

# **Summary of U.S. Stock Assessment Workflows**

**Tools, Templates, and other Resources**

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## Citation

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# 1 Summary

Developing and producing a stock assessment report requires a considerable amount of data consolidation, analysis, and research. Reports can range from 10 pages to well over 300, but the goal of the process remains to provide management advice with the current and projected status of the stock, catches, and other important parameters to ensure its sustainability. There have been many efforts done to improve the reproducibility of workflows and reduce time it takes to produce these reports. So far, improvements and efforts have ranged considerably by region of the U.S. Specifically, each of the seven regional fishery science centers across the U.S. have their own workflows to assess a stock and produce its report. Many of these workflows are guided by requirements from fishery management councils and other involved managing bodies that utilize these reports to delegate fishery regulations.

Workflows across the country not only range from region to region, but from scientist to scientist. There is no current standardized or accepted best practice for producing a stock assessment report. Some centers rely on the use of latex, a common software to produce documents with in-text calculations, while others utilize more recently developed programs like Rmarkdown and quarto, which both use latex as a basis for their production. Others utilize the capacity of Microsoft word which restricts the reproducibility of a report as well as increases work time since figures, tables, and other associated resources must be compiled outside of the word document.

**Description of interaction and list of fishery management councils across the US**

## **2 General Stock Assessment Workflow (commonalities and process)**

- Description of stock assessment workflows from input to bringing the report to the SSC and council(s) for evaluation and adoption of formal management measures resulting from recommendations
1. Gather data inputs for model
  2. Configure assessment model with updated data (based on assessment need for that year)
  3. Sensitivity runs and projections
  4. Develop assessment report for SSC, councils, and/or RFMOs
  5. Present assessment and recommendations to SSC and councils
  6. Assessment accepted or not, create formal report for public release and adoption recommendations as designated by the councils

### 3 Stock Assessment Models

[Short descriptions of commonly used stock assessment models within the U.S. including acknowledgement of smaller used models and FIMS for the future]

- General use of assessment models in the workflow (self-explanatory)
- Short descriptions of various models used in the U.S. around the regions (purpose is so that the reader can understand the model when it is reference in the section later)
  - Categorize based on assessment type rather than assessment model (age-structured/catch-at-age, catch-at-length, VPA, Agg. Biomass Dynamics, Index-based, data-limited)
- Include link/reference to papers/repositories at end of summary for reader to reference (also refer to FIT)
- WHAM, SS, BAM, ASAP, AMAK, Bespoke, FIMS, ect

## 4 Tools and Resources

- Tools and templates available for different models and workflows (added as a list of tools in a way instead of by region since there are a lot of regions that use the same tools)





**4.1 afscdata**

**4.2 afscassess**

**4.3 safe Report Template**

**4.4 r4ss**

**4.5 sa4ss - SS Report Template**

**4.6 ASAPplots**

**4.7 MAFSC SAFE Reports Template**

**4.8 SEDAR-Assessment Report Template**

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**4.11 SASINF**

**4.12 SW Stock Assessment Template**

**4.13 BrailleR**

**4.14 SW R Process Output**

**4.15 swfscMisc**

**4.16 NMFSReports**

**4.17 NOAA Tech Memo Template**

**4.18 Other Assessment Report Template Repositories**

## 5 Region Specific Workflow

- Descriptions of the workflows by region and what separates them from other regions
- Advances made by this region and the tools they use
- Particular struggles or unique operations incorporated into their workflow
- Table of resources used for their workflows

### 5.1 AFSC

Alternative way to reference section [safe Report Template](#) rather than Section 4.3 \*Note doesn't work with html render.

### 5.2 NEFSC

Process variations:

- Informal/verbal agreement for TOR guidelines for each stock
- Standardized report template agreed upon by NOAA and the MAFMC AND NEFMC (agreed on in 2017)
  - Short and concise to make policy decisions (mgmt track specifically)
- Report template is not publicly available but all done in latex (modular workflow)
  - Figures rendered outside (saved as png) then reference in doc
  - Tables created into tex files and referenced as component in template
- Extensive work with 508 compliance
  - Contractors developing package for compliance to apply to template

Largest problems:

- Lots of processing variables for 508 compliance

- Even with all the work in the compliance, there is still a large effort into making it accessible (~2 week conversion for single analyst at the center)
- 

### **5.3 NWFSC**

### **5.4 PIFSC**

### **5.5 SEFSC**

### **5.6 SWFSC**

Example in text reference (Clark 1993).

## 6 Conclusions

- Conclusions about how workflows operate in the U.S.
  - Both pros and pitfalls of current workflows
  - Incorporating perspectives from regional scientists?
- Additional hope for greater look into the inputs and pulling together the entire stock assessment workflow process

### 6.1 Future Work

- Discuss the upcoming/in development tool for automated workflows and plan for the future including stock assessment modelling for the future

## References

Clark, W. G. 1993. "The Effect of Recruitment Variability on the Choice of a Target Level of Spawning Biomass Per Recruit." In, 233246. Alaska Sea Grant College Program AK-SG-93-02.