NATIONAL MARINE FISHERIES SERVICE INSTRUCTION 04-111-02
May 25, 2015

Science and Technology
NMFS Data and Information Management, NMFSPD 04-111

Data Management Planning

NOTICE: This publication is available at: http://www.nmfs.noaa.gov/op/pds/

OPR: F/S&T (M. Brady)   **Certified by:** F/ST (N. Cyr)
Type of Issuance: Initial

SUMMARY OF REVISIONS:

Signed _____/S/_____May 8, 2015_____
Eileen Sobeck,   Date
Assistant Administrator for the National Marine Fisheries Service

Table of Contents

1. <u>Purpose .</u> The NOAA's National Marine Fisheries Service (NMFS) is a data driven organization. It pursues its mission by collecting, processing, analyzing, storing, using, sharing, and distributing data. NMFS reaches its scientific conclusions and manages valuable marine resources based on its data. Therefore, by enhancing the way that divisions and other units with data management plans manage data, NMFS can execute its mission with greater speed, accuracy, efficiency, cost savings, and confidence.

   The details of NMFS' responsibilities, its funding, the natural environment, and technology are constantly in flux. In order to adapt to and even exploit such changes NMFS personnel must carry out a program of continual improvement in data management and hence continual improvement in the execution of NMFS's mission.

   Data management plans will yield continual data management improvement. This directive and the corresponding [template](#)[1] also provide practical guidance on how to prepare a plan. This directive provides a high degree of flexibility to divisions in preparing their plans.

2. <u>Terminology and acronyms used in this directive</u>.
   - *NMFS* is the National Marine Fisheries Service

   - *Environmental data* are data that excludes personnel and administrative data.

   - The term *Best Practices* refers to the best practices originally described in the NMFS Enterprise Data Management (EDM) Vision and Strategy[2] and being iteratively developed on the Best Practices wiki page[3].

   - A *data set* is a database, a collection of related data files, or any other collection of data. The emphasis in this directive is on environmental data.

   - A *DMP* is a Data Management Plan (DMP).

   - The term *Financial Management Center* (*FMC*) is used to denote any one of NMFS Science Centers, Regional Offices, or Headquarters Offices.

   - *Divisions* refers to the organizational units within FMCs. The term is used throughout this document to mean an actual division, or any other unit that has its own DMP.

---

[1] *NMFS Data Management Plan Template*
https://www.st.nmfs.noaa.gov/confluence/display/edm/NMFS+Data+Management+Plan+Template
[2] *Fisheries EDM: Vision and Strategy*
https://www.st.nmfs.noaa.gov/confluence/download/attachments/4063557/Fisheries%20EDM%20Vision%20%26%20Strategy%202.1.5.docx?version=1&modificationDate=1363706607000&api=v2
[3] *NMFS EDM Best Practices* https://www.st.nmfs.noaa.gov/confluence/display/edm/NMFS+EDM+Best+Practices

- The term *Effectiveness Goals* refers to the Effectiveness Goals described in Appendix A. They are capability, speed, efficiency, accuracy, cost reduction, and confidence.

- The *FIMAC* is the Fisheries Information Management Advisory Committee (FIMAC).

- The Information Architect is the Chair of the FIMAC, the NMFS representative for NOAA data management, and is responsible for NMFS data management and implementation.

3. Comparing NOAA DMPs and NMFS DMPs - In 2009, NOAA established the Data Management Planning Procedural Directive (DMP-PD)[4] that directs managers of all environmental data production projects to have data management plans in place before starting to acquire data. The NOAA DMPs are associated with individual data sets and provide descriptions of the data, points of contact, quality control methods, documentation, data sharing, and data protection.

In contrast, a NMFS DMP is a data management improvement plan associated with an organizational unit, usually a division.

Both the NOAA DMPs and NMFS DMPs build on a foundation of standard data management best practices. The NMFS Best Practices also include practices that are unique to fisheries.

4. Who Should Have a DMP? Each NMFS data stewarding division must have a DMP. A data stewarding division is defined as a NMFS division, which manages data sets, processes data, stores data, or provides data services. The data should be of an environmental nature; that is, it excludes personnel and administrative records.

FMCs may opt to have a DMP for the entire FMC. In this case, divisions within the FMC can inherit elements of the FMC's DMP. However, this approach should not diminish DMP coverage.

