

Recommendations for:

NMFS

Enterprise Data

Management

Executive Summary

V1.0

November 2008

Outline

- **Background**
- **Determining the Problem**
- **Developing the Recommendations**
- **The Recommendations**
 - The Four Components of NMFS EDM
 - Alternative Implementation Strategies: Minimal, Intermediate, and Full Cost Options
 - Recommended Strategy
 - Benefits and Risks
- **Requested Actions**

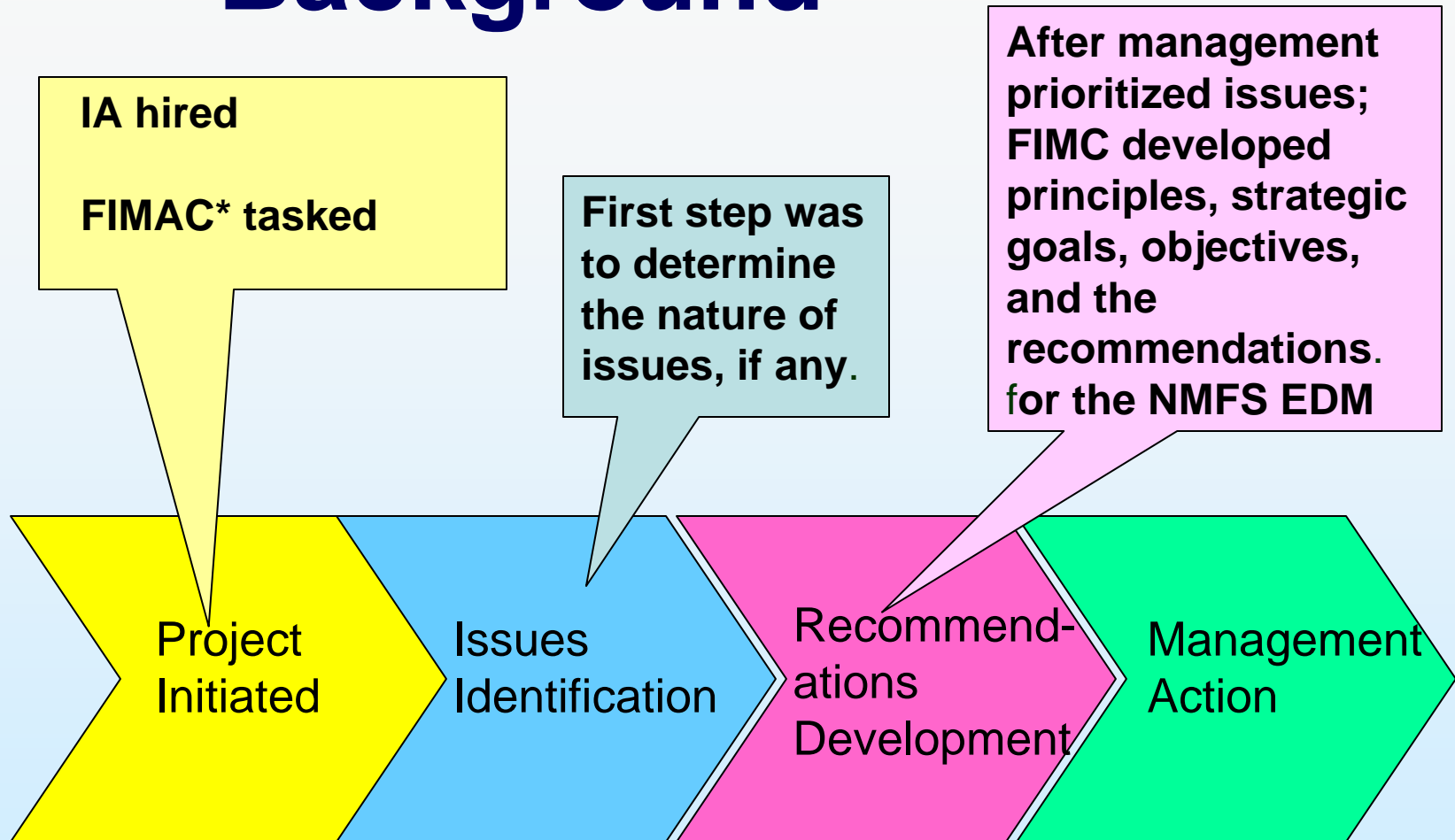
Quick Notes about Terminology

- The terms *Data* and *Information* are treated and used synonymously
- Scope of information under consideration: All NMFS information including scientific, management, legal-enforcement, and administrative databases, photographs, paper forms, etc.
- ***Enterprise*** - Scope of the enterprise is NMFS
- ***Data (Information) Management*** - Scope of *Information Management* is “end to end”, i.e., from collection to final preservation

Quick Notes about Terminology

- **Enterprise Data (Information)** is data and information that is:
 - already shared with some entity outside of the FMC of origin (for example, observer data that is already shared between a Science Center and a Region);
 - about entities or issues that cross FMC boundaries (for example, data about vessels that fish in multiple regions); or
 - routinely aggregated to support decisions at a higher organizational level (such as catch and value data that rolls-up to Fisheries of the United States).
- **Information assets (data assets)** are the managed containers for information, e.g., databases, sets of photographs, administrative records, and video clips
- **Information Management (IM) vs. Information Technology (IT)**
 - IT is the infrastructure and the applications running on the infrastructure. IT addresses issues such as operations, security, capital planning, investment control, and IT tools development (primarily CIO responsibility).
 - IM is the management of the information that resides on the IT infrastructure and addresses issues such as collection, data stewardship, IM tools, and applications development for information sharing, preservation, and confidentiality.

