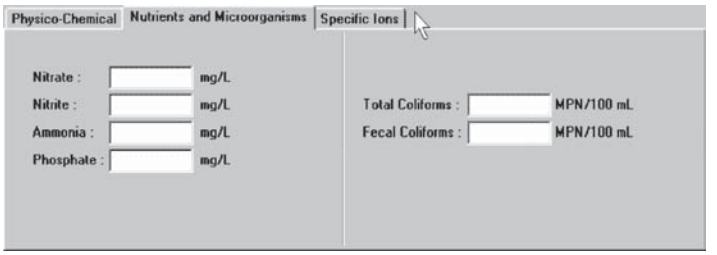


Water Quality Data

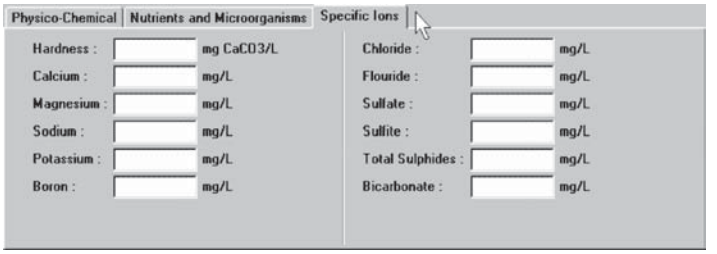
Physico-Chemical Parameters refers to chemical and physical observations obtained from groundwater samples. Water depth represents the depth below the ground level of the water table, if known.



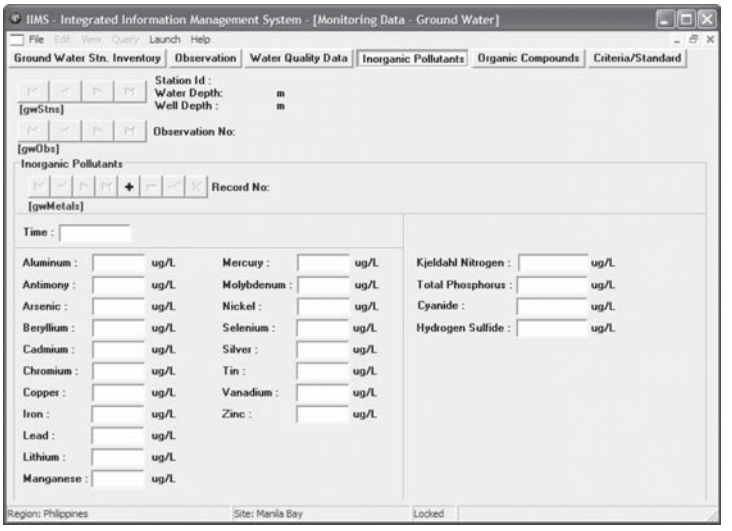
Nutrients and Microorganisms



Specific Ions

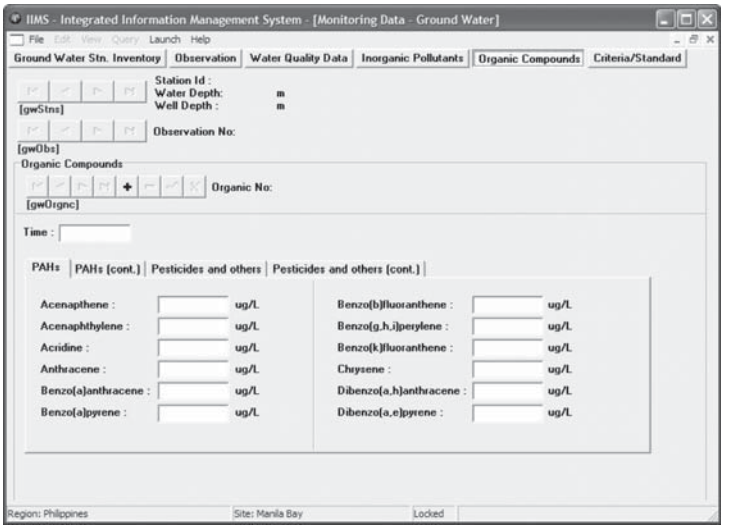


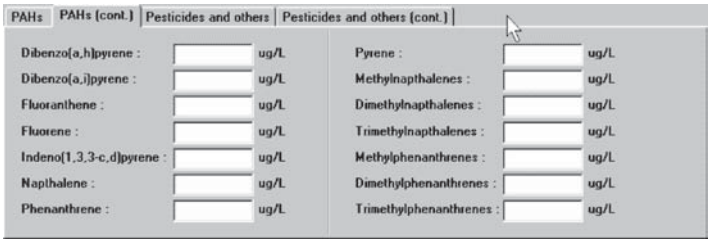
Inorganic Pollutants refers to data on inorganic pollutants that are found in a groundwater samples such as metals and other chemicals.



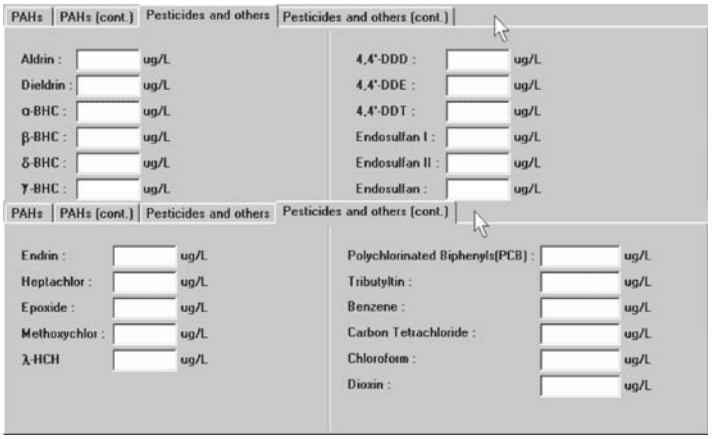
Organic Compounds

PAHs refers to data on PAHs, pesticides and other organic compounds found in groundwater samples.



