Geospatial Data Coordination Implementation Guide

Version 2.2, March 2008

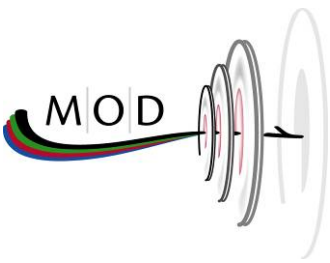


Table of Contents

1 Introduction

1.1 Geospatial Data Coordination Goals and Policy

The Department of Homeland Security's Federal Emergency Management Agency (FEMA) Geospatial Data Coordination Policy (Maurstad, 2005) establishes the principles for coordinating, communicating, documenting, and reporting existing and proposed geospatial data collected, produced, or manipulated under the FEMA Flood Map Modernization Program.

The goals of the Policy are to help ensure that the Flood Map Modernization Program will:

- protect its investments in geospatial data by requiring data to be documented, comply to standards, and be easily accessible to the general public;
- maximize the use of partnerships, including Federal, State, and local partners, for the acquisition and production of geospatial data;
- minimize duplicative requests from Federal agencies to State and local data stewards;
- recognize the value of existing coordination efforts at the State and local levels; and
- comply with all Federal requirements for coordination and reporting of geospatial activities.

These goals are derived from FEMA's desire:

- to be thrifty with geospatial data. The resources of the program are dedicated to flood mapping and not to the development of underlying base map, elevation, and other geospatial data. Reuse existing data, minimize duplication, and create new data only as a last resort, and when doing so partner with others to reduce costs. The avoidance of duplication of existing data and the use of the best available data are critical to managing FEMA's production budget and demonstrating proper stewardship of the funds expended.
- for partnerships to achieve the short- and long-term goals of the program. FEMA seeks to develop relationships that support the immediate map modernization program and continual, longer-term maintenance of the data. Respect existing coordination efforts at the State and local government levels, minimize requests for State and local information that duplicate those of other Federal agencies, and maximize partnerships when creating new data.
- to manage geospatial data as an investment by and asset of the American people. The last four Presidents and the Department of Homeland Security have specified minimum requirements for good management of federally-sponsored geospatial activities, and most states and many communities have similar policies and coordination activities. Document data, make sure that the data comply with standards, and make them readily accessible to the public; and comply with Federal requirements for coordination and reporting.

1.2 Geospatial Data Coordination Implementation Guide

To achieve the goals of the Policy, the Geospatial Data Coordination Implementation Guide (hereafter referred to as the Implementation Guide) provides guidance on how to coordinate with Federal, State, and local governments for base map, elevation, and other geospatial data, and to document and report these geospatial data collections, to support flood insurance studies. For the most part, geospatial data coordination tasks most often occur as part of pre-scoping, scoping, and data development or acquisition activities in a flood insurance study. There also is a continuing effort to maintain awareness of geospatial data development activities, especially at the Federal or State level, that might benefit future Flood Map Modernization studies.

Each process in the Implementation Guide is described using the following outline:

- Task(s): The activity to be conducted.
- Resources: Information to be used in the task.
- Anticipated outcome(s): The new information to be known or processes to be completed at the end of the task.
- Responsible organization(s): The organization that should perform the task.
- Problems? (optional): Sources of additional information about the task.
- Reminder(s) (optional): Additional notes about the task

This document is available at <https://hazards.fema.gov/femaportal/docs/GeoDataImplem.pdf>.

1.3 Audience for the Implementation Guide

Section 2 of the Implementation Guide provides guidance to organizations responsible for identifying, developing or acquiring, and inspecting base map, elevation, and other geospatial data used in flood insurance studies. Because the assignment of responsibilities can vary among and within FEMA regions, organizations that might have these responsibilities include the FEMA regions, Regional Management Centers, Cooperating Technical Partners, and mapping contractors and subcontractors. Study leads must ensure that study participants clearly understand their responsibilities to achieve the outcomes described in the Implementation Guide.

In addition, FEMA Regional personnel will find the Implementation Guide helpful in their efforts to oversee partners' and contractors' compliance with the Policy.

Section 3 describes enterprise responsibilities of Regional Management Centers and the Geospatial Data Coordination and Standardization Team. See Appendix A for contact information for these organizations.

1.4 Related Documents

The Implementation Guide:

- Supports FEMA's Geospatial Data Coordination Policy (Maurstad, 2005). The Policy is available at <https://hazards.fema.gov/femaportal/docs/GeoDataCoord.pdf>.
- References FEMA's Guidelines and Specifications for Flood Hazard Mapping Partners (hereafter referred to as G&S) (U.S. Department of Homeland Security, 2003). The G&S is available at <http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm>. Although some sections of the Implementation Guide summarize procedures and specifications contained in the G&S, this document is not meant to be used as a substitute. The G&S is the comprehensive reference for flood map specifications.
- References FEMA's National Flood Insurance Program (NFIP) metadata profiles (U.S. Department of Homeland Security, 2006a). The profiles are available though the Mapping Information Platform web site. Start at <https://hazards.fema.gov> and follow the links Tools & Links, and then Metadata Profiles.
- References positional accuracy and metadata standards developed by the Federal Geographic Data Committee (1998a and 1998b).
- References related activities of the National Digital Elevation Program (NDEP) (2006a and 2006b) and the National Digital Orthophoto Program (NDOP) (2006a and 2006b).
- References national FEMA resources (for example, contact information and fact sheets) on the Mapping Information Platform that support flood insurance studies.

1.5 Versioning

This document is Version 2.2 of the Implementation Guide. Major changes from version 2.1, dated March 2007, include:

- Provide updated instructions for documenting base map and elevation data sets identified for use in Map Mod projects in the NDEP and NDOP Project Tracking systems.
- Section 3.1: Updated to include overall Geospatial Data Coordination strategy overview.
- Section 3.4: Updated information on monitoring activities to expand upon purpose of the monthly audits, define roles of RMC, MOD and FEMA HQ, and FEMA Regional staff.
- Section 3.5: Updated to include semiannual geospatial data coordination report preparation and compilation processes.
- Appendix A: Update contact information.
- Appendix E: Updated instructions on the use of the National Digital Orthophoto Program and National Digital Elevation Program project tracking systems.

- Appendix F: Process for completing the monthly audits of the NDEP and NDOP Project Tracking Systems.

Subsequent versions will be released in conjunction with changes to the Mapping Information Platform (MIP), related procedures, or new resources available to coordination tasks.

1.6 Maintenance of the Implementation Guide

The Geospatial Data Coordination and Standardization Team wrote and maintains this document. See Appendix A for contact information for the team.

2 Flood Insurance Study Coordination Activities

In flood insurance studies, geospatial data coordination results in the identification and acquisition of geospatial data, especially base map and elevation data, essential to the studies. It does so in a way that takes maximum advantage of existing data, and, when new data are needed, forms partnerships between a study and other organizations to share the costs of collecting new data. Coordination reduces costs, speeds production, and garners good will. In addition to helping the studies, these procedures ensure that FEMA complies with government-wide instructions that agencies search for existing data before procuring or developing new data (U.S. Executive Office of the President, 1994, section 3(d), and 2002, section 8(a)(10)).

These tasks are not additional work for the study, but integral parts of a study that help it be successful. These activities should be integrated with the normal study pre-scoping and scoping processes during which participants develop the overall plan for the study and a consensus on the study approach, and the follow-on data development tasks, especially the development of topographic (elevation) data and acquisition of base map data. They are reflected in the template for Mapping Activity Statements for Cooperating Technical Partners and Statements of Work for Contractors and Other Federal Agencies (U.S. Department of Homeland Security, 2006b), an updated excerpt from which is provided in Appendix B, and the new Scoping Guide: Pre-Scoping and the Scoping Meeting (U.S. Department of Homeland Security, 2006c).

Study leads must ensure that participants clearly understand their responsibilities to achieve the outcomes described in the Implementation Guide. For cases in which a study does not conduct pre-scoping or scoping activities, the study still must accomplish the outcomes identified in this section. Even when formal prescoping and scoping tasks are not assigned, someone will need to coordinate to identify and obtain geospatial data needed for the project. Where this Implementation Guide identifies responsibilities for mapping partners performing prescoping and scoping, this means whatever partner searches for and identifies the basemap and topographic data for the project. Regardless, the partner responsible for basemap acquisition and topographic data acquisition for their respective data themes is responsible for the flood insurance study coordination outcomes if they have not been accomplished prior to those tasks.

This section assumes that the reader is familiar with the minimum criteria for content, currentness, accuracy, and other criteria for base map and elevation data used in flood insurance studies. Appendix C provides an overview of these criteria, and identifies sources of more detailed information. This section also assumes that the reader is familiar with FEMA's policies on sharing and collecting new data; see Appendix D for more information.

Although base map (especially orthophotos) and elevation data receive special attention in the Implementation Guide, the coordination process in this section should be followed for other themes of geospatial data required by the study.

The general process for geospatial data coordination is shown in Figure 1. Each box (▭) shows the study process (pre-scoping, scoping, develop topographic data, or acquire base map) in which an activity occurs and the tasks to be completed. Each slanted box (▱) shows resources used in the task, or outcomes that result from the task.

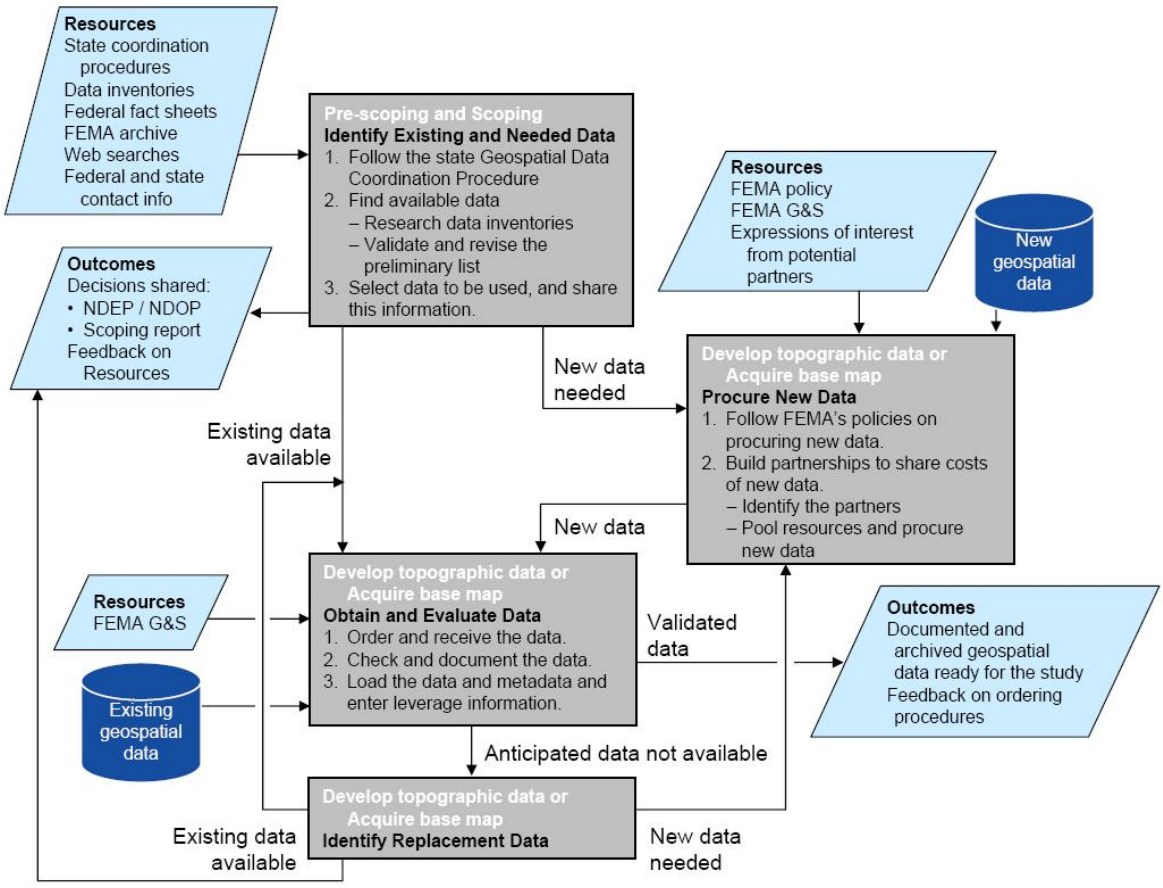


Figure 1. Overview of the geospatial data coordination process during a flood insurance study.

2.1 Identify Existing and Needed Data

This activity identifies the best geospatial data available for use by FEMA mapping partners in accomplishing tasks related to Map Modernization, gains consensus among study participants on the choice of data to be used, and documents plans to use the selected data and to procure new data. Such efforts should be as exhaustive as possible to help inform decisions about the scope of the project. This need is especially true for elevation data; they are critical for flood insurance studies and all sources should be explored.

The steps outlined in this section (see Figure 2) are completed during the pre-scoping and scoping phase, other project planning or initiation activities, or during the base map acquisition and topographic data development phases of a flood insurance study.

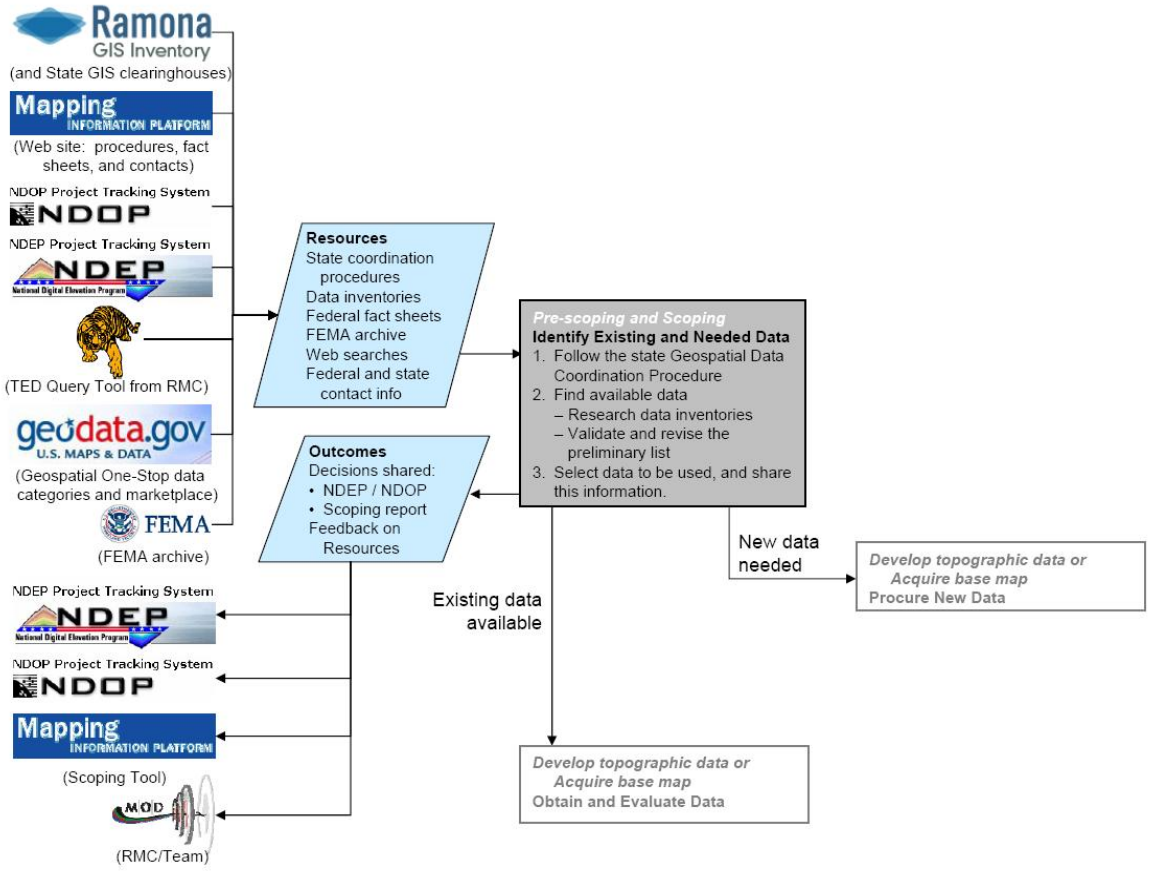


Figure 2. Process to identify existing and needed data.

Step 1 – Follow the State Geospatial Data Coordination Procedure

The Flood Map Modernization Program has a Geospatial Data Coordination Procedure, sometimes called the "State SOP" (standard operating procedure), for each state. Prepared in cooperation with each state's geospatial data coordinator, the procedures outline sources of geospatial data and contact information, preferences for base map data and state geospatial participation in studies, and other useful information. They also provide reminders about unique needs for states, such as the need to coordinate with special district governments (such as regional planning commissions and councils of governments as well as flood control, levee, and water districts), for data about the Public Land Survey System, or to consider extra-territorial jurisdictions for studies. (Note that FEMA anticipates that contractors performing studies will provide feedback on the procedure as a means to continually improve this resource.)

Task: Early in the pre-scoping activity or prior to beginning the search for basemap and topographic data, read the state procedure and learn about the geospatial data assets and preferences of the geospatial data community in the state. Follow the procedures listed.

Resources: State Geospatial Data Coordination Procedure: The procedure is available from the from the Mapping Information Platform web site starting in March 2007. Start at https://hazards.fema.gov and follow the links Tools & Links and then Geospatial Data Coordination Procedure by State. The Procedures also are available from the Regional Management Center (see Appendix A for the list of contacts).

Anticipated outcome: Responsible organization has a general awareness of geospatial activities and preferences in the state, and knows state-specific starting points for finding more information about available data and contacts.

Responsible organization: Organization responsible for pre-scoping activity and mapping partner responsible for the scoping activity or the organization that searches for and obtains the basemap and topographic data if formal prescoping and scoping are not assigned.

Problems?: Send questions about the procedure, or updates or corrections to the procedure found during the conduct of a study, to the geospatial coordination lead of the Regional Management Center.

Step 2 – Find Available Data

Data sources that will meet the needs of studies may exist at the Federal, State, and local levels. Data sources that exist, or that are in work or planned, must be identified and investigated. Only if they are ruled out may a project consider the purchase of new data.

In some cases, the state Geospatial Data Coordination Procedure directs study participants to interact with the state geospatial data coordinator. Study participants also will discuss Federal data holdings with the federal agencies' representatives in the states. To avoid repetitive study-by-study contacts with these personnel, mapping partners that are responsible for scoping multiple studies should approach the coordinator and the federal agency representatives once to discuss all of their studies.

This step has two parts: researching data inventories to develop a preliminary list of data available for the study, and validating and revising the list by interacting with knowledgeable members of the geospatial community and study participants. The main outcome is the list of geospatial data the study anticipates using, and the identification of data gaps that will be filled by procuring new data. This activity should be pursued in the order presented.

Research Data Inventories

This desk work allows a study to gain a sense of available data that might be useful, identify gaps in data that will have to be filled before a study can proceed, and have background knowledge that will speed discussions with state, tribal agency, and community contacts in later phases of the study. This task also helps reduce the burden on state and local study partners by developing a consolidated list of potential data sources in advance. By developing a complete list of data sources, the study can identify data that serve as "fall back" options in case the primary data identified for a study later are found to not be available

Task: Work with study team members to identify the themes of geospatial data (including, but not limited to, base map and elevation data) that might be needed. Review geospatial data inventories (see the Resources section below) on the web and other media, select the existing, in-work, and planned data that meet the minimum criteria for studies (see Appendix C) and are otherwise available and useful to the study, and build a preliminary list of these data. Record the data discovered and their characteristics in the reports described in the Scoping Guidelines (U.S. Department of Homeland Security, 2006c). If formal Scoping is not performed, the partner should still document geospatial data in the format provided in Table 5 of the Scoping Report template. Note that specific information for orthoimagery and elevation data is required for populating the NDEP and NDOP tracking systems. See Appendix E for the list of information required to complete the project tracker entries. Provide corrections to the resources and feedback on their usefulness to the Regional Management Center.

Resources:

- State Geospatial Data Coordination Procedure: The procedures identify preferred data sources. The Procedures are available from the from the Mapping Information Platform web site starting in March 2007. Start at https://hazards.fema.gov and follow the links Tools & Links and then Geospatial Data Coordination Procedure by State. The procedure also is available from the Regional Management Center (see Appendix A for the list of contacts).
- Data inventories: Information about data that exist, are in work, or are planned are recorded in these inventories:
    - State geospatial data clearinghouses, including Ramona: The state Geospatial Data Coordination Procedure identifies geospatial data clearinghouses maintained by the state. Among these clearinghouses might be the state's implementation of the Ramona GIS Inventory System (National States Geographic Information Council, 2006). Implemented on a state-by-state basis, and not yet adopted by all states, Ramona provides basic information about geospatial data availability and contact information. The NDOP and NDEP tracking systems can access data from the Ramona system and include this information in responses to queries.

