

1 *From Policy to Practice: Progress towards Data- and Code-*
2 *Sharing in Ecology and Evolution*

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84 85 *Abstract*

86 High quality research data and analytical code are essential for ensuring the credibility of
87 scientific results, are key research outputs, and are crucial elements to facilitate reproducibility.
88 However, in ecology and evolution (E&E) in particular, it is currently unknown how many
89 journals have policies on data- and code-sharing for peer review purposes, or upon manuscript
90 acceptance. Furthermore, the clarity of such policies may impact authors' compliance. Thus, we
91 assessed the clarity, strictness, and timing of data- and code-sharing policies across 275
92 journals in E&E. We also analysed initial policy compliance using submission data from two

93 journals: *Proceedings of the Royal Society B* and *Ecology Letters*. Across all 275 journals,
94 22.5% encouraged and 38.2% mandated data-sharing, whereas 26.6% encouraged and 26.9%
95 mandated code-sharing. Most journals that mandated data- or code-sharing required these to
96 be provided “during peer review” (59.0% and 77.0%). This number was reduced for journals that
97 encouraged data- and code-sharing (40.3% and 24.7%). More journals mandated or
98 encouraged data- (+5.7%) and code-sharing (+12.6%) since the last assessments of these
99 percentages in 2021 and 2020. Mandatory policies were associated with higher rates of data-
100 and code-sharing upon submission (16.9% pre-mandate to 42.6% post-mandate), even when
101 not fully adhered to. When enforced by editorial staff, mandated policies led to very high
102 compliance rates (e.g., 96.5%). Our results also suggest that low initial compliance may in part
103 be explained by vague wording used in sharing policies. We provide seven specific
104 recommendations to help journals improve policy compliance and boost data- and code-sharing
105 in E&E.

106

107 *Keywords*

108 open science, journal policy, reproducibility, replicability, transparency, peer review

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116 *Introduction*

117 In the last two decades, there has been a fundamental shift in the scientific community towards
118 transparency; providing both data and code is now considered by many to be a minimum
119 requirement for publication (Stodden *et al.*, 2013, 2018; Powers & Hampton, 2019). To address
120 this, journals have gradually moved towards implementing data- and code-sharing policies
121 (Roche *et al.*, 2015; Culina *et al.*, 2020), with the number of journals that explicitly mandate
122 data- and/or code-sharing greatly increasing in the last decade (Stodden *et al.*, 2013; Abdill *et*
123 *al.*, 2024), including in ecology and evolution (Mislán *et al.*, 2016; Sholler *et al.*, 2019; Culina *et*
124 *al.*, 2020; Berberi & Roche, 2022; Roche *et al.*, 2022). However, despite an increase in policy
125 implementation in journals in recent years, compliance with these data- and code-sharing
126 policies appears to be lagging (Roche *et al.*, 2015, 2022; Stodden *et al.*, 2018; Culina *et al.*,
127 2020; Kambouris *et al.*, 2023; Kimmel *et al.*, 2023). As a result, the replicability and
128 reproducibility of scientific findings remains low across numerous fields of research (Archmiller
129 *et al.*, 2020; Minocher *et al.*, 2021; Kambouris *et al.*, 2023; Kimmel *et al.*, 2023; Lear *et al.*,
130 2023; Nguyen & Benjamin-Chung, 2023). In part, such low compliance may be driven by vague
131 language and non-definitive policy requirements (Christian *et al.*, 2000), which can impede both
132 author and editor understanding. This highlights the need to assess journal policies and their
133 clarity of language to examine a potentially important cause of low compliance, and strengthen
134 reproducibility and reuse via greater data- and code-sharing in ecology and evolution.

135

136 Whereas much of the research thus far has focussed on the amount of data- and code-sharing
137 post-publication (i.e., after acceptance), much less is known about the proportion of journals that
138 require data and code upon manuscript submission (*during* peer review). Providing data and
139 code for peer review not only allows for deeper insight into the manuscript for reviewers and
140 editors (Powers & Hampton, 2019; Archmiller *et al.*, 2020; Fernández-Juricic, 2021), but can

141 also promote reproducibility earlier in the publication process, as well as reduce the probability
142 of errors in published papers (Casadevall *et al.*, 2014; Sanchez *et al.*, 2021; Heyard & Held,
143 2022; Chen *et al.*, 2023; Ivimey-Cook *et al.*, 2023; but see Berberi & Roche, 2022, 2023).
144 Indeed, Heyard & Held (2022) suggest that although preparing data and code for submission
145 during peer review may increase workload, it could also promote the uptake of reproducible
146 workflows in research groups, and ultimately, reduce sources of error and improve the quality of
147 the data and code shared. However, despite some journals adopting mandatory data- and code-
148 sharing during peer review for some years (e.g., *The American Naturalist* (in 2022), *Ecology*
149 *Letters* (in 2023), and *Proceedings of the Royal Society B: Biological Sciences* (in 2017)), little is
150 known about the overall percentage of journals in ecology and evolution that have implemented
151 any form of policy on data- and code-sharing for peer review and their compliance rates, when
152 in place.