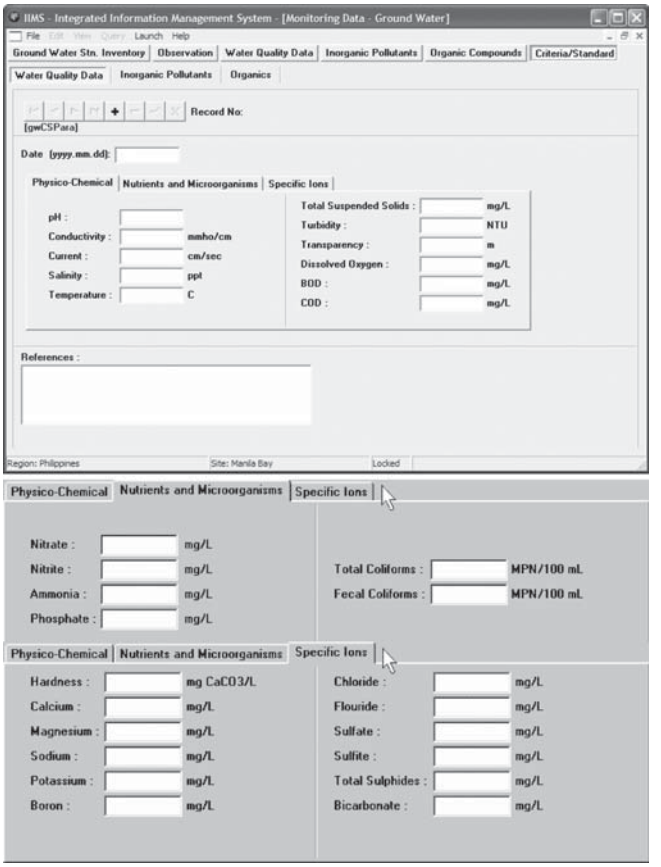


Pesticide and Others

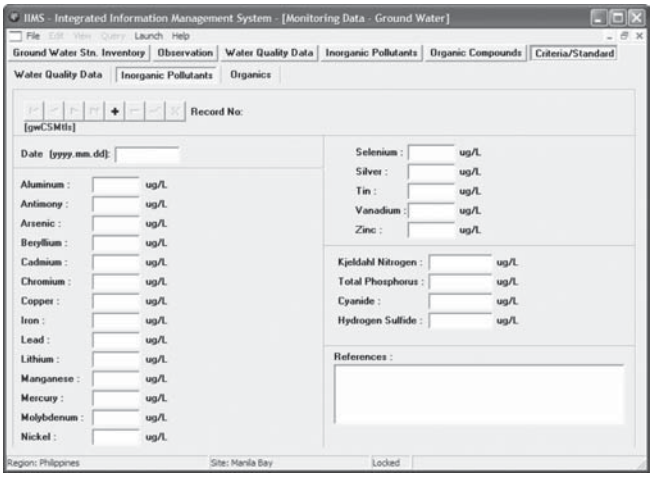


Criteria/Standards

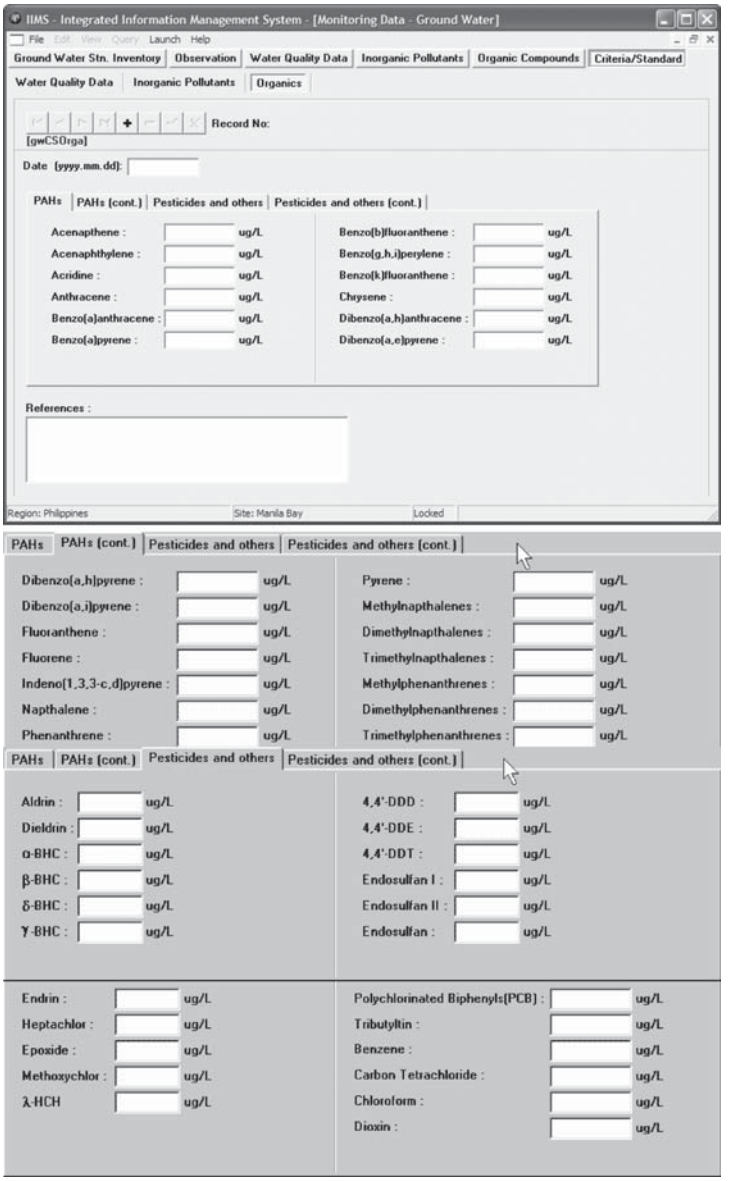
Physico-chemical Parameters, Nutrients and Microorganisms, and Specific Ions is for parameters set for groundwater quality in the site.



