DATA MANAGEMENT
Action Plan

June 2020

Contents

01 Introduction

The Iowa Department of Transportation (DOT) gathers, stores, analyzes, and relies on a wide range of data and information to support business functions across the Agency. The Agency has developed three documents outlining the Agency's strategic, operational, and tactical approach for managing one of the Agency's most critical assets – data. **Figure 1** shows the documents overlap and therefore, interact with each other to achieve the Agency's data management goals.

This document represents the Agency's *Data Management Action Plan* (**DMAP**), which outlines recommended action items necessary to achieve the Agency's data management goals and objectives. While the **DMAP** focuses on what needs to be accomplished to strengthen existing data management practice, it also addresses how and why specific actions should be accomplished. The Agency has prioritized these action items using a prioritization framework and data management roadmap. In doing so, the Agency can more efficiently allocate the resources allotted for data management activities. The **DMAP** should be read with the two supporting plans referenced in **Figure 1**.

The **DMAP** is targeted mainly at the Data Stewards and Data Domain Trustees who will carry out the recommended work plan to improve existing data management practices. The success of this plan depends on sustainable buy-in and action from across the Agency including the executive level, IT, data stewards, and data users.

Iowa DOT Data Management Goals

- Strengthen data governance
- Formalize data life cycle and management
- Improve data architecture and integration
- Improve data collaboration
- Improve data quality

Data Governance Roles

A *Data Steward* is an operational-level role that implements data management strategies for a specific data source.

A *Data Domain Trustee* is a tactical-level role that helps integrate high-level strategies for data management with day-to-day data activities carried out by data users.

The *Data Management Committee* (DMC) is a strategic-level group that ensures continuous buy-in for data management initiatives and activities.

Figure 1. *Iowa DOT Data Management Plans*

Organization of the DMAP

The remainder of the DMAP includes the following sections:

- *Stakeholder Engagement:* This section discusses the importance of stakeholder engagement and communication throughout the implementation process. Strategies to help create buy-in are discussed.

- *Recommended Actions:* This section contains a list of recommended action items and includes a discussion of how the recommended action items work together to achieve the Agency's data management goals and objectives. The recommended action items within this section correspond to the data management strategies further detailed in the *Data Management Business Plan* (**DMBP**).

- *Action Plan:* This section provides an Agency roadmap for data management focused on the interdependencies, risks, and impact of action items recommended. A prioritization framework is also established to ensure Agency resources are efficiently allocated.

02 Stakeholder Engagement

The adoption and implementation of this plan is contingent on adequate resources and continuous support. Specifically, each action item relies on internal buy-in at all levels of the Agency. At the strategic level, it is essential for the Agency to have support from upper management. While upper management will play a limited role in implementing specific action items, executive leadership will champion efforts and help ensure that the necessary resources are available for implementation. At the tactical and operational levels, the levels at which action items will be implemented, strong

	Key Success Factors
	✓ Support from upper management
	✓ Operational-level leadership
	✓ Tactical-level commitment
	✓ Effective communication and buy-in

leadership and commitment to adopting and complying with agency-wide data management procedures is important. At all levels, buy-in will require regular communication and training on data management concepts and practices.

The Agency will employ effective stakeholder engagement techniques such as gathering information from stakeholders to establish the need for data management, consulting with stakeholders on a consistent basis, and using effective channels to disseminate consistent information. In this section, strategies focused on these two areas are discussed.

Information Gathering

As discussed in the *Data Management Strategic Plan* (DMSP), data management helps mitigate common data challenges that reduce the efficiency of data activities within the Agency. However, while these challenges provide anecdotal evidence of why data management is important, they do not provide tangible benefits for making a business case for implementing data management practices. The DMSP provides evidence for the need to implement data management. The methodology used in the benefit assessment focuses on security, quality, relevance and efficiency, and accessibility costs associated with the lack of a strong data management practice and can be used to create a business case for supporting data management and establishing buy-in.

Communication Strategies

Consistent communication is an effective way to promote data management with the Agency. This section highlights some of the key strategies the Agency can use to increase the shared understanding and adoption of data management at all levels.[1]

Keep it Simple

Understanding change is one of the most critical factors in accepting or carrying out the change. One strategy to increase understanding, and therefore buy-in, is to market data management and data governance internally. In the simplest terms, the Agency needs to describe why data needs to be managed and how data management relates to the overall vision and goals of the Agency. For example, the Agency can develop short video presentations, workshops, committee meetings, and training sessions to communicate the importance of data management. The Agency has also developed brochures focused on presenting key concepts established throughout each of the data management plans.

Use Examples

Often, the problems surrounding data are easier to understand if an example is provided. The Agency will use effective models to communicate the detriment incurred by not improving existing data management practices. A simple example is to demonstrate the value of data management in eliminating or reducing

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[1] John Kotter (1988), *Leading Change.*

the cost associated with duplicate data collections as presented in the *Data Management Strategic Plan* (DMSP). The use of such examples allows the Agency to highlight how improvements in data management processes are enabling the Agency to make efficient use of resources.