Background



* The FIMC has representatives from each RO, SC, and F/SF, F/PR, F/HC, F/CIO, and F/ST

Identifying the Problem

The FIMC identified 12 key issues and interviewed their management to determine their priorities

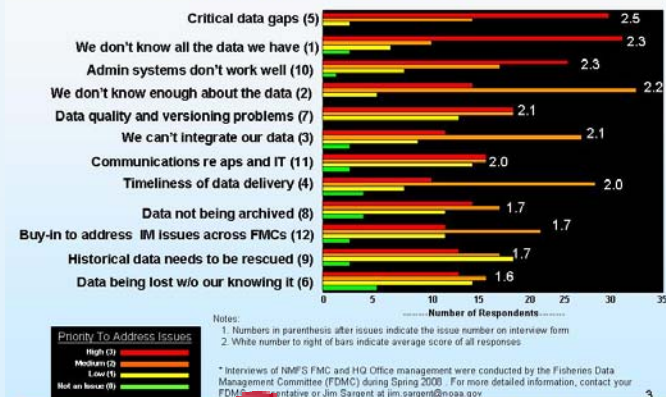
- **Top priority Issues**

- Critical gaps
- No authoritative data inventory
- Insufficient metadata
- Data quality and consistency challenges
- Ability to Integrate data
- Administrative systems

- **Other issues**

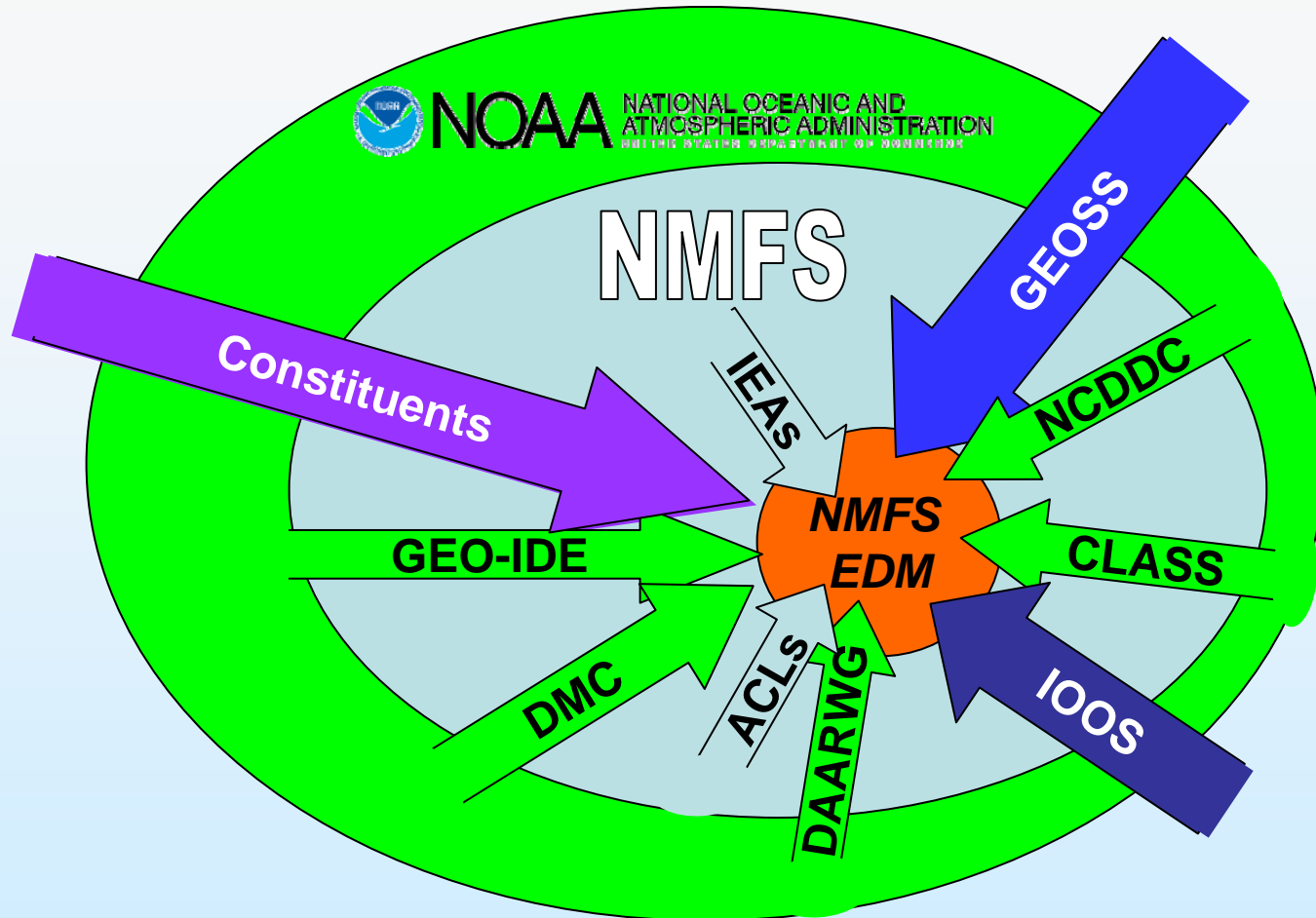
- Data being lost
- Data not being archived for perpetuity
- Historical data that need rescuing
- Communications re: applications and IT

Information Management Issues: Priorities to Address Interviews of NMFS Management* (n=57)



