NATIONAL WEATHER SERVICE INSTRUCTION 1-1004

NOVEMBER 26, 2021

Administration and Management

Managing the Provision of Environmental Information, NWSPD1-10

GIS/GEOSPATIAL ENVIRONMENTAL DATA

NOTICE: This publication is available at http://www.nws.noaa.gov/directives/.

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SUMMARY OF REVISIONS: This directive supersedes NWSI 1-1004, *"GIS/Geospatial Environmental Data,"* effective April 20, 2018. Changes were made to reflect updates to NWS GIS policy and geospatial contracts.

1. Content changes also made to:
2. Update to the most current OGC standard versions (section 2.3.1).
3. Delete reference to Google Maps Enterprise License Agreement as it no longer exists (section 2.4.6).
4. Update Third Party Map Applications to specifically mention the Environmental Systems Research Institute ᵀᴹ (ESRI) ArcGIS Online application (section 2.5.3).
5. Add a reference to new NWS GIS Service Description Document (Appendix A).
6. Clarify edits as requested by OWP to sections 2.2, 2.3, 2.5, 2.5.1 and 3.2.

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Michelle Mainelli-McInerney   Date
Director, Office of Dissemination

GIS/Geospatial Environmental Data

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1.   Introduction

The use of Geographic Information Systems (GIS) and geospatial data technology has increased dramatically over the last decade. Exploiting innovative capabilities of the National Oceanic and Atmospheric Administration's (NOAA's) National Weather Service (NWS) workforce can help leverage this technology to protect lives and property and enhance the national economy. Additionally, NWS external partners and users use GIS to support their missions, including response to disasters, profit-generating businesses, and life-saving missions. As a result, these entities repeatedly provide NWS with requirements for data in GIS-compatible formats so the data can be seamlessly ingested into their systems independent of platform operating system, development software, and/or native data format. As with every new opportunity, there are important factors that need to be considered to ensure effectiveness.

This Instruction provides process guidelines intended to ensure NWS geospatial data and applications are developed, managed, and disseminated in a manner that adheres to appropriate U.S. government policies, international data standards and maximizes the effectiveness of the NWS.

All public-facing and operational NWS geospatial data and applications shall be hosted on the Integrated Dissemination Program (IDP) infrastructure managed by the National Centers for Environmental Prediction (NCEP) Central Operations (NCO). The geospatial development to operation (D2O) process will be managed by the Office of Dissemination (DIS). This process and the requirements for integrating into the process are detailed by this directive.

2.   NWS Approach for Providing Geospatial Data and Applications

The NWS approach to providing geospatial data and applications includes data access by subscription or individual download, as well as tools and applications for data collection, visualization, and discovery. Taking this balanced approach to create and provide data in Open Geospatial Consortium (OGC®) formats optimizes the rapid delivery of critical environmental data and services to emergency managers, electronic media, and other core partners, as well as to the public. According to the OGC Web site (https://www.opengeospatial.org/), "The OGC is an international industry consortium of 440 companies, government agencies, and universities participating in a consensus process to develop publicly available interface standards. OGC Standards support interoperable solutions that "geo-enable" the Web, wireless and location-based services, and mainstream information technology (IT). The standards empower technology developers to make complex spatial information and services accessible and useful with all kinds of applications.".

2.1   Support for NWS Core Partners

NWS recognizes that it has a special mission responsibility for core partners, defined as, "Government and non-government entities who are directly involved in the preparation, dissemination, and discussions involving weather, water or climate-related NWS information that supports decision making for routine or episodic high impact events." This subset of the NWS user community requires timely information wherever they are, through multiple channels of dissemination, in data formats compatible with their application, and decision support services. It is vitally important that these core partners have access to unaltered NWS data/products to ensure successful interaction between these partners and our field forecasters. In addition, these core partners require tools to facilitate two-way information sharing with NWS. Consideration for the special needs of this user community will be given in applying the decision process in section 3, with the intent of maximizing NWS flexibility in developing geospatial data and applications (OGC Open Geospatial Web services, downloadable Keyhole Markup Language (kml)/Keyhole Markup language Zipped (kmz) and Shapefiles, etc.) to efficiently and effectively meet core partner needs.