Use Multiple Mediums

The Agency is made up of diverse groups, requiring effective cross-disciplinary and cross-generational communication strategies to share important information about data management. The Agency will explore multiple means of sharing information on the data management plan including via email or the Agency website and through employee awareness programs, as well as aggressive communication methods such as short videos, presentations, or in-person meetings to effectively engage key stakeholders.

Reiterate

The Agency understands that change does not occur overnight. It requires persistence and reiteration of key points and any relevant details, without overloading, to allow the ideas to sink in. The Agency will accomplish this by sharing messages repeatedly through emails or question and answer sessions at staff meetings.

Lead by Example

Adoption of data management policies and procedures by leaders throughout the Agency is crucial for this cultural change in the management approach. Key stakeholders involved in the creation and communication of the plan should support changes in the practice by understanding and complying with any new or revised protocols. The actions of data management champions and liaisons in their respective positions reinforces the importance of the mission and vision of the data management program.

Explain Inconsistencies

The Agency will ensure that data management strategies are consistently applied across the board. However, the Agency understands that consistent adoption of data strategies is not always an achievable objective. The Agency intends to communicate circumstances where exceptions to created practices are required. For example, if federal laws require new naming conventions for data collection that do not adhere to the existing naming conventions, data managers will develop consistent messaging explaining why a deviation is necessary. Providing an explanation to key stakeholders ensures transparency and reinforces that the standards are still valid despite a temporary inconsistency.

Give and Take

Feedback is equally important to this change process. The Agency will continue to solicit input, feedback, and suggestions from all levels of the Agency, including data managers and technical staff, to improve the data management implementation process. The Agency will use different venues to solicit feedback, including Q/A sessions or through an online commenting tool. Upon receipt of questions and comments, the data management committee will acknowledge receipt and address the issues promptly.

03   Recommended Actions

This section contains the recommended data management action items directly related to the data goals, objectives, and principles established and the strategies suggested in the *Data Management Strategic Plan* (DMSP) and the *Data Management Business Plan* (DMBP), respectively. These recommended action items are crucial in improving the Agency's data management practices; each action item builds on the existing strengths of the Agency and focuses on leveraging the Agency's resources to effectively bridge data management gaps overall.

The following figures provide an overview of the key information for the recommended action items including:

- ***Action Item Description***: A description of the action item's purpose.

- ***Goals Impacted:*** The data management goals, discussed in the *Data Management Strategic Plan* (DMSP), supported by implementing the action item.

- ***Objectives Impacted:*** The data management objectives, discussed in the *Data Management Strategic Plan* (DMSP), supported by implementing the action item.

- ***Effort:*** The level of effort required to accomplish the action item. Level of effort is categorized into three categories—High, Medium, and Low—which correspond to the type of work necessary to complete the tasks associated with the action item. High effort activities include tasks where concentrated effort from a few key individuals is necessary (i.e. creating plans, procedures, communication materials). Medium and low effort activities focus on a collaborative effort of many individuals throughout the Agency rather than a concentrated effort from a few individuals (i.e. consensus building activities).

- ***Timeframe***: The expected completion timeframe for the action item. Action items are considered short-term (completed in 1-2 years), mid-term (completed in 2-3 years), or long-term (completed in 3-5 years) based on the interdependencies of the action items recommended.

- ***Key Stakeholders:*** Stakeholders accountable for the action item's completion. For each action item, a lead stakeholder is also identified.

- ***Key Deliverables:*** Key outcomes and deliverables that will result from accomplishing the action item.

- ***Tasks Accomplished Under this Action Item:*** Subtasks, discussed in detail in the *Data Management Business Plan* (DMBP), that are necessary to accomplish the action item.

RECOMMENDED ACTION ITEM 1: DATA PRIORITY LIST CREATION

1 ACTION ITEM DESCRIPTION

The objective of this task is to prioritize data sources within a business area based on the importance of the data source to key data activities.

2 GOALS IMPACTED

– **Goal 1**: Data Strategy and Governance

3 OBJECTIVES IMPACTED

– **Objective 5**: Identify data users and understand their needs.

4 EFFORT

Low

5 TIMEFRAME

1-2 years

6 KEY STAKEHOLDERS

– Data Management Committee (Lead)

7 KEY DELIVERABLES

– Prioritized data list

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 1.1 Data Source Prioritization—Prioritize data sources by their importance to data activities.

RECOMMENDED ACTION ITEM 2: DATA STANDARDS IDENTIFICATION

1 ACTION ITEM DESCRIPTION

The objective of this task is to identify existing data standards used and data standards needed within the Agency.

2 GOALS IMPACTED

– **Goal 1**: Data Strategy and Governance

3 OBJECTIVES IMPACTED

– **Objective 1**: Improve collaboration on necessary data improvements and planning tools by systematically and continuously reviewing data practices.
– **Objective 2**: Identify roles and capabilities needed for data management activities.
– **Objective 3**: Ensure data management procedures and policies are properly established, documented, and implemented.

4 EFFORT

Medium

5 TIMEFRAME

1-2 years

6 KEY STAKEHOLDERS

– Data Management Committee
– Data Domain Trustees (Lead)
– Data Stewards

7 KEY DELIVERABLES

– List and summary of existing data standards
– List of data standard needs

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 2.1 Master List of Standards—Determine all applicable standards (formal and informal) within the business area of interest.

