Agenda Item XYZ

Attachment NNN

Updated Documentation of the

Fishery Regulation Assessment Model (FRAM)

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**Summary**

Since the most recent prior documentation was prepared, the Fishery Regulation Assessment Model (FRAM) software has incorporated functional and design changes in response to management needs and software advancements. FRAM has undergone significant changes and transitioned from a Visual Basic 6 platform that works with text and binary files to a Visual Studio.Net platform that works with MS Access databases. This has enhanced the organization and sharing of model run data while facilitating improved output creation by reducing reliance on the creation of “report drivers” and supporting flexible queries across multiple runs.

These changes have warranted the development of revised and updated documentation, and staff from the Washington Department of Fish and Wildlife (WDFW) and the Northwest Indian Fisheries Commission (NWIFC) have adopted the approach taken with the 2019 update of the FRAM User Manual[[1]](#footnote-2) to produce a readily accessible documentation website: <https://framverse.github.io/fram_doc/>. This online living document is based on a public code repository and provides many attractive features including ease of collaboration and project management across organizations. Access to the revised documentation can increase the mutual technical understanding among users of FRAM, and thereby increase confidence in and support for decisions based on those outputs.

**Methodology**

During the spring of 2019, WDFW and NWIFC staff decided on an online “living document” approach. After reviewing existing materials, staff converged on an initial chapter structure, then added and revised content to reach the current draft.

This project updates the FRAM User Manual, while simultaneously introducing a means to support the consistent maintenance of help resources as the application itself continues to change[[2]](#footnote-3). The revised User Manual consists of a collection of Rmarkdown files, organized with the *bookdown*[[3]](#footnote-4) package and hosted on the WDFW Fish Program GitHub account (Appendix Figure 1). These scripts are “knit” into various products, including a simple but interactive website based on Gitbook bootstrap styling as well as static output as Microsoft Word docx files. At this time, the underlying repository is only accessible to designated collaborators, but the “published” website is publicly and freely available for viewing.

Descriptions of Rmarkdown and Git/GitHub are beyond the scope of this report, but the basic work cycle involves editing Rmd source files and re-generating html and/or docx output files after a “commit” of one or several changes within a local copy of the repository. These changes are then shared by “pushing” the local commit(s) up to the hosted repository. Changes from multiple staff can be readily merged, and the record of committed changes allows rapid recovery of prior states. The collection of html files that form the website are generated within a single directory, such that an offline copy of the interactive content could be easily created (or re-hosted elsewhere).

**Document Organization**

After a landing page with links to the organizations responsible for FRAM (Appendix Figure 2), the current content begins with a FRAM overview in the introductory chapter (Appendix Figure 3), followed by brief descriptions of the various file types associated with FRAM runs (Appendix Figure 4), and then chapters with an overview of the main menu and a “start-to-finish” sequence of steps for the common use case of modifying fishery controls in a single pre-season run (Appendix Figure 5). This “how-to” chapter includes text and dynamic images (gifs) addressing the phases of file preparation, parameter manipulation and output acquisition. Having established an overview of the modeling process, the remaining content is structured thematically, mostly following the FRAM main menu options. Later chapters provide additional detail on editing and running iterations, on understanding the available outputs, on “Backwards FRAM” runs that reconstruct pre-fishing cohorts from terminal run sizes or escapements, on the closely associated Terminal Area Modeling Module (TAMM) files, and on various utilities and advanced uses (Appendix Figure 6). A troubleshooting section with common error messages, a glossary of key terms, and tables of current stocks and fisheries wrap up the main document.

**Highlights of Hosted Living User Manual**

The ease of ongoing development positions the documentation to stay synchronized with the underlying FRAM application, and the webhosted, living user manual provides fast, intuitive navigation through refreshed content.

Users of this electronic “book” can navigate via various mouse-click and keyboard options, including the collapsing chapter sidebar, the “last/next page” arrows, and embedded links to other related content. The static Word files that also can be produced from the source Rmarkdown scripts preserve some of this functionality within that application’s Navigation sidebar (Appendix Figure 7).

