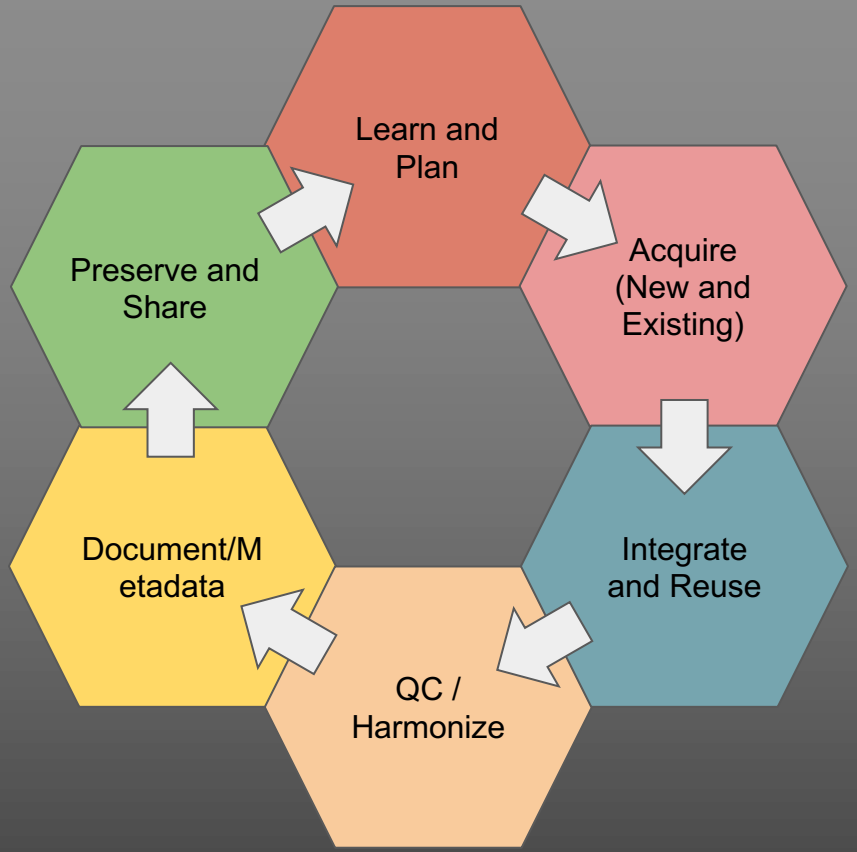
Salmon Data Mobilization

IYS Synthesis Symposium
Vancouver, Canada
2022-10-04



The IYS Challenge

Theme: Information Systems

Objective:

Freely available information systems contain historic and current data about salmon and their environment.

Sub-theme: Towards a Data driven Future: Progress and Future Requirements for Data Mobilization across the Salmosphere

Ensure data related to salmon are readily available to scientists and decision makers.

International Challenge? International Response!

Atlantic co-leader

Graeme Diack[f]

Pacific co-leader

Tom Bird[a]

Scott Akenhead[a]
Deirdre Brophy[e]
Nora Hanson[i]
Alexis Knight[a]
Tim van der Stap[j]

Hlynur Bardarson[b]
Colin Bull[fg]
Brett Johnson[j]
Bryce Mecum[k]
Alan Walker[m]

Jennifer Bayer[c]
Elvira de Eyto[h]
Matt Jones[k]
Marie Nevoux[l]
Vidar Wennevik[n]

[a]Fisheries and Oceans Canada.
[b]Institute of Marine and Freshwater Research, Iceland
[c]United States Geological Survey, USA
[e]Galway Mayo Institute of Technology, Ireland
[f]Atlantic Salmon Trust, Scotland, Battleby House, Perth, UK
[g]Biological and Environmental Sciences, University of Stirling, UK
[h]Marine Institute, Ireland
[i]Marine Scotland Science, UK
[j]Hakai Institute, Campbell River, BC, Canada
[k]National Centre for Ecological Analysis and Synthesis, USA
[l]National Research Institute for Agriculture and Food, France
[m]Centre for Environment, Fisheries, and Aquaculture Science, UK
[n]Institute of Marine Research, Norway