Task 2.2 Summary of Standards—Create a summary of the standards' ownership, content, and implementation information.

Task 2.3 Gap Analysis—Determine data areas in need of additional or modified data standards.

RECOMMENDED ACTION ITEM 3: DATA DEFINITIONS

1 ACTION ITEM DESCRIPTION

The objective of this task is to create data definitions for selected assets or business processes.

2 GOALS IMPACTED

- **Goal 1**: Data Strategy and Governance
- **Goal 2**: Data Life Cycle and Management
- **Goal 3**: Data Architecture and Integration

3 OBJECTIVES IMPACTED

- **Objective 1**: Improve collaboration on necessary data improvements and planning tools by systematically and continuously reviewing data practices.
- **Objective 3**: Ensure data management procedures and policies are properly established, documented, and implemented.
- **Objective 10**: Create a data dictionary that is current, complete, and useful to data users throughout the Agency.
- **Objective 13**: Identify and standardize the process for adding additional data to the agency-wide data system.

4 EFFORT

High

5 TIMEFRAME

2-3 years

6 KEY STAKEHOLDERS

- Data Domain Trustees
- Data Stewards (Lead)

7 KEY DELIVERABLES

- Metadata training materials
- Metadata for each data source

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 3.1 Metadata Training—Conduct training on the importance of metadata and technical procedures of creating metadata for key personnel.

Task 3.2 Metadata Assessment—Create rights, technical, preservation, descriptive, and structural metadata for each data source.

RECOMMENDED ACTION ITEM 4: NAMING CONVENTIONS

1 ACTION ITEM DESCRIPTION

The objective of this task is to develop standard naming conventions.

2 GOALS IMPACTED

- **Goal 1**: Data Strategy and Governance
- **Goal 2**: Data Life Cycle and Management
- **Goal 3**: Data Architecture and Integration

3 OBJECTIVES IMPACTED

- **Objective 1**: Improve collaboration on necessary data improvements and planning tools by systematically and continuously reviewing data practices.
- **Objective 3**: Ensure data management procedures and policies are properly established, documented, and implemented.
- **Objective 10**: Create a data dictionary that is current, complete, and useful to data users throughout the Agency.
- **Objective 13**: Identify and standardize the process for adding additional data to the agency-wide data system.

4 EFFORT

High

5 TIMEFRAME

2-3 years

6 KEY STAKEHOLDERS

- Data Management Committee
- IT (Lead)
- Data Domain Trustees

7 KEY DELIVERABLES

- Naming convention standards
- Naming convention training

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 4.1 Data Source Naming—Create or rename the dataset or database to be unique within the data practice.

Task 4.2 Attribute Naming—Create or rename data attributes by defining the scope, authority, semantics, syntactics, lexical, and uniqueness conventions for each data source.

Task 4.3 Naming Conventions Training—Conduct training on the importance of data naming conventions and the naming conventions created.

RECOMMENDED ACTION ITEM 5: DATA POLICIES

1 ACTION ITEM DESCRIPTION

The objective of this task is to establish data policies for selected assets or business processes.

2 GOALS IMPACTED

- **Goal 1:** Data Strategy and Governance
- **Goal 2:** Data Life Cycle and Management
- **Goal 3:** Data Architecture and Integration

3 OBJECTIVES IMPACTED

- **Objective 1**: Improve collaboration on necessary data improvements and planning tools by systematically and continuously reviewing data practices.
- **Objective 3**: Ensure data management procedures and policies are properly established, documented, and implemented.
- **Objective 7**: Create data business rules to update data within data systems consistently.
- **Objective 8**: Ensure data access control and standard guidelines are being adhered to in a safe and secure manner.
- **Objective 10**: Create a data dictionary that is current, complete, and useful to data users throughout the Agency.
- **Objective 13**: Identify and standardize the process for adding additional data to the agency-wide data system.

4 EFFORT

High

5 TIMEFRAME

2-3 years

6 KEY STAKEHOLDERS

- Data Management Committee
- Data Domain Trustees (Lead)
- Data Stewards

7 KEY DELIVERABLES

- Documentation on existing and new policies
- Communication materials for data policies

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 5.1 Identify Policies—Identify any existing data policies within the business area.

Task 5.2 Gap Analysis—Determine data areas in need of additional or modified data policies.

Task 5.3 Recommend Policies—Recommend additional policies based on gap analysis and data user input.

Task 5.4 Communicate Policies—Communicate created or updated policies to key stakeholders.

RECOMMENDED ACTION ITEM 6: STANDARDS IMPLEMENTATION PLAN

1 ACTION ITEM DESCRIPTION

The objective of this task is to compile the findings and recommendations into a data standards implementation plan.

2 GOALS IMPACTED

- **Goal 1:** Data Strategy and Governance
- **Goal 2:** Data Life Cycle and Management
- **Goal 3:** Data Architecture and Integration

3 OBJECTIVES IMPACTED

- **Objective 1**: Improve collaboration on necessary data improvements and planning tools by systematically and continuously reviewing data practices.
- **Objective 2**: Identify roles and capabilities needed for data management activities.
- **Objective 3**: Ensure data management procedures and policies are properly established, documented, and implemented.
- **Objective 5**: Identify data users and understand their needs.
- **Objective 10**: Create a data dictionary that is current, complete, and useful to data users throughout the Agency.
- **Objective 13**: Identify and standardize the process for adding additional data to the agency-wide data system.