In addition to screen shots of various menus, the web book includes several looped “mini-tutorials” illustrating a sequence of steps for a particular model task. Built-in search and font-scaling functionality may also make it easier to find information on a particular topic and then read it comfortably. Finally, although modeling and driving is not recommended, the ability to quickly read the User Manual from any device with a web-browser greatly increases the portability of this reference resource

As noted, content creation and revision for this project is fully tracked in the commit log that is generated by the Git version control system (Appendix Figure 8). Project management boards and issue threads facilitate the integration of user feedback and ensure attribution. In combination, these features build collaborative confidence, foster transparency, and encourage testing ideas.

**Appendix**

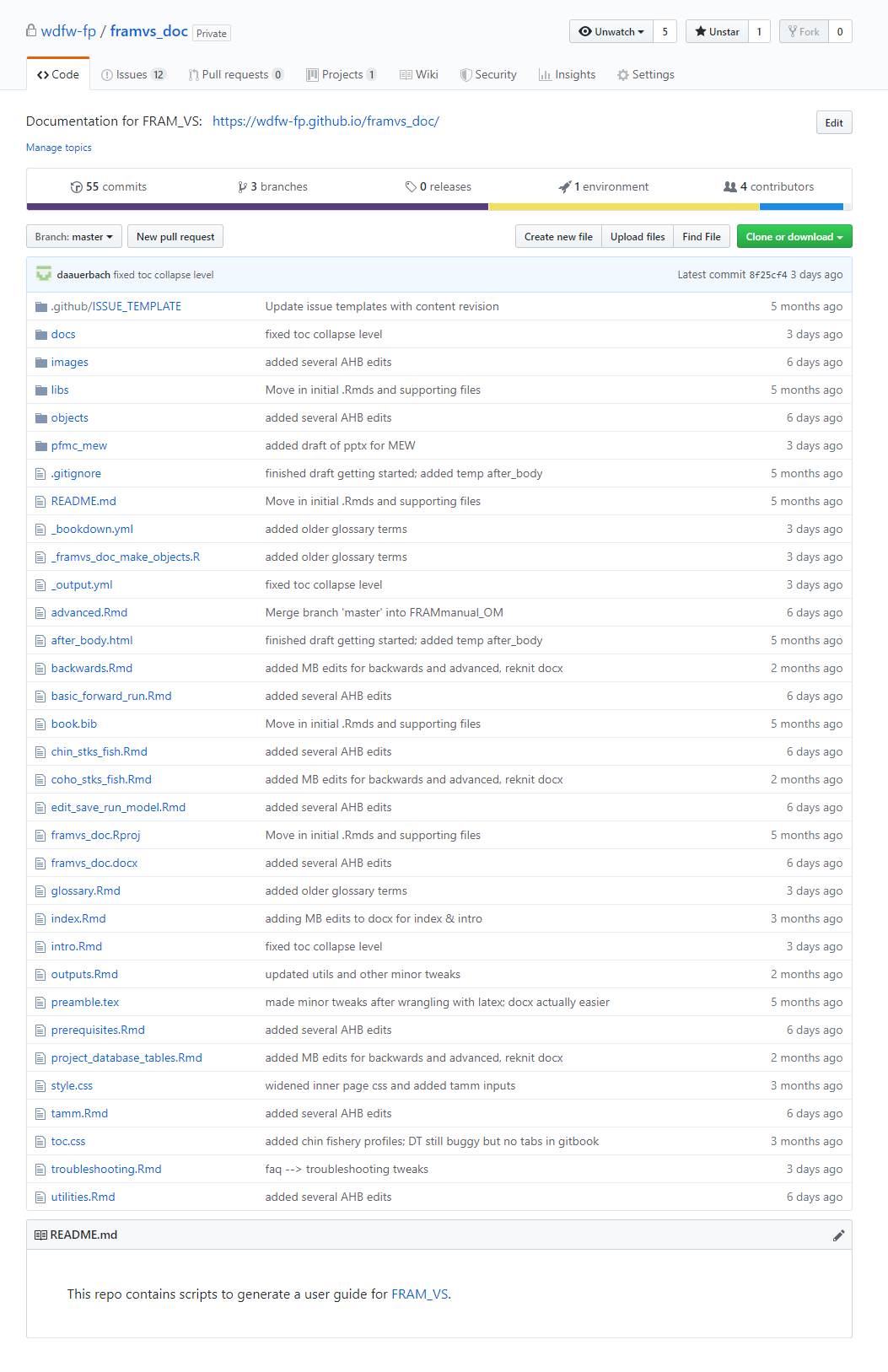


Figure - GitHub repo code overview

