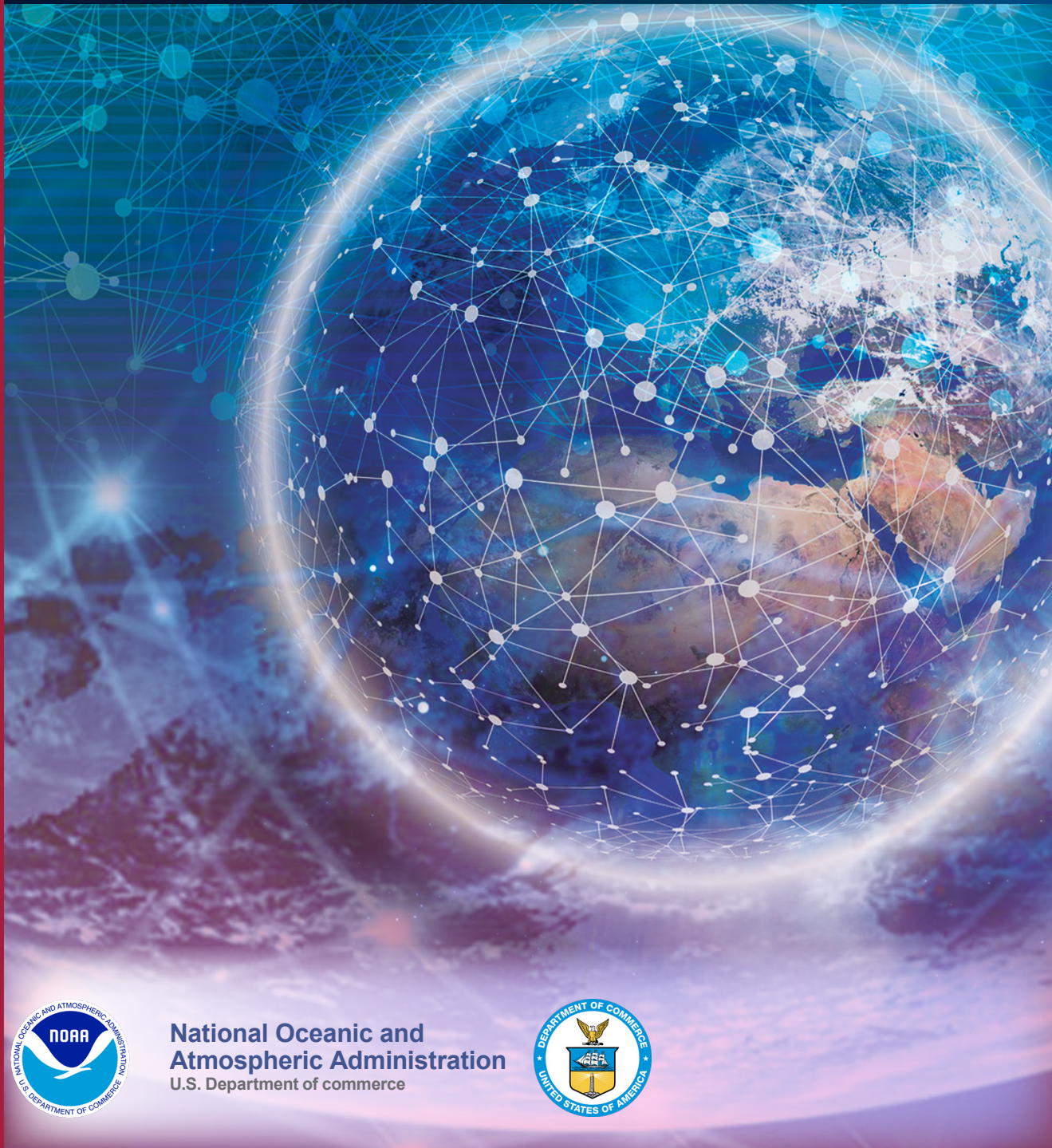


# NOAA Data Strategic Action Plan

Maximizing the Value of NOAA Data



National Oceanic and  
Atmospheric Administration  
U.S. Department of commerce



## NOAA Science & Technology Focus Areas:

Uncrewed Systems ■ Artificial Intelligence ■ 'Omics ■ Cloud ■ Citizen Science ■ Data **March 2022**

# NOAA Data Strategic Action Plan

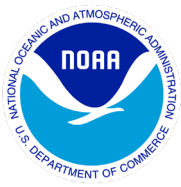
## Maximizing the Value of NOAA Data

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### NOAA Climate

*From supercomputers and state-of-the-art models to observations and outlooks, we provide data, tools, and information to help people understand and prepare for climate variability and change. <https://www.noaa.gov/climate>*





## Introduction

Data are foundational to NOAA, underpinning virtually all aspects of our mission. This includes key NOAA priorities such as providing data and information to the public about climate science, reducing the impacts of severe weather events, and enabling the New Blue Economy. NOAA is the authoritative source for multiple national datasets that form the foundation of the National Spatial Data Infrastructure, including geodetic control, nautical charts, coastal elevation, weather and climate models, critical habitat, and satellite and observational platforms. NOAA's data are a vital national asset, serving the needs of countless stakeholders in industry, academia, other government agencies, and the public. NOAA data derive from globally collected observations which in turn support analyses and predictions of the earth systems, development and updates to nautical charts, protection of life and property, sustainable fisheries and ecosystem management, and numerous other NOAA mission areas. Consistent and timely access to quality NOAA data significantly enhances the value and return on the Nation's investment.

The [NOAA Data Strategy: Maximizing the Value of NOAA's Data](#), published in July 2020, describes the vision, scope, goals, and objectives for establishing a foundation to effectively manage, share, and maximize the value of NOAA data assets. The Strategy's five goals are broadly applicable across NOAA mission areas and the supporting objectives guide implementation.

**GOAL 1: LEADERSHIP – Align data management leadership roles across the organization**

**GOAL 2: GOVERNANCE – Govern and manage data strategically to most effectively steward the US taxpayers' investment**

**GOAL 3: OPEN DATA – Share data as openly and widely as possible to promote maximum utilization of NOAA data**

**GOAL 4: CAPABILITIES – Promote data innovation and quality improvements to facilitate science and support data-driven decision making**

**GOAL 5: COLLABORATION – Engage stakeholders and leverage partnerships to maximize the value of NOAA data to the Nation**

Through the Strategy and this Strategic Action Plan, NOAA seeks to maximize the value of data assets by providing a consistent and transparent approach to data governance, stewardship, access, and use. This Data Strategic Action Plan serves as a roadmap for implementation of the NOAA Data Strategy, beginning with the top priorities for FY22–FY23 (Appendix 1). This action plan will establish a modernized and unified NOAA data enterprise in support of the missions across NOAA, including close coordination with the NOAA science and technology focus areas (Uncrewed Systems, Artificial Intelligence [AI], 'Omics, Cloud, and Citizen Science).