2.2   Downloadable Open Geospatial Consortium (OGC) Data

Historically, the most common means for acquiring geospatial data was via data access points such as File Transfer Protocol (FTP) or Web links where users pull data from an NWS server to the client platform for manipulation. Since most NWS data is dynamic and time-sensitive (i.e., requires periodic refresh), users need to routinely return to NWS access points to retrieve updated data sets (e.g., hurricane track forecasts need to be re-downloaded each time a new forecast is issued). Specifically:

- NWS Geospatial data for download will be discoverable by links on NWS GIS Data Portal. https://www.weather.gov/gis/.
- Ensure that NWS Geospatial data for download are in OGC-compliant data formats, with exceptions for Shapefiles as noted below.

- Shapefiles are not an official OGC standard but are included as an NWS standard format because they have an open and published specification and are an industry standard.
- At a minimum, Shapefiles including all subfiles (e.g., Database file (dbf), Shapefile (.shp), Shape Entities (.shx), and Coordinate Reference System (.prj)) will be compressed (e.g., zip file (.zip)) with a common filename prefix for download. Shapefiles are a vector file format developed by Environmental Systems Research Institute ^{TM} (ESRI) and store data as points, lines, or polygons.
- Shapefile development and dissemination will follow Shapefile best practices available as an appendix to this document.
- A KML file is an Extensible Markup Language (XML) file recognized and displayed by GIS viewers (e.g., Google Earth). KML 2.2 is the only version adopted as an OGC standard.
- KML 2.2, or the currently adopted OGC standard KML version, is the preferred KML version to be used by NWS when serving KML data.
- Google Earth 6.1 or greater requires strict adherence to the KML 2.2 standard. Thus, Google Earth 6.1 or higher is required to be used in testing standard compliance of all NWS KML data sets to be served.
- KMZ is the compressed form of KML and may be used in NWS if the compressed file is KML 2.2.

2.3   OGC Compliant Open Geospatial Web Services

The World Wide Web Consortium (W3C) defines a "Web service" as, "a software system designed to support interoperable machine-to-machine interaction over a network." In other words, a user can connect to a Web service and have data stream into their local system or application. The following OGC Web service types are to be supported:

- Web Map Services (WMS)
- Web Map Tiling Services (WMTS)
- Web Feature Services (WFS)
- Web Coverage Services (WCS)
- Web Coverage Processing Services (WCPS)
- Web Processing Service (WPS)

Ensure that services provide timely data so users (internal and external) can load the service to their application and have confidence in receiving current and authoritative NWS data.

It is of extreme importance to use OGC compliance testing tools to ensure that the OGC Web services are fully compliant with the standards. These tools are available at http://www.opengeospatial.org.
Ensure that all NWS geospatial Web services conform to **one** of the following OGC Web services:

- Queryable   Web Map Service (WMS) current OGC standard version, WMS 1.3.0 as of February 2020
- Web Feature Service (WFS) current OGC standard version WFS 2.0.2 as of February 2020
- Web Coverage Service current OGC standard version, WCS 2.0.1 as of February 2020
- Web Coverage Processing Service current OGC standard version, WCPS 1.0.0 as of February 2020

- Web Processing Service current OGC standard version, WCPS 2.0.0 as of February 2020
- Web Map Tile Service current OGC standard version. WMTS 1.0.0 as of February 2020
- Web Processing Service current OGC standard version. WPS 2.0.0 as of February 2020

2.4   Use of Third-Party Mapping Services and Map Data

NWS data and data from third-party mapping services displayed using third-party mapping services on an NWS Website will be made available in industry-standard formats. In addition to a display using third-party Web mapping service applications, these data will be made available in appropriate industry-standard formats such as WMS, KML, Geographically Encoded Objects for Real Simple Syndication (RSS) feeds (GeoRSS), or Shapefiles. A link to the data will be provided in the lower right corner of the Web mapping service application.

