

GIS User Manual

Prepared by: DMF Mapping Advisory Team

A general guide to GIS and GPS technology and resources available to employees of the North Carolina Division of Marine Fisheries, including information on hardware, software, data, applications, and training.

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SECTION I: PURPOSE AND BACKGROUND

PURPOSE

The purpose of this manual is to inform the Division of Marine Fisheries (DMF) staff of Geographic Information Systems (GIS) resources available through the Department of Environment and Natural Resources Information Technology Services (DENR ITS) and to provide guidance on how to obtain and use those resources.

DENR ITS GIS PROGRAM

The DENR ITS GIS Program supports the GIS needs for all DMF sections. Specifically, the GIS Program supports the Shellfish Mapping Program, the Oyster Sanctuary Program, the Artificial Reef Program, Fishery Management Plans (FMPs), the Coastal Habitat Protection Plan (CHPP), Strategic Habitat Area (SHA) development, DMF proclamations, and biological database analyses using GIS. Additional support tasks include mapping and updates to geographic locations for the DMF rulebook, shellfish leases, Under Dock Oyster Culture (UDOC), Waterfront Access and Marine Industry (WAMI) projects, Marine Patrol violations, pound net locations, oyster cultch planting sites, and compound and office location maps. DENR ITS GIS staff also contributes to FMPs, MAT, the Biological User Group (BUG), and the Rules Advisory Team (RAT). In addition, the DENR ITS GIS Program maintains a variety of software and hardware and provides DMF staff with training, technical support, other products/deliverables, and ESRI ArcGIS Desktop software (upon request).

The DENR ITS GIS Program started out as part of the Information Technology (IT) section of DMF; however, it was consolidated along with the IT section into the Division of Information Technology Services under DENR in 2008. As a result, any requests for services or software must be submitted through a DENR One Ticketing System (DOTS) service desk request (see "Requesting GIS Staff Assistance" at the end of Section II).

The DMF Mapping Advisory Team (MAT) is a subcommittee of the DMF IT Steering Committee (ITSC) that is responsible for communicating GIS needs and issues between DMF and DENR ITS. Members from each DMF section have representatives on MAT. The MAT prioritizes DMF's GIS projects for the GIS Program, and DENR ITS tracks the progress of these projects using JIRA, a time tracking and report generating tool used for management and prioritization of DENR ITS projects.

SECTION II: GIS RESOURCES

DMF RESOURCES

GIS and GPS Software

Currently, a variety of software products are used for GIS mapping and GPS data collection. These products include:

- ESRI Desktop GIS software (available for distribution to DMF staff upon request)
 - ArcView 3.x
 - o ArcGIS Desktop (9.x,10.0,10.1, 10.2, 10.3, Pro)
 - ArcGIS Explorer
- ESRI Enterprise GIS software (used by GIS staff)
 - ArcGIS Server Enterprise 10.1
 - ArcGIS Online (AGOL)
 - ArcSDE Enterprise for SQL Server
- Trimble GPS software (used by GIS staff)
 - o Terrasync GPS
 - o GPS Pathfinder Office (3.0, 3.1, 4.0, 5.4)

Hardware

Hardware products used by DMF and GIS staff for the production of data, maps, and reports include:

- Plotters
 - Hewlett Packard Designjet Z6100 plotter
 - Prints posters up to 42 inches wide and 8 feet long
 - Frequent users from MHC-HQ and CDO may request a LAN connection to print directly to the plotter
 - Media are plain paper and high-gloss photo paper
- Scanners
 - o Contex Cougar 36 scanner
 - Scans documents up to 36" wide and 5' long
 - Not on LAN; all scanning work performed by GIS staff
 - Backup scanning services are by Staples in Morehead City
- Color Printer
 - Hewlett Packard CP5220 Color Printer
 - Prints color copies 8.5" x 11" to 11" x 17"
 - On LAN

Technical Support

GIS staff members are able to provide support and expertise to ongoing DMF programs and future projects in a number of ways. Primarily, the GIS group will:

• Create, update, and maintain GIS data sets and applications

- Assist with project planning for GIS issues
- Support GPS data collection issues using Trimble GPS software, including real-time and post-processed differential correction and integration into GIS databases The GIS program does not have GPS units to loan. (Discuss this issue in MAT)
- Deliver a variety of GIS mapping products:
 - Printed map documents (for reports or large color posters)
 - o Digital maps for Microsoft Office products (PowerPoint, Word) or websites
 - Web Mapping Services (WMS) databases for web-based GIS data access
 - o Customized web mapping applications through Google Earth and ArcGIS Server
- Software Installation Requests. GIS software requests are submitted through the DENR Online Ticket System (DOTS). Operations staff has the necessary administrative rights to install the GIS software. Operations staff will document the following information for tracking purposes: user name, software version, system information, FAS#, and serial number, office location, section.

Data

See section III of this document for details on the DMF GIS library and additional online data resources.

Training

See section V of this document for details on training available to DMF staff.

GIS Staff

The current GIS staff members are listed below with contact information, relevant projects, and areas of expertise. Three of the staff members are in the DENR ITS organization and one is a member of the DMF staff.