NMFS Information Management





Developing the Recommendations

FIMAC Activities

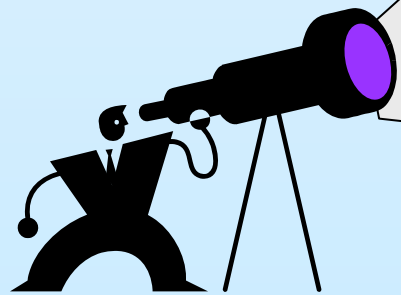
- **Workshop and many web meetings**
- **Leveraged professional IM consultants**
- **Developed Vision, Principles, Mission, Goals, and Objectives for a NMFS IM Program**
- **Wrote “Recommendations For a NMFS Enterprise Data Management Program”**
 - Current and target states
 - Detailed recommendations
 - Minimal, intermediate, and full cost options
 - Risks, constraints, and other considerations
 - Summary recommendations

Next Step: Presenting the Recommendations

- **Recommendations presented to the Leadership Council at its Fall 2008 meeting**

So, here we are...

NMFS EDM Vision

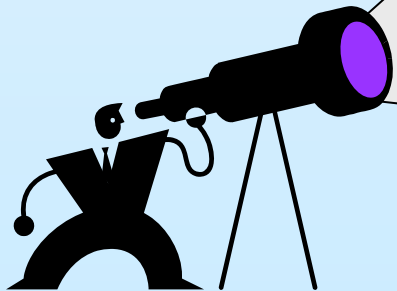


**NMFS
customers
can confidently
find, access,
and use
our data**

NMFS EDM Vision

**Internal and
external
constituents**

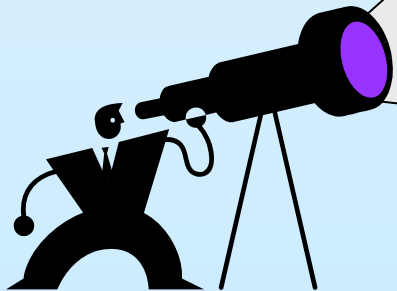
**NMFS
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NMFS EDM Vision

**Confidence in
finding and trust in
using our data**

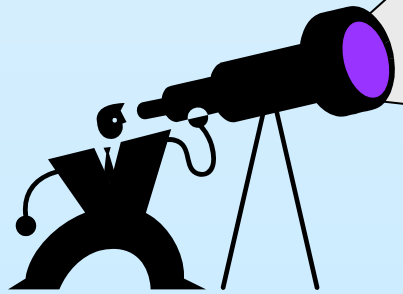
NMFS
customers
can confidently
find, access,
and use
our data



- Using an Amazon.com-type portal (or portals)
- Browse through an ordered hierarchy or taxonomy
- Search using:
 - Discipline specific key words (taxonomies)
 - User tags (folksonomies)
 - Metadata include users' comments
- Minimize the number mouse clicks

FS
mers

can confidently
**find, access,
and use
our data**

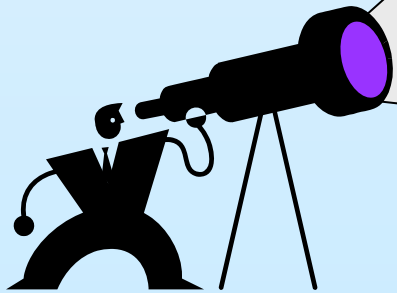


NMFS

EDM Vision

Through confidentiality and security filters while using standard tools and formats

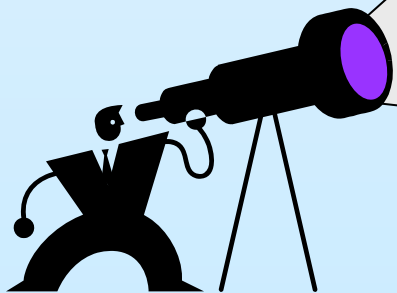
NMFS customers can confidently find, access, and use our data



NMFS

Download selected data with sufficient metadata, including quality indicators and warnings to effectively and properly use the data

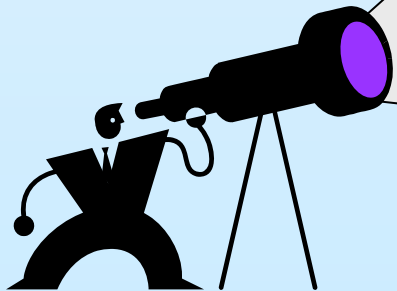
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NMFS EDM Vision

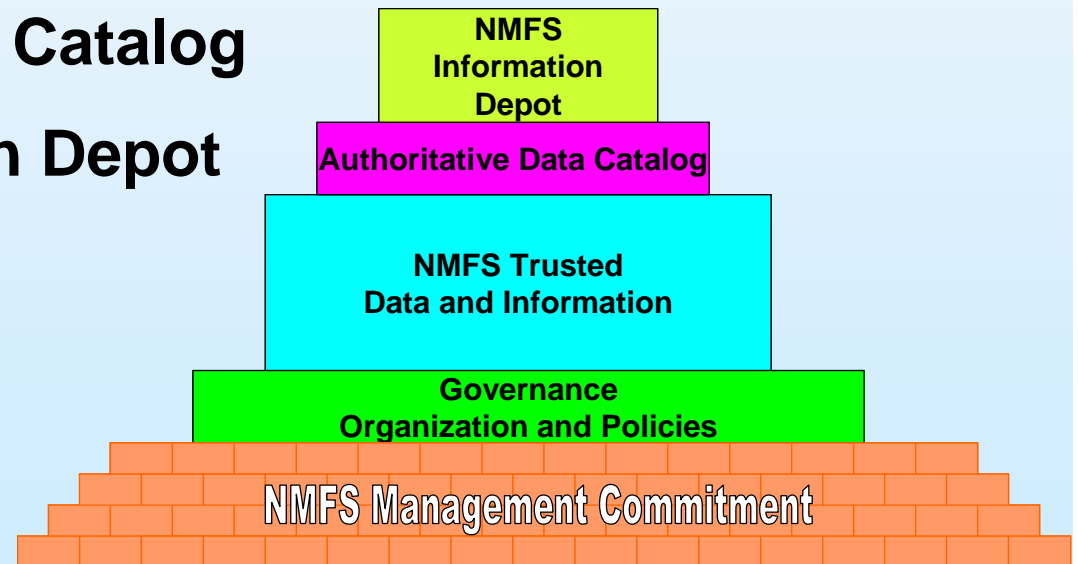
All NMFS enterprise
data we choose to
share

