NOAA Fisheries Open Science and Openscapes

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NMFS rep on PARR 2.0 WG

https://nmfs-opensci.github.io/

2023-2025
OST led Open Science initiative
NMFS Open Science
Openscapes Mentors program

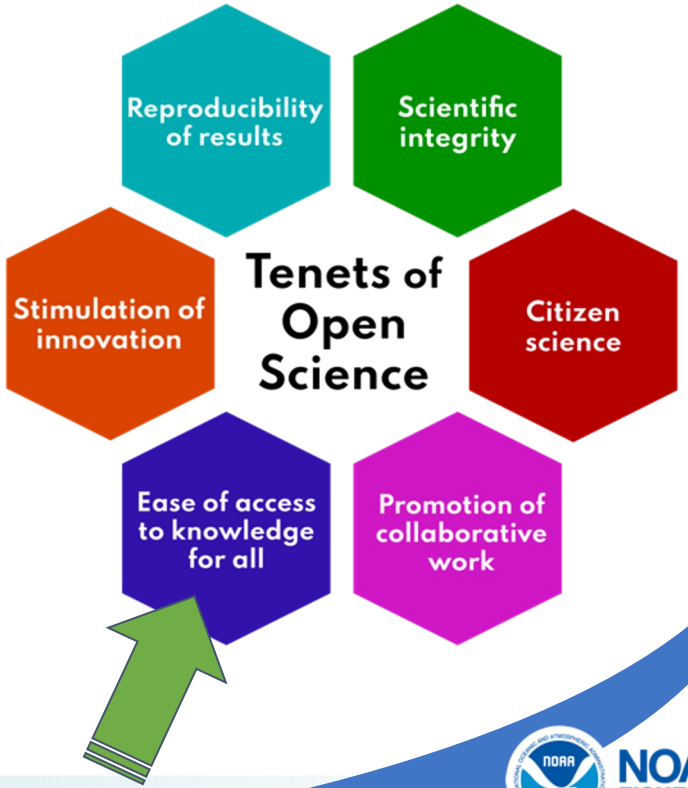
2020-2022

Grassroots science center led

Openscapes Champions program

All centers, 400+ staff


A Common Definition
Open science is the principle and practice of making research products and processes available to all, while respecting diverse cultures, maintaining security and privacy, and fostering collaborations, reproducibility and equity.
TOPS
NASA
2023 Year of Open Science
23


Reproducibility of results
Scientific integrity
Stimulation of innovation
Tenets of Open Science
Citizen science
Ease of access to knowledge for all
Promotion of collaborative work

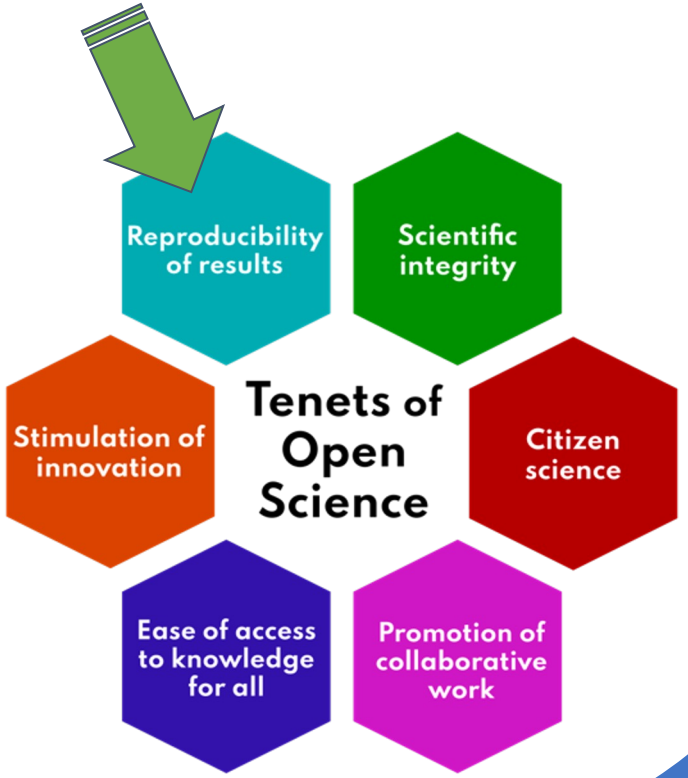
The Reproducibility Crisis in Science

Scientific fields have been rocked by the "reproducibility crisis" that has been building for the last 10 years or so, although really came to fore around 2015.

Journals begin requiring authors share the raw data and code

Recently scientific studies have shown that significant (over half) of studies cannot be replicated – even with the raw data and written methods.

Journals are moving toward requiring that authors share the "data to paper pipeline"



NOAA FISHERIES

Data

- Analyses, plots, tables with no documentation (just the final product)
- Manual undocumented manipulations
- Many data file in different formats
- Scripts of various analyses
- Emails, emails, emails
- Lots of Google docs
- Files on individual folders
- Data of unknown provenance

Unreproducible product:

- Paper
- Decision
- Report

Decisions that impact protected species, human communities, fishing, land use

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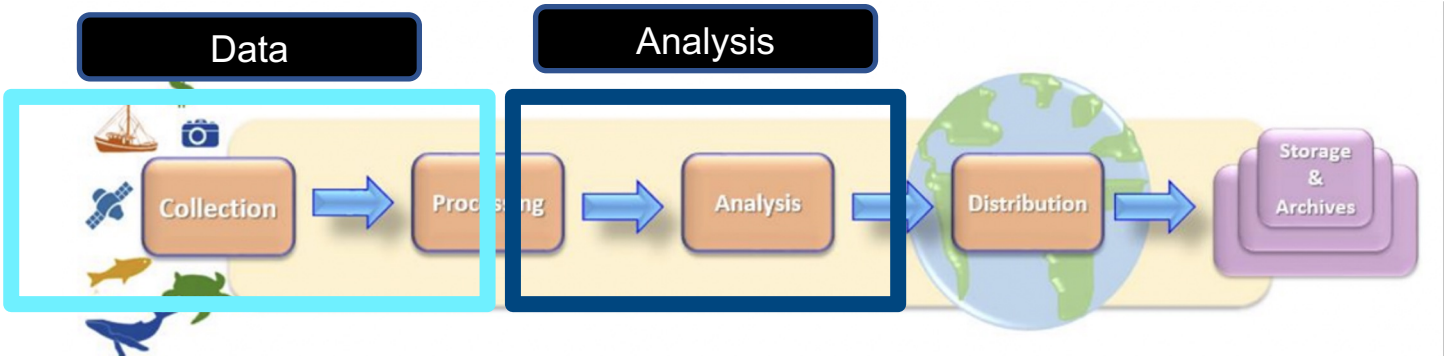
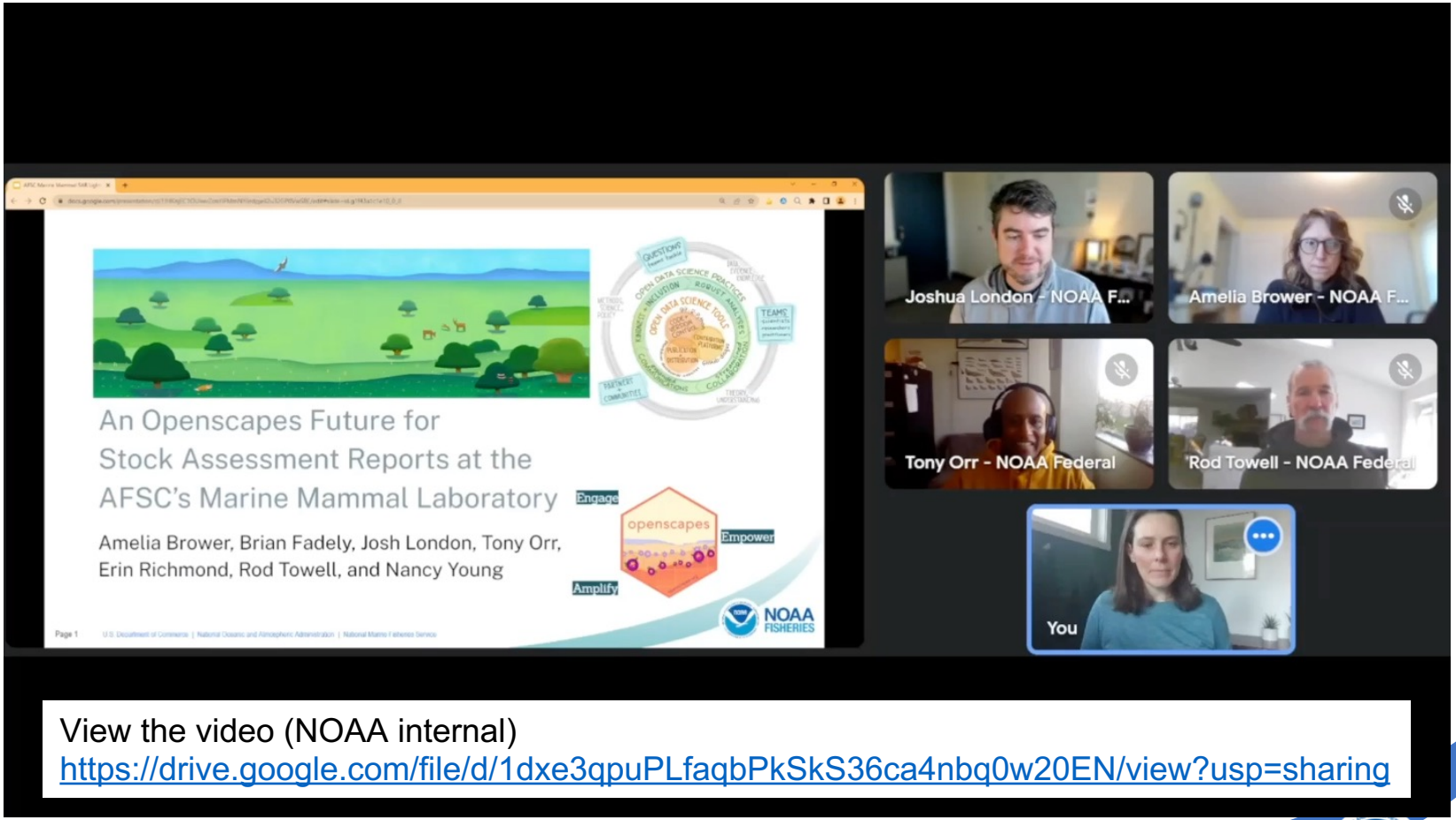
Good news!

- We know how to create “reproducible science workflows”
- Tools have gotten much better and easier to use
- Academic institutions are teaching data science