Name:	Mark Voss
Location:	Morehead City, Central District Office, Room 18
Phone:	(252) 808-8123
Email:	mark.voss@ncdenr.gov
Job:	DENR ITS GIS Branch, GIS Branch Head, GIS analyst for DMF GIS needs
Contact for:	DMF GIS Program contact, GIS tasks allocation, strategic planning, ESRI desktop software (ArcGIS)
Supports:	Rules, proclamations
Name:	Jeremy Aycock
Location: Phone:	Morehead City, Central District Office, Room 20 (252) 808-8070

Email: Jeremy.aycock@ncdenr.gov

Contact for:	ESRI desktop software (ArcGIS), ArcGIS server applications, BioGIS link
	extension, ESRI training credits
Supports:	Biological programs related to the Fisheries Information Management and Support System (FIMSS) F-75 grant, DMF water body codes, Estuarine Benthic Habitat Mapping Program

Name: Location: Phone: Email:	Vacant Position Morehead City, Central District Office, Room 20 (252) 808-8069 @ncdenr.gov
Contact for:	ESRI desktop software (ArcGIS), ArcGIS server applications, ArcGIS training, tool development, web applications, geospatial analytics.
Supports:	Submerged lands, rules, proclamations, shellfish leases, CHPP, SHAs

Name:	Mohan Paletti
Location:	Morehead City, Central District Office, Room 7
Phone:	(252) 8008-8163
Email:	Mohan.Palleti@ncdenr.gov
Job:	DMF Shellfish Sanitation and Recreational Water Quality Section, GIS
	Analyst for GIS support
Contact for:	Shellfish Sanitation data, ESRI desktop software (ArcGIS)
Supports:	Shellfish Sanitation section

Requesting GIS Staff Assistance

Division of Marine Fisheries staff must use the DENR Online Ticketing System (DOTS) to request assistance from DENR IT GIS staff. The URL for accessing DOTS is <u>http://portal.ncdenr.org/group/its/request/submit</u>. If a request is received by DENR IT GIS staff by email, phone, or during a meeting, GIS staff will enter the request into DOTS for the DMF staff and fulfill the request.

The DOTS system assists DENR ITS with categorizing, tracking, and assigning requests to DENR ITS staff. All requests are categorized as a service desk issue, a maintenance issue, or a project.

Requests that are categorized as projects (generally work estimated to take more than 40 hours and has a beginning and end date) must follow the process outlined in the DMF IT Project Management SOP for completion. Projects only require a DOTS request to initiate the project but do not require additional DOTS request for each deliverable since those details should be described in the project charter. See appendix B for more details on DOTS requests.

DENR GIS RESOURCES

GIS Branch

The GIS Branch is a component of the DENR Division of Information Technology Services (DENR ITS). The current GIS Branch was created in July 2008 as a result of Senate Bill 991

consolidating ITS into DENR. Three DENR ITS GIS Branch staff have offices at DMF's Central District office in Morehead City: the GIS Branch Head (Mark Voss), the GIS analyst for finfish-related biological data (Jeremy Aycock), and the GIS analyst for DMF GIS needs (Vacant Position). Jeremy Aycock and Vacant Position are primarily assigned to supporting DMF activities.

GeoTeam

The GeoTeam is a GIS work group composed of state employees from DENR agencies who have an interest in GIS issues. These GIS issues range from the ESRI Enterprise License Agreement (ELA) for DENR, software installations and version upgrades, web applications, and GIS issues identified by the NC State Government Users Committee (SGUC) and the DENR Technical Management Committee (TMC). Each agency has at least one GIS contact on the DENR GeoTeam, which meets monthly. Mohan Palleti is the current DMF GeoTeam contact. The 3 staff in the GIS Branch also participate on an ITS and DMF level. The GeoTeam has a chair and secretary, who are elected from the GeoTeam members. The GeoTeam creates teams and committees to address GIS related issues, such as GPS PathFindar Office (PFO) team, ArcGIS Online Team. Current topics include, Green Square SAN for housing Raleigh Campus agencies GIS data, ESRI ELA software and training courses, GPS issues and the ArcGIS Online group.

ESRI Enterprise License Agreement

When ArcGIS desktop software is requested for installation on a computer, a license manager is necessary to install and use the software. The license is either installed on the computer (a single-use license) or the license is accessed remotely from a pool of licenses (concurrent-use license). The cost for concurrent license use is less than a single-use license. DENR ITS has set up an ESRI concurrent-use license manager on a OITS server, which the majority of ArcGIS license users in DENR agencies access to use ArcGIS. An internet connection is necessary for the ArcGIS desktop software to be accessed. The license is functional 24/7 on the OITS servers, and has capability to lend a license for a designated amount of time.

The state of North Carolina entered into an Enterprise License Agreement (ELA) with ESRI in 2005. The OITS manages the ESRI ELA for all NC Departments. ESRI desktop software and training credits were made available to GIS users in NC government, and the ESRI ELA was paid for by funds identified by the legislature. As a result, ESRI desktop software and extensions were basically free to state agencies (for 2005 to 2010).

In 2010 another five-year ESRI ELA was signed, with cost applied to each NC Department. The new ELA agreement with ESRI resulted in DENR divisions having to change their ArcGIS licensing policy so that lighter GIS users with single-use licenses were switched to concurrent-use licenses. The OITS allocated costs to departments based on license counts. Each year, a cost model is created to identify what DENR agencies will need to pay for ESRI software licenses. In recent years, DENR has been able to use end of year funds to pay for the ELA. The software cost is greatly reduced through the ELA, yet there is a cost for each ESRI software installation. Under the current cost model, each installation of GIS software will have a cost. Although advertised as 'free' software under the ESRI ELA, the OITS cost model has charges based on software license installations and software use. It is pay as you go for the ESRI software costs at this time.

In 2015-2016 fiscal year will be next re-negotiation for NC and the ESRI ELA. Advances in web and cloud services will have a strong impact of desktop software and license costs. It is undetermined at this time what whose impacts will be.

Training courses are also available through the ESRI ELA and are allocated to DENR agencies based on a license use model. These courses are free to divisions on an allocation basis.