In other cases, where branches within a division have distinct data management requirements, those branches may have DMPs. Such DMPs may inherit elements from division or FMC DMPs.

For simplicity, this document uses the term *division* to mean any organizational unit that is associated with a DMP.

---

[4] NOAA Data Management Planning Procedural Directive
https://www.nosc.noaa.gov/EDMC/documents/EDMC_PD-DMP_transmittal_v1.pdf

5. Directive. Each NMFS division will create, follow, and update their Data Management Plans (DMPs) every two years.

In the context of this directive, a DMP is composed of the following:
- A list of the DMP document authors.
- A list of datasets stewarded by the division.
- A description of data that are provided to the division by other organizations and the names of those organizations. When it collects data directly, via observation or human input, a division can be a provider of its own data.
- A description of data that the division provides and the corresponding data consumers. If a division analyzes its own data, it is a data consumer.
- A description of, or reference to, the data management Best Practices currently in use and their corresponding data sets.
- A list of desired Effectiveness Goals for the division. See Appendix A. Authors will choose Effectiveness Goals based on the performance demands within the division as well as the performance demands of the corresponding data consumers.
- A list of long term and short term data management best practices to reach the chosen Effectiveness Goals. A short term practice is one that can be implemented within two years. A long term practice is one that requires more than two years to fully implement.
- A dataflow diagram describing the current state of data systems managed by the division. Authors will provide a description of the processing within each node of the diagram. Processing descriptions should permit users of downstream data to clearly understand the algorithms involved. Dataflow diagrams must cover, at a minimum, the portion of each data management system impacted by newly implemented Best Practices. Over time, such dataflow diagrams should cover all of the data management systems within a division.
- Description of the target state using data flow diagrams. The target state diagram shows the system after implementation of Best Practices. The current state and target state dataflow diagrams together should clearly illustrate the effect of the newly introduced Best Practices on the data management system.
- An implementation schedule of best practices and metrics.
- A description of metrics to be applied, before and after application of new Best Practices. Preferably, these metrics are quantitative measures of Effectiveness Goals, for example, a count of errors (-accuracy) or the time required to provide a data product to a consumer (1/speed). Where this is not possible, authors may specify a proxy measure based on Best Practices, such as the percent of data sets with complete documentation.
- An analysis of results to be provided at the end of each DMP cycle. The analysis should discuss the impact of the Best Practices on metrics, what was learned through the DMP implementation, and effect on strategies going forward.
- Development of DMPs will be consistent with and reinforce the Public Access to Research Results (PARR) Plan and Open Data Policy. In particular, the requirements and methods of PARR and Open Data Policy are considered to be part of NMFS best practices.

Each data stewarding division will create a Division DMP and update it every two years to show improvements achieved in the past two years and to establish new objectives for the current cycle.

5.1 <u>Review and Approval of DMPs</u>. Data Management Plan Review Teams, to be established and chaired by the Information Management Coordinators (IMCs) for each FMC, will review DMPs. The IMC may recommend one or two additional team members from outside the FMC.   The Information Architect will assign teams to each DMP being reviewed to insure balancing of workload and skill sets. The Team will review all the DMPs in an FMC and provide recommendations to DMP authors. Division Chiefs and FMC Directors will approve the DMPs.

Review and approval process:
1. Division Director appoints DMP Authoring Team
2. DMP Authoring Team writes DMP draft using DMP Template. It provides draft to review team and the NMFS Information Architect.
3. Review Team reviews DMP and makes recommendations prior to approval. Information Architect may also make recommendations.
4. Authoring Team revises DMP as needed.
5. Authoring Team provides DMP to Division Director for review and approval. Division Director may request revisions prior to signing.
6. DMP provided to FMC Director or delegate for review and approval. FMC Director may request revisions prior to signing.