## Scope

The NOAA Data Strategy and Strategic Action Plan apply to all types of NOAA data. These include environmental data, program data, statistical data, mission-support data such as administrative, financial, performance, and workforce data, as well as the derived information, products, and services that facilitate the best use of NOAA data. Data collected by external groups using NOAA funds (e.g., grant recipients, cooperative institutes) will continue to be subject to NOAA public access requirements<sup>1</sup>. The Data Strategy does not define specific technologies or implementations. While all NOAA data need to be managed and are subject to open data policies, different data will have different requirements and must be treated differently. For example, environmental data may have different requirements than mission support data, which often includes personally identifiable information. Similarly archived data versus real or near-real time operational data, or fully open data versus controlled unclassified information may also differ.

## Strategic Imperative

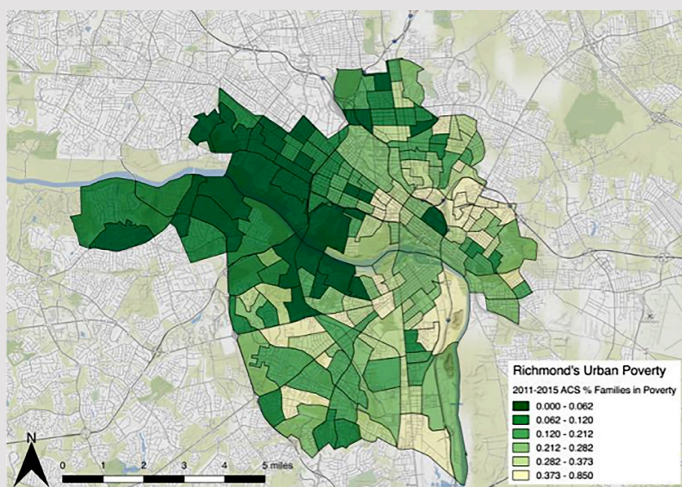
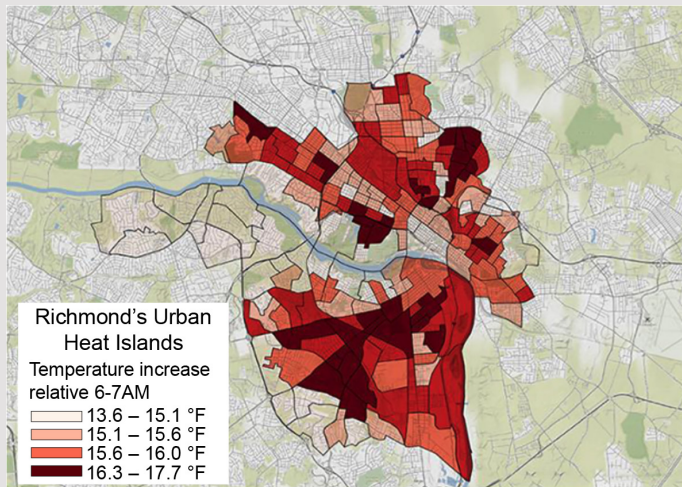
The NOAA Data Strategic Action Plan directly supports the NOAA Strategic Plan and its three overarching priorities: (1) building a Climate Ready Nation by establishing NOAA as the primary authoritative provider of climate information and services in the whole-of-government response to tackling the climate crisis; (2) integrating equity into our core operations; and (3) promoting economic development while maintaining environmental stewardship, with a focus on advancing the New Blue Economy. This action plan supports NOAA's objectives to accelerate growth of the New Blue Economy with improved data access and multi-sector engagement activities. The overarching objective of the NOAA Data Strategy is to achieve readiness for tomorrow's data landscape. To prepare for NOAA's future data needs, this action plan aligns with several levels of federal data policy requirements while supporting the NOAA mission and bringing value to the organization and our partners. The current executive and

<sup>1</sup>See EDMC Data Sharing Directive: <https://nosc.noaa.gov/EDMC/PD.DSP.php>

legislative requirements for data management include: the **Information Quality Act (IQA)**, the **Foundations for Evidence-Based Policymaking Act** ["Evidence Act"], the **Federal Data Strategy and Annual Action Plan**, the **Executive Order on Tackling the Climate Crisis at Home and Abroad**, and the **Memorandum on Restoring Trust in Government Through Scientific Integrity and Evidence-Based Policymaking**.

**NOAA climate data and analyses support the President's Executive Order 14008 on "Tackling the Climate Crisis at Home and Abroad"**

NOAA *Climate.gov* is a source of timely and authoritative scientific data and information about climate. The current administration's Executive Order 14008 on Tackling the Climate Crisis at Home and Abroad only emphasizes the nation's need for a climate specific data portal. The urban heat island map of Richmond, Virginia juxtaposed with the percentage of families in poverty map displays the importance to another of this administration's priorities: social and racial equity. The data and analysis conducted and displayed at *climate.gov* serves to keep the American people informed and educated about the climate crisis and its subsequent impacts.



The Evidence Act was enacted in 2019, and directs Agencies to manage their data as an asset. It defines the responsibilities of the Chief Data Officer (CDO) within federal agencies and assigns to her/him the oversight of the full data lifecycle, data inventories, the Paperwork Reduction Act (PRA), the Information Quality Act (IQA), agency Open Data Plans (ODP), and other related activities and policies. Many open data and data sharing directives from the White House have been codified in the Evidence Act, with the result being that all NOAA data assets are open by default (can be used or reused by the public without restriction) unless such sharing is expressly prohibited by other law, regulation, or binding agreement. These data include NOAA environmental data as well as programmatic, financial, and other administrative data. Documentation, code (e.g., computer programs), data quality information, and metadata are also included.

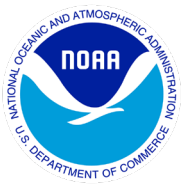
Additionally, the Office of Management and Budget (OMB) Memorandum, M-19-18 **Federal Data Strategy – A Framework for Consistency**, and the Federal Data Strategy's 2020 Action Plan support federal agencies in fulfilling a wide array of legislative and administrative requirements while also prioritizing foundational activities for agencies in developing a mature data asset management environment. The 2020 Action Plan identifies initial actions for agencies that are essential for establishing processes, building capacity, and aligning existing efforts to better leverage data as a strategic asset. The NOAA Data Strategic Action Plan aligns with and complies with the Federal Data Strategy and the 2020 Action Plan. As with the Federal Data Strategy, the NOAA Data Strategy and Strategic Action Plan will be regularly updated for consistency with new statutory or OMB information policy guidance.

Federal government priorities for collecting, using, sharing, and disseminating data are shifting with modern practices and policies. A critical role for data is specifically referenced in the climate crisis<sup>2</sup> and the racial equity<sup>3</sup> Executive Orders, as well as in the Memo on Scientific Integrity.<sup>4</sup> The NOAA Data Strategic Action Plan directly supports the NOAA Science Council's Scientific Integrity Committee in the development of updated IQA processes needed in order to comply with the new administration priorities for scientific integrity.

