NOAA'S CORAL REEF INFORMATION SYSTEM

Technical Guidelines for Metadata Preparation
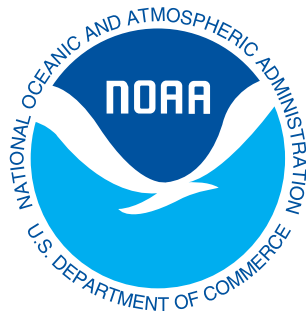
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1 Introduction

1.1 Preface

NOAA's Coral Reef Information System (CoRIS) is the official NOAA system for managing access to its coral reef data and information. CoRIS is a web-enabled, GIS-enhanced, state-of-the-art information system utilizing a single web portal to gain access to NOAA's coral reef data and information holdings, activities, and library services. CoRIS supports NOAA's contribution to the U.S. Coral Reef Task Force National Action Plan and provides a rich offering of search tools to aid in the discovery and interpretation of NOAA data and information on coral reef ecosystems and adjacent interrelated habitats and communities.

The development of CoRIS was based on several underlying principles. CoRIS is to provide a rich and varied content of data and information; demonstrate rigorous scientific integrity; be factual; provide direct access to well-documented data through a united interface; make use of existing operational coral reef information systems; and provide metadata-enabled access to data and information. Therefore, quality metadata are a crucial supporting component that significantly affects the success CoRIS. The CoRIS web site is http://www.coris.noaa.gov .

1.2 Document Purpose

The purpose of this document is to provide the technical details needed to understand and create metadata that will be contributed to CoRIS. These metadata will assist evaluation of, and access to, online coral reef data products. To this end, metadata are briefly defined, references to metadata resources and the Federal Geographic Data Committee (FGDC) standards are presented, and a general methodology for preparing metadata is outlined. It is assumed that the reader of this guidance document has sufficient knowledge of the data to be documented to prepare relevant metadata. While specific to coral reef data, these guidelines are relevant and useful to many NOAA data disciplines because of the diverse coral reef data types and collection methods.

If you have questions about creating metadata, or submitting metadata to CoRIS, contact the CoRIS metadata staff at CoRIS.metadata@noaa.gov.

2 Metadata

2.1 Definition

Metadata consist of information that characterizes data sets and provides documentation for data products. Metadata describe data and thereby impart knowledge about the data to potential users. Geospatial metadata include the format of the data, positional and temporal references and processes applied to the data, and describe attributes and characteristics of objects identified in the data. Metadata define: what was observed or measured; when, where, how, why and by whom the observations or measurements were made, and; what standards, reference materials and calibration procedures were applied. Metadata define the accuracy, quality, and resolution of the data and provide a means to access the data. To learn more about metadata, access the websites presented in Appendix A., Metadata Information Resources.

3 CoRIS Metadata

3.1 CoRIS Metadata Principles

Development and management of CoRIS metadata are based on the following principles:

1. Metadata are central to CoRIS data and information search and discovery.
2. CoRIS metadata structure is based on existing standards – Federal Geographic Data Committee (FGDC) Content Standards for Digital Geospatial Metadata (CSDGM) and FGDC Profiles (including the Biological, Remote Sensing and Shoreline Profiles).
3. Metadata are reviewed for consistent and appropriate content, and to ensure proper functioning of the CoRIS web portal Data Discovery component.

4. Data linkages from metadata should provide direct access to data product whenever possible.
5. Metadata are preserved in a secure environment to guard against loss and ensure continuing availability.
6. Metadata are periodically updated to reflect changes in the data set(s), data access and/or other information contained in metadata files.

3.2 CoRIS Metadata Searches

The pathway to the broad array of diverse coral reef data and information is through metadata, which are critical for the CoRIS web site Data Discovery process. The efficiency and success of the search strategy is only as good as the completeness and correctness of the metadata. Especially crucial are the metadata title, abstract, temporal and spatial bounds, place, theme and discovery keywords, contact information and distribution URLs. The entire metadata record is provided as a readable option in the search results.

The CoRIS Text Search accesses two types of metadata records. One, based upon FGDC standards, and the other, based upon MARC21 standards, which meet the user's search criteria. This method provides access to traditional coral reef data sets described by FGDC metadata and access to publications, videos, etc., through NOAALINC, the NOAA Central Library online catalog, and its coral reef MARC21 metadata via the Z39.50 search protocol. The relationship between MARC21 and FGDC standards are defined in the crosswalk document in which the core elements of each standard are mapped to the equivalent elements in the other standard (http://coris.noaa.gov/backmatter/examples/MetadataCrosswalk.pdf). The library metadata available in CoRIS are created and maintained in the NOAA Central Library according to the library guidelines incorporated in its Cataloging Manual document (http://www.lib.noaa.gov/cataloging/Cataloging_Manual/TOC.html

3.3 CoRIS Metadata Standards

To ensure uniformity in metadata, and to meet Federal requirements, CoRIS metadata adhere to the Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata (CSDGM) and endorsed profiles that pertain to coral reef data sets. The federally mandated use of the CSDGM enforces consistency by providing a common set of terminology and definitions for the documentation of geospatial data.

Approved variations to CSDGM are called profiles or extensions. An organization may define its own local extensions. Profiles are extensions that have been developed and approved by a broader community. Profiles use the base CSDGM and include specific metadata elements for the type of data addressed by the profile.

The FGDC Biological Data Profile defines metadata elements specifically relevant to geospatial biological data, including taxonomic identifications and specimen handling descriptors. If data include biological taxonomy, CoRIS uses the Biological Data Profile.

The FGDC Metadata Profile for Shoreline Data is oriented towards providing the elements necessary for documenting shoreline data and reaching a common understanding of the shoreline for national mapping purposes and other geospatial and Geographic Information Systems (GIS) applications. The Shoreline Profile may be used for CoRIS metadata.

The FGDC CSDGM Extensions for Remote Sensing Metadata (usually referred to as 'RSE') may be used to document data collected from satellites. This extension defines additional metadata elements for sensor, platform, method and process of deriving geospatial information from raw satellite telemetry, and the information needed to determine the geographical location of the remotely sensed data.

The present capability of the CoRIS metadata system to handle FGDC profiles and extensions other than the biological profile is limited. Therefore, CoRIS does not require the use of any profile, but will accept metadata in any approved FGDC profile. CoRIS will save the original metadata records and use content from them to prepare metadata records for inclusion in CoRIS and replace those in CoRIS with the original records when feasible.

See Appendix A., Federal Geographic Data Committees Metadata Standards, for links to the various FGDC metadata standards.

3.3.1 Minimum Required Metadata Elements

The elements identified below are required for the CoRIS search and discovery mechanisms and to conform to minimum FGDC standards:

Section 1: Identification
  1.1 Citation - Use of Online Linkage (Standard Section 8.10) information is mandatory if the originator of the data maintains the data at an online location.
  1.2 Description
  1.3 Time Period of Content
  1.4 Status
  1.5 Spatial Domain
  1.6 Keywords
  1.6 ½ Taxonomy (mandatory for biological data)
  1.7 Access Constraints
  1.8 Use Constraints
Section 6: Distribution
  6.1 Distributor
  6.3 Distribution Liability
  6.4 Standard Order Process - Use of Network Resource Name (6.4.2.2.1.1.1.1) is required for data served by a distribution center, such as an archive or data center.
    Other Portions of Section 6 are mandatory if they are applicable.
Section 7: Metadata Reference Information
  7.1 Metadata Date
  7.3 Metadata Contact (Contact Information)
  7.4 Metadata Standard Name
  7.5 Metadata Standard Version

Other sections are mandatory if applicable. In particular, Section 2, Data Quality Information and Section 4, Spatial Reference Information, should be included for quantitative data (e.g. GIS products, numeric data files, video transects, etc.). Section 3 Spatial Data Organization, Section 5 Entity and Attribute Information, if applicable, should be used for spatial data (e.g. maps, geo-referenced images, GIS files). When possible, it is preferred that all relevant sections are completed. The more complete a metadata record, the greater is its value to future users. In some cases, when all mandatory information is not available for a subsection, the available information can be placed in other metadata elements, e.g., Supplemental Information.