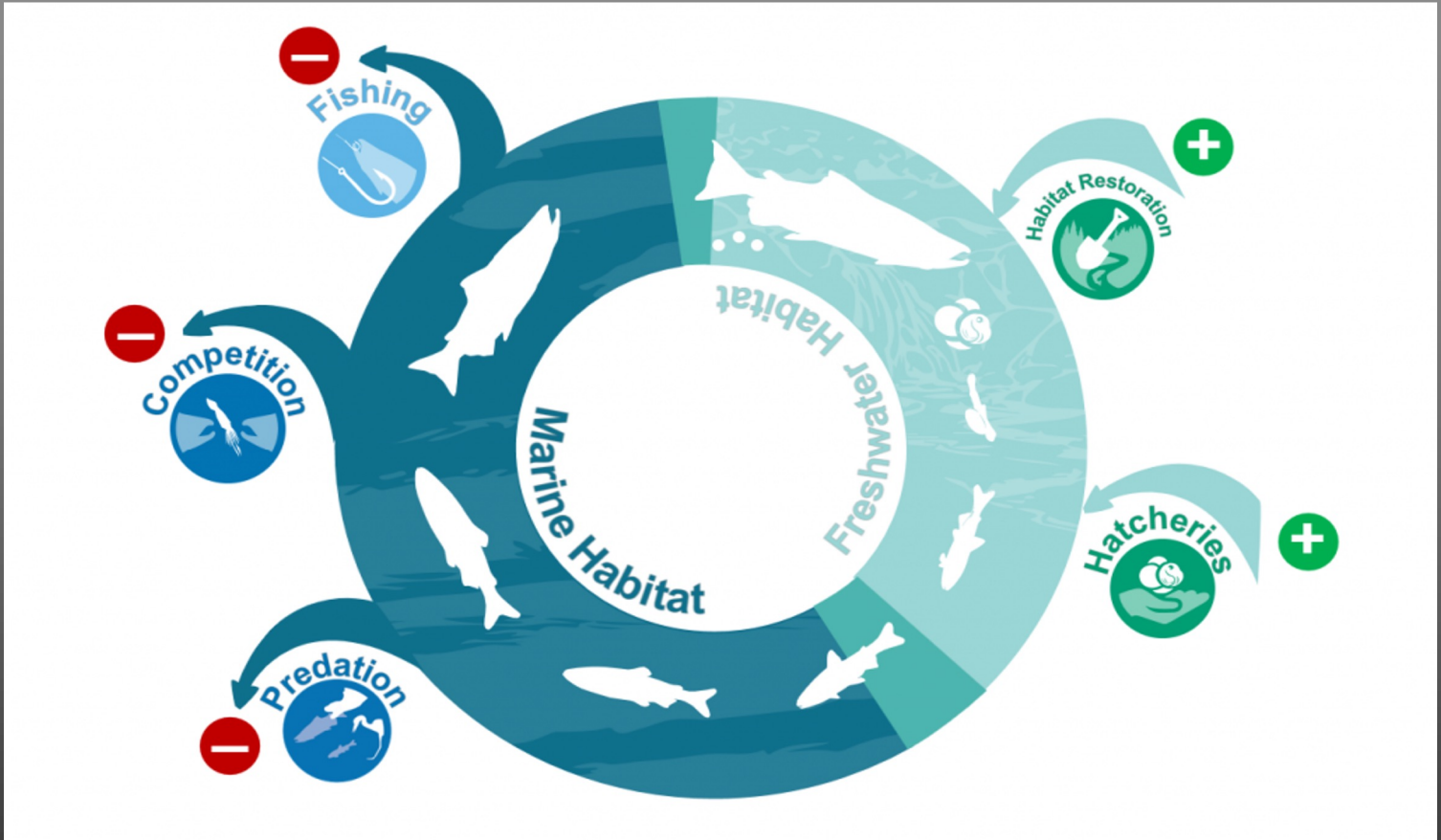
Outline

1. Problem: failing salmon marine survival
2. Solution: salmon data mobilization (SDM)
3. SDM: definition, context
4. Requirements: consumer, producer, community
5. Barriers: sociocultural, technical, institutional
6. Recommendations: leadership, education, community

1. Problem

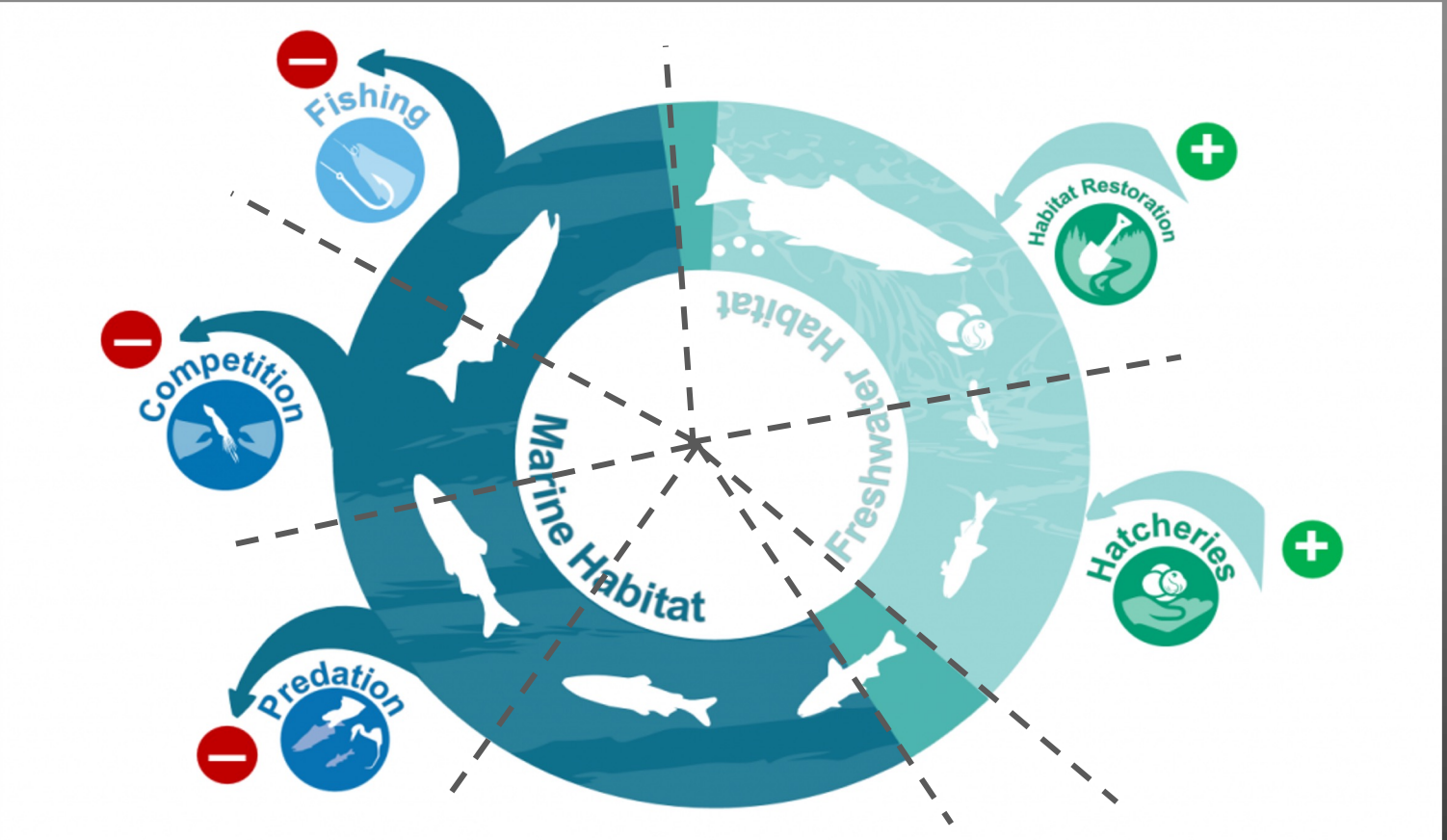
Population declines across salmon species – globally – remain unexplained despite ***massive*** research and conservation efforts… and expense.