153

154 To this end, we first reviewed the current state of data- and code-sharing policies across 275
155 journals that publish studies in ecology and evolution. For each policy, we considered three
156 main features: (1) the clarity of the policy (i.e., how easy it was to understand); (2) the strictness
157 of the policy (i.e., from mandatory to optional sharing); and (3) the ‘timing’ of the policy (i.e., at
158 which point in the publication process data- and/or code-sharing was required or expected by
159 the journal: during peer review or after acceptance). We aimed to test: (1) whether the number
160 of journals encouraging or mandating data- and code-sharing “during peer review” differed from
161 the number encouraging or mandating sharing “after acceptance”; (2) whether there are
162 associations between data- and code-sharing timing and strictness, between a policy’s
163 strictness and timing, and between a policy’s clarity and strictness; (3) whether the number of
164 journals mandating or encouraging data- and code-sharing (either “during peer review” or “after
165 acceptance”) has increased since the assessments by Berberi & Roche (2022; data) and Culina
166 *et al.* (2020; code).

167 Second, using data obtained directly from the editorial team at two journals that publish ecology
168 and evolution studies (*Ecology Letters* and *Proceedings of the Royal Society B: Biological*
169 *Sciences*), we examined (1) whether the number of submissions sharing data and code differed
170 from those that didn't share; (2) whether sharing of data was greater than code; and (3)
171 whether the introduction of a mandatory data- and code-sharing policy was associated with an
172 increase in data- and code-sharing upon manuscript submission.

173

174

175 *Methods*

176 The pre-registration for this study is available at: <https://osf.io/zxurh> (Ivimey-Cook *et al.*, 2024)
177 and was written after data collection of journal policies but prior to receiving data from *Ecology*
178 *Letters* and *Proceedings of the Royal Society B: Biological Sciences* (hereafter, *Proceedings B*)
179 and prior to data analysis. In addition, where appropriate, we provide author initials as per
180 MeRIT to identify authors roles in the methodology and elsewhere (Nakagawa *et al.*, 2023).

181

182 *Data and code accessibility*

183 All analyses were conducted in R (v4.4.1; R Core Team, 2024). All data and code used for
184 processing, analysis, and visualisation are available at Open Science Framework
185 (<https://osf.io/cqn3f/>, DOI:10.17605/OSF.IO/CQN3F; Ivimey-Cook *et al.*, 2024).

186

187 *Data- and code-sharing policies*

188 A list of journals that publish ecology and evolution studies was created by combining a series
189 of lists previously generated as described below, producing a preliminary list of 284 journals
190 after duplicates were removed. 241 journals came from a search for "ecology" and "evolutionary
191 biology" journals in the Clarivate Journal Citation Report (<https://jcr.clarivate.com/jcr/browse->

192 categories) on the 30th of September, 2022 (searched performed by Patrice Pottier). 118
193 journals were compiled by AC as part of a pre-conference event on Registered Reports for the
194 Society for Open, Reliable, and Transparent Ecology and Evolutionary Biology (SORTEE;
195 (O’Dea *et al.*, 2021) in 2023 by merging a list of ecology journals
196 (<https://listofjournals.com/field.php?q=Ecology>) with a list of ecology and evolution journals
197 compiled for a hackathon organised as part of the SORTEE conference in 2021
198 (https://freeourknowledge.org/2021-07-01-registered-reports-now_ecol-evol-biol/). The
199 remaining 96 journals were surveyed by both Mislán *et al.* (2016) and Culina *et al.* (2020). The
200 resulting list of 284 journals was then used in the hackathon “Open code and data practices
201 during peer review”, for policy extraction, which EIC, AST, and NPM organised at the SORTEE
202 conference on October 17th, 2023. We removed nine titles from the list post-hackathon, which
203 were either duplicated or no longer appeared to be in operation ($n_{\text{final}} = 275$ journals; see Table
204 S1; note an additional four journals were removed post-preregistration as they were found to no
205 longer be operating).

206

207 Each journal was assigned to three separate data extractors (DEs, $n = 36$). Each DE was
208 assigned an initial subset of 15 journals, with the option to extract additional subsets. Mean and
209 median number of subsets of 15 journals assigned per person were 1.3 and 1 respectively, with
210 a range = 1 to 3. For each journal, DEs extracted information regarding the timing of data- and
211 code-sharing (Categorical: Not Expected At All; During Peer Review; After Acceptance (Post-
212 Publication); Unclear; Other), policy strictness (Ordinal: Not Mentioned; Encouraged; Optional
213 for Authors; On Reviewer Request; Mandated), and clarity (Quantitative: 1 (Totally Unclear) - 5
214 (Totally Clear) [5 levels]) into a Google Form (full details on variables in Table S2). As
215 mentioned above, this extraction was done prior to pre-registration. Between-DE agreement
216 was tested using Fleiss Kappa intraclass correlation scores for the categorical variables of

217 strictness and timing, and Kendall's W for the ordinal variable of clarity (via package {irr}
218 v0.84.1; Gamer *et al.*, 2012).

219

220

221 ***Deviation from preregistration***

222 Prior to analysis, we made one change to the DE's responses. The category "Other", which was
223 originally among the responses for data- and code timing, was subsequently re-categorised as
224 either "During Peer Review", "After Acceptance, or "Not Expected At All" by EIC, AST and NPM
225 based on the text entries provided by the DEs. In addition, clarity ratings were excluded from the
226 analyses for journals that did not have any data or code policy (i.e., policy strictness = "Not
227 Mentioned"). When DEs left scores for clarity blank because they were unable to locate a policy
228 despite the journal having a policy, we assigned the lowest clarity score (i.e., 1) to those entries,
229 based on the rationale that not being able to locate or identify a data- or code-sharing policy is
230 consistent with the policy being extremely unclear. Note that, the dataset generated after
231 response re-categorisation and data exclusion was used to assess the agreement between DEs
232 in their data extraction across all journals and to assess journal clarity ratings.