Appendix B., ASCII Template for CoRIS Metadata, contains a template of recommended CoRIS metadata elements for the most common types of data documented in CoRIS at this time.

4 CoRIS Metadata Preparation

4.1 Overview

CoRIS recognizes that a data collector is most likely the best person to understand and accurately describe collection and processing methods, units of measure, and other important metadata about those data. But, creating high-quality, FGDC-compliant metadata is not normally a simple task for those unfamiliar with the CSDGM. Realizing this, CoRIS provides these metadata guidelines and keyword thesauri to assist metadata creators, and CoRIS staff are available to help with metadata preparation and to answer questions about format, content, or how to transfer files. CoRIS may be able to offer a web based interface to CoRIS contributors for metadata creation and maintenance in the future.

The creator of the metadata, who may be the principal investigator or another individual, uses expert knowledge of the data to create metadata. The metadata creator should include CoRIS keywords as described in Section 4.3.1. The metadata creator may use any tool to create well-structured, compliant metadata records in ASCII text or XML.

After a metadata record has been created, the responsible principal investigator reviews the record. The purpose of this review is to ensure that the scientific content, such as the data set description, methodology, etc., are correct. The metadata record is then given to CoRIS.

When a metadata file is received, CoRIS personnel review the metadata file and work with contributors to develop conforming data set descriptions. The remainder of Section 4 presents a framework for preparing CoRIS metadata records. When added to CoRIS, these metadata records will be used to support CoRIS web site text and map searches by potential users interested in coral reef data products.

Several sample FGDC metadata records are provided on the CoRIS web site http://coris.noaa.gov/backmatter/supportingdocs.html.

4.1 Analyze the Data Set

Coral reef data sets and products are diverse, consisting of coastal observations such as aerial photographs of habitats, bathymetric survey data, meteorological observations, physical, chemical and/or biological oceanographic measurements, benthic habitat characterizations, fish censuses, geologic and paleoclimatologic data, acoustic profiles, and GIS products containing monitoring and assessments data.

The characteristics and anticipated uses of a data product need to be considered in order to determine the number and type of metadata records; whether parent and child records are needed, and how to create parent and child records (see section 4.4); and which CSDGM standard profile or extension applies (Section 3.2). In general, one metadata record will be created for each data type/instrument package, location and time period.

4.2 Select a Method to Prepare Metadata

Metadata can be created by using a text editor, or software such as a metadata tool designed for that purpose. A text editor can be used to enter information into a metadata template that contains whatever metadata elements are necessary. Needed metadata elements can be added, and unnecessary or empty metadata elements deleted. ASCII templates are simple to use, require no specialized software, and can be made for parts of the metadata standard that are common to multiple data sets. A major drawback to using templates is that there is no built-in control of the metadata structure, so a person must be careful during the process of cutting and pasting to avoid corrupting the record so that it no longer complies with the FGDC structure.

For CoRIS metadata contributors, an ASCII template of required and mandatory-if-applicable fields for CoRIS is available in Appendix B. Use this template if it is appropriate for describing your data. If not, an ASCII template of the full, basic FGDC metadata is available at http://geology.usgs.gov/tools/metadata/tools/doc/template or http://coris.noaa.gov/backmatter/examples/FGDCBasicASCII.pdf. Information about ASCII templates can be found at http://www.sco.wisc.edu/wisclinc/metatool/template.htm.

ASCII Templates were not available for other FGDC profiles at the time of publication of this document.

There are many software tools with various capabilities and system requirements available for preparing metadata. Information about many of these tools is presented on these two web sites: http://www.ncddc.noaa.gov/Metadata/tools and http://geology.usgs.gov/tools/metadata/

Authors are encouraged to use the MP (Metadata Parser) tool for error checking the metadata records. MP checks for consistency with the FGDC standards and provides for export of metadata to XML, SGML, and HTML formatted output files, if desired. If there are issues with formatting the CNS (Chew aNd Spit) tool can be utilized to fix many formatting issues programmatically. CNS and MP use configuration files to identify extension elements, such as those added to the Biological Profile or the RSE. To avoid corruption of the taxonomic hierarchy when using the Biological Profile, it is important to use the appropriate configuration files (available from CoRIS). For additional information, see http://geology.usgs.gov/tools/metadata/tools/doc/config.html and http://geology.usgs.gov/tools/metadata/tools/doc/config-simple.html. For additional general information about the FGDC standard and creating metadata see http://geology.usgs.gov/tools/metadata/tools/doc/faq.html#1.1

These tools are provided for information purposes only. CoRIS, NOAA and the federal government do not recommend any particular software tool, and are not liable for any malfunctions, errors, deletions, or omissions.

4.3 Content and Format Considerations

Metadata authors are encouraged to review the metadata elements of the FGDC standard and/or profile to be used and note the information required such as, title, abstract, spatial and temporal extents, etc. To facilitate uniform results across many data descriptions, it is important to review CoRIS specific metadata content requirements. For example, keywords for location, theme and data type (Discovery Keyword) are used by CoRIS in web searches to find data and information and must be included in the metadata records. Also, the metadata author should consider the CoRIS requirement for a public URL for direct access to the data or product. These and other metadata element contents of importance to CoRIS are in Section 4.6. Appendix C., Metadata Element Level Guidance, describes individual metadata element content.

The following sections describe CoRIS format and content requirements for specific data elements from the basic FGDC standard and the biological profile to assure FGDC compliance and to support Data Discovery on the CoRIS website.

4.3.1 CoRIS Keywords for Metadata

To facilitate the CoRIS web site data and information discovery process, CoRIS uses hierarchically arranged suites of standardized keywords for inclusion in the metadata to characterize each data set being described and to simplify text searches for coral data on the CoRIS web site. These keyword thesauri, or controlled vocabularies, define categories of terms (e.g., 'Theme', 'Place', and 'Discovery') used during a CoRIS web site metadata search to assure positive results when used as the sole search criteria keywords.

CoRIS metadata must include keywords from the CoRIS thesauri for 'Theme', 'Place' and 'Discovery.' Discovery keywords identify data according to a general 'type of data' and are used to perform the Topic/Theme search in the CoRIS map-based search interface. Place keywords are standardized designations for places or regions. Theme keywords describe measurable variables or data values. Each metadata record should have only one Discovery keyword, at least one pair of Place keywords, and one or more Theme keywords. CoRIS Thesauri are available at http://coris.noaa.gov/backmatter/supportingdocs.html#keywords. For first time metadata preparers, CoRIS staff will insert CoRIS keywords in metadata records as necessary.