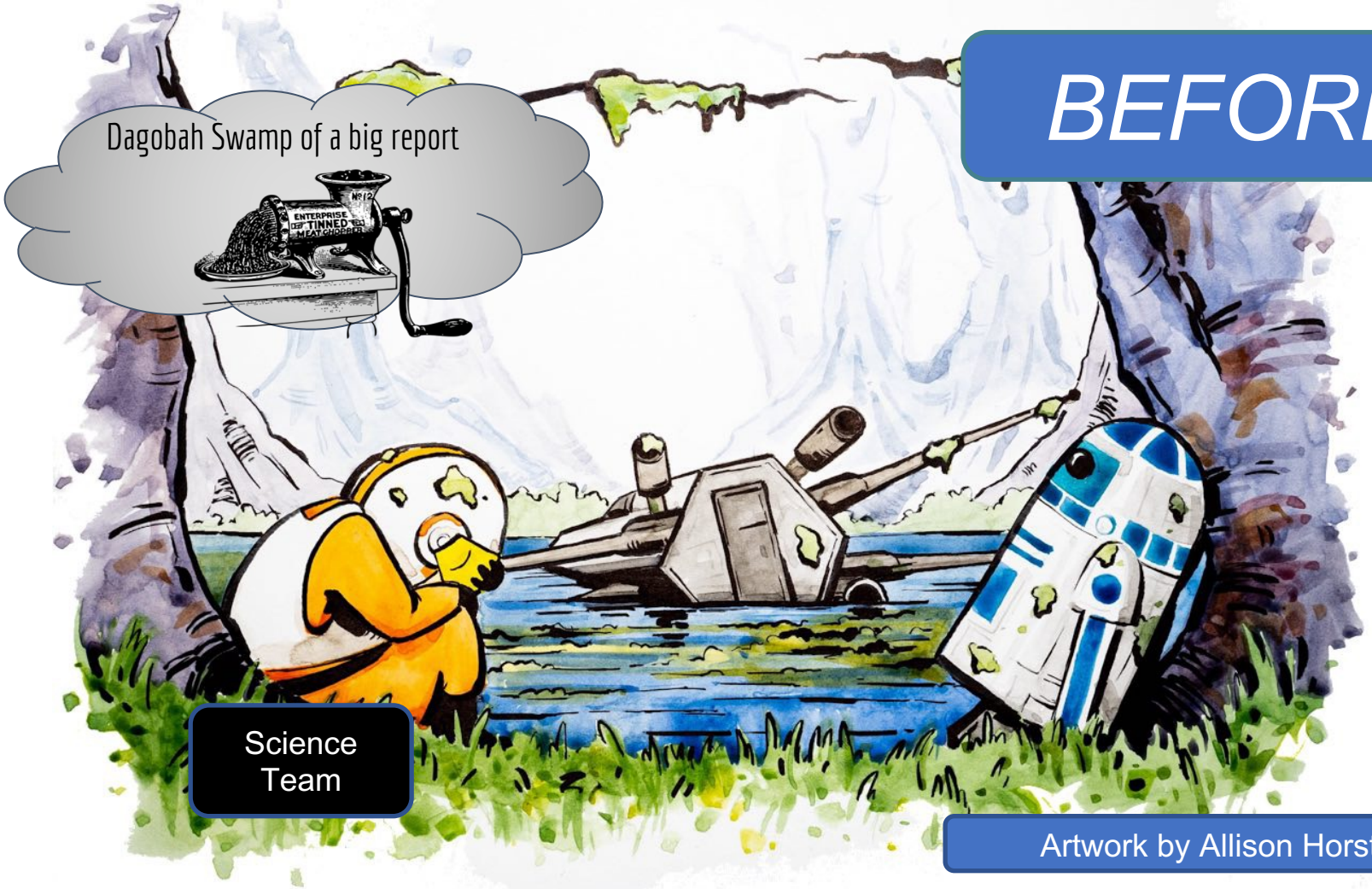


Fisheries Information Management Modernization Workshop 2020, Tech Memo September 17-19, 2019, NMFS Office of Science and Technology (OST)

NOAA FISHERIES



View the video (NOAA internal)
https://drive.google.com/file/d/1dxe3qpuPLfaqbPkSkS36ca4nbq0w20EN/view?usp=sharing



BEFORE

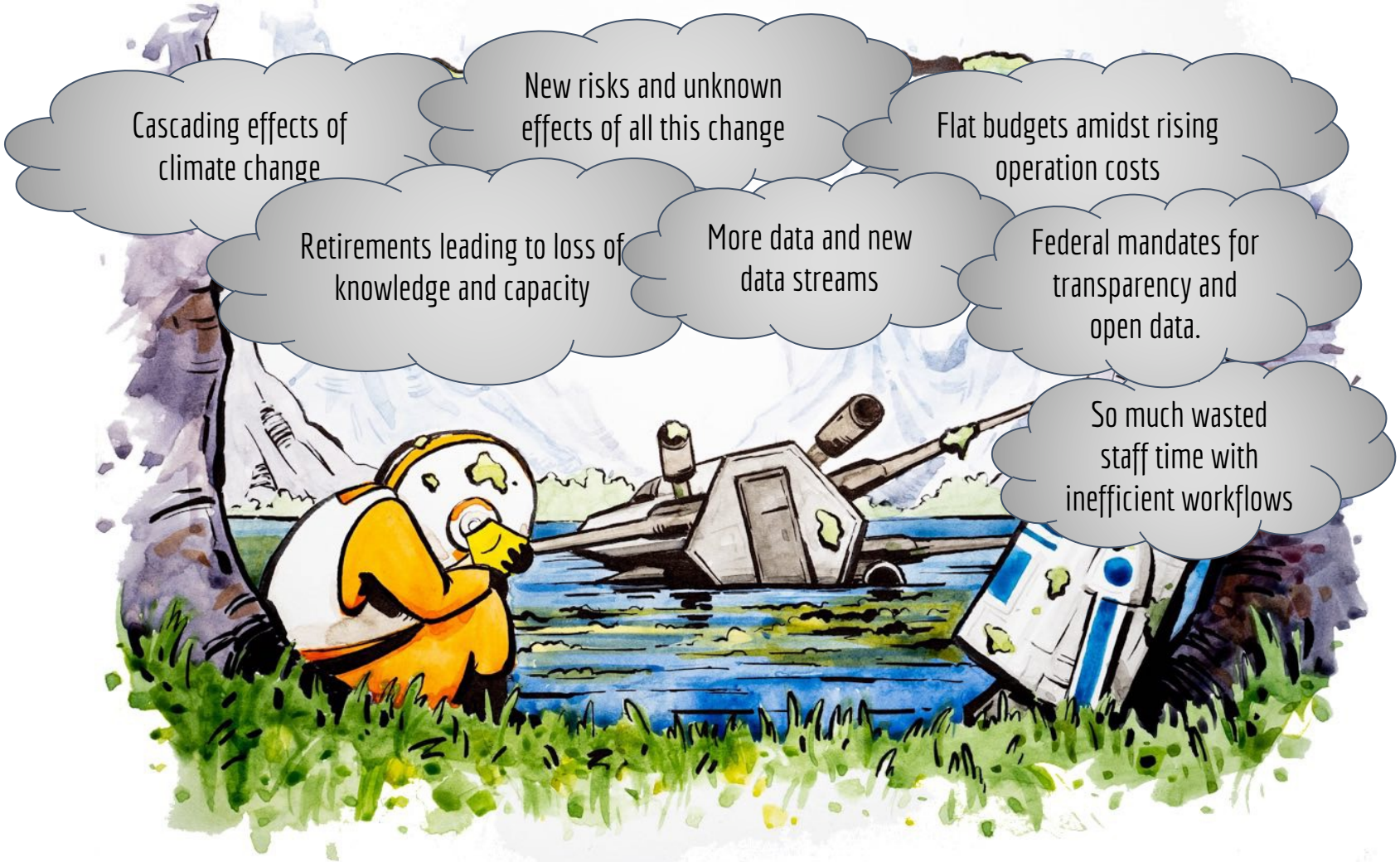
Artwork by Allison Horst!