233

234 Due to the high number of "Unclear" responses from DEs and to obtain up-to-date data- and
235 code-sharing policies across the entire dataset for each journal, EIC and AST reviewed and re-
236 assessed (using the same timing and strictness ratings as the DEs above; clarity was not re-
237 assessed) all of the 275 journal policies in 9th-15th September 2024 along with any policy text
238 copied by the DEs into the Google Form during extraction (regardless of the level of agreement
239 between DE's). At this stage an additional step was also conducted. If a journal specifically
240 referenced adhering to a publisher-level policy, this higher-level policy was also checked to
241 ensure that the timing and strictness was similar between both policy levels. However, if either
242 the journal or publisher required data- and or code-sharing at an earlier time or with increased

243 strictness, this was taken as the final rating (for instance, if a journal mentions encouraging
244 data- and code-sharing after acceptance, but the publisher mentions that editors and reviewers
245 can request data and code during peer review, then the overall rating became: during peer
246 review on reviewer request for both data and code). This re-assessment was conducted due to
247 the length of time between the hackathon (October 2023) and the final data analysis
248 (September 2024). We list a number of important methodological clarifications below. Note that
249 this dataset, which incorporated up-to-date and potential publisher-level policies, was used for
250 all future analyses.

251

252 *Methodological clarifications*

253 In addition, we applied several different rules for rating strictness and timing in order to maintain
254 consistency across journals (some of which are mentioned in the pre-registration above but are
255 reiterated here for clarity).

- 256 1. As the use of verbs differed markedly across journals, a consistent rating was applied.
257 When a journal uses wording such as “expect”, “must”, or “require” this represents
258 mandated. If a journal instead uses words such as “should”, “recommends” or “requests”
259 this is taken as encouraged. Lastly, if a journal uses wording such as “if data are
260 present” or “we invite authors to archive data” then this is taken as optional. The authors
261 of this paper realise this is not ideal and opinions may differ as to precise terminology.
- 262 2. For journals with data and/or code as “Mandated” or “Encouraged”, if the journal does
263 not explicitly mention that data or code should be available during peer review or at
264 submission, timing should be assigned as “After Acceptance”. In addition, this applies
265 when a journal mentions “prior to publication” or discusses “data- or code-sharing”.

- 266 3. For journals that “require” code but only for "papers that describe new simulations or
267 analytical methods", strictness should be assigned as “Encouraged”. This also fits when
268 some but not all forms of data and/or code have a mandated policy.
- 269 4. If a journal mentions data- and/or code-sharing but does not say anything about whether
270 data and/or code should or must be submitted at any point, strictness should be
271 assigned as “Optional to Authors” and timing, unless stated otherwise, as “After
272 Acceptance”. This also includes when journals say that data or code can be uploaded as
273 supplementary material.
- 274 5. If a journal does not want any new data, strictness should be assigned as “Optional for
275 Authors” and timing as “Not Expected At All”. This refers to particular cases where
276 previously published data must be made available if novel analyses have been
277 conducted. This also includes when journals simply require authors to state the
278 availability of data or code with no requirement for sharing.
- 279 6. If a journal mandates data and/or code-sharing as a condition of publication but then
280 also mentions that data and/or code should be available upon request from editors and
281 reviewers, strictness should be assigned as “On Reviewer Request“ and timing as
282 “During Peer Review”. This also applies for higher-level publisher policies if the journal
283 directly refers to them in text.
- 284 7. Lastly, for most ScienceDirect journals, there is consistent use of the same text (with
285 minor edits) for their data- and code-sharing, since they explicitly write “Research data
286 refers to the results of observations or experimentation that validate research findings,
287 which may also include software, code, models, algorithms, protocols, methods and
288 other useful materials related to the project.”, we decided to treat their sharing policies
289 as concerning both data and code. In addition, though the policies do not explicitly
290 mention that the sharing should be done during peer review, we have deemed that they
291 do so implicitly and categorise the timing as “During Peer Review” based on the policies

292 including the following two statements: “To foster transparency, we require you to state
293 the availability of your data in your submission if your data is unavailable to access or
294 unsuitable to post.” and “You are [required or encouraged (depending on the journal)] to:
295 Deposit your research data in a relevant data repository. Cite and link to this dataset in
296 your article. If this is not possible, make a statement explaining why research data
297 cannot be shared.”, which we interpret as having to be “during peer review” given that
298 the policies ask you to add the data to the reference list and very clearly ask you to
299 explain upon submission why you might not be able to share the data (e.g., due to
300 ethical reasons).