2.4.1   WMS, as defined by the OGC, provides a simple Hypertext Transfer Protocol (HTTP) interface for requesting geo-registered map images from one or more distributed geospatial databases. A WMS request defines the geographic layer(s) and area of interest to be processed. The response to the request is one or more geo-registered map images (returned as Joint Photographic Experts Group (JPEG), Portable Graphics Format (PNG),, etc.) that can be displayed in a browser application. The interface also supports the ability to specify whether the returned images should be transparent so that layers from multiple servers can be combined or not.

2.4.2   KML is an XML grammar and file format for modeling and storing geographic features such as point lines, images, and polygons for display in GIS applications. KML language is used by a variety of GIS and mapping applications. The specifications are freely available to the public and the user community without charge or restriction. To reduce file size, KML files may be compressed using standard compression tools. These compressed (or "zipped") files are stored with the file extension KMZ (zipped KML files). The KML/KMZ files will contain a NOAA/Web/NWS watermark image.

2.4.3   GeoRSS. GeoRSS is a formal Geography Markup Language (GML) that provides a way to encode location in Real Simple Syndication (RSS), and Atom (an XML language used for Web feeds) feeds. There are currently two encodings of GeoRSS: GeoRSS-Simple and GeoRSS- GML. GeoRSS-Simple is meant as a very lightweight format that developers and users can quickly and easily add to their existing feeds with little effort. It supports basic geometries (point, line, box, polygon) and covers the typical use cases when encoding locations. Specifications for GeoRSS-Simple are posted on the GeoRSS Web site at http://www.georss.org/simple. For a more feature-rich option, GeoRSS GML is a formal GML Application Profile and supports a greater range of features, notably coordinate reference systems other than WGS-84 latitude/longitude. Specifications for GeoRSS GML are posted on the GeoRSS Web site at http://www.georss.org/gml. Both formats are designed for use with Atom 1.0, RSS 2.0, and RSS 1.0. More information on GeoRSS is available from the GeoRSS Web site at http://www.georss.org/. Information on GML is available from the GC) Web site at

https://www.opengeospatial.org/standards/gml. The standard icon for RSS and GeoRSS is .

2.4.4   Shapefiles. Shapefiles are a geospatial vector data format for GIS software. Shapefiles spatially describe points, polygons, and polylines. A "Shapefile" commonly refers to a collection of files with ".shp", ".shx", ".dbf", and other extensions on a common prefix name (i.e., "lakes.*").

Data layers legends. Each layer of NWS data displayed on a third-party mapping application will contain a legend explaining meanings of symbols, areas, and colors used to convey information.

2.4.5   **Metadata**. A link entitled "About this Data" will be provided. This link should direct the user towards metadata. A metadata record is a file of information, usually presented as an XML document, which captures the basic characteristics of a data or information resource (the who, what, when, where, why, and how of the resource). Geospatial metadata are used to document geographic digital resources such as GIS files, geospatial databases, and earth imagery. The Content Standard for Digital Geospatial Metadata (CSDGM), Version. 2 Federal Geographic Data Committee (FGDC) - STD-001-1998) is the US Federal Metadata standard. More information on geospatial metadata is available from the Federal Geographic Data Committee Web site.

2.4.6   **Disclaimer.** Immediately to the lower right of any third-party Web map will be a link to the NWS standard disclaimer: https://www.weather.gov/credits.php#mapping.

2.4.7   **Use of Third-Party Data layers.** Data provided by non-NWS sources may be included in Web mapping applications displays.

2.4.8   **Data Layers Provided by Other Federal Agencies.** Data layers provided by other federal agencies should be attributed to the contributing agency on the display on NWS Web pages. Data layers displayed on NWS Web pages provided by non-federal agencies must follow the same standards as hyperlinks to Web sites not under the control of a federal government agency. Data layers displayed on NWS Web pages provided by non-federal agencies must follow the same standards as hyperlinks to Web sites not under the control of a federal government agency. Data layers provided by commercial organizations, non-federal agencies, including state and local governments, universities, or interest groups present special challenges with respect to maintaining agency objectivity and thus must be used judiciously. Data layers provided by non-Federal agencies should be attributed to the contributing agency on the display on NWS Web pages. External data layers not available from other federal sources must meet the following criteria: 1) data layers are necessary for and material to the presentation of agency information or the delivery of services in the proper performance of an agency function; 2) reasonable steps are taken to ensure the presentation is accurate, relevant, timely, and complete; and 3) reasonable steps are taken to assure that data layers remain active or continue to provide the level of quality (including objectivity, utility, and integrity) as intended by the agency.