- National program fact sheets: Information about national data programs of Federal agencies is identified in fact sheets available from the Mapping Information Platform web site. Start at https://hazards.fema.gov and follow the links Tools & Links and then Federal Mapping Program Factsheets).
- National Digital Orthophoto Program (NDOP) tracking system (National Digital Orthophoto Program, 2006a and 2006b): The system allows the search of orthophoto project information and the entry of information about new projects and existing data. Users also can use the system to search for data in the states' implementations of Ramona (see above). The system provides project entries to Geospatial One–Stop. To access the system, go to the NDOP web site at <http://www.ndop.gov/> and follow the link Project Tracking.
- National Digital Elevation Program (NDEP) tracking system (National Digital Elevation Program, 2006a and 2006b): The system allows the search of elevation project information and the entry of information about new projects and existing data. Users also can use the system to search for data in the states' implementations of Ramona (see above). The system provides project entries to Geospatial One–Stop. To access the system, go to the NDEP web site at <http://www.ndep.gov/> and follow the link Project Tracking.
- TED Query Tool: This tool provides access to information about Federal, state, and local government agency and private sector data holdings gathered by the Census Bureau and maintained in the TIGER® (Topologically Integrated Geographic Encoding and Referencing) Enhancement Database (TED). This tool is available through the Regional Management Centers.
- Geospatial One–Stop <http://www.geodata.gov> (U.S. Executive Office of the President, undated, and U.S. Department of the Interior, 2005b): Geospatial One–Stop provides a single point of access to geospatial data. Two parts of this Federal electronic government initiative that should be investigated are the "data categories" for existing data and the "marketplace" to find data that are planned or in-work and potential partners for new data collection activities. Two sources of data for Geospatial One–Stop are the National Digital Orthophoto Program and National Digital Elevation Program tracking systems (see above).

- FEMA archive: Information gathered during previous flood insurance studies from the FEMA archive, including most recent pre-scoping/scoping packages, Map Needs Update Support System (MNUSS), Community Assistant Contacts from the Community Information System (CIS), the Technical Support Data Notebook (TSDN), and other information, is available on request through the FEMA/National Service Provider (NSP) library.
- Web searches: Information about data held by local governments (for example, county or parish, tribal agency, or community), special district governments (for example, councils of government, regional planning commissions), and other organizations (for example, local

universities) is available by searching web sites for geospatial data maintained by these organizations. The state Geospatial Data Coordination Procedure might provide contact information for such organizations. Another starting point is the government links portal at <http://www.statelocalgov.net/.>

- Specification of the minimum criteria for geospatial data acceptable for use in flood insurance studies from the G&S and the National Flood Insurance Program metadata profiles (U.S. Department of Homeland Security, 2006a). A summary of both items is in Appendix C.

Anticipated outcome: Preliminary list of available data and their characteristics and procedures to obtain the data. Corrections to and feedback on the resources provided to the Regional Management Center.

Responsible organization: Organization responsible for pre-scoping activity and mapping partner responsible for the scoping activity or the organization that searches for and obtains the base map and topographic data if formal pre-scoping and scoping are not assigned.

Problems?: Send questions about the task, and questions, updates, or corrections found related to the list of resources, to the geospatial coordination lead of the Regional Management Center.

Validate and Revise the Preliminary List

To validate and revise the preliminary list of potentially useful geospatial data, invite comments on the list from members of the geospatial data community interested in the geographic area in which the study is located. Unless specified otherwise in the state's Geospatial Data Coordination Procedure, initiate direct contacts at the Federal level, then go to the state contacts, and then to contacts at the local level.

Some discussions with members of the geospatial community might reveal the existence of data that would be useful to the study, but that the contact is reluctant to "give" the data to the study. In such cases, make sure that the contact knows that FEMA counts data made available to a study as a cost sharing arrangement, and so the data are not a "gift" but are an "in-kind contribution" to the study. Such contributions are a major way that communities share the costs of a study without expending their funds. FEMA's "Estimating the Value of Partner Contributions: A Blue Book" (U.S. Department of Homeland Security, 2006d) provides more information on this subject. Also be sure that the contact knows that by providing high-quality data to the study, the contact is helping to protect the community by improving the quality of the flood maps used to mitigate hazards and protect lives and property.

Task: Unless otherwise instructed in the state Geospatial Data Coordination Procedure, contact relevant local Federal, then state, and then local government and tribal agency members of the geospatial data community. Verify that data identified in the list are the most recent and the most complete data available, and determine study stakeholder preferences about data to be

used in the study. For needs of the study for which no data have been identified, ask the contacts for leads to finding suitable data that exist, are in work, or are planned, or their interest in partnering to collect new data. Provide corrections to the resources and feedback on their usefulness to the Regional Management Center.

In particular:

- Federal Contacts: Contact the Federal agency's state representative to obtain the most up-to-date information on the status of Federal data holdings and future projects. Share with them information about the most promising data identified so far and data gaps, and ask whether they are aware of other existing or planned data that might be more suitable. Appendix F contains a summary of the geospatial interests of selected Federal agencies.

  Note changes in Federal contact information or status of national data holdings and report them to the Regional Management Center.

- State Contacts: Follow the preferences of the state geospatial data coordinator listed in the Geospatial Data Coordination Procedure to contact the coordinator to obtain the most up-to-date information on the current status of state data holdings and future projects. Share with the coordinator information about the most promising data identified so far and data gaps, and ask if they are aware of other existing or planned data that might be more suitable. Discuss plans for coordination with other state agencies. Obtain contact information for county, tribal agency, and community geospatial personnel if such a list is identified in the state Geospatial Data Coordination Procedure. Discuss plans for coordination with local contacts. Note changes in state contact information and report them to the Regional Management Center.

- Local Contacts: Compile a list of local geospatial data contacts using contacts identified in lists provided by the state, in the FEMA archive and CIS system, or in other sources for inclusion in the pre-scoping report. Note changes in contact information to be reported to the state geospatial data coordinator if such updates are requested in the state Geospatial Data Coordination Procedure.

  Use the list to coordinate with local contacts:

  - Special government district contacts: Call the geospatial contact at special government districts (for example, councils of government or regional planning commissions) to discuss their data holdings. Share with them information about the most promising data identified so far and data gaps, and ask if they are aware of other existing or planned data that might be more suitable or for which they have a preference.

  - County and parish contacts: Call the geospatial contact at the county, parish, or other equivalent unit of government and discuss their data holdings. Share with them information about the most promising data identified so far and data gaps, and

ask if they are aware of other existing or planned data that might be more suitable or for which they have a preference.

- Community and tribal agency contacts: Call the geospatial contact for incorporated communities and tribal agencies in the county or parish and discuss local data holdings. Share with them information about the most promising data identified so far and data gaps, and ask if they are aware of other existing or planned data that might be more suitable or for which they have a preference.

Resources:

- Federal and state contact information: Lists of Federal agencies' state representatives and the main state contacts are available on the MIP web site at <https://hazards.fema.gov/contacts/statecontacts/contacts.asp?page=xx> where "xx" is the two-letter postal abbreviation for the state. (For example, the web address for contacts for Alabama (abbreviation "AL") is <https://hazards.fema.gov/contacts/statecontacts/contacts.asp?page=AL>.)
- Lists of contacts available from the state if identified in the state Geospatial Data Coordination Procedure. The procedure is available from the from the Mapping Information Platform web site starting in March 2007. Start at https://hazards.fema.gov and follow the links Tools & Links and then Geospatial Data Coordination Procedure by State. The procedure also is available from the Regional Management Center (see Appendix A for the list of contacts).
- Preliminary list of geospatial data and related characteristics developed in the previous step.

Anticipated outcomes:

- Revised list of geospatial data and their characteristics and procedures to obtain the data, and updated contact information.
- Updated contact information for Federal agencies' state representatives and the main state contacts found on the MIP web site is reported to the Regional Management Center.
- Updated local contact information for local organizations contacts is reported to the state geospatial data coordinator if requested in the state Geospatial Data Coordination Procedure.

Responsible organization: Organization responsible for pre-scoping activity and mapping partner responsible for the scoping activity or the organization that searches for and obtains the basemap and topographic data if formal pres-coping and scoping is not assigned.

Problems?: Send questions about the task to the geospatial coordination lead of the Regional Management Center.

Step 3 – Select Data to be Used and Share this Information

Select and document available geospatial data and their characteristics to be used in the study, and identify new data to be procured. Be sure to communicate decisions to not use data recommended by study stakeholders in the previous step, and the reasons for those decisions.

Tasks:

- Compare the needs of the study to the list of available geospatial data, and identify the candidate available data that comply with minimum criteria to be used in the study and data needed to be procured to fill gaps.
- Confirm whether the base map data will be vector or raster (orthophoto) data. Consider the format used in adjacent county/community flood maps. Obtain commitments from the communities/county to the method of delivery and delivery schedule for the base map and elevation data. Confirm that the data being delivered satisfies FEMA's criteria for geospatial data in the G&S (see Appendix C).
- Record information about geospatial data to be used and procured and updated contact information in the scoping report (see the Scoping Guidelines (U.S. Department of Homeland Security, 2006c) for more information). If formal Scoping is not performed, the partner should still document geospatial data in the format provided in Table 5 of the Scoping Report template. Note that specific information for orthoimagery and elevation data is required for populating the NDEP and NDOP tracking systems. See Appendix E for the list of information required to complete the project tracker entries.

These tasks must be accomplished by the date for the completion of the scoping activity provided in the schedule baseline or immediately following the decision of the basemap and topographic data to use on the study.

Resources: Geospatial data needs identified by study participants and revised list of available geospatial data and their characteristics.

Anticipated outcomes:

- Decision recorded in the scoping report: Information about available and needed geospatial data to be used in the study and updated contact information are recorded in the scoping report. See the Scoping Guidelines (U.S. Department of Homeland Security, 2006c) for more information. If formal Scoping is not performed, the partner should still document geospatial data in the format provided in Table 5 of the Scoping Report template. Note that specific information for orthoimagery and elevation data is required for populating the NDEP and NDOP tracking systems. See Appendix E for the list of information required to complete the project tracker entries.
- Decisions shared in NDEP and NDOP tracking systems: Required information is entered in the NDEP and NDOP tracking systems (NDEP, 2006a and NDOP, 2006a) (if they are not entered already). This requirement includes entries for:

- Information about elevation and orthophoto data to be obtained from non-Federal sources.
- Information about plans to procure new orthophoto and elevation data.

See Appendix E for more information about the data to be entered.

Responsible organization: Mapping partner responsible for the scoping activities or the organization that searches for and obtains the basemap and topographic data if formal prescoping and scoping is not assigned..

Reminders: To be credited for making entries in the tracking systems, be sure to include the "for use by FEMA Map Mod" entry in answer to the question "Are there other agencies or organizations funding the data collection?". (Include this entry even if no funding is being provided.)

Entries in the tracking systems are the means by which FEMA shares information about geospatial data with other organizations. Entries made in the tracking systems are forwarded to Geospatial One–Stop. These systems are available to other organizations (and the public). Through these entries, study participants advertise the need for data to others, and might receive inquiries from other organizations about opportunities to share the cost of new data collection or to receive copies of data to be used in the study.

Note that contacts for projects entered in the NDEP and NDOP tracking systems incur obligations to maintain the records for projects that are proposed, planned, or in work. The systems will send the contact an e-mail message notifying them when the metadata for the project are entered, and a message prompting them to update the status of "proposed" and "planned" projects after the start date entered into the systems has passed and the status of "in work" projects after the end date entered into the systems has passed. When the data about the project are entered, they also will receive a copy of the metadata record in Extensible Markup Language (XML) format. The contact can use this record as a starting point from which they can build more detailed metadata. Other organizations will use the point of contact to gain access to the data if no website for data distribution is entered into the systems. When working with other organizations, be sure to explain these responsibilities to them before entering them as the contact. If an organization prefers not to maintain project status information in the system, substitute the contact information for the geospatial coordination lead from the Regional Management Center.

2.2 Obtain and Evaluate Data

In this activity, geospatial data that were selected for use in the study are ordered, received, checked, documented, and archived in the MIP (see Figure 3).

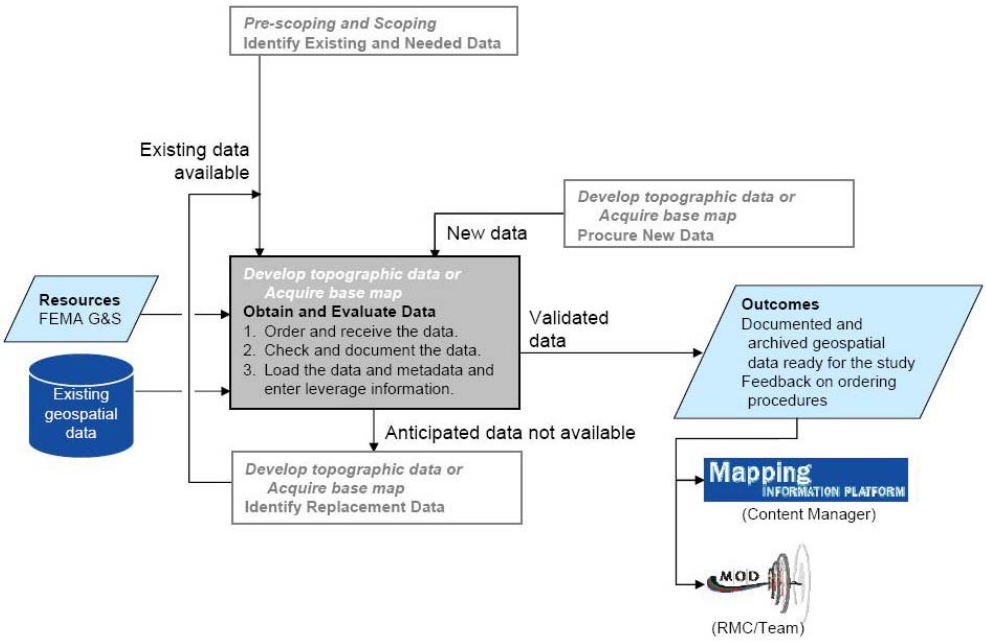


Figure 3. Process to obtain and evaluate data.

These activities also will identify data that were selected for use in the study, but subsequently were found not to be available, or on inspection not to be suitable, for use. In such cases, use the procedures in "Identify Replacement Data" (see section 2.4).

Step 1 – Order and Receive the Data

Tasks: Formally request from the appropriate organization geospatial data and related metadata that were selected for use in the study. Follow the standard data ordering procedures of the organization; request data from an organization's geospatial point-of-contact *only* if the organization does not have a standard procedure. Report any newly established and/or updated ordering procedures for Federal or state data to the Regional Management Center.

Monitor the receipt of data to ensure that orders are received on a timely basis. Typically FEMA requires that existing data be delivered within 30 days of a request. Follow-up on overdue orders to determine the status of geospatial data that have not been received. Alert the study lead if data selected for the study are not available.

Resources: Ordering procedures identified during the "Identify Existing and Needed Data" (section 2.1) or "Procure New Data" (section 2.3) activities, including the procedures for Federal data found in national program fact sheets, and for state data found in the state Geospatial Data Coordination Procedure. The procedure is available from the from the Mapping Information Platform web site starting in March 2007. Start at https://hazards.fema.gov and follow the links Tools & Links and then Geospatial Data Coordination Procedure by State. The procedure also is available from the Regional Management Center (see Appendix A for the list of contacts).

Anticipated outcomes:

- Required geospatial data and related metadata are received for use in study.
- Anticipated data that are not available for the study due to delays in delivery or non-delivery are identified.
- Feedback on Ordering Procedures: Updated ordering procedures for Federal and state data are reported to the Regional Management Center for use in updating the federally-sponsored national data program fact sheets and the state Geospatial Data Coordination Procedure.

Responsible organization: Mapping partner responsible to develop topographic data (for elevation data) or acquire base map.

Step 2 – Check and Document the Data

Tasks: Check the data and metadata to ensure that they comply with the criteria in the G&S (U.S. Department of Homeland Security, 2003), and so are suitable for use in the study. For example, check the data and metadata to determine if they have the characteristics identified during the "Identify Existing Data" activity. Inspect the data for errors, such as blunders (for example, look at the attribute table for vector base map data and sort the elevation data to find obvious outliers that are not consistent with the data), edge matching errors (for example, look at the edges of adjoining tiles to see if base map and elevation data are consistent from one tile to the next), data voids (missing data), and artifacts (areas of anomalous data).

If the problems are minor and corrections can be made cost effectively and without reducing the integrity of the data, make corrections to the data without going back to the source of the data. Update related metadata to reflect the changes. If problems are widespread or cannot be corrected, contact the source of the data to troubleshoot problems and receive replacement data and metadata. If the problems cannot be resolved, alert the study lead that data selected for the study are not available.

Check that the metadata comply with the National Flood Insurance Program metadata profiles and correct any deficiencies found.

Resources: Geospatial data and metadata received in the previous step, and the G&S and the National Flood Insurance Program metadata profiles (U.S. Department of Homeland Security, 2006a). A summary of both items is in Appendix C.

Anticipated outcomes:

- Required geospatial data and related metadata are found or are corrected to be of sufficient quality for use in study.
- Anticipated data that are not available for the study due to insufficient quality are identified.

Responsible organization: Mapping partner responsible to develop topographic data (for elevation data) or acquire base map.

Reminders: Be sure that each data set is (1) accompanied by metadata and (2) available with rights for FEMA to use and redistribute the data as needed. (Appendix C has more information on these topics.)

Step 3 – Load the Data and Metadata and Enter Leverage Information

Task: Load the data and related metadata in the Mapping Information Platform. Enter leverage information in the Mapping Information Platform to record the geographic area covered by the data. This task must be accomplished by the date provided in the schedule baseline.

Resources: Checked geospatial data and metadata from the previous step.

Responsible organization: To load the data, the mapping partner responsible to develop topographic data (for elevation data) or acquire base map. For entering leverage information, the Topography Task Lead for elevation data and the Base Map Task Lead for base map data.

2.3 Procure New Data

This activity focuses on procuring new geospatial data and related metadata needed to fill data gaps (see Figure 4). New data may be procured only if needed data are not already available from other sources and may require pre-approval by FEMA.

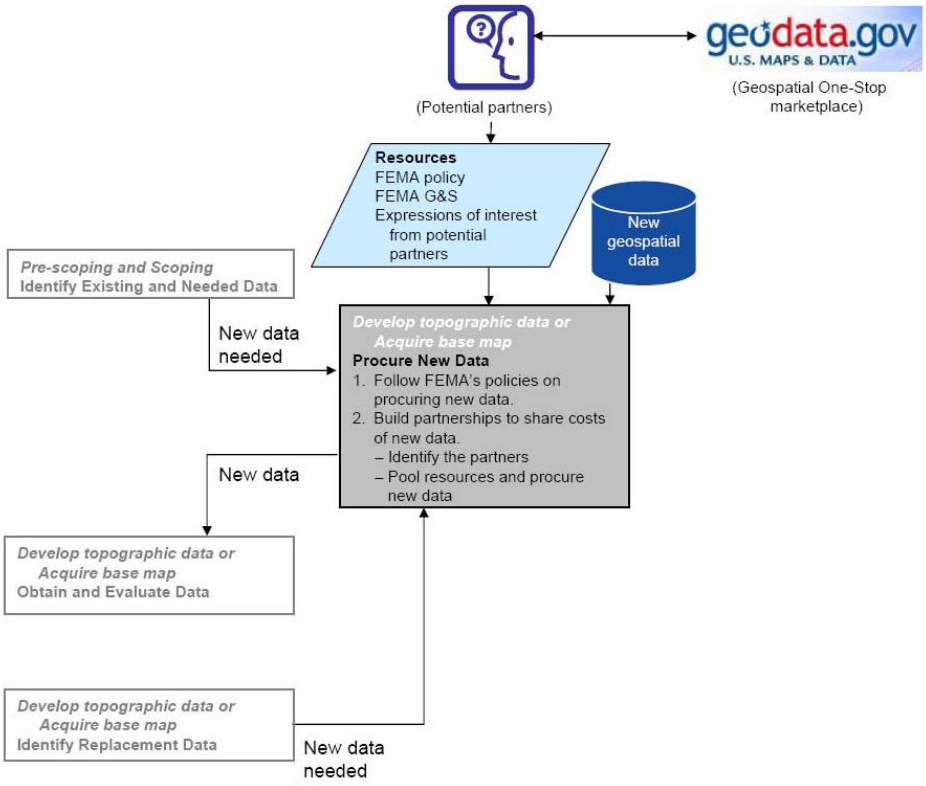


Figure 4. Process to procure new data.