301
302
303 This updated dataset was then used for the remaining analyses, including calculating several
304 descriptive statistics (exploratory analyses listed in the pre-registration) and assessing the
305 difference between journals in terms of code- and data-sharing strictness, timing, and clarity.
306 Specifically, NPM calculated Cramer’s V non-parametric correlations (i.e., between journal
307 code- and data-sharing policy strictness; between journal code- and data-sharing timing; and,
308 between strictness and clarity for both code and data separately; via package {confintr} v1.0.2
309 (Mayer, 2022) as well as performed chi-squared tests (χ^2) to assess if journals differ in whether
310 code or data is expected “during peer review” or “after acceptance”. Lastly, to assess changes
311 in the number and percentage of journals mandating or encouraging data- or code-sharing,
312 NPM compared our results with those of Berberi and Roche (2022) and Culina et al. (2020)
313 using χ^2 tests. To do this, we used the subset of overlapping journals between these studies
314 and ours (Culina et al. 2020: 95 out of 96 journals overlapped with our list; Berberi and Roche
315 2022: 194 out of 199 overlap).

316

317 *Journal-specific submission data*

318 We received data related to the data and code submission for peer review on the 28th of
319 February 2024 from *Proceedings B*, and the 2nd of April 2024 from *Ecology Letters*.

320

321 *Ecology Letters*

322 For *Ecology Letters*, we received initial submission data for original research articles (i.e.,
323 “Letters”) from two 3-month periods, Jun - Aug 2021 (i.e., the pre-mandate period, 280
324 submissions) and Sep - Nov 2023 (i.e., the post-mandate period, 291 submissions). Note that
325 for *Ecology Letters*, the mandated enforcement of data- and code-sharing for peer review had
326 been in place in August 2023. 79 out of the 280 submissions from the pre-mandate period were
327 rejected before peer review, and no information on compliance could be extracted for these.
328 Therefore, we only used data on the 201 remaining submissions during this period. During the
329 pre-mandate period, authors were required to provide a data availability statement with their
330 initial submission, either providing a link to the study’s data (e.g., DOI, GitHub repository, or
331 website) or stating that such a link would be provided upon acceptance (note that in the pre-
332 mandate period, the requirement did not include any reference to code-sharing). The policy
333 requiring a data availability statement had been in place since *ca.* 2018 (*Ecology Letters*
334 Editorial Team *pers. comms.*). Data from the pre-mandate period included whether a compliant
335 data availability statement was provided, and if so, whether it included a link. During the post-
336 mandate period, authors were required to submit a link (e.g., DOI, GitHub repository, or
337 website) to the study’s data and code upon submission. This policy was implemented in early
338 2023 and has been systematically enforced by the managing editors since Aug 2023 (i.e., prior
339 to review and any formal data editor or peer review, the managing editor was responsible for
340 checking and enforcing the mandated policy). Data from the post-mandate period include
341 whether a compliant link was provided upon first submission (but without verifying that all

342 necessary data and code and associated metadata was provided). Note that “Letters”
343 submissions do not distinguish between research articles that may not rely on data or code
344 (e.g., some theoretical papers); therefore, the percentage of non-compliant submissions may
345 include a small number of submissions that did not use data or code.

346
347 With the data received from *Ecology Letters*, NPM assessed whether the frequency of policy-
348 compliant submissions was higher than the frequency of non-policy-compliant submissions both
349 within and between the pre- and post-mandate periods using χ^2 tests. In addition, since
350 compliance did not require the provision of a data-sharing link in the pre-mandate period, NPM
351 also compared the frequency of submissions that did or did not provide a data-sharing link
352 within the pre-mandate period, and between the pre- and post-mandate periods.

353

354 *Proceedings of the Royal Society B: Biological Sciences*

355 For *Proceedings B*, we received submission data for all article types from a single post-mandate
356 period (i.e., Mar 2023–Feb 2024, 2340 submissions), where authors were required to provide
357 data and/or code via sharing a link or uploading them as supplementary materials. This
358 mandate has been in place since *ca.* 2017 (*Proceedings B* Editorial Team *pers. comms.*). Data
359 received include the manuscript type (e.g., Research, Evidence Synthesis, Comment, etc.) and
360 the authors’ responses to the following submission questions: (1) “*Does your paper present new*
361 *data, or use data/models published elsewhere?*”, and (2) “*If yes, provide a link to your data if it*
362 *is in a repository. If depositing your data with Dryad, ensure that you give the private reviewer a*
363 *'sharing' link. If your data is uploaded as supplementary material, please state this. Your paper*
364 *will be unsubmitted without this information.*”. Note, that although the *Proceedings B* policy
365 requires data- and code-sharing, the questions included during the submission procedure only
366 referred to data.

367

368 In contrast to *Ecology Letters*, we did not have access to pre-mandate data and therefore could
369 not assess policy compliance and percentage of submissions providing a data- and/or code-
370 sharing link for *Proceedings B* before the mandate. In addition, we were not able to assess
371 initial policy compliance in this post-mandate period with the data we obtained because
372 submissions determined to be non-compliant by the managing editors were unsubmitted and
373 authors were required to add the missing information before resubmitting. Therefore, we first
374 used question (1) above to explore the proportion of papers from each manuscript type that had
375 data associated with them. In addition, using the authors' response to question (2) above for the
376 subset of research manuscripts with associated data (i.e., 2000 submissions), NPM first
377 compared the percentage of submissions that appear to have provided a data- and/or code-
378 sharing link to those that provided data and/or code as supplementary materials. NPM then
379 estimated the percentage of submissions that appeared to have provided data, code, or both
380 data and code, by categorising them based on the text provided by the authors in question (2),
381 and compared the proportion appearing to share data to the proportion appearing to share code
382 using χ^2 tests.