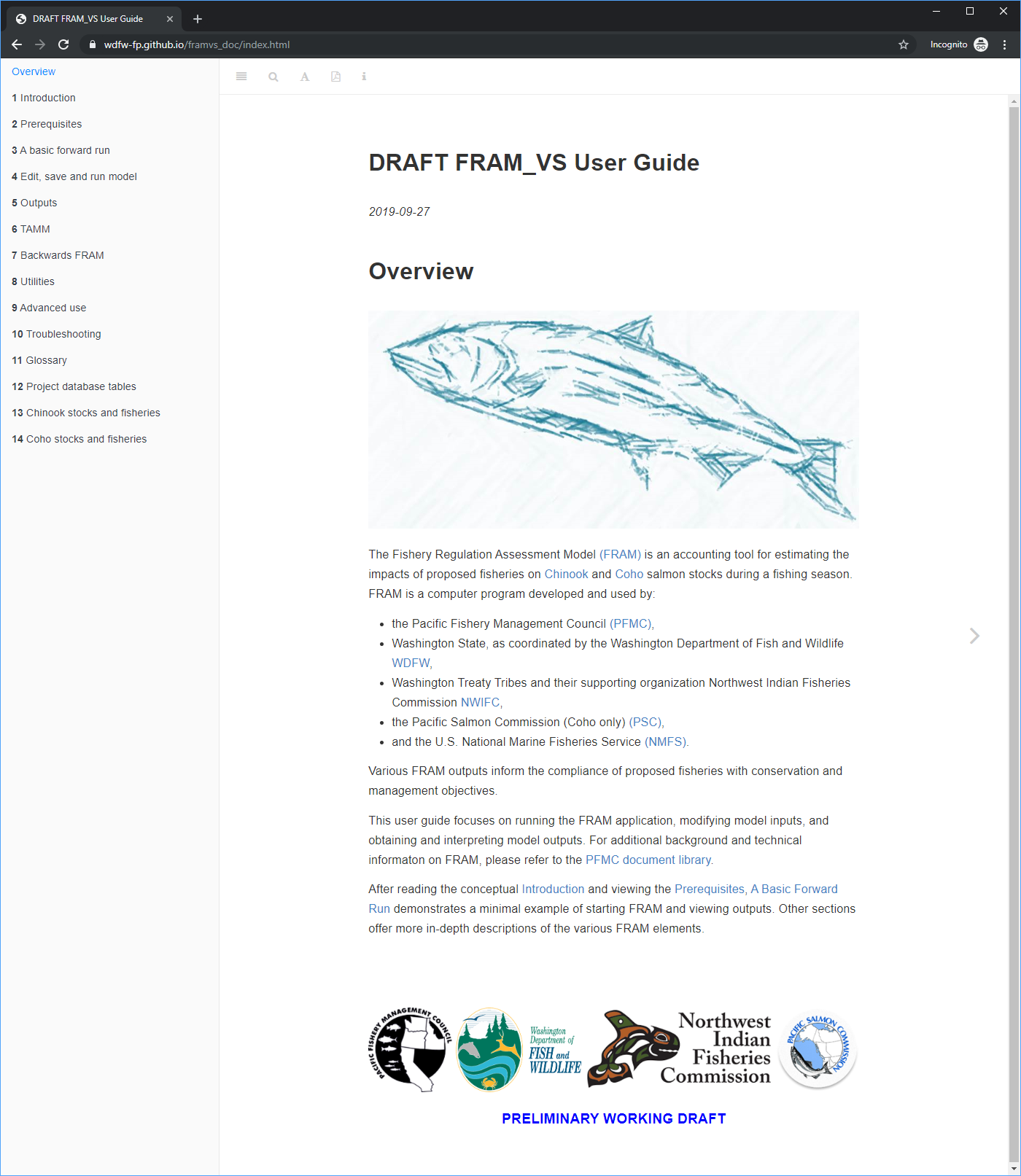


Figure - Landing page

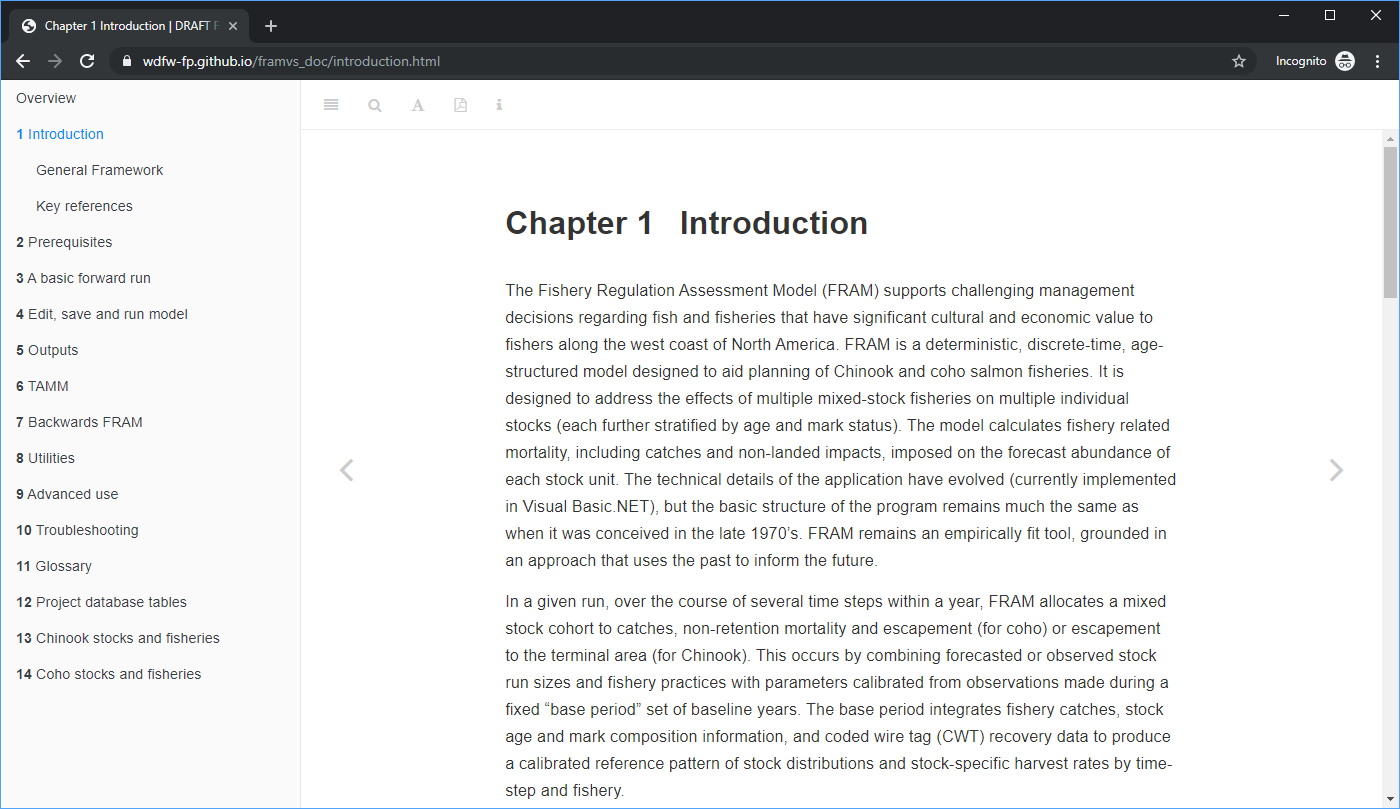


Figure - Introduction

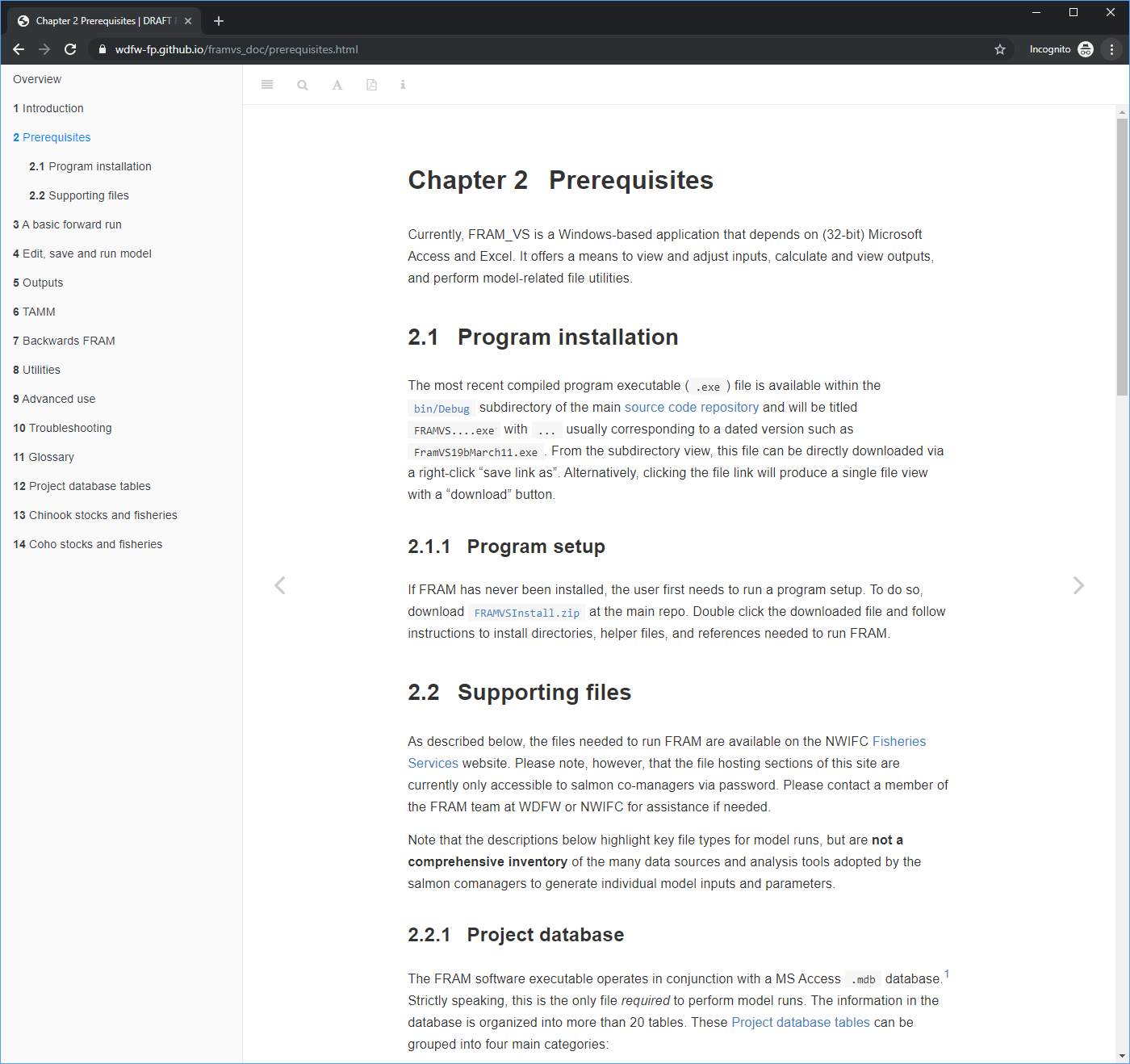


Figure - Prerequisite setup and supporting files



Figure - A step-by-step forward run tutorial