If a needed keyword is not available in the appropriate CoRIS thesaurus, include it under a thesaurus of "None" in the metadata record and notify CoRIS at CoRIS.metadata@noaa.gov.

Keywords from other than CoRIS thesauri, or "none" may be used in the metadata records, but not in lieu of CoRIS keywords.

4.3.1.1 ISO Topic Category and Codes

The International Standards Organization (ISO) has prepared geospatial metadata standards (http://www.fgdc.gov/metadata/geospatial-metadata-standards#isometadata). CoRIS uses an "ISO Thesaurus" of ISO keywords, containing Topic Categories and Codes for use in CoRIS metadata records for minimal compliance. (http://www.fgdc.gov/metadata/documents/MetadataQuickGuide.pdf). There must be at least one Topic Category and Code in a metadata record. A sample entry in a metadata record follows:

    Theme:
     Theme_Keyword_Thesaurus: ISO 19115 Topic Category
     Theme_Keyword: oceans
     Theme_Keyword: 014
     Theme_Keyword: biota
     Theme_Keyword: 002

This CoRIS ISO implementation is based upon recommendations found on the Federal Geographic Data Committee (FGDC) website http://www.fgdc.gov/.

For first time metadata preparers, CoRIS staff will insert ISO Category and Codes in metadata records as necessary.

4.3.2 Specifying Dates and Positions

Date and geographic position information are required to properly locate the data temporally and spatially. This section provides guidance and some samples for completing date and bounding coordinate fields.

The date for the standard is represented as follows:

    A.D. Era to December 31, 9999 A.D.:
        YYYY for year,
        YYYYMM for month of a year, and
        YYYYMMDD for a day of the year

    A.D. Era after 9999 A.D.: cdYYYYYYY

    B.C. Era to 9999 B.C.:
        bcYYYY for year,
        bcYYYYMM for month of a year, and
        bcYYYYMMDD for a day of the year

    B.C. Era before 9999 B.C.: ccYYYYYYY

Element 1.3, Time Period of Content, includes Beginning_Date and Ending_Date fields, under Range_of_Dates/Times. Dates of the data set being described by the originator should be the actual dates of the conditions that are represented by the data, when the conditions occurred, not necessarily the data collection or publication dates. For example, for paleoclimate data, the dates are those when the environmental conditions occurred, and the data collection dates of aerial photography are the (same as) dates of the data. For near real-time data, *still being collected*, enter the earliest date of the data or product in Beginning_Date. Enter the word "Present" in the field Ending_Date.

Bounding dates must be for multiple discrete dates, a continuous time period, or more than one continuous time period, for data of the same type.

The geographic position for the standard is represented as follows:

Latitude is represented as DD.DDD in decimal degrees.
Northern hemisphere is positive and southern hemisphere is negative (-).

Longitude is represented as DDD.DDD in decimal degrees.
Eastern hemisphere is positive and western hemisphere is negative (-).

A sample of bounding coordinates for a single position in the northwest quadrant is:

    West_Bounding_Coordinate: -120.00 (no space between the number and negative sign)
    East_Bounding_Coordinate: -120.00
    North_Bounding_Coordinate: 38.236
    South_Bounding_Coordinate: 38.236

Bounding coordinates of a rectangle in the southeastern hemisphere might be:

    West_Bounding_Coordinate: 115.345
    East_Bounding_Coordinate: 122.500
    North_Bounding_Coordinate: -35.122
    South_Bounding_Coordinate: -38.236

Sample bounding coordinates for a rectangle straddling the equator and 180 degree meridian:

    West_Bounding_Coordinate: 175.345
    East_Bounding_Coordinate: -178.500
    North_Bounding_Coordinate: 8.236
    South_Bounding_Coordinate: -5.122

Bounding coordinates must be for spatially contiguous data of the same type.

4.3.3 Taxonomy

Users of CoRIS will be able to find data with a specific taxon only if that information is included in the metadata. Taxonomy is to be included from the highest to the lowest classification level possible to provide valuable biological information and make the metadata more useful. The Biological Data Profile of the Content Standard for Digital Geospatial Metadata is used to document taxonomic keywords, classification system(s) used, methodology, analytical tools, taxa, etc.

Data originators are encouraged to compare all species names with the Integrated Taxonomic Information System (ITIS) and to document the classification system used for their taxonomy**.** ITIS is available at http://www.itis.usda.gov/ . The original ITIS partners include: National Oceanic and Atmospheric Administration (NOAA), US Geological Survey (USGS), Environmental Protection Agency (EPA), Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) and Smithsonian National Museum of Natural History (NMNH).

All the taxa and hierarchical classifications for existing CoRIS metadata are available to possibly assist adding taxonomy to a metadata record at the web site:

 http://www.coris.noaa.gov/data/coris_data.html

CoRIS requests the following metadata elements for taxonomy:

```
 Taxonomy:
     Keywords/Taxon:
         Taxonomic_Keyword_Thesaurus:
         Taxonomic_Keywords:
     Taxonomic_System:
        Classification_System/Authority:
             Classification_System_Citation:
     General_Taxonomic_Coverage:
     Taxonomic_Classification:
         Taxon_Rank_Name:
         Taxon_Rank_Value:
         Applicable_Common_Name:
```

The compound element Taxonomic_Classification is repeated for each level of taxonomic rank.

CoRIS requests the use of Kingdom, Phylum, Division (Plantae only), Class, Order, Family, Genus and Species. If more than one Kingdom is represented, begin the hierarchy with Kingdoms, and the list. The web document, http://coris.noaa.gov/backmatter/examples/BiologicalProfileElements.pdf, contains a sample metadata record with these taxonomy elements.

For complete taxonomy metadata elements and definitions see

http://www.fgdc.gov/standards/projects/FGDC-standards-projects/metadata/biometadata/biodatap.pdf and

http://www.nbii.gov/images/uploaded/151871_1162508205217_BDP-workbook.doc

To properly represent taxonomic classification of more than one taxon, indentation and nesting of the lines of the file is used to define the taxonomic hierarchy. In XML, the hierarchy is maintained with nesting using the opening and closing XML tags; <taxoncl>, <taxonrn>, </taxonrn>, <taxonrv>, </taxonrv> and </taxoncl>.

If CNS is used be sure the proper configuration file is used to preserve the taxonomic hierarchy.

4.3.4 Miscellaneous Considerations

The CoRIS metadata management system maintains metadata records as XML files. Therefore, the use of "<" in the metadata elements must be avoided because "<" is the opening designator for an XML tag. Use the actual text "less than" in the descriptive text of a metadata record.

Special characters in the metadata text, such as, "⁰" for degrees, "±" and measurement units, etc., may be misinterpreted by different computer systems or when viewed with text editors or web browsers. This is apparently due to ASCII and UNICODE encoding differences and may cause erroneous character representations, depending on which software and operating system is being used. To minimize the possibility of erroneous characters, please use terms like "degrees" or "plus or minus", instead of special characters.

The Metadata Parser (MP) tool tends to flag the use of metadata standard element names when those names occur in a text element. It is best to avoid the use of metadata element names in text elements, especially when associated with a semi-colon (":"). Another good practice is to use spaces to indent text, rather than the tab key, which inserts an unprintable character that may be erroneously interpreted by different browsers or other software.