1. A wicked problem




ECOSYSTEM PRESSURES
Warmer water
More extreme weather events
Erosion
Changes in food web
Changes in water flow
Less ice cover, shrinking glaciers
Spawning
Eggs
Emergence
Alevin
Juvenile rearing
Fry
Juvenile downstream migration
Smolts
Ocean residence
Adults and juveniles
Spawner upstream migration
Spawners
Climate change impacts
ON THE PACIFIC SALMON LIFE CYCLE

1. Areas of expertise are not enough



1. The fragmentation problem

Poor coordination of data collections means:

- Datasets are not accessible outside of their immediate context;
- Broad-scale, data-driven insights and solutions are impossible;
- Redundancy, project inefficiency and churn.

1. We need to synthesize *Data* into *Knowledge* and *Action*

To solve the salmon crisis we need:

- Integration of information across silos
- Larger samples sizes
- Borrowing of information between systems
- Sharing of successes and failures

At scale, in context and leading to useful advice

2. Solutions:

These require standardized data that is

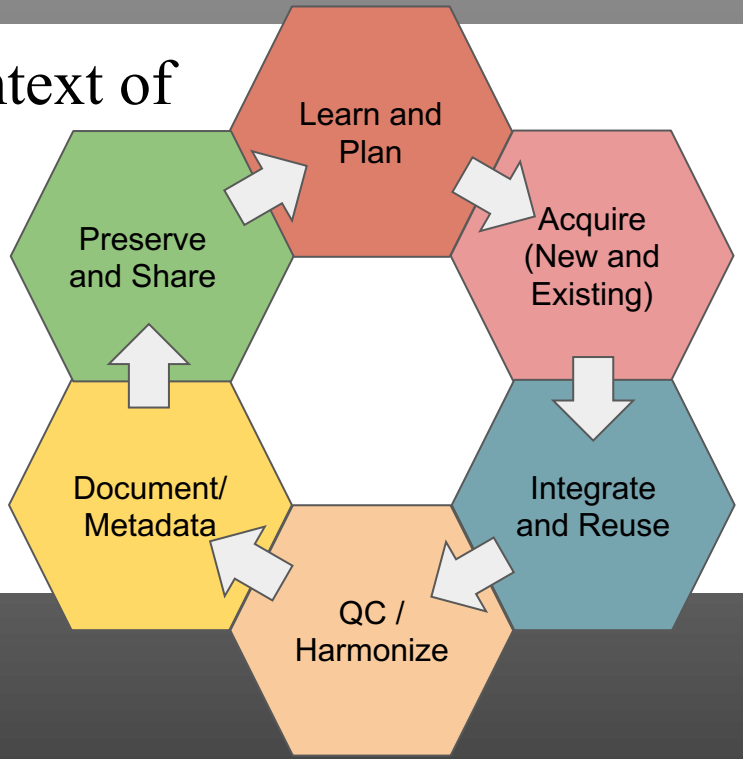
- well documented
- openly available
- near real-time
- Contextually linked