Inorganic Pollutants refers to standards set for metals in groundwater.

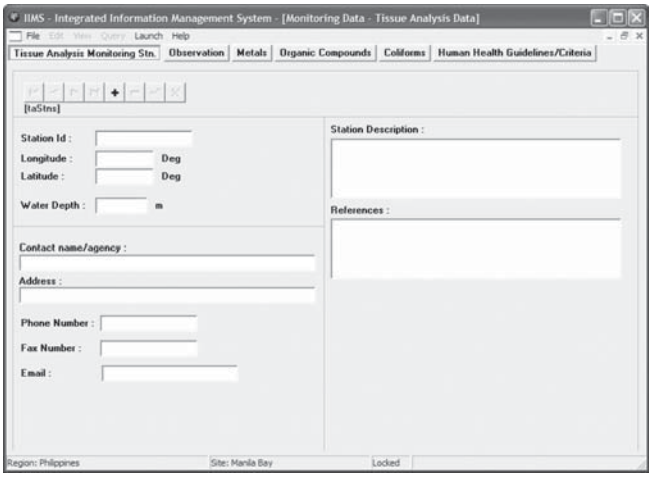


Organics is for criteria/standards set for organics in groundwater.

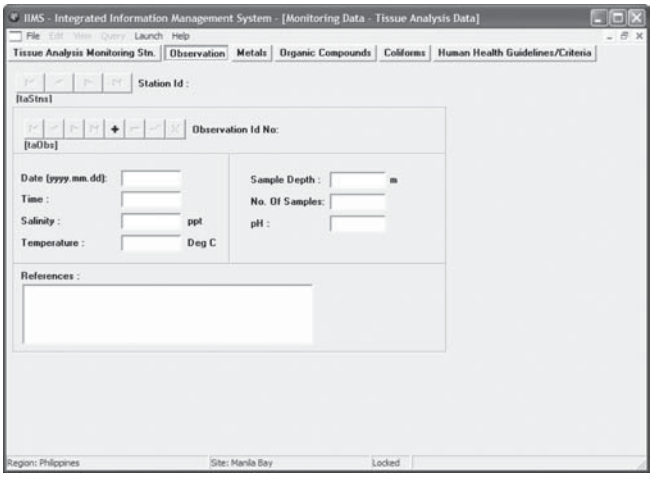


Tissue Analysis

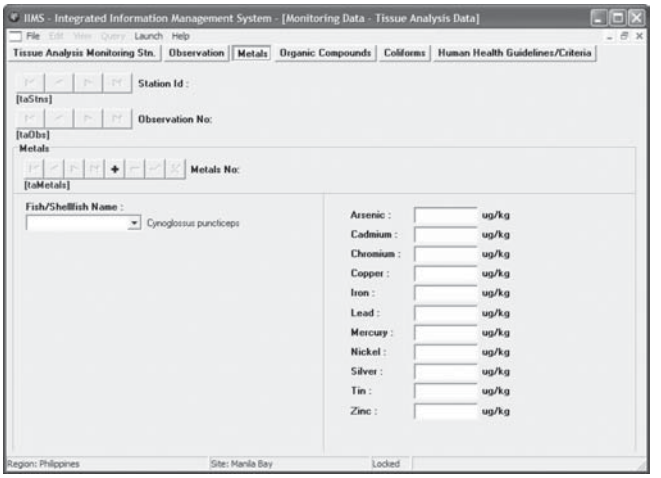
Tissue Analysis Monitoring Station contains description of monitoring stations where samples were taken.



Observation refers to information on the date and time of survey, salinity, temperature, sample depth, number of samples and pH.

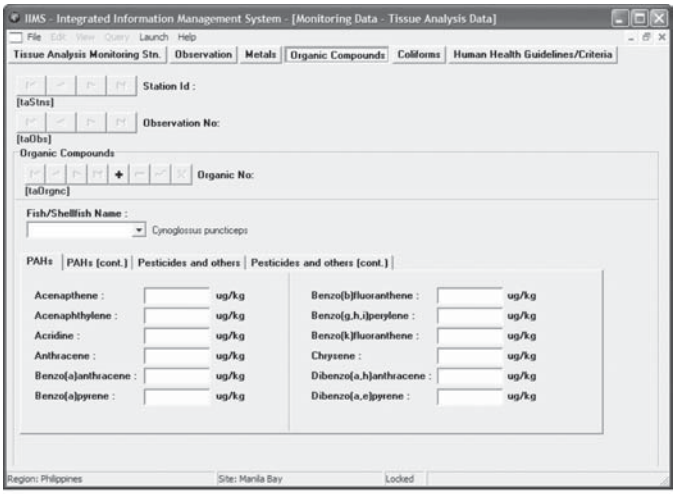


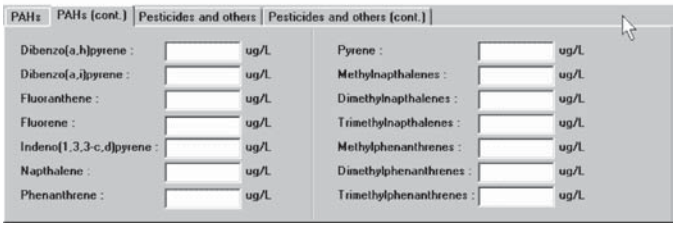
Metals refers to the concentration of various metals measured from the analysis of the tissues.