<sup>2</sup>Executive Order 14008 of January 27, 2021 (Tackling the Climate Crisis at Home and Abroad)

<sup>3</sup>Executive Order 13985 of January 20, 2021 (Advancing Racial Equity and Support for Underserved Communities Through the Federal Government)

<sup>4</sup>"Restoring trust in government through science and integrity and evidence-based policy making"



## Timeline, Roles, and Priorities

The NOAA Data Strategic Action Plan outlines a five-year execution timeline applying to fiscal years (FY) 22 through FY26. Milestones and deliverables have been set for every action, each linked to one or more of the Strategy objectives. This Strategic Action Plan reflects the many levels of collaboration within the NOAA data community. Teams from across line offices collaborated to create a strategic implementation (action) plan with a set agenda and priorities. These cross-NOAA collaborations will continue to regularly update this action plan as needed.

The priority focus in the first two fiscal years (FY22 through FY23) is what can be reasonably achieved with no new resources. During FY22 and FY23, the NOAA CDO will begin internal NOAA data governance planning and engagement with appropriate groups in NOAA for handling administrative-, financial-, performance-, and workforce-related data for years FY24 and beyond.

The NOAA Data Strategic Action Plan lays out how the NOAA CDO and existing bodies such as the NOAA Environmental Data Management Committee (EDMC), will make progress toward the goals and objectives of the Data Strategy while leveraging expertise and established groups in NOAA Line Offices and Staff Offices. The NOAA CDO will ultimately oversee the execution of the Data Strategic Action Plan. Goals 1 and 2 of the Data Strategy focus on establishing the NOAA CDO organizational structure, governance, and supportive processes within the line/staff offices to enable the execution of the actions in this plan. Therefore, the priority actions for the remainder of FY22–23 will advance these goals.

## Action Plan

### GOAL 1 – Leadership

**Aligning data management leadership roles across NOAA is the critical first step to ensuring there are authorities, organizational structures, and budgets in place to sufficiently and transparently support the management and maximum use of NOAA data assets.**

Goal 1 aligns NOAA enterprise data governance roles establishing collaborative leadership, empowered by policy and budget, with representation on NOAA's strategic and decision-making councils and advisory boards.

To ensure users have the information they need, effective data management leadership requires a governance structure that starts with the NOAA CDO and extends through NOAA Line and Staff Offices. Working toward establishing a NOAA Data Governance structure, involving the NOAA CDO and incorporating or interfacing with existing bodies such as the NOAA EDMC, will ensure that data governance includes representation from across NOAA's diverse data management landscape.

The data governance structure, promoted NOAA-wide via a carefully crafted communications plan, establishes a solid foundation that will support implementation of the strategy for the next five years (and beyond). Establishing an effective enterprise data management and governance approach will allow the agency to effectively develop and track data management reporting and evaluation frameworks while advocating for the required budgets and resources needed to succeed.

**Action 1)** Establish the NOAA CDO organizational structure.

#### Milestones and Deliverables:

- A. Define the roles and responsibilities of the NOAA CDO.
- B. Establish a budget for the NOAA CDO to ensure the resources are available to perform the functions of the office.

**Objectives Addressed:** 1.1

**Action 2)** Establish the NOAA CDO as a representative on the appropriate NOAA decision-making bodies.

#### Milestones and Deliverables:

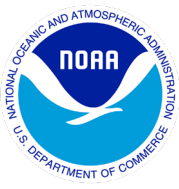
- A. Analyze the charters or terms of reference of all NOAA councils, committees, and boards to identify data connections.
- B. Add the NOAA CDO or their representative as a member of the appropriate NOAA decision-making and strategic bodies.

**Objectives Addressed:** 1.1 and 1.3

**Action 3)** Formalize NOAA Line Office data governance and roles.

#### Milestones and Deliverables:

- A. Line Offices identify data managers, data leads, data management groups, and critical points of contact (POCs) that provide technical and tactical input and guidance to the NOAA CDO.
- B. Establish Line Office data management leads if not already in place.



- C. Define the relationship between of Line Office data management leads and the NOAA CDO.
- D. Assist Line Office leadership in defining budget and staffing requirements.

**Objectives Addressed:** 1.2

## GOAL 2 – Governance

**Goal 2 lays out the framework, roles, and responsibilities of the NOAA Data Governance Body, advancing the data governance structure established in Goal 1.**

Establishing a diverse and collaborative Data Governance Body with cross-line office representation will ensure that sufficient human resources are available to support data-driven agency policies, decision making, and accountability in addition to creating direct lines of communication from data managers to NOAA leadership and executive governing bodies.

The Data Governance Body will support and guide the development of a more strategic approach to NOAA enterprise and line office-level data management practices, strategies, and performance measures. The Data Governance Body will review, evaluate, and create NOAA data policies that are consistent with federal mandates and legislation such as the Evidence Act, Geospatial Data Act, and the Federal Data Strategy. This new Data Governance Body may be a modified or expanded version of the existing NOAA Environmental Data Management Committee (EDMC), or may be a replacement for the existing committee.

**Action 4)** Establish a NOAA Data Governance Body.

### Milestones and Deliverables:

- A. Recommend the establishment of a diverse NOAA Data Governance Body and seek approval to establish the new body from NOAA strategy councils and NOAA leadership.
- B. Establish expert teams that serve as advisory committees to the NOAA Data Governance Body as appropriate.

**Objectives Addressed:** 2.1

**Action 5)** Socialize and promote the NOAA Data Governance structure and leadership roles and responsibilities.

### Milestones and Deliverables:

- A. Designate leaders for data governance policies<sup>5</sup> to ensure visibility, sponsorship and progress.
- B. Create a NOAA Data Strategy Communications Plan that includes details about the NOAA Data Governance framework, organizational structure, and annual priorities.
- C. Share the communication plan widely across NOAA.

**Strategy Objectives Addressed:** 2.1

**Action 6)** Harmonize existing NOAA data directives into updated and consolidated policies that align with new federal policies and legislation.

### Milestones and Deliverables:

- A. Identify, review, and update existing NOAA administrative orders (NAOs), Procedural Directives, and policies on environmental data management based on Federal policies and directives.<sup>6</sup>
- B. Establish a NOAA policy and guidance for NOAA environmental data management throughout the data life cycle, including data archiving, and long-term preservation.

**Objectives Addressed:** 2.2

**Action 7)** Increase awareness of common NOAA data services and data standards and evaluate their use more broadly across NOAA.

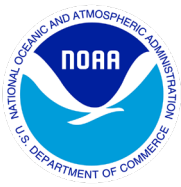
### Milestones and Deliverables:

- A. Create a baseline inventory and maintain a catalog of common NOAA data services to provide a foundation for enterprise services that meet NOAA's data management requirements.
- B. Create and maintain a data standards catalog to guide best practices.
- C. Identify gaps in common data services and standards and leverage line office data management expertise to fill any gaps.
- D. Recommend the use of NOAA-approved data standards that are consistent with the Evidence Act, and implement controls to define and measure compliance.

