2023-2027 FEMA Data Strategy

OPPA | Data Management Branch

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FEMA

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Letter from the Administrator

Dear readers,

I am proud to share with you FEMA's Data Strategy. This document provides us with a roadmap toward reimagining our systems and streamlining our work, while inspiring an agencywide change in how we use one of the most transformational tools at our fingertips—data.

As tremendous change continues across our nation's threat landscape and in our professional roles, we must embrace the tools that enable us to focus on mission-critical priorities. Today's technological age presents us with an exciting opportunity to leverage advanced data and analytics to better inform our decision making before, during, and after disasters.

I believe that among all our strategic assets, data enables us to capture a community's experiences. It is a person's name, a home address, a neighborhood that provides a snapshot of the people who need us most. By being good stewards and safeguarding our data, we are protecting and building trust with the communities we are charged to serve.

Deanne Criswell
March 2023

Introduction

Data is critical to the FEMA mission of helping people before, during, and after disasters, and it will continue to transform the way the agency and its emergency management partners operate. The proliferation of new datasets and the application of modern analytical methodologies to emergency management questions provide opportunities to greatly improve mission delivery, service design, and effective tax-dollar stewardship. Within FEMA, data informs decisions that impact the lives of millions of Americans, before, during, and after disasters. Over the last five years, FEMA has obligated an average of $30 billion federal dollars per year to respond to an average of 130 disasters annually.[1] With that magnitude of operations, data is an essential component of successful disaster relief efforts.

FEMA faces growing expectations to harness the vast data assets of the agency and its partners to improve performance, however the current state of data maturity at FEMA can be simply described as reactive. **FEMA's data capabilities and architecture inform today's status, but do not sufficiently enable tomorrow's planning.** FEMA personnel use data at the tactical level to inform immediate decisions and situational reporting, but strategic decisions at FEMA could benefit from advanced analytics, artificial intelligence, and meaningful evidence-building and evaluation work. Additionally, FEMA personnel find the current state of data sharing to be insufficient, and program-level management of data across FEMA is piecemeal and disparate in organizational silos.[2] These gaps inhibit sustainability and scalability, further compounded by the ever-increasing varieties and volumes of data available within the agency.

Despite enterprise challenges, some programs – often led by a few dedicated individuals – are making progress toward harnessing data for long-term planning. Moving forward, the agency must ensure that this type of forward-thinking data usage becomes part of the data culture at the agency. To serve individuals and communities more effectively, FEMA must strive toward a future where data is a strategic asset of the agency; the federal and state, local, Tribal, and territorial (SLTT) governments; and the American people. FEMA must embody a share-by-default culture for data and widely leverage evidence-building activities to make decisions. A FEMA Data Strategy is required to attain this future and guide FEMA towards an ideal state of data maturity.

The FEMA Data Strategy is aligned with existing FEMA data directives and instructions and draws priorities and goals from the Federal Data Strategy; the Foundations for Evidence-Based Policymaking Act of 2018; the Department of Homeland Security Data Framework Act of 2018; and the Geospatial Act of 2018.

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[1] FEMA Human Capital Gains and Losses Public Data Sources; Common Operating Picture; FEMA Disaster Declarations Summaries

[2] 2022 FEMA Data Management Program Study Final Report

Summarized in Figure 1, this document presents the agency's overarching vision for data, the guiding principles for future data operations necessary to support the vision, and the strategic goals necessary to operationalize the vision. The vision serves as the north star – the ideal to strive for; the strategic goals set the course to follow that north star; and the guiding principles act as the rules of the road, reminding personnel of the priorities and behaviors that are expected. The Data Strategy applies to all types of data at FEMA, be it raw data or analytical outputs, quantitative or qualitative, structured or unstructured, geospatial or otherwise. Together, the vision, goals, and principles will guide data sharing, data science, database management, data policy creation, geospatial reporting and analysis, data architecture, and data governance for the benefit of all FEMA personnel and the emergency management community at large. To maximize impact, the Data Strategy will have living companion documents that outline implementation, communication, and training initiatives so new personnel are introduced to the Data Strategy and all personnel can successfully implement and sustain Data Strategy capabilities over time.