The procurement of geospatial data is a large and sometimes complex topic. The Implementation Guide only discusses concerns related to coordination.

Remember that the lead time needed to produce and deliver new data might be significant. Start efforts to coordinate efforts to develop and deliver new data as soon as possible to ensure that the investment in data will pay off for the study.

Step 1 – Follow FEMA's Policies on Procuring New Data

Task: Review and follow FEMA's policies on procuring new geospatial data.

Resources: Policy summary in Appendix D.

Anticipated outcome: Responsible organization is aware of FEMA's policy as background for discussion with potential partners.

Responsible organization: Mapping partner responsible to develop topographic data (for elevation data) or acquire base map.

Step 2 – Build Partnerships to Share Costs of New Data

FEMA seeks partners to defray the costs of new data collection. These partners might be organizations that are participating in the study, or organizations that have other business reasons for needing data over the area of the study. Coordinate with the FEMA project lead for suggestions of potential partners and guidance on the FEMA region's approach to partnerships.

At this point, the study participants have laid the groundwork for developing partnerships. They completed two related tasks by working with the project tracking systems of the National Digital Orthophoto Program (2006a) and the National Digital Elevation Program (2006a). While researching data inventories (section 2.1, Step 2), the study participants identified organizations that reported data needs and work that was planned in the tracking systems. While sharing information about data to be used in the study (section 2.1, Step 3), the study participants advertised the need for data by entering information into the tracking systems. This information is forwarded to other systems, such as Geospatial One–Stop. Other organizations that use these systems might contact study participants and inquire about opportunities to share costs of new data. Finally, the study participants identified the needs to other organizations and contacted organizations that are likely to partner while validating and revising the list of available data (section 2.1, step 2).

The main point of this step is to use this previously-gathered information to quickly identify those organizations that are ready and able to work together to collect new data, and to formalize this partnership so that data collection can begin.

Identify the Partners

Task: Contact other organizations to identify those able to share costs of new data.

Resources: List of potential partner organizations (1) identified or contacted while researching data inventories and validating and revising the list of available data or (2) that contacted study participants to volunteer their interest in partnering to collect new data.

Anticipated outcome: List of organizations interested in partnering to develop new data.

Responsible organization: Mapping partner responsible to develop topographic data (for elevation data) or acquire base map.

Pool Resources and Procure New Data

Task: Represent study to work with partners to pool resources to procure new data and related metadata. Be sure to reach written agreement on the area of coverage, delivery schedule, technical specifications for the data and metadata, rights to the data collected, data acceptance responsibilities and procedures, financial arrangements, and plan to deliver a copy of the final data to the study. While some negotiation among the participants is likely, ensure that the minimum requirements for data content and quality are met, ensure that rights to the data are retained by FEMA, and do not violate FEMA's policies on procuring new data. Treat new data created during a study as a separate deliverable.

Resources: List of partner organizations, the policy summary in Appendix D, and the G&S and National Flood Insurance Program metadata profiles (U.S. Department of Homeland Security, 2006a), a summary of which is Appendix C.

Anticipated outcome: New data needed for the study.

Responsible organization: Mapping partner responsible to develop topographic data (for elevation data) or acquire base map.

2.4 (if needed) Identify Replacement Data

This activity responds to situations when data anticipated for the study are not available (see Figure 5). The approach is a modification of section 2.1, step 3.

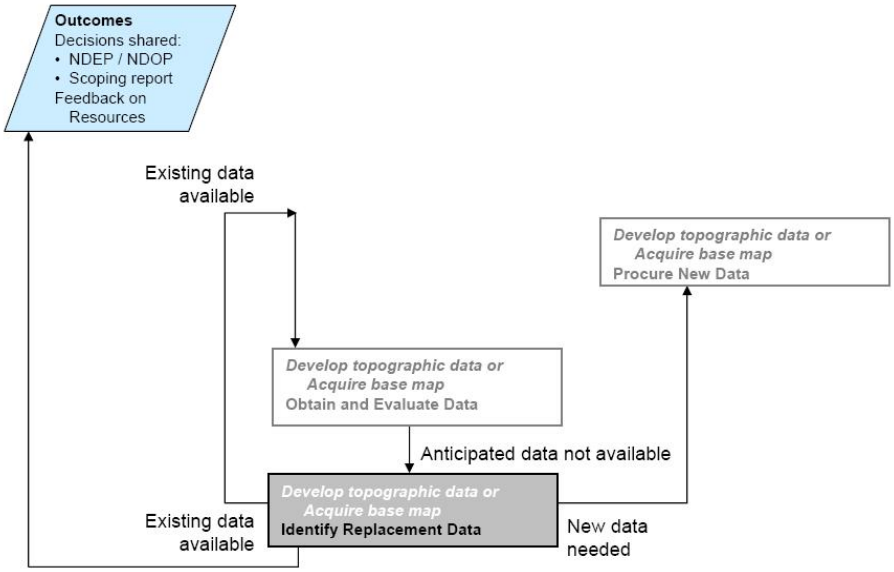


Figure 5. Process to identify replacement data.

Task: Compare the needs of the study to the list of remaining available geospatial data (from section 2.1, step 2), and identify the candidate replacement available data that comply with minimum criteria or the need to procure data to fill the new gap. Provide the findings to the study lead for decision. If the lead decides to pursue replacement data, record information about the replacement geospatial data to be used and procured, and updated contact information, in the scoping report and the National Digital Elevation Program (NDEP) and National Digital Orthophoto Program (NDOP) project tracking systems.

Resources: Geospatial data needs identified by study participants and list of remaining available geospatial data and their characteristics.

Anticipated outcomes:

- Decision recorded in the scoping report: Information about available and needed geospatial data to be used in the study and updated contact information are recorded in the scoping report. See the Scoping Guidelines (U.S. Department of Homeland Security, 2006c) for more information.
- Decisions shared in NDEP and NDOP tracking systems: Required information is entered in the NDEP and NDOP tracking systems (NDEP, 2006a and NDOP, 2006a) (if they are not entered already). This requirement includes entries for:

- Information about elevation and orthophoto data to be obtained from non-Federal sources.
- Information about plans to procure new orthophoto and elevation data.

See Appendix E for more information about the data to be entered.

Responsible organization: For the recommendations on data replacement options, the mapping partner responsible for topographic data development (for elevation data) or for base map acquisition. For decisions on what data to use, the study lead is responsible.

Reminders: To be credited for making entries in the tracking systems, be sure to include the "for use by FEMA Map Mod" entry in answer to the question "Are there other agencies or organizations funding the data collection?". (Include this entry even if no funding is being provided.)

Entries in the tracking systems are the means by which FEMA shares information about geospatial data with other organizations. Entries made in the tracking systems are forwarded to Geospatial One–Stop. These systems are available to other organizations (and the public). Through these entries, study participants advertise the need for data to others, and might receive inquiries from other organizations about opportunities to share the cost of new data collection or to receive copies of data to be used in the study.

Note that contacts for projects entered in the NDEP and NDOP tracking systems incur obligations to maintain the records for projects that are proposed, planned, or in work. The systems will send the contact an e-mail message notifying them when the metadata for the project is entered, and a message prompting them to update the status of "proposed" and "planned" projects after the start date entered into the systems has passed and the status of "in work" projects after the end date entered into the systems has passed. When the data about the project are entered, they also will receive a copy of the metadata record in Extensible Markup Language (XML) format. The contact can use this record as a starting point from which they can build more detailed metadata as the project progresses. Other organizations will use the point of contact to gain access to the data if no website for data distribution is entered into the systems. When working with other organizations, be sure to explain these responsibilities to them before entering them as the contact. If an organization prefers not to maintain project status information in the system, substitute the contact information for the geospatial coordination lead from the Regional Management Center.

3 Enterprise Coordination Activities

Enterprise coordination activities maintain common resources that support flood insurance studies, operate systems that fulfill FEMA's responsibilities to participate in government-wide coordination activities, monitor and report compliance of studies with coordination policies, report benefits of coordination, provide for communication among geospatial components of the Flood Map Modernization Program, and maintain awareness of national, state, and regional coordination activities. This section provides an overview of FEMA's geospatial data coordination strategy and activities that implement this strategy.

3.1 Geospatial Data Coordination Strategy Overview

The National Service Provider (NSP) is tasked with managing geospatial data coordination and standardization activities for FEMA's Flood Map Modernization (Map Mod) Program. The policy and tools for this coordination are in place, and must be implemented fully and consistently. The NSP is tasked to insure the policies are followed across the program by both study contractors and internal stakeholders. This section provides a high-level strategy and plans for insuring that the policies and business processes for the tracking and reporting of geospatial coordination activities are institutionalized and result in effective and complete coordination and reporting.

The Strategy Overview will provide the reader with a high level view of how the 'actors' and 'organizations' work together to reach the goals and requirements for Geospatial Data Coordination Management in the Map Modernization program.

I. High Level Geospatial Coordination Process Flow

Figure 6 shows the core infrastructure and activities that have been established to provide the management structure, reporting, and feedback mechanisms and their linkages to enable effective geospatial data coordination activities and results.

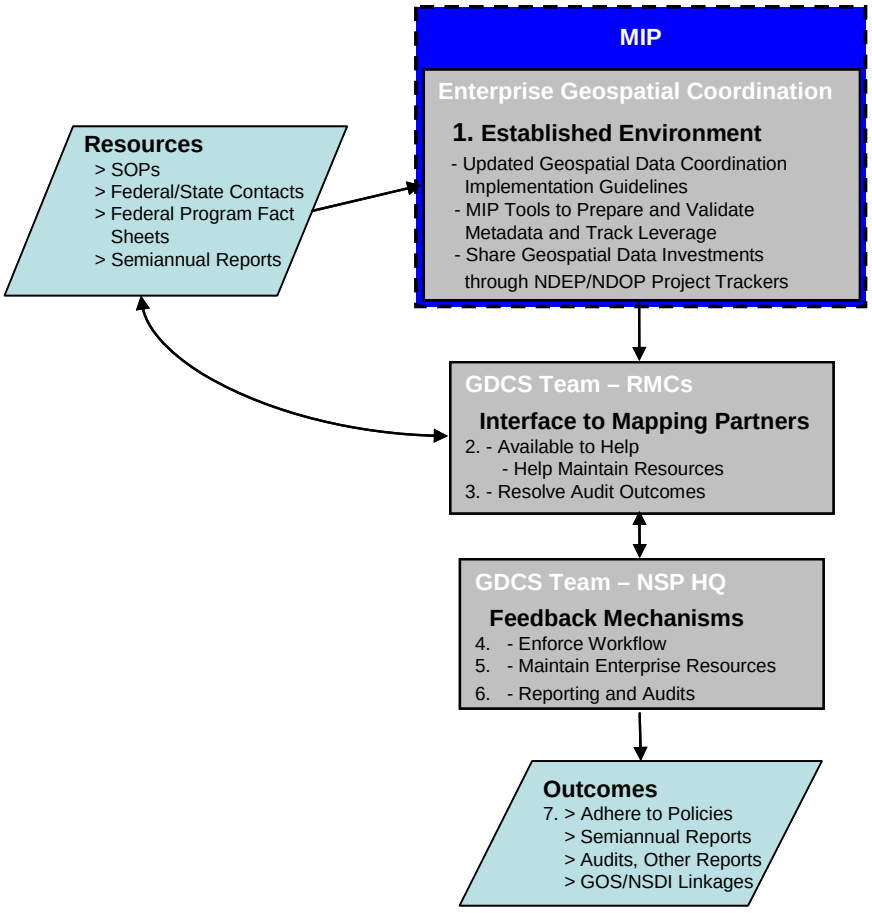


Figure 6. Geospatial Data Coordination flow overview

Figure 7 represents the Geospatial Data Coordination organization model of relationships and linkages of 'actors' and 'organizations' at the highest level. Dashed lines represent where there is no formal or contractual obligations imposed on geospatial coordination activities between the 'actors' or 'organizations' rather that coordination does exist. This graphic is rendered in the following sections to show the linkages and relationships of resources within each of the numbered sections in **Figure 6**.

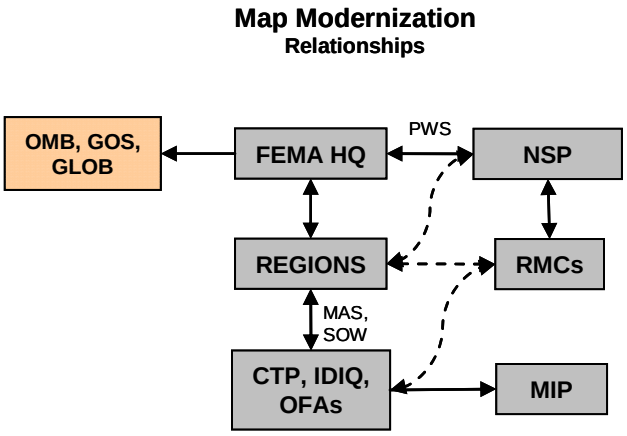


Figure 7. Map Modernization Actors and Organizations

II. Establish Geospatial Data Coordination Environment

FEMA has established an environment and management structure to achieve its goals for geospatial data coordination. This environment is in place to provide the enterprise-level resources and communication to enable flood study participants, RMC and NSP Headquarters staff, and FEMA staff to work together to document, monitor, and deliver geospatial data products in compliance with Federal requirements for coordination and reporting of geospatial activities. **Figure 8** represents the geospatial coordination pathways and resources in the environment. The Geospatial Data Coordination Implementation Guide provides study participants with the "what, when, how" guidance for coordinating with Federal, State, and local governments for geospatial data and how to report on the data collected.

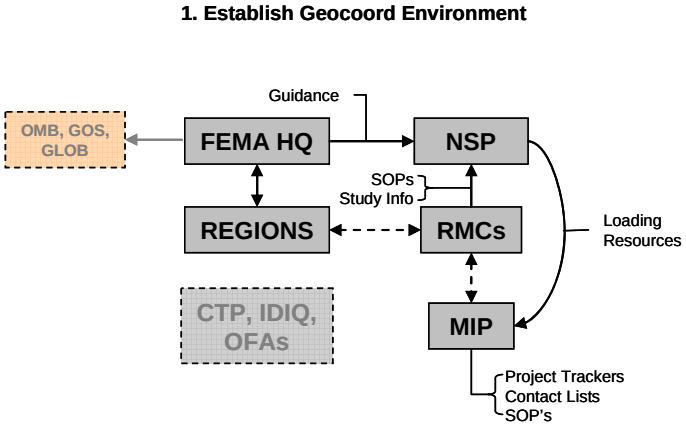


Figure 8. Geospatial Coordination Environment.

Now, the NSP must make sure that RMCs and Mapping Partners are following the implementation guide. This requires communicating the goals and policies so they are understood and institutionalizing these policies as standard business practices. Communication and guidance on how to maximize the use of these enterprise resources will be achieved through a monthly teleconference call for NSP, RMC, and FEMA headquarters and Regional geospatial leads to discuss successes and needed improvements in the Geospatial Coordination Environment. .

Figure 9 represents the flow of the information that results from periodic monitoring and reporting of geospatial data collection activities. These outputs document Map Mod's efforts in geospatial data coordination with Federal, state, and local agencies during the study process and at regular intervals. FEMA uses these documents to communicate these successes with other Federal agencies and oversight organizations. To further enhance internal coordination amongst study participants, RMCs, and FEMA Regional geospatial contacts, the NSP uses the reports and other information held in the MIP to communicate and reconcile gaps in data reporting.

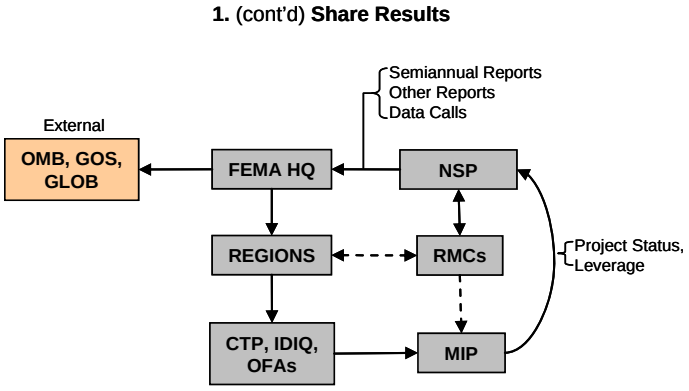


Figure 9. Report Geospatial Coordination Results

III. Provide an Interface to Mapping Partners

The RMCs provide the human interface to mapping partners by providing and maintaining geospatial coordination resources and providing technical support to FEMAs mapping partners in each Region. The RMC's provide mapping partners with help and information about using FEMA's geospatial resources and applications as well as gather feedback on the usefulness of resources from the user community. FEMA has designated a geospatial lead at each of its regional offices to provide the MOD team and FEMA headquarters staff a single point of contact to address coordination and performance issues among its mapping partners. The RMC's geospatial staff should coordinate support to the mapping partners with the FEMA region geospatial lead to ensure continuity with FEMA's agreements with the mapping partners. **Figure 10** below illustrates the relationships at the Regional level and the support role of the RMCs.

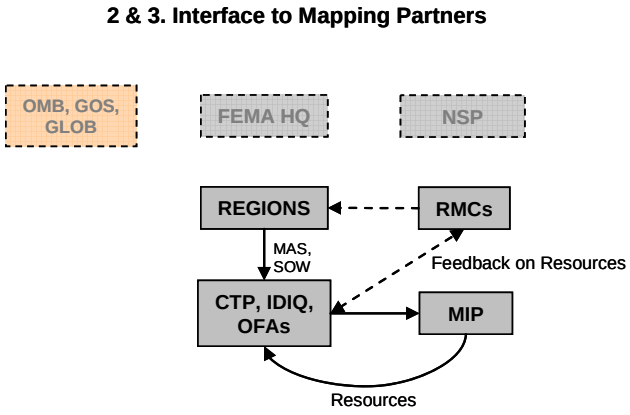


Figure 10. RMC Support Role in Geospatial Coordination

The RMCs should also look for opportunities to communicate and raise awareness of geospatial coordination resources and responsibilities through other direct communication with mapping partners. They also support better coordination by providing mapping partner and RMC initiated updates to resources such as the state geospatial data coordination procedures.

IV. Feedback Mechanisms

Figure 11 shows the linkage of study workflow and metadata artifacts, monitoring activities performed by the RMCs, and reporting performed by the NSP headquarters team.

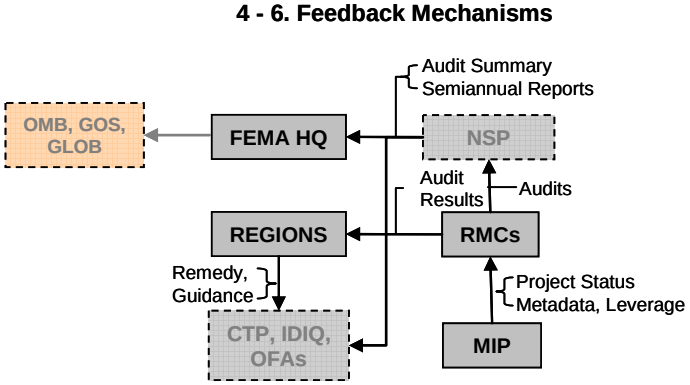


Figure 11. Linking Geospatial Data Coordination to Project Quality

The RMCs begin to monitor compliance to geospatial data coordination policy early in the study at the Scoping and data development phases by verifying metadata entries into the project tracking systems. In-process feedback from audit results should be shared with the Region so that appropriate guidance can be provided to the mapping partners to insure adherence to FEMAs policies. Furthermore, the audits should have quality component to them to insure that FEMA can report accurate and useful information on where it is using orthoimagery and terrain data sets in its

projects as well as the investment value leveraged from partner data sources. Monthly audits are described in detail in Section 3.4 and Appendix F.

The NSP headquarters team will provide regular updates and notifications about geospatial coordination resources and activities to the mapping partner community, FEMA regions, and RMC staff through the Geospatial Coordination listserv. Internally, the monthly geospatial data coordination conference call can be used as a forum to review audit summaries and draft geospatial coordination reports and gather feedback and guidance from FEMA and NSP geospatial coordination leads. Summaries of the audit result may also be shared at the National level through the main Map Mod Conference call and/or other mechanisms to emphasize the importance and allow the Regional Management staff to see how their performance compares with others.

V. Outcomes

The successful outcome of Geospatial Data Coordination is that FEMA's mapping partners adhere to FEMA's Geospatial Data Coordination Policy and Implementation Guidelines and that FEMA can share complete and accurate information about its geospatial data investments with its partners and stakeholders.