NMFS
customers
can confidently
find, access,
and use
our data



FIMC Recommendations: The Four Components of NMFS EDM

- **Governance**
 - Governance Structure
 - Policies, Procedures and Best Practices
- **Trusted Data**
- **An Authoritative Data Catalog**
- **The NMFS Information Depot**

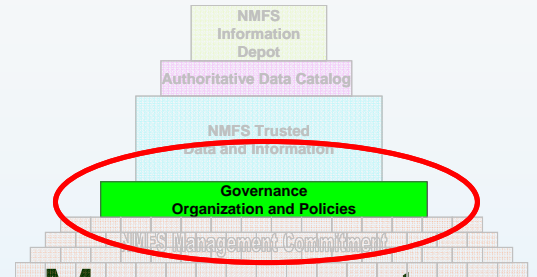


Component One:

Governance

- **The Governance Model**

- The Information Architect (IA) in S&T
- Regional (and HQ Office*) Information Management Coordinators (RIMCs)
 - In each Regional Office, Science Center, and key HQ Office
- The Fisheries Information Management Advisory Committee (FIMAC)
 - Advisory to the NMFS Leadership Council
 - Comprised of RIMCs/OIMCs
 - Chaired by the IA
- Data Stewards responsible for NMFS enterprise information assets



* HQ Office Information Coordinators (OITCs)

Component One:

Governance (cont.)

- **Administration and Management**
 - Cultural shift
 - Communications and technology sharing
 - Information requests
 - Data calls
- **Policies, Procedures, Best Practices**
 - Data stewardship
 - Data inventory and metadata maintenance
 - Security and confidentiality
 - Disaster recovery
 - Data quality

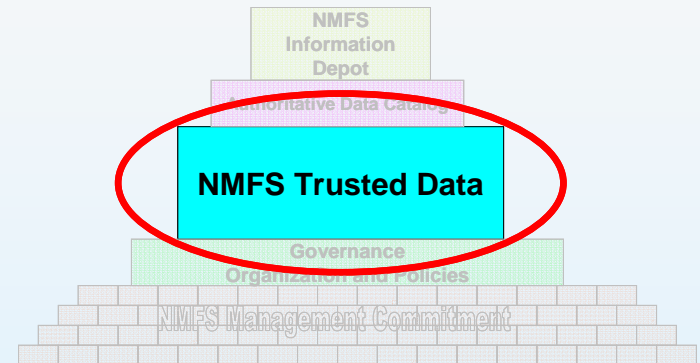
Component Two: Trusted Data

- **Policies**

- Data stewardship
- Security and confidentiality
- Disaster recovery
- Data quality plans

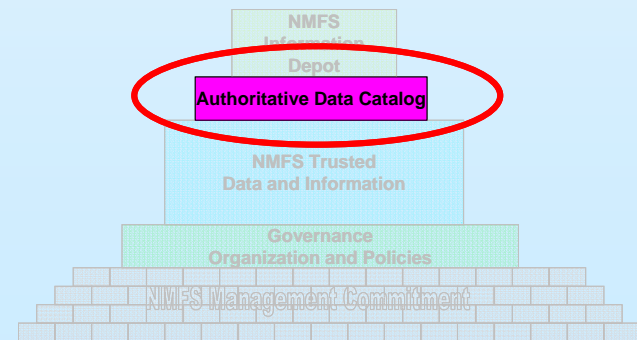
- **Addressing the Gaps**

- A repeatable process for reviewing data gaps
- Based on business needs
- Supported with
 - Inventories, metadata, and data models
 - Proven project management strategies
 - Facilitated data assessment workshops
 - Project management support
 - Recommendations development



Component Three: The Authoritative Data Catalog

- **An inventory of all NMFS enterprise information assets**
 - Shared among FMCs
 - Databases, photograph collections, administrative records, and other digital, analog, and hard copy information sets
- **Metadata for all Data Catalog Entries**
 - Discovery level
 - Detail level
 - Data element level



Component Three: The Authoritative Data Catalog

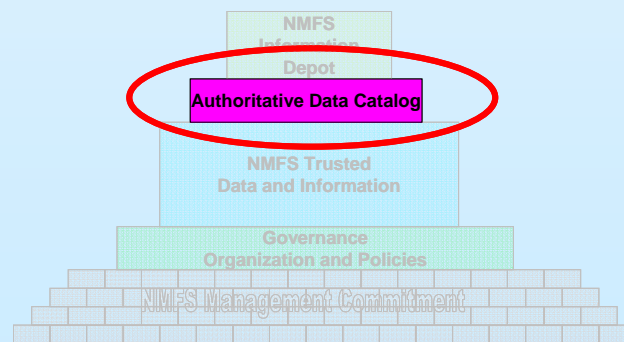
- An inventory of all NMFS enterprise information assets

- Shared between FMOs
- Databases, photographs, records, and other digital information sets

Enough Information to find it: name, owner, brief description, confidentiality, etc.