AFTER

Better teamwork, and new skills and workflows

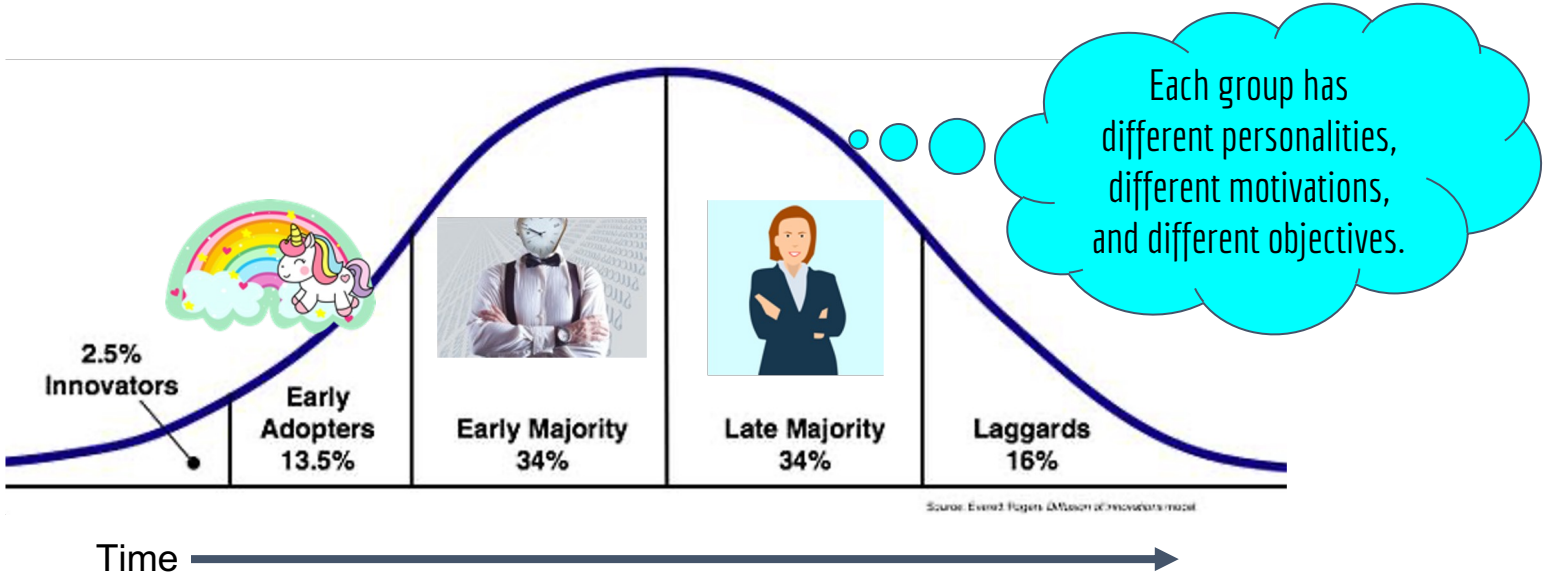
Artwork by Allison Horst!


Great! We can help individual teams
but how do we make change go viral?
Me


Cascading effects of climate change
New risks and unknown effects of all this change
Flat budgets amidst rising operation costs
Retirements leading to loss of knowledge and capacity
More data and new data streams
Federal mandates for transparency and open data.
So much wasted staff time with inefficient workflows

EM Rogers (1962) "Diffusion of Innovation" theory

Predictable progression of stages as idea diffuses through a population



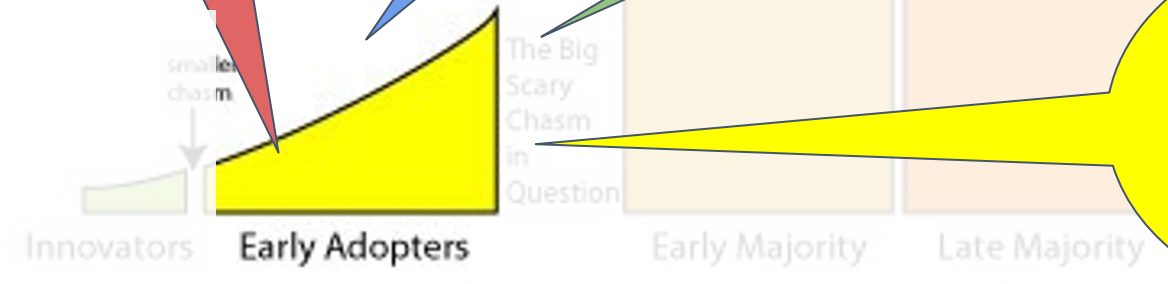
Early Adopters

This is great! This is going to make our work so much more robust!!