3.2 Maintain Resources for Flood Insurance Studies

As described in section 2, flood insurance studies coordinate with other organizations to take advantage of existing geospatial data and to form partnerships to defray the costs of collecting new data. It is useful to have as much background information about data that exist, are in work, or are planned and related information about contacts for these data available at the beginning of studies. Reasons include the typically brief timeframe for pre-scoping and scoping phases of studies (and so there is not much time to discover and become familiar with what is available), and the usefulness of some data resources, particularly those of Federal and state agencies, that cover large areas and could be used by many studies (and so are inefficient to discover and rediscover study-by-study). This activity avoids the need for each study to repetitively learn about agency contacts, data available from the agencies, and the agencies' interests in new data collection opportunities. The activity is illustrated in Figure 12.

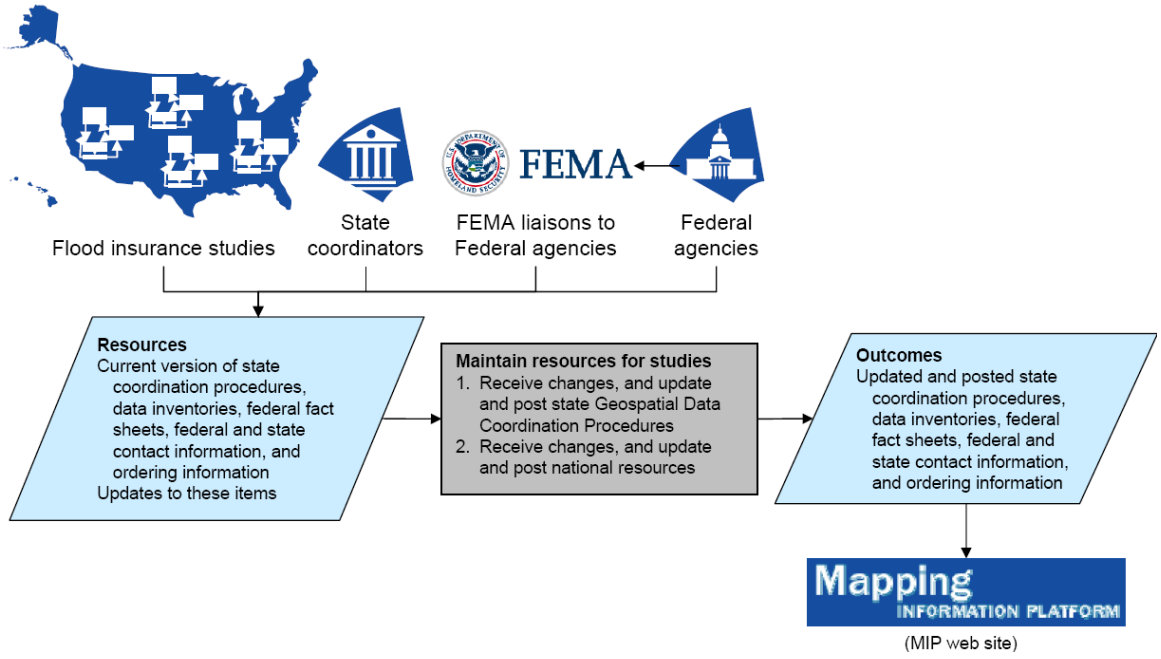


Figure 12. Process to maintain resources for flood insurance studies.

Receive Changes, and Update and Post State Geospatial Data Coordination Procedures

Task: Receive information about potentially useful existing data, data that are in work, data that are planned, and questions and comments about the procedures from flood insurance study mapping partners, regional offices of Federal agencies, state geospatial data coordinators and agencies, and regional and local data sources. Solicit feedback from state geospatial data coordinators on the state Geospatial Data Coordination Procedures at least annually. Use the information received to update the procedures as changes warrant (at least annually). Solicit comments on the changes from state coordinators before issuing revisions. Post the revised procedures on the MIP web site through the Geospatial Data Coordination and Standardization Team.

Resources: Feedback and updates on the state Geospatial Data Coordination Procedure from flood insurance studies, state coordinators, and others. Knowledge of new activities of other organizations gained through participation in state, regional, and other coordination activities (as funds and time allow). The current versions of the Procedures available from the Mapping Information Platform web site (start at https://hazards.fema.gov and follow the links Tools & Links and then Geospatial Data Coordination Procedure by State).

Anticipated outcome: State Geospatial Data Coordination Procedures are kept current on at least an annual basis and made available for flood insurance studies through the MIP web site.

Responsible organizations: Regional Management Centers for receiving the changes, updating the procedures, reviewing them with the state geospatial data coordinator, and forwarding the revised procedures to the Geospatial Data Coordination and Standardization Team. The Team for posting the revised procedures on the MIP web site.

Receive Changes, and Update and Post National Resources

Task: Receive feedback on national resources from flood insurance study participants provided through Regional Mapping Centers and Federal agencies provided through FEMA federal liaisons. Receive semiannual releases of the TED Query Tool from the Census Bureau. Update the resources as follows:

- TED Query Tool: Receive semiannual updates of the TED Query Tool provided by the Census Bureau and make them available to flood insurance studies through the Regional Management Centers.
- National program fact sheets: Receive feedback from flood insurance participants provided through the Regional Management Centers and Federal agencies provided through FEMA's federal liaisons, update the fact sheets as changes warrant (at least annually), and post the results to the MIP web site.
- Federal agencies' state representatives and main state contacts: Receive feedback from flood insurance participants and state agencies provided through the Regional Management Centers and Federal agencies provided through FEMA's federal liaisons, update the contacts as changes warrant (at least annually), and post the results to the MIP web site.

Resources: TED Query Tool updates from the Census Bureau. Feedback and updates on fact sheets and contacts from flood insurance studies received through the Regional Management Centers and from federal agencies received through FEMA's federal liaisons. Knowledge of new activities of other federal organizations gained through participation in national and federal coordination activities (as funds and time allow). The current version of the fact sheets and contact information.

Anticipated outcome: The resources identified in the Task section kept current on at least an annual basis and made available for flood insurance studies through the MIP web site or other appropriate channel.

Responsible organizations: Regional Management Centers to forward feedback received from studies and FEMA liaison to forward feedback from federal agencies to the Geospatial Data Coordination and Standardization Team. The Team to receive this information, update the resources, and post them to the MIP web site.

3.3 Post Metadata Related to Flood Insurance Studies

Sometimes long lead times are needed to coordinate with other organizations to share existing data and to develop partnerships to procure new data. To alert other organizations about the opportunity to cooperate with new studies and to share geospatial data collected and used for studies, metadata for planned flood insurance studies, and for geospatial data collected and used for studies, are posted to Geospatial One–Stop and the National Digital Elevation Program and National Digital Orthophoto Program tracking systems.

Through these activities, FEMA complies with the government-wide directives to post planned geospatial data investments to the Geospatial One–Stop marketplace (U.S. Executive Office of the President, 2006a, page 4 and 2006b) and to make metadata available in the National Spatial Data Infrastructure (U.S. Executive Office of the President, 1994, section 3(b), and 2002, section 8(a)(4)).

Metadata are posted at three different phases of a study. The first is a general metadata record that identifies plans for a study. The second is metadata about geospatial data that a study plans to use. The third is final metadata for geospatial data used in studies.

Post Metadata for Planned Studies

The process to post plans for flood insurance studies to the Geospatial One–Stop marketplace is depicted in Figure 13.

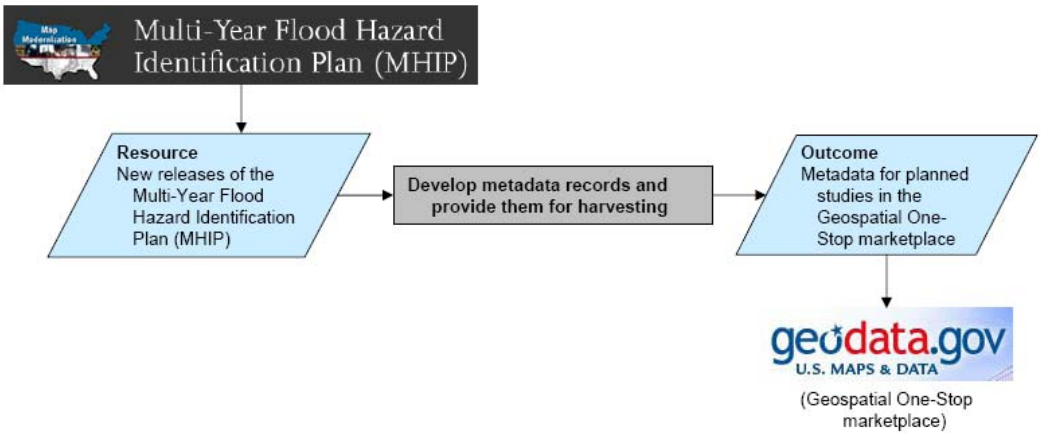


Figure 13. Process to post planned studies to the Geospatial One-Stop marketplace.

Task: Develop study-level metadata records for plans for studies identified in new releases of the Multi-Year Flood Hazard Identification Plan (MHIP) (U.S. Department of Homeland Security, 2006e). Work with Geospatial One–Stop support personnel to delete records for studies currently in the marketplace. Provide new records for the studies planned for the prior, current, and next two fiscal years for harvesting by Geospatial One–Stop. Based on the normal release

cycle for the MHIP, the metadata will be available for harvesting within 90 days of an appropriation to the Department of Homeland Security to comply with the requirements of Office of Management and Budget Circular A-11 (U.S. Executive Office of the President, 2006a) and for interim updates to the MHIP.

Resources: New releases of the MHIP.

Anticipated outcome: Metadata for planned studies harvested into the Geospatial One–Stop marketplace.

Responsible organization: Geospatial Data Coordination and Standardization Team

Post Metadata about Data to Be Used in Studies

This activity makes metadata records entered by studies into the NDEP and NDOP project tracking systems available for harvesting by Geospatial One–Stop. This process is depicted in Figure 14.

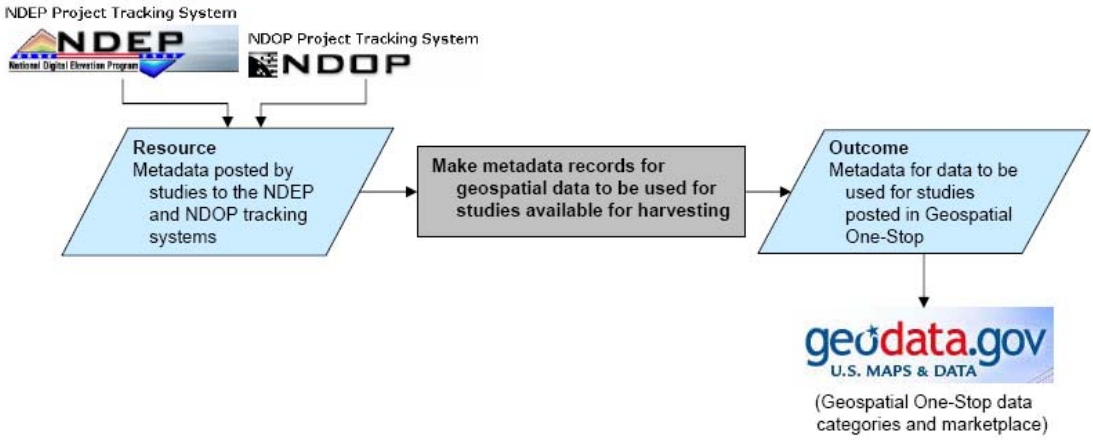


Figure 14. Process to post metadata about data to be used in studies to Geospatial One-Stop.

Task: Make newly-entered metadata records (developed in step 3 of section 2.1) in the NDEP and NDOP tracking systems available for weekly harvesting by Geospatial One–Stop. In addition to harvesting all metadata records into the Geospatial One–Stop data categories, metadata records for data identified as "planned" in the tracking systems also are posted to the Geospatial One–Stop marketplace.

Resources: Metadata records in the NDEP and NDOP tracking systems.

Anticipated outcome: Metadata for geospatial data to be used in studies harvested into the Geospatial One–Stop.

Responsible organization: Geospatial Data Coordination and Standardization Team

Reminder: This activity processes metadata records entered in the project tracking systems by all organizations, and not just those entered by studies.

Post Final Metadata for Data Used in Studies

This activity makes National Flood Insurance Program (NFIP)-compliant metadata records for data used in studies available for harvesting by Geospatial One–Stop. Studies provide this metadata along with geospatial data submitted to the MIP. This process is depicted in Figure 155, and will be implemented in the future.

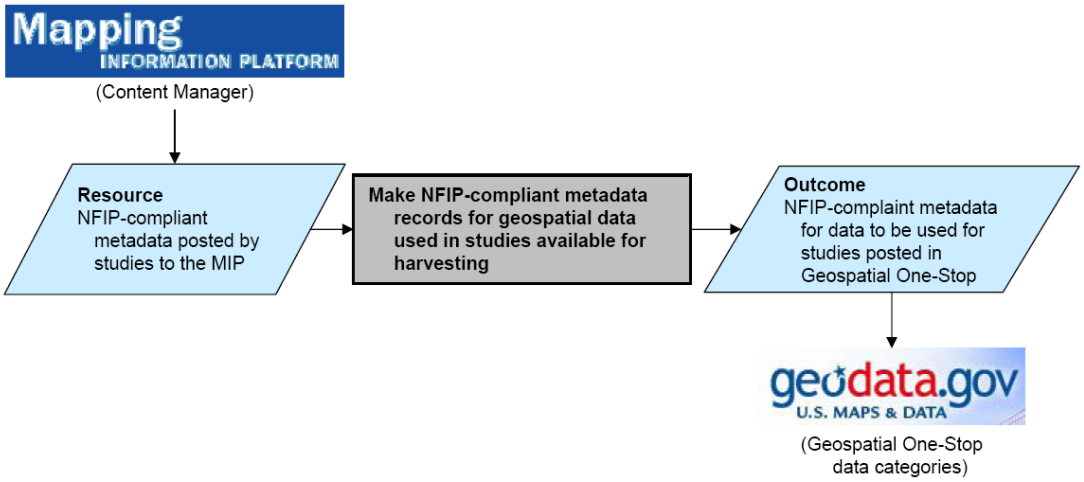


Figure 15. Process to post NFIP-compliant metadata for data used in studies to Geospatial One-Stop.

Task: Make NFIP-compliant metadata in the MIP Content Manager for harvesting by Geospatial One–Stop.

Resources: Metadata records in the MIP Content Manager.

Anticipated outcome: Metadata for geospatial data used in studies harvested into the Geospatial One–Stop.

Responsible organization: Geospatial Data Coordination and Standardization Team

3.4 Monitor and Report Compliance of Studies

This activity monitors and reports the compliance of study participants with the Geospatial Data Coordination Policy and Implementation Guide. It does so monthly in close coordination with other study management activities by comparing the activities completed by studies with the status of metadata entries in the National Digital Elevation Program (NDEP) and National Digital Orthophoto Program (NDOP) tracking systems, and the Mapping Information Platform (MIP) database. Monitoring results are provided as an outcome of the monthly NDEP/NDOP project

tracking system audits and are intended to be used as feedback to the Regions and mapping partners as a means of continuously improving FEMAs coordination, communication, and reporting of the geospatial data used in the Flood Map Modernization Program. See Appendix F for the complete monthly audit process for NDEP and NDOP metadata entries for Map Mod projects.

Task: On a monthly basis, perform audits of the NDEP and NDOP project tracking systems. Compare the stage completed by studies, either project planning (scoping), or data development tasks, with the status of entries in the NDEP and NDOP project tracking systems. Coordinate with the regional study management team and the FEMA Regional Geospatial Lead to determine the appropriate project milestone (completion of scoping, or completion of topographic data development or base map acquisition tasks) to initiate the audit for each project. In the case of projects that are formally scoped, and where the NSP is tasked to review the scoping report, compare the metadata with related information provided in the scoping report for completeness and consistency. In the case of projects where adequate scoping or project planning information is not available, but data development tasks are claimed complete in the Mapping Information Platform, review the entries for completeness as defined by the guidance for information needed for the NDEP and NDOP project tracking systems provided in Appendix E. Report the results of the comparison to appropriate FEMA and Mapping on Demand personnel.

Resources: Monthly audit assignments will be assigned to each RMC, detailed project tracking information that includes scoping and data development task completion dates, and past audit results for active projects. Additionally, the NDEP and NDOP project tracking systems available at http://www.ndep.gov/ and http://www.ndop.gov.

Anticipated outcome: Monthly audit results provided to the following stakeholders:

FEMA HQ - for assessment of program-wide compliance to the Geospatial Data Coordination Policy.

FEMA Regions – for providing feedback to mapping partners and CTPs on compliance with FEMAs policy for sharing planned geospatial data acquisitions.

RMC Geospatial Leads – for providing assistance to Region and mapping partners for maintaining records in the NDEP and NDOP project tracking systems.

Responsible organization: The following organizations each have responsibilities to do the following:

NSP Headquarters - to issue monthly audit assignments based upon completed project milestones as reported in the MIP; compile regional audit results and provide summary data to FEMA HQ, FEMA Regions, and RMCs.

Regional Management Centers – to complete audits of each project listed in the monthly audit assignments report; to review scoping reports (when applicable) and compare basemap and topographic data selections to metadata in the project tracking systems per established audit guidelines; assist Region in providing feedback and assistance to mapping partners in use of the project tracking systems.

FEMA Headquarters – to review monthly audit results and provide guidance to Regions on improving adherence to FEMA's Geospatial Data Coordination Policy and Mapping Activity Statements.

3.5 Report Benefits of Coordination Activities

This activity analyzes information in the Mapping Information Platform, the National Digital Elevation Program and National Digital Orthophoto Program tracking systems, and other sources to report, on a scheduled basis or in response to ad hoc requests, benefits from geospatial data coordination activities to the Flood Map Modernization Program. One such report is the semiannual Geospatial Data Coordination Report.

Task: Analyze information in the Mapping Information Platform, the National Digital Elevation Program and National Digital Orthophoto Program tracking systems, and other sources to report benefits. Measure of benefits may include costs avoided by taking advantage of available data and partnering in the collection of new data, and benefits provided to other organizations that take advantage of data used in studies.

Resources: Leverage data and metadata stored in the Mapping Information Platform, the NDEP and NDOP project tracking systems, and project scoping tracking databases.

Anticipated outcome: Semiannual Geospatial Data Coordination Report and reports that respond to ad hoc queries provided to requestors.

Responsible organization: Geospatial Data Coordination and Standardization Team

Semiannual Geospatial Data Coordination Report Compilation

Inputs to the semiannual Geospatial Data Coordination Reports include contents of metadata catalogs that store projects tracked by the NDEP and NDOP project tracking systems, the MIP metadata repository, and project scoping tracking databases maintained by the Regional Management Centers (RMCs). The report is organized into a introductory summary section that provides an overview of the value of base map (imagery) and topographic data sets leveraged from partners, and appendices that provide details on regional leverage values, base map and topographic data that is planned to be used in active studies, and data that is currently available for download via the MIP's Search & Retrieve interface. The reports are compiled as described in each of the following process steps below:

Step 1 – Retrieve NDEP/NDOP records for reporting period

Metadata records from the NDEP and NDOP (NDP) project tracking systems must be restored from system archives to account for projects that are removed from the system due to temporal conditions (susnsetting). Project backups are recovered from the NDP backup directory that resides on the host server. To ensure all projects are restored, backups that precede sunset dates that occur during the reporting period must be restored to a 'superset' that will be loaded into a temporary CSW that summary data will be harvested from. Sunset logs and backup file locations are not published in this report due to system security requirements.

When all metadata records have been restored, the superset is loaded into the temporary CSW using the Catalog Manager tool and summary metadata is exported using the NDP export tool. Project metadata identified as being associated with the FEMA Map Mod program are selected from the universe of projects and used as the basis for compiling projects that utilize orthoimagery and topographic data sets that are planned to be used, or in use on FEMAs projects. This data set forms the foundation for Appendix B of the semiannual Geospatial Data Coordination Report.

Step 2 – Retrieve MIP project metadata

Summary level metadata is extracted for each project at the completion of data development tasks and stored in the MIP database. An extract from this database is processed to summarize orthoimagery and topographic data submissions for each project. This data is presented in Appendix C of the semiannual Geospatial Data Coordination Report.

