

Updated Documentation of the Fishery Regulation Assessment Model (FRAM)

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1 Introduction

2 Since the prior documentation was prepared, analysts from Washington Department of Fish
3 and Wildlife (WDFW), Puget Sound Treaty Tribes, the Northwest Indian Fisheries Commission
4 (NWIFC), and the National Oceanic and Atmospheric Administration (NOAA) have made
5 functional and design changes to the Fishery Regulation Assessment Model (FRAM) software in
6 response to management needs and software advancements. FRAM now has new algorithms, has
7 undergone reparameterization of the Chinook base period, and was moved to a Visual
8 Studio.Net platform structured around MS Access databases. These changes have improved the
9 representation of stock-specific fishery impacts and enhanced the organization and sharing of
10 model run information. These changes have also warranted the development of revised and
11 updated documentation. Major FRAM content updates have included:

- 12 • Separate sections for Chinook and Coho
- 13 • List of Chinook and Coho differences
- 14 • Figure illustrating FRAM interactions with other models
- 15 • Expanded glossary
- 16 • Chinook and Coho tables demonstrating how a stock is reduced from starting cohort to
17 escapement by major FRAM processing steps
- 18 • Addition of mark-selective fishing bias calculations
- 19 • Addition of a Backwards FRAM chapter
- 20 • Addition of size-limit corrected algorithms
- 21 • Descriptions of tables and FRAM variables in the Access database
- 22 • Alphabetical list of FRAM variables and their origin

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24 Staff from WDFW and NWIFC have adopted the approach taken with the 2019 update of the
25 FRAM User Manual¹ to produce a readily accessible documentation website:

26 https://framverse.github.io/fram_doc/. This online living document is based on a public code

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.

27 repository that provides many attractive features, including ease of collaboration and project
28 management across organizations (https://github.com/FRAMverse/fram_doc). It is hoped that the
29 revised documentation can increase the mutual technical understanding among users of FRAM,
30 and thereby increase confidence in and support for decisions based on those outputs.

31 32 **Methodology**

33 During the spring of 2019, WDFW and NWIFC staff decided on an online “living
34 document” approach to a revised User Manual, producing a website from a shared code
35 repository. This approach was well received and has been maintained with the expansion to cover
36 additional material in the new documentation website. Behind the public-facing site, a collection
37 of Rmarkdown² scripts and associated resources (images, pdf references, etc.) are hosted on the
38 public FRAMverse GitHub account. These scripts are “knit” into html output organized into a
39 simple static site. Although the collection of html files that form the website are hosted in
40 association with the source repository, they can be easily downloaded as a standalone offline
41 copy (or re-hosted elsewhere).

42 43 **Website Organization**

44 A viewer navigating to the fram_doc website finds a landing page with sections describing
45 the background and history of the model development, as well as an overview of differences
46 between the Coho and Chinook implementation (Figure 1). The top-level menu then provides
47 options to find content describing model details (e.g., species-specific parameterization,
48 calculations, outputs), applications in pre-season planning and post-season evaluation, and
49 construction of the Chinook base period³ via the FRAMBuilder. In addition, the content from the
50 2019 User Manual has been migrated into the new site design. The top menu also contains a link
51 to the source repository, where it is hoped that users can report issues (Figure 2). Throughout the
52 site, specialized terms are linked to definitions in a glossary (Figure 3), and supporting literature is
53 available as downloadable .pdf files.

² <https://rmarkdown.rstudio.com/index.html>

³ Base period documentation is still incomplete.

