



**NOAA
FISHERIES**

Integrated Ecosystem Assessment Data Guidance Documentation

Integrated Ecosystem Assessment^{1,*}

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* *Correspondence:* Integrated Ecosystem Assessment enter

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Part I

Welcome

Report run date: Wednesday, April 02, 2025

Integrated Ecosystem Assessments

[description]



Figure 1: Sorting and weighing fish on deck on the 2022 Bering Sea groundfish survey aboard the F/V Alaska Knight. Credit: Emily Markowitz/NOAA Fisheries.

Documentation Objective

As part of our commitment to open science, reproducibility, and transparency, we provide this metadata guide to compliment our public-domain data.

User Resources

Please consider this resource to be a **Living Document**. The code in this repository is regularly being updated and improved. Please refer to releases for finalized products and project milestones.

Do not hesitate to reach out (to us at either [email] or GitHub issues, especially if you find discrepancies in the data or want to suggest improvements to infrastructure. Thank you in advance for your collaboration and partnership with us as we develop our future data universe.

User Resources

- IEA Ecosystem Status Reports

Cite this data

Use the below bibtext citations, as cited in our group's citation repository for citing the data created and maintained in this repo. Add "note = {Accessed: mm/dd/yyyy}" to append the day this data was accessed. Included here are AFSC RACE Groundfish and Shellfish Assessment Program's:

```
@misc{IEA-Data,  
  author = {{National Integrated Ecosystem Assessment Program}},  
  title = {National Integrated Ecosystem Assessment Program},  
  howpublished = {https://www.integratedecosystemassessment.noaa.gov/ecosystem-status-repor},  
  publisher = {{U.S. Dep. Commer.}},  
  copyright = {Public Domain}  
}
```

Access Constraints

There are no legal restrictions on access to the data. They reside in public domain and can be freely distributed.

User Constraints: Users must read and fully comprehend the metadata and code of conduct prior to use. Data should not be used beyond the limits of the source scale.

Suggestions and comments

Acknowledgement of the Program, as the source from which these data were obtained, in any publications and/or other representations of these data, is suggested.

Suggestions and comments

If the data or metadata can be improved, please create a pull request or submit an issue to the code's repository.

NOAA README

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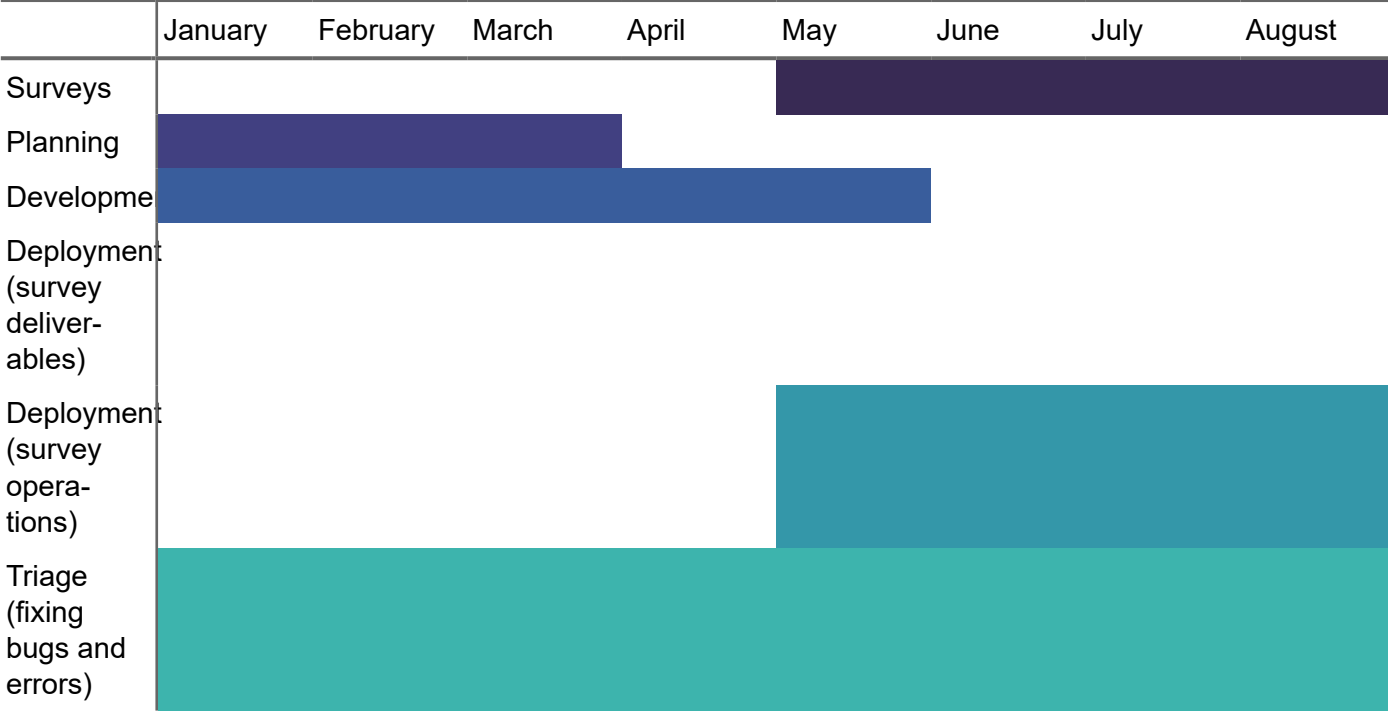
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1 Workflow