4 EFFORT

High

5 TIMEFRAME

3-5 years

6 KEY STAKEHOLDERS

- Data Management Committee
- Data Domain Trustees (Lead)
- Data Stewards

7 KEY DELIVERABLES

- Standards implementation plan

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 6.1 Standards Implementation Plan—Develop a data standards implementation plan.

RECOMMENDED ACTION ITEM 7: INITIAL ASSESSMENT

1 ACTION ITEM DESCRIPTION

The objective of this task is to determine key data activities, data sources, necessary skills, and data sharing and integration objectives.

2 GOALS IMPACTED

– **Goal 1:** Data Strategy and Governance

3 OBJECTIVES IMPACTED

– **Objective 2**: Identify roles and capabilities needed for data management activities.
– **Objective 5**: Identify data users and understand their needs.
– **Objective 6**: Determine risks associated with the loss of key individuals and mitigate knowledge loss over time.

4 EFFORT

Low

5 TIMEFRAME

1-2 years

6 KEY STAKEHOLDERS

– Data Management Committee
– Data Domain Trustees (Lead)

7 KEY DELIVERABLES

– List of key business area activities
– List of necessary practices and skills

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 7.1 Business Area Activity Identification—Determine the business area activities that will be target of the data sharing and integration efforts.

Task 7.2 Data Source Identification—Identify data sources that are key to the business area.

Task 7.3 Practices and Skills Gap Analysis—Determine the practices and skills the Agency needs to strengthen the business area.

Task 7.4 Objectives Identification—Identify data sharing and integration objectives for the Agency.

RECOMMENDED ACTION ITEM 8: DATA QUALITY ASSESSMENT

1 ACTION ITEM DESCRIPTION

The objective of this task is to assess the quality of data sources being shared and integrated through profiling and assessment of business rules.

2 GOALS IMPACTED

- **Goal 1:** Data Strategy and Governance
- **Goal 2:** Data Life Cycle and Management
- **Goal 5:** Data Quality

3 OBJECTIVES IMPACTED

- **Objective 1**: Improve collaboration on necessary data improvements and planning tools by systematically and continuously reviewing data practices.
- **Objective 5**: Identify data users and understand their needs.
- **Objective 7**: Create data business rules to update data within data systems consistently.
- **Objective 18**: Create common data metrics that enable consistent assessment across data programs.
- **Objective 19**: Establish defined data metrics and standards for accuracy, timeliness, and completeness.
- **Objective 20**: Promote formal guidelines for assessing data quality, validity, processing consistency, and ordinal accuracy.

4 EFFORT

High

5 TIMEFRAME

1-2 years

6 KEY STAKEHOLDERS

- Data Domain Trustees
- Data Stewards (Lead)
- IT

7 KEY DELIVERABLES

- Data profile summaries
- Documentation on existing business rules

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 8.1 Data Profiling—Examine data sources and document high-level information about the quality of the assessment.

Task 8.2 Assessment of Data Business Rules—Identify the restrictions or constraints in place to process or use data for business area activities.

RECOMMENDED ACTION ITEM 9: IT CAPABILITIES ASSESSMENT

1 ACTION ITEM DESCRIPTION

The objective of this task is to assess the capabilities of the existing IT systems that support the business area activities.

2 GOALS IMPACTED

- **Goal 1:** Data Strategy and Governance
- **Goal 2:** Data Life Cycle and Management
- **Goal 3:** Data Architecture and Integration

3 OBJECTIVES IMPACTED

- **Objective 1:** Improve collaboration on necessary data improvements and planning tools by systematically and continuously reviewing data practices.
- **Objective 2:** Identify roles and capabilities needed for data management activities.
- **Objective 12:** Assess the impact of changes in data collection, policies, and procedures to the overall data program.
- **Objective 15:** Improve internal collaboration on IT and data management activities through effective communication and planning.

4 EFFORT

Medium

5 TIMEFRAME

1-2 years

6 KEY STAKEHOLDERS

- Data Management Committee
- IT (Lead)
- Data Domain Trustees
- Data Stewards

7 KEY DELIVERABLES

- Summary of existing IT systems

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 9.1 IT Systems Discovery Workshop—Review, assess, and summarize existing IT systems and implementation projects.

Task 9.2 IT Systems Gap Analysis—Determine the strengths of existing systems in addressing the data sharing and integration objectives.

RECOMMENDED ACTION ITEM 10: DATA FLOW ASSESSMENT

1 ACTION ITEM DESCRIPTION

The objective of this task is to establish a data flow for the data sources within the business area being assessed.