Step 3 – Compile Leverage Data

Leverage, or the approximate dollar value of partner data contributions is compiled from unit-based leverage data stored for each project in the MIP, quarterly CTP leverage reports, and estimated for projects with known orthoimagery or topographic data that has not been tracked by the MIP or CTP leverage reports. Leverage data is rolled up for each of FEMAs regions and presented in Appendix A of the semiannual Geospatial Data Coordination Report. The value of orthoimagery data is specified in FEMA's Blue Book for estimating the value of partner contributions to flood mapping projects. Topographic data contribution values vary based upon data set resolution and leverage values are calculated as follows:

Low Resolution – contour interval > 3 m, or 10'

Medium Resolution – Contour interval = 1.5 m – 3 m, or 5'-10'

High Resolution – contour interval < 1.5 m, or 5' (typically includes LiDAR data collection).

Monthly ad-hoc leverage reports are compared to project metadata lists compiled from Steps 1 & 2 and used as the basis for computing a unit-based leverage value for each project where leverage information has been recorded in the MIP. For projects where no leverage information is available

from the MIP, the leverage value is estimated based upon a percentage of the project area that represents the floodplain.

Leverage for base map acquisition and topographic data development that is reported from CTPs is also included in Appendix A of the semiannual Geospatial Data Coordination Report. CTP leverage is compared to project-level leverage contribution values so that leverage for projects is not computed twice if already accounted for in the CTP leverage contributions.

3.6 Provide for Communication among Geospatial Components of the Program

This activity maintains the capability to broadcast electronic mail messages among the geospatial components of the Flood Map Modernization Program.

Task: Maintain a list of electronic mail addresses for, and provide the capability to send messages to, the geospatial components of the program, including the geospatial leads for FEMA's headquarters and regions, Mapping On Demand's National Service Provider and Regional Management Centers, and mapping partners.

Resources: Electronic mail addresses provided by the participating organizations and technical means provided by the Mapping On Demand's National Service Provider.

Anticipated outcome: Capability to transmit messages about geospatial coordination among participants.

Responsible organization: Geospatial Data Coordination and Standardization Team

3.7 Maintain Awareness of Geospatial Activities

This activity provides for the Geospatial Data Coordination and Standardization Team and Regional Management Centers to participate in national (for the team) and national, state, or regional (for the centers) coordination activities. The purpose of this participation is to maintain awareness of geospatial activities of other organizations that might affect the progress of the Flood Map Modernization Program. Examples of national activities include meetings of the National Digital Elevation Program, the National Digital Orthophoto Program, the Federal Geographic Data Committee, and the National States Geographic Information Council, and their component structures. Examples of state or regional activities include meetings of state geographic information system coordination groups and their component structures.

This activity is pursued as resources allow and as agendas of meetings match the interests of the Flood Map Modernization Program.

Task: Participate in meetings of national, state, or regional geospatial coordination conferences and meetings.

Resources: Publicly-available information about the schedule and agendas of conferences and meetings.

Anticipated outcome: Brief report of decisions or findings from an event is provided to the Geospatial Data Coordination and Standardization Team for further dissemination as appropriate.

Responsible organization: Geospatial Data Coordination and Standardization Team and Regional Management Centers

4 References

Federal Geographic Data Committee, 1998a, Geospatial positioning accuracy standards, Part 3, National standard for spatial data accuracy (FGDC-STD-007.3-1998): Reston, Va., Federal Geographic Data Committee, 28 pp. (Available through <http://www.fgdc.gov/standards/projects/FGDC-standards-projects/accuracy/part3/chapter3>) (Accessed September 5, 2006)

Federal Geographic Data Committee, 1998b, Content standard for digital geospatial metadata (FGDC-STD-001-1998): Reston, Va, Federal Geographic Data Committee, 90 pp. (Available through <http://www.fgdc.gov/standards/projects/FGDC-standards-projects/metadata/base-metadata/v2_0698.pdf>) (Accessed September 19, 2006)

Federal Geographic Data Committee, 2006 (August 29), Geospatial metadata standards <http://www.fgdc.gov/metadata/geospatial-metadata-standards>. (Accessed September 12, 2006)

Maurstad, David, to Regional Flood Insurance and Mitigation Division Directors and Risk Identification Branch Staff, 2005 (August 23), Memorandum regarding geospatial data coordination policy: Washington, U.S. Department of Homeland Security, Federal Emergency Management Agency, 5 pp. (Available through <https://hazards.fema.gov/femaportal/docs/GeoDataCoord.pdf>) (Accessed August 30, 2006)

National Digital Elevation Program (NDEP), 2006a (July 31), NDEP project tracking system. (Available through the NDEP web site at <http://www.ndep.gov/>; follow the link Project Tracking) . (Accessed September 19, 2006).

National Digital Elevation Program (NDEP), 2006b (July), NDEP project tracking system quick reference guide: Washington, Federal Emergency Management Agency, 18 pp. (Available through <http://hazards.fema.gov/metadata/NDEP/doc/ndepquickref.pdf>. (Accessed September 19, 2006)

National Digital Orthophoto Program (NDOP), 2006a (July 31), NDOP project tracking system. (Available through the NDOP web site at <http://www.ndop.gov/>; follow the link Project Tracking). (Accessed September 19, 2006)

National Digital Orthophoto Program (NDOP), 2006b (July), NDOP project tracking system quick reference guide: Washington, Federal Emergency Management Agency, 19 pp. (Available through <http://hazards.fema.gov/metadata/NDOP/doc/ndopquickref.pdf>. (Accessed September 19, 2006)

National States Geographic Information Council, 2006 (March 6), Ramona GIS inventory system (version 2): Bel Air, Md., National States Geographic Information Council, 2 pp. (Available through <http://www.nsgic.org/hottopics/ramona_announcement.pdf>. (Accessed September 21, 2006)

Roche, Sean, 2006 (June 8), FW: NDEP&NDOP updates for FY06 projects, E-mail and attachments to Barbara Hayes and others.

U.S. Department of Agriculture, Forest Service, 2005 (March 2), Regional areas of the Forest Service <http://www.fs.fed.us/contactus/regions.shtml>. (Accessed September 19, 2006)

U.S. Department of Commerce, Census Bureau, 2005 (December 27), U.S. Census Bureau regional offices <http://www.census.gov/field/www/>. (Accessed September 19, 2006)

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Geodetic Survey (NGS), 2006 (June 5), NGS geodetic advisors <http://www.ngs.noaa.gov/ADVISORS/AdvisorsIndex.shtml>. (Accessed September 22, 2006)

U.S. Department of Defense, U.S. Army Corps of Engineers, 2002 (January 17), Where we are <http://www.usace.army.mil/divdistmap.html>. (Accessed September 19, 2006)

U.S. Department of Defense, U.S. Army Corps of Engineers, 2005 (June), Civil works activities wall map <http://www.tec.army.mil/research/products/wall_map.html>. (Accessed September 22, 2006)

U.S. Department of Defense, U.S. Army Corps of Engineers, 2006 (May 19), Joint airborne LIDAR bathymetry technical center of expertise (JALBTCX) <http://shoals.sam.usace.army.mil/>. (Accessed September 22, 2006)

U.S. Department of Homeland Security, Federal Emergency Management Agency, 2003 (April) (individual sections have various dates), Guidelines and specifications for flood hazard mapping partners: Washington, Federal Emergency Management Agency. (Available through <http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm>) (Accessed August 30, 2006)

U.S. Department of Homeland Security, Federal Emergency Management Agency, 2006a (September 12), NFIP metadata profiles. (Available through the Mapping Information Platform web site at <https://hazards.fema.gov>; follow the links Tools & Links and then Metadata Profiles.) (Accessed September 12, 2006)

U.S. Department of Homeland Security, Federal Emergency Management Agency, 2006b, Template for cooperating technical partners mapping activity statement and statement of work for IDIQs [indefinite delivery indefinite quantity contractors] and OFAs [other federal agencies] (version 4): Washington, Federal Emergency Management Agency, 56 pp.

U.S. Department of Homeland Security, Federal Emergency Management Agency, 2006c, Scoping Guidelines: Pre-Scoping and the Scoping Meeting (version 1.0, September 28 draft): Washington, Federal Emergency Management Agency, 65 pp.

U.S. Department of Homeland Security, Federal Emergency Management Agency, 2006d (September), Estimating the value of partner contributions: a blue book (Version 1.0, draft): Washington, Federal Emergency Management Agency, 11 pp.

U.S. Department of Homeland Security, Federal Emergency Management Agency, 2006e (May 5), Multi-year flood hazard identification plan (MHIP). (Available through <http://www.fema.gov/plan/prevent/fhm/mh_main.shtm>). (Accessed September 22, 2006)

U.S. Department of Homeland Security, Federal Emergency Management Agency, 2006f (March 21), Regional contacts <http://www.fema.gov/about/contact/regions.shtm>. (Accessed September 19, 2006)

U.S. Department of the Interior, Bureau of Land Management, 2005a (November 15), Geographic coordinate data base <http://www.blm.gov/gcdb/>. (Accessed February 6, 2007)

U.S. Department of the Interior, U.S. Geological Survey, 2005b (September), Geodata.gov: U.S. maps and data: Reston, Va: U.S. Geological Survey, 2 pp. (Available from <http://www.usgs.gov/ngpo/documents/Geodata-2s.pdf>.) (Accessed September 22, 2006)

U.S. Department of the Interior, U.S. Geological Survey, 2005c (October 18), USGS geospatial liaisons <http://nmcatalog.usgs.gov/crreps/faces/crreps.jspx>. (Accessed September 22, 2006)

U.S. Department of the Interior, U.S. Geological Survey, 2006 (March 13), The Public Land Survey System (PLSS) *in* The National Atlas of the United States of America <http://nationalatlas.gov/articles/boundaries/a_plss.html>. (Accessed September 6, 2006)

U.S. Environmental Protection Agency, 2006 (September 6), Regions <http://www.epa.gov/epahome/locate2.htm>. (Accessed September 20, 2006)

U.S. Executive Office of the President, Office of Management and Budget, undated, Geospatial One–Stop <http://www.whitehouse.gov/omb/egov/c-2-1-geo.html>. (Accessed September 22, 2006)

U.S. Executive Office of the President, The President, 1994 (April 11), Coordinating geographic data acquisition and access: the National Spatial Data Infrastructure (Executive Order 12906): Washington, U.S. Executive Office of the President. (Available through the National Archives and Records Administration web site at <http://www.archives.gov/federal-register/executive-orders/pdf/12906.pdf>). (Accessed September 22, 2006)

U.S. Executive Office of the President, Office of Management and Budget, 2002 (August 19), Coordination of geographic information and related spatial data activities (revised

Circular A-16): Washington, Office of Management and Budget. (Available from <http://www.whitehouse.gov/omb/circulars/a016/a016_rev.html#2b2>) (Accessed September 26, 2006)

U.S. Executive Office of the President, Office of Management and Budget, 2006a (June), Summary of requirements (Section 25) <http://www.whitehouse.gov/omb/circulars/a11/current_year/s25.pdf>, 10 pp. *available through* U.S. Executive Office of the President, Office of Management and Budget, 2006, Table of contents for Circular No. A-11 (2006) <http://www.whitehouse.gov/omb/circulars/a11/current_year/a11_toc.html>. (Accessed September 22, 2006)

U.S. Executive Office of the President, Office of Management and Budget, 2006b, Reporting requirements for geospatial data investments <http://www.whitehouse.gov/omb/circulars/a11/current_year/geospatial.pdf>. (Accessed September 22, 2006)

Appendix A. Geospatial Coordination Leads

(This list is current as of March 8, 2007. For changes made after this date see the Federal and state contacts listed by state, which are available on the MIP web site at <https://hazards.fema.gov/contacts/statecontacts/contacts.asp?page=xx>, where "xx" is the two-letter postal abbreviation for the state. For example, the web address for contacts for Alabama (abbreviation "AL") is <https://hazards.fema.gov/contacts/statecontacts/contacts.asp?page=AL>.)

National

Federal Emergency Management Agency

Paul Rooney
(617) 832-4719
Paul.Rooney@dhs.gov

Scott McAfee
(510) 627-7113
Scott.Mcafee@dhs.gov

Mapping on Demand (MOD) Geospatial Data Coordination and Standardization Team

Jerry McCarty, National Geospatial Data Coordinator
(703) 960-8800 ext. 3115
Jerry.Mccarty@mapmodteam.com

Michael Domaratz, Technical Advisor
(703) 317-6269
Mike.Domaratz@mapmodteam.com

Regional

Region	Federal Emergency Management Agency	MOD Regional Management Center
I	Kerry Casserly (617) 956-7576 Kerry.Casserly@dhs.gov	Jeff Burm (617) 482-4930 ext. 4752 Jeff.Burm@mapmodteam.com
II	Brian Shumon (212) 680-3631 Brian.Shumon@dhs.gov	Michael Crino (718) 482-9945 Michael.Crino@mapmodteam.com
III	Vanessa Glynn-Linaris (215) 931-5723 Vanessa.Glynn-Linaris@dhs.gov	Steve Eberbach (215) 446-5191 Steve.Eberbach@mapmodteam.com
IV	Bruce Buckerfield (770) 220-5397 Bruce.Buckerfield@dhs.gov	David Lloyd-Davis (678) 459-1033 David.Lloyd-Davis@mapmodteam.com
V	Lee Treager (312) 408-5538 Lee.Treager@dhs.gov	Hans Anderson (312) 575-3927 Hans.Anderson@mapmodteam.com

Region	Federal Emergency Management Agency	MOD Regional Management Center
VI	Timothy (Scott) Eller (940) 898-5266 Scott.Eller@dhs.gov	Julie Vicars (940) 783-4120 Julie.Vicars@mapmodteam.com
VII	Robert Franke (816) 283-7073 Bob.Franke@dhs.gov	Shaun Fortuna (816) 502-9420 ext. 4979 Shaun.Fortuna@mapmodteam.com
VIII	Douglas Bausch (303) 235-4859 Douglas.Bausch@dhs.gov	Michael Garner (720) 514-1105 Mike.Garner@mapmodteam.com
IX	Eric Simmons (510) 627-7029 Eric.Simmons@dhs.gov	Xing Liu (510) 879-0955 Xing.Liu@mapmodteam.com
X	Nick Delmedico (425) 487-4626 Nicholas.Delmedico@dhs.gov	Oren Gruber (703) 243-0938 Oren.Gruber@mapmodteam.com

Figure 16. Location of FEMA Regions and Regional headquarters. Each Regional Management Center is located near its corresponding FEMA regional headquarters. (U.S. Department of Homeland Security, 2006f)

Appendix B. Mapping Activity Statement and Statement of Work Template (current version)

This appendix is an excerpt of the template for draft mapping activity statements and statements of work (U.S. Department of Homeland Security, 2006b). The excerpts include the sections for which there is a strong role for geospatial data coordination. Places where text was deleted are marked with the phrase *[Text deleted]* and in some cases ellipses (…). The draft updated text more clearly identifies the responsibilities for carrying out coordination activities described in the Implementation Guide and should find their way into future versions of the template.

This appendix is provided for information purposes only. Be sure to obtain the current version of the template for authoritative text. The current Mapping Activity Statement (MAS) template can be downloaded from the Mapping Information Platform (MIP) at http://www.fema.gov/library/viewRecord.do?id=2190.

Section 1—Objective and Scope

The objective of the Flood Map Project documented in this {MAS or SOW} is to develop a Digital Flood Insurance Rate Map (DFIRM) and Flood Insurance Study (FIS) report for {insert name of community(ies) or county}. The DFIRM and FIS report will be produced in the FEMA {countywide or community-based} format. . (Refer to Procedure Memorandum 41.)

{If the {CTP, IDIQ, OFA} is not responsible for Scoping, mapping needs assessment and data gathering delete the following sentence} Existing Geographic Information System (GIS) data and study needs for the community will be researched, obtained, organized, and provided in accordance with the Scoping Activity and data coordination procedures set forth in FEMA's Geospatial Data Coordination Policy and Geospatial Data Coordination Implementation Guide. {If the {CTP, IDIQ, OFA} is not going to conduct Scoping Tasks as described in the *Guidelines and Specifications for Flood Hazard Mapping Partners* delete the following sentence} Scoping will be necessary to determine the final scope of work for this project.

[Text deleted]

FEMA will be providing download/upload capability for intermediate data submittals through the MIP. Data submittals uploaded via the MIP will include the same data required prior to the existence of the MIP, with the addition of Metadata profiles required for search and retrieve capabilities. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded digital data in order to facilitate proper cataloging of the data for search and retrieve capabilities within the MIP. The metadata profile should be obtained from FEMA or its contractor to assure compliance.

Metadata profiles are to be included with the appropriate geospatial activities and they must satisfy the Data Capture Standards, as appropriate. The metadata profiles are available from FEMA. The NFIP Metadata Profiles follow the Federal Geographic Data Committee Content Standard for Digital Geospatial Metadata, but define some specific domains and business rules to make the metadata more useful to FEMA and its mapping partners.

Scoping

Responsible Mapping Partner: {Insert name of SC, CTC, or MCC responsible for this task}

Scope: This task involves collecting data from a variety of sources including community surveys, other Federal and State agencies, National Flood Insurance Program (NFIP) State Coordinators, Community Assistance Visits (CAVs), and FEMA archives. {Insert name of SC, CTC, or MCC responsible for this task}will evaluate the effective FIS report and Flood Insurance Rate Maps (FIRMs) to see if it needs to be updated. Lists of mapping needs will be obtained from the WISE Scoping Tool, MNUSS database, community surveys, and CAVs, if available.

Data collection will include obtaining the best available base map materials (corporate limits, roads, orthophotos, etc) along with stream centerline files. The acquired data will be imported into the Scoping Tool and used during the Scoping Task. …

[Text deleted]

Preliminary Research Activities can be separated into two categories—researching effective information and researching available data for the Flood Map Project. The following tasks shall be completed to research effective information: inventory the FEMA archives for effective FIRM panels, Flood Boundary Floodway Map (FBFM) panels, FIS reports, and other flood hazard data or existing study data; summarize the information in the WISE Scoping Tool and/or MNUSS database; summarize contiguous community agreement checks; review CAV and Community Assistance Contact files; and develop a "scoping map" and an overview of the results of the research.

For researching of available data for the Flood Map Project, {Insert name of SC, CTC, or MCC responsible for this task} should follow the FEMA Geospatial Data Coordination Policy and Implementation Guide.

{Insert name of SC, CTC, or MCC responsible for this task}will coordinate, setup, and hold the Scoping Meeting. This includes identifying a time, place, and participants. The purpose of this meeting is to present the current information to the local officials (State, county, and municipal) and coordinate on prioritization and identification of study areas. {Insert name of SC, CTC, or MCC responsible for this task}shall be responsible for compiling the necessary information for the meeting. These items may include: the FIS and FIRM for affected communities; United States Geological Survey quads for the study area; best available community base map(s); effective FIRM

summary; Available Data Inventory; Scoping Map; Scoping Meeting Agenda/Minutes form; Aerial photos/topographic mapping, if available; existing drainage studies or other H&H data; Community Master Plan(s)/Drainage Master Plan(s); Zoning Maps; Street Maps; As-built plans; and Floodplain Ordinance(s).

The project management team shall review the initial mapping needs list, review the research findings, and make selections of proposed methods for obtaining/producing flood data. Any additions or changes to the needs list shall be discussed with all members. All needs shall also be prioritized. …

[Text deleted]

Based on the discussion of mapping needs, {Insert name of SC, CTC, or MCC responsible for this task}and the FEMA Project Officer will finalize the areas to be included in the project (based on recommendations provided by the Project Management Team). Areas to be studied by detailed, limited detail, and approximate methods shall be identified. The following issues will be discussed and refined: Review and Refinement of Flood Hazard Identification Methodologies, Review of Proposed Paneling Scheme, Review and Refinement of Base and Topographic Map Source, and Finalization of Map Production and Database Options.

[Text deleted]

Standards: All Scoping work shall be performed in accordance with the standards specified in Section 5 - Standards.

<Add, modify or delete deliverables below, as necessary>

Deliverables:

- The Final Scoping with all of the components as laid out in the attached "Partner Flood Map Modernization Program Scoping Report" template in Appendix A, or an approved alternate, will be delivered in accordance with the schedule outlined in Section 6 - Schedule to the Regional Project Officer for approval.
- QA/QC Plan for the review of the mapping project outlined in this {MAS/SOW}. This will include the checklists developed for that review in accordance with the schedule included in Section 6 - Schedule.
- MNUSS and the WISE Scoping Tool (optional) population. (The MIP Scoping Tool is strongly recommended to be used during the scoping process, populated with data, and uploaded to the MIP. See Procedure Memorandum 35)
- National Digital Orthophoto Program and National Digital Elevation Program Tracking System Documentation. Where non-Federal orthoimagery or topographic data sets are discovered during scoping or when the planned scope for the project includes production of new orthoimagery or topographic data, information about the data sets must be entered into

the appropriate tracking system consistent with the FEMA Geospatial Data Coordination Policy.