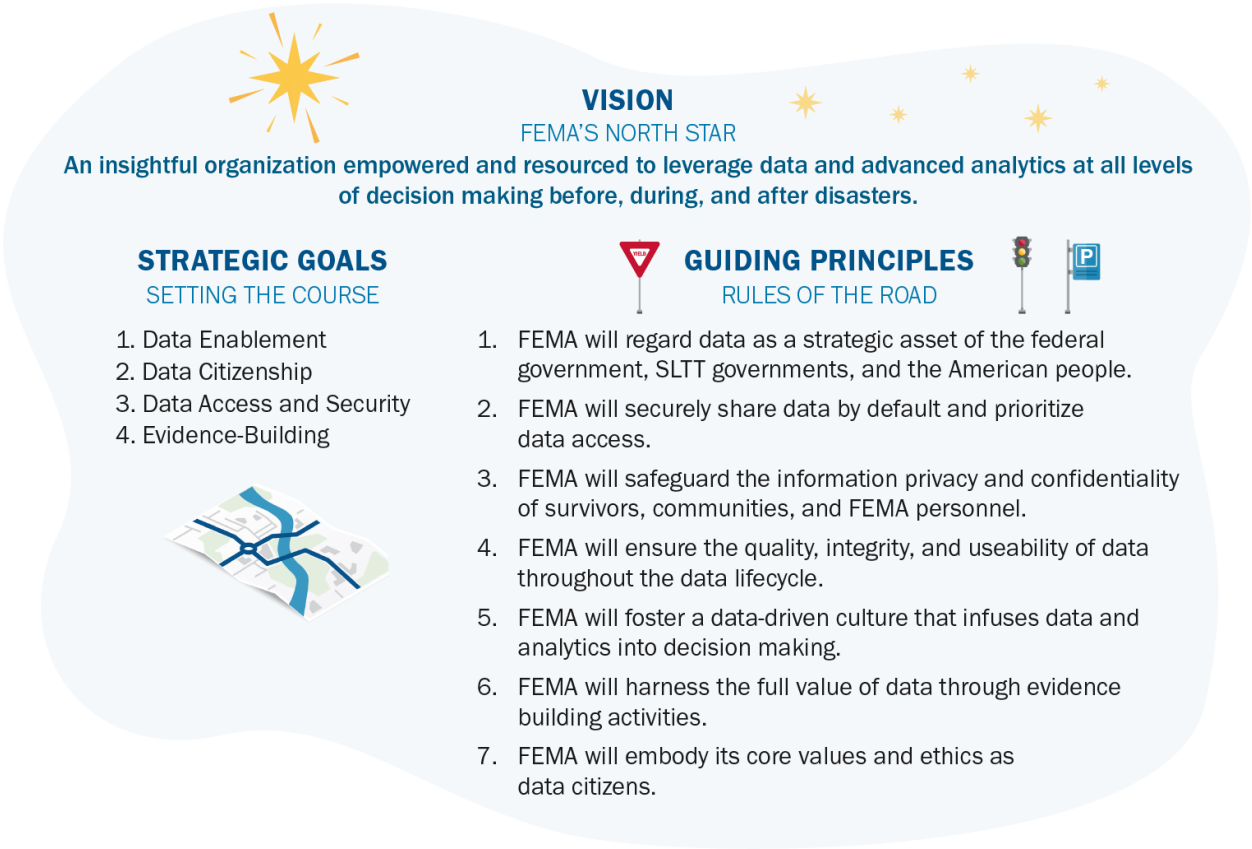

Figure 1. FEMA Data Strategy Overview

The Vision for FEMA Data

An insightful organization empowered and resourced to leverage data and advanced analytics at all levels of decision making before, during, and after disasters.

As the national leader for emergency management, FEMA needs to expertly use data to manage emergencies effectively, equitably, and sustainably.