2 GOALS IMPACTED

– **Goal 1:** Data Strategy and Governance
– **Goal 2:** Data Life Cycle and Management
– **Goal 3:** Data Architecture and Integration
– **Goal 4:** Data Collaboration

3 OBJECTIVES IMPACTED

– **Objective 1**: Improve collaboration on necessary data improvements and planning tools by systematically and continuously reviewing data practices.
– **Objective 3**: Ensure data management procedures and policies are properly established, documented, and implemented.
– **Objective 11**: Establish data backups and archiving procedures to ensure data is secure and protected from losses.
– **Objective 12**: Assess the impact of changes in data collection, policies, and procedures to the overall data program.
– **Objective 13**: Identify and standardize the process for adding additional data to the agency-wide data system.
– **Objective 16**: Coordinate data collection and processing, as well as product acquisition, between Divisions within the Agency.
– **Objective 17**: Share data externally in a manner that is appropriate and effective for all users.

4 EFFORT

High

5 TIMEFRAME

3-5 years

6 KEY STAKEHOLDERS

– Data Management Committee
– Data Domain Trustees
– IT (Lead)

7 KEY DELIVERABLES

– Summary of existing data flow process
– Updated data flow diagram

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 10.1 Existing Data Flow Review—Review, assess, and summarize existing data flow within the Agency.

Task 10.2 Data Flow Validation—Validate existing data flow and change propagation.

Task 10.3 Data Flow Protocol Implementation—Implement new data flow or business rules to better automate the flow of data.

RECOMMENDED ACTION ITEM 11: DATA INTEGRATION SOLUTIONS

1 ACTION ITEM DESCRIPTION

The objective of this task is to identify data integration techniques to be used by the Agency.

2 GOALS IMPACTED

- **Goal 2:** Data Life Cycle and Management
- **Goal 3:** Data Architecture and Integration
- **Goal 4:** Data Collaboration

3 OBJECTIVES IMPACTED

- **Objective 9:** Provide data access to all users throughout the Agency by enabling data to be widely available on multiple platforms, using diverse analysis tools.
- **Objective 11:** Establish data backups and archiving procedures to ensure data is secure and protected from losses.
- **Objective 12:** Assess the impact of changes in data collection, policies, and procedures to the overall data program.
- **Objective 13:** Identify and standardize the process for adding additional data to the agency-wide data system.
- **Objective 15:** Improve internal collaboration on IT and data management activities through effective communication and planning.
- **Objective 16:** Coordinate data collection and processing, as well as product acquisition, between Divisions within the Agency.
- **Objective 17:** Share data externally in a manner that is appropriate and effective for all users.

4 EFFORT

Low

5 TIMEFRAME

1-2 years

6 KEY STAKEHOLDERS

- Data Management Committee
- IT (Lead)

7 KEY DELIVERABLES

- Summary of existing data integration solutions
- Recommendations for data integration solutions

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 11.1 Review of Existing Integration Efforts —Review, assess, and document existing data integration efforts within the Agency.

Task 11.2 Data Integration Solution Recommendation—Select and implement a data integration solution(s) based on the Agency's needs.

RECOMMENDED ACTION ITEM 12: LINEAR REFERENCING SYSTEM ASSESSMENT

1 ACTION ITEM DESCRIPTION

The objective of this task is to reassess and improve upon the universal Linear Referencing System (LRS) adopted by the Agency.

2 GOALS IMPACTED

- **Goal 1:** Data Strategy and Governance
- **Goal 2:** Data Life Cycle and Management

3 OBJECTIVES IMPACTED

- **Objective 1**: Improve collaboration on necessary data improvements and planning tools by systematically and continuously reviewing data practices.
- **Objective 12**: Assess the impact of changes in data collection, policies, and procedures to the overall data program.

4 EFFORT

Low

5 TIMEFRAME

3-5 years

6 KEY STAKEHOLDERS

- Data Management Committee
- IT
- Analytics staff (Lead)

7 KEY DELIVERABLES

- Updated LRS standards documentation

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 12.1 Review of Existing Linear Referencing System—Review and assess existing Linear Referencing System used by the Agency.

Task 12.2 Implementation of Linear Referencing System Improvements—Determine and implement any improvements to the Agency's LRS.

RECOMMENDED ACTION ITEM 13: DATA SECURITY ASSESSMENT

1 ACTION ITEM DESCRIPTION

The objective of this task is to identify, assess, and create data security standards to reduce data-related risks.

2 GOALS IMPACTED

- **Goal 1:** Data Strategy and Governance
- **Goal 2:** Data Life Cycle and Management
- **Goal 3:** Data Architecture and Integration
- **Goal 4:** Data Collaboration

3 OBJECTIVES IMPACTED

- **Objective 1**: Improve collaboration on necessary data improvements and planning tools by systematically and continuously reviewing data practices.
- **Objective 2**: Identify roles and capabilities needed for data management activities.
- **Objective 5**: Identify data users and understand their needs.
- **Objective 7**: Create data business rules to update data within data systems consistently.
- **Objective 8**: Ensure data access control and standard guidelines are being adhered to in a safe and secure manner.
- **Objective 11**: Establish data backups and archiving procedures to ensure data is secure and protected from losses.
- **Objective 13**: Identify and standardize the process for adding additional data to the agency-wide data system.
- **Objective 14**: Improve external data integration by vetting external data sources so that the data is compatible enterprise-wide.
- **Objective 16**: Coordinate data collection and processing, as well as product acquisition, between Divisions within the Agency.
- **Objective 17**: Share data externally in a manner that is appropriate and effective for all users.