1.1 Operational Product Development Timeline

Over the course of the year, the survey team is developing a variety of different data products. Planning and preparation for surveys happens in the late winter and spring, surveys occur in the summer, data validation takes place over the course of the survey and after the survey, and data products are produced through fall and late winter.

Table 1.1: Operational product development timeline.



1 Workflow

	January	February	March	April	May	June	July	August
User feedback and brainstorming								

1.2 Data workflow from boat to production

Organisms first need to be collected aboard the vessel before data can be entered into tablets.

The objective of this process is to take raw data, QA/QC and clean these data, curate standard data products for these survey. Please note, through this process we are not providing “data” (what we consider lower level data material; see the data levels section below) but “data products”, which is intended to facilitate the most fool-proof standard interpretation of the data. These data products only use data from standard and validated hauls, and has undergone careful review.

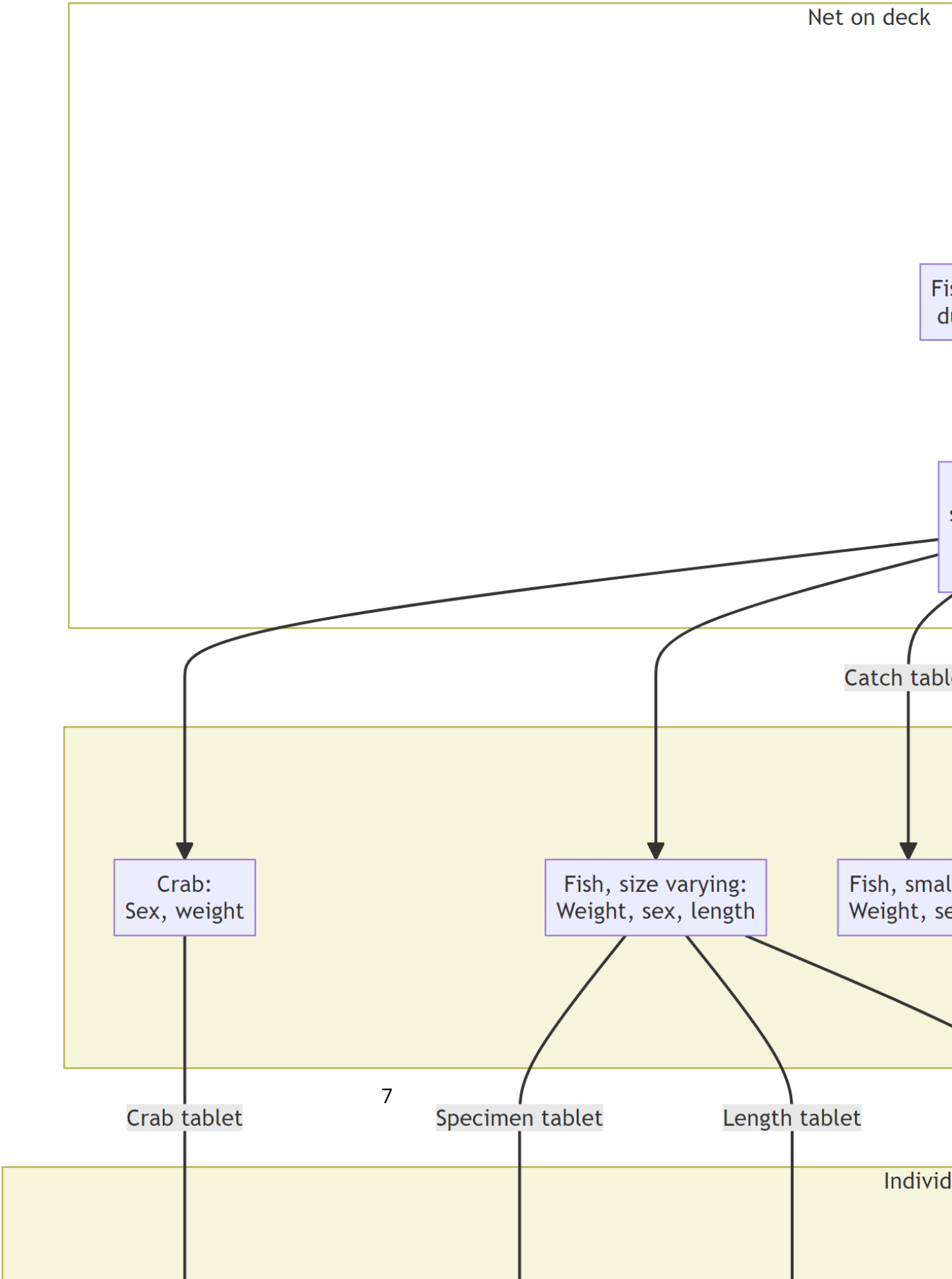
Once survey data collected on the vessel has been checked and validated, the `gap_products/code/run.R` script is used to orchestrate a sequence of programs that calculate the standard data products resulting from the NOAA AFSC GAP bottom trawl surveys. Standard data products are the CPUE, BIOMASS, SIZECOMP, and AGECOMP tables in the GAP_PRODUCTS Oracle schema. The tables are slated to be updated twice a year: once after the survey season following finalization of that summer’s bottom trawl survey data to incorporate the new catch, size, and effort data and once prior to an upcoming survey to incorporate new age data that were processed after the prior summer’s survey season ended. This second pre-survey production run will also incorporate changes in the data due to the specimen voucher process as well as other post-hoc changes in the survey data.

The data from these surveys constitute a **living data set** so we can continue to **provide the best available data to all partners, stakeholders, and fellow scientists**.

During each data product run cycle:

1. Versions of the tables in GAP_PRODUCTS are locally imported within the gap_products repository to compare with the updated production tables. Any