383

384 *Results*

385 *Code- and data-sharing policies*

386 Overall, fewer than a quarter of all 275 investigated journals implemented “mandated data
387 sharing during peer review” (22.6%; Table 1, Fig. 1), however, this was still the most common
388 data-sharing policy. The second and third most common policies were data-sharing on ‘reviewer
389 request during peer review’ (17.1%) and ‘mandating data sharing post-publication’ (15.6%).
390 Lastly, 10.6% of all journals did not have any form of data-sharing policy (Table 1, Fig. 1). For
391 code, the most common finding was for journals to have no code-sharing policy (23.3%; Table
392 1, Fig. 1). For journals that did have a code-sharing policy, the percentages were similar to

393 those of data sharing, where the most common policy was mandated code-sharing during peer
394 review (20.7%) closely followed by encouraged code-sharing post-publication (20.0%) and
395 code-sharing on reviewer request during peer review (18.6%; Table 1, Fig. 1). In total, 167
396 journals mandated or encouraged data sharing (60.7% of all journals). Of these, about half
397 required some kind of data sharing during peer review (87, 52.1%) and during post-publication
398 (80, 47.9%; $\chi^2 = 0.293$; $P = 0.588$). The results were similar for code-sharing: of the 147
399 journals that mandated or encouraged code-sharing (53.5% of all journals), a similar percentage
400 required it during peer review (75, 51.0%) and during post-publication (72, 49.0%; $\chi^2 = 0.061$; P
401 $= 0.805$).

402
403 We also found a significant non-zero correlation between the strictness of data- sharing policies
404 and the strictness of code-sharing policies ($V = 0.546$, 95% Confidence Interval (hereafter
405 95CI): [0.489, 0.605]), consistent with journals with stricter data policies tending to have stricter
406 code policies. Similarly, the timing of both data- and code-sharing requirements were also
407 significantly correlated ($V = 0.733$, 95CI: [0.651, 0.817]). We also found that the strictness and
408 clarity rating of a policy were significantly correlated both for data ($V = 0.295$, 95CI: [0.230
409 0.366]) and code ($V = 0.217$, 95CI: [0.163 0.281]). Summary statistics show that that highest
410 mean clarity rating was for journals with mandated data sharing (3.77, $SD = 0.99$; median = 4)
411 compared to the overall average (3.49, $SD = 1.16$; median = 4) and for journals with mandated
412 code-sharing (3.08, $SD = 1.25$; median = 3) compared to the overall average (2.56, $SD = 1.33$;
413 median = 2), although the difference between mandated journals and the overall means were
414 relatively small.

415
416 The number of journals that mandate data- and code-sharing was found to increase. In 2021,
417 Berberi & Roche (2022) found that 35.6% of journals ($n = 69$ out of 194) mandated data sharing,
418 compared to 41.2 of those journals that mandate data sharing as of 2024 ($n = 80$). Berberi &

419 Roche (2022) also found that 41.8% of journals (n = 81) had a weak data-sharing policy and
420 22.7% (n = 44) appeared to have no data-sharing policy at all. In comparison, we found that
421 49% of journals (n = 95) had a non-mandated or weak data-sharing policy (i.e., encouraged, on
422 reviewer request, optional), and only 9.8% of journals (n = 19) appeared to have no data-
423 sharing policy at all. While the results do not represent a statistically significant increase in the
424 percentage of journals that mandate data-sharing between 2021 and 2024 ($\chi^2 = 1.090$; $P =$
425 0.297), there was a statistically significant increase in the percentage of journals with some form
426 of data-sharing policy during this period ($\chi^2 = 10.915$; $P < 0.001$). Culina *et al.* (2020) found that
427 72 out of 95 journals (75.8%) encouraged or mandated code-sharing in 2020. Here, we found
428 that 84 out of those 95 journals (88.4%) now have implemented some code-sharing policy. This
429 includes journals that we classified as “On Reviewer Request” (n = 21). This difference
430 corresponds to a statistically significant increase in the percentage of journals implementing
431 some form of code-sharing policy between 2020 and 2024 ($\chi^2 = 4.334$; $P = 0.037$).
432 Incorporating three additional journals that we had categorised as “Optional for Authors”
433 increases this percentage to 91.6%, which would represent an even greater increase since
434 2020 ($\chi^2 = 7.555$; $P = 0.006$). However, the observed increase may be partially influenced by
435 subtle differences in the categorisations used in Culina *et al.* (2020) and here.