[Text deleted]

Topographic Data Development

Responsible Mapping Partner: {Insert name of SC, CTC, or MCC responsible for this task}

Scope: To supplement the field surveys conducted under this {MAS/SOW}, {Insert responsible party} shall obtain additional topographic data of the overbank areas of the flooding sources studied to delineate floodplain boundaries and extend surveyed channel cross sections. {Insert responsible party} shall gather information on what topographic data is available for the given community and what accuracy and currency it meets. {Insert responsible party} shall use this topographic data that is better than that of the original study. In coordination with the partner who performed scoping, insure that the FEMA Geospatial Data Coordination Policy and Implementation Guide are followed. {If necessary, describe additional steps that may need to be taken to use the available data.}

<Optional Paragraph, as appropriate> Because there is no new topographic data available that can be used and it is demonstrated that there is a need during the Scoping phase, with approval from the Regional Project Officer, {Insert responsible party} shall generate new topographic data for {insert flooding souce(s)} using {Insert method for collecting additional topopgrahic data}. {Insert responsible party} also shall coordinate with other team members conducting field surveys. Contour interval and/or accuracy for the topographic data shall be selected based on the current FEMA requirements as documented in *Guidelines and Specifications for Flood Hazard Mapping Partners*. No FEMA funds shall be expended on new topographic data unless prior approval is given by the Regional Project Officer after analyzing the request submitted at the end of the scoping period.

<Add additional details regarding the scope of this task, as appropriate>For this activity, {Insert responsible party} also shall develop topographic maps and/or Digital Elevation Models for the subject flooding sources using the data collected under this Topographic Data Development process and via field surveys. In addition, {insert responsible party} shall address all concerns or questions regarding the topographic data development that are raised by {Insert responsible party} during the independent QA/QC review. {Insert responsible party} should confirm with the appropriate FEMA Regional Engineer the automated H&H software proposed to be used.

<Add additional details regarding the scope of this task, as appropriate>

Standards: All Topographic Data Development work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, {Insert responsible party} shall make the following products available to FEMA by uploading the digital data to the MIP so that {Insert name of Mapping Partner responsible for Independent QA/QC} can access it for an independent QA/QC review in accordance with the schedule outlined in Section 6. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded Appendix N compliant digital data. Additionally, the Technical Support Data Notebook (TSDN) format described in Appendix M of Guidelines and Specifications for Flood Hazard Mapping Partners must be delivered in accordance with Section 2 - Technical and Administrative Support Data Submittal.

The MIP shall be updated for status reporting not less than prescribed {Insert interval of reporting requirements} periods and when the activity is complete. The MIP should also be populated with appropriate leverage information regarding who paid for the topographic data and the amount of data used by the Flood Map Project. Where paper documentation is required by State Law for Professional certifications, you may submit the paper in addition to a scanned version of the paper for the digital record.

<Add, modify or delete deliverables below, as necessary>

- Digital topographic maps;
- Report summarizing methodology and results;
- Mass points and breaklines data;
- Digital work maps with contours;
- Checkpoint analyses to assess the accuracy of data, including Root Mean Square Error calculations to support vertical accuracy;
- Identification of remote-sensing data voids and methods used to supplement data voids;
- National Geodetic Survey data sheets for Network Control Points used to control remote-sensing and ground surveys;
- Metadata file complying with the NFIP Metadata Profiles Specifications;
- Documentation of the Datum;
- Format Terrain Database or Data Delivery consistent with the Data Capture Standards–Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan.

Appendix M and Appendix N may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

[Text deleted]

Base Map Acquisition

Responsible Mapping Partner: {Insert name of SC, CTC, or MCC responsible for this task}

Scope: Base Map Acquisition consists of obtaining the digital base map, {specify which one}, for the project and as necessary, preparing the base map for use. {Insert name of SC, CTC, or MCC responsible for this task}shall provide the digital base map. The required activities are as follows:

<Add, modify or delete tasks below, as necessary>

- Obtain digital files (raster or vector) of the base map. In coordination with the partner who performed scoping, insure that the FEMA Geospatial Data Coordination Policy and Implementation Guide are followed.
- Secure necessary permissions from the map source to allow FEMA's use and distribution of hardcopy and digital map products using the digital base map, free of charge.
- Certify that the digital data meets the minimum standards and specifications that FEMA requires for DFIRM production.

Standards: All Base Map Acquisition work shall be performed in accordance with the standards specified in Section 5 - Standards. The Data Capture Standards must be met for this deliverable to be acceptable.

Deliverables: In accordance with the *Guidelines and Specifications for Flood Hazard Mapping Partners* (Volume 1, Appendix K and Appendix L), {Insert responsible party} shall make the following products available to FEMA by uploading the digital data to the MIP so that {Insert name of Mapping Partner responsible for Independent QA/QC} can access it for an independent QA/QC review in accordance with the schedule outlined in Section 6. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded digital data. Additionally, the Technical Support Data Notebook (TSDN) format described in Appendix M of Guidelines and Specifications for Flood Hazard Mapping Partners must be delivered in accordance with Section 2 - Technical and Administrative Support Data Submittal.

The MIP shall be updated for status reporting not less than prescribed {Insert interval of reporting requirements} periods and when the activity is complete. The MIP should also be populated with appropriate leverage information regarding who paid for the base map data and the amount of data used by the Flood Map Project.

<Add, modify or delete deliverables below, as necessary>

- Written certification that the digital data meet the minimum standards and specifications;
- Documentation that FEMA can use the digital base map; and
- Documentation of the Datum, if appropriate.

The *Guidelines and Specifications for Flood Hazard Mapping Partners* may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

[Text deleted]

Section 2—Technical and Administrative Support Data Submittal

The Project Team members for this Flood Map Project that have responsibilities for activities included in this {MAS/SOW} shall comply with the data submittal requirements summarized below.

All supporting documentation for the activities in this MAS shall be submitted in the TSDN format in accordance with Appendix M of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners*, dated April 2003. Appendix M may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/pdf/fhm/frm_gsam.pdf. Table 2-1 indicates the sections of the TSDN that apply to each mapping activity.

If any issues arise that could affect the completion of an activity within the proposed scope or budget, the responsible Mapping Partner shall complete a Special Problem Report (SPR) as soon as possible after the issue is identified and submitted to FEMA. The SPR is to describe the issue and propose possible resolutions. (For additional information on SPRs, refer to Appendix M, Subsection M.2.1.1 of *Guidelines and Specifications for Flood Hazard Mapping Partners*.)

<Include only those tasks listed below that apply to this mapping project>

Table 2-1. Mapping activities and applicable TSDN sections (excerpt)

TSDN Section	Mapping Activities		
	Scoping	Topo Data	Base Map
General Documentation			
Special Problem Reports	X	X	X
Telephone Conversation Reports	X	X	X
Meeting Minutes/ Reports	X	X	X
General Correspondence	X	X	X
Mapping Information	X	X	
Miscellaneous Reference Information	X	X	X

[Text deleted]

Section 4—Funding/Leverage (For CTP, OFA, and/or Community)

FEMA is providing funding, in the amount of {Insert responsible party}, to {Insert Partner name}for the completion of this Flood Map Project. {Insert Partner name} shall provide any additional resources required to complete the assigned activities for this Flood Map Project. During the scoping process, additional needs may be identified. Activities associated with any additional needs would be performed based on availability of additional funds. The CTP Leverage listed below includes in-kind services and blue book values for acquired information (i.e. base map data, hydrologic and hydraulic analyses, etc.). These values should also be reported on the MIP. More detailed leverage information will be determined during the detailed scoping process and reported back to FEMA at that time.

Funding for Project/Partner Name	FEMA Contribution	Partner Contribution	% Leverage	Total Project Cost
TOTAL FUNDING AMOUNTS	$	$	%	$

The FEMA funds identified above are available to be used for the activities included in Table 4.1.

Section 4 (alternate)—Funding (For IDIQ, OFA)

FEMA is providing funding, in the amount of {Insert amount of funding provided by FEMA through an IDIQ Contract and Task Order}, to {Insert Mapping Partner Name} for the completion of this Flood Map Project. The FEMA funds identified above are available to be used for the activities included in Table 4-1.

Table 4-1 FEMA funds identified above are available to be used for the following activities (excerpt)*

*<Include only those tasks listed below that apply to this mapping project>

Activities	Fundable?
Scoping	Yes, up to 10 percent of total cost
Topographic Data Development	No, unless approval given during scoping phase by Regional Project Officer

Activities	Fundable?
Base Map Acquisition	No, unless approval is given by the Regional Project Officer for base map preparation tasks only.

*This table is for information purposes only.

Section 5—Standards

The standards relevant to this MAS are provided in Tables 5-1 and 5-2. Information on the correct volume, appendix, section, or subsection of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* to be referenced for each mapping activity are summarized in Table 5-2 for convenience. However, all mapping partners working on a Flood Map Project are responsible for complying will all appropriate requirements in the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* and related Procedure Memoranda published by FEMA as of the date of this agreement.

These guidelines may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm.

Table 5-1. Applicable standards for project activities (excerpt)

	Activities		
Applicable Standards	Scoping	Topo Data	Base Map
Guidelines and Specifications for Flood Hazard Mapping Partners, April 2003	X	X	X
American Congress on Surveying and Mapping Procedures	X	X	
FEMA's Geospatial Data Coordination Policy, August 2005	X	X	X
FEMA's Geospatial Data Coordination Implementation Guide, January 2008	X	X	X
Global Positioning System (GPS) Surveys: National Geodetic Survey (NGS-58), "Guidelines for Establishing GPS-Derived Ellipsoid Heights," November 1997	X	X	
Engineer Manual 1110-1-1000, *Photogrammetric Mapping* (USACE), July 1, 2002	X	X	
Engineer Manual 1110-2-1003, *Hydrographic Surveys* (USACE), January 1, 2002	X		
"Numerical Models Accepted by FEMA for NFIP Usage," Updated April 2003	X		

Applicable Standards	Activities		
	Scoping	Topo Data	Base Map
NFIP Metadata Profile Specifications, April 2006	X	X	X
Document Control Procedures Manual, December 2000	X		
44 Code of Federal Regulations Part 66 and 67	X		

Table 5-2. Project Activities and Applicable Portions of FEMA *Guidelines and Specifications* (excerpt)

Activity Description	Applicable Volume, Section/Subsection, and Appendix
Scoping	Volume 1, Section 1.3, Appendix I, Scoping Report document attached in Appendix A to this Mapping Activity Statement; 44 Code of Federal Regulations Part 66 and 67
Topographic Data Development	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1) Appendix A Appendices N and M
Base Map Acquisition and Preparation	Volume 1, Section 1.3 (specifically Subsection 1.3.1.8) and 1.4 (specifically Subsections 1.4.3.1 and 1.4.3.2) Appendix A, Section A.1 (specifically Subsection A.1.1) Appendices K, L, and M

[Text deleted]

Section 6—Certifications

Field Surveys and Topographic Data Development

A Registered Professional Engineer or Licensed Land Surveyor shall provide an accuracy statement for field surveys and/or topographic data used and shall certify these data meet the accuracy statement provided. Data accuracy should be stated using the Federal Geographic Data Committee National Standards for Spatial Data Accuracy (NSSDA), but ASPRS accuracy reporting standards are acceptable.

Base Map Acquisition and Preparation

- A community official or responsible party shall provide written certification that the digital data meet FEMA minimum standards and specifications.
- The responsible Mapping Partner shall provide documentation that the digital base map can be used by FEMA. Please note that uploading base map data to the MIP does not constitute agreement that the digital base map can be used by FEMA. Documentation that the digital base map can be used by FEMA is still required.

Certifications must be made at the time the intermediate data is submitted. For example, if hydrologic data is submitted, certification will be required at the time it is submitted.

[Text deleted]

Section 7—Technical Assistance and Resources

[Text deleted]

Project Team members also may consult with the FEMA Regional Project Officer to request support in the areas of selection of data sources, digital data accuracy standards, assessment of vertical data accuracy, data collection methods or subcontractors, and GIS-based engineering and modeling training.

[Remaining text deleted]

Appendix C. Summary of Base Map and Elevation Data and Related Metadata

Geospatial data coordination focuses on requirements for base map and elevation data. The following section provides a summary of specifications for these data. More detailed specifications can be found in the G&S, especially Volume 1 and appendices A, B, I, K, L, and N through the web site at <http://www.fema.gov/plan/prevent/fhm/gs_main.shtm> (U.S. Department of Homeland Security, 2003). Additional information about metadata specifications can be found through the Mapping Information Platform web site; start at <https://hazards.fema.gov> and follow the links Tools & Links and then Metadata Profiles (U.S. Department of Homeland Security, 2006a).

Base Map Data

A base map is a planimetric map that shows the georeferenced location of geographic features. These features include roads and railroads, streams and lakes, boundaries, other geographic features, and related names and labels.

Every flood insurance study must have a base map. The base map helps flood map users understand the location of flood risks in relation to geographic features they encounter everyday in their communities.

The characteristics of data used for base maps may vary among studies as long as the data fulfill the role of a base map. At a minimum, the final base map data must:

- Provide a reasonably useful representation of important features on the ground (for example, roads, railroads, and hydrography), especially for areas of significance for flooding. Data created, updated, or checked within the last seven years is preferred, although older data can be used if the area has not changed substantially since the data were created and the data provide reasonable locational reference information and do not confuse potential map users.
- Have a horizontal radial accuracy ($Accuracy_r$) better than or equal to 38 feet (11.58 meters) as measured using the National Standard for Spatial Data Accuracy (Federal Geographic Data Committee, 1998a). (Under the old National Map Accuracy Standard, this measure equates to maps of scales larger than or equal to 1:12,000.) FEMA adopted this accuracy requirement in 1988.
- Be sent by the data source within 30 days of FEMA's request for the data.
- Be provided with permission from the source to allow FEMA's use and distribution of hardcopy and digital map products free of charge.
- Cover the entire study area.

The preferred horizontal datum is the North American Datum of 1983 (NAD 83). New data funded in whole or in part by FEMA must be provided on this datum. Data provided by partners can be in the North American Datum of 1927 (NAD 27) if the data can be cost-effectively transformed to NAD 83 for final flood map products.

It is important to remember that there must be no restrictions on FEMA's use or redistribution of base map data. The base map data must accompany the flood risk data when distributed to the public, and so FEMA needs to be able to distribute the base map freely. Distribution methods include, but are not limited to, incorporating an image of the base map data as part of printed flood maps, distributing digital base map data with other digital flood data online and on media, and displaying digital base map data on the web with other flood data. FEMA also participates in interagency exchanges of base map data.

Starting Point for a Base Map: Vector and Raster Options

The starting point for a base map is the portrayal of transportation (for example, roads, railroads, and airports) and hydrographic (for example, streams and lakes) features. Two types of geospatial data can be used as the starting point for transportation and hydrographic features: vector data or raster data.

Vector data use lines to depict geographic features such as roads, railroads, streams, and boundaries. Vector base map data must contain the alignments of all transportation features (for example, roads (travelways intended for use by motorized vehicles), railroads, and airports). These data also must include hydrography.

Raster data use a picture to depict geographic features. The typical raster base map is a digital orthophoto. Orthophotos depict the location of features using aerial photographs. These photographs are specially processed, or orthorectified, so that positions on the image are accurately georeferenced. For flood hazard maps, orthophotos are used to provide the location of transportation and hydrographic features (only).

The orthophoto data must provide a useful image of the ground:

- Have a ground-sample distance (resolution) of one meter or finer.
- Have a minimum image radiometry of 256 gray levels.
- Provide a clear view of important features on the ground for areas of significance for flooding. Leaf-off, cloud-free imagery is preferred, although the canopy of deciduous vegetation and a small amount of cloud cover is tolerated if features in areas of significance for flooding are not obscured. Different spectral bands (such as near infrared) can be used if the resulting image is usable as a base map for flood data.

One-meter resolution Digital Orthophoto Quarterquadrangles (DOQQs) from the U.S. Geological Survey meet (and often exceed) the minimum criteria for a base map. Several States, especially in

the northeast and midwest, have statewide orthophoto programs that yield data that exceed the minimum criteria.

A second (and rare) type of raster base map is a picture of a map. Such data look like a scanned image of a paper map, although they are created directly from vector data. Such a base map is an option if a source of vector transportation data refuses to permit FEMA to redistribute the vector data, but accepts a compromise in which FEMA receives vector transportation data and converts them to a raster map image that will serve as the base map in place of the vector data.

If a study uses either type of raster data as a starting point for its base map, it also must have vector data for hydrography. Hydrographic data are employed in other roles in a study than that of providing a base map.

Mapping partners have the option of using either a vector or raster data as the starting point. An advantage of vector data is that the file sizes typically are small, they can have associated attribute data like geographic names, and they are cheaper to use when the flood map is printed. Note, however, that the preference of the community, the accuracy of available base map data, and the degree of difficulty in using the proposed base map data in flood map production must be taken into account before making the final choice of the data to be used as the base map. The majority of communities are selecting orthophotos as their base map.

If suitable base map data are not available from the community, U.S. Geological Survey/National Digital Orthophoto Program DOQQs are the second choice and the default starting point.

Completing the Base Map

The base map is completed by adding vector data that depict:

- Hydrographic features, including their geographic names
- Other transportation features and names for all transportation features (especially names of roads)
- Boundaries and names of political jurisdictions.
- Boundaries and names of park and forest lands if required for the base map.
- For states included in the Public Land Survey System (see Figure 17), boundaries and numbers of townships and sections if required for the base map.

Figure 17. States included in the Public Land Survey System (PLSS). For some States, the PLSS only covers part of the State. Hawaii, which is not shown on the map, is not included in the PLSS. (U.S. Department of the Interior, 2006)

Note that these data may or may not be required for a flood map for a particular area; check with the study lead for requirements for a particular study. These data can be less accurate than the data that serve as the starting point for the base map, and often are "fit" to the starting point data.

Additional optional content to be obtained if available include:

- Bridges
- Unimproved roads or trails (i.e., those travelways not intended for motorized vehicles or not usually used by motorized vehicles due to width or seasonal conditions)
- Flood-control structures (i.e., levees, dams, weirs, floodwalls, jetties)
- Building footprints
- Parcel outlines or parcel centroids

Elevation Data

Elevation (topographic) data encode the bare-earth elevation of the topography for an area, devoid of vegetation and structures. The data may be organized in a number of forms, including contours, mass points, breaklines, triangulated irregular networks, and digital elevation models (regularly spaced grids).

Typical hydrologic analyses do not require high-accuracy elevation data. USGS digital elevation data may suffice for analyzing and modeling entire watershed. Hydraulic analyses do require high-accuracy data. The study lead must determine the required accuracy based on the risk for each stream reach. For areas of high flood risk, elevation data can be used to create cross sections and reduce the need for new surveys. Such data should have a vertical accuracy ($Accuracy_z$) of 2.4 feet (0.73 meters) measured using the National Standard for Spatial Data Accuracy, equivalent to the

accuracy for four-foot contours assessed using the old National Map Accuracy Standard. In unusually flat areas, elevation data with a higher vertical accuracy of 1.2 feet (0.366 meters) ($Accuracy_z$), equivalent to the accuracy assessed for two-foot contours using the old National Map Accuracy Standard, may be needed.

Costs of new data should be evaluated carefully. In many cases, existing five-foot contours would provide sufficient accuracy or hard copy topographic maps with four-foot (or better) contours could be digitized and used at much lower cost than new data collection. When elevation data of reasonable quality exist, the study lead should assess if they can be used to produce a result nearly the same as that could be provided by newly collected data.

Current methods for developing elevation data include traditional photogrammetry; digital camera photogrammetry (such as multi-angle scanning with a high resolution stereo camera); laser sensors (such as Light Detection and Ranging (LIDAR)); and radar sensors (such as Interferometric Synthetic Aperture Radar (IFSAR)). Missions or systems that use these technologies have different names; some of the more well-known are the Shuttle Radar Topography Mission (SRTM), Geographic Synthetic Aperture Radar (GeoSAR), and ISTAR.[1] Different technologies yield data of different accuracies. Any particular technology or system can have different performance characteristics that vary with different types of terrain, and vegetation and other land cover. Section A.8 of the G&S (U.S. Department of Homeland Security, 2003, Appendix A, pages A-39 though A-56) provides extensive coverage of considerations for LIDAR surveys.

The preferred vertical datum is the North American Vertical Datum of 1988 (NAVD 88). New data funded in whole or in part by FEMA must be provided using this datum.