1 Workflow



1 Workflow

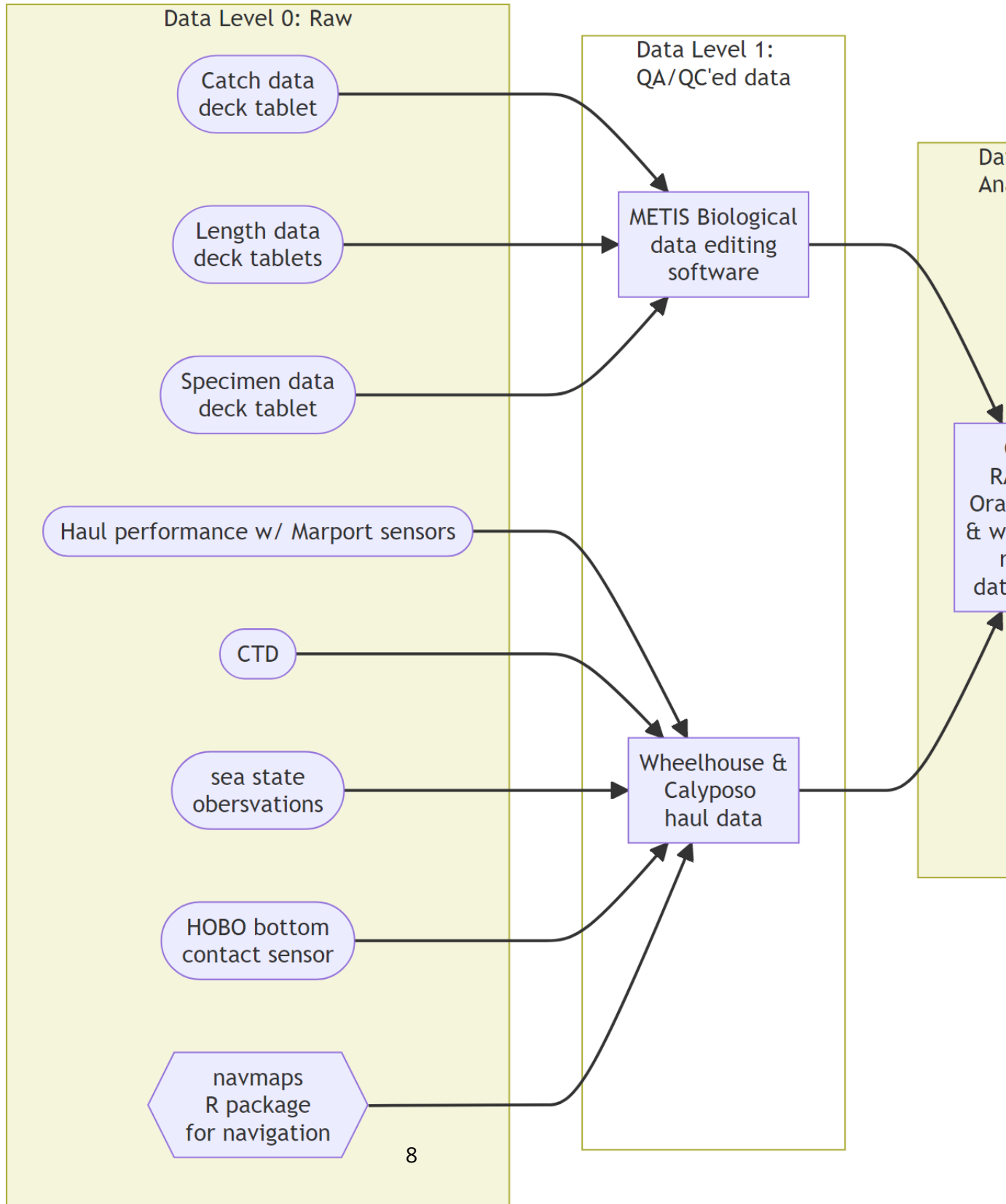


Figure 1.2: Simplified data workflow from boat to production.

1 Workflow

changes to a production table will be compared and checked to make sure those changes are intentional and documented.

2. Use the `gapindex` R package to calculate the four major standard data products: CPUE, BIOMASS, SIZECOMP, AGECOMP. These tables are compared and checked to their respective locally saved copies and any changes to the tables are vetted and documented. These tables are then uploaded to the GAP_PRODUCTS Oracle schema.
3. Calculate the various materialized views for AKFIN and FOSS purposes. Since these are derivative of the tables in GAP_PRODUCTS as well as other base tables in RACEBASE and RACE_DATA, it is not necessary to check these views in addition to the data checks done in the previous steps.