4.4 Parent/Child Metadata

Child metadata records give users the ability to find only those data products that meet their spatial and temporal requirements from within a large dataset containing hundreds of similar products. For example, a data set consisting of a collection of daily AVHRR SST images of a single geographic area might have one parent record for a month or a year, but have 30 or 365 temporal child records (one child record per day), respectively.

The use of parent and child metadata records may be considered when the majority of respective metadata elements for a suite of data products will consist of redundant content, but the temporal or spatial values vary over a long time period. Metadata authors are encouraged to contact CoRIS staff at *CoRIS.metadata@noaa.gov* before creating child records for a collection of data.

If the metadata author decides that parent and child records are needed, a complete 'parent' metadata record is created that describes the entire data collection, its general contents, the complete geographic extent and earliest/latest dates of coverage, as well as other source and distribution information. Each child record contains all variable metadata elements content, applicable individual spatial and/or temporal value(s), a link to the specific data item being described, and a tag to its parent. Child records decrease the number of multiple, nearly identical metadata records in the CoRIS metadata database, which results in less work for metadata preparers and data searchers, but managing child records requires an ancillary child-records maintenance system.

To illustrate the above discussion, several child records that accompany the parent metadata record for AVHRR Degree Heating Week Charts in the Eastern Hemisphere for the year 2003 are presented below:

20030103, http://www.osdpd.noaa.gov/PSB/EPS/SST/data2/dhwe.1.3.2003.gif
20030106, http://www.osdpd.noaa.gov/PSB/EPS/SST/data2/dhwe.1.6.2003.gif
20030111, http://www.osdpd.noaa.gov/PSB/EPS/SST/data2/dhwe.1.11.2003.gif
20030113, http://www.osdpd.noaa.gov/PSB/EPS/SST/data2/dhwe.1.13.2003.gif
20030118, http://www.osdpd.noaa.gov/PSB/EPS/SST/data2/dhwe.1.18.2003.gif

Fields of these child records are separated by commas. In this example, the columns are:
Date of product, URL to the specific data item/product being described in the child record

The fields above are appropriate for this particular dataset, but other fields may be needed for different datasets. For example, a data set whose child products vary by geography rather than by date should include the bounding coordinates of each child.

To alert CoRIS staff to related parent and child metadata files, prefix "child_" to the parent metadata filename and use this as the name of the file containing the respective child records, e.g., parentMetadataFile.txt, child_parentMetadataFile.txt.

When parent/child metadata records are created, be sure to include the following:

(1) a complete metadata description of the data collection – the parent metadata,
(2) a file of comma-separated values that make up the child metadata for each product (parent), and
(3) description of the child fields and any other information that may be needed to interpret the metadata.

4.5 Contributing Metadata to CoRIS

When the principal investigator is satisfied with the metadata, final ASCII text and⁄or XML versions of the metadata record are created for transfer to CoRIS.

The most common method of transfer is to attach the files to an email message, or attach a zip file if there are many records. Other methods are via digital media, such as CD or DVD. Another alternative is to use FTP to transmit completed metadata to the CoRIS FTP receipt site at ftp://ftp.nodc.noaa.gov/pub/incoming/CoRIS.

To use FTP from a command-line prompt (e.g., a unix workstation, Apple OS terminal, or MS DOS prompt), type the following series of commands:

```
ftp ftp.nodc.noaa.gov
```
userID: `anonymous`
password: `your email address`
```
cd pub/incoming/CoRIS
     mkdir newDirectoryName` (optional command to make a new directory)
     cd newDirectoryName` (optional command if new directory was created)
put filename.ext` (repeat as needed for each file)
bye` (to exit FTP)
```

Regardless of the method used to provide metadata to CoRIS, the metadata author/submitter should send an email message to CoRIS.metadata@noaa.gov and identify the metadata source, the Coral Reef Conservation Program project name and identifier and the filenames. Any unusual characteristics pertaining to the data or metadata should be clearly identified in the email.

4.6 Metadata Review

When a metadata file is received, CoRIS personnel will review the metadata file and work with contributors to make a complete, conforming data set description for CoRIS. The primary items addressed in the metadata review are presented below. When the contributor and CoRIS approve the metadata record, the metadata record will be made available to the CoRIS web server and web coral data searches.

In some cases, a metadata record will reference a dataset of large areal or temporal extent. To expedite CoRIS website users' access to any subsets of such a dataset, CoRIS staff will use the single dataset metadata record as a template and prepare metadata records for discrete spatial and/or temporal subsets of the dataset, if such detailed information can be provided by the contributor. This is similar to a parent-child relationship, except each subset metadata record is a complete description of each data subset, rather than an abbreviated child-description (as described in Section 4.4).

4.6.1 Content Review and CoRIS Amendments

Metadata files are the means by which coral reef data sets can be discovered on the CoRIS web site by potential users. Metadata contain the information a user will search to decide whether or not the described data or product is of interest. To meet website user needs, national and international metadata requirements, website search software limitations, and the constraints of the CoRIS metadata support system, CoRIS staff reviews all metadata provided to CoRIS and *may* make minor changes to the content of specific metadata elements. CoRIS personnel will work with the metadata contributors to enhance the metadata when necessary.

The following are the primary items reviewed by CoRIS staff:

- Do all required metadata elements exist with applicable content? The minimum set of required elements for CoRIS are listed in Appendix B. If required elements are missing or empty, CoRIS will work with the metadata author or PI to complete the metadata record.

- Does the title describe the data adequately? A good descriptive title should answer the 'what', 'where' and 'when' of the data to enable easy recognition of the content of a data set.

- Is the abstract a good summary?

- Are the dates specified by originators in Time_Period_of_Content the actual dates during which environmental conditions that are represented by the data occurred?

- Are CoRIS Discovery, Place and Theme keywords and ISO Categories and Codes included?

- Are data available online from the originator OR are offline access instructions provided OR does a NOAA National Data Center or CoRIS have a copy of the data or product?

- Do the data meet CRCP guidelines for limiting access to 'sensitive data'? If the product requires limited access due to the nature of the data or product, has a request and approval been completed for limiting access from CoRIS? See "Access Limitations to Sensitive Data from CoRIS" for additional guidance, available from CoRIS.

- Are the data URLs provided functional?
    - If a preview or browse graphic is available, the URL that points to the graphic will be included in Browse_Graphic.
    - If data are served from the data originator's site, the URL that leads to data would be identified in Online_Linkage.
    - If data are being made available online from a distribution center, the URL that leads to data would be in Network_Resource_Name. If not, the originator URL may be here too. (If CoRIS serves the data set, the CoRIS URL will appear here too). Multiple URLs are permitted.
    - If data are being made available offline, instructions for data access should be identified in Ordering_Instructions.

- Are child metadata included? If so, the fields in child records will also be reviewed. The temporal and spatial extents of the parent metadata must encompass the collection of respective child records minimum and maximum temporal and spatial values.

- If the taxonomy hierarchy is present, are the species names found in ITIS? If not, is the taxonomic classification system used identified and documented?

- Are the structure and syntax of metadata fields valid? MP (Metadata Parser) is used to validate structure and syntax of the metadata content.

4.6.2 Completion of a Metadata Record

To assist the identification and tracking of a contributor's metadata within CoRIS and for applying future updates, a unique metadata tracking identifier is assigned by CoRIS to identify each metadata record in CoRIS. This is simply a sequence number assigned by CoRIS and is referred to as the Tracking ID.