**Objectives Addressed:** 2.3, 2.4, 4.1, 5.3, 4.5

<sup>5</sup>E.g., NOAA Chief Data Officer, Assistant Chief Data Officers, etc.

<sup>6</sup>E.g., Public Access to Research Results (PARR), the Evidence Act, Geospatial Data Act, NOAA Records Schedules, and the Federal Data Strategy.



## GOAL 3 – Open Data

**Goal 3, sharing NOAA data as openly and widely as possible, maximizing its utilization by NOAA partners, stakeholders, and the public, is foundational to NOAA's mission and thus central to NOAA's Data Strategy.**

Achieving this goal is not solely dependent on data communications and access, as it includes building and maintaining the infrastructure, strategies, and plans necessary to ensure timely, equitable, and appropriate access to NOAA data. Establishing the NOAA Data Governance structure described in Goals 1 and 2, enables NOAA to more effectively achieve Goal 3 by providing leadership, reporting, and communication structures that support development of actionable plans for open data, data security, and NOAA's collective data management operations. A NOAA Open Data Plan for sharing agency data must be developed with stakeholder engagement to ensure utility and flexibility that reflects NOAA's diverse user community requirements. In addition, critical implementation plan components include developing and maintaining a comprehensive data inventory, ensuring data licensing is aligned with open data guidance in the Evidence Act and the Federal Data Strategy, adopting tiered data access practices that protect privacy and confidentiality, and improving communication of data authenticity and lineage to reinforce and build trust. Footnote<sup>7</sup>: E.g., Agreements with the World Meteorological Organization, the International Hydrographic Organization, etc.

**Action 8)** Develop a NOAA Open Data Plan (ODP) for improving public access to priority NOAA data assets that aligns with the Office of Management and Budget (OMB) and Department of Commerce (DOC) guidance on the Evidence Act, as well as the Executive Order on On Advancing Racial Equity and Support for Underserved Communities Through the Federal Government and the DOC Environmental Justice Strategy.

### Milestones and Deliverables:

- A. Establish a NOAA Open Data Plan writing team to evaluate OMB and DOC guidance for the NOAA Open Data Plan.
- B. Seek approval for the NOAA Open Data Plan through the appropriate governing bodies.

<sup>7</sup>A NOAA Open Data Plan for sharing agency data must be developed with stakeholder engagement to ensure utility and flexibility that reflects NOAA's diverse user community requirements.

- C. Publish and promote the NOAA Open Data Plan widely throughout NOAA and beyond.

### Objectives Addressed: 3.1, 3.4

**Action 9)** Assess baseline compliance with Open Data requirements in the Evidence Act.

### Milestones and Deliverables:

- A. Develop a checklist to define Open Data compliance, based on OMB and DOC implementation guidance.
- B. Measure Open Data compliance for NOAA environmental data and identify compliance gaps.
- C. Measure Open Data compliance for NOAA mission support data and identify compliance gaps.
- D. Develop a gap closure strategy and implementation plan to improve open data compliance and measure progress

### Objectives Addressed: 3.1

**Action 10)** Maintain a comprehensive NOAA data inventory, including standard metadata, that is published to NOAA and federal data catalogs (data.gov) to ensure that NOAA's data are discoverable and accessible to external stakeholders.

### Milestones and Deliverables:

- A. Inventory NOAA data assets leveraging ongoing line office efforts and expertise, working in close coordination with the Commerce Data Governance Board's (CDGB) Inventory Working Group and existing relevant NOAA data inventory teams.
- B. Maintain a comprehensive NOAA data inventory utilizing a tiered structure to ensure sensitive and confidential data are made available to the extent possible, while protected to the extent required, in consultation with the NOAA Office of the Chief Information Officer controlled unclassified information (CUI) team.
- C. Identify gaps and duplicates in the data inventory and develop an action plan to address gaps and eliminate duplicates.

### Objectives Addressed: 3.2, 3.4, 3.5, 5.3

**Action 11)** Develop and maintain NOAA data licensing guidance that is consistent with Open Data policies in the Evidence Act.

**Milestones and Deliverables:**

- A. Develop and publish NOAA Data Licensing Guidance that is machine-readable and clearly defines characteristics for data licenses that conform with and support Evidence Act requirements.
- B. Develop NOAA policy for specifying appropriate Data Licenses for data that NOAA creates, procures, or otherwise receives as in the case with NOAA Data Buys from commercial or outside vendors.<sup>8</sup>
- C. Promote NOAA Data Licensing Guidance within NOAA and with key partners.

**Objectives Addressed:** 3.3, 3.4

**Action 12)** Develop and implement new approaches for sharing NOAA data and update existing policies as needed to reflect these changes.