436

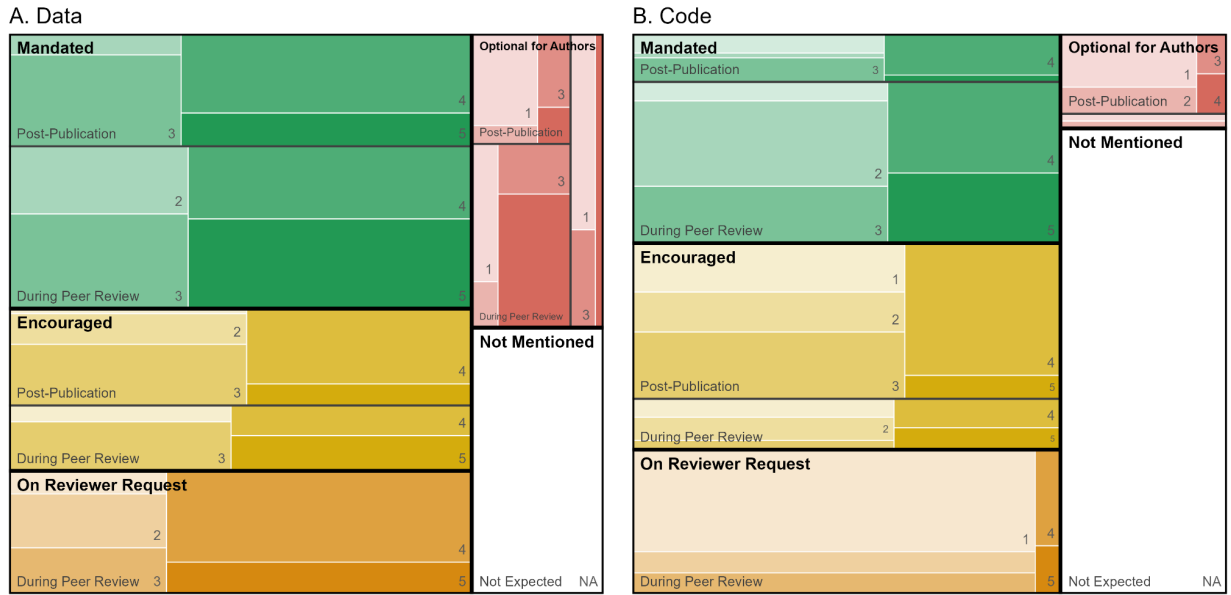
437 The agreement between data extractors (DEs) was statistically significant for all six extracted
438 variables. There was general agreement on the timing, strictness, and clarity of the data and
439 code policies for journals (Table 2). The percentage of full disagreement (i.e. no agreement
440 between the three DEs) ranged from 7% for Data Strictness to 30% for both Data and Code
441 Clarity (median = 14.5%, mean = 18.1%; Table 2).

442

Table 1.: Summary of policy requirements for data- and code-sharing for 275 ecological and evolutionary journals.

Note that Not Mentioned - Not Expected At All = no policy and Optional for Authors - Not Expected At All = there is no requirement for new sharing of “new” data or code or a journal simply wants an availability statement (see “Methodological clarifications” above).

Policy strictness		Policy timing	Data policy	Code policy
Mandated	-	During Peer Review	62 (22.55%)	57 (20.73%)
	-	After Acceptance (Post-Publication)	43 (15.64%)	17 (6.18%)
Encouraged	-	During Peer Review	25 (9.09%)	18 (6.55%)
	-	After Acceptance (Post-Publication)	37 (13.45%)	55 (20.00%)
On Reviewer Request	-	During Peer Review	47 (17.09%)	51 (18.55%)
Optional for Authors	-	During Peer Review	15 (5.45%)	2 (0.73%)
	-	After Acceptance (Post-Publication)	9 (3.27%)	11 (4.00%)
	-	Not Expected At All	8 (2.91%)	0 (0.00%)
Not Mentioned	-	Not Expected At All	29 (10.55%)	64 (23.27%)



444
 445 **Figure 1.** Treemap showing the proportions of (A) data, and (B) code policies by timing (“during peer
 446 review”, “after acceptance”, “not expected at all”, “unclear”), strictness (“encouraged”, “optional”, “not
 447 mentioned”, “on reviewer request”, or “mandated”), and clarity (from 1-5) ratings. Subgroup areas are
 448 proportional to the number of journals determined to be within each grouping (total n=246 and 211 for
 449 data and code policies, respectively; for summary data for timing and strictness groupings see Table 2).
 450 Thick black links distinguish strictness groupings (i.e., Mandated = green, Encouraged = yellow, On
 451 Reviewer Request = orange, Optional for Authors = red, Not Expected At All = white), and grey lines
 452 distinguish timing subgroupings. Numbers displayed show the clarity score for each subgroup (1 - 5, or
 453 NA for journals without a policy), which are shaded relative to their clarity score (1 = lightest, 5 = darkest).
 454 Timing labels of smaller subgroups are not displayed, including for A, Optional for Authors/ Not Expected
 455 at All (4 journals), and in (B), Optional for Authors/ During Peer Review (2 journals). Figure produced via
 456 package {treemapify} v2.5.6 (Wilkins, 2021). Figure by NPM and RZ.
 457

Table 2: Summary agreement data between data extractors (DEs) for policy timing, strictness, and clarity for data- and code-sharing submission policies across journals that publish ecology and evolution studies. The analysis of timing (“during peer review”, “after acceptance”, “not expected at all”, “unclear”) and strictness (“encouraged”,

“optional”, “not mentioned”, “on reviewer request”, or “mandated”) includes all 275 journals, whereas that of clarity (from 1-5) includes 246 journals for data and 211 journals for code, which corresponds to the subset of journals mentioning data- and/or code-sharing in their policies.