From the bottom up, FEMA needs to build a strong foundation of trusted data; foster a culture that manages, aggregates, and draws insights from data from across the community; and instill confidence in emergency managers that analytical insights will bolster and improve decision-making. As data becomes more ubiquitous, the role of FEMA as a central hub for its mission partners is more crucial than ever. Enabling more analysts to better understand and access vast collections of data, integrate disparate datasets, and exchange analyses and ideas more easily will be critical to maximizing the value of data. Data is not a single-use consumable, and by empowering and resourcing the emergency management community to leverage data and advanced analytics, FEMA will build the capacity to repeatedly extract more value from data in new and creative ways. From the field to the front office, all decision makers must have the opportunity to leverage trusted data and insightful analysis to maximize readiness; manage risk; and make the best possible decisions for immediate responses, long-term planning, mitigation, and everything in between.

Guiding Principles

These seven tenets represent the key ideals that underpin the data vision and govern how FEMA personnel interact with data. The strategic goals and objectives were developed with these principles in mind, and they will guide the implementation and sustainment of the Data Strategy.

1. **FEMA will regard data as a strategic asset of the federal government, SLTT governments, and the American people.**

   Use and manage data in a way that shows an understanding of its current and potential future value. All FEMA personnel must think beyond program and project silos and always remember whom the data helps serve and what benefits it may bring to the nation. Data is an asset that should be strategically utilized again and again.

2. **FEMA will securely share data by default and prioritize data access.**

   Move away from the status quo where one must argue why they need access to data, and shift to a culture where all FEMA data is available to the extent allowed by law and policy. Adjust the way we handle data access and ensure the related dataset information and business context are made available. FEMA data belongs to the agency and the American people, and thus, as appropriate, must be available to the agency and American people.

3. **FEMA will safeguard the information privacy and confidentiality of survivors, communities, and FEMA personnel.**

   Protect and maintain the confidentiality, integrity, and availability of information as it is shared more frequently. By clarifying requirements for managing sensitive information and using technological capabilities to automatically detect, encrypt, and mask sensitive information, the agency will reduce the risk of mishandling private and sensitive data.

4. **FEMA will ensure the quality, integrity, and useability of data throughout the data lifecycle.**

   Make data available in structures and formats that make it easy to analyze, and with the quality and timeliness that meet the business needs of users. Those who interact with data must understand its lifecycle – from acquisition through disposition – and how it should be handled at each stage. FEMA personnel must be aware of and follow all policies, procedures, and best practices to minimize data degradation over time.

5. **FEMA will foster a data-driven culture that infuses data and analytics into decision making.**

   Infuse data and analytics into the decision-making process, instilling trust in leaders that the information is of high quality and acknowledging how data may complement or challenge their intuition and perspectives.

6. **FEMA will harness the full value of data through evidence-building activities.**

   Encourage new lines of research and methods of evaluation on new and existing policies and programs. Thoughtfully identify needs for new data and determine ways to collect or obtain it. Emphasize that data can serve multiple purposes, and that the rigorous and methodical analysis of data over time, beyond its original intent and users, can greatly improve mission delivery.

7. **FEMA will embody its core values and ethics as data citizens.**

   Collect, utilize, and analyze data with compassion, fairness, integrity, and respect in mind. Encourage and maintain data equity by consistently considering the ways in which data is collected, analyzed, interpreted, and distributed. Acknowledge and minimize bias in data and always use it for the good of the nation.

FEMA Strategic Data Goals

The strategic goals outline the capabilities that FEMA will optimize through the implementation of the Data Strategy. They broadly encompass FEMA data priorities and clarify how FEMA will achieve its data vision. While each strategic goal has its own distinct objectives, they are highly interdependent, and the success of each goal relies on the success of the others. For instance, evidence-building will be supported by a strong culture of data citizenship, clear access and security policies, and data enablement practices. Specific tasks and use cases that will bring these goals to reality are outlined in a companion Implementation Plan that the agency will act on over the next several years (see Implementation Approach below).

1: Data Enablement

Make data accessible, usable, and effective through top-down data governance and bottom-up data management.