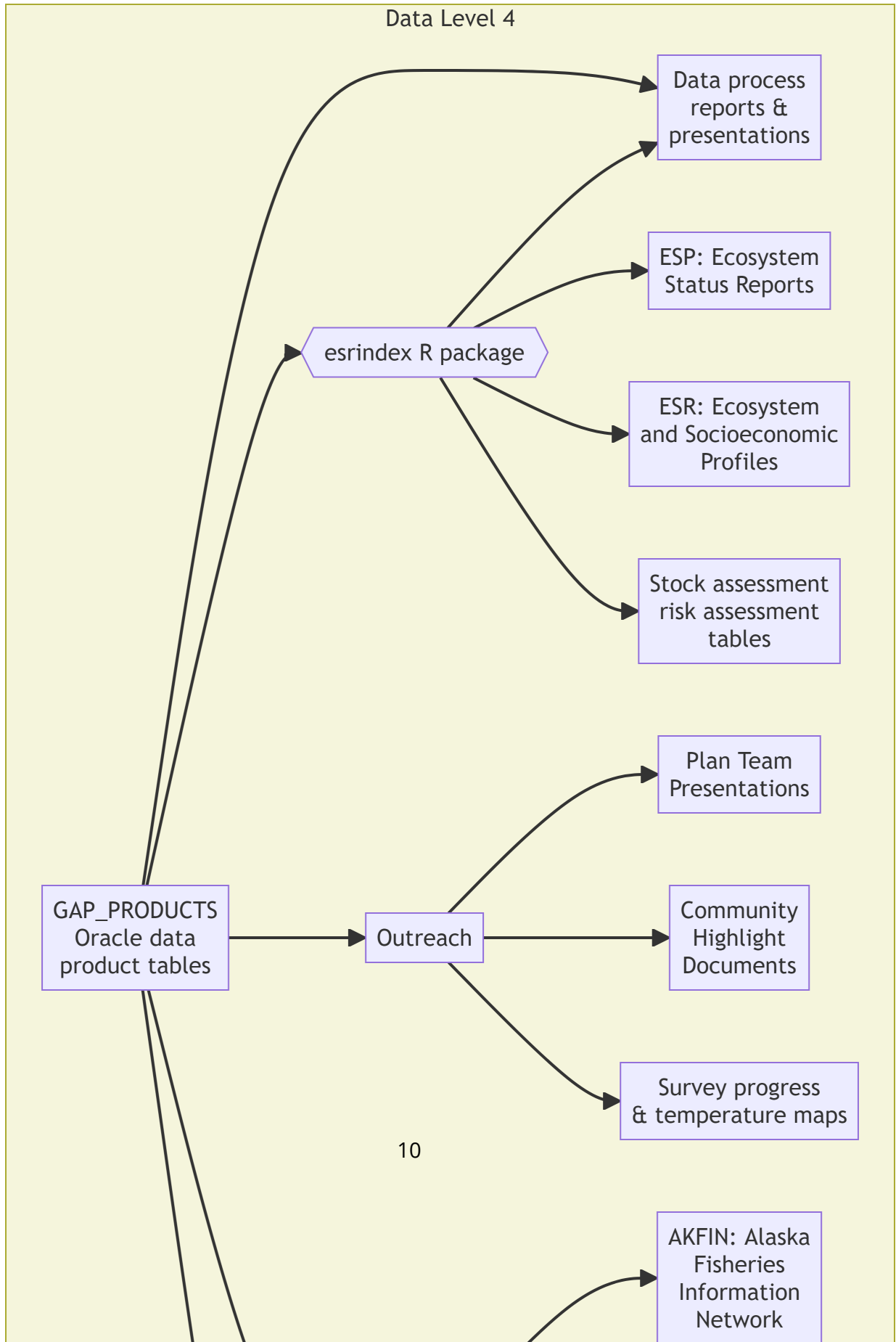
1.3 Data levels

GAP produces numerous data products that are subjected to different levels of processing, ranging from raw to highly-derived. The suitability of these data products for analysis varies and there is ambiguity about which data products can be used for which purpose. This ambiguity can create challenges in communicating about data products and potentially lead to misunderstanding and misuse of data. One approach to communicating about the level of processing applied to data products and their suitability for analysis is to describe data products using a Data Processing Level system. Data Processing Level systems are widely used in earth system sciences to characterize the extent of processing that has been applied to data products. For example, the NOAA National Centers for Environmental Information (NCEI) Satellite Program uses a Data Processing Level system to describe data on a scale of 0-4, where Level 0 is raw data and Level 4 is model output or results from analysis. Example of how NASA remote sensing data products are shared through a public data portal with levels of data processing and documentation.

For more information, see Sean Rohan's October 2022 SCRUGS presentation on the topic.