- Metadata for all Data Catalog Entries

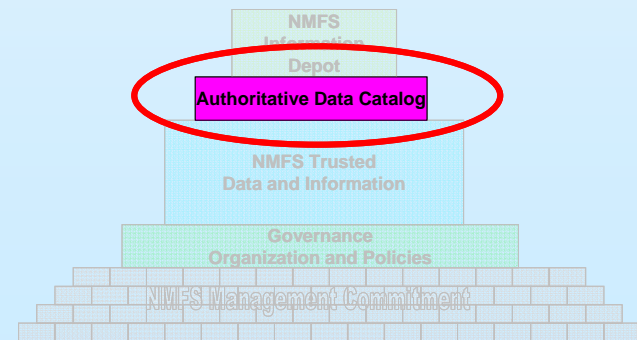
- Discovery Level
- Detail Level
- Data Element level



Component Three: The Authoritative Data Catalog

- An inventory of all NMFS enterprise information assets
 - Shared between FMCs
 - Databases, photograph records, and other digital information sets
- Metadata for all Data Catalog
 - Discovery Level
 - Detail Level
 - Data Element level

Enough Information to know if you want it: Detailed info, quality, usage warnings, etc.



Component Three: The Authoritative Data Catalog

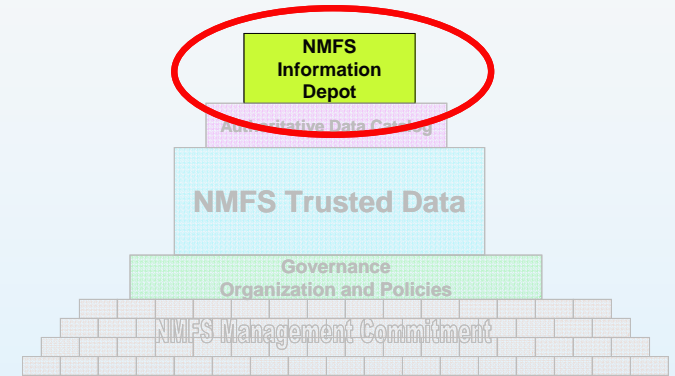
- An inventory of all NMFS enterprise information assets
 - Shared between FMCs
 - Databases, photograph collections, administrative records, and other digital, analog and hard copy information sets
- Metadata for all Data Catalogs
 - Discovery Level
 - Detail Level
 - Data Element level

Enough Information to know how to use it: data element meaning, coding structures, etc.

Component Four:

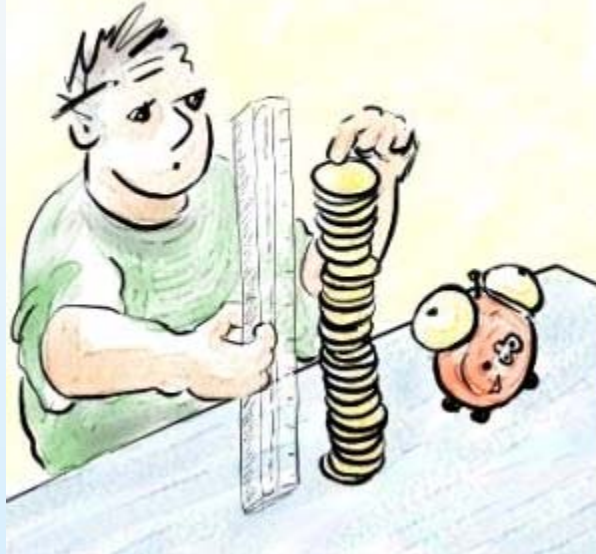
The Information Depot

Amazon.com-type portal(s) to enable NMFS internal and external constituents to effectively discover, access. Integrate and use NMFS information resources to answer key current and future questions.



- **Multiple taxonomies**
 - Customers can use their common language to search & find information
- **Discovery engineering tools and techniques**
 - To learn about customer search patterns
 - Customer reviews and assessments
- **Subscriptions, notices, and alerts**

Implementation



Alternatives

The Menu

Intermediate Cost Option

- **FTEs**
 - ST: IA, data Librarian (ZP-4), and admin support
 - FIMC reps: <40%
- **Funds**
 - ST: \$300K
 - Other sources: \$700K

Minimal Cost Option

- **FTEs**
 - ST: IA, and admin support
 - FIMC reps: <10%
- **Funds**
 - ST: \$300K

Full Cost Option

- **FTEs**
 - ST: IA, data Librarian (ZP-4), Data Technician (ZP-3), and admin support
 - FIMC reps: <80%
- **Funds**
 - ST: \$300K
 - Other sources: \$2.7M