2.5   **Third-Party Map Applications**

Web mapping applications and technologies provided by third-party providers power many map-based services. Web maps are often a presentation media in Web GIS apps, and Web maps are increasingly gaining capabilities to display NWS data on both traditional desktop computers and on mobile devices. Web mapping using these third-party providers on NWS pages involves legal considerations, interoperability concerns, and other considerations.

2.5.1   **Use of Third-Party Mapping Applications.** Only properly licensed third-party mapping applications will be used on NWS Web pages or in NWS publications. For example, NOAA has established an enterprise license for ESRI Maps application programming interface (API), which allows NWS offices to use screen captures from ESRI software and to present data layers from the ESRI Maps API as reference layers (e.g., terrain, highways) in NWS maps.

2.5.2   Use of Enterprise Licensing Mapping Service API Keys. Third-party Web mapping service applications on NWS Web pages will use only API keys provided under the enterprise licensing agreement, using software classes and license keys provided by the NOAA GIS Committee. Individual account API keys will not be used on any testing, development, or production servers.

2.5.3   Use of Cloud-Based Third-Party Mapping Applications. As part of the NOAA Enterprise License Agreement (ELA) with ESRI, all NOAA employees have an ArcGIS Online (AGOL) account through the NOAA GeoPlatform. AGOL is part of the ESRI Geospatial Cloud. AGOL enables users to connect people, locations, and data using interactive maps. NOAA's AGOL Account, the NOAA GeoPlatform, is a GIS application environment for use by NOAA employees and contractors. It gives users the ability to quickly share NOAA data, Web maps, applications, tools, and Web services with internal project teams, as well as with NOAA partners and the public in compliance with the NOAA AGOL Best Practices. AGOL includes premium service for which NOAA has a limited number of credits annually. Applications requiring credit usage must follow the process included in Appendix C, including Portfolio Integration Council (PIC) approval for funding of credit usage. All NWS policies referenced in Section 3.1 also apply to AGOL development and public sharing.

2.6   Outreach/Education about Environmental Data available in Geospatial Formats

2.6.1   NWS will provide the public with links to information about the data provided in geospatial formats and provide links to more information on geospatial data formats and their uses.

2.6.2   NWS will register GIS products on the NOAA GeoPlatform, data.gov, and the federal GeoPlatform for maximum user awareness of data availability.

3.   Development/Implementation of New Geospatial Data and Applications

GIS desktop applications written for analysis, display, or data conversion by Weather Forecast Offices (WFOs), River Forecast Centers (RFCs), Center Weather Service Units (CWSUs), and regional and national centers for their own internal use are beyond the scope of this document.

A proposal to develop/implement a new geospatial data provision or application, including geospatial Web portals and viewers and all variations of geospatial Web services (WMS, WCS, WFS), will be provided to DIS and include interagency collaboration through the Geospatial Integrated Work Team (GIWT*). Applications include, but are not limited to, data viewers, data portals, models or tools created to extend GIS software functionality, and customizations to basic software or Web-based tools.

DIS, with the GIWT will review requests to ensure the request has, at a minimum, immediate supervisory approval and/or the requestor of the data or parent application has completed the Capabilities and Requirements Decision Support (CaRDS) process. Requests without completed CaRDS will be evaluated to ensure it is a new format or enhancement of a previously approved CaRDS project, is within mission scope, encourages/identifies projects for cross-agency collaboration, and minimizes duplication of efforts.

If the request is determined to be an entirely new capability and/or datasets, it will be redirected to

CaRDS before being added to the GIS development pipeline. New GIS requests that meet the aforementioned criteria will be compiled and presented to the Mission Delivery Council (MDC) on a quarterly basis for a decision on whether or not to pursue development/implementation of new geospatial data provision or applications (map services, downloads, tools, portals, viewers, etc.). The MDC will also prioritize the requests it approves. If an MDC-approved request requires funding, the request will be presented at the following PIC meeting for a funding decision. Appendix C details the process outlined above.

