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

Table 1: 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. Because Dietze et al. (2018) do not specifically outline a defined list of practices, here we use the practices from Dietze et al. (2018) that were listed in Box 1 of White et al. (2019).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Reference | This manuscript | Harris et al. (2018) | Dietze et al. (2018), as synthesized by 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. | Iterative near-term ecological forecasting: Needs, opportunities, and challenges. | 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 | From White et al. (2019): 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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