The Minimal Cost Option

	FY08	FY09	FY10	FY11	FY12+
Component 1. Governance Structure					
Org Structure	Started	Done	Done	Done	Done
Establish data stewards	Not Started	Started	Partially Done	Done	Done
Establish Stewardship Policies	Not Started	Started	Partially Done	Done	Done
Establish Data Element Coding standards	Not Started	Not Started	Not Started	Started	Partially Done
Communication and Technology Sharing	Not Started	Not Started	Started	Partially Done	Done
Budgeting Strategy	Not Started	Partially Done	Done	Done	Done
Cultural Shift	Not Started	Started	Partially Done	Done	Done
Information Request Management	Not Started	Not Started	Not Started	Partially Done	Done
Data Call Management	Not Started	Not Started	Not Started	Partially Done	Done
Component 2. Trusted Data					
<i>Establish Data Quality Plans</i>	Not Started	Not Started	Started	Partially Done	Done
<i>Information Sufficiency and Necessity</i>	Not Started	Started	Partially Done	Done	Done
<i>Security and Confidentiality policies and Procedures</i>	Not Started	Started	Partially Done	Done	Done
Component 3. Authoritative Data Catalog					
<i>Phase 1 Inventory and Metadata collection</i>	Not Started	Not Started	Not Started	Not Started	Not Started
<i>Phase 2 Inventory and Metadata collection</i>	Not Started	Not Started	Not Started	Not Started	Not Started
<i>Phase 3 Inventory and Metadata collection</i>	Not Started	Not Started	Not Started	Not Started	Not Started
<i>Phase 4 Inventory and Metadata collection</i>	Not Started	Not Started	Not Started	Not Started	Not Started
Component 4. NMFS Information Depot					
Lexicons and Taxonomies	Not Started	Not Started	Not Started	Not Started	Not Started
Roadblocks Resolution	Not Started	Not Started	Not Started	Not Started	Not Started
Depot Portals	Not Started	Not Started	Not Started	Not Started	Not Started
Discovery Engineering	Not Started	Not Started	Not Started	Not Started	Not Started
Interfaces with Other Systems	Not Started	Not Started	Not Started	Not Started	Not Started
SOA	Not Started	Not Started	Not Started	Not Started	Not Started
Information Integration	Not Started	Not Started	Not Started	Not Started	Not Started

FTES
 ST: IA: Admin support
 FIMC Reps: (<10%)

Funding: \$300K
 ST: \$300K
 Other: -

Color Code
Not Started
Started
Partially Done
Done

The Intermediate Cost Option

	FY08	FY09	FY10	FY11	FY12+
Component 1. Governance Structure					
Org Structure	Started	Done	Done	Done	Done
Establish data stewards		Started	Partially Done	Done	Done
Establish Stewardship Policies	Started	Started	Partially Done	Done	Done
Establish Data Element Coding standards		Not Started	Not Started	Started	Partially Done
Communication and Technology Sharing	Started	Started	Started	Partially Done	Done
Budgeting Strategy		Partially Done	Done	Done	Done
Cultural Shift		Started	Partially Done	Done	Done
Information Request Management		Not Started	Not Started	Partially Done	Done
Data Call Management		Not Started	Not Started	Partially Done	Done
Component 2. Trusted Data					
<i>Establish Data Quality Plans</i>		Started	Partially Done	Done	Done
<i>Information Sufficiency and Necessity</i>		Started	Partially Done	Done	Done
<i>Security and Confidentiality policies and Procedures</i>	Started	Started	Partially Done	Done	Done
Component 3. Authoritative Data Catalog					
<i>Phase 1 Inventory and Metadata collection</i>	Started	Done	Done	Done	Done
<i>Phase 2 Inventory and Metadata collection</i>		Done	Done	Done	Done
<i>Phase 3 Inventory and Metadata collection</i>		Partially Done	Done	Done	Done
<i>Phase 4 Inventory and Metadata collection</i>		Started	Partially Done	Done	Done
Component 4. NMFS Information Depot					
Lexicons and Taxonomies	Started	Partially Done	Partially Done	Done	Done
Roadblocks Resolution		Partially Done	Done	Done	Done
Depot Portals		Not Started	Started	Started	Partially Done
Discovery Engineering		Not Started	Not Started	Started	Partially Done
Interfaces with Other Systems		Not Started	Not Started	Started	Partially Done
SOA		Not Started	Not Started	Started	Partially Done
Information Integration		Started	Partially Done	Done	Done

FTES
 ST: No Cost + Data Libr.
 FIMC Reps: (<40%)

Funding: \$1M
 ST: \$300K
 Other: \$700K

Color Code

Not Started
Started
Partially Done
Done

The Full Cost Option

	FY08	FY09	FY10	FY11	FY12+
Component 1. Governance Structure					
Org Structure					
Establish data stewards					
Establish Stewardship Policies					
Establish Data Element Coding standards					
Communication and Technology Sharing					
Budgeting Strategy					
Cultural Shift					
Information Request Management					
Data Call Management					
Component 3. Trusted Data					
<i>Establish Data Quality Plans</i>					
<i>Information Sufficiency and Necessity</i>					
<i>Security and Confidentiality policies and Procedures</i>					
Component 3. Authoritative Data Catalog					
<i>Phase 1 Inventory and Metadata collection</i>					
<i>Phase 2 Inventory and Metadata collection</i>					
<i>Phase 3 Inventory and Metadata collection</i>					
<i>Phase 4 Inventory and Metadata collection</i>					
Component 4. NMFS Information Depot					
Lexicons and Taxonomies					
Roadblocks Resolution					
Depot Portals					
Discovery Engineering					
Interfaces with Other Systems					
SOA					
Information Integration					

FTES
 ST: Mid Cost + Data
 Tech
 FIMC Reps: (<80%)

Funding: \$3M
 ST: \$300K
 Other: \$2.7M

Color Code

Not Started
Started
Partially Done
Done

Recommended Strategy:

Combination of Min.-Cost and Int.-Cost options

For FY09:

- **Establish the EDM governance structure**
 - Adopt the FIMC as an advisory committee to the LC
 - Establish the roles of RIMCs and OITCs
 - Establish data stewards for all enterprise information assets
 - Establish collaboration tools and methodologies
 - Foster communication re: IM activities and technologies
 - Draft EDM policies and best practices
 - Policies are needed for basic data stewardship including data inventory and metadata maintenance;
 - Draft NMFS glossary of key terminology.