DENR Confluence page: <u>http://spaces.ncdenr.org/spaces/display/GIS/ESRI+ELA</u>

OITS Server Consolidation

The OITS manages the DENR servers. Test, development, and production servers are located at OITS offices at Western Data Center (WDC) and at Eastern Data Center (EDC) in Raleigh. File and print servers are located at local offices. Currently OITS houses the DENR – ESRI License Manager, test/development servers for ArcGIS Server applications, and SDE databases.

STATE GIS RESOURCES

State Government Users Committee (SGUC)

The role of the SGUC is to report to the state Geographic Information Coordinating Council (GICC) on GIS issues and disseminate GIS issues to department-level GIS users. The SGUC has an Executive Committee and general level group that meet monthly to discuss GIS issues within NC government.

Center for Geographic Information and Analysis (CGIA)

The Center for Geographic Information and Analysis (CGIA) is part of OTIS and is the lead agency for GIS services and coordination for the state of North Carolina. The CGIA brings the statewide community together to promote data sharing, informed decision-making, and cost efficiencies. The CGIA supports NC OneMap for GIS data distribution, is the contact for GIS issues in North Carolina, provides GIS project consulting, and supports a state GIS convention held every two years.

DENR Green Square GIS Shares (Green Square SAN)

In Raleigh at the NC government complex area, specifically Green Square and Archdale building, exists a high-speed campus LAN for DENR agencies. A server is set up to store and disseminate released GIS files to DENR agencies. The DMF GIS data is copied to this location. GIS data from other DENR agencies can be access through this location. DMF staff need to request this capability through the GIS Branch staff. GIS Branch staff will submit requests to Green Square GIS SAN administrator to access this server share, usually mapped as a drive letter. This data location is also referred to as 'GIS framework data'.

GIS framework location:	\\wp3nrfp01.eads.ncads.net .
Llear must man a drive let	tor to this directory, recommendation is V/

User must map a drive letter to this directory, recommendation is Y./				
GISFramework (\\wp3nrfp01.eads	.ncads.net) (Y:) 🕨	+ 4	• Search GISFramework (\\wp3nrfp01.e 🔎
Organize 🔻 Burn New folder			8	= • 🔟 🔞
★ Favorites	Name	Date modified	Туре	Size
🧮 Desktop	📗 GISTask Force	2/17/2014 1:10 PM	File folder	
🔒 Downloads	🐌 Imagery	9/30/2013 11:22 AM	File folder	
🔚 Recent Places	Infrastructure	3/26/2014 11:47 AM	File folder	
=	Natural_Resources	1/8/2014 9:34 AM	File folder	
🧮 Desktop	Political_Social	3/27/2014 12:38 PM	File folder	
🥽 Libraries	퉬 Property	2/19/2014 4:43 PM	File folder	
🔀 Voss, Mark	🐌 Regulatory	3/27/2014 2:11 PM	File folder	
I Computer	퉬 Soils_Geology	3/21/2014 10:26 AM	File folder	
🚢 OS (C:)	퉬 Terrain	2/25/2014 1:58 PM	File folder	
👝 Elements (D:)	퉬 Water	3/25/2014 10:07 AM	File folder	
🖵 e-drive (\\10.46.82.226\data\working) (E:)	퉬 Weather_Climate	7/19/2012 9:14 AM	File folder	
🔮 DVD RW Drive (F:)	ContentsTree.txt	4/9/2013 9:00 AM	Text Document	169 KB
🖵 GIS (\\10.46.82.184) (G:)	ContentsTree-digest.txt	4/15/2013 10:01 AM	Text Document	161 KB
🖵 mvoss (\\wp3dfmorfp01.eads.ncads.net\DMFusers) (H	DENR_GIS_Dataset_log.xlsx	12/2/2013 10:45 AM	Microsoft Excel Workshee	t 23 KB
🖵 mfscan (\\wp3dfmorfp01.eads.ncads.net) (I:)	📄 list.txt	4/15/2013 10:00 AM	Text Document	1,768 KB

Green Square SAN drive letter and shares listing.

External Resources

ESRI Resource Center

There are a variety of online resources for GIS support through the ESRI Resource Center (<u>http://resources.arcgis.com/en/home/</u>). This site provides discussion forums, step-by-step tutorials, training resources, and technical information regarding ESRI products to help GIS users learn about ArcGIS. The site is connected to ArcGIS Online (<u>www.arcgis.com</u>), which provides a number of online mapping resources and GIS data for public use.

SECTION III: GEOSPATIAL DATA SOURCES

DMF GIS LIBRARY

The DMF GIS Library is stored on a file server, which is mapped by the computer as the "K:\ drive"¹ designation. Each regional office has a replica of the main file server, which is hosted at the Morehead City Central District Office (CDO). The GIS Library in other DMF offices is synchronized monthly with data from the server at CDO.

The GIS Library will be updated in 2014-2015. GIS Branch staff and designated DMF staff are part of this task. The update is a result of software and database upgrades for desktop and web services.

Organization

The GIS Library contains nearly 2,000 datasets distributed in a loosely hierarchal structure of folders and subfolders. Data is available in vector (shapefiles, ArcInfo coverages, layers, geodatabases), and raster (img, tiff, jpeg, bmp) formats. The first level of folders is organized based on the data source, type of data, or purpose of the data. Subfolders are based on projects.

<u>A word of caution:</u> Many of the data sets in the GIS Library have existed for several years and could be outdated. Contact the agency that originally provided the data or DENR ITS GIS staff to see if an updated version of the dataset you are interested in might be available. Also, readme files were initially included in each directory to describe the data sets within each folder. However, the readme files have not been updated since the early 2000's and may also be out of date. The tables included in the sections below attempt to update the readme files for the top-level folders (Tables 1–6). Many of the outdated folders and datasets have been scheduled for deletion. If you do not see a description of an upper level folder described in this document, it may be scheduled for deletion.