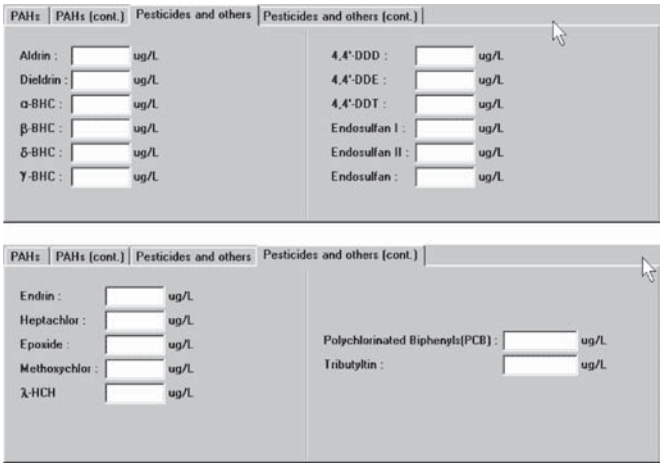
Organic Compounds

PAHs refers to the concentration of various metals measured from the tissue analysis.

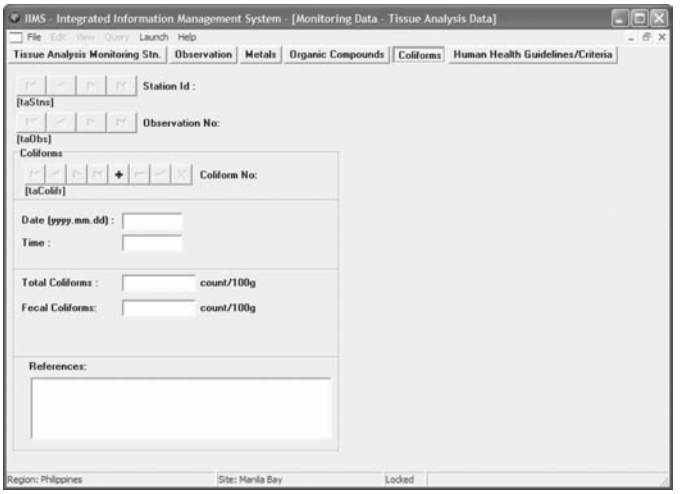




Pesticides and Others refers to the concentration of various pesticides measured from the tissue analysis.



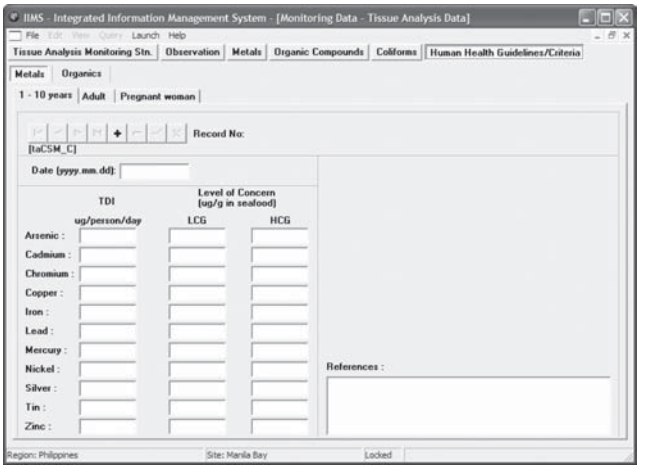
Coliform refers to the number of total and fecal coliform observed in a certain station.



Human Health Guidelines/Criteria refers to the tolerable daily intake (TDI) and the level of concern for each age group. The TDI is the maximum amount of contaminant a person can take. The level of concern (LOC) — low consumption group (LCG) and high consumption group (HCG) — is the ratio of TDI and fish consumption of a person per day. The level of concern can be sourced from health departments or from international literature. There may be differences in TDIs and LOCs between countries and regions.

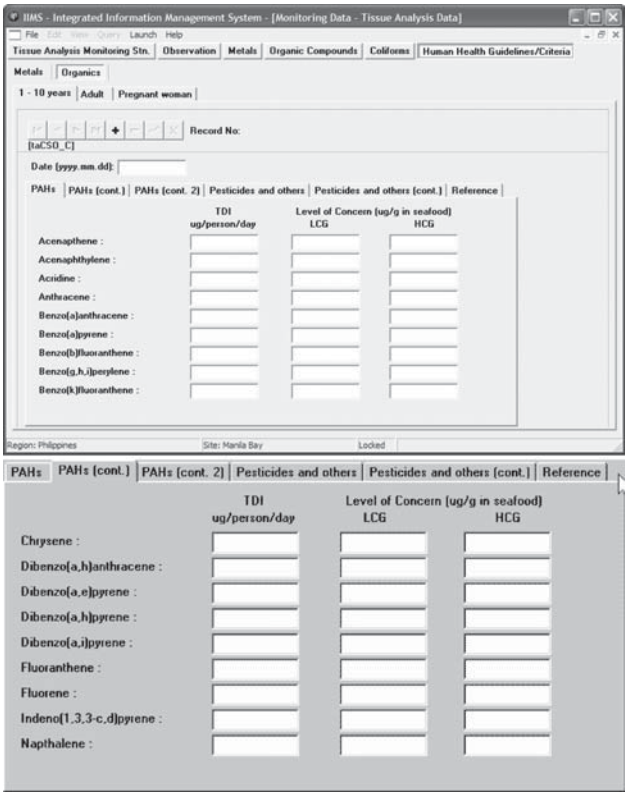
These forms requires input for three age groups: 0-10 years, adult and pregnant woman.