New elevation data funded in whole or in part by FEMA must allow for unlimited free distribution by FEMA and its partners. FEMA prefers to have these rights for all elevation data used in studies so that it can participate in interagency exchanges of elevation data. Depending on the vendor and their business model, some existing elevation data may have use or distribution restrictions. In cases when existing elevation data are suitable and cost effective for use in a study but are available only with licensing restrictions, they may be used if the restrictions are not too limiting and the use of the data is advantageous to the study.

The data must be sent by the data source within 30 days of FEMA's request for the data.

Metadata

Metadata, or "data about data," provide information about the content, quality, condition, and other characteristics of data. Metadata help an organization manage its data, advertise its data to others

[1] Names of specific systems are provided for descriptive purposes only, and do not represent an endorsement by the United States Government.

through data portals, catalogs, and clearinghouses, and inform recipients of data about correct ways to use the data.

For flood insurance studies, the information content of metadata for geospatial data follow the National Flood Insurance Program (NFIP) metadata profiles. The profiles can be found through the Mapping Information Platform web site; start at <https://hazards.fema.gov> and follow the links Tools & Links and then Metadata Profiles (U.S. Department of Homeland Security, 2006a). FEMA created these profiles (agreed-upon subsets and interpretations of the standard) based on the Federal Geographic Data Committee's Content Standard for Digital Geospatial Metadata (1998b and 2006).

In the early phases of a flood insurance study, participants use metadata provided by data sources to understand the characteristics of available data and evaluate and rank their usefulness to the study. Once base map and elevation data are selected for use in a study, participants enter a very basic set of metadata into the National Digital Orthophoto Program (if orthophotos are used as a base map) and National Digital Elevation Program tracking systems (National Digital Orthophoto Program, 2006a and 2006b and National Digital Elevation Program, 2006a and 2006b) for orthophoto or elevation data obtained from non-Federal sources or to be procured through new collection. Appendix E has more information about the tracking systems.

As geospatial data to be used in a study are received, checked, and accepted, more complete metadata that comply with the appropriate NFIP metadata profile must be completed and provided with the package of data submitted to the Mapping Information Platform. These metadata include information about points of contact, the type of data, the sources of data, the quality, lineage, and processes applied to the data, the coordinate system, the information content, and the transfer media for the data. The mapping partner responsible for selecting the data to be used in a study must have a reasonable idea of all of these characteristics in order to determine the suitability of a candidate set of data for a study.

There must be no restrictions on FEMA's use or redistribution of metadata. The metadata must accompany the flood risk data when distributed to the public, and so FEMA needs to be able to distribute the metadata freely. Distribution methods include, but are not limited to, incorporating information from the metadata in collar information and annotations on printed flood maps, distributing metadata with other digital flood data online and on media, and providing metadata on the web with flood maps. FEMA also participates in interagency exchanges of metadata, and participants can expect the metadata to appear on publicly available data portals and clearinghouses such as Geospatial One–Stop and the National Digital Orthophoto Program and National Digital Elevation Program tracking systems. The metadata also may appear in other applications that acquire data from such portals and clearinghouses, even if FEMA does not participate in these other applications directly.

The best time to collect metadata is when the data are being developed, and it can be very difficult to recover information about the development of a set of data after the fact. Because of this fact and

the requirement that compliant metadata be submitted with other data for the study, participants will benefit greatly from asking data sources to provide compliant metadata with geospatial data supplied for the study, from working with data sources to recover information that has not been recorded, and for requiring vendors to provide compliant metadata for any newly collected data.

Appendix D. FEMA Policies on Procuring New Data

This appendix outlines FEMA's policies for funding new base map and elevation data. These policies reflect the approach FEMA uses to estimate the value of mapping activities contributed by community, tribal, regional, and state agencies described in "Estimating the Value of Partner Contributions: A Blue Book" (U.S. Department of Homeland Security, 2006d).

Policy for New Base Map Data

Generally, the base map used for a flood map is not part of the flood risk assessment process. The base map helps map readers understand the location of the results of the flood insurance study by ensuring that the hazard information is referenced accurately to its real world location. The most important characteristic of the base map is that it is spatially accurate so that features are shown in their correct real world locations.

The policy for FEMA providing funding for new base map data collection as part of a flood insurance study is as follows:

- FEMA will only provide funding when existing base map data are inadequate. If base map data are inadequate, FEMA will provide funding only if the base map data to be procured meet or exceed minimum requirements for content, currentness, accuracy, and NFIP-compliant metadata. (See Appendix C for an overview of minimum content, currentness, and accuracy requirements for data that are adequate and references to more detailed specifications.)
- If FEMA provides funds for new base map data collection, it must have the rights to distribute the resulting base map data without restriction or cost. (Note that FEMA must have such rights to base map data regardless of the source of funds.)
- The maximum amount that FEMA will provide to a community project for the procurement of new base map data is 50 percent of the cost to produce a black-and-white panchromatic orthophoto with a one-meter ground sample distance over a "small" area based on cost estimates from participants in the National Digital Orthophoto Program[1].
- New base map data for which FEMA provides funding must be referenced to the North American Datum of 1983.

Regarding leverage credits to communities, if adequate base map data exist but a community supplies better data, FEMA will provide leverage credit to the community.

[1] In late 2006, the cost was estimated to be $25 per square mile; 50 percent of this amount is $12.50 per square mile.

Policy for New Elevation Data

While many flood insurance studies require new elevation data, the development of these data is only part of the overall study process. FEMA must focus its investment in new elevation data in areas where flood hazard analyses need to be updated, and is not able to support general-purpose data production. Therefore FEMA usually procures elevation data only for the floodplain areas.

The policy for FEMA providing funding for new elevation data collection as part of a flood insurance study is as follows:

- FEMA will only provide funding when existing elevation data are inadequate. In cases where adequate elevation data exist but are not in digital form, FEMA will fund new data collection only if the study participants clearly demonstrate that new data collection is more cost effective than the conversion of the existing data to digital form.
- FEMA will only fund the development of new finished bare earth elevation data in the floodplain. If cost effective, FEMA will consider funding the collection of raw data over a larger area that contains the floodplains (for example, where it is inefficient to fly LIDAR data collection only over the floodplain). The area in such cases must be the smallest rectangle that encloses the floodplains.
- FEMA will only fund data to meet the minimum accuracy required for the study to be performed as outlined in FEMA's flood hazard mapping standards. (See Appendix C for an overview of these requirements and references to more detailed specifications.) This accuracy needed is determined on a reach-by-reach basis during scoping.
- If FEMA funds new elevation data collection in whole or in part, it must have the rights to distribute the resulting elevation data without restriction or cost.
- The cost to FEMA for new ground elevation data collection for a study must be proportionate to the risk to the area to be mapped by the study.
- New elevation data funded by FEMA must be referenced to the North American Vertical Datum of 1988 and have NFIP-compliant metadata.

Regarding leverage credits to communities, the credit is based on the area for which the study requires elevation data. Typically this area is the floodplain and not the entire area for which the community has elevation data

Note that this emphasis on funding elevation data only in floodplains does not preclude FEMA's participation in more ambitious (and more expensive) efforts to collect data for larger areas that include the floodplains. For example, FEMA can partner with a community that seeks elevation data for its entire jurisdiction. Funding from the study defrays the cost to the community's expenses. The community gains many benefits from the new data beyond those of updated flood maps, and the study gets the data needed for the project. Such an arrangement allocates the costs of projects in proportion to the benefits received by the participants.

Appendix E. Information Needed for NDEP and NDOP Project Tracking Systems

This appendix highlights elements of metadata required for entries into the National Digital Elevation Program (NDEP) and National Digital Orthophoto Program (NDOP) tracking systems (NDEP, 2006a and NDOP, 2006a). The tracking systems are web-based applications that allow users to search for and register data that are proposed, planned, in work, or complete. The systems contain information about contacts for the data or project ("who"), a few elements about the technical aspects of the data ("what," "when," and "how"), and the general coordinates for the area covered by the data ("where"). The systems help flood insurance study participants find data that exist, are in work, are planned, or are proposed during agreed upon project planning or initiation activities, including but not limited to pre-scoping and scoping activities (see section 2.1, step 2), and find partners to defray the costs of collecting new data (see section 2.1, step 3 and section 2.3, step 2).

The systems also are the means through which a study informs other organizations of existing geospatial data that will be used or new data that will be procured. This action is accomplished by making entries into the systems. Entries are required for:

- Elevation and orthophoto data to be obtained from non-Federal sources.
- Plans to procure new orthophoto and elevation data.

Please make entries for your study even if records for the data already exist in the systems.

At the point in the scoping process, or agreed upon project planning or initiation process (see section 2.1, step 3) when data entries are required, the study should be reasonably certain about the sources from which it will receive data, and at least some information about organizations that will participate in new data collection (even if the study is the only identified participant). If offered, use the selection "To be determined" for elements for which a decision has not been made, for which an answer is not known, or for which the concept does not apply to the data. Note however that, at the point in the scoping activity when entries are required, the study participants should be reasonably well informed about most of these topics and so "To be determined" should be used sparingly.

One required entry is information about the point of contact for a project or set of data. In addition to being a source of information about projects, project contacts maintain the records in the system. The system will send the contact an e-mail message notifying them when the metadata for the project is entered, and a message prompting them to update the status of "proposed" and "planned" projects after the start date has passed and the status of "in work" projects after the end date has passed. When the data about the project are entered, they also will receive a copy of the metadata record in Extensible Markup Language (XML) format. The contact can use this record as a starting point from which they can build more detailed metadata as the project progresses. Other

organizations will use the point of contact to gain access to the data if no website is provided for data distribution. As part of working with other organizations, be sure to explain these responsibilities to them before entering them as the contact. If the organization prefers not to maintain project status information in the system, substitute the contact information for the geospatial coordination lead from the Regional Management Center.

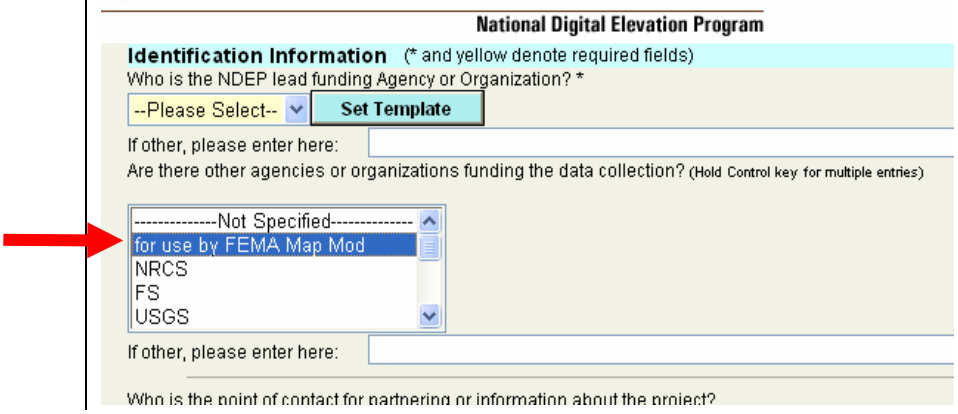
The ability to edit or delete a record is password-protected. Contact the geospatial coordination lead from the Regional Management Center to obtain the password.

Entries for the NDEP Project Tracking System

An overview of the system, including descriptions of information required for data entries, is provided in the reference guide (NDEP, 2006b) at <http://hazards.fema.gov/metadata/NDEP/doc/ndepquickref.pdf>. The NDEP system also has a set of "frequently asked questions" at <http://www.ndep.gov/faq.html>.

Information about entering data into the system is provided below. This information is an update to instructions provided to the Regional Management Centers (Roche, 2006).

To enter data, start at <http://www.ndep.gov/>, follow the link Project Tracking, and click on Enter Project Information.

NDEP Project Tracking System Data Element	Instructions
Identification Information (screen 1 of 3)	
Who is the NDEP lead funding Agency or Organization? Are there other agencies or organizations funding the data collection?	*Select the lead agency from the list. If the organization is not on the list select OTHER and key in the agency name.* *Select among the choices to identify other participating agencies. Multiple agencies can be selected by holding down the Control key and picking each agency. If an agency is not on the list, the user may key in the name in the box to the right of the list.* ***If the entry is about data to be used in a study**, be sure to include the "for use by FEMA Map Mod" item in the selection of other agencies participating in the project (even if no funding is being provided).* 

NDEP Project Tracking System Data Element	Instructions
Who is the point of contact for partnering or information about the project?	
Who is the contact person?	*Enter the name of the contact person from whom more information about the project can be obtained. This person is not necessarily from the organization that produced the data. For "completed" status, this person will receive requests for data if a data distribution website is not provided (see below).*
Contact Phone	*Enter the phone number of the contact. Please use xxx-xxx-xxxx format.*
Contact E-Mail	*Enter the email address of the contact person.*
When the data are complete, how can someone obtain a copy?	
Organization	*Enter the name of the organization that can supply a copy of the data.*
Contact Phone	*Enter the phone number of the contact for the data*
Website for data distribution	*Enter the web address for the data, or enter "None" if a website has not yet been determined.*
Project Information (screen 2 of 3)	
What is the title of your project?	*Enter a project name. For projects that cover the same or smaller geographic area as the flood insurance study, use the form "geographic-area data-type" (for example, "Denver County, CO LiDAR"); for projects that cover an area larger than the study, use the form "geographic-area data-type (study-area)" (for example, "Colorado LiDAR (Denver County)"). Always include a place name and state abbreviation. The entry must be 90 characters or fewer.*
In what fiscal year will the data be collected?	*Select the federal fiscal year in which the data will be collected from the dropdown list. Federal fiscal years run from the October of the previous year to the following September (for example, federal fiscal year 2007 runs from October 2006 to September 2007).*
What will be the estimated starting and ending dates? (yyyymmdd)	*Please use yyyymmdd format (where y is the year, m is the numeric month, and d is the day). While these fields are optional when a project is initially entered, the system will send an e-mail message to the project contact at the end of the quarter and ask that these dates be completed. If entries are not made for these fields within 30 days of the message, the record will be deleted and not credited to the flood insurance study. Estimate the schedule if you have an idea of the dates within a month or two.*
What is the status of your project?	*Select the status of the elevation project (not the status of the entire flood insurance study) from the choices of Complete, In Work, Planned, or Proposed. The records for "Planned" projects are forwarded to the Geospatial One–Stop marketplace so that others in the geospatial community can offer to partner and defray the costs of data collection.*
Abstract	*This optional field allows the user to further identify the project in fewer than 200 characters.*
What vertical datum will be used in collecting the data?	*Select the vertical datum from the drop down list. Note that data funded by FEMA must be in the North American Vertical Datum of 1988 (NAVD 88), and FEMA prefers that all data it receives be in this datum.*
What is the planned NSSDA vertical accuracy of the data (in meters)?	*NSSDA is the National Standard for Spatial Data Accuracy. Enter the vertical accuracy in meters or click the box next to To be Determined. The system provides a link to a conversion tool among different units of length and to the NSSDA guidelines if the user requires help. Appendix A, sections A.3 and A.4, of the G&S provides information about measuring and stating the accuracy of elevation data.*
What is the approximate planned posting spacing of the data (in meters)?	*Select the approximate planned posting spacing from the choices of 1 meter, 3 meters, 5 meters, 10 meters, 30 meters, 100 meters, OTHER, or To be Determined. Post Spacing is the smallest distance between two discrete points that can be explicitly represented in a gridded elevation dataset.*
What type of elevation data (Data Model) will you produce?	*Select the type of elevation data that will be collected from the choices of Regular Grid, Multi-resolution Grid, Mass Points/Variable Spacing, Mass Points/Breaklines, Contours, DEM [digital elevation model], and TIN [triangulated irregular network]. Multiple selections may be made by holding down the Ctrl-key.*

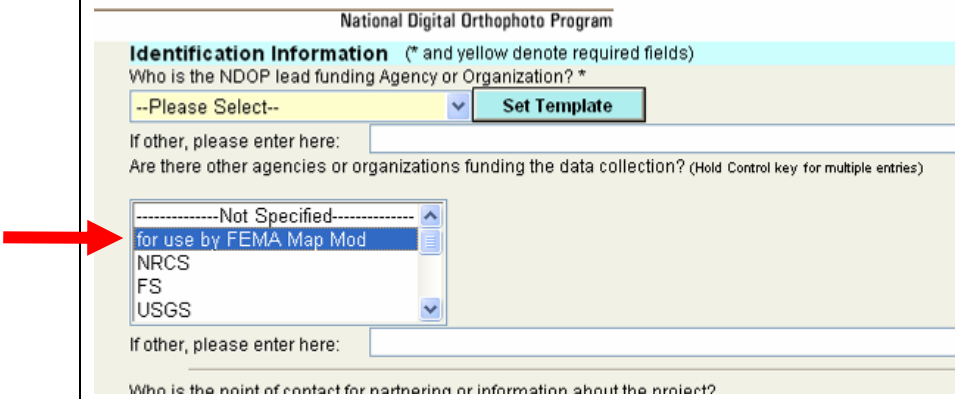
NDEP Project Tracking System Data Element	Instructions
How will the data be collected?	*Select the method through which the data will be collected from the choices of LIDAR [Light Detecting and Ranging], IFSAR [Interferometric Synthetic Aperature Radar], Cartographic, Photogrammetric, Sonar, and To be Determined.*
What will be the surface mapped by the data?	*Select the surface mapped by the data from the choices of Base Earth Surface, Reflective Surface, Constant Elevation, Multiple Returns, Bathymetric Surface, and To be Determined. Multiple selections may be made by holding down the Ctrl-key. Note that flood insurance studies require bare earth surface elevation data.*
Use constraints: Do you anticipate licensing or usage restrictions? (What can one do with the data after receiving it?)	*Select the use constraints for the data from the choices of Yes, contact the lead agency; No; or To be Determined. Note that for data funded by FEMA, the answer must be No; in other cases, be sure that the constraints are not so restrictive that FEMA cannot use the data in the flood insurance study.*
Project Location (screen 3 of 3)	
What area will be covered by this data?	*This section requires the entry of a geographic box (a box described by bounding longitude and latitude values) to provide the location of the project. The coordinates for a geographic box are required. Great precision is not required. The coordinates used should be roughly the minimum bounding rectangle that encloses the whole project area. If the area mapped is significantly different from the bounding rectangle, add a textual description of the actual area covered.* *Entries can be made by manually entering coordinates or by selecting the bounding coordinates of a geographic feature (a state, or state and county). In each case text may be added to further describe the location.* *<u>Manual entry</u>: "Please enter Bounding Rectangle for the data." Manually enter the longitude and latitude coordinates of the bounding box in decimal degrees.* • *"North Bounding Coordinate" – Enter the North latitude coordinate (must be larger than the South coordinate; remember to use a negative (-) for south latitude).* • *"South Bounding Coordinate" – Enter the South latitude coordinate (must be smaller than the North coordinate; remember to use a negative (-) for south latitude).* • *"East Bounding Coordinate" – Enter the East longitude coordinate (remember to use a negative (-) for west longitude).* • *"West Bounding Coordinate" – Enter the West longitude coordinate (remember to use a negative (-) for west longitude.* *<u>State selection method</u>: Select the coordinates of a geographic feature (state) to be used as the bounding box.* • *"Please select a state or a corresponding county to insert the bounding box coordinates into the FGDC record" – Select the state from the list and click on "Use statewide bounding box." The fields for the north, south, east, and west bounding coordinates are populated with the bounding box for the state.* *<u>State and County selection method</u>: Select the coordinates of a geographic feature (state and county) to be used as the bounding box.* • *"Please select a state or a corresponding county to insert the bounding box coordinates into the FGDC record" – Select the state from the list. After the state is selected, a list of counties for that state is displayed. Select the county (only one selection is allowed) from the list. Click on "Use county bounding box." The fields for the north, south, east, and west bounding coordinates are populated with the bounding box for the county.*
Is there a specific description of the area you would like to provide?	*If desired, describe the area for the project in greater detail (limited to 200 characters).*

Entries for the NDOP Project Tracking System

An overview of the system, including descriptions of information required for data entries, is provided in a reference guide (NDOP, 2006b) at <http://hazards.fema.gov/metadata/NDOP/doc/ndopquickref.pdf>.

Information about entering data into the system is provided below. This information is an update to instructions provided to the Regional Management Centers (Roche, 2006).

To enter data, start at <http://www.ndop.gov/>, follow the link Project Tracking, and click on Enter Project Information.