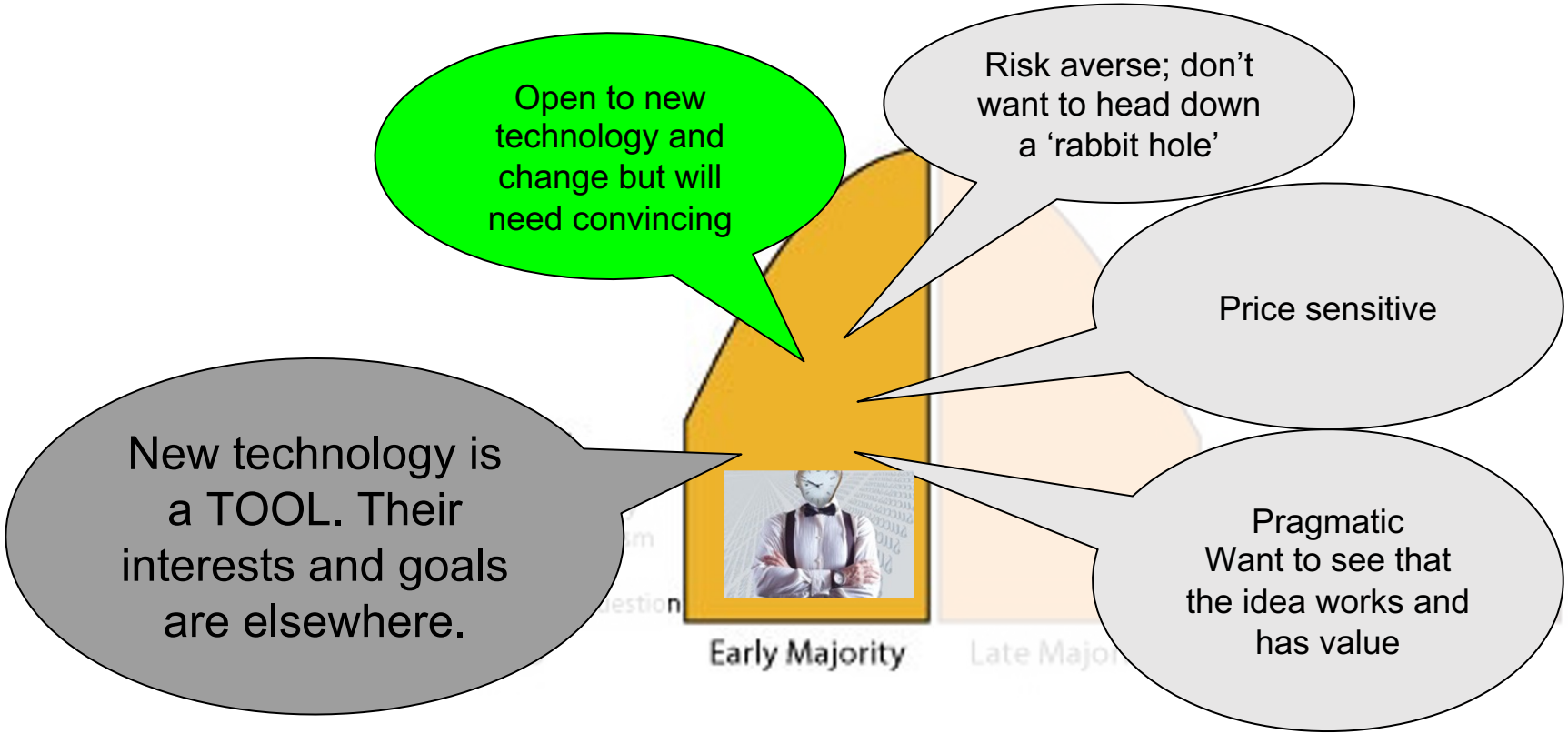
Check out this cool new R package! Wow, that is so cool. I want to try that!

I have a VISION of what our workflow would look like if everyone embraced this!

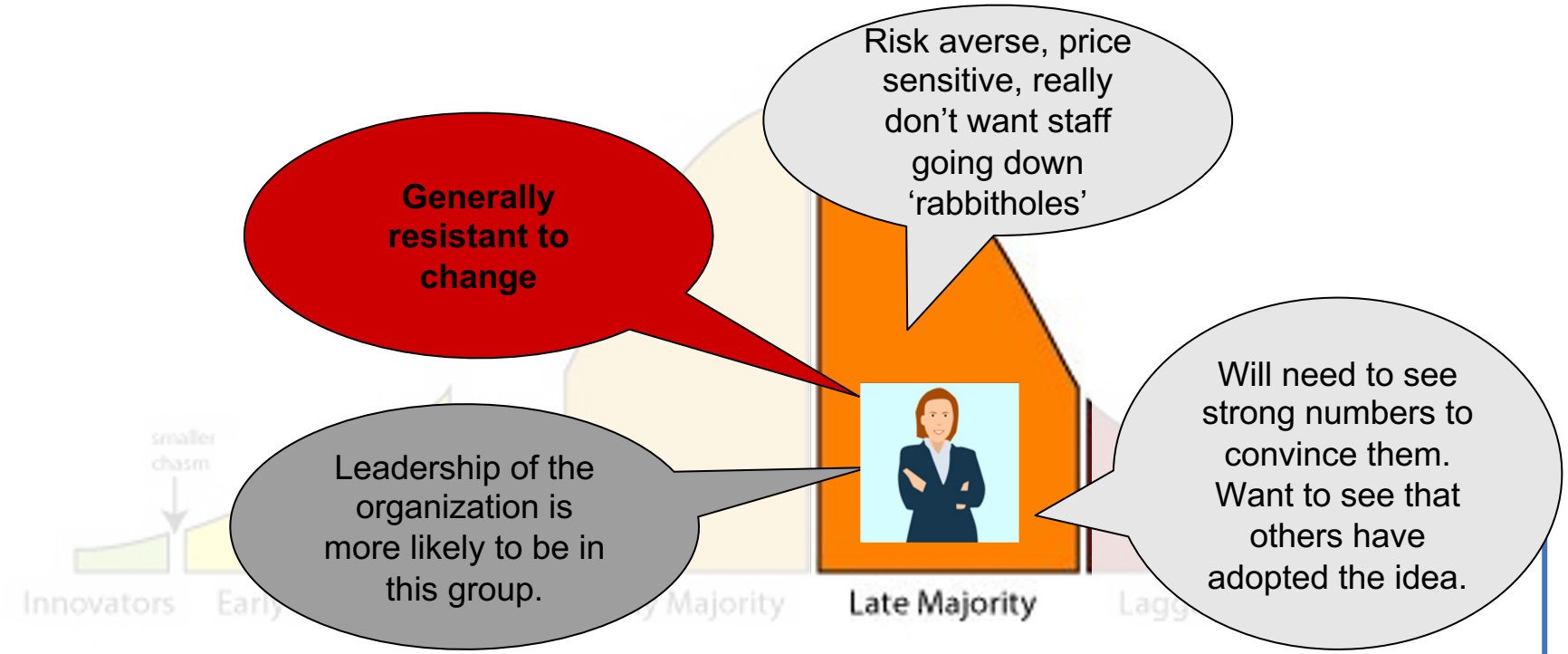
GitHub Actions! Wow! Let me try it too! 12 hours later…. That was so much fun! I learned so much!!



