Quarto template for *Journal of Fish and Wildlife Managment*

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# Abstract

**Keywords:** Findability, Accessibility, Interoperability, and Reuse (FAIR); markdown; reproducible science; journal template; Quarto

# 1. Introduction

* Motivation
  + Scientists increasingly using reproducible results
  + Findability, Accessibility, Interoperability, and Reuse (FAIR) [\_doi:10.1016/j.molp.2018.07.005]
  + Often not reproducible in Natural Resource fields such as \_doi:10.1002/jwmg.21855
  + Embedding data and code into documents can help with reproducible, especially when released together
  + Additionally, natural resource professional routinely complete reports (e.g., annual reports) with standard statistics and data summaries.
  + Embeding code can help, such as R Markdown and Quarto documents.
  + First hand observation that FWS scientists would use tools based upon conversations on the FWS’s MS Teams “Great Lakes R Working Group” and FWS participation in USGS CDI CoP for LaTeX and Markdown
* Brief history
  + Trouble typesetting math, which lead to TeX (Knuth 1984) and then an easier to use via Leslie Lamport’s LaTeX (Lamport 1985)
  + Sweave \_doi:10.1007/978-3-642-57489-4\_89
  + Jupyter Notebooks (Quarto documents non-interactive, better for static documents) \_doi:10.1109/JCDL.2017.7991618
  + RMarkdown \_doi:10.1201/9781138359444
  + Quarto \_doi:10.5281/zenodo.5960048
* Purpose of this manuscript
  + Present a template for JFWM using Quarto
  + Demonstrate some useful features: table creation and quarto-utils package
  + Examples tend to focus on R, but Quarto works with many languages. In fact, one of the authors does not use R at all.

# 2. Materials and Methods

* Quarto [Figure 1](#fig-qurto)
* Quarto-utils Python package
* Tables with R and Python
* Inline code with R (currently underdevelopment with Python https://github.com/quarto-dev/quarto-cli/pull/6190)

## 2.1 Background knowledge

* Basic Markdown

## 2.2 Specific steps

1. Write document.
2. Optionally, include code or call code through knitr::read\_chunk() Table 1.

# 3. Results

We have demonstrated how to use Quarto to prepare manuscript for the *Journal of Fish and Wildlife Management*. This includes Figures (such as [Figure 1](#fig-qurto)) and Tables (Such as Table 1 and Table 2).

We have also described the co-authors random links to the upper Midwest (Table 2). The main purpose of this sentence sentence is to be a placeholder to demonstrate the second paragraph and the related indentation.

# 4. Discussion

* Reproducible methods such as Quarto can help science through following principles such as FAIR
* Pragmatically, helps author be more efficient and avoid formatting of word documents

# Conflict of Interest

The authors report no conflicts of interest.

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# Data availability

# Figures

|  |
| --- |
| Figure 1: Exampe of quarto workflow. |

# Tables

Table 1: Steps to use the Quarto template associated with this manuscript with the *Journal of Fish and Wildlife Management*.

| order | step |
| --- | --- |
| 1 | Obtain template from DOI |
| 2 | Write your text using Markdown |
| 3 (optional) | Run Python script to populate bibliography file |
| 4 | Break Quarto-Word link and do final formatting manually |
| 5 | Submit to \_Journal of Fish and Wildlife Management\_ |

Table 2: Author trivia to demonstrate a table. The table awkwardly includes wide and long form data to demonstrate how to use the flextable package.

|  | Minnesota Connection | | Wisconsin Acadmeic Connection |
| --- | --- | --- | --- |
| Author | Intership | Undergraduate | Univeristy of Wisconsin (UW) System |
| RAE | University of Minnesota | -- | Undergarduate, UW-Stevens Point |
| -- | -- | Internship, UW-Madison |
| -- | -- | Graduate facutly, UW-La Crosse |
| AAA | University of Minnesota | Gustavus Adolphus | Graduate Certificate, UW-Madison |
| MNF | -- | Macalester | Graduate facutly, UW-Madison |

# References

Knuth DE. 1984. TEX: The program. Reading, MA: Addison–Wesley.

Lamport L. 1985. LaTeX–a document preparation system. Reading, MA: Addison–Wesley.