4 EFFORT

High

5 TIMEFRAME

1-2 years

6 KEY STAKEHOLDERS

- Data Management Committee
- Data Domain Trustees
- IT (Lead)

7 DELIVERABLES

- Data security standards
- Data security communication materials

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 13.1 Security Requirements Identification—Identify or classify the security level necessary for each data source.

Task 13.2 Security Assessment—Conduct a security assessment to identify areas of strength and weakness with the Agency's data security.

Task 13.3 Security Policy and Standards Creation—Create security policies and standards.

Task 13.4 Protocol Communication—Communicate and implement established security protocol.

RECOMMENDED ACTION ITEM 14: EXTERNAL COLLABORATION

1 ACTION ITEM DESCRIPTION

The objective of this task is to identify stakeholders and develop an engagement plan to enable collaboration.

2 GOALS IMPACTED

- **Goal 1:** Data Strategy and Governance
- **Goal 3:** Data Architecture and Integration
- **Goal 4:** Data Collaboration

3 OBJECTIVES IMPACTED

- **Objective 1**: Improve collaboration on necessary data improvements and planning tools by systematically and continuously reviewing data practices.
- **Objective 5**: Identify data users and understand their needs.
- **Objective 13**: Identify and standardize the process for adding additional data to the agency-wide data system.
- **Objective 14**: Improve external data integration by vetting external data sources so that the data is compatible enterprise-wide.
- **Objective 16**: Coordinate data collection and processing, as well as product acquisition, between Divisions within the Agency.
- **Objective 17**: Share data externally in a manner that is appropriate and effective for all users.

4 EFFORT

Low

5 TIMEFRAME

2-3 years

6 KEY STAKEHOLDERS

- Data Management Committee
- Data Domain Trustees (Lead)
- Executive Board
- IT

7 KEY DELIVERABLES

- Stakeholder engagement plan

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 14.1 Stakeholder Identification—Identify key stakeholders that utilize Agency data or provide/analyze data that the Agency utilizes.

Task 14.2 Stakeholder Engagement Plan—Develop a stakeholder engagement plan focused on data sharing protocols.

RECOMMENDED ACTION ITEM 15: PROCEDURE STANDARDIZATION

1 ACTION ITEM DESCRIPTION

The objective of this task is to standardize data sharing and integration procedures for new data or applications.

2 GOALS IMPACTED

- **Goal 1:** Data Strategy and Governance
- **Goal 2:** Data Life Cycle and Management
- **Goal 3:** Data Architecture and Integration
- **Goal 4:** Data Collaboration

3 OBJECTIVES IMPACTED

- **Objective 1:** Improve collaboration on necessary data improvements and planning tools by systematically and continuously reviewing data practices.
- **Objective 4:** Identify and track data collection or acquisition costs.
- **Objective 12:** Assess the impact of changes in data collection, policies, and procedures to the overall data program.
- **Objective 13:** Identify and standardize the process for adding additional data to the agency-wide data system.
- **Objective 16:** Coordinate data collection and processing, as well as product acquisition, between Divisions within the Agency.

4 EFFORT

High

5 TIMEFRAME

2-3 years

6 KEY STAKEHOLDERS

- Data Management Committee
- Data Domain Trustees (Lead)
- IT

7 KEY DELIVERABLES

- New data collection, application, and software acquisition protocols

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 15.1 New Data Collection Standardization—Create a standardized procedure that supports data integration for new data collections.

Task 15.2 New Application Standardization—Create a standardized procedure that supports data integration for new application development and system acquisitions.

RECOMMENDED ACTION ITEM 16: DATA SHARING AND INTEGRATION PLAN

1 ACTION ITEM DESCRIPTION

The objective of this task is to develop and implement a data integration plan.

2 GOALS IMPACTED

- **Goal 1:** Data Strategy and Governance
- **Goal 2:** Data Life Cycle and Management
- **Goal 3:** Data Architecture and Integration

3 OBJECTIVES IMPACTED

- **Objective 1:** Improve collaboration on necessary data improvements and planning tools by systematically and continuously reviewing data practices.
- **Objective 2:** Identify roles and capabilities needed for data management activities. Objective 3
- **Objective 5:** Identify data users and understand their needs.
- **Objective 10:** Create a data dictionary that is current, complete, and useful to data users throughout the Agency.
- **Objective 13:** Identify and standardize the process for adding additional data to the agency-wide data system.