We need **Salmon Data Mobilization.**

3. SDM: Definition and Context

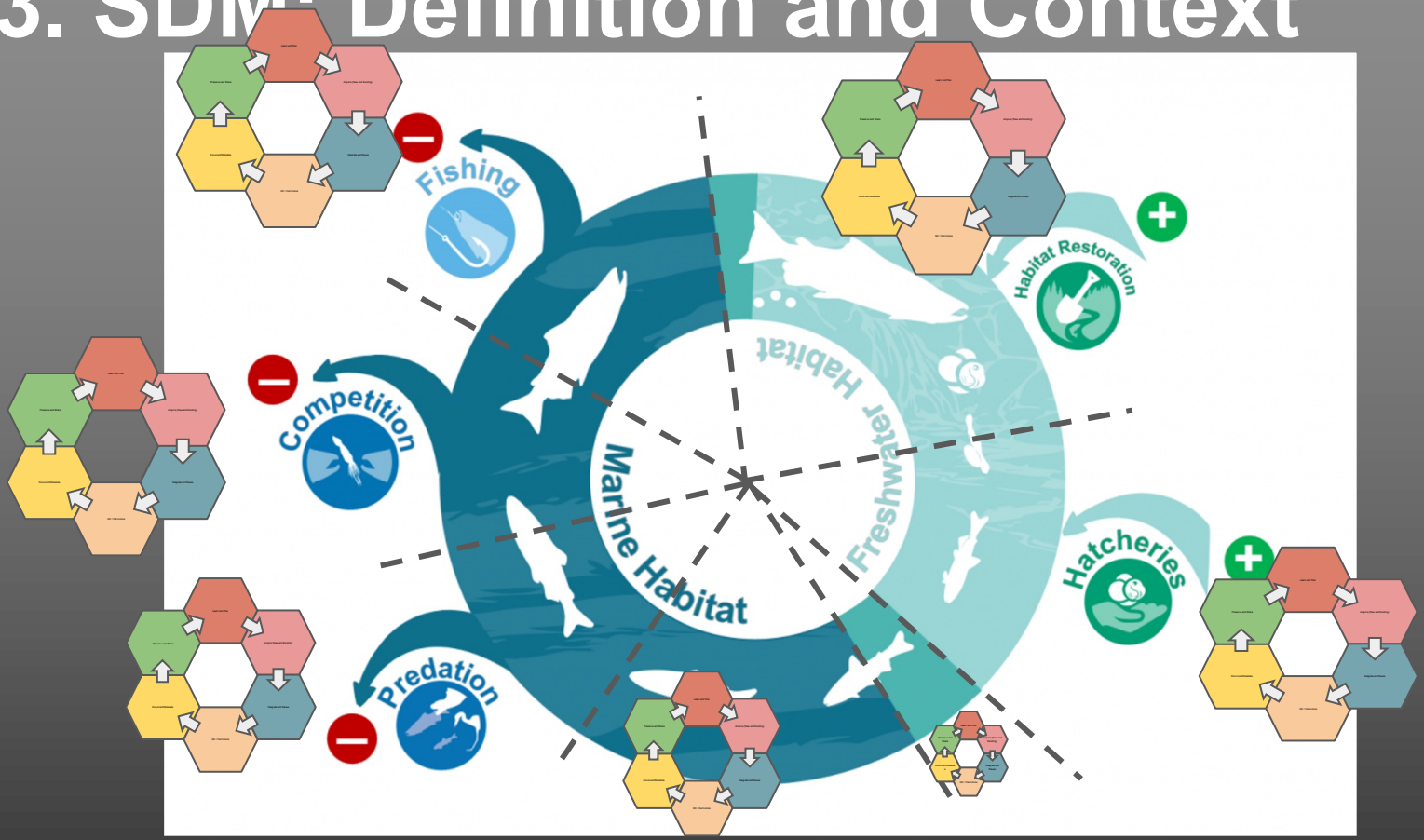
- The Data Life Cycle[1] in the context of Data Mobilization
- Single Project Cycle

Where does it interact with other projects?



[1]Strasser *et al*., 2011

3. SDM: Definition and Context



3. SDM: Definition and Context

Research Campaigns Link Together through Data Mobilization

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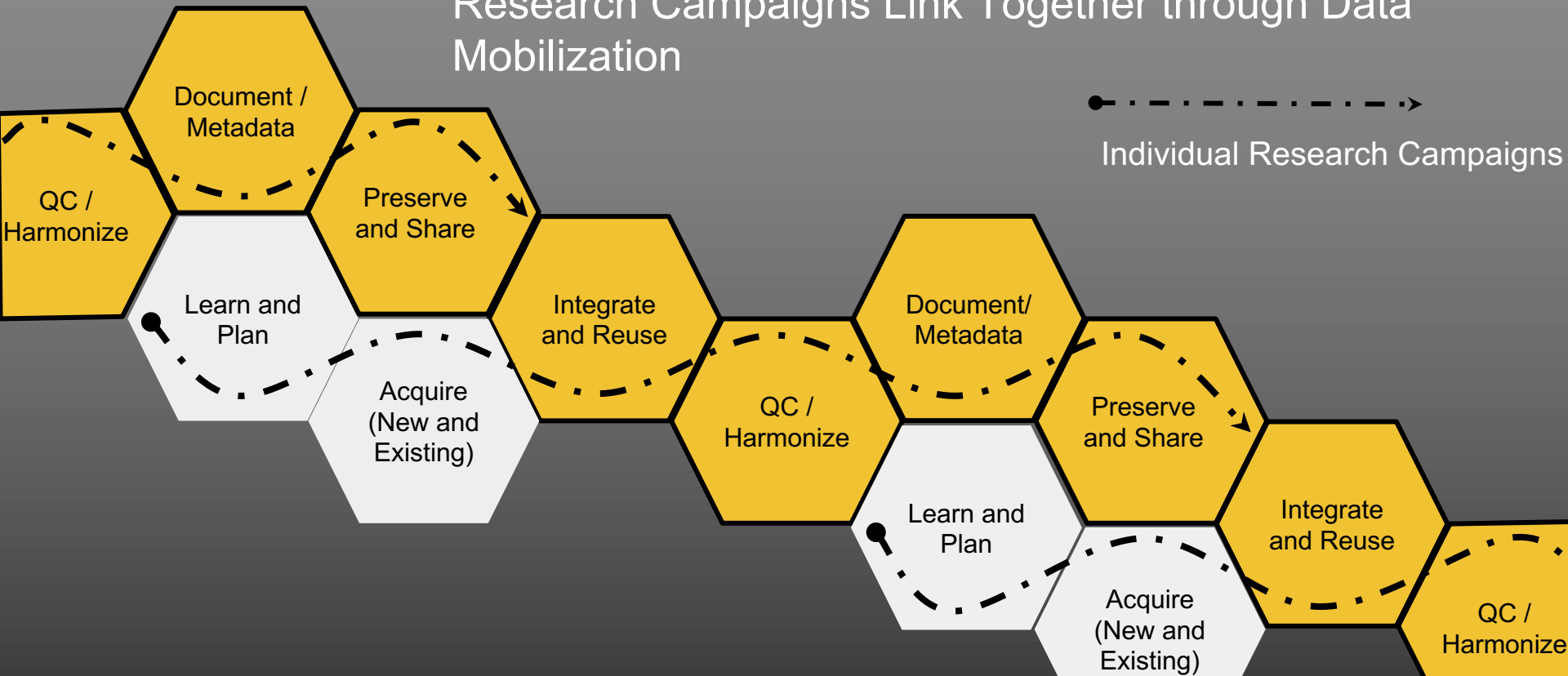
Research Campaigns Link Together through Data Mobilization