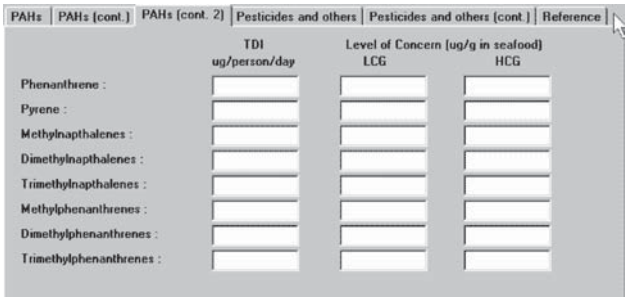
Metals



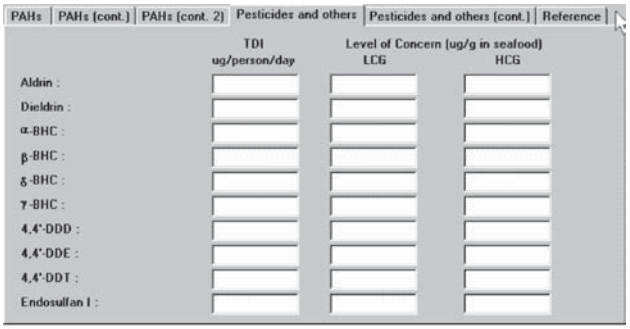
Organic Compounds

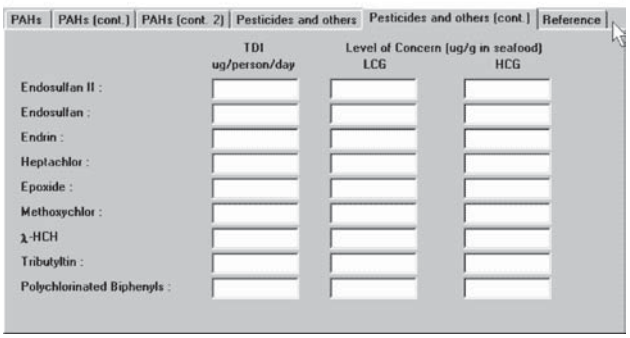
PAHs





Pesticides and Others



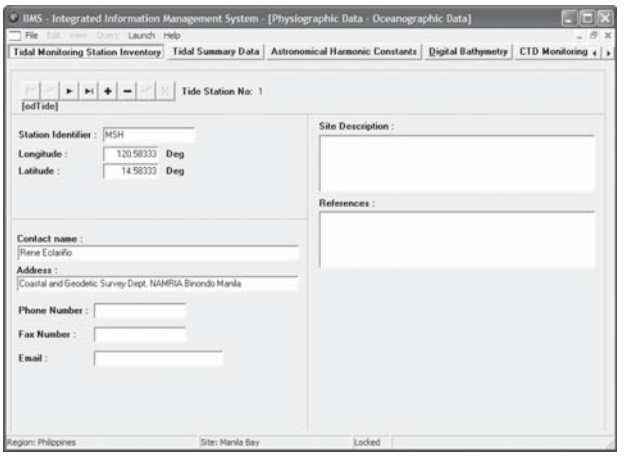


Physiographic Data Category

The physiographic category deals with oceanographic, hydrologic and geological data, which are important inputs in hydrodynamic modeling, ecological and pollutant fate modeling and natural hazard management.

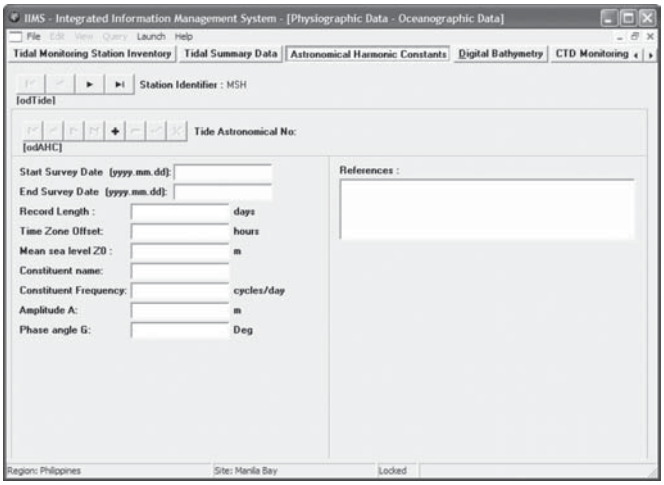
Tissue Analysis

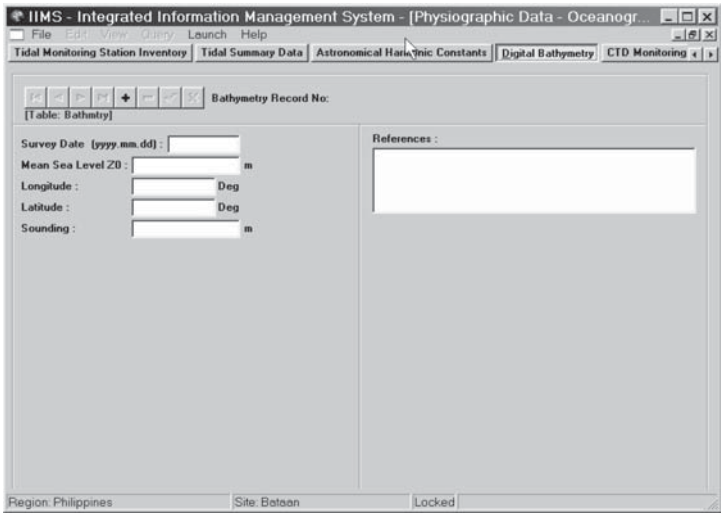
Tidal Monitoring Station Inventory contains data on tide gauging stations and basic data describing the station.



Data Collection: Data are obtained from hydrographic surveying and oceanographic agencies and/or naval authorities in each country. Primary tidal measurement station data may also be available in global databases maintained by the National Oceanic and Atmospheric Administration (NOAA) in the United States and the United Kingdom Institute of Oceanography. Any station listed in this table must be located in the site (or a logical extension of the site to accommodate numerical modeling) and must have data available in summary and/or astronomic constant form.