After new metadata files are added to the CoRIS metadata repository, a web search will be performed to retrieve and verify the metadata and data access. The contributor should do the same to ensure correctness of the metadata.

For each metadata record, CoRIS will provide to the contributor the following information (upon request): CoRIS metadata file name, Tracking ID number, and a copy of the CoRIS version of the metadata record.

4.7 Metadata Record Updates

Metadata must be reviewed and maintained for various reasons. Examples of necessary metadata changes include fixing typographical errors, inserting missing information, updating data access URLs or observation dates, correcting ASCII and UNICODE character mistranslations, etc. In the event that changes to submitted metadata are necessary, metadata authors/contributors are asked to modify the current CoRIS version of their metadata record and send the

updated record (with Tracking ID) to CoRIS.metadata@noaa.gov. Updates or corrections to existing parent/child information (e.g., new spatial and/or temporal extent) are also requested whenever appropriate. To minimize redundant efforts, metadata authors are asked to contact CoRIS for a copy of the current metadata record before making any changes.

Appendix A. Metadata Information Resources

The US Federal Geographic Data Committee (FGDC) developed the Content Standard for Digital Geospatial Metadata (CSDGM) to provide a uniform set of descriptive information (metadata) about any data that may be related to a specific geographic position. A general discussion about the CSDGM is presented in Section 3.3 of this document. The FGDC maintains the Standard, as well as a workbook containing extensive explanatory text, FAQs about metadata, and other instructional materials about standards and metadata at their web site. Other organizations provide additional geospatial metadata resources. Some of these web resources are listed below.

1. **Introduction to Metadata:**

     http://www.fgdc.gov/metadata

     http://marinemetadata.org/guides

2. **Metadata in Plain Language:**

     http://geology.usgs.gov/tools/metadata/tools/doc/ctc/

3.   **Metadata Information and Training:**

     http://www.csc.noaa.gov/metadata/

     http://www.csc.noaa.gov/metadata/curriculum/

4.   **FGDC Metadata Standards Information:**

     http://www.fgdc.gov/metadata/geospatial-metadata-standards

   FGDC Content Standard for Digital Geospatial Metadata FGDC-STD-001-1998

     http://www.fgdc.gov/metadata/csdgm/index_html

   Graphical Map of FGDC CSDGM:

   http://www.fgdc.gov/csdgmgraphical/index.html

   We should download this entire html section in case this disappears?

   Biological Data Profile of the Content Standard for Digital Geospatial Metadata FGDC-STD-001.1-1999:

     http://www.fgdc.gov/standards/projects/FGDC-standards-projects/metadata/biometadata/biodatap.pdf

   Content Standard for Digital Geospatial Metadata: Extensions for Remote Sensing Metadata, FGDC-STD-012-2002

http://www.fgdc.gov/standards/projects/FGDC-standards-projects/csdgm_rs_ex/MetadataRemoteSensingExtens.pdf

   Metadata Profile for Shoreline Data FGDC-STD-001.2-2001

     http://www.csc.noaa.gov/metadata/sprofile.pdf

5. **FGDC Metadata Workbook**:

   http://www.fgdc.gov/metadata/documents/workbook_0501_bmk.pdf

   FGDC biological profile workbook downloaded from "Metadata Standards link on

http://metadata.nbii.gov/portal/community/Communities/Toolkit/Metadata/FGDC_Metadata/

6. **Metadata Tools:**

   http://www.fgdc.gov/metadata/geospatial-metadata-tools

   http://www.ncddc.noaa.gov/Metadata/tools

   http://geology.usgs.gov/tools/metadata/

Appendix B. Minimal ASCII Template for CoRIS Metadata

This metadata template can be copied and used to create a metadata record that meets the minimum metadata content requirements for inclusion in CoRIS. Appendix C provides specific guidance, instructions, and examples for completing metadata fields. NOTE: Biological Profile elements are highlighted in gray in Appendices B and C.

```
Metadata:
 Identification_Information:
  Citation:
   Citation_Information:
    Originator:
    Publication_Date:
    Title:
    Online_Linkage:
  Description:
   Abstract:
   Purpose:
  Time_Period_of_Content:
   Time_Period_Information:
    Single_Date/Time:
     Calendar_Date:
    Multiple_Dates/Times:
     Single_Date/Time:
      Calendar_Date:
    Range_of_Dates/Times:
     Beginning_Date:
     Ending_Date:
   Currentness_Reference:
  Status:
   Progress:
   Maintenance_and_Update_Frequency:
  Spatial_Domain:
   Description_of_Geographic_Extent:
   Bounding_Coordinates:
    West_Bounding_Coordinate:
    East_Bounding_Coordinate:
    North_Bounding_Coordinate:
    South_Bounding_Coordinate:
  Keywords:
   Theme:
    Theme_Keyword_Thesaurus:
    Theme_Keyword:
   Place:
    Place_Keyword_Thesaurus:
    Place_Keyword:
   Taxonomy:
      Keywords/Taxon:
        Taxonomic_Keyword_Thesaurus:
        Taxonomic_Keyword:
   Taxonomic_System:
    Classification_System/Authority:
     Classification_System_Citation
      Citation_Information:
      General_Taxonomic_Coverage:
    Taxonomic_Classification:
     Taxon_Rank_Name:
     Taxon_Rank_Value:
     Applicable_Common_Name:
  Access_Constraints:
```

```
  Use_Constraints:
  Browse_Graphic:
    Browse_Graphic_File_Name:
    Browse_Graphic_File_Description:
    Browse_Graphic_File_Type:
Distribution_Information:
  Distributor:
    Contact_Information:
      Contact_Person_Primary:
        Contact_Person:
      Contact_Organization_Primary:
        Contact_Organization:
      Contact_Address:
        Address_Type:
        Address:
        City:
        State_or_Province:
        Postal_Code:
      Contact_Voice_Telephone:
  Distribution_Liability:
  Standard_Order_Process:
    Non-digital_Form:
    Digital_Form:
      Digital_Transfer_Information:
        Format_Name:
      Digital_Transfer_Option:
        Online_Option:
          Computer_Contact_Information:
            Network_Address:
              Network_Resource_Name:
        Offline_Option:
          Offline_Media:
          Recording_Format:
    Fees:
    Ordering_Instructions:
Metadata_Reference_Information:
  Metadata_Date:
  Metadata_Contact:
    Contact_Information:
      Contact_Person_Primary:
        Contact_Person:
      Contact_Organization_Primary:
        Contact_Organization:
      Contact_Address:
        Address_Type:
        Address:
        City:
        State_or_Province:
        Postal_Code:
      Contact_Voice_Telephone:
  Metadata_Standard_Name:
  Metadata_Standard_Version:
  Metadata_Extensions:
    Online_Linkage:
    Profile_Name:
```

Appendix C. Metadata Element Level Content Guidance

Instructions for completing a metadata record following the FGDC standards, including CoRIS required metadata elements are presented in this appendix. For further information, please see http://geology.usgs.gov/tools/metadata/tools/doc/ctc/.

Standard CSDGM Metadata element names that must be included (mandatory) or are to be included if applicable (mandatory if applicable) are underlined.
Biological Profile Elements are shaded grey.
WORDS IN ALL CAPITALS are instructions or provide an example or suggested value, with *additional comments provided in italics.* Some metadata fields or groups can be repeated. For example, Originator can be repeated to name more than one person.