- 1.1 Equip personnel with knowledge and communities to work with data from multiple sources and collaborate across programs
- 1.2 Ensure awareness, consistency, and repeatability of data
- 1.3 Promote widespread data sharing

2: Data Citizenship

Empower and hold accountable all stakeholders of the agency to use and care for data properly.

- 2.1 Codify the responsibilities of FEMA personnel and outline the expectations of partners for the use and care of data
- 2.2 Identify and resource support structures that enable responsible citizenship

3: Data Access and Security

Ensure data is accessed, shared, and used to the full extent allowed by legal, privacy, and security requirements.

- 3.1 Assess, modernize, and assemble policies and procedures that describe and guide data access and security and clarify the responsibilities and required due diligence for all agency roles
- 3.2 Leverage and modernize technology to improve and encourage data access and sharing

4: Evidence-Building

Inform decision making by producing evidence with policy analysis, foundational fact finding, performance measurement, and program evaluation.

- 4.1 Improve data quality and promote usable data for analysis
- 4.2 Streamline and standardize data management for collaborative analytics and strategic decision making
- 4.3 Generate analytical efficiencies to maximize evidence curation and increase data-informed decision making

Figure 2. Strategic Goals and Objectives

Strategic Goal 1 – Data Enablement

Make data accessible, usable, and effective through top-down data governance and bottom-up data management.

Meeting this goal requires top-down enterprise data governance and bottom-up program data management to put in place the tools, programs, and processes that enable the use, effectiveness, and accessibility of data at FEMA. Analysts, decision makers, and other data users need to know what data is available to them, how to access it, and must maintain confidence in the trustworthiness and consistency of the data. Optimizing data usage also necessitates that FEMA personnel and partners have the knowledge, networks, and communities they need to make best use of what the agency can offer.

Objective 1.1: Equip personnel with knowledge and communities to work with data from multiple sources and collaborate across programs

For FEMA personnel and partners to optimize their work with data, it will be critical to install foundational support structures. Users of FEMA data will have access to networks of data stewards who know the data and its current business uses, and who can help apply it in support of emergency management decisions. There will be a clear, logical data governance organizational structure at FEMA that can be leveraged to introduce new policies, procedures, and guidance. Cross-agency learning resources will be made available to upskill the workforce, including data lexicons and business glossaries, that ensure consistency in communication. FEMA will foster communities of practice to support data managers and data users in curating the data necessary to inform decision making.

Objective 1.2: Ensure awareness, consistency, and repeatability of data

FEMA must create frameworks so data users can find, trust, and use data effectively and efficiently. All data used by FEMA will be inventoried and categorized to break down organizational silos and to identify similar data from different programs. Data of analytic value will be easily discoverable and accessible from a centralized repository that also provides information so data consumers can understand and trust the data. Data programs and policies will be introduced and modernized with clear guidance to ensure data quality, enable information sharing and analysis, support interoperability, and maintain data integrity.

Objective 1.3: Promote widespread data sharing

Meeting the vision of this strategy will require the agency to cultivate the data-driven, share-by-default culture prioritized in the guiding principles. As an agency, the default thinking should be that FEMA data is safe to share unless law, regulation, or policy says otherwise. Acknowledging that this is a significant change to existing philosophy, culture will evolve over time and data will not be opened immediately and without regard for consequences. In order to make this transition while managing risk, new and streamlined policies, guidance, and approval procedures will be developed to provide clarity and reduce undue burden when accessing information. This transition will also be

FEMA focused and will respect the boundaries of partner data. Accepting that privacy and security will be a major consideration, this strategy sets the expectation that FEMA will begin to make more of its data available as quickly as possible. Much of FEMA's data can and should be made public in accessible, machine-readable formats for the American people to make use of. Additionally, every second counts when responding to a disaster, and FEMA must be able to share information internally, across the field, and with partners as quickly and efficiently as possible. Ongoing technology modernization initiatives and new procurements such as the FEMA Data Exchange will implement the policies and guidance that support safe and efficient data sharing, thus fostering a culture that is comfortable and empowered to share all types of data.