4. Requirements: Producer

- Access and training in usable and relevant standards and metadata
- Shared methods vocabularies and ontologies
- Federated and robust data repositories
- Rewards for sharing/re-use
- Best practices with pathways to success

4. Requirements: Community

Community of practice to mobilize data

- Interconnected users, producers and brokers
- Coordinated
- Evolving
- Nodes of expertise, leadership, and capacity
- Social capital (rewards)

4. Requirements: Consumer

Findable - *to a novice user, either manually or using code*

Accessible – *using trusted authentication protocols*

Interoperable - *via broadly used language, code and tools*

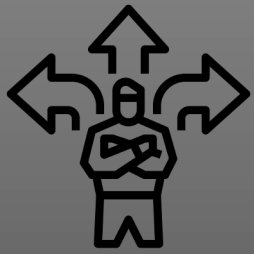
Re-Usable – *in a different context*

5. Barriers

Sociocultural

Technical

Institutional



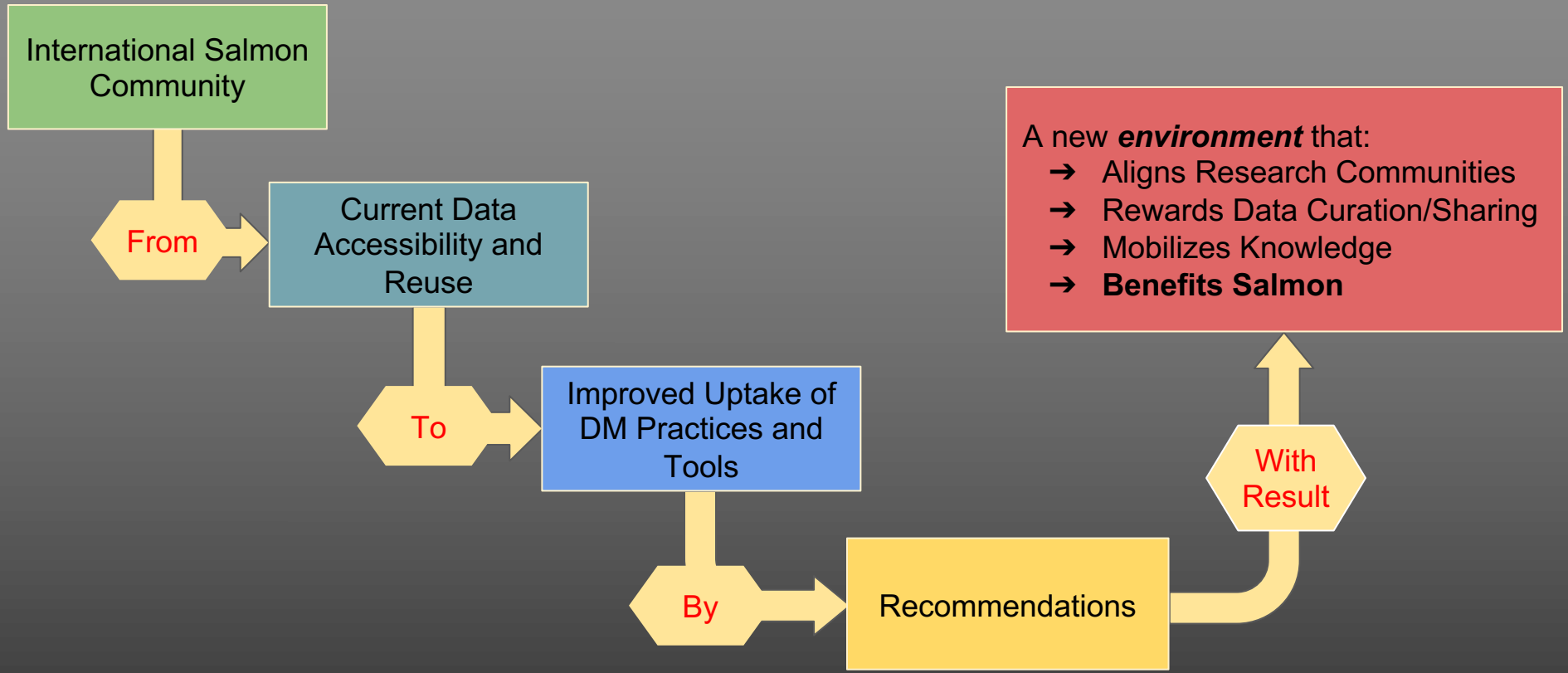
5. Barriers

Sociocultural | **Technical** | **Institutional**

These general Data Mobilization barriers apply to the salmon problem, but are exacerbated by those ‘wicked’ elements:

- Invisible migration pathways
- Migration through multiple Economic Zones
- High social, economic, cultural value

6. Recommendations



6. Recommendations

Create a new environment in which these efforts can be shared and understood.

This is a key step towards the research insights and informed management actions needed to address this **crisis**.