* The GIWT is a chartered national integrated working team. The GIWT charter includes the option for all national centers and headquarters offices to provide an official member. GIWT meetings are open to any NWS employee and occur as a teleconference (as of October 2021, bi-weekly on Mondays). The GIWT process can be found at https://sites.google.com/a/noaa.gov/nws-gis/standard-processes.

3.1   Policy Compliance

Ensure that new geospatial data and applications conform to U.S. Government policies.

3.1.1   NWS will adhere to NOAA's Policy on Partnerships in the Provision of Environmental Information (NOAA Administrative Order (NAO) 216-112) in developing new geospatial data and applications.

3.1.1.1   As stated in NAO 216-112, NWS "will take advantage of existing capabilities and services of commercial and academic sectors to support the efficient performance of NOAA's mission and avoid duplication and competition in areas not related to NOAA's mission. NOAA will give due consideration to these abilities and consider the effects of its decisions on the activities of these entities, in accordance with its responsibilities as an agency of the U.S. government, to serve the public interest and advance the nation's environmental information enterprise as a whole.".

3.1.1.2   Public Input on Proposed New Geospatial Application. In accordance with NAO 216-112, ensure that the public has the opportunity to provide input on any proposed new geospatial application. Procedures for seeking input are described in NWS Policy Directive (PD) 1-10 and NWS Instruction (NWSI) 10-102. Input from a public comment/review period will be considered in making a decision on whether or not to pursue implementation of the proposed application. New geospatial applications will not be provided external to NWS until this decision is reached.

3.1.1.3   Public Input on Proposed New Geospatial Data representing Changes to NWS Information Services. New data (e.g., screen captures, RSS feeds, shapefiles, displayed data layers, XML services, etc.) provided via geospatial applications leveraging custom code or third-party software or services representing a substantial change to NWS information services requires a public comment and review process (NWSPD 1-10, Managing the Provision of Environmental Information).

3.1.2   NOAA's Policy on the Management of Environmental and Geospatial Data and Information (NAO 212-15). NWS will adhere to NAO 212-15 to manage and provide geospatial data and information.

3.1.2.1   As stated in NAO 212-15 NWS, geospatial data "will be visible, accessible and

independently understandable to users, except where limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements."

3.1.2.2 In accordance with NAO 212-15, NWS will work with core partners and users to obtain requirements and feedback as well as provide complete data management plans, including coordination with NOAA data centers and data management systems with details of secure storage and archive delivery. All data must include metadata that is compliant with the current Federal standard.

NOAA's Policy on Requirements Management (NAO 216-108). NWS will adhere to NAO 216-108 in developing and collecting requirements for new geospatial data and applications. In particular:

3.1.2.3 As stated in NAO 216-108, NWS geospatial data and application, "requirements are driven from internal or external sources. The mission requirements will identify user needs, enabling science and technology developments, and/or other opportunities that support NOAA's mission and goals. Program managers shall review and propose additions, deletions, or modifications to the existing mission requirements baseline."

3.1.2.4 In accordance with NAO 216-108, requirements will be validated at least annually through a review for compelling requirement driver(s), consistency with NOAA mission, clear benefits for users and core partners, and scientific and technical feasibility.

3.1.3 Other Applicable Policies:
- Web
- Internet Use
- Privacy
- NWS, NOAA, and Department of Commerce (DOC) IT Security policies
- Section 508 of the Rehabilitation Act of 1973
- Information Quality Act Guidelines
- Records Retention Requirements
- NWSPD 1-12, Managing the Acquisition of Environmental Data from External Parties – if the service is used to acquire information
- Technology transfer, NWSPD 100-4 – for technology solutions implemented external to NWS (e.g., mobile phone "apps")
- Executive Order 13166, Limited English Proficiency
- NOAA GIS Committee Best Practice Documents

3.2 Legality

Ensure that the use of commercial services to support the proposed geospatial environmental data or application has an end-user license or agreement approved by the General Services Administration and the DOC Office of the General Counsel.