Next step: early majority

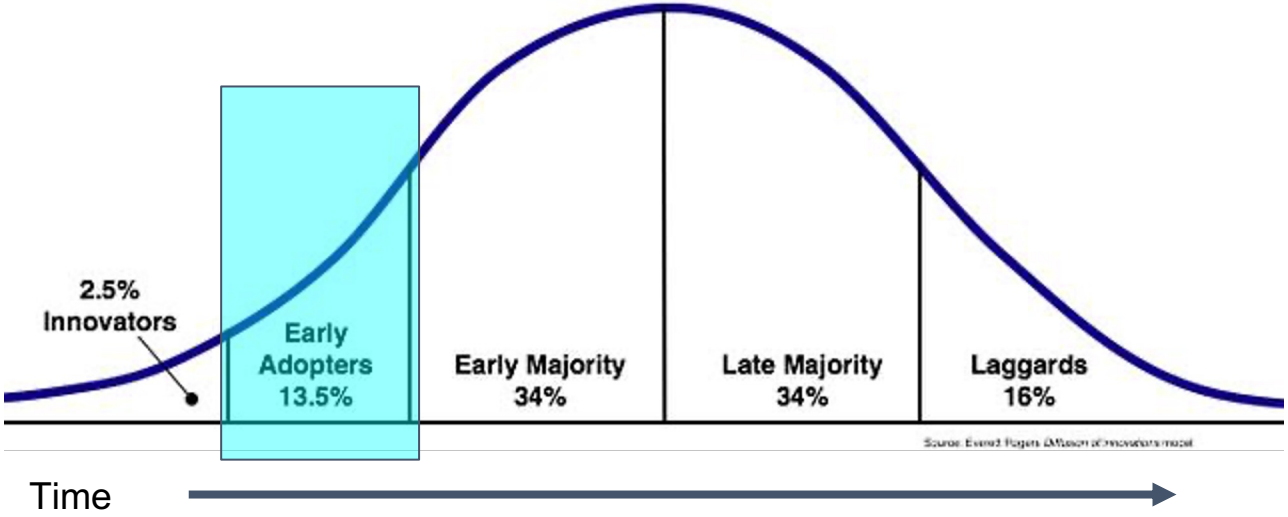


Late Majority often includes organizational leadership



The Early Adopters are critical to diffusion of innovation

1. Early Adopters develop the innovation into something of value
2. Their **energy and effort** is what drives the initial diffusion process, but that is a hard and slow process.




openscapes
openscapes.org
Happy early adopters having found community
WELCOME!
Sad and lonely early adopter

NMFS Openscapes training in Open Science -- Started 2020

At NMFS, a grassroots effort due to desire from staff for training in Open Science

9 NMFS Champions Cohorts (40 staff ea)

- 2020: Winter NEFSC
- 2021: Spring NWFSC
- 2021: Fall NWFSC, AFSC, SEFSC, NEFSC
- 2022: Winter AFSC
- 2022: Summer SEFSC/SERO
- 2022 Fall 4 cohorts 6 science ctrs, WCRO

https://nmfs-openscapes.github.io/

What is Openscapes?

Not your traditional training/workshop

- Cohort-based remote sessions for teams: introduce concepts and workflows; facilitate teams to talk about problems then go and solve them, with accountability and support.
- **It's about getting stuff done. It's about identifying and making progress on barriers**
- "A process to help you build better lanes of communication" -Laura Waters, SE Regional Office

Sustainability built-in

- Strengthening a teaching & learning culture within teams & orgs. Not just for scientists:, admin, IT staff, etc, welcomed. Equitable.

No coding or software skills required

Openscapes works with many environmental orgs

https://openscapes.org/

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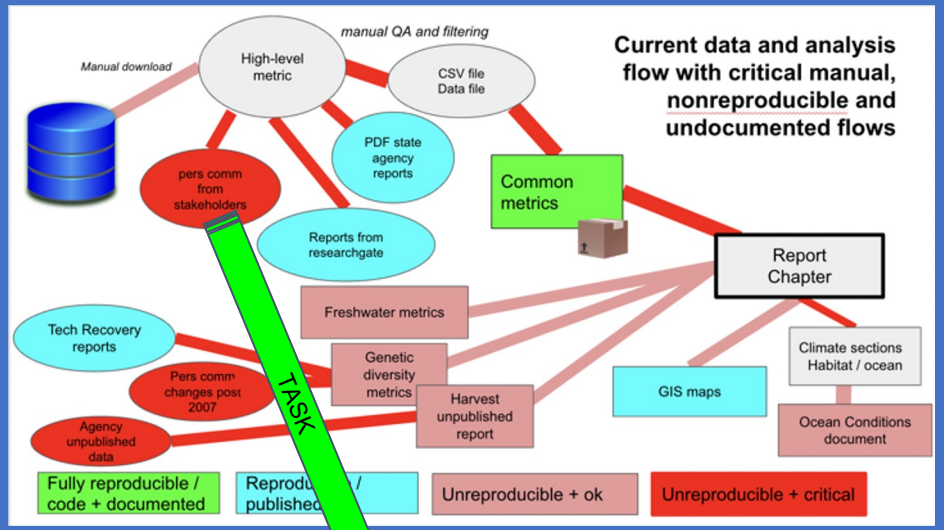
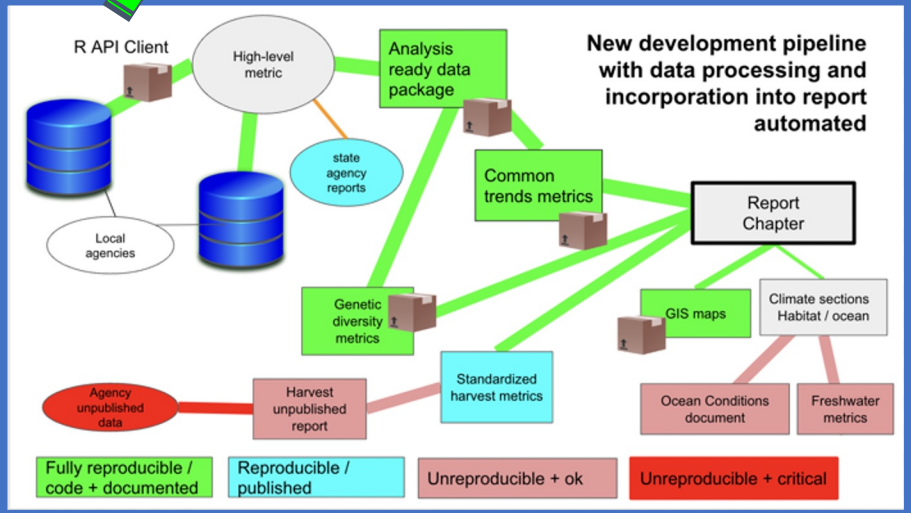
PNW Salmonid Viability Report (NWFSC) + Status Reviews (WCRO) Team