Metadata:
 Identification_Information:
  Citation:
   Citation_Information:
    Originator:
     ENTER THE NAME OF THE DATA ORIGINATOR HERE; may be repeated
    Publication_Date:
     ENTER DATE IN THE FORM YYYYMMDD or YYYYMM.
    Title:
     CREATE A MEANINGFUL TITLE FOR THESE DATA IF ONE DOES NOT ALREADY EXIST. Title should explain Where, What, When and How .
    Geospatial_Presentation_Form:
     ENTER THE MODE IN WHICH THE DATA ARE PRESENTED. Examples are:
     "atlas" "audio" "diagram" "document" "globe" "map" "model"
     "multimedia presentation" "profile" "raster digital data" "remote-sensing
     image" "section" "spreadsheet" "tabular digital data" "vector digital data"
     "video" "view" "CAD data" "database" "table (non-digital)" or your choice
    Online_Linkage:
     Mandatory if applicable (CoRIS).
     *ENTER THE ONLINE LOCATION OF THE DATA AS MAINTAINED BY THE **ORIGINATOR OF THE DATA**. If possible the location should be expressed as a URL. The URL provided should link either directly to the data or to a web page that is as close as possible to the data, accompanied by access instructions. Linking to the home page of a program or organization will necessitate further searching on the part of the user, but in some cases is the best that can be done.*
  Description:
   Abstract:
    COPY AN EXISTING ABSTRACT OR CREATE A BRIEF ABSTRACT THAT DESCRIBES THE DATA SET, not the program or project..
   Purpose:
    STATE THE PURPOSE FOR WHICH THESE SPECIFIC DATA WERE COLLECTED.
  Time_Period_of_Content:
   Time_Period_Information:
    USE ONE OF THREE OPTIONS – SINGLE DATE, MULTIPLE DATES OR RANGE OF DATES.
   Single_Date/Time:
    Calendar_Date:
    ENTER SINGLE DATE, IF DATA WERE COLLECTED DURING ONE DAY, ONE MONTH OR ONE YEAR. FORMAT IS YYYYMMDD, YYYYMM, OR YYYY.
   Multiple_Dates/Times:
    Calendar_Date:
    ENTER CALENDAR DATE ON WHICH DATA WERE COLLECTED.
    Calendar_Date: *Repeat as necessary.*
   Range_of_Dates/Times:
    Beginning_Date:
    EARLIEST DATE OF OBSERVATION IN THESE DATA Use the format YYYY, YYYYMM, or YYYYMMDD, depending on how much you know about these data. For real-time data sets, enter the beginning date of the series of real-time data or products.
    Ending_Date:

LATEST DATE OF OBSERVATION IN THESE DATA Use the format YYYY, YYYYMM, or YYYYMMDD, depending on how much you know about these data. For real-time data sets, enter the word "Present".

Currentness_Reference:

CHOOSE FROM "Ground condition" (preferable), meaning data represent conditions on or during the dates specified, or "Publication date", meaning date on which data were published.

Status:

Progress:

CHOOSE FROM "In work", "Complete"

Maintenance_and_Update_Frequency:

CHOOSE FROM "As needed", "None", OR SOME OTHER TIME PERIOD ("Weekly", "Yearly", etc.) THAT APPLIES TO THESE DATA

Spatial_Domain:

Description_of_Geographic_Extent:

A SHORT DESCRIPTION OF THE AREAL DOMAIN OF THE DATASET.

Bounding_Coordinates:

West_Bounding_Coordinate:

WESTERNMOST LONGITUDE OF DATA EXTENT IN DECIMAL DEGREES, WESTERN HEMISPHERE IS NEGATIVE, EASTERN HEMISPHERE IS POSITIVE.

East_Bounding_Coordinate:

EASTERNMOST LONGITUDE OF DATA EXTENT IN DECIMAL DEGREES, EASTERN HEMISPHERE IS POSITIVE, WESTERN HEMISPHERE IS NEGATIVE.

North_Bounding_Coordinate:

NORTHERNMOST LATITUDE OF DATA EXTENT IN DECIMAL DEGREES, NORTHERN HEMISPHER IS POSITIVE, SOUTHERN HEMISPHERE IS NEGATIVE.

South_Bounding_Coordinate:

SOUTHERNMOST LATITUDE OF DATA EXTENT IN DECIMAL DEGREES, SOUTHERN HEMISPHERE IS NEGATIVE, NORTHERN HEMISPHERE IS POSITIVE.

Keywords:

Theme:

THEME KEYWORDS ARE MANDATORY. Any thesauri may be used in addition to the CoRIS thesauri. CoRIS has a Discovery (theme) Keyword Thesaurus too. Repeat for each thesaurus used. (May be "None").

Theme_Keyword_Thesaurus:

ENTER "CoRIS Discovery Thesaurus"

Theme_Keyword:

INCLUDE ONE AND ONLY ONE KEYWORD FROM THE DISCOVERY THESAURUS.

Theme:

ISO TOPIC CATEGORY AND CODES.

Theme_Keyword_Thesaurus:

ENTER "ISO 19115 Topic Category"

Theme_Keyword:

ENTER APPROPRIATE Topic Category

Theme_Keyword:

ENTER CORRESPONDING Topic Code

Theme:

Theme_Keyword_Thesaurus:

ENTER "CoRIS Theme Thesaurus". You may repeat this element with other thesauri, if necessary for your data. To do that, repeat "Theme:" then the Theme_Keyword_Thesaurus:" element and then list the keywords from that thesaurus.

Theme_Keyword:

KEYWORDS FROM THE THESAURUS NAMED ABOVE May be repeated unlimited number of times. All keywords must be preceded by "Theme_Keyword:

Place:

Repeat for each thesaurus used. (May be "None").

Place_Keyword_Thesaurus:

"*CoRIS Place Thesaurus*"

Place_Keyword:

KEYWORDS FROM THE PLACE THESAURUS NAMED ABOVE May be repeated unlimited number of times. All keywords must be preceded by " Place_Keyword:"

Temporal:

TEMPORAL KEYWORDS ARE OPTIONAL; may be repeated.

Temporal_Keyword_Thesaurus:

*PICK ONE (OR MORE) OF THE AVAILABLE TEMPORAL THESAURI TO CHARACTERIZE THESE DATA.
You can use more than one of these choices in one record, just repeat "Temporal:", then
"Temporal_Keyword_Thesaurus:" element and then list the keywords from that thesaurus.*

Temporal_Keyword:
*KEYWORDS FROM THE TEMPORAL THESAURUS NAMED ABOVE May be repeated unlimited number of
times. All keywords must be preceded by " Temporal_Keyword :".*

Stratum:
STRATUM KEYWORDS ARE OPTIONAL; may be repeated.

Stratum_Keyword_Thesaurus:
*PICK ONE (OR MORE) OF THE AVAILABLE STRATUM THESAURI TO CHARACTERIZE THESE DATA.
You can use more than one of these choices in one record, just repeat "Stratum:", then
"Stratum_Keyword_Thesaurus:" element and then list the keywords from that thesaurus.*

Stratum_Keyword:
*KEYWORDS FROM THE STRATUM THESAURUS NAMED ABOVE May be repeated unlimited number of
times. All keywords must be preceded by " Stratum_Keyword:"*

Taxonomy:
TAXONOMY KEYWORDS ARE MANDATORY IF DATA INCLUDE TAXA IDENTITIES.