Folder	Type of Information
cgia	Center for Geographic Information & Analysis data
county	Miscellaneous
doq	Aerial photos
doqcir	Infrared aerial photos
drg	Topographic charts in raster format
drg100	Topographic charts in raster format
drg250	Topographic charts in raster format
fish	Division of Marine Fisheries Data
gps	Miscellaneous
hii	Aerial photos after Hurricane Isabel

Table 1. Top-level folders on the GIS Library (K:\ drive). See text below for details on folder contents.

¹ Drive letters are not supported for a naming convention. The server name and directory path is supported as a naming convention. The K:\ drive path designation is currently used to support the BioGIS Link ArcView extension.

mailboxes	Mutual data transfer folder
nc	Miscellaneous
noaa	Navigation charts in raster format
readme	Miscellaneous
sysadmin	Access restricted to GIS Administrators
working	Access restricted to GIS Administrators

Subfolder Descriptions

K:\cgia

Datasets found in this folder were obtained from the Center for Geographic Information and Analysis (CGIA) and contain general data related to North Carolina and/or fisheries. Subfolders are listed in Table 2.

Table 2. Folders and dataset descriptions for the K:\cgia folder. Note: All files in this folder, except Basinpro and LULC, are scheduled for review and deletion since the data is available for download or in WMS format. See GIS staff for details.

Folder	Description
basinpro	CGIA product for river basin analyses
lulc	Land use and land cover (imagery and coverages)

K:\county

These datasets were acquired from various coastal county planning departments and include parcel maps, aerial photos, etc.

K:\doq

This folder contains 1998 black and white digital orthophoto quadrangle (DOQ) images for North Carolina. The file "ImgCat-doq.dbf" contains a catalog of file pathways to locate each DOQ within this directory (use the identify tool in ArcCatalog to get the file pathway for a particular quadrangle). Newer imagery is available for use in GIS, some of which is freely available via online image services (see Table 6 in the section on WMS services below). Contact GIS staff for more information on how to use online imagery services.

K:\doqcir

This folder contains 1998 color infra-red images for North Carolina. The file "ImgCat-doqcir.dbf" contains a catalog of file pathways to locate each DOQ within this directory (use the identify tool in ArcCatalog to get the file pathway for a particular quadrangle). Newer imagery is available for use in GIS, some of which is freely available via online image services (see Table 6 in the section on WMS services below). Contact GIS staff for more information on how to use online imagery services.

<u>K:\drg</u>

This folder contains 1:24,000 scale topographic maps. Newer topographic data is available for use in GIS, some of which is freely available via online image services (see section on "External Geospatial Data Services" below). Contact GIS staff for more information on how to use online imagery services.

K:\drg100

This folder contains1:100,000 scale topographic maps. Newer topographic data is available for use in GIS, some of which is freely available via online image services (see sections on "External Geospatial Data Services" and "Geospatial Data Portals" below). Contact GIS staff for more information on how to use online imagery services.

K:\drg250

This folder contains 1:250,000 scale topographic maps. Newer topographic data is available for use in GIS, some of which is freely available via online image services (see sections on "External Geospatial Data Services" and "Geospatial Data Portals" below). Contact GIS staff for more information on how to use online imagery services.

<u>K:\fish</u>

The "fish" folder contains geographic data related to Division of Marine Fisheries projects. All data, except data in the "geog" folder, are primarily stored in the NAD 1983 NC State Plane (Meters) projection. Data in the "geog" folder are stored in the NAD 1983 World Geographic projection. Subfolders are described in the following sections.

chpp

The "chpp" subfolder contains data related to the Coastal Habitat Protection Plan (CHPP) (Table 3).

Folder	Description
chowan	Chowan River Basin info used in the initial stages of the CHPP project
Coastwide data	Used to produce coastwide maps for the CHPP and Strategic Habitat Area (SHAs)
SHA related	Data used for Strategic Habitat Area analyses specific to individual regions

Table 3. Folders and dataset descriptions for the K:\fish\chpp folder.

final

This folder contains fisheries-related datasets projected in the NAD 1983 NC State Plane (Meters) coordinate system. Table 4 lists these datasets, including fisheries

management water body data and some external data obtained from CGIA and the DCM.

Name	Туре	Description	
culverts	Folder	DMF culvert survey	
floorplans	Folder	Info on DMF offices	
grid_10sec	Folder	10 scond grid lines separated by topo quad	
logos	Folder	DMF logos for maps	
msa	Folder	Mapped Shellfish Areas from the DMF Bottom Mapping	
Waterbody	Geodatabase	Program Water bodies used by DMF biological sampling programs	
anno3	Dataset	Text water body labels	
anno4	Dataset	Text water body labels	
anno5	Dataset	Text water body labels	
bathy	Dataset	Offshore bathymetry (DCM)	
cb100cb	Dataset	1:100,000 scale county boundaries	
cb100sl	Dataset	1:100,000 scale county boundaries with shoreline and EEZ	
cbanno	Dataset	County boundary annotation	
demhyd	Dataset	1:100,000-scale hydrology for coastal area (DCM)	
gcp	Dataset	NC Geodetic Survey Points	
grid10min	Dataset	10 minute grid for Eastern NC	
grid10scs	Dataset	10 second grid for Core Sound Area	
grid10sro	Dataset	10 second grid for Roanoke Island Area	
grid15min	Dataset	15 minute grid Eastern NC	
grid1dnc	Dataset	1 degree grid for North Carolina	
grid1min	Dataset	1 minute grid Eastern NC	
grid20min	Dataset	20 minute grid Eastern NC	
grid30min	Dataset	30 minute grid Eastern NC	
grid5min	Dataset	5 minute grid Eastern NC	
hqworw	Dataset	High Quality and Outstanding Resource Waters (CGIA)	
logo98	Dataset	DMF logo from 1998	
mb	Dataset	Municipal boundaries (CGIA)	
nl12	Dataset	1:12,000 scale neat line	
nl24	Dataset	1:24,000 scale neat line	
nm3	Dataset	3 nautical mile boundary for state jurisdictional waters	
oigd1m	Dataset	Oregon Inlet 1 minute grid	
oigd10s	Dataset	Oregon Inlet 10 second grid	

Table 4. Folders and dataset descriptions for the K:\fish\final folder.