New environment means:

new tools, new processes, new support, new experts, new training, and – critically – a new culture.

6. Recommendations

1. Policy Leadership (Guidance)

2. Funding and Education

3. Data Community Building

6.1 Recommendation #1

Develop Policy Leadership so that

- Salmon Data Mobilization is part of the core structure of data creation campaigns

- The requirements that need to be met are clear; all participants know what is expected of them

6.1 Recommendation #1

Examples:

- The Open Data Directive (EU)
- The Open Government Data Act (International)

With results:

- Publication guidelines bringing these ideas into practice
- FOI Requests will theoretically become easier to fulfill

6.2 Recommendation #2

Funding and Education

- Salaries for Ecological Data Experts
- Data Management Education Programs
- Long-term funding for data repositories, catalogues and social networks

6.2 Recommendation #2

Include workplanning for

- Education program scheduling
- Collaboration with data expert(s)
- Data management tasks
- Support future re-use

6.2 Recommendation #2

Examples:

- EU Horizon Europe research funding through the Marie Skłodowska-Curie Actions (MSCA). *Requires FAIR data handling as a prerequisite for grants.*
- Specific Data Stewards Roles (*e.g.,* CEFAS UK)
- NCEAS Learning Hub - *environmental data science skills*
- 4TU.ResearchData - *store and re-use datasets*

6.3 Recommendation #3

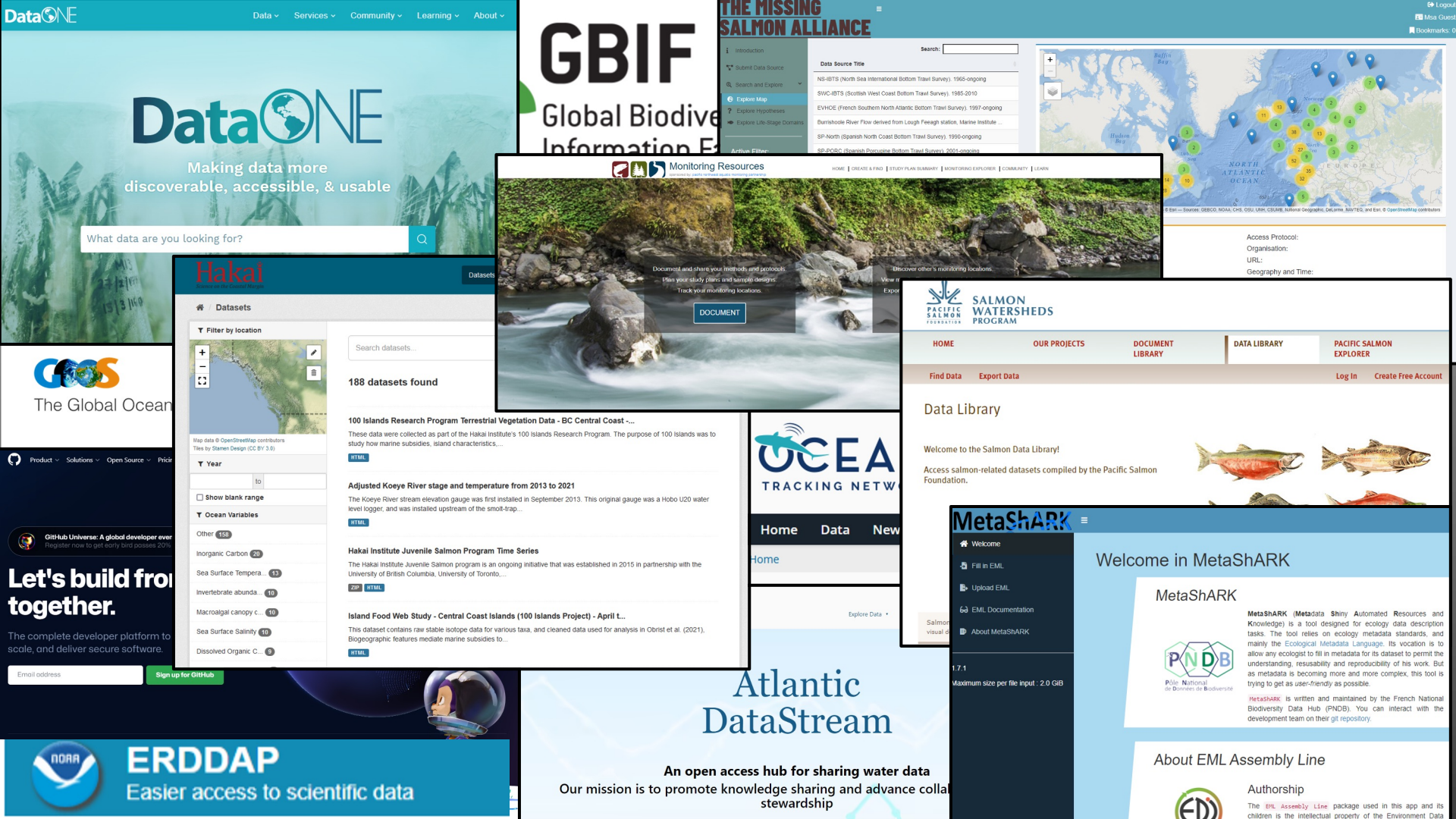
Build a Data Community

- Create, promote, and sustain a peer-support network to mobilise data
- Social incentives for making data accessible and for contributing to the development of consistent vocabularies and standards
- Promote best practices with examples that can be replicated

