

**USDA Service Center Initiative
Geospatial Data Acquisition, Integration and Delivery
Business Re-engineering Project**

**Data Themes - Outline - Hydrography (1:24,000)
Updated 23-Jun-99**

I. Acquisition

A. Data Source

1. Producer Information

a. Name

The Hydrography File is a subset of the Large scale Digital Line Graphs, produced by the United States Geological Survey (USGS).

b. Location of Headquarters

US Geological Survey
EROS Data Center
47914 252nd Street
Sioux Falls, SD 57198-0001
USA
Tel: 605-594-6151
1-800-252-GLIS
Fax: 605-594-6589
e-mail (Internet): custserv@edcmail.cr.usgs.gov

c. Internet Address

<http://edcwww.cr.usgs.gov/eros-home.html>

2. Publisher Information

a. Name

The Hydrography File is published by the USGS. It is available through the USGS Geospatial Data Clearinghouse.

b. Location of Headquarters

c. Internet Address

The internet address of the USGS is www.usgs.gov
The internet address of the clearinghouse is www.nsd.usgs.gov

3. Acquisition Information

a. Delivery Media

The Hydrography file is available via anonymous file transfer protocol (ftp). It is also available in the optional format on 8-mm cassettes, 3480 cartridges, and CD-recordables.

b. Download URL

http://edcwww.cr.usgs.gov/doc/edchome/ndcdb/dlg_large/states.html

c. Projected Data Availability Schedule

The Hydrography files are available now.

These DLGs are produced from the largest scale topographic quadrangle maps available, are usually the USGS 7.5-minute, 1:24,000-scale topographic maps for the contiguous United States, Hawaii, and the Virgin Islands. Large-scale DLGs also are produced from 1:25,000- and 1:63,360-scale maps for Alaska and 1:30,000-scale maps for Puerto Rico.

The DLG data are being collected for all 50 States and the 1:24,000-scale series eventually provide complete national coverage. A status graphic is available through the Produce Information web page (see 7.5' DLG Coverage).

http://mcmcweb.er.usgs.gov/status/dlg_stat.html/Large Scale

B. Standards Information

1. Geospatial Data Standard

a. Standard Name and Steward Information

SDTS - Spatial Data Transfer Standard

The SDTS was approved in July 1992 as Federal Information Processing Standard (FIPS) 173. The standard allows the exchange of digital spatial data between different computer systems. It provides a solution to the problem of spatial data transfer from the conceptual level to the details of physical file encoding. Transfer of spatial data involves modeling spatial data concepts, data structures, and logical physical file structures.

FIPS - Federal Information Processing Standard

The U.S. National Institute of Standards and Technology (NIST) is responsible for developing standards, guidelines, and associated methods and techniques for computer systems, including those needed to assure the cost-effective security and privacy of sensitive information in U.S. Federal computer systems. NIST adopts and publicizes U.S. FIPS standards under the provisions of Section 111(d) of the U.S. Federal Property and Administrative Services Act of 1949 as amended by the Computer Security Act of 1987.

b. Standard Version

c. Standard URL

2. Metadata Standard

a. Standard Name and Steward Information

Metadata Standard Name: Content Standards for Digital Geospatial Metadata
Metadata Standard Version: 19940608

The metadata contact is:
U.S. Geological Survey
507 National Center

Reston, Virginia 20192

b. Description of Metadata Captured

The metadata is available online at

http://edcwww.cr.usgs.gov/doc/edchome/ndcdb/dlg_large/states.html

The sections of metadata include:

Identification Information (includes abstract)

Data Quality Information

Spatial Data Organization Information

Spatial Reference Information

Entity and Attribute Information

Distribution Information (includes ordering information)

Metadata Reference Information

c. Metadata Accuracy and Completeness Assessment

Additional information is available in the

U.S. Department of the Interior, U.S. Geological Survey, 1990,
Standards for Digital Line Graphs, Reston, VA, 1994

Softcopies in ASCII, WordPerfect, and PostScript format are available at:

<ftp://mapping.usgs.gov/pub/ti/DLG/24kdlgguide>

C. Acquired Data Structure

1. Geospatial Data Format

a. Format (raster, vector, etc.)