Ensure an analysis has been completed to determine the extent to which (if any) functionality of the proposed geospatial environmental data or application is subject to existing patent restrictions (i.e., does any functionality infringe on rights established by existing patents?).

Waiver for Proprietary Solutions. Development of geospatial applications will be platform/service agnostic whenever possible. To develop an NWS geospatial environmental application that requires technologies that are not vendor-neutral, a specific waiver is required to be granted by DIS.

Scientific Validation and Technical Merit. The proposed application must receive scientific approval from the NWS Office of Science & Technology Integration (STI) Director or his/her designate (see NWSPD 80-5). The analysis will include identification of how the proposed data or application will improve support for carrying out the NWS mission.

3.3   Documentation

Ensure that all geospatial data is accompanied by metadata in accordance with federal standards. Analysis of applications will provide resources for providing documentation on the new geospatial application.

3.4   Operational Sustainability

The analysis will include identification of the office[s] responsible for maintenance, updates, patches, user support services, life cycle costs, and expected impacts on NWS systems and telecommunications.

4   Authorities and Responsibilities

4.1   Office of Dissemination

The DIS-sponsored GIWT will analyze the policy and management factors (described in section 3) associated with the development/implementation of NWS geospatial data and applications. This analysis will be provided to the deciding official to support the decision process. Appendix C outlines the analysis process.

4.1.1   The GIWT may create or use existing working groups to support the analysis. Expertise needed to support a thorough analysis should include views from individuals in the following areas: policy, legal, technical, knowledge of field operations, the NWS Employees Organization, etc.

4.1.2   The GIWT may determine at what stage in the development/implementation process a decision is needed (e.g., prototyping of new capabilities may be needed to perform a thorough analysis).

4.1.3   If the data/application or the source data has not previously completed the CaRDS process and is not operational according to NWSI 10-102, requests will be redirected to the CaRDS process.

4.2   The Deciding Official

The MDC is the deciding body responsible for approving and prioritizing the development/ implementation of a new geospatial application and/or data service. If new funds are needed, the prioritized requests will be presented to the PIC. For new data sets and applications going through the NWSI 10-102 process, this decision should be made in coordination with the NWSI 10-102 approval process. Creation of a geospatial be included in the quarterly MDC presentation to be prioritized with other requests for development/implementation.

4.2.1   The deciding official or designate will review the analysis (section 4.1) presented by DIS to determine whether the expected benefits are within the scope of the NWS mission and prioritize the development order. If requests include costs beyond Full Time Equivalent Positions (FTEs) and existing hardware, the MDC decision will be taken to the PIC to determine if the new geospatial service or application's mission relevance justifies the cost. The deciding official(s) will consider the input from public comment/review (see sections 3.1.1.2 and 3.1.1.3 above) in determining whether the proposed new geospatial application will be developed and implemented and will confer with the deciding official for any concurrent processes described in NWSPSD 1-10 and/or NWSI 10-102 in making a coordinated agency-wide approval for implementation.

4.2.2   The decision will be recorded in a decision memorandum and should include an explanation that addresses comments received from public comment/review. The decision memorandum will be posted in the public database of proposed changes to NWS information services.

APPENDIX A – References and Definitions

<u>References</u>

[NWSPD 1-10 – Managing the Provision of Environmental Information](#)

[NWSI 10-102 – New or Enhanced Products and Services](#)
[NWSI 10-103 – Operations and Services Improvement Process Implementation NWSPD 80-5 – Science Review and Approval](#)
[NAO 212-15 – Management of Environmental Information NAO 216-108 = Requirements Management](#)
[NAO 216-112 –Policy on Partnerships in the Provision of Environmental Information](#)
[NWS Services Description Document (SDD) for NWS Data is GIS Form 2020](#)

<u>Definitions (as applied in this instruction)</u>

Geospatial application – A software application ("app") that processes geospatial data. Geospatial applications may perform an analysis on data, fusing of data, or queryable viewing of data usually on a computer or mobile device-based map.