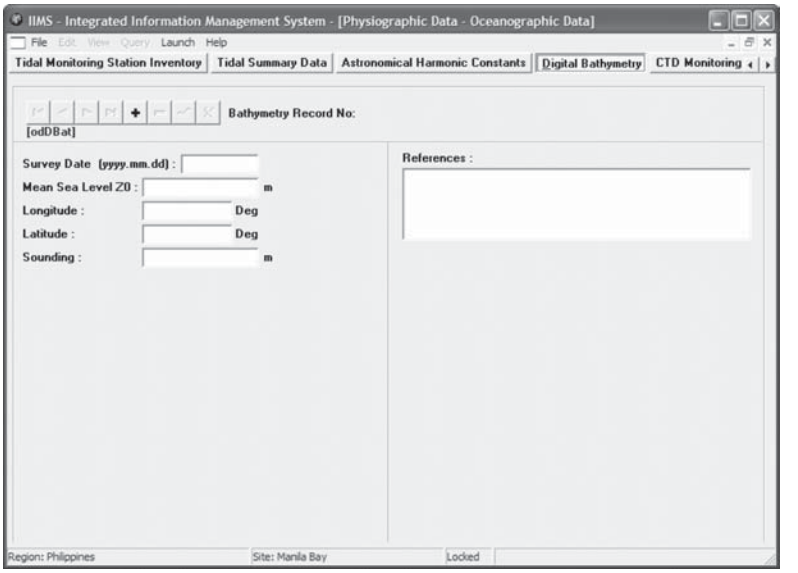
Tidal Summary Data refers to height and range parameters for a tide gauging station.





The record length specifies the period of measurements used to calculate the summary parameters. Generally, the summary parameters are more reliable for records exceeding one year than for measurements of 30 days or less.

Astronomical Harmonic Constants refers to harmonic constants for amplitude and phase of tidal height measurements. The constituent names, which are standardized, are listed in the template when the data file is created. Amplitude and phase parameter values are entered for each constituent. Specify the Z0 term (height of mean sea level above the Lower Low Water Large Tides (LLWLT) or chart datum and the time zone offset of the analysis for the phase. These are mandatory fields.

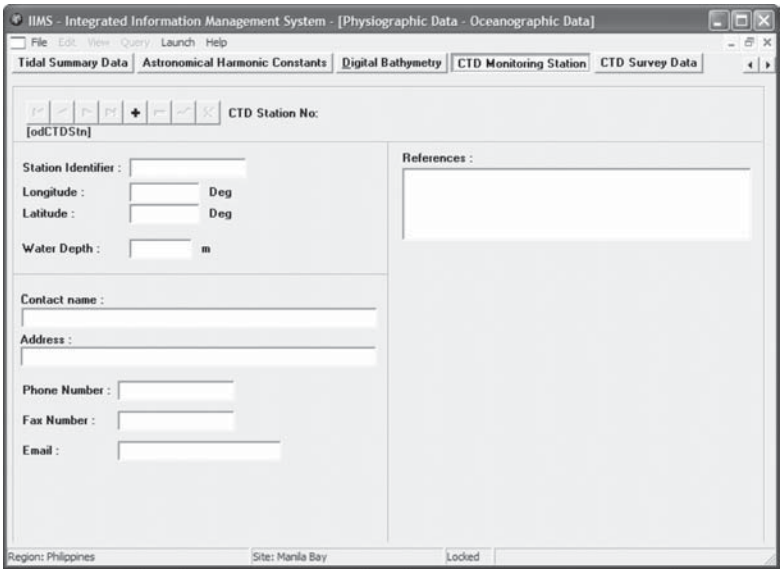


Digital Bathymetry files specify the sounding depth of water from a datum to the seabed, positive downward. For hydrographic surveys, the sounding depth is usually reduced to LLWLT or chart datum. In this case, the mean sea level (MSL) height must be specified since it is used to adjust the sounding values to the common MSL reference for modeling and analysis.

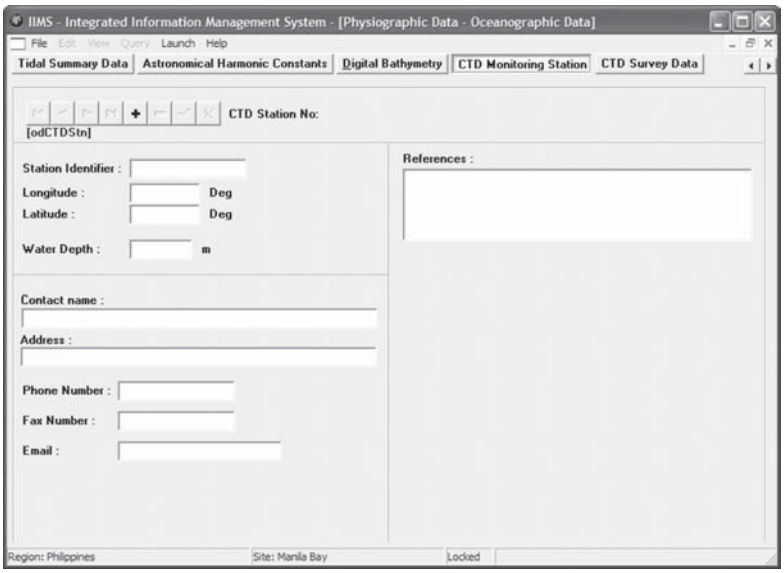
If the data are available relative to MSL, the Z0 term in the header must be specified as zero, meaning no further adjustment is required.

Data are obtained from hydrographic surveying and oceanographic agencies and/or naval authorities in each country. Gridded sounding data are also available in global databases distributed by the NOAA.