Keywords/Taxon:

Taxonomic_Keyword_Thesaurus:
*PICK ONE (OR MORE) OF THE AVAILABLE TAXONOMIC THESAURI TO CHARACTERIZE THESE DATA.
You can use more than one of these choices in one record, just repeat the "Keywords/Taxon:" element and
then list the thesaurus and the keywords from that thesaurus. (May be "None").*

Taxonomic_Keywords:
ENTER ONE OR MORE TAXONOMIC KEYWORDS, EACH ONE PRECEDED BY "Taxonomic_Keywords:".

Taxonomic_System:
MAY BE ONE OR MORE. REPEAT AS NEEDED.

Classification_System/Authority:
INFORMATION ABOUT THE CLASSIFICATION SYSTEM OR AUTHORITY USED.

Classification_System_Citation:

Citation_Information:
*A CITATION FOR THE CLASSIFICATION SYSTEM OR AUTHORITY USED;
defines the authority used for classifying organisms. Use all appropriate citation elements.*

General_Taxonomic_Coverage:
OPTIONAL.

*A DESCRIPTION OF THE RANGE OF TAXA ADDRESSED IN THE DATA SET
OR COLLECTION.*

Taxonomic_Classification:
SEE APPENDIX B SAMPLE 2 FOR FORMATTING.

Taxon_Rank_Name: Kingdoms
Taxon_Rank_Value: Animalia, Plantae, Monera
ENTER KINGDOMS AS APPROPRIATE FOR ALL TAXA IN THE DATASET.

Taxonomic_Classification:

Taxon_Rank_Name:
ENTER THE RANK OR LEVEL in the taxonomy. Examples are "Kingdom", "Genus", etc.

Taxon_Rank_Value:
ENTER THE NAME REPRESENTING THE TAXONOMIC RANK.

Applicable_Common_Name:
*ENTER ANY APPLICABLE COMMON NAMES for the given taxonomic rank and value. This element can be
repeated for multiple common names.*

See Appendix B., Sample 2 for an example of taxonomy.

Access_Constraints:
*ENTER "None" OR SPECIFY ACCESS CONSTRAINTS. IF THERE ARE ACCESS CONSTRAINTS, PLEASE
SPECIFY HOW A USER CAN ASK FOR THE DATA.*

Use_Constraints:
ENTER "None" OR SPECIFY USE CONSTRAINTS, SUCH AS "Please cite contributors when using this data".

Point_of_Contact:
*HOW TO CONTACT AN INDIVIDUAL OR ORGANIZATION THAT IS KNOWLEDGEABLE ABOUT THE DATA
SET.*

Contact_Information:
NOTE: INCLUDE EITHER CONTACT PERSON PRIMARY OR CONTACT ORGANIZATION PRIMARY.

Contact_Person_Primary:

Contact_Person:
Enter the name of the contact person.
Contact_Organization_Primary:
Contact_Organization:
NAME OF THE ORGANIZATION FROM WHOM THE DATA MAY BE OBTAINED
Contact_Address:
THIS ENTIRE GROUP CAN BE REPEATED
Address_Type:
"MAILING', OR "PHYSICAL", OR BOTH
Address:
STREET OR MAILING ADDRESS
City:
CITY NAME
State_or_Province:
STATE OR PROVINCE NAME
Postal_Code:
POSTAL CODE
Country:
COUNTRY
Contact_Voice_Telephone:
THE TELEPHONE NUMBER BY WHICH INDIVIDUALS CAN SPEAK TO THE ORGANIZATION OR INDIVIDUAL; can be repeated.
Contact_Electronic_Mail_Adress:
can be repeated
Browse_Graphic:
This group is to be used to identify the URL of a preview of browse graphic file. It is optional and repeatable.
Browse_Graphic_File_Name:
MANDATORY FOR BROWSE_GRAPHIC. Enter the name of a related graphic file that provides an illustration of the data set.
Browse_Graphic_File_Description:
MANDATORY FOR BROWSE_GRAPHIC. Enter a text description of the illustration.
Browse_Graphic_File_Type:
MANDATORY FOR BROWSE_GRAPHIC. Enter the graphic file type of a related graphic file, from the following list.
"CGM"...................Computer Graphics Metafile
"EPS".....................Encapsulated Postscript format
"EMF"....................Enhanced Metafile
"GIF".....................Graphic Interchange Format
"JPEG"...................Joint Photographic Experts Group format
"PBM"....................Portable Bit Map format
"PS".......................Postscript format
"TIFF"....................Tagged Image File Format
"WMF".................Windows metafile
"XWD"...................X-Windows Dump
Extended Domain with Biological Profile
"AIF"……………… Audio Interchange File Format
"ASF"……………… Advanced Streaming Format
"AU"…………….....Sun audio format
"AVI"……………..Audio Video Interleave format
"MID"……………..Musical Digital Interface format
"MOVIE"……………SGI movie video format
"MP3"………...........MP3 music format
"MPEG"……………Moving Picture Experts Group video format
"MPGA"……………MPEG audio format
"PNG"………………Portable Network Graphics format
"PPT"………………Powerpoint presentation
"QT"…………………Quicktime video format
"RA"…………………RealAudio format
"WRL"………………Virtual Reality Modeling Language
"WAV"………………Microsoft audio form
Distribution_Information:

THIS ENTIRE GROUP CAN BE REPEATED

Distributor:

 Contact_Information:

   NOTE: INCLUDE EITHER CONTACT PERSON PRIMARY OR CONTACT ORGANIZATION PRIMARY.

  Contact_Person_Primary:

   Contact_Person:

    Enter the name of the contact person.

  Contact_Organization_Primary:

   Contact_Organization:

    NAME OF THE ORGANIZATION FROM WHOM THE DATA MAY BE OBTAINED

  Contact_Address:

    THIS ENTIRE GROUP CAN BE REPEATED

   Address_Type:

    "MAILING', OR "PHYSICAL", OR BOTH

   Address:

    STREET OR MAILING ADDRESS

   City:

    CITY NAME

   State_or_Province:

    STATE OR PROVINCE NAME

   Postal_Code:

    POSTAL CODE

   Country:

    COUNTRY

  Contact_Voice_Telephone:

    THE TELEPHONE NUMBER BY WHICH INDIVIDUALS CAN SPEAK TO THE ORGANIZATION OR INDIVIDUAL; can be repeated.

 Distribution_Liability:

    STATEMENT OF LIABILITY, IF ANY, ASSUMED BY THE DISTRIBUTOR

    FOR EXAMPLE: NOAA makes no warranty regarding these data, expressed or implied, nor does the fact of distribution constitute such a warranty. NOAA and NODC cannot assume liability for any damages caused by any errors or omissions in these data, nor as a result of the failure of these data to function on a particular system.

 Standard_Order_Process:

    USE NON-DIGITAL FORM FOR DATA AVAILABLE IN NON-DIGITAL FORM; USE DIGITAL FORM FOR DATA AVAILABLE IN DIGITAL FORM; can be repeated.

  Non_Digital_Form:

    DESCRIBE HOW TO OBTAIN DATA IN NON-DIGITAL FORM.