The large-scale DLG data files are available in two distribution formats: Spatial Data Transfer Standard (SDTS), and Optional. The Optional format is available "at cost" on various magnetic media in addition to CD-ROM through the Earth Science Information Center address provided below.

Large-scale DLG files are available in optional and SDTS formats. These files have been compressed with the GNU gzip utility. If you do not have access to gzip, the FTP server will uncompress the file as you retrieve it.

For a complete explanation of the large-scale DLG format see the USGS National Mapping Program, Technical Instructions, Data User's Guide 1 "Digital Line Graphs from 1:24,000-Scale Maps". For details about the SDTS format see the "DLG-3 SDTS Transfer Description" draft document. These booklets can be ordered, for a small fee, from the Earth Science Information Center at the following address:

Earth Science Information Center
U.S. Geological Survey
507 National Center
Reston, VA 20192
Tel: 703-648-6045 or 800-USA-MAPS
Fax: 703-648-5548

Technical Instructions can also be obtained from the following anonymous FTP accounts:

User Guide:

<ftp://mapping.usgs.gov/pub/ti/DLG/24kdlgguide> (User Guide)

SDTS Transfer Description and other SDTS documents:

<ftp://sdts.er.usgs.gov/pub/sdts/>

Large-scale DLG files are available in optional and SDTS formats. These files have been compressed with the GNU gzip utility. If you do not have access to gzip, the FTP server will uncompress the file as you retrieve it.

b. Format Name

Vector

c. Data Extent

The United States and its territories.

d. Horizontal and Vertical Resolution

The data are either manually digitized using equipment with a resolution of 0.001 inch and an absolute accuracy of from 0.003 to 0.005 inch or are scanned on an automatic device with a resolution of 0.0013-inch (30 points per millimeter).

e. Absolute Horizontal and Vertical Accuracy

Horizontal positional accuracy is based upon the use of USGS source quadrangles, which are compiled to meet National Map Accuracy Standards (NMAS). NMAS horizontal accuracy requires that at least 90 percent of points tested are within 0.02 inches of the true position. The digital data are estimated to contain a horizontal positional error of less than or equal to 0.003 inches standard error in the two component directions relative to the source quadrangle.

Vertical positional accuracy is based upon the use of USGS source quadrangles, which are compiled to meet National Map Accuracy Standards (NMAS). NMAS vertical accuracy requires that at least 90 percent of well-defined points tested be within one half contour interval of the correct value. Comparison to the graphic source is used as control to assess digital positional accuracy.

f. Nominal Scale

1:24,000

g. Horizontal and Vertical Datum

The horizontal datum is the North American Datum (NAD) 27. The vertical datum is mean sea level.

h. Projection

UTM

i. Coordinate Units

Coordinates are expressed as integer mils (one unit = .001") in a Cartesian coordinate system.

- j. Average Data Set Size

The Hydrography file will vary in size depending on the area of choice.

- k. Symbology
None

2. Attribute Data Format

- a. Format Name

Vector format

- b. Database Size

These files are sent with a MIME type of application/x-gzip.

3. Data Model

- a. Geospatial Data Structure

DIRECTORY STRUCTURE

The directory structure for the large-scale DLG FTP account is defined as follows:

A-Z/mapname_STATE/layer/version

where:

A-Z = The first character of the map name

Mapname = The name of the large-scale map

STATE = The two character state code used to for duplicate map names

Layer = The category of data (such as hydrography or transportation)

Version = The version of data (1-current; 2-historical)

Example: B/bismarck_ND/boundaries/version_1 is the location for the boundary layer of the Bismarck, ND quadrangle.