One record is used for each constituent repeating the information in fields 1 to 6 exactly. The number of available constituents depends on the record length available for analysis.



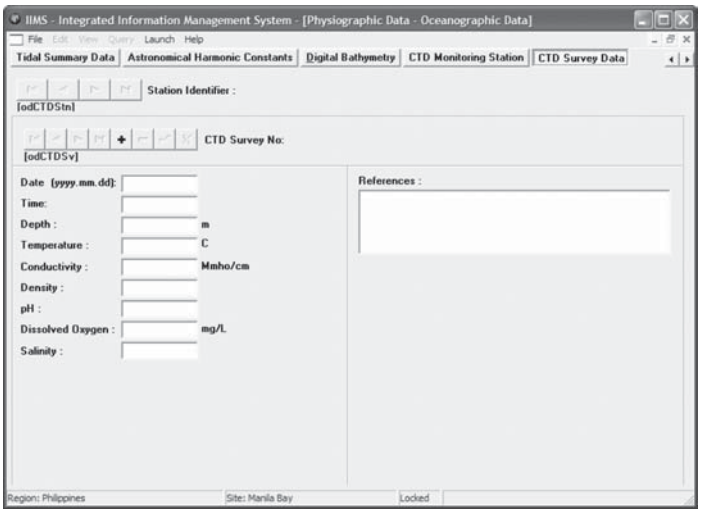
CTD Monitoring Station provides information on CTD monitoring stations, including location and contact details.



CTD Survey Data is an inventory of conductivity–temperature–depth (CTD) measurement stations, and basic data describing the station.

CTD data are commonly obtained in oceanographic surveys to describe standard marine water properties. CTD data may be obtained from bottle casts, but since the 1980s these data were most often obtained with self-recording or direct read-out instruments that provide evenly spaced profiles of water properties. CTD data are obtained from hydrographic surveying and oceanographic agencies and/or naval authorities in each country. Some data may also be available in global databases maintained by the NOAA. In general, CTD profile data are stored in ASCII files with sequential records for each measurement depth. These files are not amenable to a data table format in the IIMS; the station inventory is used to define available information and its time and location parameters. The data description must specify the instrumentation used to collect the data and provide references to reports or publications describing the data.

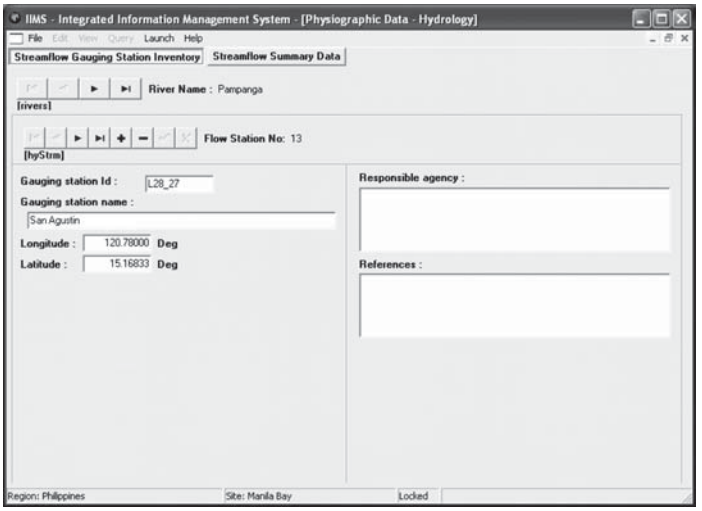
The purpose of these fields is to indicate that the parameter value has been measured and is reported in the required units.



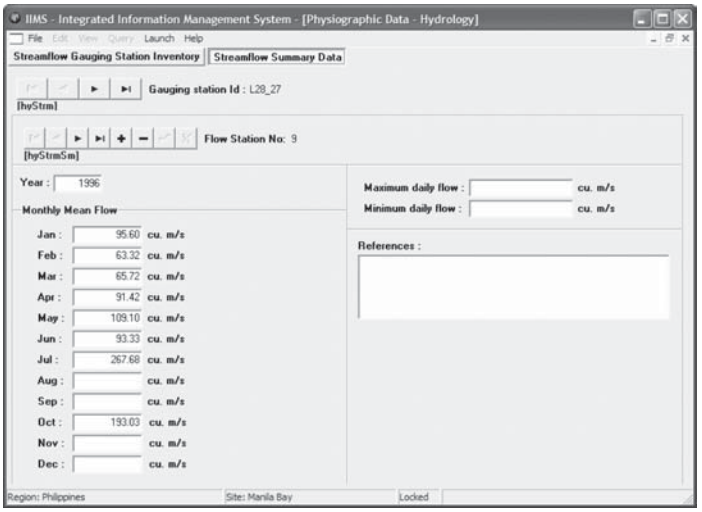
Hydrologic Data

Stream flow data are usually collected by water resources management departments at the provincial and national government levels.

Stream Flow Gauging Station contains an index of stream flow gauging stations organized by river. The table on river is linked to the pollution loads table and to the flow summary table by the river number.



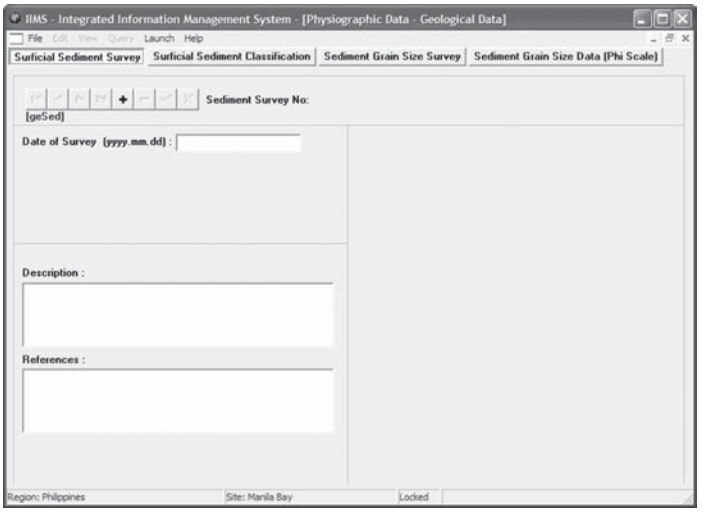
Stream Flow Summary Data contains monthly mean flow data and annual maximum and minimum flows from each gauging station. This table is linked with the river and gauging station inventories.