4 EFFORT

High

5 TIMEFRAME

3-5 years

6 KEY STAKEHOLDERS

- Data Management Committee (Lead)
- Data Domain Trustees
- Executive Board
- IT

7 KEY DELIVERABLES

- Data sharing and integration plan

8 TASKS ACCOMPLISHED UNDER THIS ACTION ITEM

Task 16.1 Data Sharing and Integration Plan—Develop a data sharing and integration implementation plan.
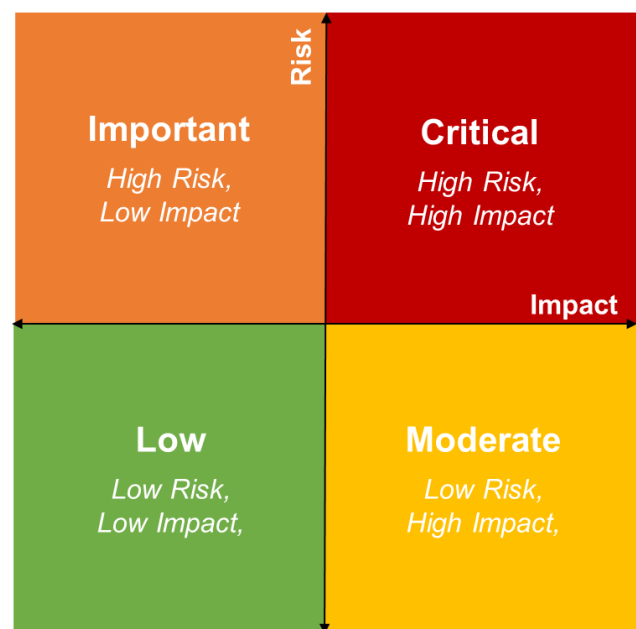
04 Action Plan

While progress has been made in establishing data practices, additional action is necessary to further mature data management within the Agency. In this section, a prioritization framework and data management roadmap for the implementation of the recommended action items is proposed. The prioritization of action items enables the Agency to identify which activities are most important in achieving Agency-defined objectives and meeting Agency-defined goals while the data management roadmap identifies in what order the prioritized action items should be carried out.

Prioritization Framework

To better compare the value of each recommended action item, a prioritization framework is proposed. The framework relies on an assessment of the level of risk and the level of impact associated with each recommended action item. The *level of risk* describes the importance of the action item in a) enabling the Agency to access data safely and efficiently and b) supporting the implementation of other interdependent action items. *Level of impact* describes the importance of an action item in addressing the data management objectives, goals, and data principles. Once these elements have been assessed, the action items are placed in a matrix based on the action item's level of risk and level of impact in relation to other action items. Such a matrix, as depicted in **Figure 2**, utilizes the determined risk and impact to categorize action items into four priority categories. The four categories are as follows:

- **Critical**: These action items are considered high risk and high impact, meaning they are both important to achieving the Agency's data management goals, objectives, and principles as well as furthering the overall function and development of strong data management strategies. Action items that fall in this category are considered before any other category of action items.

- **Important**: These action items are considered high risk, low impact. While these action items are essential to furthering data management practices within the Agency, as they are high risk, these action items are less impactful in achieving the Agency goals, objectives, and principles and are therefore considered second.

- **Moderate:** These action items are considered low risk, high impact. While these actions are of low risk, they are of high impact in achieving the Agency's data management goals, objectives, and principles and are therefore considered third.

Figure 2. *Risk-impact priority matrix*

- **Low:** These action items are considered low risk, low impact which makes them the least important or least impactful action items to carry out. Action items that fall in this category are considered last.

The sections to follow describe how the risk and impact of an action item are calculated and what the role of the prioritization framework is.

Level of Risk

Level of risk refers to the importance of the action item in a) enabling the Agency to access data safely

> **Level of Risk**
>
> The importance of the action item in a) enabling the Agency to access data safely and efficiently and b) supporting the implementation of other interdependent action items.

and efficiently and b) supporting the implementation of other interdependent action items. For the purposes of the prioritization framework, level of risk describes the action item's importance to the Agency in conducting daily data management activities and the number of action items that are successors to that action item. High-risk action items are considered essential to both the current and future data management practices. Therefore, failure to implement these action items hinders the success of the Agency's data management practice and strategy.

Level of Impact

The level of impact describes the importance of an action item in accomplishing the data management objectives and goals and promoting the data principles of the Agency. In the DMSP, the Agency presented five key goal areas, twenty goal objectives, and eight data principles. The level of impact of an action item is related to the total number of objectives and principles that the action item directly supports.

> **Level of Impact**
>
> The importance of an action item in addressing the data management objectives, goals, and data principles.

Role of the Prioritization Framework

The prioritization framework developed can be used to assess or evaluate action items developed in this plan and future iterations of this plan. As the Agency's data management practice evolves and new action items are developed, the prioritization framework can be modified to assess the unique needs of the Agency. However, while the prioritization framework helps identify the importance of action items to the Agency's data management practice, it is just one tool used to better evaluate action items utilizing similar metrics. The data management roadmap, described in the next section, provides more information on how each action item would be implemented by the Agency as it considers the effort required to carry out each action item and the relationship and interdependencies of action items in addition to priority.

Data Management Roadmap

To better understand how the Agency will implement and allocate resources to data management activities over time, a data management roadmap was developed. The roadmap is divided into two data management strategy areas—data standards and data sharing and integration—with action items within each area proposed concurrently. Action items in each strategy area are arranged along a 5-year timeline. Recommended actions identified for the 1-2-year timeframe are considered short-term and are the first action items to be implemented. Mid-term (2-3-year timeframe) action items are to be conducted following the short-term action items, and long-term action items (3-5-year timeframe) are to be conducted last.