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Website Highlights

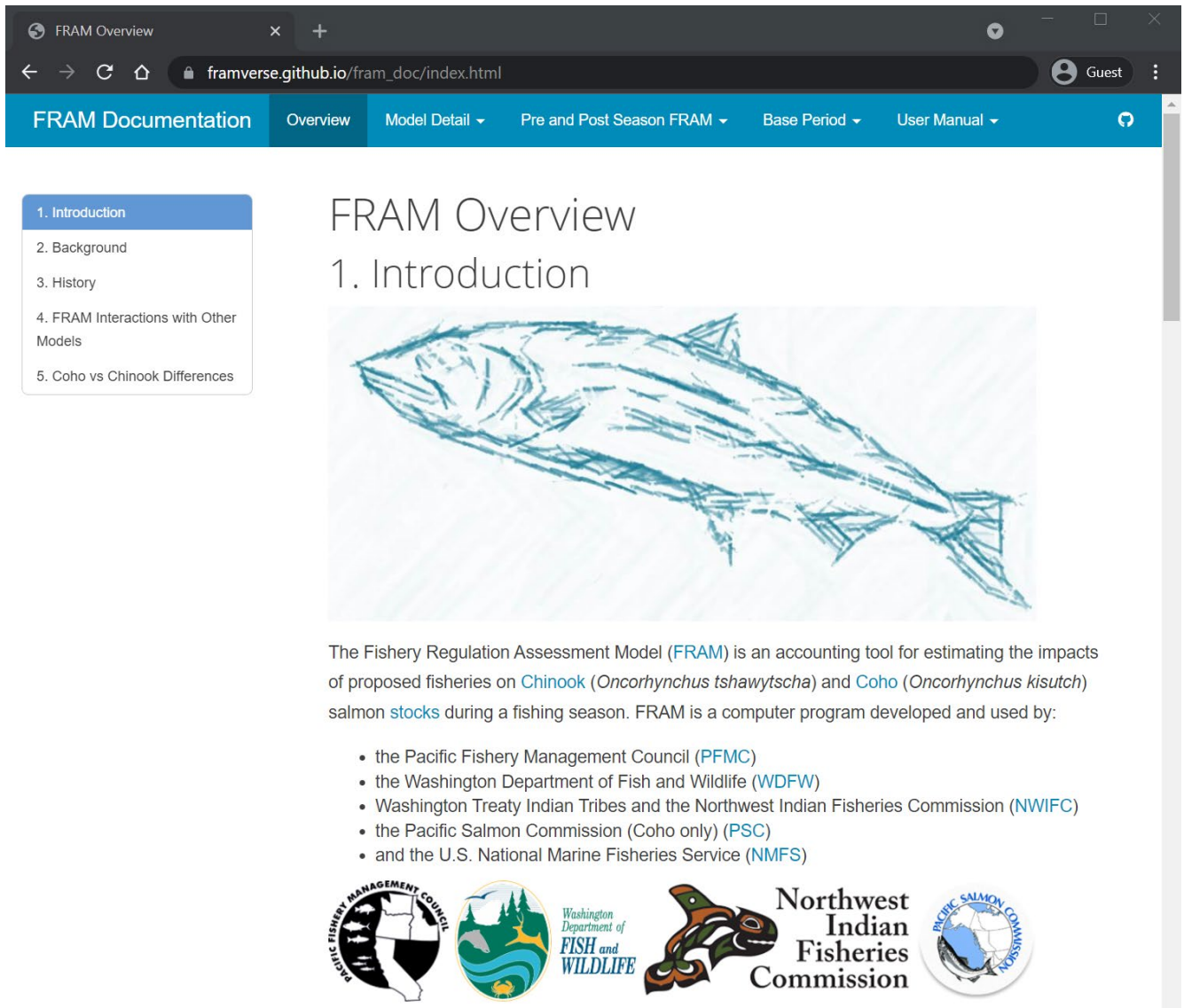
The ease of updating content facilitates synchronization with the underlying FRAM application, i.e., since multiple documentation pieces link to the same appendix, appendices are only updated once. The webhosted, living documentation provides fast, intuitive navigation through refreshed content.

Users can navigate via various mouse-click and keyboard options, including the collapsing chapter sidebar and embedded links to other related content.

Keeping all relevant FRAM documentation in one place and linking to reference materials facilitates the user experience.

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.

