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**Appendix S1: Table of best practices referenced in previous publications**

Table S1: Proposed best practices for ecological forecasting. Each column lists the practices that are specifically outlined in a given paper, and practices are aligned into rows with the same or similar proposed practices. We note that White et al. (2019) synthesized many of the best practices mentioned by Dietze et al. (2018). The Dietze et al. (2018) paper is not included here because it did not provide a defined list of practices (as provided by the four other papers in this table).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Reference | This manuscript | Harris et al. (2018) | White et al. (2019) | Hobday et al. (2019) | Carey et al. (2021) |
| Title | Increased adoption of best practices in ecological forecasting enables comparisons of forecastability | Forecasting biodiversity in breeding birds using best practices. | Developing an automated iterative near-term forecasting system for an ecological study | Ethical considerations and unanticipated consequences associated with ecological forecasting for marine resources | Advancing lake and reservoir water quality management with near-term, iterative ecological forecasting |
| Description | Proposed best practices | Best practices for making and evaluating ecological forecasts | Key practices for automated iterative near-term ecological forecasting | Principles for ethical forecasting | Lessons learned from iterative near-term forecasting for management |
|  | Include uncertainty | Pay attention to uncertainty | Focus on uncertainty | Representation of uncertainty |  |
|  | Assess and report forecast skill | Validate using hindcasting |  | Skill assessment |  |
|  | Identify an end user |  |  | Engagement and education | Human-centered design improves the utility of forecasts for managers |
|  | Make iterative forecasts |  |  | Delivery failures | Sustainability plans are needed for short- and long-term forecasting system maintenance |
|  | Automate forecasting workflows |  | Automated end-to-end reproducibility | Ongoing delivery | Cyberinfrastructure is not trivial |
|  | Make data available |  | Rapid data release under open licenses |  | Forecasts should be reproducible and archived |
|  | Archive forecasts | Publicly archive forecasts | Publicly archive forecasts |  | Forecasts should be reproducible and archived |
|  | Use null model comparisons | Compare multiple modeling approaches (specifically mentions null models) | Compare forecasts to simple baselines |  |  |
|  | Compare modeling approaches | Compare multiple modeling approaches | Compare and combine multiple modelling approaches |  |  |
|  |  | Use time-series data when possible |  |  |  |
|  |  | Use predictors related to the question |  |  |  |
|  |  | Address unknown or unmeasured predictors |  |  |  |
|  |  | Include an observation model |  |  |  |
|  |  | Assess how forecast accuracy changes with time-lag |  |  |  |
|  |  |  | Frequent data collection |  |  |
|  |  |  | Best practices in data structure |  |  |
|  |  |  | Best practices in software development |  |  |
|  |  |  | Support easy inclusion of new models |  |  |
|  |  |  |  | Conflicts of interest |  |
|  |  |  |  | Ecosystem health |  |
|  |  |  |  | Equity for end users |  |
|  |  |  |  | Unintended consequences |  |
|  |  |  |  | Review of performance |  |
|  |  |  |  |  | Uncertainty partitioning informs forecast interpretation and forecast improvement |
|  |  |  |  |  | Building and maintaining a forecasting system takes an interdisciplinary, highly coordinated team |
|  |  |  |  |  | Let your forecasting goals guide your modeling approach |

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