Folder	Туре	Description
sc-cbsl	Dataset	South Carolina county boundaries with shoreline
sc-lakes	Dataset	South Carolina lakes
sc-places	Dataset	South Carolina place names, towns
sc-riversa	Dataset	South Carolina rivers (arcs, lines)
sc-riversp	Dataset	South Carolina rivers (polygons)
shipwrck	Dataset	Shipwrecks (DCM)
shore24k	Dataset	1:24,000 scale shoreline (CGIA)
shorec	Dataset	1:24,000 scale shoreline - Central area of NC
shoren	Dataset	1:24,000 scale shoreline - Northern area of NC
shores	Dataset	1:24,000 scale shoreline - Southern area of NC
waterbdy	Dataset	DMF biological database code manual waterbodies compiled into one laver
waterbody	Dataset	DMF biological database code manual waterbodies
wb1	Dataset	Level One - DMF Biological Database Code Manual Waterbodies
wb2	Dataset	Level Two - DMF Biological Database Code Manual Waterbodies
wb3	Dataset	Level Three - DMF Biological Database Code Manual Waterbodies
wb4	Dataset	Level Four - DMF Biological Database Code Manual Waterbodies
wb5	Dataset	Level Five - DMF Biological Database Code Manual Waterbodies
wbtt	Dataset	DMF Trip ticket waterbodies

pgm

The "pgm" folder contains Fisheries Management Independent biological program station locations.

reg

The "reg" folder contains Marine Fisheries Commission rules datasets and military zones. However, the most recent data is from 2004 and is scheduled to be updated with current data. Check with DENR IT GIS staff before using data in the folder to see if it is current.

<u>K:\hii</u>

This folder contains imagery for Hurricane Isabel separated by county.

K:\mailboxes

This directory was created for DMF staff to transfer large GIS data sets. This is the only area of the GIS Library to which DMF staff has write access. The K:/mailboxes pathway at all DMF offices links to the GIS server at the Central District Office in Morehead City. This location allows GIS users to transfer GIS data without using email, zipping files, or using media (USB, CDs, DVDs, or external drives). The location was created since file storage on the DMF HQ LAN file server has limited storage capacity. DMF staff has the ability to copy files to and from this directory.

Also note, an FTP connection is available to transfer data to the public that is too big for email. Contact the DENR IT GIS staff for details and instructions on using this service.

<u>K:\nc</u>

This folder contains data that was sent to DMF from other state agencies for use as references in various map projects.

<u>K:\noaa</u>

This folder primarily contains NOAA charts and other data, such as SEAMAP data, from National Oceanic and Atmospheric Administration as listed in Table 5. An index of NOAA chart numbers can be found in the following coverage: "K:\noaa\vector\noaacharts".

Folder	Description
bsb	NOAA Nautical Charts from BSB Electronics. Includes extensions from Coastal Services Center for viewing data.
charts	NOAA Nautical Charts with borders obtained from BSB charts. TIF format images in NAD 1983 NC State Plane (Meters) projection.
chartsg	1:40,000 scale NOAA Nautical Charts obtained from SEAMAP Version 1.1 CD. TIF format images in NAD 1983 geographic projection (decimal degrees).
chartsgwc	NOAA Nautical Charts with borders obtained from BSB charts. TIF format images in NAD 1983 geographic projection (decimal degrees).
hist	Historical NOAA Nautical Charts (not georeferenced)
seamap11	Bottom mapping data from SEAMAP Version 1.1 CD
seamap12	Bottom mapping data from SEAMAP Version 1.2 CD
vector	NOAA Nautical Charts hydrographic data (buoys, lights, bathymetry, towers, etc.) in vector format (point, lines, text) in the NAD 1983 NC State Plane (Meters) projection.

Table 5. Folder descriptions for the K:\noaa folder.

K:\sysadmin

This folder is for DENR IT GIS staff use only.

<u>K:\working</u>

This folder is for DENR IT GIS staff use only.

Data Maintenance

Access to data on the GIS Library is restricted. To maintain data integrity and security, DMF staff is granted read-only access to the GIS Library. Since the data is read-only, it can be viewed or copied but cannot be edited or deleted. The DENR ITS GIS Staff use a special login that grants write access to the data to make changes to the data or the directory structure.

Uploading Data to the GIS Library

To upload data to the GIS Library, DMF staff must submit a DOTS request and include the location of the data set. Do not place GIS data sets on the DMF file server. Instead, use either external media to transfer files or email data to GIS staff. The data set will be reviewed by DENR ITS GIS staff for consistency and errors, placed on the main GIS Library at the CDO, and copied to outside DMF offices during the next monthly update cycle (unless requested to be updated immediately).

The following is the minimum amount of metadata required for all datasets to be posted on the GIS Library:

- <u>Summary</u> Purpose for which the data was created.
- <u>Description</u> Abstract or brief description of the data's content.
- Credits Who created the data and when was the data was created?
- <u>Access and use limitations</u> Are there any limitations to be aware of when using or distributing this data?
- <u>Attributes</u> Define attributes and any codes that are used as fields in the attribute table.