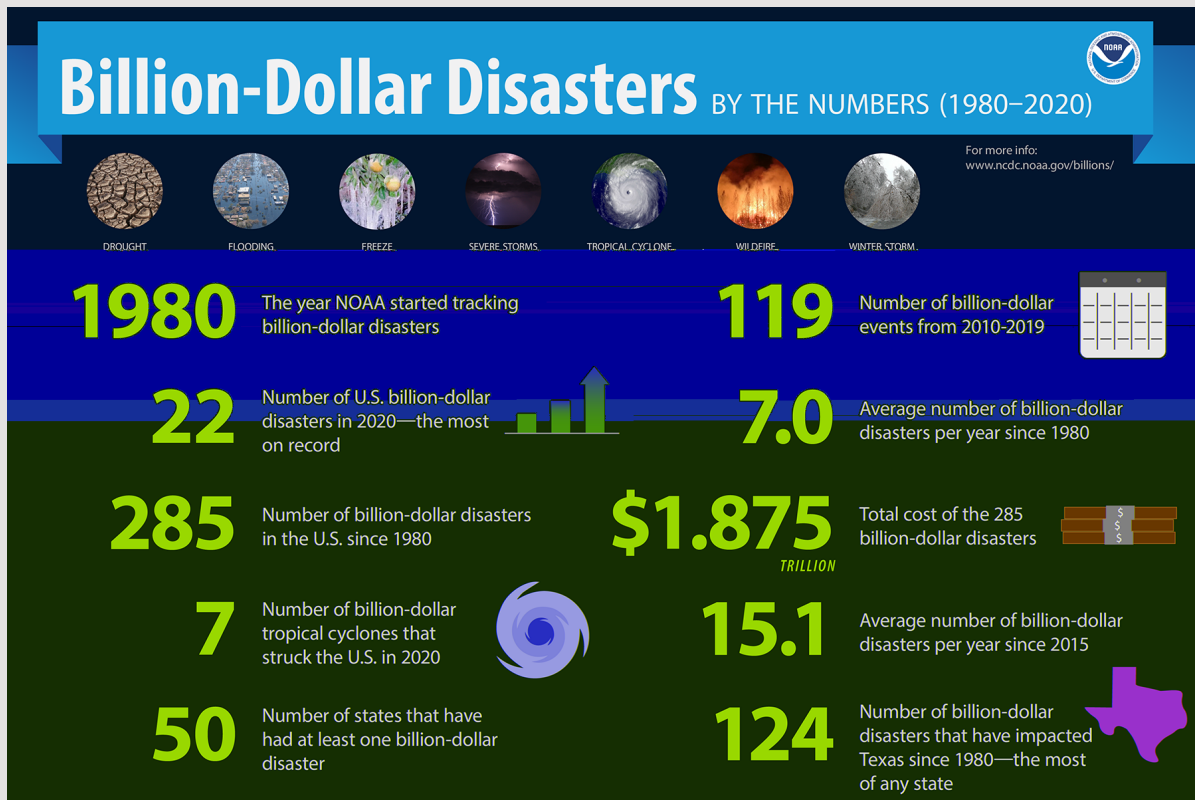
**Milestones and Deliverables:**

- A. Develop a communications plan for use within NOAA for sharing data that highlights NOAA Cloud-hosted data projects and other data sharing strategies.
- B. Revise the NOAA Digital Object Identifier (DOI) issuance policy to enable expanded use of DOIs for NOAA data, to promote discoverability and help track usage and ensure NOAA researchers receive credit for publishing their data.

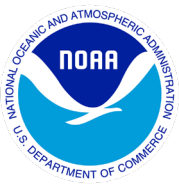
<sup>8</sup>Within legal authorities, NOAA still retains flexibility in establishing terms for attaining and sharing data to support its mission, constrained by budget and other factors such as timeliness of delivery.

**NOAA continuous data collection and management of billion dollar disasters aids in climate action**

NOAA's National Center for Environmental Information (NCEI) tracked a record number of billion dollar disasters in 2020. These disasters pose tremendous risks to public infrastructure, private property, businesses, environmental capital, and human lives. The totaled cost was calculated at 95 billion dollars for these events- fourth highest cost on record. Through NCEI's continuous data collection and management, trends can be tracked and forecasts made for the coming years to aid in decision making regarding climate action and mitigation.  
<https://www.ncdc.noaa.gov/billions/>







- C. Engage with and support NOAA programs that provide data and planning tools that empower communities to take action on environmental justice issues.
- D. Support the development of an Equitable Data Lifecycle Strategy to be included in NOAA's equity strategy and to inform and support NOAA data lifecycle management.

**Objectives Addressed:** 3.4, 3.5

## GOAL 4 – Capabilities

### Innovative data solutions developed by NOAA foster and promote agency-wide efficiencies.

Goal 4 ties together all of NOAA's Data Strategy by calling for actions and initiatives that build and maintain the necessary technical tools and staff skills to support data-driven science and decision making throughout the data lifecycle (i.e. planning, measurement, collection, documentation, access, and long term preservation). Investing in training opportunities, data science and analytical tools, and data communities will expand capacity for critical data-related activities and will lead to a more educated, empowered, and data literate NOAA workforce. Cultivating the creativity and innovation essential for achieving these objectives demands a workforce with diverse backgrounds, experiences, and expertise and an inclusive work environment that drives workforce performance and collaboration.

Building and expanding data architecture solutions that link to NOAA's Enterprise Architecture will be vital for the adoption and utility of scientific data solutions, both within the agency and beyond, and are critical to aligning synergies across NOAA's Science & Technology (S&T) and Information Resources Management (IRM) strategies.

Expanding data infrastructure will ensure that the data-centric needs of NOAA's new and expanding S&T initiatives are met, while providing additional opportunities to leverage these technologies to maximize the value of NOAA's data.

**Action 13)** Assess NOAA's data program maturity<sup>9</sup> and report on progress.

<sup>9</sup>See [Federal Data Strategy Data Governance Playbook](#).

### Milestones and Deliverables:

- A. Conduct regular data program maturity assessments, building on information gained in previous assessments.
- B. Report on increased NOAA's data program maturity progress to DOC and share the report widely.

**Objectives Addressed:** 4.1, 4.4

**Action 14)** Increase awareness of NOAA-developed data management software and tools to maximize the investment and ensure sustainability.

### Milestones and Deliverables:

- A. Maintain a catalog of NOAA-developed data management software solutions.
- B. Establish NOAA enterprise-level information technology (IT) security review support for NOAA data management software solutions.

**Objectives Addressed:** 2.3, 4.1, 4.2

**Action 15)** Identify enterprise platforms to support data management requirements throughout the data lifecycle to provide flexible, adaptive infrastructure required to meet the needs of existing and future programs.

### Milestones and Deliverables:

- A. Identify NOAA enterprise-level solutions that support the full diversity of NOAA's data to ensure that end user needs are met.<sup>10</sup> Flexible, adaptive infrastructure will be required to meet the needs of existing programs and future data-intensive initiatives.

**Objectives Addressed:** 4.1, 4.2, 4.5, 5.3

**Action 16)** Assess and increase NOAA staff data literacy and data skills<sup>11</sup> to improve the efficiency and effectiveness of use and management of NOAA data.

### Milestones and Deliverables:

- A. Identify critical data skills needed for the agency and assess the current staff capacity for those data skills.
- B. Perform a data skills gap analysis to prioritize the agency's needs.
- C. Identify and execute approaches to fill those needs.

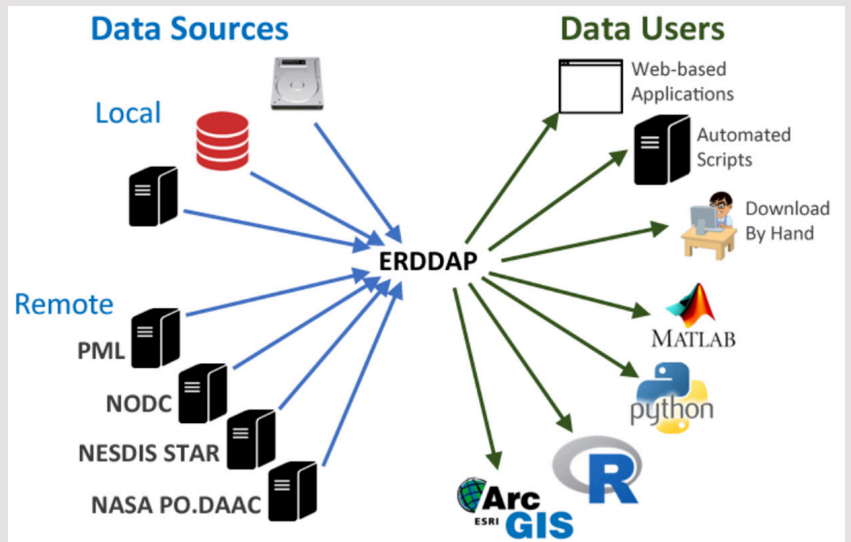
<sup>10</sup>E.g., latency requirements, data volumes, etc.