Strategic Goal 2 – Data Citizenship

Empower and hold accountable all stakeholders of the agency to use and care for data properly.

In general, citizenship is about the relationship and promises between an individual and a construct – an American citizen has a responsibility to act in the best interest of the nation, and the nation has a responsibility to protect and empower its citizens.

All FEMA personnel have the responsibility to act in the best interest of the agency and FEMA's use of data should empower the workforce to advance the agency mission. As such, all FEMA personnel can be regarded as data citizens and have the responsibility to uphold the integrity and confidentiality of data. Thinking bigger, however, FEMA personnel are not the only people who interact with and benefit from FEMA data, and FEMA data is not the only data that FEMA personnel leverage. Consequently, data citizenship transcends agency borders and roles, and the specific levels of responsibility and accountability will be documented with distinctions made for personnel, roles, partners, individuals, and thresholds of data interaction. Since data has become ubiquitous in emergency management operations, the misunderstanding and misusing of data at any stage of the data lifecycle introduces risk to the agency and its mission. Data citizens are responsible for properly applying and understanding the data they interact with and ensuring its integrity, accuracy, and security as relevant to their own unique roles. In return, data empowers data citizens and provides justification for decision making. Only when the responsibilities of data are universally shared will the data be able to truly empower operations and improve outcomes for the American people.

Objective 2.1: Codify the responsibilities of FEMA personnel and outline the expectations of partners for the use and care of data

From a FEMA perspective, the management of expectations around data citizenship requires regular and intentional communication to all members of the FEMA workforce. FEMA personnel must understand their roles within the data lifecycle and be aware of the potential impacts they may have on the quality of the data. Although all FEMA personnel can be regarded as data citizens, there are specific roles within the agency that will require distinct and detailed responsibilities. Among those roles are data stewards, data engineers, data scientists, and data analysts, all of whom are integral to all the strategic data goals. In particular, recognizing data stewards and identifying stewardship gaps is a priority. FEMA will codify the responsibilities of data stewards, and other data roles,

particularly regarding the sharing of data across the agency and with its partners. Beyond FEMA, the expectations and accountability of partners must be reasonable and proportionate to the level of risk they have the potential to introduce to the agency.

Objective 2.2: Identify and resource support structures that enable responsible citizenship

As FEMA begins to ask more of its data citizens, it must provide more resources, training, and support to enable them. By restructuring, clarifying, and reducing overlap between existing data working groups and communities of practice, data citizens will know exactly where to go for specific problems, questions, or proposals. Priorities, requirements, and tools for building the capacity to manage metadata will be outlined and procured, and resources for filling the gaps in data stewardship will be identified. The organizational structures, frameworks, and learning resources discussed in Strategic Goal 1: Data Enablement, will also contribute to enabling data citizenship.

Strategic Goal 3 – Data Access and Security

Ensure data is accessed, shared, and used to the full extent allowed by legal, privacy, and security requirements.

To leverage the full value of FEMA data and analytical products, they must be accessible to as many people as allowable. Enabling wider access of FEMA data will require policy modernization, technology considerations, and cultural adjustments. These changes will promote consistent and open data access and contribute to reducing the access inequity often felt at the field level. Things happen fast in disasters and having appropriate and timely data is crucial to the success of the emergency management mission.

While sharing FEMA data more openly is a high priority, ensuring the protection of private and sensitive information is equally important. Personnel must be able to identify the sensitivity of a particular dataset quickly and easily, which will decrease the risk of mishandling information and increase the confidence that the data can be shared.

Objective 3.1: Assess, modernize, and assemble policies and procedures that describe and guide data access and security and clarify the responsibilities and required due diligence for all agency roles

FEMA will evaluate and update existing policies and procedures and develop new policies and procedures where gaps are identified. Accompanying them will be more detailed guidance and resources that clearly delineate types of data that cannot be shared, and that ensure all personnel clearly understand the privacy and security laws, regulations, and policies that may impact, and potentially limit, the sharing of data. New policies and procedures, and their related guidance, will serve as lane markers – clarifying one's responsibilities and the specific processes they must follow to stay on the acceptable path. Within that acceptable path, it is imperative for all members of the agency to do the appropriate level of due diligence – whether that is implementing security protocols, reviewing the context of a report, or simply double checking the "send to" line in an email

to ensure information is shared with the correct person. Wherever possible, FEMA will take advantage of modern technology capabilities to provide automated support for following policies and procedures, but all personnel must take the initiative to understand their responsibilities as outlined in policy.