Access

Staff members who wish to use GIS mapping software to make maps will require access to the GIS Library. You will first need ESRI ArcGIS Desktop software installed on your computer in order to use the geospatial data. To request GIS Library access, submit a Service Desk /DOTS ticket and include:

- 1. ArcGIS Desktop software installation request (if necessary)
- 2. GIS Library access request
- 3. Your computer name (found under Control Panel\System\Computer Name) and physical location (office location, room #)

EXTERNAL GEOSPATIAL DATA SERVICES

Geospatial data services provide a connection to data hosted on a remote server that allows data to be displayed and analyzed on your desktop through an internet connection. These services provide convenient access to a number of datasets, often free of charge, without requiring the data to be downloaded and stored on a local computer, although with some sources this is still an option. These services can easily be added to a map created in ArcGIS Desktop. Table 6 contains a list of commonly used services that may be useful to DMF staff. In addition to this list, a number of useful datasets can be accessed online directly through the ArcGIS software and used as base maps without the need to download anything (aerial imagery, USGS topographic maps, street maps, etc.). Contact GIS staff for details on how to access these datasets.

Name	Layers	URL	Туре
NAIP 2010 Imagery (True Color)	Statewide Imagery	http://ge-nt.ncmhtd.com/cgi-bin/naip2010.cgi?	WMS
NAIP 2009 Imagery (True Color)	Statewide Imagery	http://ge-nt.ncmhtd.com/cgi-bin/naip2009.cgi?	WMS
NAIP 2009 Imagery (IR)	Statewide Infrared Imagery	http://ge-nt.ncmhtd.com/cgi-bin/naip2009ir.cgi?	WMS
NAIP 2008 Imagery (True Color)	Statewide Imagery	http://ge-nt.ncmhtd.com/cgi-bin/naip2008.cgi?	WMS
NAIP 2006 Imagery (True Color)	Statewide Imagery	http://ge-nt.ncmhtd.com/cgi-bin/naip2006.cgi?	WMS
High-Resolution County Imagery	Select County Imagery (dates vary)	http://ge-nt.ncmhtd.com/cgi-bin/ge-wms.cgi?	WMS
NC One Map Imagery	Statewide Imagery, Hurricane Irene Imagery	http://imagery.nconemap.com/arcgis/services	ArcGIS Server
NOAA	NOAA Raster Navigational Charts (coastwide layer)	http://egisws02.nos.noaa.gov/ArcGIS/services	WMS
Nexrad Radar	NWS Nexrad Radar	http://mesonet.agron.iastate.edu/cgi- bin/wms/nexrad/n0r.cgi?	WMS
ESRI ArcGIS Online	ESRI Basemaps, Demographics, Elevation, etc.	http://services.arcgisonline.com/ArcGIS/rest/services	ArcGIS Server

Table 6. Commonly used online geospatial data services.

GEOSPATIAL DATA PORTALS

Listed below are websites that have geospatial data available for viewing and/or download that may be relevant to DMF staff:

- NC OneMap Portal for NC-related data hosted by the State Government through CGIA

 <u>http://www.nconemap.com/</u>
- NC Division of Coastal Management (DCM) Links to interactive viewers and GIS spatial data such as wetlands, shoreline, erosion and coastal hazards, beach access, bulkheads, docks & piers, etc.

http://portal.ncdenr.org/web/cm/maps-and-data

- NC Department of Transportation (DOT) County boundaries, roads, bridges and culverts, aerial photography, USGS topographic maps, flood data, elevation data, etc.
 <u>https://connect.ncdot.gov/resources/gis/Pages/default.aspx</u>
- SAFMC Portal for South Atlantic Fishery Management Council GIS data

 <u>http://ocean.floridamarine.org/safmc_dashboard/index.html</u>
- NOAA Digital Coast Portal for various NOAA datasets
 - o <u>http://coast.noaa.gov/dataregistry/search/collection</u>
- NOAA ENC Direct to GIS NOAA Navigational Charts

 <u>http://encdirect.noaa.gov/ENC_Direct/encdirect_download.html</u>
- The National Map Collaborative effort among the USGS and other federal, state, and local partners. Contains topographic maps, orthoimagery (aerial photographs), elevation, geographic names, hydrography, boundaries, transportation, structures, and land cover data
 - o <u>http://nationalmap.gov/index.html</u>
- National Hydrography Dataset Contains data on lakes, ponds, streams, rivers, canals, dams, streamgages, and watershed boundaries
 - o http://nhd.usgs.gov/
- National Land Cover Database Contains U.S. land use data
 http://www.mrlc.gov/index.php
- Geodata.gov Portal for many different federal government maps

 http://geo.data.gov/geoportal/catalog/gallery/gallery.page
- The GIS Data Depot Website that stores open source GIS layers for download

 <u>http://data.geocomm.com/</u>
- Census Bureau Access to KMLs for use with GoogleEarth and GIS shapefiles for census data, boundaries, roads, address information, water features, and more
 http://www.census.gov/geo/www/tiger/

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SECTION IV: DMF GEOSPATIAL APPLICATIONS

LINKING BIOLOGICAL DATA

DMF has created a new method of data analysis using the ESRI Maps for Office add in tool. This is achieved by offering visual representation of sampling efforts as well as the ability to analyze data trends. Some of the functions of the BioGIS Link include the following:

- Display of sampling effort locations.
- Display of environmental averages.
- Display of species data averages.
- Display of waterbody locations.

ESRI Maps for Office displays data from the biological database by linking the biological data to known geographic locations, either by sampling station or grid location depending on the program. The premise behind this link is that geographic and biological data are linked to one another using a similar field found in both datasets. In this case, the similar field must either be a combination of waterbody and sampling station or grid and strata. Using tools created by the DMF Biological database administrator, data is extracted from the biological database. Once a query is completed and the locational data is joined using external tools, it is brought into Excel. This Excel toolset processes the data output and presents the output by using the locational data that has been joined to it This output is displayed directly in Excel, but can be saved to ArcGIS online for future reference or distribution to other groups.