All files for each layer are contained under the layers directory. For more information see FILE EXTENT and DATA FORMAT sections of this readme.

FILE EXTENT

SDTS transfers are stored as compressed "tar" archive files. Each transfer contains a complete set of files, for a specific layer and version, covering a quadrangle. The transfer naming convention is as follows: XXX.layer.V.sdts.tar.gz.

XXX = a unique quadrangle identifier; which consists of quad SE coordinates preceded by a D,

layer = data category name abbreviation (such as "bd" for boundary) followed by 0 (zero) and "s" or "f" ("s" is for 7.5-minute and "f" is for 15-minute)

V = file version (1-current; 2-historical)

sdts = denotes that the data is in SDTS format

tar = represents "tar" file

gz = refers to "gzip" compression

The "tar" files have been compressed to speed up the download. You will need to decompress the ".gz" files before untarring the SDTS files. For information about tar and unzip see the FILE COMPRESSION section of this "README".

You must download the Master Data Dictionary (MDD), (00MASTERDD_LRG.SDTS) Version 3.0, which is meant to be used in conjunction with a Large Scale (DLG-3) SDTS transfer to form a fully compliant SDTS/Topological Vector Profile (TVP) transfer. The MDD can be found in this directory as a compressed tar file, (00MASTERDD_LRG.SDTS.tar.gz), or as separate uncompressed files in the 00MASTERDD_LRG.SDTS directory. Please refer to the "README" file found at data/DLG/LARGE_SCALE/00MASTERDD_LRG.SDTS for more MDD information.

***** PLEASE NOTE THAT YOU MUST HAVE THE MASTER DATA
***** DICTIONARY AT THE SAME DIRECTORY LEVEL AS THE DATA.

Unzipping, then untarring SDTS data creates several files all having a .DDF extension. Refer to "DLG-3 SDTS Transfer Description" draft document for details about the SDTS format. It may be found at the SDTS information ftp site in two formats.

Word Perfect - ftp://sdts.er.usgs.gov/pub/sdts/datasets/tvp/dlg3/dlg3.wp
Post Script - ftp://sdts.er.usgs.gov/pub/sdts/datasets/tvp/dlg3/dlg3.ps

FILE COMPRESSION

The SDTS transfers are stored as compressed "tar" archive files. Each transfer is comprised of several files, which are combined with the Unix "tar" command and compressed using the GNU "gzip" utility. To extract the SDTS modules, the following UNIX command could be used:

gunzip < hydro.sdts.tar.gz | tar xvBf -

In MSDOS, the command is:

gzip -d hydro.sdts.gz

WARNING! Some uncompression utilities automatically default to "Smart TAR CR/LF translation". This setting must NOT be used as it will introduce errors in the data!

(See "FTP SITES" for a list of places where DOS and MAC versions of tar can be downloaded.)

Note: If you do not have access to gzip, the FTP server will uncompress the files as you retrieve them if you omit the gz extension. For example, in a ftp session, to retrieve the file "D4212204_bd0s.1.sdts.tar.gz" without compression, type:

"get D4212204_bd0s.1.sdts.tar"

Note that the uncompressed files are typically five times larger than the compressed versions and will take five times longer to transmit. Most web browsers will allow FTP retrieval as well. For a list of gzip sites see "FTP SITES".

FTP SITES

UNIX gzip:

ftp://prep.ai.mit.edu/pub/gnu

ftp://wuarchive.wustl.edu/systems/gnu

MAC gzip and tar:

ftp://mirrors.aol.com/pub/mac/util/compression

```
macgzip0.3b2.sit.hqx
suntar2.03.cpt.hqx
MSDOS gzip and tar:
ftp://prep.ai.mit.edu/pub/gnu
gzip-1.2.4.tar
ftp://ftp.uu.net/systems/ibmpc/msdos/pcroute
tar.exe
```