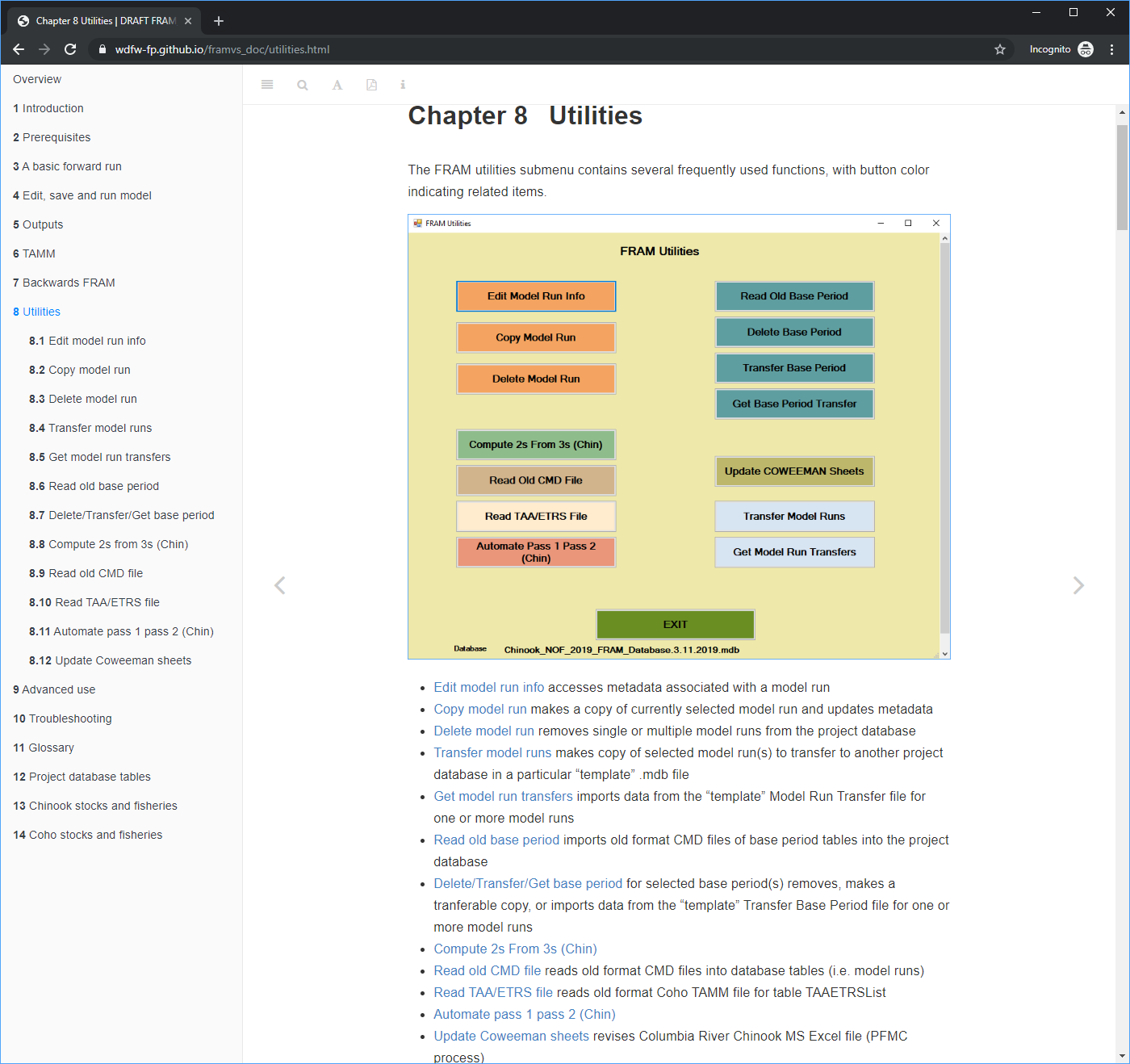


Figure - Complete description of included file utilities

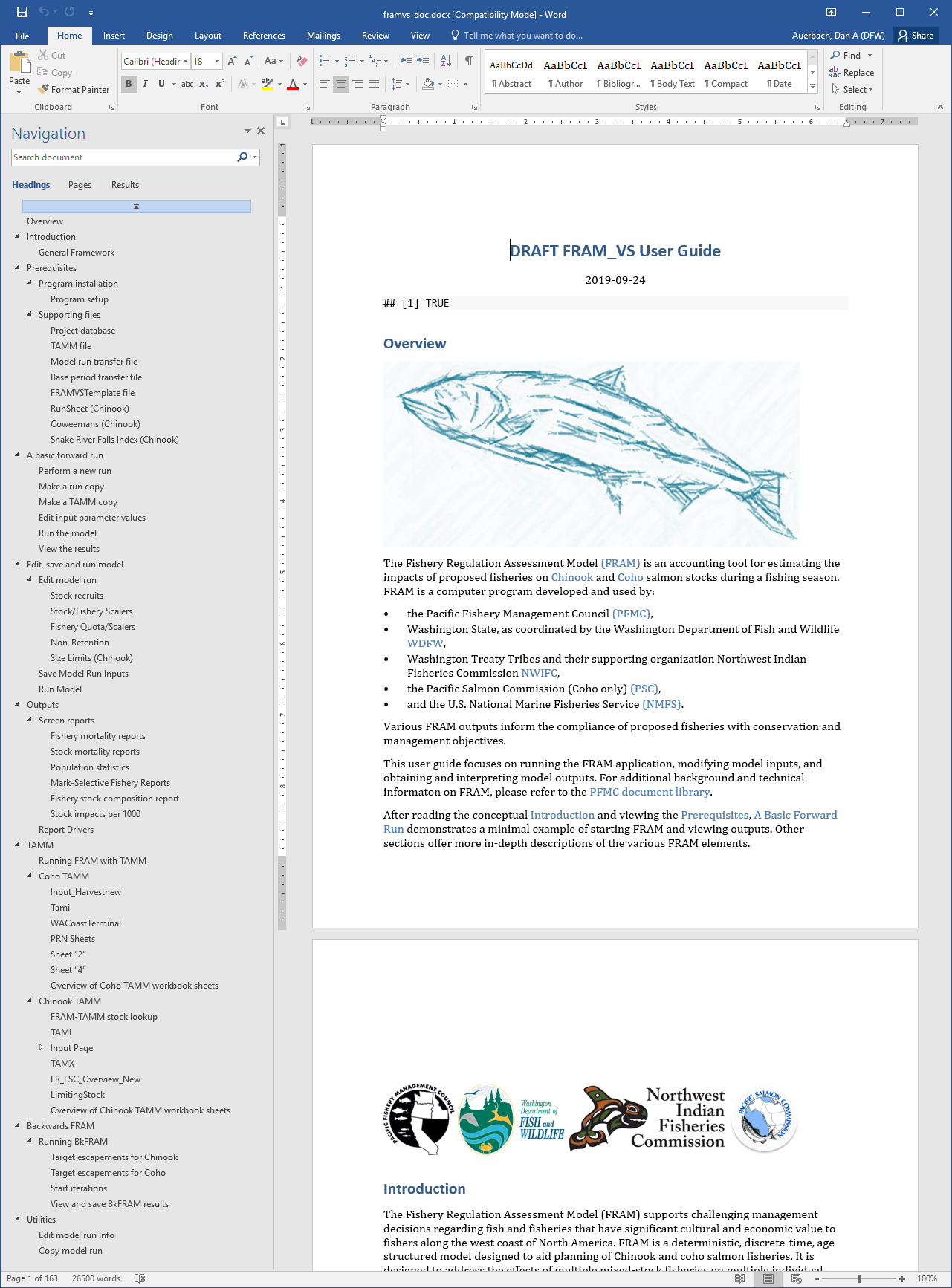


Figure - In addition to html output, the source scripts can produce docx for a static snapshot