Objective 3.2: Leverage and modernize technology to improve and encourage data access and sharing

Once it is confirmed that a particular dataset is safe to share, the ability to transmit that data must not be a limiting factor. FEMA must ensure that agency technology can implement related data policies and procedures and execute the exchange of information appropriately by prioritizing access and sharing considerations across its numerous ongoing and future technology modernization and acquisition initiatives.

Strategic Goal 4 – Evidence-Building

Inform decision making by producing evidence with policy analysis, foundational fact finding, performance measurement, and program evaluation.

Emergency managers are always seeking to answer questions: What areas are most susceptible to damage? Are mitigation grants building climate resilience? Is FEMA assistance delivered equitably? Instead of relying on intuition or anecdotes to answer these questions, evidence in the form of data and analysis provides a more informed and impartial approach to decision making. Leaders across the emergency management community at all levels must have access to trusted evidence to complement their experience and expertise and help them make the best possible decisions. To build that trust in evidence, attention needs to be paid in all stages of the data lifecycle: from collection or procurement of new information to the management and analysis of the data, and to its eventual use and disposition.

Objective 4.1: Improve data quality and promote usable data for analysis

Data quality issues can arise from various sources, such as typos, outdated references, non-standardized survey questions, and collection bias, and each type of issue requires its own resolution. Due to time and budget constraints, analysts and programs often must install stop-gap measures and workarounds rather than finding and addressing the root cause of a data quality issue. While this may address the immediate need, maintaining the workaround may end up costing more in the long run and may ultimately inhibit the validity of evidence-building products. Additionally, as FEMA prioritizes equitable program delivery, it is crucial to consider what biases may exist in the data and how that may affect its usability for analysis. If, for instance, a particular geographic area was excluded from data collection – even unintentionally – any resulting analysis using that data would contain bias and may lead to inequitable delivery of assistance. FEMA must acknowledge that data may reflect existing inequities in society and work to ensure that use of this data does not perpetuate such inequities. FEMA will use technology to continuously and automatically monitor data quality and to alert data stewards of quality issues. The agency will make

it easier for data consumers to report data quality issues that they encounter, and FEMA will designate data stewards as accountable for understanding agency-wide data quality requirements and providing data that meets them. By continually and intentionally scoping sources of data quality and data equity issues and implementing solutions, FEMA will have more consistently accurate data for analysis and decreased time to insight for decision makers.

Objective 4.2: Streamline and standardize data management for collaborative analytics and strategic decision making

As FEMA continues to create novel metrics, take new measurements, and collect more data, agency management efforts must scale up to ensure new and existing data remains usable and effective. Standard reference data, such as geographic place names, FEMA organization names, or lifeline reference lists, must be kept consistent across multiple systems to allow for data integration and must be managed intentionally and centrally to reduce rework and improve the consistency of data across the agency. A single, central repository for accessing analytic data must also be created and leveraged to improve ease of discovery and analysis, and to reduce duplication of efforts. New data management and analysis tools will allow for better collaboration and evidence that can be more readily used for decision making.

Objective 4.3: Generate analytical efficiencies to maximize evidence curation and increase data-informed decision making

To maximize the effectiveness of data and analysis for decision making, and to reduce time to insight, robust data collection strategies, analytical methods, and data products must be designed and leveraged. Creating playbooks and guidance for commonly repeated research needs will reduce the need for rework across different disasters. Providing technology systems that help users plan the data collection process and discover and re-use existing analyses will increase the speed at which analysis can occur, opening the door for more and better information to be used in decision making. To improve the discovery and usability of new and existing analyses, collaborative technology must be leveraged to associate analytical products to standard metadata, such as business context, privacy level, and data lineage. Similarly, FEMA must continue to grow and advance its suite of analytical tools, services, and products – to include modeling, machine learning, and other advanced techniques – and then leverage those advancements for real-time decision making. FEMA must also identify the areas of the agency that lack access to analytics staff or are otherwise disconnected from data-informed decision making and support them wherever they are – field operations, program management, core business functions, and everything in between.