Example FTP:

```
ftp prep.ai.mit.edu
user name: <enter anonymous>
password: <enter your email address>
cd /pub/gnu
set binary
get <filename>
quit
```

- b. Attribute Data Structure
- c. Database Table Definition
- d. Data Relationship Definition
- e. Data Dictionary

00MASTERDD_LRG (Version 3.0 - Large Scale data)

MODULES INCLUDED IN THE MASTER DATA DICTIONARY TRANSFER:

MDEF: Data Dictionary/Definition - Contains definitions of entities and attributes

MDIR: Catalog/Directory - Directory of each module included in the transfer

MDOM: Data Dictionary/Domain - Contains the domain of values for attributes

MIDE: Identification - Contains global identification for the transfer

MQCG: Data Quality/Completeness - Completeness data quality report for the master data dictionary

MQHL: Data Quality/Lineage - Lineage data quality report for the master data dictionary

PURPOSE OF TRANSFER:

This transfer's purpose is to transfer the Data Dictionary/Definition and Data Dictionary Domain modules which are common to all DLG-3 and SDTS transfer.

**** BE AWARE THAT YOU MUST HAVE THE MASTER DATA
**** DICTIONARY AT THE SAME DIRECTORY LEVEL AS THE DATA

REFERENCES:

To avoid duplication, the data dictionary is transferred in a master data dictionary transfer as described in Section 3 of the "DLG-3 SDTS Transfer Description". It is a draft document, which describes SDTS transfers of DLG-3 data, including detailed information on each module. This file can be downloaded from the SDTS ftp information site in two formats:

Word Perfect - <ftp://sdts.er.usgs.gov/pub/sdts/datasets/tpv/dlg3/dlg3.wp>

Post Script - <ftp://sdts.er.usgs.gov/pub/sdts/datasets/tpv/dlg3/dlg3.ps>

POINT OF CONTACT:
U.S. Geological Survey
SDTS Task Force, MS 821
1400 Independence Road
Rolla, Mo 65401

| E-mail: sdts@usgs.gov
| Web: <http://mcmweb.er.usgs.gov/sdts>
| FTP: [sdts.er.usgs.gov](ftp://sdts.er.usgs.gov) (144.47.162.236)

D. Policies

1. Restrictions

a. Use Constraints

None. This information is provided with the understanding that it is not guaranteed to be correct or complete and conclusions drawn from such information are the responsibility of the user.

b. Access Constraints

None

c. Certification Issues

None

2. Maintenance

a. Temporal Information

The newer Spatial Data Transfer Standard (SDTS) format availability will continue to increase as data are converted and/or produced in this format.

b. Average Update Cycle

Unknown.

E. Acquisition Cost

1. Cooperative Agreement

a. Description of Agreement

None

b. Status of Agreement

N/A

2. Cost to Acquire Data

None, assuming it is acquired via ftp.