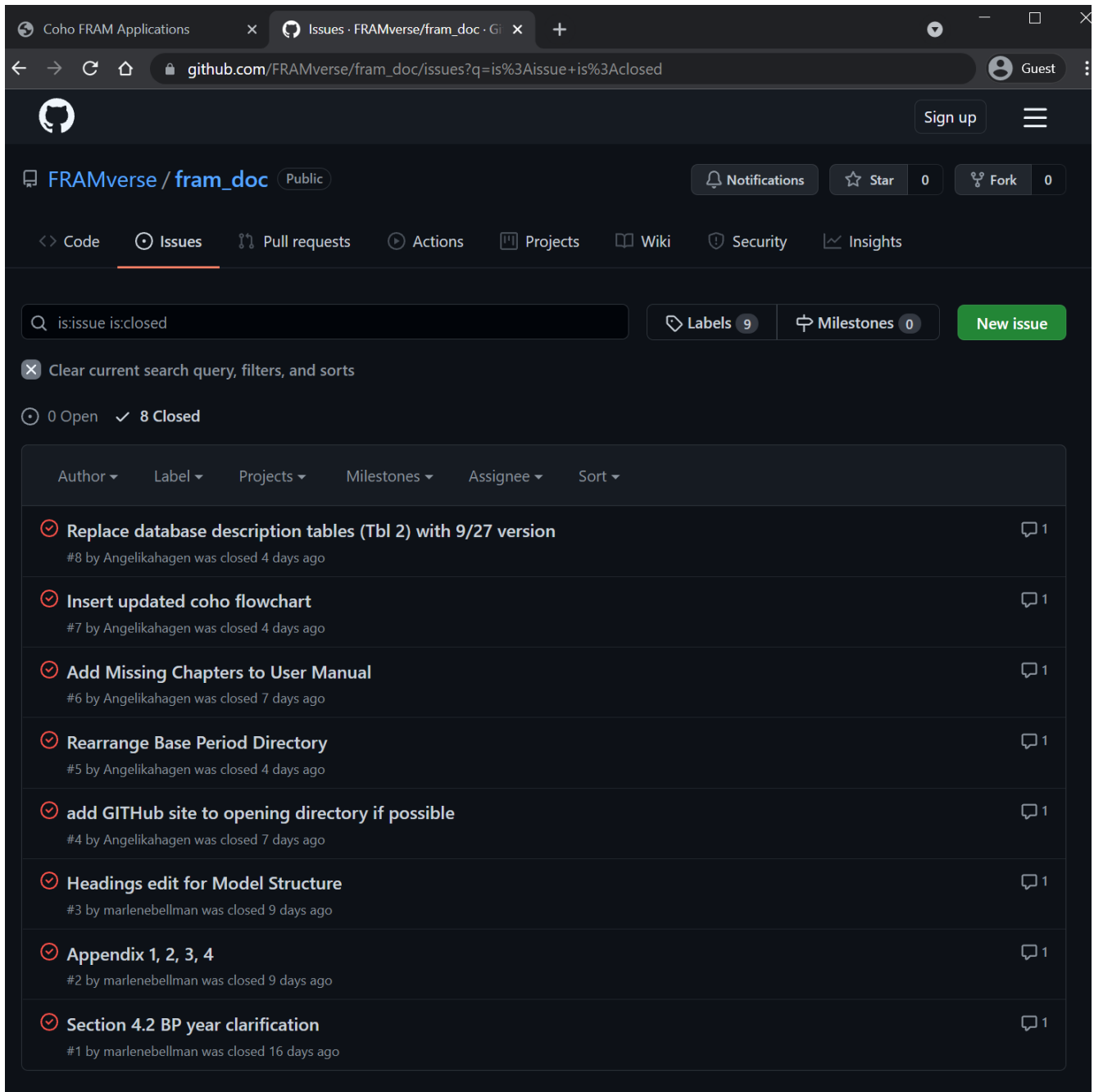
As noted, content creation and revision for this project is fully tracked in the commit log that is generated by the Git version control system (Figure 2). Project management boards and issue threads facilitate the integration of user feedback and ensure attribution. In combination, these features build collaborative confidence, foster transparency, and encourage testing ideas.