Throughout this process, DMP authors will provide revised versions of the DMP to the Review Team and Information Architect for review.
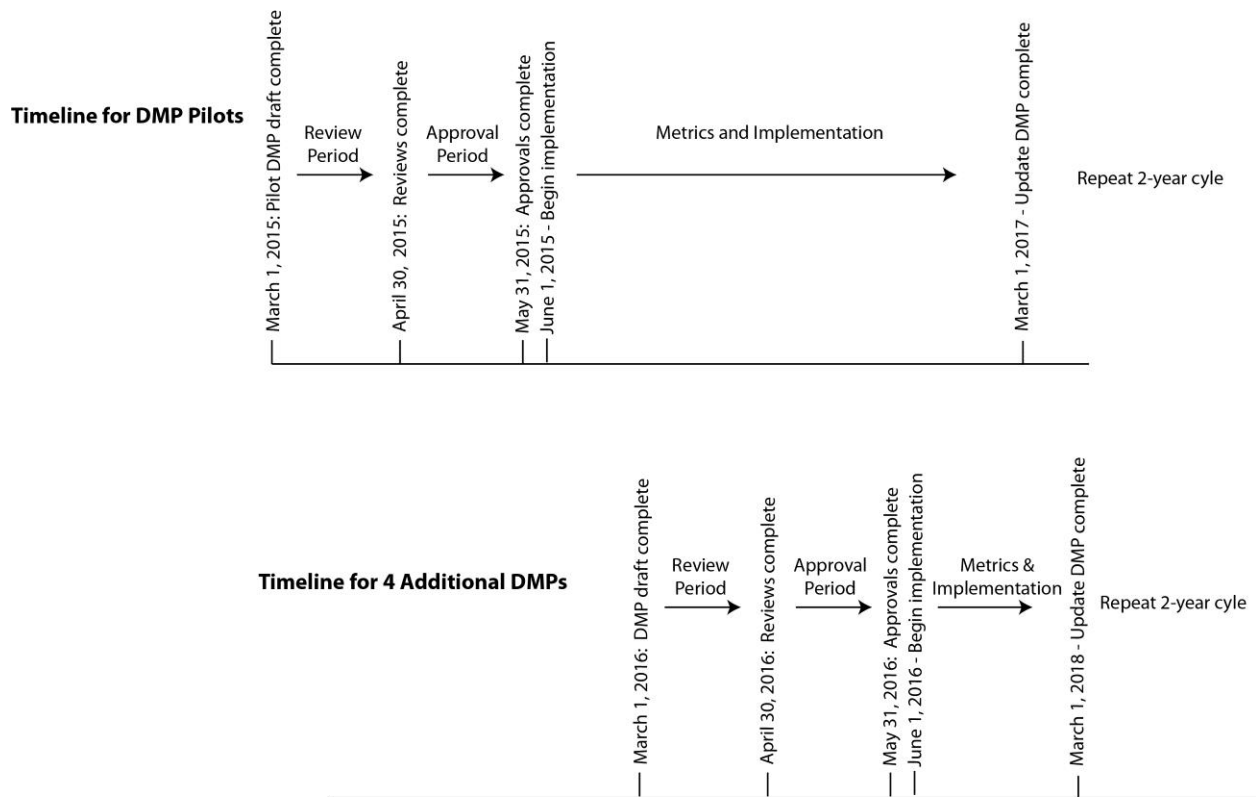
5.2 <u>Storage of DMPs.</u> Division Directors or their delegates will submit approved DMPs to the NMFS Office of Science and Technology InPort [5] Librarian for posting in the DMP repository.

5.3 <u>Timing</u>.   Figure 1 shows the schedule of DMP development and implementation. The process starts with a minimum of one pilot DMP per FMC. It adds four additional DMPs per FMC per year until all data stewarding divisions are covered by a DMP. Ultimately, NMFS will update and review approximately 50% of DMPs in odd years and approximately 50% in even years.

The review period for a DMP is January and February every other year. This duration allows for the scheduling of a number of DMP reviews by the review teams.

---

[5] *InPort* https://inport.nmfs.noaa.gov/inport/

Figure 1. Timeline for DMP development.

Timeline for DMP Pilots

March 1, 2015: Pilot DMP draft complete

Review Period →

April 30, 2015: Reviews complete

Approval Period →

May 31, 2015: Approvals complete
June 1, 2015 - Begin implementation

Metrics and Implementation →

March 1, 2017 - Update DMP complete

Repeat 2-year cyle

Timeline for 4 Additional DMPs

March 1, 2016: DMP draft complete

Review Period →

April 30, 2016: Reviews complete

Approval Period →

May 31, 2016: Approvals complete
June 1, 2016 - Begin implementation

Metrics & Implementation →

March 1, 2018 - Update DMP complete

Repeat 2-year cyle

Add 4 DMPs Per Year Until All Data Stewarding Divisions Have DMPs

6. <u>Flexibility and Scalability</u>.   Divisions have varying effectiveness requirements, levels of data management development, and available resources. For these reasons, divisions are best able to determine what their needs are in terms of Effectiveness Goals and Best Practices.