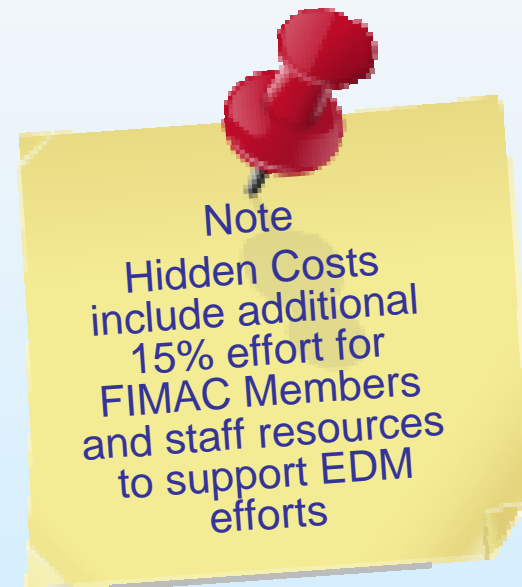
Recommended Strategy (cont.):

- **Data Catalog**
 - Conduct **Phases 1 & 2** of the inventory capturing discovery level metadata
 - Use InPort as the NMFS Authoritative Data Catalog
- **NMFS Information Depot**
 - Initiate the development of a NMFS information taxonomy
 - Increase corporate understanding of SOA and other emerging technologies
- **Develop performance metrics for these tasks, and**
- **Keep LC apprised of progress with quarterly reports**

	Metadata Level		
	Discovery	Detailed	Element
Large Assets/ Often shared	1	2	3
Medium Assets/ Occas. Shared	2	3	4
Small Assets/ Seldom Shared	3	4	4

FY09 Resources Required

- **FTES**
 - ST: No additional FTEs
 - FIMC Reps: <25%
- **New Funding: \$500K**



Benefits/Risks

- **Benefits**

- Basic governance components in place
- Data Catalog started
- NMFS information categorized in a draft taxonomy
- Cultural shift started

- **Risks:**

- Not all data assets identified so can't define stewards for all enterprise data.
- The following must wait:
 - Information requests management
 - Data call management
 - Information Depot development
 - Development of constituent taxonomies
 - Completion of confidentiality policy
 - Communications and technology sharing

Management Actions Requested

- **Approve FIMAC**
- **Reprogram \$500K to NMFS EDM**
- **Provide management support for:**
 - Populating the Authoritative Data Catalog;
 - Developing policies for data stewardship and confidentiality;
 - Establishing data stewards and data quality plans for key data assets;
 - Developing business and information terminology; and
 - Assessing data sufficiency for programs.

Risks of Not Moving Ahead Now

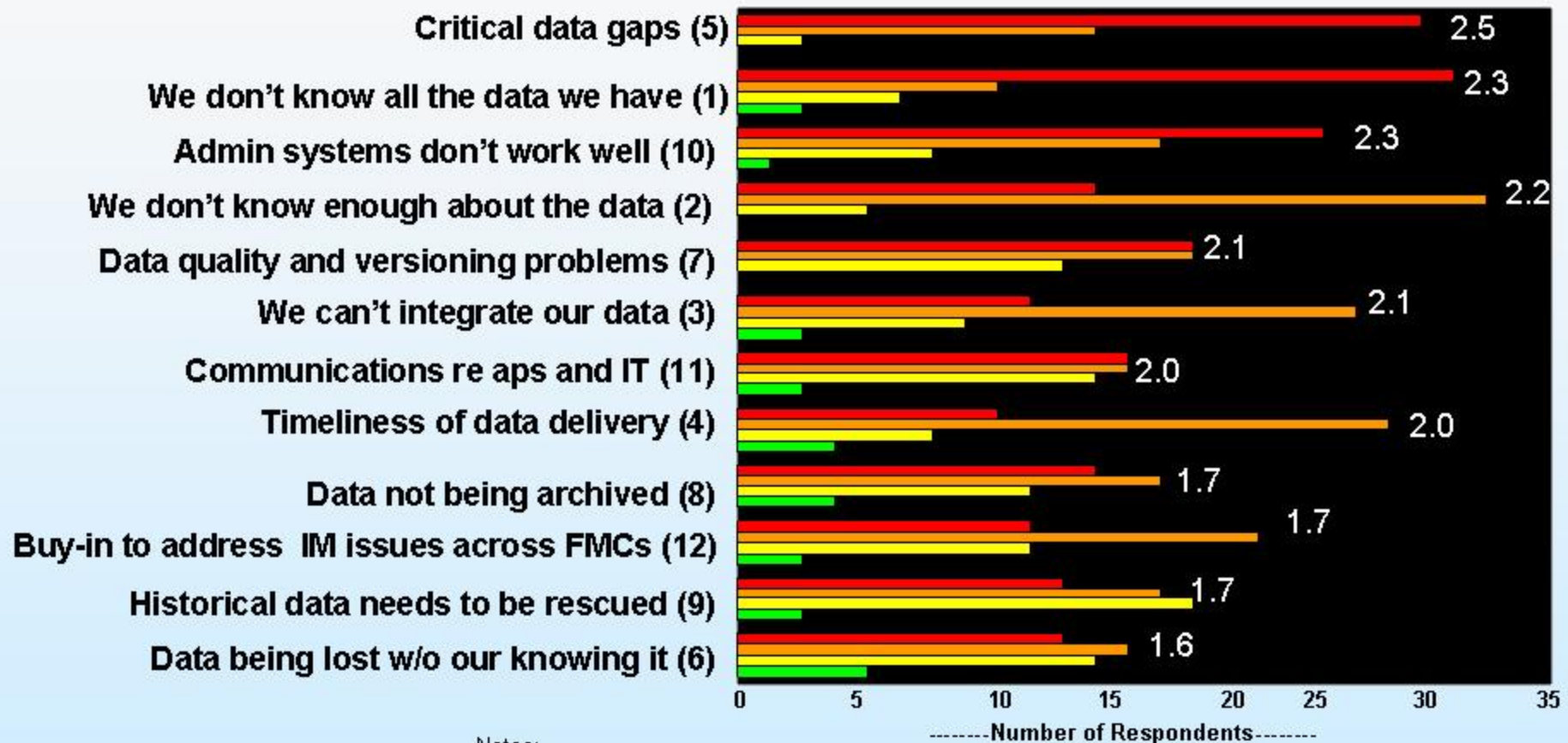
- **Underrepresented by GEOSS, IOOS, Census of Marine Life portals**
- **Inconsistent NMFS web portals**
- **Sharing inconsistent information**
- **Inconsistent and poorly structured data calls**
- **Inability to quickly access the information**
- **Being perceived as “hoarding data”**
- **Enterprise approach further behind times**
- **Poor perception of NMFS science and information**