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74 *Figure 1 Documentation website landing page*

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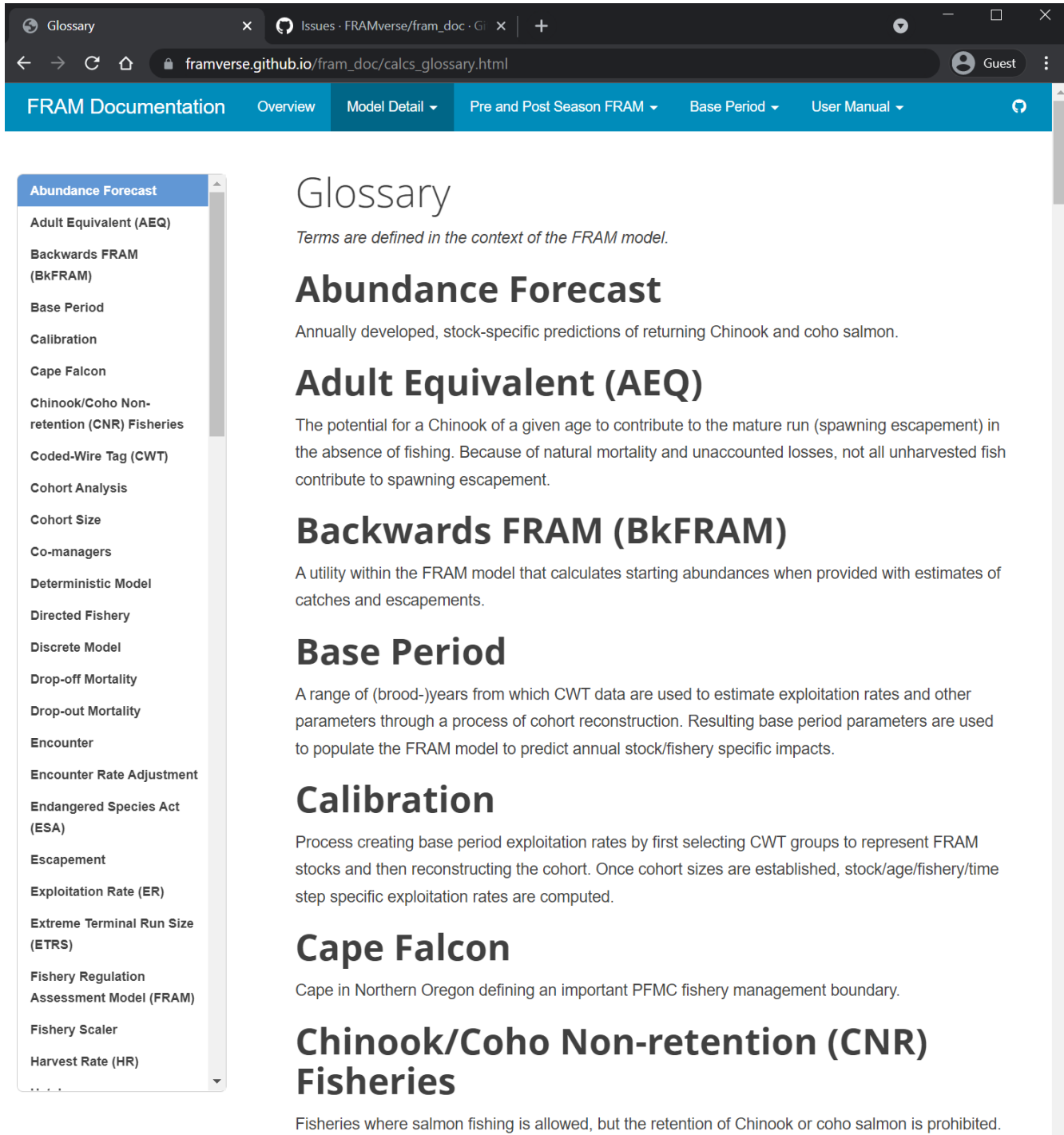
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Figure 2 Issue tracking on the source repository provides a convenient means to report, discuss and resolve problems or suggest enhancements.



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Figure 3 A glossary of specialized terminology is linked to usage throughout the site.

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