II. Integration

A. Value Added Process

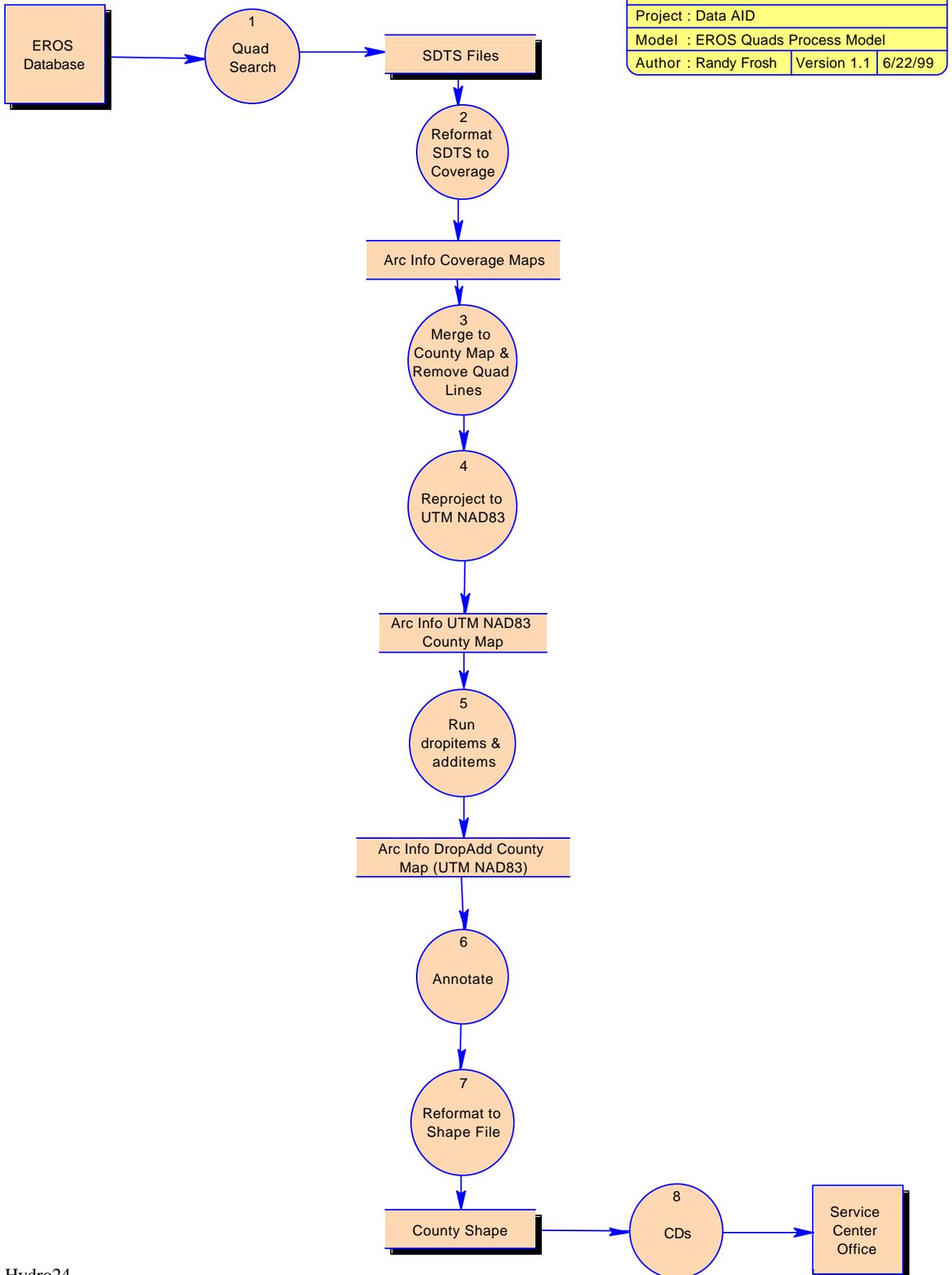
1. Benefit to the Service Center

The hydrography file is a SDTS format. This file can be used with other geospatial data for analysis. If a Service Center wanted to use the hydrography file, it would have to

perform the conversions. In addition the hydrography files are tiled by quad and have to be joined and reprojected to the specific county.

2. Process Model

a. Flow Diagram



Process Model		
Project : Data AID		
Model : EROS Quads Process Model		
Author : Randy Frosh	Version 1.1	6/22/99

1. ftp to edcftp.cr.usgs.gov
2. use an arc/info AML to start the SDTS process
3. append all the quads together
4. reproject to UTM NAD83
5. run dropitems and additems commands
6. annotate(label) all drainage names
7. convert to shapefile hydro.shp and hydro_txt.shp
8. cut CDROM and send to service center office

b. Process Description

- The dlg sdts format Hydrography files are downloaded from the USGS ftp site
- The files are converted to ARC/INFO coverage
- These files are appended to create one coverage
- The ARC/INFO coverage is converted to a shapefile