6.3 Recommendation #3

Build a Data Community

- Provide toolkits and methods libraries
- Enable security and longevity of data repositories
- Enable continuous funding to re-use (and evolve) tools
- Enable thorough documentation for confidence in appropriate reuse


DataONE
Data
Services
Community
Learning
About
DataONE
Making data more
discoverable, accessible, & usable
What data are you looking for?
GBIF
Global Biodive
Information Fa
THE MISSING
SALMON ALLIANCE
Introduction
Submit Data Source
Search and Explore
Explore Map
Explore Hypotheses
Explore Life-Stage Domains
Active Filters
Search:
Data Source Title
NS-IBTS (North Sea International Bottom Trawl Survey). 1965-ongoing
SWC-IBTS (Scottish West Coast Bottom Trawl Survey). 1985-2010
EVHOE (French Southern North Atlantic Bottom Trawl Survey). 1997-ongoing
Burrishoole River Flow derived from Lough Feeagh station. Marine Institute ...
SP-North (Spanish North Coast Bottom Trawl Survey). 1990-ongoing
SP-PORC (Spanish Porcupine Bottom Trawl Survey). 2001-ongoing
Monitoring Resources
HOME | CREATE & FIND | STUDY PLAN SUMMARY | MONITORING EXPLORER | COMMUNITY | LEARN
Document and share your methods and protocols
Plan your study plans and sample designs
Track your monitoring locations
DOCUMENT
Discover other's monitoring locations
Access Protocol:
Organisation:
URL:
Geography and Time:
Hakai
Datasets
Datasets
Filter by location
Search datasets...
188 datasets found
100 Islands Research Program Terrestrial Vegetation Data - BC Central Coast -...
These data were collected as part of the Hakai Institute's 100 Islands Research Program. The purpose of 100 Islands was to study how marine subsidies, island characteristics,...
HTML
Adjusted Koeye River stage and temperature from 2013 to 2021
The Koeye River stream elevation gauge was first installed in September 2013. This original gauge was a Hobo U20 water level logger, and was installed upstream of the smolt-trap...
HTML
Hakai Institute Juvenile Salmon Program Time Series
The Hakai Institute Juvenile Salmon program is an ongoing initiative that was established in 2015 in partnership with the University of British Columbia, University of Toronto,...
ZIP HTML
Island Food Web Study - Central Coast Islands (100 Islands Project) - April t...
This dataset contains raw stable isotope data for various taxa, and cleaned data used for analysis in Obrist et al. (2021). Biogeographic features mediate marine subsidies to...
HTML
Map data © OpenStreetMap contributors
Tiles by Stamen Design (CC BY 3.0)
Year
to
Show blank range
Ocean Variables
Other 158
Inorganic Carbon 20
Sea Surface Tempera... 13
Invertebrate abunda... 10
Macroalgal canopy c... 10
Sea Surface Salinity 10
Dissolved Organic C... 9
SALMON
WATERSHEDS
PROGRAM
PACIFIC SALMON FOUNDATION
HOME
OUR PROJECTS
DOCUMENT LIBRARY
DATA LIBRARY
PACIFIC SALMON EXPLORER
Find Data
Export Data
Log In
Create Free Account
Data Library
Welcome to the Salmon Data Library!
Access salmon-related datasets compiled by the Pacific Salmon Foundation.
The Global Ocean
Product
Solutions
Open Source
Pricir
GitHub Universe: A global developer ever
Register now to get early bird posses 20%
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together.
The complete developer platform to
scale, and deliver secure software.
Email address
Sign up for GitHub
OCEA
TRACKING NETW
Home
Data
New
Home
Explore Data
MetaShARK
Welcome
Fill in EML
Upload EML
EML Documentation
About MetaShARK
1.7.1
Maximum size per file input : 2.0 GiB
Welcome in MetaShARK
MetaShARK
MetaShARK (Metadata Shiny Automated Resources and Knowledge) is a tool designed for ecology data description tasks. The tool relies on ecology metadata standards, and mainly the Ecological Metadata Language. Its vocation is to allow any ecologist to fill in metadata for its dataset to permit the understanding, resusability and reproducibility of his work. But as metadata is becoming more and more complex, this tool is trying to get as user-friendly as possible.
MetaShARK is written and maintained by the French National Biodiversity Data Hub (PNDB). You can interact with the development team on their git repository.
PNDB
Pôle National de Données de Biodiversité
About EML Assembly Line
Authorship
The EML Assembly Line package used in this app and its children is the intellectual property of the Environment Data
Atlantic
DataStream
An open access hub for sharing water data
Our mission is to promote knowledge sharing and advance collal
stewardship
NOAA
ERDDAP
Easier access to scientific data