Questions?

Information Management Issues: Priorities to Address

Interviews of NMFS Management* (n=57)



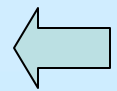
Priority To Address Issues

- High (3) █
- Medium (2) █
- Low (1) █
- Not an Issue (0) █

Notes:

1. Numbers in parenthesis after issues indicate the issue number on interview form
2. White number to right of bars indicate average score of all responses

* Interviews of NMFS FMC and HQ Office management were conducted by the Fisheries Data Management Committee (FDMC) during Spring 2008. For more detailed information, contact your FDMC representative or Jim Sargent at jim.sargent@noaa.gov



NMFS Information Management Principles

- Data and information are an important NMFS corporate resource and need to be managed over its lifecycle. **(Management, Stewardship and Preservation)**
- Our data and information are a global resource and need to be shared appropriately. **(Discovery and Access)**
- Our data and information inspire public trust and confidence. **(Transparency, Reliability and Accountability)**
- Our data and information are continuously assessed for quality, objectivity, timeliness and sufficiency to meet NMFS mission **(Sufficiency and Necessity, Integrity and Completeness)**

NMFS Information Management

Mission and Goals

Mission: Deliver the right data, information and services when and where they are needed.

Goals

1. Manage Information with appropriate governance, focus and accountability.
2. Manage Information cooperatively to promote sharing of information, solutions, and IM investments
3. Establish and maintain policies, best practices, procedures and metrics to ensure good stewardship and preservation of NMFS information resources.
4. Empower internal and external constituents to effectively discover, access, integrate and use the information to answer key current and future questions.
5. Continually assess and improve the availability, the availability, timeliness, and quality of data resources to support NMFS mission.

Objectives/Actions

Goal 1. Manage Information with appropriate governance, focus and accountability

- Establish an information architect position
- Establish role of information coordinator in each FMC to work with local data managers and act as point of focus for IM in the FMC
- Establish a governance structure for IM (project/portfolio mgmt)
- Develop elements of performance plans for information managers and data stewards within the agency
- Achieve buy-in and secure commitment from management
- Develop mechanisms for communicating progress, success, value, and benefits
- Develop recommendations for funding and budget initiatives needed to support IM efforts

Objectives/Actions

Goal 2. Manage Information cooperatively to promote sharing of information, solutions, and IM investments

- Establish mechanisms for ongoing communication and coordination with FMCs and related programs (e.g. FIS)
- Create mechanism for collaboration to allow exchange of information on common needs and services
- Develop a service oriented architecture, enterprise service bus
- Identify and manage roadblocks to data access and recommend solutions to management and data stewards
- Define information terms

Objectives/Actions

Goal 3: Establish and maintain policies, best practices, procedures and metrics...

- Define concept of operations for NMFS IM including high-level view of functions, data subjects, tools, and technology
- Define policy and standards related to stewardship of data through the life-cycle including metadata, security, access, preservation
- Identify, assess, and prioritize shareable information assets
- Publish and maintain metadata on all shareable information assets
- Develop metadata policy and standards for data access and use
- Establish quality plans for all data collections including minimum elements, formats, and values

Objectives/Actions

Goal 4: Empower internal and external constituents with information, services and metadata...

- Define and implement a "front door" to enable access to NMFS information access by both internal and external constants
- Develop taxonomy for all NMFS data, information, and services
- Educate ourselves on SOA and assess the need and applicability of SOA within the agency
- Develop policies, guidelines, MOUs, etc. needed to facilitate access to data
- Define business glossary for NMFS information assets

Objectives/Actions

Goal 5: Identify and fill gaps in the availability, timeliness and quality...

- Provide training, education, and outreach to data stewards, managers, and users of NMFS data
- Establish mechanisms to receive feedback from users on satisfaction with NMFS information and services
- Establish service level and metrics related to delivery of NMFS products and services. Enable periodic review of service level.
- Establish independent review of compliance with policy and standards related to data stewardship and evolve as needed