<sup>11</sup>Federal Data Strategy Playbook: <https://resources.data.gov/assets/documents/assessing-data-skills-playbook.pdf>

**NOAA's Environmental Research Division Data Access Program (ERDDAP) provides interoperable data access maximizing its utilization by stakeholders**

The NOAA developed Environmental Research Division Data Access Program (ERDDAP) data server is a highly configurable data broker that serves subsetted gridded and tabular data from numerous file types or other ERDDAP servers in common file formats. ERDDAP provides human and machine interfaces to its data serving and data visualization functionality. This application is widely used at NOAA and outside NOAA by U.S. and International organizations. ERDDAP addresses a core need in data management for interoperable data access. More information on ERDDAP, including download links and installation instructions are available.

<https://coastwatch.pfeg.noaa.gov/projects/erddap/introduction.html>



**Strategy Objectives Addressed: 4.3**

**Action 17)** Recruit data professionals to infuse data science expertise and diversity across the organization and ease the data stewardship burden on science and support staff.

**Milestones and Deliverables:**

- A. Develop Data Management/Data Scientist staff requirements and position descriptions.
- B. Develop and implement standardized language for new data scientist job postings that emphasize our commitment to building a more diverse and inclusive workforce.
- C. Define a NOAA Data Manager curriculum on the Commerce Learning Center platform.
- D. Work with the Office of Human Capital Services (OHCS) to add Data Scientist job classifications as appropriate.
- E. Utilize internship and fellowship programs to increase data science expertise across NOAA including NOAA affiliates and other partners.<sup>12</sup>

**Objectives Addressed: 4.3**

**Action 18)** Support the data components of the NOAA Science and Technology (S&T) Strategies and Implementation Plans.

<sup>12</sup>For example, data science specific Pathways recruitment, Cooperative Institute, Cooperative Science Center, and other partnership program affiliates.

**Milestones and Deliverables:**

- A. Provide guidance and expertise to NOAA S&T initiatives in developing Data Management Plans and templates.
- B. In cooperation with the NOAA Artificial Intelligence (AI) Center, define data and metadata quality, documentation, and dissemination requirements for NOAA's AI-ready open data to ensure consistent standards across Federal agencies.
- C. In cooperation with the NOAA Cloud Strategy implementation, define requirements for cloud-ready data formats and dissemination requirements when applicable to ensure the plans align.

**Objectives Addressed: 4.1, 4.2, 4.4, 4.5**

**Action 19)** Establish an appropriate lifecycle for data made available in real and near real time that builds on past practices to meet unique data distribution and quality control needs.

**Milestones and Deliverables:**

- A. Identify examples of successful, ongoing real-time data sharing that supports NOAA's mission and determine characteristics that align with open data requirements.
- B. Collaborate with NOAA partners to determine optimal policies that support and improve real-time data access and use.
- C. Identify common data formats that accelerate the use of data for specific applications that depend on data timeliness or quality.

**Objectives Addressed: 3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.4, 5.2**

## GOAL 5 – Collaboration

**When an environmental measurement is taken, these data become immediately invaluable, because that instant in time and space will never exist again and the data can never be replicated or replaced.**

The value of these data can decrease, or be lost, if the data are not secured, publicly accessible, or ready for use when needed. Goal 5 highlights NOAA's responsibility to ensure that the full value of NOAA data is realized by ensuring data readiness and actively engaging with stakeholders. This stakeholder engagement involves establishing partnerships with federal agencies, international partners, and industry, academic, and other non-federal groups that utilize NOAA data and/or share data with NOAA. Stakeholder feedback is especially important in helping NOAA design data delivery practices that are flexible enough to optimize access for our very diverse user communities.

Understanding and addressing the evolving needs of stakeholders is vital to maintaining effective partnerships and to the wide, public use of NOAA data.

**Action 20)** Improve internal NOAA stakeholder engagement, problem solving, and innovation to strengthen partnerships.

### Milestones and Deliverables:

- A. Establish a process with the NOAA Science Council to align the synergistic actions and activities of the Data Strategic Action Plan with other NOAA S&T Strategic Plans.
- B. Designate “change champions” focused on NOAA data stewardship.
- C. Develop stakeholder engagement plan with existing stakeholders to gather feedback on areas for NOAA data management improvement.<sup>13</sup>
- D. Engage with NOAA's Technology Partnerships Office, the NOAA S&T Partnerships Working Group, the Office of General Counsel, and others as needed to ensure NOAA's various partnership authorities are utilized and legal requirements are met.

### Objectives Addressed: 5.1

<sup>13</sup>I.e., the Data Access & Archive Requirements Working Group (DAARWG), Science Advisory Board (SAB), and others.

**Action 21)** Increase engagement with stakeholders and gather external feedback on NOAA data management.

### Milestones and Deliverables:

- A. Coordinate with NOAA External Affairs to increase stakeholder identification and engagement, both nationally and internationally.
- B. Chair dedicated sessions at major ocean, weather, and earth observation conferences as well as major business and data-centric conferences to raise awareness of NOAA data and to gather feedback on data management and usability.
- C. Improve consistency in the processes for seeking stakeholder input on substantial changes to NOAA's data/data services.<sup>14</sup>
- D. Align coordination of data product development between the science subject matter experts and the product user communities to enhance development to best meet users' needs.
- E. Coordinate NOAA's increasing use of data from external sources via policies and best practices, including the EDMC Data Sharing Directive<sup>15</sup> and new NOAA data licensing guidance.<sup>16</sup>

### Objectives Addressed: 5.1, 5.2

**Action 22)** Track the use of NOAA data to help identify stakeholders and end users, within the bounds of Federal law and policy, to measure the value of NOAA data.

### Milestones and Deliverables:

- A. Identify NOAA and federal law and policies that pertain to tracking the use of data and establish a NOAA policy and best practices for “tracking” data use.
- B. Partner with existing NOAA user engagement teams and efforts to assist with developing NOAA use case examples that show the value of NOAA data.

<sup>14</sup>See [NAO 216-112: Policy on Partnerships in the Provision of Environmental Information](#).

<sup>15</sup>See EDMC Data Sharing Directive: <https://nosc.noaa.gov/EDMC/PD.DSP.php>.

<sup>16</sup>See Action 11: Develop and maintain NOAA data licensing guidance that is consistent with Open Data policies in the Evidence Act.

- C. Develop a plan to increase NOAA's understanding of how much our data are used, why they are being used, if they are useful, and how NOAA can measure improvement. The plan should address the relative value of furnishing data in real time compared to a post-collection archive.

**Objectives Addressed:** 5.2, 5.3

**Action 23)** Streamline method(s) for NOAA scientists and research grantees (e.g., cooperative institutes) to identify NOAA data sources used in peer-reviewed publications.

#### Milestones and Deliverables:

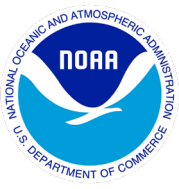
- A. Work with NOAA Institutional Repository to incorporate accessible data as part of the manuscript record.
- B. Develop a plan and procedure for dissemination of data used in peer-reviewed research publications, or internal studies, that would not otherwise be accessible.
- C. Host workshops for NOAA grantees to raise awareness and gather feedback on data management and usability.