NWS "Core Partner" – See definition in [NWSI 1-1003](#).

APPENDIX B

Best Practices for Geospatial Standard Data and Application Development

Shapefiles:
- Include only one Shapefile in a .zip archive.
- Zip file name should match the prefix of the filenames in the zip file.
- Include no more than 1,000 Shapefile features in your file.
- In some cases, when you attempt to add a file with more than 1,000 features, you see an error message that the Shapefile is too big to add to the map. This occurs when the extracted data is too big to display in a Web browser. Often, generalizing the features will reduce the overall size and allow the Shapefile to be added to the map. If that doesn't work, you may need to create a feature service with ArcGIS for Server.
- The Shapefile should contain valid geometries. All NWS field offices have access to ArcGIS software, which contains a Repair Geometry tool to correct invalid geometries.
- Learn more about correcting invalid geometries.
- Include in the Shapefile the accompanying .prj file in which the coordinate system of the data is defined.
- Do not assume a coordinate system. Research the origin of a shapefile. There are American Meteorological Society (AMS) pre-prints and textbooks available as resources.
- Learn more about defining coordinate systems.

APPENDIX C

**Geospatial Data/Application Review Process**

The review process described in this NWS Geospatial Directive will be implemented in the following manner (diagrams follow summary).

IDP is the path to operational NWS GIS Applications and Services. To create a geospatial Web service from an existing NWS product or enhance an existing operational GIS application, an NWS GIS request ticket must be completed.

New tickets received will be reviewed by the GIWT and/or the DIS GIS team. These teams will summarize requests each quarter and present the proposed development to the MDC for decision, approval, and prioritization. If the requests are approved by the MDC and require additional funds, then the prioritized requests requiring funding approval will also be presented at the next PIC meeting. The requestor will be notified of the date their request will be included in DIS' MDC presentation. They will also be provided with a link to track the request.