9. Technical Issues

a. Tiling

Original data is primarily from 1:24,000 USGS topographic quadrangles (published as 7.5-minute). This is changed to a county tiling.

b. Compression

None

c. Scale

1:24,000

d. Tonal Matching

Not applicable.

e. Edge-matching

Validation software provides for checking the edges of each quadrangle against the edges of the four adjacent quadrangles. Each edge of a DLG-3 is checked for positional and attribute matching along the neatlines of the adjoining DLG-3 cells, provided that the surrounding data cells are available at the time the DLG-3 is entered into the National Digital Cartographic Data Base (NDCDB).

10. Quality Control

a. Procedures

The Hydrography file is verified against the Digital Raster Graph and the Digital Ortho Quadrangle to ensure an accuracy rate of at least 95%.

b. Acceptance Criteria

See above.

11. Data Steward

a. Name and Organization

Currently, the data steward for the integrated hydrography file is:
National Cartography and Geospatial Center
Natural Resources Conservation Service
US Department of Agriculture
501 Felix Street, Building 23
P.O. Box 6567
Fort Worth, Texas 76115-0567 USA

If the integration procedure can be automated, the steward would optimally be:
US Geological Survey
EROS Data Center
47914 252nd Street
Sioux Falls, SD 57198-0001

b. Responsibilities

B. Integrated Data Structure

1. Geospatial Data Format

a. Format (raster, vector, etc.)

Vector

b. Format Name

ESRI shape file and ARC/INFO coverage.

c. Data Extent

Individual county

d. Horizontal and Vertical Resolution

Same as source data.

e. Absolute Horizontal and Vertical Accuracy

Same as source data.

f. Nominal Scale

Same as source data.

g. Horizontal and Vertical Datum

The horizontal datum is the North American Datum (NAD) 83. The vertical datum is mean sea level.

h. Projection

Universal Transverse Mercator (UTM), North American Datum (NAD) 83

i. Coordinate Units

Meters

j. Symbology

Solid blue line.

2. Attribute Data Format

a. Format Name

ESRI Shape File

b. Database Size

The data per county will vary with size of the county.

3. Data Model

a. Geospatial Data Structure

Line Files		Text Files	
map shp	shp file	map shp	shp file
map dbf	dbf file	map dbf	dbf file
map shx	shx file	map shx	shx file
map sbn	sbn file	map sbn	sbn file
map sbx	sbx file	map sbx	sbx file

b. Attribute Data Structure

See below.

c. Database Table Definition

FNODE#	41
TNODE#	23
LPOLY#	1
RPOLY#	1
LENGTH	18.29205
HYDRO#	5
HYDRO-ID	700
ENTITY_LABEL	500414
ENTITY_DEF	DITCH OR CANAL
PHOTOREVISED	
RELATION_TO_GROU	
VERTICAL_RELATIO	
BANK	
OPERATIONAL_STAT	
SALT	
UNSURVEYED	
INTERMITTENT	
SUBMERGED	
DRY	
MINERAL_OR_HOT	

NAVIGABLE	
EARTHEN	
INTERPOLATED	
ELEVATION	-9999.99
ROTATION_ANGLE	-99
RIVER_MILE	-999.9
BEST_ESTIMATE	
COMPOSITION	
TIDE	
UNDREDGED	
COINCIDENT	

d. Data Relationship Definition

The Hydrography File is a subset of the Large scale Digital Line Graphs, produced by the United States Geological Survey (USGS)