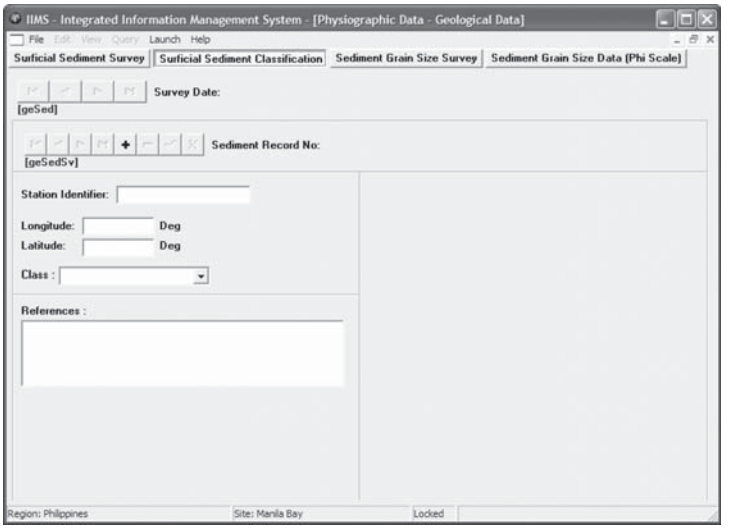
Geological Data

Data are obtained from field surveys based on physical sampling and/or video and sonar imaging techniques.

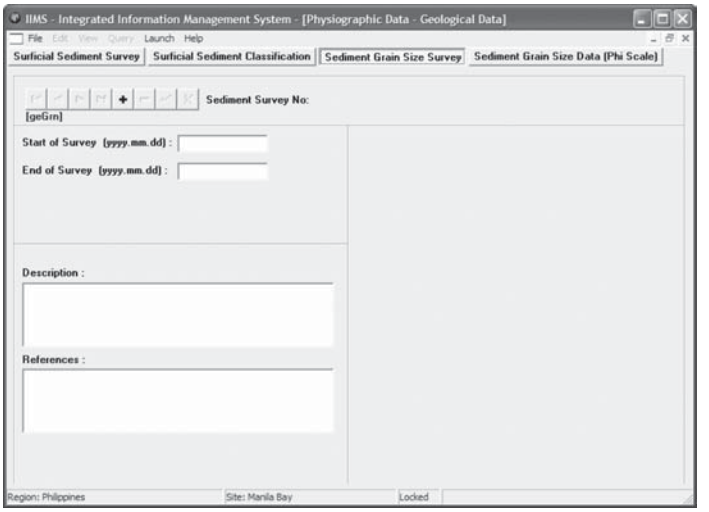
Surficial Sediment Survey Inventory refers to the surveys in which digital seabed classification data have been collected. The survey description provides a summary of the survey, its purpose, methods used and references to reports or other documentation.



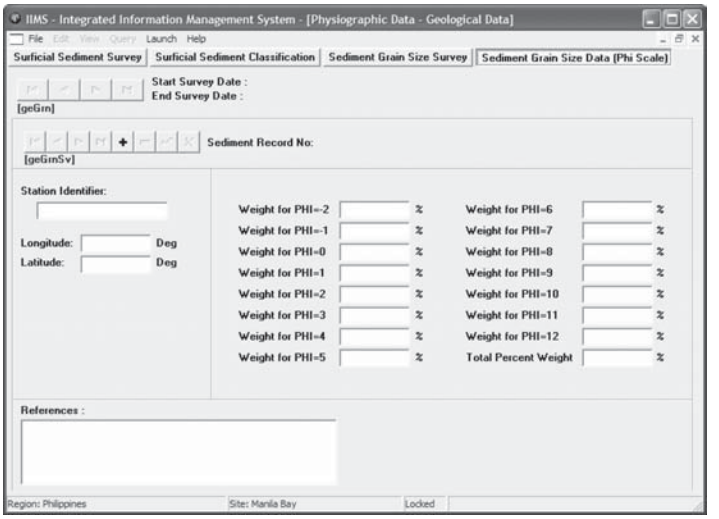
Surficial Sediment Classification Data contains digital seabed classification data that can be derived through several survey techniques and provides a codified description of the surficial soil cover. This qualitative information is intended to discriminate hard from soft substrates and classify the soft-bottom material.



Sediment Grain Size Survey Inventory contains survey description thats provides a summary of the survey, its purpose, methods used and references to reports or other documentation. Surveys separated in time by more than three months must be recorded as separate entries. Data are obtained from field surveys based on physical sampling and a geotechnical grain size analysis.



Sediment Grain Size Data (Phi Scale) contains particle size information derived from a geotechnical analysis of surficial sediment samples reported as dry weight per cent in each class. The dataset consists of one or more stations forming a logical dataset. Data are obtained from field surveys based on physical sampling and a geotechnical grain size analysis.



References

United Nations. 2005. International Standard for Industrial Classification for All Economic Activities. ST/ESA/STAT/SER.M/4/Rev. 3.1, E.0.3.XVII.4. http://unstats.un.org/unsd/cr/family2.asp?Cl=17

United Nations Environment Programme. 1989. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. Annex 1 Categories of Wastes to be Controlled. www.globelaw.com/Toxics/basel.htm