Because divisions have varying resources and workloads, NMFS DMPs are scalable. This means that a division with limited available resources may opt to develop a modest DMP. DMPs with a single Effectiveness Goal and a single new Best Practice still provide a strategy

for continual improvement. Focusing on the Efficiency Effectiveness Goal is recommended for divisions with limited resources.

Other divisions may want to exploit greater opportunities by developing more ambitious DMPs.

Whereas the NMFS DMP Procedural Directive is flexible, it also provides uniform standards in its Best Practices. Because it encourages the adoption of an increasing number of Best Practices, the DMP process naturally leads toward a consistent adoption of all Best Practices.

7. Roles and Responsibilities.

Role	Responsibilities
IMCs	Establish and chair the FMC Data Management Plan Review Team.
	Coordinate development of DMPs.
	Provide DMPs to the Science & Technology InPort Librarian.
FMC Data Management Plan Review Teams	Review all DMPs for the FMC in collaboration with the Information Architect.
	Provide recommendations for revising Division DMPs to the Authoring Team prior to submission for approval.
Division Chiefs	Provide signatory approval of Division DMPs.
	Establish division's Authoring Team.
Regional Administrators, Science Center Directors, and HQ Office Directors	Provide signatory approval of Division DMPs.

8. Developing DMPs: Guidance and Support

8.1 Additional Best Practices. Divisions may develop additional Best Practices to meet programmatic requirements. The FIMAC will consider these Best Practices for NMFS-wide use.

8.2 Support Available. Sources to help develop DMPs include:

The Data Management Planning Wiki – Will contain a list of answers to frequently asked questions (FAQs), a template, and other material for use in preparing DMPs.

The NMFS Information Architect – The Information Architect will answer questions and handle training requests regarding the writing or implementation of DMPs.

Your Information Management Coordinator - Your IMC will be the first responder to your questions and concerns about the directive, developing plans, and managing data sets using the plans.

Experts within Your FMC - Typically, each FMC has its own corps of data management experts that understand dataflow diagrams, data management best practices, and other aspects of data management.

Frequently Asked Questions - A FAQ page is available at **https://www.st.nmfs.noaa.gov/confluence/display/edm/NMFS+Data+Management+Plan+FAQ**

The NOAA Data Management Plan Repository – As data management plans mature across NOAA, the repository will serve as a source of examples of proven plans, contact points, and other information for developing new plans.

Appendix A. Effectiveness Goals

- **Capability -** refers to the ability to perform a particular analysis. This ability depends on data management practices and cannot be assumed.
- **Speed -** is important because data requestors want or need results as fast as possible. Also, completing tasks faster means freeing time for other essential tasks that would otherwise have to be postponed or left undone.
- **Efficiency -** means doing a task with fewer resources, doing more with the same resources, or doing more with less.
- **Accuracy -** Fishery analyses have value only if they are accurate.
- **Cost reduction -** is closely tied to efficiency, but deserves special emphasis in times of shrinking budgets.
- **Confidence -** NOAA, industry, and taxpayers must all have confidence in our analytical results.

Appendix B. Sources, Dependencies, and Interfaces

The list of NMFS Best Practices is a living document maintained by the FIMAC.

Data management planning should be done in the context of other NMFS and NOAA policies, procedures, and best practices. Some examples are:

NAO 212-15: Management of Environmental Data and Information

Data Management Planning Procedural Directive

NOAA Data Documentation Procedural Directive

Grants Data Sharing Procedural Directive

Procedure for Scientific Records Appraisal and Archive Approval

NMFS Data and Information Management Policy Directive

NMFS Data Documentation Procedural Directive

Of particular significance are the Public Access to Research Results (PARR) Plan, Open Data Policy, and associated procedural directives.

Public Access to Research Results (PARR) Plan

Open Data Policy

NOAA Data Management Planning Procedural Directive

NOAA Data Access Procedural Directive