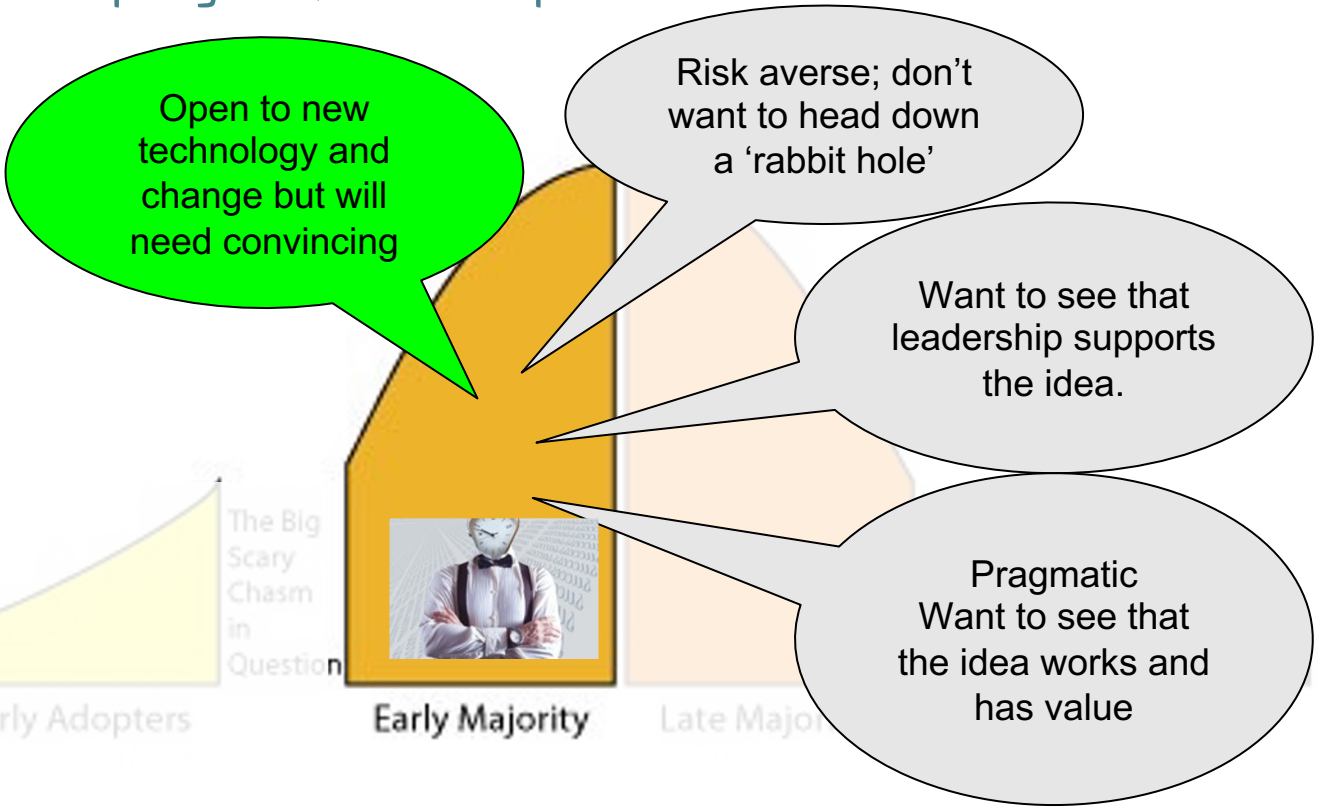


Set up single email address for pers comms re data requests

TASK

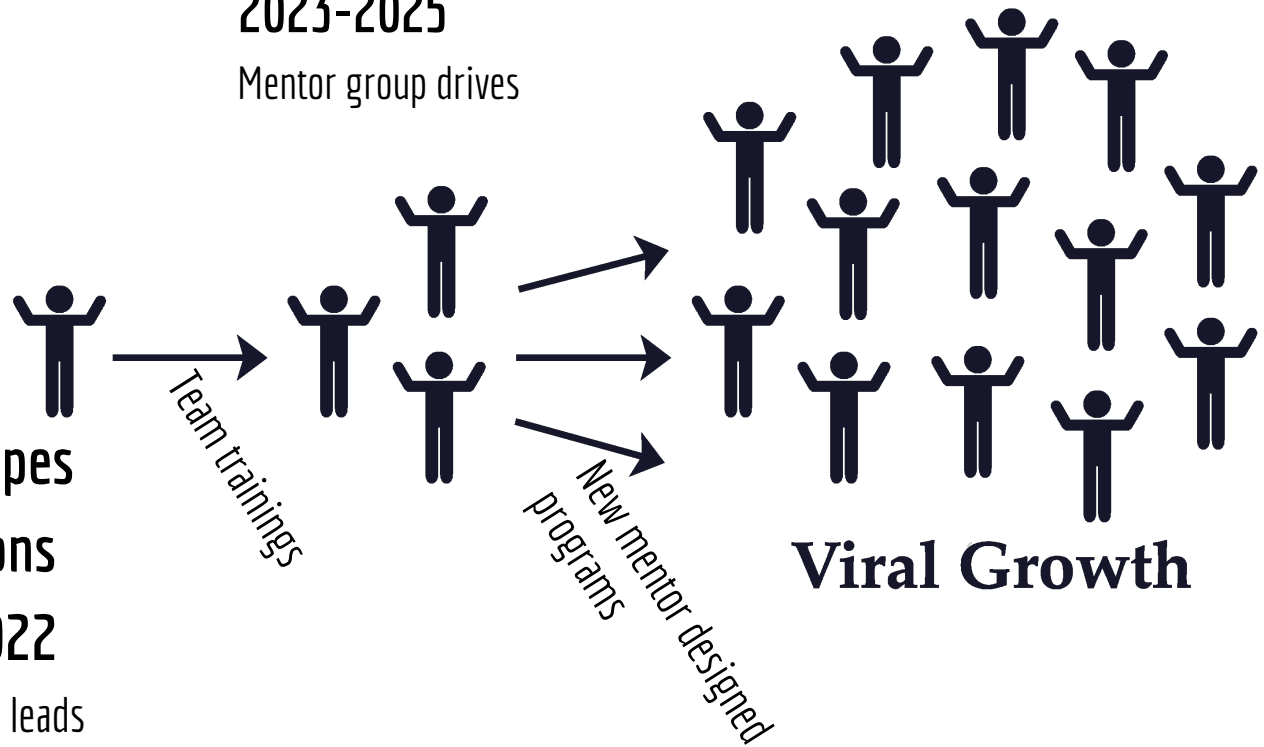


2023-2026: NMFS OST led Open Science initiative
Openscapes Mentors program, NMFS Open Science



Openscapes Mentors 2023-2025

Mentor group drives



Openscapes Champions 2020-2022

Openscapes leads drive and organize

NMFS Openscapes Mentors Program 2023-2026

		YEAR 1				YEAR 2				YEAR 3			
		2023		2024				2025				2026	
TASK NO.	TASK TITLE	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
1	Develop Mentor Community												
1.1	Outreach to new NMFS mentors												
1.2	Openscapes Mentors Cohort Activities												
1.3	Identify and Address Cross-Center Roadblocks												
2	Empower Research Teams												
2.1	Engage NMFS teams												
2.2	Openscapes Champions Cohorts												
2.3	Community Skills Workshops (R/Python)												
2.4	Pathways to Open Science (DEI)												
3	Amplify Open Science Leaders												
3.1	Community engagement & webinars												
3.2	Coordinate, comms, tag-ups												

NMFS Open Science