Response	Full agreement (3/3)	Partial agreement (2/3)	No agreement (0/3)	Between-DE agreement coefficients
Data - Timing	71 (25.82%)	167 (60.73%)	37 (13.45%)	Fleiss' κ : 0.261 (P < 0.001)
- Strictness	156 (56.73%)	100 (36.36%)	19 (6.91%)	Fleiss' κ : 0.555 (P < 0.001)
- Clarity	29 (11.79%)	142 (57.72%)	75 (30.49%)	Kendall's W: 0.505 (P < 0.001)
Code - Timing	90 (32.73%)	142 (51.64%)	43 (15.64%)	Fleiss' κ : 0.259 (P < 0.001)
- Strictness	118 (42.91%)	123 (44.73%)	34 (12.36%)	Fleiss' κ : 0.389 (P < 0.001)
- Clarity	34 (16.11%)	114 (54.03%)	63 (29.86%)	Kendall's W: 0.535 (P < 0.001)

458

459

460 *Journal-specific submission data*

461 *Ecology Letters*

462 The *Ecology Letters* manuscript submission data showed that in the pre-mandate period (i.e.,
 463 where the authors were required to simply provide a data availability statement in their initial
 464 submission) the number of submissions complying with the policy was statistically higher than
 465 the number of non-compliant submissions (Table 3 & 4). In contrast, in the post-mandate period
 466 (i.e., where the authors were required to provide a link to the study’s data and/or code in their
 467 initial submission) policy compliance was statistically lower than non-compliance (Table 3 & 4).
 468 Nonetheless, despite lower policy compliance during the post-mandate period, the percentage
 469 of submissions including a link to the study’s data and/or code increased significantly after the

470 introduction of the mandate (Table 3 & 4; however, we note that we could neither assess
471 compliance for data- and code-sharing separately nor confirm whether all data and code were
472 provided). Fewer submissions appear to include data and/or code with their submission (i.e.,
473 provided a link) than those that did not, in both the pre-mandate and post-mandate period
474 (Table 3 & 4).

475

476

477 *Proceedings of the Royal Society B: Biological Sciences*

478 *Proceedings B* submission data showed that the manuscript types 'Research' and 'Evidence
479 Synthesis' had the highest percentage of submissions with associated data (90.3% and 81.3%,
480 respectively; Table 5), however this does not infer whether the associated data and/or code was
481 actually shared with the manuscript. Based on the authors' responses to the two submission
482 questions, the percentage of submissions that appear to have included a link to and/or uploaded
483 the data and/or code as supplementary material was very high across all manuscript types
484 (96.5%; Table 6). Many of the submissions that did not provide data or code via a link or
485 supplementary material were genetic studies that included only accession numbers to public
486 sequence repositories (e.g., Genbank), which are currently treated as policy-compliant during
487 the submission screening process. More authors chose to share their data and/or code via a link
488 rather than as supplementary material (Table 6). Lastly, a considerable percentage of
489 submissions appear to share only data (45.1%), followed by submissions sharing both data and
490 code (29.5%), or only code (3.3%). As a result, the number of papers appearing to share data
491 compared to code was significantly higher ($\chi^2 = 675.79$; $P < 0.001$; Table 6). Submissions
492 mentioning code only were often simulation- or computation-based studies.

493

Table 3: *Ecology Letters* submission data summary. There are 201 submissions with data from the pre-mandate period and 291 submissions with data from the post-mandate period. Pre-mandate compliance requires submissions to include a data availability statement, which may or may not include a link to the study's data, while post-mandate compliance requires submissions to include an active link to a data/code repository of the study.

Was the submission apparently compliant with the period-specific policy at the time?	Pre-mandate ('21) <i>(policy: data-sharing statement)</i>	Post-mandate ('23) <i>(policy: data/code-sharing link)</i>
- Yes	134 (66.67%)	124 (42.61%)
- No	67 (33.33%)	167 (57.39%)
Did the submission include a link to the study's data and/or code?		
- Yes	34 (16.92%)	124 (42.61%)
- No	167 (83.08%)	167 (57.39%)

Table 4: Comparisons of compliance and link sharing within and between pre- and post-mandate periods for *Ecology Letters* submissions.

Pre-mandate period ('21)	χ^2 (P-value)
- Compliance is higher than non-compliance.	22.333 (P < 0.001)
- Fewer submissions included DOI/ links than those that did not.	88.005 (P < 0.001)
Post-mandate period ('23)	
- Non-compliance is higher than compliance, and fewer submissions included DOI/ links than those that did not.	6.354 (P = 0.012)
Pre- versus post-mandate period ('21 vs '23)	
- Compliance was lower in the post-mandate period.	26.626 (P < 0.001)
- Link sharing was higher in the post-mandate period.	34.838 (P < 0.001)

495

Table 5: Summary data for the submission question (i): “Does your paper present new data, or use data/models published elsewhere?” by manuscript type for submissions to *Proceedings B*. Note that the column “My paper contains data” has been adjusted from the original question (it was simply “Yes”). Values in parenthesis relate to percentage.