- **Level 0:** Raw and unprocessed data. Ex: Data on the G drive, some tables in RACE_DATA
- **Level 1:** Data products with QA/QC applied that may or may not be expanded to analysis units, but either not georeferenced or does not include full metadata. Ex: Some tables in RACE_DATA and RACEBASE

1 Workflow



1 Workflow

- **Level 2:** Analysis-ready data products that are derived for a standardized extent and account for zeros and missing/bad data. Ex: CPUE tables, some data products in public-facing archives and repositories
- **Level 3:** Data products that are synthesized across a standardized extent, often inputs in a higher-level analytical product. Ex: Abundance indices, some data products in public-facing archives and repositories
- **Level 4:** Analytically generated data products that are derived from lower-level data, often to inform management. Ex: Biological reference points from stock assessments, Essential Fish Habitat layers, indicators in Ecosystem Status Reports and Ecosystem and Socioeconomic Profiles

2 News

2.1 News/change logs

- Run 2025-04-02 Initial Run: Initial compiling and planning notes

3 Code of Conduct

3.1 What are Codes of Conduct?

Codes of Conduct are voluntary sets of rules that assist creators, developers, and users of code and data with data protection compliance and accountability in specific sectors or relating to particular processing operations.

Codes can help organizations to ensure all participants follow best practices and rules designed specifically for their sector or processing operations, thus enhancing compliance and collaboration. They are developed and managed by an association or other body (the 'Code Owner') which is representative of a sector (or category of data controllers or processors), with the expert and sectoral knowledge of how to enhance data protection in their area.

3.1.1 Code of Conduct from the nmfs-opensci GitHub.

4 NOAA Fisheries Open Science Code of Conduct

This code of conduct was developed and adapted from the Atom code of conduct in October 2021.

4.1 Our Pledge

In the interest of fostering an open and welcoming environment, we as contributors and maintainers pledge to making participation in our project and our community a harassment-free experience for everyone, regardless of age, body size, disability, ethnicity, gender identity and expression, level of experience, nationality, personal appearance, race, religion, or sexual identity and orientation.

4.2 Our Standards

Examples of behavior that contributes to creating a positive environment include:

- Using welcoming and inclusive language
- Being respectful of differing viewpoints and experiences
- Gracefully accepting constructive criticism
- Focusing on what is best for the community
- Showing empathy towards other community members

Examples of unacceptable behavior by participants include:

- The use of sexualized language or imagery and unwelcome sexual attention or advances
- Trolling, insulting/derogatory comments, and personal or political attacks
- Public or private harassment

4 NOAA Fisheries Open Science Code of Conduct

- Publishing others' private information, such as a physical or electronic address, without explicit permission
- Other conduct which could reasonably be considered inappropriate in a professional setting

4.3 Our Responsibilities

Project maintainers are responsible for clarifying the standards of acceptable behavior and are expected to take appropriate and fair corrective action in response to any instances of unacceptable behavior.

Project maintainers have the right and responsibility to remove, edit, or reject comments, commits, code, wiki edits, issues, and other contributions that are not aligned to this Code of Conduct, or to ban temporarily or permanently any contributor for other behaviors that they deem inappropriate, threatening, offensive, or harmful.

4.4 Scope

This Code of Conduct applies both within project spaces and in public spaces when an individual is representing the project or its community. Examples of representing a project or community include using an official project e-mail address, posting via an official social media account, or acting as an appointed representative at an online or offline event. Representation of a project may be further defined and clarified by project maintainers.

4.5 Enforcement

Instances of abusive, harassing, or otherwise unacceptable behavior may be reported by contacting the project team. All complaints will be reviewed and investigated and will result in a response that is deemed necessary and appropriate to the circumstances. Further details of specific enforcement policies may be posted separately.

4.6 Attribution

This Code of Conduct is adapted from the Contributor Covenant, version 1.4, available at <https://contributor-covenant.org/version/1/4>

5 How to Contribute

6 [Enter]

[enter]

Part II

Products

Part III

[Enter]

[enter]

7 Ecosystem Status Reports

8 [Enter]

[enter]

Part IV

Data Products & Tools

To accompany these data, we also produce data products to make using our data more accessible and straightforward.