e. Data Dictionary

FNODE#	Internal sequence number of the from-node.
TNODE#	Internal sequence number of the to-node.
LPOLY#	Internal sequence number of the left polygon: set to 0 if the coverage does not contain polygons.
RPOLY#	Internal sequence number of the right polygon: set to 0 if the coverage does not contain polygons.
LENGTH	Length in coverage units.
HYDRO#	Internal sequence number (i.e. the record number) of the arc in the ARC file.
HYDRO-ID	User-assigned feature ID.
ENTITY_LABEL	7 -digit DLG-3 code or blanks
ENTITY_DEF	definition of DLG-3 code
PHOTOREVISED	"Y" (applied) or blank
RELATION_TO GROU	"U" (underground) "E" (elevated) "T" (tunnel) " "(not applied)
VERTICAL_RELATIO	"O" (overpassing) "U" (under passing) " "(not applied)
BANK	"R" (right bank) "L" (left bank) " "(not applied)
OPERATIONAL_STAT	"U" (under construction) "A" (abandoned) " "(not applied)
SALT	"Y" (applied) or blank
UNSURVEYED	"Y" (applied) or blank
INTERMITTENT	"Y" (applied) or blank
SUBMERGED	"Y" (applied) or blank
DRY	"Y" (applied) or blank
MINERAL_OR_HOT	"Y" (applied) or blank
NAVIGABLE	"Y" (applied) or blank
EARTHEN	"Y" (applied) or blank
INTERPOLATED	"Y" (applied) or blank
ELEVATION	Reals to the nearest 0.01 meter; -9999.99 indicates not applied
ROTATION_ANGLE	Integers to the nearest degree; -99 indicates not applied
RIVER_MILE	Reals to the nearest 0.1 mile; -999.9 indicates not applied
BEST_ESTIMATE	"Y" (applied) or blank
COMPOSITION	unknown
TIDE	unknown
UNDREDGED	unknown
COINCIDENT	First 2 digits of major code of coincident category

C. Resource Requirements

1. Hardware and Software

To acquire the Hydrography data, it requires a UNIX or NT machine with approximately 50-Mb of disk.

2. Staffing

This will vary depending on the size of the county data.

D. Integration Cost

1. Hardware and Software

In order to reformat, reproject, and tile the data, the USDA requires:

Arc/Info on UNIX or NT platform

Arcview on NT

1 GB disk

2. Staffing

The procedure is currently not 100% automated. If it were automated, this procedure would require personnel to check the results of the procedure and annotate the data. A rough estimate for fully automating the procedure is one programming staff member for 5 - 10 days. The automated procedure would require approximately 1/2 - 1 1/2 days to run. To generate maps for the US and territories with no automation, it would require approximately two staff members, familiar with ESRI software, for five days.

III. Delivery

A. Specifications

1. Directory Structure

- a. Folder Theme Data is Stored In

\Hydrography (V 5.0)

2. File Naming Convention

- a. List of Theme Files and The File Naming Convention

\hydro.dbf

\hydro.shx

\hydro.shp

\hydro_txt.dbf

\hydro_txt.shx

\hydro_txt.shp

B. User Information

1. Accuracy Assessment

a. Alignment with Other Theme Geospatial Data

The Hydrography data will be aligned well with other themes captured at a scale of 1:24,000. This is easily seen with the Digital Raster Graph theme loaded with the hydrography theme.

b. Content

2. Appropriate Uses of the Geospatial Data

a. Display Scale

The original data source scale or smaller, usually 1:24,000.

b. Plot Scale

The original data source scale or smaller, usually 1:24,000.

c. Area Calculations

N/A

d. Decision Making

N/A

C. Maintenance and Updating

1. Recommendations and Guidelines

a. Frequency of Updates

In order of preference:

- Extract the data from the USGS clearinghouse node at the time of request for the data. Perform the data integration in an automated fashion. Therefore, no updates are required because USDA would not be the data steward.
- To coincide with USGS updates, if notification is a possible from USGS
- At a regular interval of 3 months, 6 months, or 12 months, depending on budget

b. Location for the Theme Data to be Maintained

In order of preference:

- At the USGS, with USGS as the data steward
- At the USDA data warehouse, potentially in Fort Worth, Texas

c. Maintenance and Updating Procedures Overview

Follow the integration procedure listed above for each update if it is not done at the time of request of the data.