**Objectives Addressed:** 5.1

### The partnership between NOAA and Saildrone enables quality NOAA mission data collection and innovative data delivery workflows

*A saildrone is a commercially leasable uncrewed surface vehicle (USV) powered by wind and solar energy used for observing the marine environment. In 2014 and 2020 NOAA-PMEL (Pacific Marine Environmental Laboratory) and Saildrone established a Cooperative Research and Development Agreement (CRADA) to facilitate information exchange between NOAA-PMEL and Saildrone towards the development and evaluation of this platform for the collection of climate quality data. Over 6 years, NOAA- PMEL and Saildrone worked together to successfully develop, integrate, test and evaluate ocean and atmospheric sensors on saildrone and the development of data delivery formats and workflows. This public-private partnership resulted in establishing saildrone as another viable option to meet NOAA's environmental observing objectives (Meinig et al. 2019). Saildrone Inc.*





## Conclusion

NOAA is committed to accelerate the use of data throughout the agency and with other key partners, expand data collection with openness and transparency, deliver on mission, and steward resources while protecting quality, integrity, security, privacy, and confidentiality for the greater benefit of the agency, our partners, and the Nation. This Strategic Action Plan serves as a living document that identifies actions linked to the goals and objectives that continue the advancement of NOAA data priorities, while also providing a set of milestones and deliverables that show how NOAA can reach that potential. The actions of this plan will be collectively executed in a phased approach with the assumption of stable resources that can be redirected when possible and new resources when available to accelerate NOAA's progress to meet these milestones. The actions of this plan will continue to improve data management leadership, governance, open data sharing, innovation, and stakeholder engagement.

NOAA data are central to emerging science and technologies and as such the strategic action plan includes coordination of synergistic activities with the Cloud, AI, Uncrewed Systems, 'Omics, and Citizen Science Strategies to fully realize the benefits of improved organizational and operational efficiencies.

As a world leader in atmospheric and ocean sciences, NOAA has demonstrated the value of high-quality and well-managed data to ensure accountability, to manage operations, and to maintain and enhance the performance of the economy, public health, and welfare.

Continued socialization and public engagement of this strategic action plan will be facilitated through the various committees, councils, stakeholders, and partner engagement activities identified within the plan.



## Appendix 1 - Top Priorities for FY22 and FY23

### Goal 1: Leadership

- Action 1: Establish the NOAA Chief Data Officer (CDO) organizational structure.
- Action 3: Formalize NOAA Line Office data governance roles.

### Goal 2: Governance

- Action 4: Establish a NOAA Data Governance Body.
- Action 5: Socialize and promote the NOAA Data Governance structure and leadership roles and responsibilities.
- Action 6: Harmonize existing NOAA EDMC data directives into updated and consolidated policies that align with new federal policies and legislation.

### Goal 3: Open Data

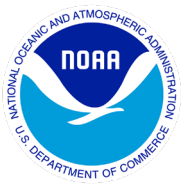
- Action 8: Develop a NOAA Open Data Plan for improving public access to priority NOAA data assets that aligns with the Office of Management and Budget (OMB) and Department of Commerce (DOC) Evidence Act guidance.
- Action 9: Assess baseline compliance with Open Data requirements in the Evidence Act.
- Action 10: Maintain a comprehensive NOAA data inventory, including standard metadata, that is published to NOAA and federal data catalogs (data.gov) to ensure that NOAA's data are discoverable and accessible to external stakeholders.
- Action 11: Develop and maintain NOAA data licensing guidance that is consistent with Open Data policies in the Evidence Act.

### Goal 4: Capabilities

- Action 13: Assess NOAA's data program maturity and report on progress.
- Action 16: Assess and increase NOAA staff data literacy and data skills to improve the efficiency and effectiveness of use and management of NOAA data.

### Goal 5: Collaboration

- Action 22: Track the use of NOAA data to help identify stakeholders and end users, within the bounds of federal law and policy, to measure the value of NOAA data.

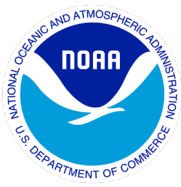


## Appendix 2 – Definitions

Links to sources can be found in Appendix 3: References

Word or Term	Definition	Source
Archiving	The set of actions of transferring, maintaining, documenting, and storing records. Archiving ensures that information is actionable—understandable, documented, discoverable, usable.	Dictionary of Archive Terminology
Communications Plan	Includes an engagement model for stakeholders, type of information to be shared, and the schedule for sharing information	The DAMA Dictionary of Data Management (2nd Edition; Earley, 2011)
Data	Recorded information, regardless of form or the media on which the data are recorded. Ex. administrative, environmental, mission, mission-support, unstructured.	NOAA Data Strategy; Reference: Evidence Act, 44 U.S.C. § 3502
Data Asset	A collection of data elements or data sets that may be grouped together.	NOAA Data Strategy; Reference: Evidence Act, 44 U.S.C. § 3502
Data Catalog	A searchable, comprehensive data inventory available to the users.	The DAMA Dictionary of Data Management (2nd Edition; Earley, 2011)
Data Creation	First step in the data lifecycle, congruent with data collection.	Reference: OMB Circular A-130, Managing Information as a Strategic Resource
Data Governance	Provides direction and oversight for data management by establishing a system of decision rights over data that accounts for needs of the enterprise.	The DAMA Dictionary of Data Management (2nd Edition; Earley, 2011)
Data Governance Body	“The head of each agency must establish an agency Data Governance Body, to be chaired by the Chief Data Officer, with participation from relevant senior-level staff in agency business units, data functions, and financial management. All agencies must include their Data Governance Body in their Strategic Information Resources Management Plan’s Governance sections as required by OMB guidance.”	Evidence Act, 44 U.S.C. § 3502
Data Inventory	A description of the data asset and associated metadata, including all variable names and definitions.	Evidence Act, 44 U.S.C. § 3511(a)
Data License	A license agreement is a legal arrangement between the creator/depositor of the dataset and the data repository, signifying what a user is allowed to do with the data. Data are then provided on demand as a service.	The DAMA Dictionary of Data Management, 2nd Edition; Earley, 2011 Consortium of European Social Science Data Archives (CESSDA Training)
Data Life Cycle	The stages through which information passes, typically characterized as creation or collection, processing, dissemination, use, storage, and disposition, to include destruction and deletion.	NOAA Data Strategy; Reference: OMB Circular A-130, Managing Information as a Strategic Resources <sup>1</sup>

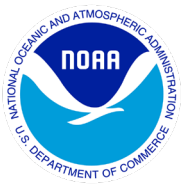
<sup>1</sup>See [OMB Circular A-130](#).