Further details on the use and installation of ESRI Maps for Office can be found in the user manual on the DMF Shared Drive (F:\SHARED\DMF\GIS\ESRI Maps for Office.doc). For information on the tools needed to extract data from the Biological Database, please contact George Joyner.

DMF ARCGIS SERVER AND ARCGIS ONLINE WEB APPLICATIONS

The division is starting to use ArcGIS Online and ArcGIS server to create GIS applications that display GIS data in a customized format using a web browser. This technology enables users to be more interactive with maps and geographic data without requiring GIS software or expertise. This technology would allow DMF staff that do not have access to or knowledge of GIS software to make and print maps for analysis and reports. It is possible to make these types of maps available to the public if additional guidelines are followed through the DENR AGOL team. The following applications are currently in development, yet there are numerous possibilities for other applications to be made:

Samples of Online Web Maps

DMF

Contacts: Jeremy Aycock, Mark Voss, Mohan Paletti

- Shellfish Sanitation

Shellfish Application v1.0 -te

-test server

http://maptest.ncdenr.org/shellfish/sga.html Shellfish application v2.0 -test server

http://maptest.ncdenr.org/WebApps/templates/template_app/

- F-75 Grant / FIMSS (waterbody codes) test server http://maptest.ncdenr.org/WebApps/DMF/WB_LOC/
- Shellfish Mapping (EBHM mapping) test server http://maptest.ncdenr.org/WebApps/DMF/EBHM/
- Artificial Reef Program

http://nc.maps.arcgis.com/apps/webappviewer/index.html?id=b0e89b21f5da4973 bbd8f7935b72ba5b

DCM

Ken Richardson contacts: applications: - combined (current IMS applications) Oceanfront Sandbags -production server http://www.nccoastalmanagement.net/sandbag locations.htm Coastal Wetlands - production server http://ims.ncdenr.org/Website/nccoastal wetlands/viewer.htm Beach and Coastal Waterfront Access -production server http://ims.ncdenr.org/Website/nccoastal_access/viewer.htm Ocean shoreline and Setback -production server http://ims.ncdenr.org/Website/ncshore/viewer.htm - test ArcGIS Server site - test server http://maptest.ncdenr.org/WebApps/DCM/

Notes: DCM is currently updating its IMS and ArcGIS Server web applications to use ArcGIS Online. These sites are scheduled to be updated in fall of 2015.

DWR/DWM Contacts: Allan Axon applications: -GWDSS viewer -production server

http://map.ncdenr.org/gwdss/index.html

As stated, these web applications are in development. They may be updated and turned off at any time, or new ones added.

SECTION V: TRAINING RESOURCES

ESRI ONLINE TRAINING COURSES

Each year through our Electronic License Agreement (ELA), ESRI offers DENR a limited number of credits to use for various online training courses offered through their virtual campus website. DENR ITS allotted some of these courses to DMF to help staff better understand ArcGIS software.

Courses range from an introductory level for staff wanting to learn how to use ArcGIS software to more advanced topics for experienced users. Courses are self-paced and can be completed as schedules allow. Courses expire one year after they have been initiated on DMF's account and may be renewed annually by DENR ITS as credits and the ELA allow.

All staff at DMF are able to take these courses free of charge; however, staff must have their supervisor's permission to spend time taking the course. DENR ITS tracks the frequency and type of courses that are taken so they can track usage and demand for future credits. To assist DENR ITS with this task, please send Jeremy Aycock (jeremy.aycock@ncdenr.gov) an email when you have completed a course and include the name of the course.

Course Access

Please create an ESRI account before attempting access to training resources: https://accounts.esri.com/signup

The following web page URL lists the current and available ESRI course for DENR under the North Carolina ESRI Enterprise ELA.

http://training.esri.com/gateway/index.cfm?fa=aul.premiumCourses

Review the courses, identify courses with your supervisor, and send the following information to the GIS Branch staff.

Name: Email address: Office phone number: Course listing:

GIS Branch staff will send to ESRI Training Credits contact for the NC ELA. The request will be sent to ESRI. ESRI will send to the email address the codes to take courses. All courses will be tracked by NC ESRI ELA Training Credits contact by Department. The requestor will be responsible for the courses at this point.

The ESRI Training Credits contact updates DENR with a list of unused training course credits, and status of completion for assigned courses. The information from the ESRI ELA for training courses and other information is located on the DENR WIKI site. Your NCID name and login are necessary to view this information. The site is:

http://spaces.ncdenr.org/spaces/display/NTBK/Geographic+Information+System s+(GIS)?ticket=ST-11187-efCkZyAGnm7sNDGIWe85

Appendix A: GLOSSARY OF ACRONYMS

BUG	Biological Users Group
CHPP	Coastal Habitat Protection Plan
DENR	Department of Environment and Natural Resources
DENR ITS	Department of Environment and Natural Resources Information Technology Services
DMF	Division of Marine Fisheries
DOTS	DENR One Ticketing System
EDC	Eastern Data Center
ELA	Enterprise License Agreement
ESRI	Environmental Systems Research Institute
FIMSS	Fisheries Information Management and Support System
FMP	Fisheries Management Plan
GIS	Geographic Information System
GPS	Global Positioning Systems
ITSC	Information Technology Steering Committee
JIRA	DENR request and tracking system
MAT	Mapping Advisory Team
RAT	Rules Advisory Team
OITS	NC State Office of Information Technology
SGUC	State Government Users Committee
SQL	Structured Query Language
SHA	Strategic Habitat Areas
ТМС	Technology Management Committee
UDOC	Under Dock Oyster Culture Program
WAMI	Waterfront Access and Marine Industry Fund
WDC	Western Data Center
WMS	Web Map Services

APPENDIX B: DOTS REQUESTS

All DMF staff must use the DENR Online Ticketing System (DOTS) to request GIS work (<u>http://portal.ncdenr.org/group/its/request/submit</u>). The DOTS uses JIRA software to request, track, assign issues to ITS staff, and make reports. All ITS staff use JIRA for these purposes including the GIS Branch staff.