The overarching vision of NMFS Open Science is to support scientists, developers, and policy analysts within NOAA Fisheries (NMFS) in fulfilling NOAA's Open Science mandates: NOAA Data Strategy, DOC Open Source Code Policy, Federal Data Strategy, and the Federal Open Access Memo. PARR

NMFS Openscapes

is concerned Open Science training in workflow and technical skills needed at the individual and team level. We focus on helping all staff engaged in data-driven science and decision-making at NMFS. Support an active and engaged mentor group across NMFS.

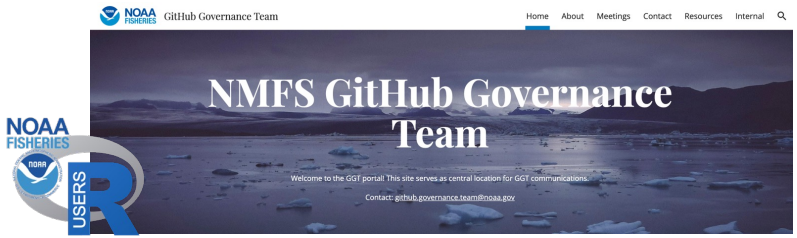
NMFS Open Science is a strategic group

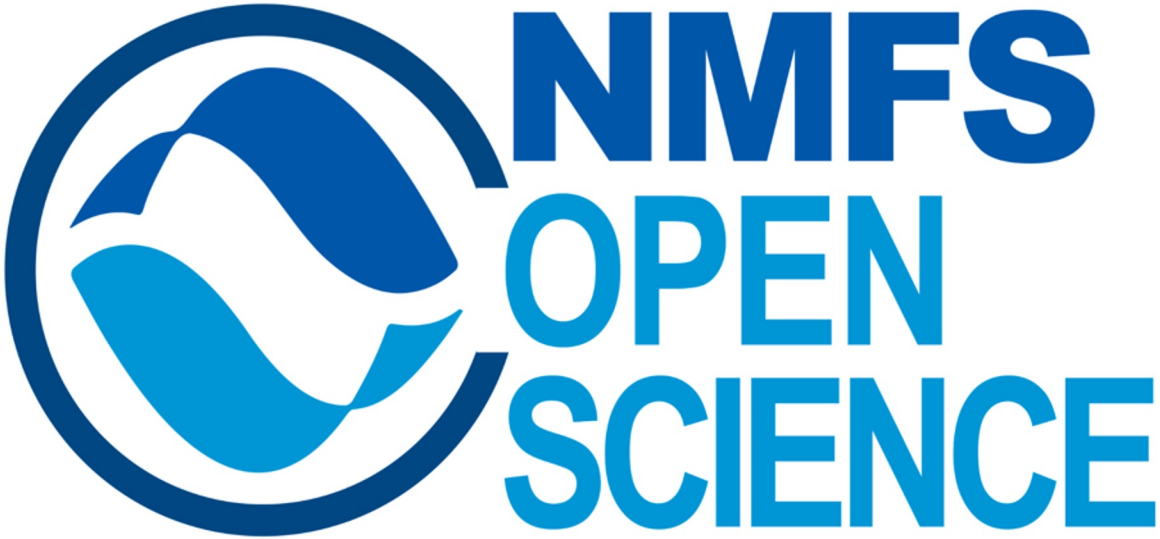
Triage the most pressing needs for scientists, developers, and policy analysts within all of NOAA Fisheries and take leadership roles to find solutions.

Support for NMFS developed research software, package development, templates, utilities

Soft infrastructure: development platforms, cloud virtual machines, and product delivery systems.

Governance groups and user groups





More info:
https://www.fisheries.noaa.gov/feature-story/2022-fall-openscapes-champion-cohort-makes-inroads-open-science
https://nmfs-opensci.github.io/ and https://nmfs-openscapes.github.io/