Table 8.1: Survey of products developed by GAP

Product	Point of Contact AI	Point of Contact GOA	Point of Contact BS	Description
<i>Data</i>				
Finalized bottom trawl data	Susanne McDermott	Ned Laman	Duane Stevenson	NOAA- trawl data post-su
Data requests	Alexandra Dowlin		Chris Anderson	To requ NOAA- trawl ra
Species codebook	Chris Anderson			List of c identifie NOAA- surveys
Survey protocols	Em?			Docum NOAA- bottom
<i>Analysis</i>				
Design-based indices for target species	Susanne McDermott	Ned Laman	Duane Stevenson	Standar and ab NOAA- trawl su
Design-based age or length composition	Susanne McDermott	Ned Laman	Duane Stevenson	Standar age com NOAA- trawl su
Model-based indices, age comps (stock assessment), area occupied, and COG (ESP)	Lewis Barnett			Spatiot indices compos NOAA- trawl su

Product	Point of Contact AI	Point of Contact GOA	Point of Contact BS	Description
Annual bottom and surface temperature summary (ESR, stock assessment)	Rebecca Howard		Sean Rohan & Lewis Barnett	Summary and surface temperature data for historical and current years
Bering Sea cold pool index and temperature data products (ESR, ESP, stock assessment)	-		Sean Rohan & Lewis Barnett	Create EBS, cold pool index, temperature data visualizations
Annual fish condition (ESR)	Rebecca Howard, Sean Rohan, & Bianca Prohaska	Rebecca Howard & Bianca Prohaska	Bianca Prohaska & Sean Rohan	Groundfish condition in the EBS and Gulf of Alaska
Rockfish indices vs environmental gradients (ESR)	Alexandra Dowlin & Christina Conrath		-	GOA/AI abundance indices vs environmental gradients
Structure-Forming Invertebrates-Habitat Areas of Particular Concern (SFI-HAPC) (ESR)	Christina Conrath		Thaddeus Buser	Relative abundance of hydrocorals, anemones, and AI
Forage fishes (ESR)	-	Megsie Siple	-	Relative abundance of sandfish, GOA and AI
Miscellaneous species (ESR)	Sarah Friedman		Thaddeus Buser	Relative abundance of poached AI survey
Jellies (ESR)	Alexandra Dowlin		Thaddeus Buser	Relative abundance of jellies and AI
Essential fish habitat	Megsie Siple		Sean Rohan	Habitat on species every fish
<i>Visualization Tools</i>				
Alaska groundfish maps (CPUE, etc.)	Megsie Siple		Sean Rohan	
<i>Communication</i>				

Product	Point of Contact AI	Point of Contact GOA	Point of Contact BS	Descripti
Annual survey data report	Megsie Siple, Bethany Riggle, Alex Dowlin		Emily Markowitz, Sophia Wassermann, Nicole Charriere, Chris Anderson	Alaska Technic survey availab for each (https://
ADF&G report of research activities	Alexandra Dowlin		Nicole Charriere & Rebecca Haehn	Report activity waters.
IPHC report of research activities	Ned Laman		Rebecca Haehn	
Plan team survey results presentation	Megsie Siple, Susanne McDermott	Megsie Siple, Ned Laman	Duane Stevenson	NOAA- their fin Plan Te attachn https:// council ground
Community highlights report	Susanne McDermott		Emily Markowitz	Compil NOAA- findings
Bottom Trawl Survey Temperature and Progress Maps	Ned Laman		Emily Markowitz	Near re temper Islands Bottom

9 Open source code

9.1 R Packages

9.1.1 akgfmaps R package

Bottom trawl survey maps layers and plotting examples. **POC:** Sean Rohan

9.1.2 coldpool R package

Cold pool area and temperature data products for the Bering Sea. **POC:** Sean Rohan

9.1.3 akfishcondition R package

Groundfish morphometric condition indicators for fish in the Bering Sea, Aleutian Islands, and Gulf of Alaska. **POC:** Sean Rohan

9.1.4 gapindex R package

Calculation of Design-Based Indices of Abundance and Composition for AFSC GAP Bottom Trawl Surveys. **POC:** Zack Oyafuso and Margaret Siple

Part V

Contact us

This code is primarily maintained by:

Thank you for using our data guide!