NDOP Project Tracking System Data Element	Instructions
	Identification Information (screen 1 of 4)
Who is the NDOP lead funding Agency or Organization?"	*Select the lead agency from the list. If the organization is not on the list select OTHER and key in the agency name.*
Are there other agencies or organizations funding the data collection?	*Select among the choices to identify other participating agencies. Multiple agencies can be selected by holding down the Control key and picking each agency. If an agency is not on the list, the user may key in the name in the box to the right of the list.* ***If the entry is about data to be used in a study**, be sure to include the "for use by FEMA Map Mod" item in the selection of other agencies participating in the project (even if no funding is being provided).* 
Who is the point of contact for partnering or information about the project?	
Who is the contact person?	*Enter the name of the person from whom more information about this project can be asked, and does not necessarily identify who produced the data.*
Contact Phone	*Enter the phone number of the contact. Please include the area code and use the format xxx-xxx-xxxx for entries.*
Contact E-Mail	*Enter the e-mail address of the contact person.*
When the data are complete, how can someone obtain a copy?	
Organization	*Enter the name of the organization that can supply a copy of the data.*
Contact Phone	*Enter the phone number of the contact for distribution of the data.*
Website for data distribution	*Enter the web address for the data, or enter "None" if a website has not yet been determined.*

NDOP Project Tracking System Data Element	Instructions
Project Information (screen 2 of 4)	
What is the title of your project?	*Enter a project name. For projects that cover the same or smaller geographic area as the flood insurance study, use the form "geographic-area data-type" (for example, "Denver County, CO CIR"); for projects that cover an area larger than the study, use the form "geographic-area data-type (study-area)" (for example, "Colorado CIR (Denver County)"). Always include a place name and state abbreviation. The entry must be 90 characters or fewer.*
In what fiscal year will the data be collected?	*Select the federal fiscal year in which the data will be collected from the dropdown list. Federal fiscal years run from the October of the previous year to the following September (for example, federal fiscal year 2007 runs from October 2006 to September 2007).*
What will be the estimated starting and ending dates? (yyyymmdd)	*Please use yyyymmdd format (where y is the year, m is the numeric month, and d is the day). While these fields are optional when a project is initially entered, the system will send an e-mail message to the project contact at the end of the quarter and ask that these dates be completed. If entries are not made for these fields within 30 days of the message, the record will be deleted and not credited to the flood insurance study. Estimate the schedule if you have an idea of the dates within a month or two.*
What is the status of your project?	*Select the status of the elevation project (not the status of the entire flood insurance study) from the choices of Complete, In Work, Planned, or Proposed. The records for "Planned" projects are forwarded to the Geospatial One–Stop marketplace so that others in the geospatial community can offer to partner and defray the costs of data collection.*
Abstract	*This optional field allows the user to further identify the project in fewer than 200 characters.*
What will the approximate image resolution be?	*Select the approximate image resolution from the choice of .2 meters, .3 meters, .5 meters, 1 meter, 2 meters, 5 meters, Multiresolution 1 meter or better, Multiresolution 2 meter or better, Multiresolution 5 meter or better, or To be Determined. Use .2 meters for 6 inch, .3 meters for 1 foot, and .5 meters for 1.5 foot resolutions.*
What is the planned NSSDA Horizontal Accuracy value of the data in meters?	*The NSSDA is the National Standard for Spatial Data Accuracy. Enter the horizontal accuracy in meters or click the box next to To be Determined. The system provides a link to a conversion tool among different units of length and to the NSSDA guidelines if the user requires help. Appendix A, sections A.3 and A.4, of the G&S provides information about measuring and stating the accuracy of base map data.*
What format will the data be in?	*Select the format the in which the data will be available to users from the choices of BIL [band interleaved by line], BIP [band interleaved by pixel], GeoTIFF [Geographic Tagged Image File Format], Satellite (raw data), Compressed (JPEG [Joint Photographic Experts Group], MrSID [Multiresolution Seamless Image Database], ECW [Enhanced Compressed Wavelet], Other), To be Determined, and OTHER. If OTHER is selected, describe the format in the field provided. Multiple selections may be made by holding down the Control key. If the user does not yet know the format for the data, please select To be Determined from the list.*
What image bands will be collected?	*Select the image bands in which the data will be collected from the choices of CIR [color infrared], Panchromatic, RGB [red-green-blue]/Natural Color, To be Determined, and OTHER. If OTHER is selected, describe the image band in the field provided. Multiple selections may be made by holding down the Ctrl-key. If the user does not yet know the image bands for the data, please select To be Determined from the list.*
How will the data be collected?	*Select how the data will be collected from the choices of Digital Airborne, Analog Airborne, Satellite, Digital or Analog Airborne, or To be Determined.. If the user does not yet know how the data will be collected, please select To be Determined from the list.*
What image bands will be available in the project deliverables?	*Select the image bands in which the data will be delivered from the choices of CIR [color infrared], Panchromatic, RGB [red-green-blue]/Natural Color, To be Determined, and OTHER. If OTHER is selected, describe the image band in the field provided. Multiple selections may be made by holding down the Ctrl-key. If the user does not yet know the image bands for the data, please select To be Determined from the list.*
Will the data be leaf-on or leaf-off?	*Select a response from the choices of Leaf-On, Leaf-Off, Not Seasonally Dependent, To be Determined, or OTHER. If OTHER is selected, describe the plan in the field provided.*

NDOP Project Tracking System Data Element	Instructions
Use constraints: Do you anticipate licensing or usage restrictions? (What can one do with the data after receiving it?)	*Select the use constraints for the data from the choices of Yes, contact the lead agency; No; or To be Determined. Note that for data to be used in a flood insurance study (regardless if the data is funded by FEMA or not), the answer must be No.*
Project Location (screen 3 of 4)	
What area will be covered by this data?	*This section requires the entry of a geographic box (a box described by bounding longitude and latitude values) to provide the location of the project. The coordinates for a geographic box are required. Great precision is not required. The coordinates used should be roughly the minimum bounding rectangle that encloses the whole project area. If the area mapped is significantly different from the bounding rectangle, add a textual description of the actual area covered.* *Entries can be made by manually entering coordinates or by selecting the bounding coordinates of a geographic feature (a state, or state and county). In each case text may be added to further describe the location.* *Manual entry: "Please enter Bounding Rectangle for the data." Manually enter the longitude and latitude coordinates of the bounding box in decimal degrees.* • *"North Bounding Coordinate" – Enter the North latitude coordinate (must be larger than the South coordinate; remember to use a negative (-) for south latitude).* • *"South Bounding Coordinate" – Enter the South latitude coordinate (must be smaller than the North coordinate; remember to use a negative (-) for south latitude).* • *"East Bounding Coordinate" – Enter the East longitude coordinate (remember to use a negative (-) for west longitude).* • *"West Bounding Coordinate" – Enter the West longitude coordinate (remember to use a negative (-) for west longitude.* *State selection method: Select the coordinates of a geographic feature (state) to be used as the bounding box.* • *"Please select a state or a corresponding county to insert the bounding box coordinates into the FGDC record" – Select the state from the list and click on "Use statewide bounding box." The fields for the north, south, east, and west bounding coordinates are populated with the bounding box for the state.* *State and County selection method: Select the coordinates of a geographic feature (state and county) to be used as the bounding box.* • *"Please select a state or a corresponding county to insert the bounding box coordinates into the FGDC record" – Select the state from the list. After the state is selected, a list of counties for that state is displayed. Select the county (only one selection is allowed) from the list. Click on "Use county bounding box." The fields for the north, south, east, and west bounding coordinates are populated with the bounding box for the county.*
Is there a specific description of the area you would like to provide?	*If desired, describe the area for the project in greater detail (limited to 200 characters).*
Grid/Coordinate System Information (screen 4 of 4)	
"What will the Grid System of the planned data be?"	*Select a coordinate system from the choices of Universal Transverse Mercator, State Plane Coordinate System of 1927, State Plane Coordinate System of 1983, or other grid system.* *If the entry is:* • *Universal Transverse Mercator (UTM), select the UTM zone number.* • *State Plane Coordinate System of 1927, select the zone identifier.* • *State Plane Coordinate System of 1983, select the zone identifier.* • *Other grid system, describe it briefly in the field provided.*

NDOP Project Tracking System Data Element	Instructions
What will the Horizontal Datum of the planned data be?"	*Select the horizontal datum from the choice of North American Datum of 1927, North American Datum of 1983, World Geodetic System 1984, or Other. If Other is selected, describe it briefly in the field provided. If the answer to the previous question is a state plane coordinate system, be sure to select the matching horizontal datum.*

Appendix F. Audit Process for NDEP & NDOP Metadata Entries for Map Mod Projects

Objective

The purpose of the monthly auditing activity of the National Digital Elevation Program (NDEP) and the National Digital Orthophoto Program (NDOP) project tracking systems is to monitor and report the compliance of study participants with the Geospatial Data Coordination Policy and Implementation Guidelines. It does so by comparing the activities completed by studies with the status of metadata entries in the NDEP and NDOP tracking systems, and the Mapping Information Platform (MIP) Content Manager appropriate for that stage of the study. Timely and accurate metadata entries into the project tracking systems is also important as it becomes the source of the information FEMA provides about planned data acquisition or development for Map Mod projects in its Semiannual Geospatial Data Coordination Reports.

Audit Process

The National Scoping Lead coordinates with the NSP Headquarters GDCS Team to prepare monthly audit assignments and track audit results based upon analysis of MIP project information. Regional Management Center (RMC) Geospatial Leads will compare the stage completed by studies with the status of entries in the NDEP and/or NDOP project tracking systems and report findings. MOD's NSP Headquarters Team will aggregate the RMC reports and provide summary information to FEMA and MOD regional staff to be provided as feedback to FEMA Regions and their mapping partners.

Audit assignments are generated each month through close coordination with the regional study management teams that are responsible for performing scoping support activities and geospatial data coordination activities. Audit assignments are issued to each RMC based upon the level of formal scoping practices and scoping report review activities assigned by each Region, or when project milestones for completed base map and topographic data development tasks are completed. The following outlines how audits are 'triggered' for each scenario:

I. Audit Assignments

Each month, new audit assignments will be determined by comparing the completion status of projects where the RMC has completed its review of the scoping report (if applicable); and by comparing all other projects with completed base map and topographic data development tasks as reported in the MIP.

Step 1: Review Scoping Support Tracking spreadsheet for projects that have completed scoping and where the RMC has completed its review of the scoping report. Note projects that meet these criteria and have not yet been audited.

Step 2: Review the monthly ad hoc report of active projects with assigned data development tasks and note projects with a completion date claimed for Acquire Basemap and Develop Topographic Data.

A. Scoped Projects

For studies that have completed Scoping, and where the NSP is tasked to review the scoping report, determine whether non-Federal Elevation and/or Orthoimagery data sets have been identified for use in the study.

1. RMC Role

i. Review the list of projects on the monthly Scoping Support Tracking spreadsheet distributed by the National Scoping Lead for completeness. Provide any changes to the list of active projects to the National Scoping Lead. Review this list periodically with your Regional counterpart to ensure that the list of projects is complete.
ii. Review the tab containing monthly audit assignments. This is the list of projects that may require an audit based upon completion of the scoping report review activity. Coordinate with Scoping Lead to access completed scoping reports as they become available. Review the section on available GIS data layers to determine if orthophotos or topographic data have been identified and what the source of this data is.
iii. Verify Project Tracker entries for projects that will use non-Federal sourced orthophoto or topographic sourced data sets (e.g., county or state produced data sets).
iv. Record monthly audit results in the monthly Scoping Support Tracking spreadsheet per the guidelines below and return results back to the National Scoping Lead by the date specified for completing monthly Scoping Support and Audit reporting.

2. NSP Headquarters Role

i. Compile each Region's monthly audit results and provide results to FEMA HQ, Regional, and RMC staff.
ii. Use the results of the audit to determine where there is a need for improvement in the study management and geospatial data coordination activities and ultimately data reported in the semiannual geospatial data coordination reports.

B. Other Projects

For studies that are not formally scoped, or when the NSP is not tasked to review the scoping report, monitor projects that have completed the Scoping, Acquire Basemap, and/or Develop Topographic data development tasks. If base map or topographic data is not identified at the scoping phase, the audit must occur once the data development task is complete. If a project does not have a Develop Topographic Data task, but will utilize elevation data to develop other DFIRM mapping tasks, the elevation data acquired should be entered into the NDEP system.

1. RMC Role

   i. Review the list of projects on the monthly Scoping Support Tracking spreadsheet distributed by the National Scoping Lead for completeness. Provide any changes to the list of active projects to the National Scoping Lead. Review this list periodically with your Regional counterpart to ensure that the list of projects is complete.
   ii. Review the tab containing monthly audit assignments. This is the list of projects that require an audit based upon completion of Scoping, Acquire Basemap, and/or Develop Topographic data development tasks.
   iii. Verify Project Tracker entries for these projects based upon which project activity or task has been established in your Region for initiating the audit process.

      Note: At this point you may not know what the source of the GIS data is – whether it is Federal agency data, or locally produced data. If the source of the data is unknown, proceed with audit and make a note in the comment field to follow up with the Region or mapping partner to determine if a non-Federal data set is to be used and therefore requiring a project tracker entry.

   iv. Record monthly audit results in the monthly Scoping Support Tracking spreadsheet per the guidelines below and return results back to the National Scoping Lead by the date specified for completing monthly Scoping Support and Audit reporting.

2. NSP Headquarters Role

   i. Compile each Region's monthly audit results and provide results to FEMA HQ, Regional, and RMC staff.
   ii. Use the results of the audit to determine where there is a need for improvement in the study management and geospatial data coordination activities and ultimately data reported in the semiannual geospatial data coordination reports.

II. Recording Audit Results

A simple numeric coding system has been established as a way of recording monthly audit results. The codes correspond to one of four (4) conditions that represent the project tracker metadata entry status.

A. Monthly Scoping Tracking spreadsheet updates

RMC to indicate whether a project tracker entry has been made for qualifying base map and topographic data sets (see FEMA's Geospatial Data Coordination Implementation Guide, Sec. 2.1, Step 3 and Sec. 2.4) by recording one of the following codes in the monthly Scoping Support Tracking spreadsheet:

0 = Entry found, but not for Map Mod
1 = No Project Tracker Entry Required (Federal data source used, or digital conversion with vector base map)
2 = Metadata entry not found, or deficient (document issues in comments field)
3 = Metadata entry complete

Consider the following conditions to establish which code to assign to each entry:

i. Is there a metadata record present in the system
ii. Is the project title representative of the data set and project – does it clearly identify what the data are and where?
iii. Is the "For use by FEMA Map Mod" origin option selected?
iv. Is there legitimate contact information provided?

Note: Projects that have already been summarized in FEMAs Semiannual Geospatial Coordination reports are given credit for having NDEP/NDOP project tracker entries are not required to be audited. The audit should focus on new projects.

B. Monthly NDEP/NDOP Audit Report

Each month the NSP Headquarters team will compile the audit results provided by each RMC and prepare a consolidated report for distribution to FEMA Headquarters, FEMA Regional, and RMC staff. The report will include the list of that month's audit assignments and the monthly audit results for each project. Analysis of audit results will be summarized and provided with each month's results.

III. Feedback Loop

Review audit results with your FEMA Regional Geospatial Lead counterpart and provide feedback to mapping partners for corrective actions as agreed upon with the Region. In the next reporting period, check the deficient records noted in the audit report and update the NDEP/NDOP status codes appropriately until a "1" or a "3" is achieved.

Appendix G. Federal Regional Organization and Activities

This appendix describes geospatial specialties of selected Federal agencies and the areas covered by the agencies' regional structures. This information will help steer study partners seeking information about Federal geospatial data to the appropriate office. Additional information about the offices often can be found on the web sites provided in the references.

Contact information for many of the agencies' state or regional geospatial personnel is available from the Mapping Information Platform (MIP) web site at <https://hazards.fema.gov/contacts/statecontacts/contacts.asp?page=xx> where "xx" is the two-letter postal abbreviation for the state. (For example, the web address for contacts for Alabama (abbreviation "AL") is <https://hazards.fema.gov/contacts/statecontacts/contacts.asp?page=AL>.)

FEMA Regional GIS Coordinator

The Federal Emergency Management Agency's (FEMA) Regional geographic information system (GIS) coordinators are knowledgeable about the agency's geospatial data holdings and activities for mission areas other than flood map modernization. Contact information will be available from the MIP web site or from the geospatial coordination lead at the Regional Management Center.

U.S. Geological Survey

U.S. Geological Survey (USGS) geospatial liaisons are knowledgeable about USGS geospatial activities for orthophoto (both national one-meter resolution coverage and higher-resolution coverage over selected states and urban areas), elevation, hydrography, geographic names, and land cover data collection efforts. They also know about related activities of other Federal, State, and regional and local activities.

A liaison is responsible for a state or a group of states. Contact information is available from the MIP web site or from the USGS at <http://nmcatalog.usgs.gov/crreps/faces/crreps.jspx> (U.S. Department of the Interior, 2005c). Note that the geospatial liaisons are associated with a different part of the USGS (the topographic mapping activities) and have a different role and often a different business model than do the USGS state-based water resource district offices that serve as Flood Map Modernization mapping partners in some areas. In most cases the geospatial liaisons and the water resources personnel are collocated in the same office.

Natural Resources Conservation Service and Farm Service Agency

State contacts for the U.S. Department of Agriculture's Natural Resources Conservation Service and Farm Service Agency are knowledgeable about orthophoto (especially the National Aerial Imagery Program (NAIP)), elevation, and soils data collection efforts and related activities of partner organizations. Contact information is available from the MIP web site.

U.S. Army Corps of Engineers

Personnel in the U.S. Army Corps of Engineers regions and districts are knowledgeable about geospatial data related to planning, designing, building and operating water resources civil works projects for navigable and other inland waters and coastal areas. For a sense of areas of interest to the agency; see the detailed map available at <http://www.tec.army.mil/research/products/wall_map.html> (U.S. Department of Defense, 2005). A map of the agency's regions and districts is available from <http://www.usace.army.mil/divdistmap.html> (U.S. Department of Defense, 2002). Contact information for agency personnel is available from the MIP web site.

The agency also leads a federal consortium that collects LIDAR data on a cyclical basis along the coastline of the United States, including the shoreline of the Great Lakes; see <http://shoals.sam.usace.army.mil/> (U.S. Department of Defense, 2006) for more information.

Federal Land Management Agencies

Federal land management agencies include the U.S. Department of Agriculture's Forest Service and the U.S. Department of the Interior's Bureau of Land Management, Bureau of Reclamation, U.S. Fish and Wildlife Service, and National Park Service. Because of their responsibilities for managing land, the agencies often hold or are knowledgeable about geospatial data over and near agency lands.

For regions of the U.S. Forest Service, geographic information system coordinators are knowledgeable about geospatial data collected over national forests and grasslands and surrounding areas. A map of the agency's regions is available at <http://www.fs.fed.us/contactus/regions.shtml> (U.S. Department of Agriculture, 2005). Contact information is available from the MIP web site.

For land management agencies in the U.S. Department of the Interior, state or regional personnel are knowledgeable about geospatial data collected over their agencies' lands and surrounding areas.

Contact information for geospatial leads in state offices of the Bureau of Land Management is available from the MIP web site. The site also provides state and regional contacts for the Geographic Coordinate Data Base (GCDB), which is "a collection of geographic information

representing the Public Land Survey System (PLSS) of the United States" (U.S. Department of the Interior, 2005a). Most coverage is for the western states.

Geographic information system contact(s) for:

- The Bureau of Reclamation is available at <http://www.usbr.gov/pmts/rsgis/>.
- The U.S. Fish and Wildlife Service are available at <http://www.fws.gov/data/scmem.html>.
- The National Park Service are available at <http://www.nps.gov/gis/contacts/cordinators.html>.

Census Bureau

Regional geographers in the Census Bureau's regional offices gathered the information in the TIGER® Enhancement Database (TED) and are especially knowledgeable about state, regional, and local holdings of orthophoto and planimetric data used to modernize the TIGER® database. A map of the agency's regions is available at <http://www.census.gov/field/www/> (U.S. Department of Commerce, 2005). Contact information is available from the MIP web site.

National Geodetic Survey

State geodetic advisors and coordinators affiliated with the National Geodetic Survey, an agency of the U.S. Department of Commerce's National Oceanic and Atmospheric Administration, guide and assist States' geodetic and surveying programs and act as liaisons between the States and the agency. Contact information for the advisors and coordinators is available by clicking on the map at <http://www.ngs.noaa.gov/ADVISORS/AdvisorsIndex.shtml> (U.S. Department of Commerce, 2006).

U.S. Environmental Protection Agency

Personnel in U.S. Environmental Protection Agency regional offices are knowledgeable about geospatial data used in agency programs to protect human health and the environment, including inland waters, coastal areas, and wetlands. A map of the agency's regions is available at <http://www.epa.gov/epahome/locate2.htm> (U.S. Environmental Protection Agency, 2006). Contact information is available from the MIP web site.