Data Management	The business function that develops and executes plans, policies, practices, and projects that acquire, control, protect, deliver, and enhance the value of data and information assets throughout their lifecycle.	The DAMA Dictionary of Data Management (2nd Edition; Earley, 2011)
Data Program Maturity	Maturity assessments allow an organization to evaluate itself against documented best practices, determine gaps, and identify areas to prioritize for improvement. A maturity assessment analyzes all aspects of agency policies, procedures, and operations related to data and data infrastructure, including data governance, data management, data culture, data systems and tools, data analytics, staff skills and capacity, resource capacity, and compliance with law and policy. The results of a maturity assessment feed into the data governance and management processes to inform investment decisions and to prioritize subsequent actions. A maturity assessment should be repeated periodically, as determined by the agency, to measure progress and prioritize next steps.	Federal Data Strategy Governance Playbook
Data Services	Data services are a subset of Data Management and includes adherence to agreed-upon standards; ingesting data, developing collections, and creating products; maintaining databases; ensuring permanent, secure archival; providing both user-friendly and machine-interoperable access; assisting users; migrating services to emerging technologies; and responding to user feedback.	NAO 212-15
Data Stewardship	All activities that preserve and improve the information content, accessibility, and usability of data and metadata.	NOAA Data Strategy; Reference: NOAA Environmental Data Management Framework <sup>1</sup>
Geospatial Data	Information that is tied to a location on the Earth, including by identifying the geographic location and characteristics of natural or constructed features and boundaries on the Earth, and that is generally represented in vector datasets by points, lines, polygons, or other complex geographic features or phenomena; may be derived from, among other things, remote sensing, mapping, and surveying technologies; includes images and raster datasets, aerial photographs, and other forms of geospatial data or datasets in digitized or non-digitized form.	Geospatial Data Act of 2018
Long-term Preservation	The set of actions for transferring, maintaining, documenting, and storing records. Data may be “well preserved” but be poorly archived, e.g., no context, format details, etc.	Dictionary of Archive Terminology
Machine Readable	Data in a format that can be easily processed by a computer without human intervention while ensuring no semantic meaning is lost.	NOAA Data Strategy; Reference: Evidence Act, 44 U.S.C. § 3502

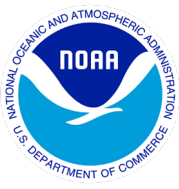
<sup>1</sup>See [NOAA Environmental Data Management Framework](#)





NOAA Records Schedules	This schedule covers records created by Federal agencies in carrying out the work of financial management: procuring goods and services, paying bills, collecting debts, accounting for all financial transactions, and monitoring agencies' net worth. It does not apply to copies of records forwarded to the Department of Treasury or the Office of Management and Budget in fulfillment of reporting requirements. These forwarded copies serve unique business purposes at those agencies and are therefore scheduled separately as records of OMB and Treasury.	National Archives General Record Schedule; Transmittal 31 Schedules ONLY (no crosswalks or FAQs)
Open Data	A public data asset that is machine-readable; available (or could be made available) in an open format; not encumbered by restrictions, other than intellectual property rights, that would impede the use or reuse of such asset; and based on an underlying open standard that is maintained by a standards organization.	NOAA Data Strategy
Open License	A legal guarantee that a data asset is made available at no cost to the public; and with no restrictions on copying, publishing, distributing, transmitting, citing, or adapting such asset.	NOAA Data Strategy; Reference: Evidence Act, 44 U.S.C. § 3502
Public Data Asset	A data asset, or part thereof, maintained by the Federal Government that has been, or may be, released to the public.	NOAA Data Strategy; Reference: Evidence Act, 44 U.S.C. § 3502
Real-Time Data	Data or observations for which the reporting or recording of events is nearly simultaneous with their occurrence. It is distinguished from archival retrieval of the data.	American Meteorological Society (AMS)
Standard	A product of protocol with a publicly published definition accepted and used by a community of practice or accredited standards organization.	Internal definition





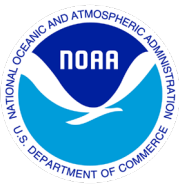
## Appendix 3 – Acronyms

Acronym	Definition
AI	Artificial Intelligence
CDGB	Commerce Data Governance Board
CDO	Chief Data Officer
CUI	Controlled Unclassified Information
DAARWG	Data Access & Archive Requirements Working Group
DOC	Department of Commerce
DOI	Digital Object Identifier
EDMC	Environmental Data Management Committee
FY	Fiscal Year
IQA	Information Quality Act
IRM	Information Resource Management
IT	Information Technology
NAO	NOAA Administrative Order
NOSC	NOAA Observing System Council
ODP	Open Data Plan
OHCS	Office of Human Capital Services
OMB	Office of Management and Budget
PARR	Public Access to Research Results
POC	Point of Contact
PRA	Paperwork Reduction Act
S&T	Science and Technology
SAB	Science Advisory Board

## Appendix 4 – References

References to the supporting policies, legislation, and other NOAA guidance documents related to this NOAA Data Strategic Action Plan.

- [NOAA Data Strategy](#)
- [NOAA Science & Technology Focus Areas](#)
- [OMB M-19-18: Federal Data Strategy - A Framework for Consistency](#)
  - [Federal Data Strategy 2020 Action Plan](#)
  - [Federal Data Strategy Resources](#)
  - [Federal Data Strategy Governance Playbook](#)
- [Foundations for Evidence-Based Policy Making Act \(“The Evidence Act”\)](#)
  - [OMB M-19-23 - Phase 1 Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Learning Agenda, Personnel, and Planning Guidance](#)
  - [OMB M-21-XX - Phase 2 Implementation of the Foundations for Evidence Based Policymaking Act of 2018: Open Data Access & Management --- PENDING OMB RELEASE](#)
  - [OMB M-21-XX - Phase 3 - Implementation of the Foundations for Evidence Based Policymaking Act of 2018: Data Access for Statistical Purposes --- PENDING OMB RELEASE](#)
  - [OMB M-20-12 - Phase 4 Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Program Evaluation Standards and Practices](#)
- [OMB M-13-13 - Open Data Policy - Managing Information as an Asset](#)
- [Geospatial Data Act of 2018](#)
- [OMB Information Quality Act \(IQA\) Guidelines](#)



– [NOAA IQA Guidelines](#)

- [Department of Commerce \(DOC\) Data Strategy](#)
- [NOAA Administrative Order \(NAO\) 212-15 - Management of Environmental Data and Information](#)
- [Implementation Plan for the National Strategy for Ocean Mapping, Exploring, and Characterizing the United States Exclusive Economic Zone \(NOMECE IP\)](#)
- [NAO 216-112 - Policy on Partnerships in the Provision of Environmental Information](#)
- [Increasing Access to the Results of Federally Funded Science](#) - otherwise known as Public Access to Research Results (PARR)

– [NOAA PARR Plan](#)

- The [Data Management Body of Knowledge \(DAMA DMBOK-2\) - DAMA Dictionary of Data Management](#) (2nd Edition; Earley, 2011) - [Note: available to NOAA staff only]
- EDMC Data Sharing Directive: <https://nosc.noaa.gov/EDMC/PD.DSP.php>
- Dictionary of Archive Terminology: [archiving](#) and [preservation](#)