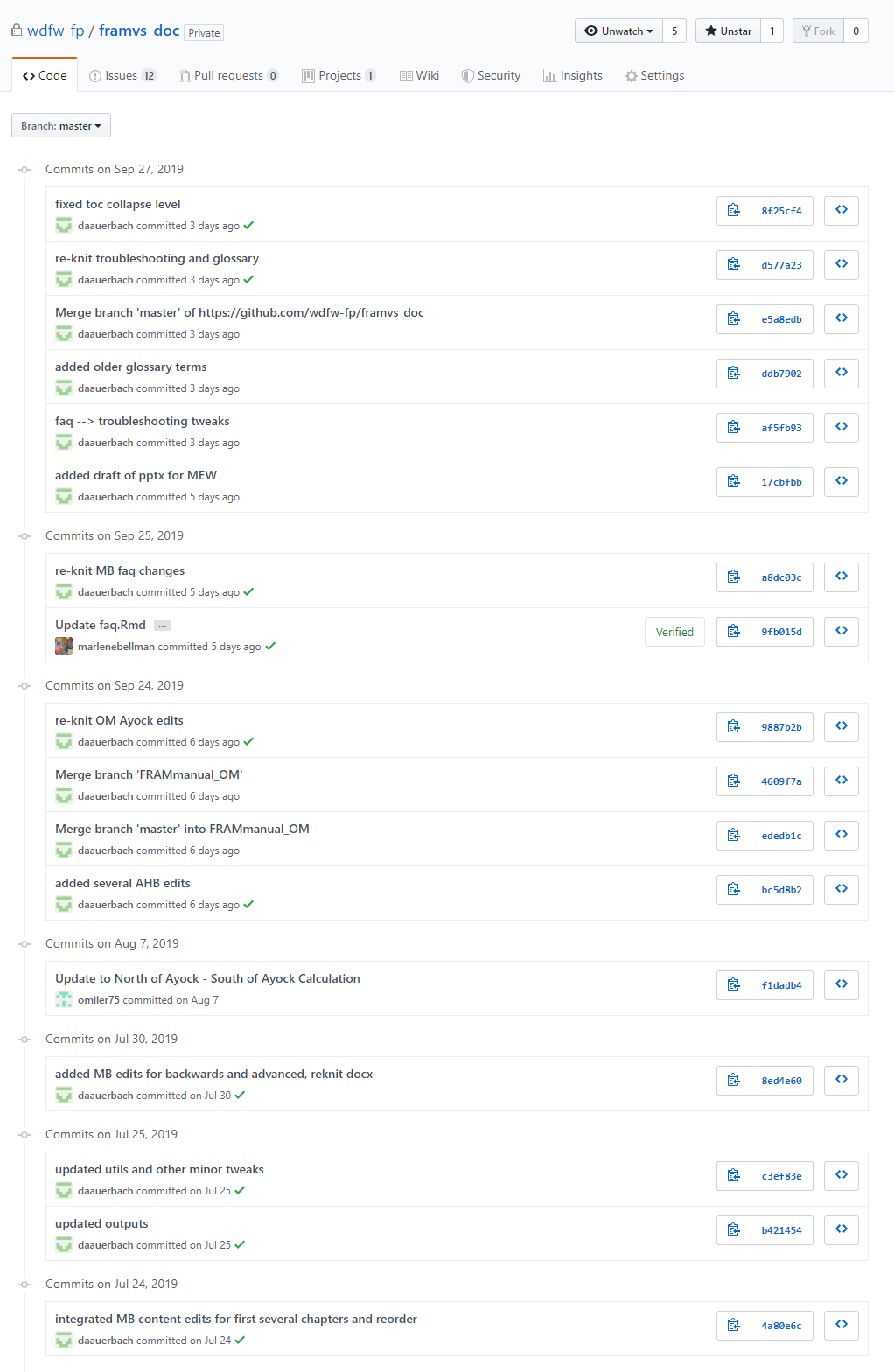


Figure - The Git log of repository commits creates a full record of changes

1. While the 2019 version of the User Manual remains available at time of writing, that content has been migrated and integrated into the new site. Staff do not anticipate maintaining the content at <https://wdfw-fp.github.io/framvs_doc/>, and will likely retire this url when the community of practice has gained familiarity with the new, broader documentation site. [↑](#footnote-ref-2)
2. As of this writing: FramVS19bMarch11.exe at <https://github.com/Angelikahagen/MainFRAM_VS-Repo> [↑](#footnote-ref-3)
3. <https://bookdown.org/> [↑](#footnote-ref-4)