Looking Forward

Implementation Approach

In conjunction with the Data Strategy, FEMA is publishing an Implementation Plan with specific tactical projects that align with the objectives laid out in this strategy, to achieve the desired future state for data at the agency. The plan outlines the tasks and outputs, ownership and accountability, and priorities and timelines associated with each project. It also anticipates the impacts of the projects by identifying critical use cases, the use case owner and supporters, and measures of success.

Implementation will be a business-driven, iterative, and evolutionary process. Focus will be placed on data-related activities that further use cases and key lines of business. Major activities will be executed in an agile way, with mechanisms built-in to monitor progress and collect feedback which in turn will re-shape how work is done in subsequent iterations. The agency will learn from the process and outcomes, refine next steps, continuously improve, and incrementally move towards the envisioned end-state. The plan will be reviewed twice yearly, updated as needed, and executed over the next several years, starting in 2023.

Sustainment Approach

To ensure data practices and capabilities do not deteriorate, FEMA will publish a Sustainment and Capacity Building Plan that commits to continuing the initiatives started via the Implementation Plan and providing meaningful value to data enablement efforts in the long-term. The plan will outline resource needs for the ongoing management, oversight, and administration of new data practices and capabilities. It will also propose pathways to integrate resources, where needed, across the agency so programs can mature their data efforts in line with the strategy. Additionally, the Sustainment and Capacity Building Plan will address training to mitigate current challenges arising from staff turnover and will outline a comprehensive Data Literacy Program – a critical pillar for all aspects of data enablement. Lastly, this plan will be flexible and scalable to ensure that FEMA continues to maximize effectiveness as its data needs mature and become more complex and abundant.

Appendix A

Data Terms

These terms, used throughout the strategy, are defined here, and more context can be found in the FEMA Data Lexicon.

Data: Recorded information, regardless of form or the media on which the data is recorded.

Data Citizenship: A cultural concept that represents the relationship and agreements between FEMA personnel and partners, and FEMA data. From the individual level, FEMA personnel and partners acting as citizens of FEMA data are responsible for properly applying and understanding the data they interact with and ensuring its integrity, accuracy, and security as relevant to their own unique roles. In return, FEMA data empowers data citizens and provides justification for decision making.

Data Enablement: The tools, processes, and guidance that empower individuals to use and make decisions with data at FEMA. It encompasses bottom-up data management, top-down data governance, and technology that automates data validation and management.

Data Governance: The establishment of data priorities, the planning and executing of data policies, agreements, and procedures, and the exercising of authority and oversight of all data management.

Data Management: The practice of ingesting, processing, securing, and storing data to ensure data quality, enable information sharing and analysis, support interoperability, and maintain data integrity. Data management also ensures compliance with legal requirements and data governance policies, agreements, priorities, and procedures.

Data Steward: A business process subject matter expert that is authorized and responsible for overseeing the lifecycle activities of their assigned data, including its use across the agency. The data steward works with data consumers to understand their needs, develop processes, manage metadata, and identify and rectify missing data to ensure access to useable and quality data. They also work with data governance entities and IT personnel to enforce data policies and procedures, ensure data accuracy and quality, and securely store data.

Dataset: A collection of related data with a particular context and that is typically used to support specific business needs.

Evidence: Evidence is viewed as the available body of facts or information indicating whether a belief or proposition is true or valid. Evidence can be quantitative or qualitative and may come from a variety of sources including foundational fact finding, performance measurement, policy analysis, and program evaluation. Evidence has varying degrees of credibility, and the strongest evidence comes from a portfolio of high quality, credible sources rather than a single source.