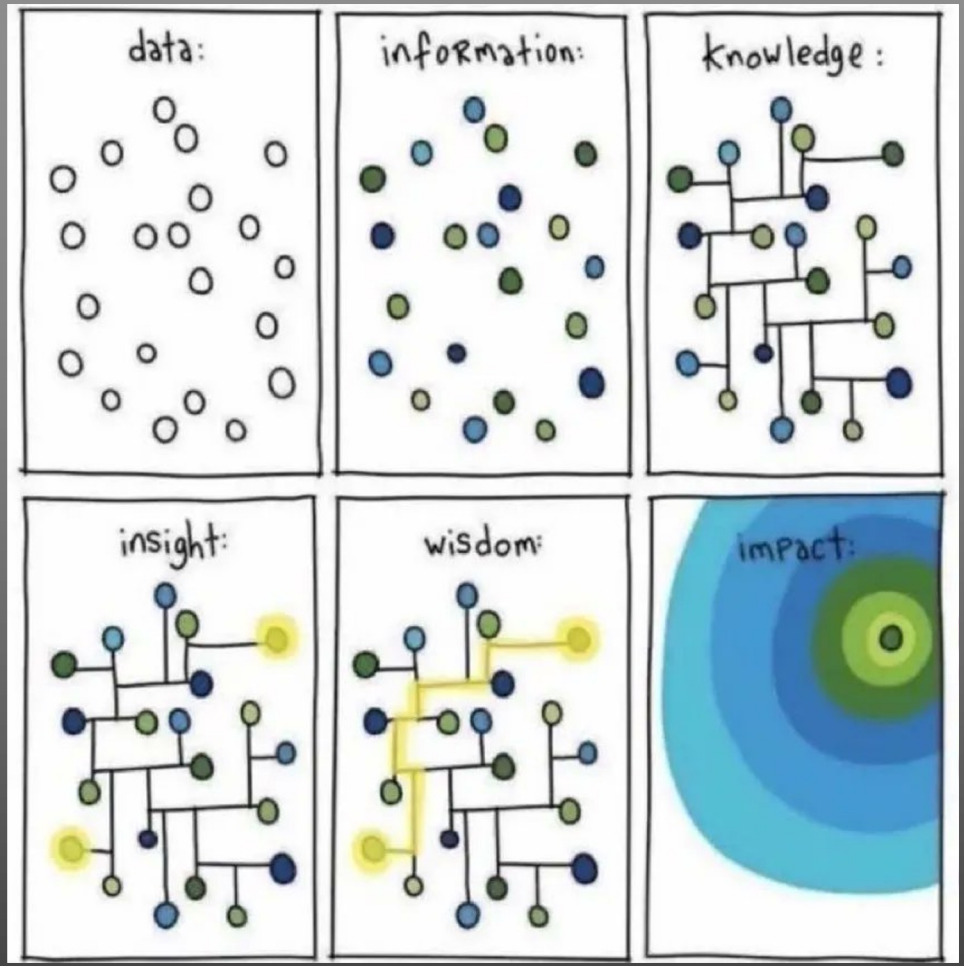
Lest We Lose The Salmon

Salmon Data Mobilization

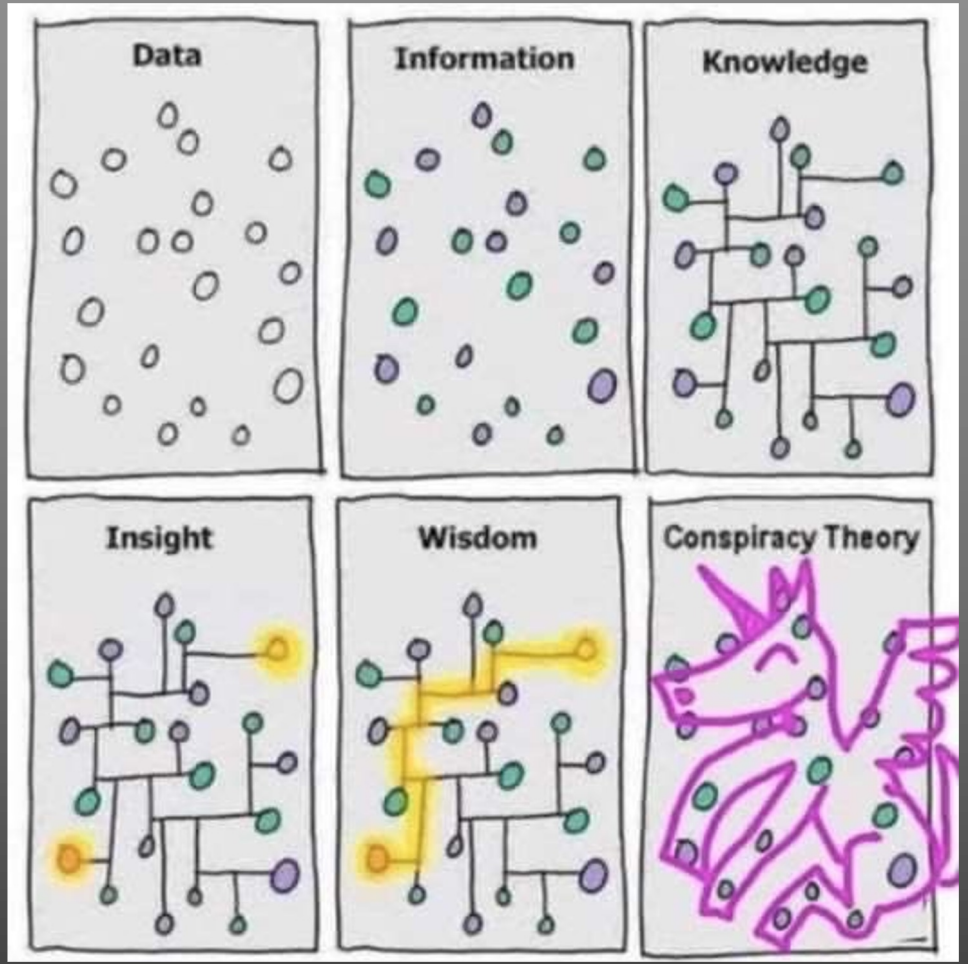
- is a critical first step toward understanding why salmon marine survival is failing, and then fixing that.
- The scope is international and YOUR desktop.
- This is not *Somebody Else's Business*.

Our ability to respond to the salmon crisis depends on it

Salmon Data Mobilization is the First Step



Salmon Data Mobilization is the First Step



modified from @gapingvoid by zeitgeist

Discussion