Geospatial Data/Application Review Process

Approvals and Requirement Prior to Work Beginning:
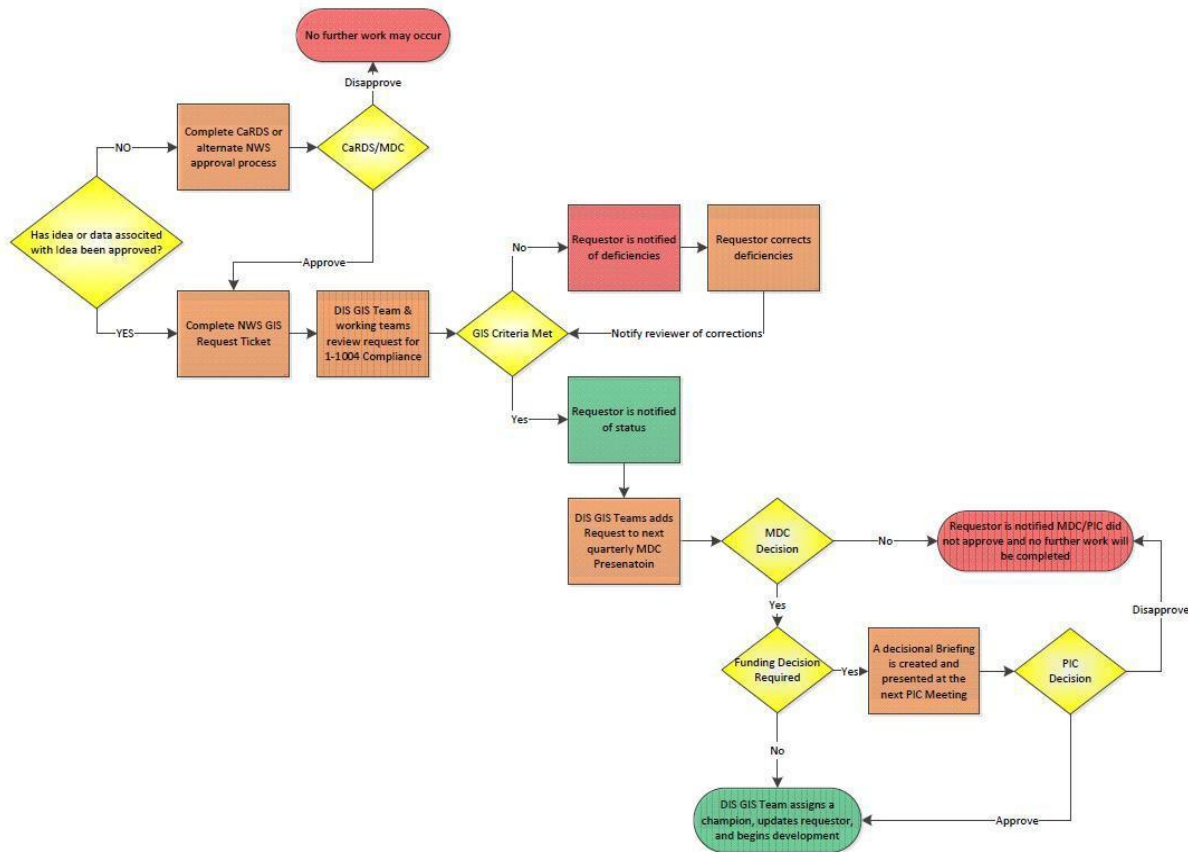
- Web/server work will be overseen by the server/Web administrators.
- All work must be approved and prioritized by the MDC.
- Work requiring funding must be approved by the PIC.
- New applications and new NWS data must receive CaRDS approval.
- Once approved, work will be coordinated with the DIS GIS team and any associated integrated or matrixed teams (e.g., GIWT, IDP GIS Development to Operations (D2O) team, etc.).
- All data must have International Standards Organization (ISO) compliant metadata before becoming operational.
- Once operational, all geospatial services and applications will receive direction for registering/providing links to the NOAA and NWS "one-stop" locations.
- If an application is similar or connected to an existing application, work may begin in collaboration with a parallel effort.
- If senior management has not yet approved the data or functionality, then the GIS ticket may proceed once approval is received or the concerns of the approving official/organization are satisfactorily addressed (whichever comes last).
- After all approvals and prioritizations are received, DIS GIS work will begin once the requestor/subject matter expert (SME) has provided a draft design of a map showing examples of the services to be provided with the "accompanying map feature layers, legends" to properly define the services, and ensure the context of the services is properly conveyed.
- In order for DIS GIS development to proceed, existing data must have metadata that is accurate, complete and in a human-readable format. This supports the creation of Representational state transfer (REST) services page (see example at https://idpgis.ncep.noaa.gov/arcgis/rest/services) as well as ISO Metadata is required for all Federal data sets.

Criteria to Evaluate GIS Request Tickets:
- Request is based on an existing WFO/RFC/CWSU/National Center product/service that is authorized by current policy (e.g., NWSI 10-102, NWS Service Description Document (SDD) for Provision of NWS Data in GIS Form 2020, and NWSPD 1-10 - see https://products.weather.gov/).
- Request has an on-going driver rooted in an NWS service area and supporting impact-based decision support services.
- Request is based on an existing data/model transmitted via NOAAPort, etc.
- Request is based on an experimental product/service working through the NWSI 10-102 process.
- Request is for an enhancement to an existing GIS service or application.
- Request is due to the application/service needing to be migrated because the existing host system is nearing the end of life or is non-operational.
- Request includes vetted high-level functional requirements.
- Is an audience (stakeholder) identified for the service?
- Is the request noted as an emergency? If so, an explanation must be provided documenting the emergency status and include proof of senior leadership approval to bypass other NWS processes.

The NWS GIS request ticket includes questions to gather information on each of these criteria, which the DIS GIS reviewers will use.

Potential Feedback to a GIS Service Request Ticket:
- This request has been added to the IDP GIS MDC approval/prioritization pipeline, which will be presented to the MDC [Month Year]. You can track progress via [Virtual Lab (VLab) link for request].
- This request will not be considered until it completes the CaRDS Process.
- This request will not be included in the IDP GIS MDC approval/prioritization pipeline because the functionality/OGC data requested is already being provided [link to the existing service/functionality]. If you disagree with this assessment, please reply to this email with your position.