Action items within each timeframe are to be conducted with consideration to the action items' priority and dependency on others. Therefore, when multiple action items are proposed at one time, resources should be focused on the high priority and prerequisite action items first. The length of the time or level of effort required for each action item is visualized in the roadmap by the length of the action item box, and no more than five action items are proposed to be worked on at one time. The roadmap, depicted in **Figure 3**, identifies a preliminary work plan that considers the level of effort or resources necessary to conduct each action item, the priority of action items, and the order and interdependency of the action items. For each action item, the level of risk and level of impact was assessed and used to determine the priority of each action item proposed.
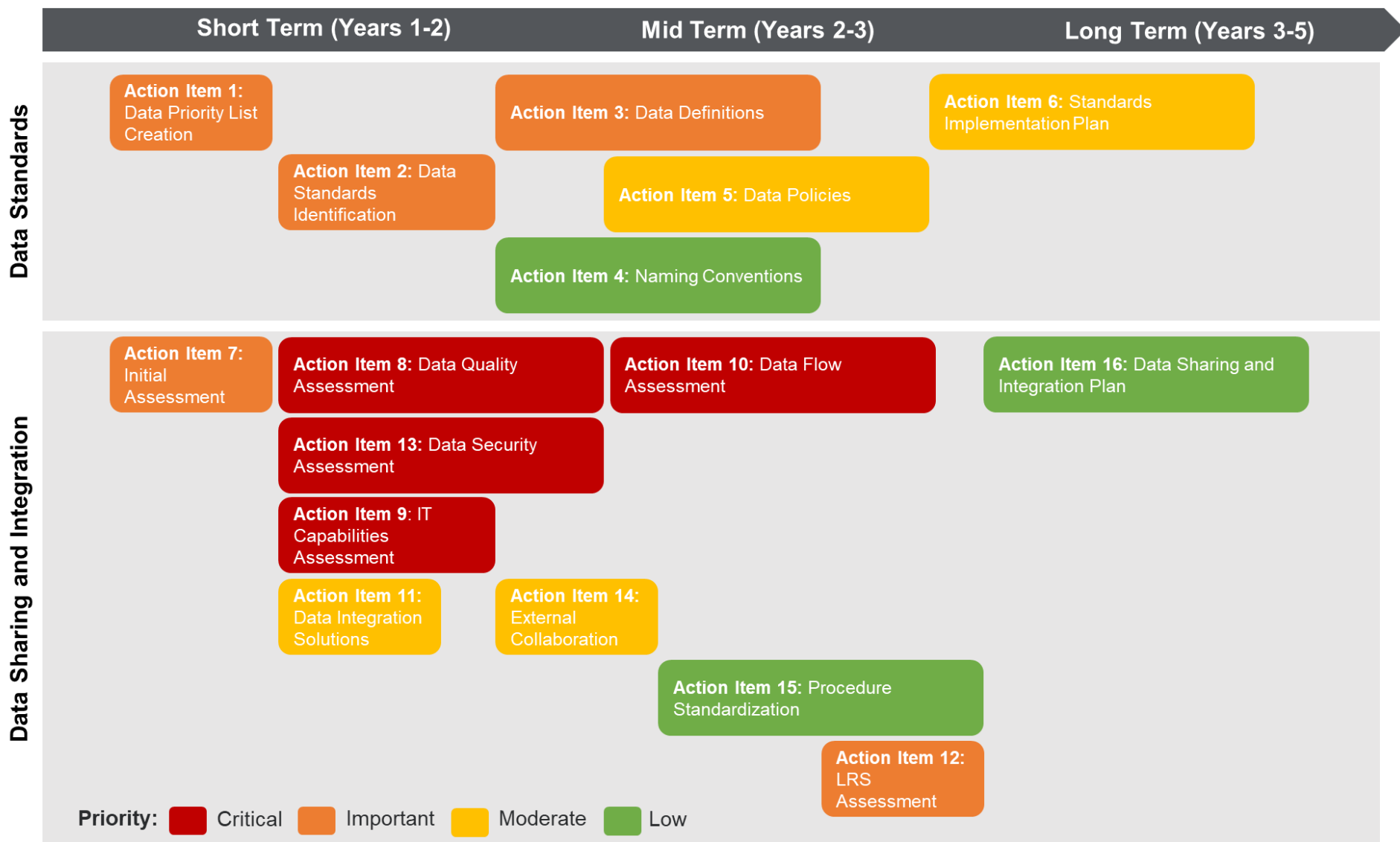
Figure 3. Data management implementation roadmap

As the action items proposed in the data management roadmap are carried out, the Agency will focus on engaging stakeholders to ensure buy-in and support throughout the process. At the start of each action item, the Agency should communicate to key stakeholders what the task is and who is the point of contact for the action item or subtasks. In doing so, the Agency will allow stakeholders to ask questions, provide comments, or minimally, stay up to date with on-going data activities within the Agency. Upon the completion of each action item, the Agency will communicate the key findings or outcomes of the activity to stakeholders; the Agency will use a combination of the communication strategies outlined in Chapter 1. If necessary, the Agency will also identify and facilitate necessary training based on the outcomes of the completed action item. By integrating communication throughout the data management action plan, the Agency will foster an environment of collaboration and shared understanding.