  Digital_Form:

    THIS ENTIRE GROUP CAN BE REPEATED

  Digital_Transfer_Information:

   Format_Name:

    THE NAME OF THE DATA TRANSFER FORMAT, USING ONE OF THE FOLLOWING:

    "ARCE" . . . . . ARC/INFO Export format

    "ARCG" . . . . . ARC/INFO Generate format

    "ASCII". . . . . ASCII file, formatted for text attributes, declared format

    "BIL". . . . . . Imagery, band interleaved by line

    "BIP". . . . . . Imagery, band interleaved by pixel

    "BSQ". . . . . . Imagery, band interleaved sequential

    "CDF". . . . . . Common Data Format

    "CFF". . . . . . Cartographic Feature File (U.S. Forest Service)

    "COORD". . . . . User-created coordinate file, declared format

    "DEM". . . . . . Digital Elevation Model format (U.S. Geological Survey)

    "DFAD" . . . . . Digital Feature Analysis Data (National Imagery and Mapping Agency)

    "DGN". . . . . . Microstation format (Intergraph Corporation)

    "DIGEST" . . . . Digital Geographic Information Exchange Standard

    "DLG". . . . . . Digital Line Graph (U.S. Geological Survey)

    "DTED" . . . . . Digital Terrain Elevation Data (MIL-D-89020)

    "DWG". . . . . . AutoCAD Drawing format

    "DX90" . . . . . Data Exchange '90

    "DXF". . . . . . AutoCAD Drawing Exchange Format

"ERDAS". . . . . ERDAS image files (ERDAS Corporation)
"GRASS". . . . . Geographic Resources Analysis Support System
"HDF". . . . . . Hierarchical Data Format
"IGDS" . . . . . Interactive Graphic Design System format (Intergraph Corporation)
"IGES" . . . . . Initial Graphics Exchange Standard
"MOSS" . . . . . Multiple Overlay Statistical System export file
"netCDF" . . . . network Common Data Format
"NITF" . . . . . National Imagery Transfer Format
"RPF". . . . . . Raster Product Format (National Imagery and Mapping Agency)
"RVC". . . . . . Raster Vector Converted format (MicroImages)
"RVF". . . . . . Raster Vector Format (MicroImages)
"SDTS" . . . . . Spatial Data Transfer Standard (Federal Information Processing Standard
               173)
"SIF". . . . . . Standard Interchange Format (DOD Project 2851)
"SLF". . . . . . Standard Linear Format (National Imagery and Mapping Agency)
"TIFF" . . . . . Tagged Image File Format
"TGRLN". . . . . Topologically Integrated Geographic Encoding and Referencing (TIGER) Line format (Bureau
of the Census)
"VPF". . . . . . Vector Product Format (National Imagery and Mapping Agency)
 "DBF".........dBASE data file
 "DIF".........VisiCalc format
 "DOC".......Microsoft Word file
 "EPS".........Encapsulated Postscript
 "FW"..........Framework spreadsheet or database format
 "GIF".........Graphics Interchange Format
 "GRA".......ARC/INFO graphic file
 "MDB".......Microsoft Access data file
 "PBM"........Portable Bit Map format file
 "PLT".........ARC/INFO Plot file
 "PS"..........Postscript
 "QP".........Quattro Pro data file
 "RPD".......Rapid File
 "SPLUS"…S-Plus file
 "WK1".......LOTUS 1-2-3 file
 "WKS".......LOTUS 1-2-3 file
 "WP".........WordPerfect
 "XLS"........Microsoft Excel worksheet
 "free text". . . . . Name of local or other format.
Digital_Transfer_Option:
 USE ONLINE OPTION IF DATA ARE AVAILABLE ONLINE, OR OFFLINE OPTION IF DATA ARE NOT
 AVAILABLE ONLINE; can be repeated.
Online_Option:
 Computer_Contact_Information:
        Can be repeated.
 Network_Address:
  Network_Resource_Name:
        THE ELECTRONIC ADDRESS AND NAME OF THE FILE OR SERVICE FROM WHICH THE DATA SET
        CAN BE OBTAINED. Network Resource Name is the name of the file, or service from which the data set
        can be obtained from a distributor, such as NCDC, NGDC, NODC, the originator, or CoRIS. The URL
        provided should link either directly to the data or to a web page that is as close as possible to the data,
        accompanied by access instructions. Linking to the home page of a program or organization will
        necessitate further searching on the part of the user. This field may be repeated as many times as needed.
Offline_Option:
 Offline_Media:
        ENTER ONE OF THE FOLLOWING:
        "CD-ROM"
        "3-1/2 inch floppy disk"
        "5-1/4 inch floppy disk"
        "9-track tape"
        "4 mm cartridge tape"
        "8 mm cartridge tape"

              "1/4-inch cartridge tape"
              Free text description of media.
    Recording_Format:
        DESCRIBE THE RECORDING FORMAT WITH FREE TEXT OR:
        "cpio"
        "tar"
        "High Sierra"
        "ISO 9660"
        "ISO 9660 with Rock Ridge extensions"
        "ISO 9660 with Apple HFS extensions"
Fees:
    DESCRIBE THE FEES AND TERMS, IF ANY, FOR RETRIEVING THE DATA SET.
  Ordering_Instructions:
    IF YOU (THE DATA ORIGINATOR) PLAN TO DISTRIBUTE THE DATA OFFLINE, PLEASE INCLUDE
    INSTRUCTIONS FOR ORDERING DATASET COPIES.
Metadata_Reference_Information:
Metadata_Date:
    DATE METADATA DESCRIPTION WAS CREATED Use the YYYYMMDD format.
Metadata_Contact:
  Contact_Information:
    USE EITHER CONTACT PERSON PRIMARY OR CONTACT ORGANIZATION PRIMARY
   Contact_Person_Primary:
    Contact_Person:
    NAME OF PERSON CREATING THE METADATA FOR THESE DATA
   Contact_Organization_Primary:
    Contact_Organization:
    ENTER THE NAME OF THE ORGANIZATION
  Contact_Address:
    THIS ENTIRE GROUP CAN BE REPEATED.
   Address_Type:
    ENTER "Mailing" OR "Physical".
   Address:
    MAILING AND/OR PHYSICAL ADDRESS OF THE PERSON NAMED ABOVE.
    This element may be a single line or multiple lines. City, State, Zip/postal code, country, telephone, fax, and
    email address go in the specific, self-explanatory elements that follow.
   City:
    CITY IN ADDRESS
   State_or_Province:
    STATE IN ADDRESS
   Postal_Code:
    5 OR 9 DIGIT US ZIP CODE OR INTERNATIONAL POSTAL CODE
   Country:
    COUNTRY NAME It is not necessary to use US, USA, or America. Use for non-US addresses.
   Contact_Voice_Telephone:
    PHONE NUMBER; can be repeated.
Metadata_Standard_Name:
    PICK ONE:
    "FGDC Content Standard for Digital Geospatial Metadata"
    "Biological Data Profile of the Content Standard for Digital Geospatial Metadata"
Metadata_Standard_Version:
    PICK ONE RESPECTIVELY:
    "FGDC-STD-001-1998"
    "FGDC-STD-001.1-1999"
Metadata_Extensions:
    PROVIDE EXTENSION INFORMATION BELOW. Mandatory if applicable.
  Online_Linkage:
    A LINK TO THE THIS CoRIS DOCUMENT/GUIDE OR THE NOAA EXTENTIONS DOCUMENT
  Profile_Name:
    THE NAME OF THE EXTENSION DOCUMENT/GUIDE.