This code is always in development. Find code used for various reports in the code releases.

This code is primarily maintained by:

Emily Markowitz (Emily.Markowitz AT noaa.gov; @EmilyMarkowitz-NOAA)

Alaska Fisheries Science Center,

National Marine Fisheries Service,

National Oceanic and Atmospheric Administration,

Seattle, WA 98195

General questions and more specific data requests can be sent to...

10 Production run notes

Report run date: Wednesday, April 02, 2025

11 R Version Metadata

R version 4.4.3 (2025-02-28 ucrt)
Platform: x86_64-w64-mingw32/x64
Running under: Windows 10 x64 (build 19045)

Matrix products: default

locale:
[1] LC_COLLATE=English_United States.utf8
[2] LC_CTYPE=English_United States.utf8
[3] LC_MONETARY=English_United States.utf8
[4] LC_NUMERIC=C
[5] LC_TIME=English_United States.utf8

time zone: America/Los_Angeles
tzcode source: internal

attached base packages:
[1] stats graphics grDevices utils datasets methods base

loaded via a namespace (and not attached):
[1] compiler_4.4.3 fastmap_1.2.0 cli_3.6.3 tools_4.4.3
[5] htmltools_0.5.8.1 rstudioapi_0.17.1 yaml_2.3.10 rmarkdown_2.29
[9] knitr_1.49 jsonlite_1.9.0 xfun_0.50 digest_0.6.37
[13] rlang_1.1.5 evaluate_1.0.3

11.0.1 NOAA README

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12 Acknowledgments

13 Community Acknowledgments

We would like to thank the many communities of Alaska and their members who have helped contribute to this body of work. The knowledge, experiences, and insights have been instrumental in expanding the scope of our science and knowledge to encompass the many issues that face this important ecosystem. We appreciate feedback from those residing in the region that are willing to share their insights and participation in an open dialog about how we can improve our collective knowledge of the ecosystem and the region.

14 Land Acknowledgements

We would like to thank the many communities of the Bering Strait region and their members who have helped contribute to this document. The knowledge, experiences, and insights of the people of the Bering Strait region have been instrumental in expanding the scope of our science and knowledge to encompass the many issues that face this important ecosystem. We appreciate feedback from those residing in the region that are willing to share their insights, including the local names used for the species covered by this document, identifying species of interest or concern that should be included in this document, and participation in an open dialog about how we can improve our collective knowledge of the ecosystem and the region.

NOAA Fisheries Alaska Fisheries Science Center's work is conducted in the waters and along the coastlines of Alaska, which include the traditional home lands and waters of the Inupiat, Yupiit, Siberian Yupiit, Unangax, Alutiiq/Sugpiaq, Eyak, Dena'ina Athabascan, Tlingit, Haida, and Tsimshian who have stewarded their lands and waters since time immemorial. We are indebted to these peoples for their wisdom and knowledge of their lands and waters.

This document was prepared in the greater Seattle area, which are the traditional lands of the Coast Salish people, including the Duwamish people, past and present. We are grateful for their continued sharing of vision, wisdom, values, and leadership.

15 Technical Acknowledgments

This quarto book is based off the NOAA-quarto-book GitHub repo designed by Eli Holmes.

This repo and GitHub Action was based on the tutorial by Openscapes quarto-website-tutorial by Julia Lowndes and Stefanie Butland.

15.1 Partners

Scientists from the Alaska Fisheries Science Center conduct these bottom trawl surveys with participation from the Alaska Department of Fish & Game (ADF&G), the International Pacific Halibut Commission (IPHC), and universities. This research is conducted on chartered fishing vessels.

15.2 Collaborators

Our data are used in many annual publications, including but not limited to the list below:

- Alaska Stock Assessments
- North Pacific Groundfish Stock Assessment and Fishery Evaluation Reports
- Groundfish Economic Status Reports for the Gulf of Alaska and Bering Sea and Aleutian Islands
- Alaska Marine Ecosystem Status Report Database
- Southeast Alaska Coastal Monitoring Survey Reports
- Alaska Fisheries Life History Database
- Essential Fish Habitat Research Plan in Alaska

16 Citations and References

17 Access Constraints

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