Requests are categorized as a service desk issue, maintenance/operation issue, or a project based on time allocation, cost, and resources (see DMF IT Project Management SOP for details). All requests are documented in JIRA, and a summary of time spent on these requests is reported to the DMF IT Steering Committee and MAT.

DOTS request process:

- 1. DOTS request entered by DMF Staff
 - DOTS request is logged and assigned a unique number.
- 2. DOTS request triage
 - A GIS request is triaged by the JIRA team to the GIS Branch head
- 3. DOTS request evaluation evaluate the effort required to complete the request
 - If less than 40 hours or if more than 40 hrs but there is no begin and end date request assigned to the appropriate available GIS Branch staff. A follow up call with the DOTS requestor will be performed as needed to complete task.
 - If greater than 40 hours and there is a begin and end date request is identified as a project, MAT chair is contacted, and the request is processed according to the DMF IT Project Management SOP.

Notes:

- 1. All DMF staff are to use the DENR Online Ticketing System (DOTS) to request GIS work.
- 2. When a request is identified by email or phone conversation, the GIS staff will enter request into DOTS for the DMF staff.
- 3. A request can move between JIRA categories, from Service Desk to Operations/Maintenance and to Project, based on time allocation, cost and resources required to complete request. This usually happens when changes occur to the requirements, criteria, and deliverables.

Who	Responsibility
DMF Staff	 Submit DOTS request for GIS requests. If request is a high priority, then DMF staff should contact GIS staff by email or phone to verify that the request was received. Give time for DENR ITS to triage the request and assign it to appropriate GIS staff. If the request is categorized as a project, complete a scope of work as outlined in the DMF Project Management SOP.
ITS Staff	 Verify that the request is entered in DOTS as a JIRA issue and has unique identifier. If request is not in JIRA, then ITS staff will enter request into JIRA. Contact requester by email or phone to identify request criteria. Notify requester that the issue is entered in JIRA with a unique identifier. Evaluate the request for estimated time allocation, cost, and resources. Categorize the request as a project, maintenance/operations, or service desk request. Notify the MAT chair if the request is categorized as a project, and complete a project charter with DMF project lead.

DOTS Request Responsibility Chart

Issue categories and processes

Category	DOTS Request Required /Not Required	Estimated Time	Examples
Project	 Requires DMF staff to submit DOTS request to initiate project only. A project charter is created to identify tasks and deliverables. Project lead and GIS staff work together to complete tasks. Does not require individual DOTS requests for each deliverable. 	• Over 40 hours	 Create GIS User Manual SHA Region 3 Submerged Lands GIS project Enterprise GIS Web Mapping Project Upgrade GIS software to ArcGIS 10.x Rule creation and updates
Operations / Maintenance	 Requires DMF staff to submit DOTS requests. Individual requests are grouped by DMF program. This category is for DMF Programs with long term GIS support needs, with undetermined time and delivery needs throughout year. If request is not by DOTS, then GIS staff will enter request using DOTS. 	• Task is less than 40 hours per individual request	 Shellfish Bottom Mapping Proclamation maps Oyster Sanctuary maps Pound net maps Oyster cultch planting maps Shellfish lease maps Shrimp trawl areas for shrimp FMP IJA/ITP map packet
Service Desk	 Requires DOTS request by DMF Staff. If request is not by DOTS, then GIS staff will enter request using DOTS. 	• less than 40 hours	 Update officer work areas Add GIS data to ArcGIS desktop session Create poster for Seafood Festival

Frequently Asked Questions

Question	Answer	Example	Current DMF Task
I have a question and just need to talk about the issue?	 Call or email GIS staff. GIS staff will contact requester, and document issue in DOTS. 	 How do I get GIS software on my PC? How do I add data in an ArcGIS desktop session? Where is a list of WMS to add to an ArcGIS session? Where are sampling stations in the GIS Library? 	 ArcGIS Desktop support GPS questions Clarify GIS data locations in GIS Library Install ArcGIS software
In a meeting, a map/data set/ analyses is identified to be updated with revised boundaries or data. How does this work get accomplished?	 If work is in the category of a Project: A DOTS request is not necessary. The task will be added to the GIS task list in the project charter by GIS staff. Otherwise: A DOTS request is necessary and will be submitted by GIS staff if they are present at the meeting. If no GIS staff is present, then DMF staff will submit the DOTS request. 	 Add sampling locations in Core Sound and create maps to show species densities. Move a boundary in Primary Nursery Areas and update DMF website map package. Create 5 data sets for SHA region 3 analysis. 	 Nursery area rule boundary move upstream. Add sampling station to Program 120.
There are 2 rules in DMF rulebook to update, and 1 new rule to create. What is the process?	DMF staff will enter DOTS request for this task if the issue is identified outside of the presence of GIS staff. GIS staff will contact requester to clarify work.	 Add new Primary Nursery Area in Back Sound Verify latitude/ longitude coordinates for Oyster Sanctuaries 	 Create Oyster Sanctuary rule (03R .0117), verify latitude / longitude points, and place map package on DMF website.
How do I update permits and leases with new boundaries?	 DMF staff submits a DOTS request. 	 Pound net request Oyster lease map Proclamation map update 	 Proclamation SH- 2-2012 Shellfish area C- 012 digitizing into final data set. Central District Office work area map updates