Manuscript Type	“My paper has no data”	“My paper contains data”
Research	216 (9.75%)	2000 (90.25%)
Review	47 (73.44%)	17 (26.56%)
Biological Science Practices	7 (36.84%)	12 (63.16%)

Evidence Synthesis	3 (18.75%)	13 (81.25%)
Commentary	10 (90.91%)	1 (9.09%)
Special Feature Reviews	7 (87.50%)	1 (12.50%)
Invited Reply	2 (66.67%)	1 (33.33%)
Comment	2 (100.00%)	0 (0.00%)

496

Table 6: Summary data for how data and or code is provided for original Research type manuscripts (total submissions = 2000), and the apparent levels of data, code or data- and code-sharing based on the statement provided by authors in response to the submission question (ii): *“If yes, provide a link to your data if it is in a repository. If depositing your data with Dryad, ensure that you give the private reviewer a 'sharing' link. If your data is uploaded as supplementary material, please state this. Your paper will be unsubmitted without this information.”* for submissions to *Proceedings B*.

Is a link and/or supplementary materials apparently provided?	
- Yes	1929 (96.45%)
- No	64 (3.20%)
- Unclear	7 (0.35%)
If it is provided, how?	
- Link	1094 (56.71%)
- Supplementary materials	713 (36.96%)
- Both	121 (6.27%)

Based on the author's response, does data, code or both appear to be provided?

- Data only	869 (45.05%)
- Code only	63 (3.27%)
- Data and code	568 (29.45%)
- Unclear	428 (22.19%)

497

498 *Discussion*

499 We had two overall aims for this study: (1) to assess the current state of data- and code-sharing
500 policies in journals that publish ecology and evolution studies; (2) to assess the influence of
501 journal policy mandates on data- and code-sharing compliance using initial manuscript
502 submission data obtained directly from the editorial offices of two journals. Our results show that
503 uptake of data- and code-sharing policies in ecology and evolution is slow; less than half of all
504 journals possess some form of mandated data- and code-sharing policy. Of these, an even
505 smaller number of journals facilitate data and code review by requiring authors to share data
506 and code during peer review. Once such a mandate is in place, it appears to be followed by
507 higher rates of data- and code-sharing, despite low initial compliance. We argue that some
508 reasons for low compliance stem from a lack of journal enforcement of mandated policies (see
509 Fidler *et al.*, 2004) in addition to the wide variety of data- and code-sharing policies that are
510 often unclear and difficult-to-interpret.

511

512 Across all 275 journals that publish ecology and evolution studies, we found that, in 2024, only
513 38.2% mandated data-sharing either during peer review or after acceptance, and 10.6% did not

514 even mention data in their policies. The remaining 51.2% either encouraged data-sharing
515 (22.5% of all journals), only required it upon explicit reviewer request (17.1%), or made it
516 optional for authors (11.6%). Mandating code-sharing was substantially lower compared to data-
517 sharing (26.9%) with about a quarter of the journals (23.3%) not mentioning code in their
518 policies. The remaining half (49.5%) either encouraged code-sharing (26.6%), only required it
519 upon reviewer request (18.6%), or made it optional for authors (4.7%). These results are in
520 agreement with previous findings showing that code-sharing policies are far less common than
521 data-sharing policies (Stodden *et al.*, 2013; Mislán *et al.*, 2016; Culina *et al.*, 2020; Abdill *et al.*,
522 2024). It should be noted that the number of journals encouraging or mandating data and code
523 during peer review in our study may likely be an overestimation due to the large proportion of
524 policies originating from a single publisher, where we had decided to be particularly lenient in
525 our policy timing categorisation (ScienceDirect by Elsevier; mandated: 31 journals, encouraged:
526 7 journals). In this specific case, we had taken the policy to refer to data- and code-sharing
527 “during peer review”, despite no specific reference in text (see details in Supplementary Material
528 “Methodological Clarifications”). As such, our percentages likely reflect ceiling values (i.e., a
529 best-case scenario). If we replace these “during peer review” policy timings with “after
530 acceptance”, the percentage of journals mandating data- and code-sharing during peer review
531 would be halved (i.e., 11.2%, and 9.5%, respectively) and, if we considered encouraging data-
532 and code-sharing during peer review, they would be reduced by a third (i.e., 6.5% and 4.0%,
533 respectively). These all present worrying statistics.

534

535 We found evidence that data- and code-sharing policies are typically aligned with one another in
536 terms of both timing and strictness. Journals with stricter data-sharing policies tend to have
537 stricter code-sharing policies and require data- and code-sharing at similar stages. These
538 results are in line with previous surveys in ecology and evolution that have found that articles
539 that shared data were up to 12 times more likely to share code than articles that did not share

540 data (Maitner *et al.*, 2024). Importantly, we also found evidence that the average clarity of policy
541 was related to strictness, with journals that mandated data- and code-sharing having policies
542 that were clearer to understand and to locate when compared to the average policy clarity
543 among journals. These results are particularly important when considering previous findings,
544 suggesting that policy wording is a significant factor in aiding authors (and even editors)
545 interpretation (Christian *et al.*, 2020). These findings underscore the imperative for journals to
546 make their data- and code-sharing policy wording as clear and easy-to-find as possible, so as to
547 increase author and editor understanding and, thus, aid policy compliance.

548
549 Our analysis reinforces positive trends found in previous meta-research studies, which
550 demonstrate slow but steady improvement in the state of data- and code-sharing in ecology and
551 evolution. The number of journals mandating or encouraging data-sharing for the subset of 194
552 journals surveyed by Berberi & Roche (2022) has increased from 36 to 41% and 42 to 49%,
553 respectively, since 2021. Importantly, whilst still non-zero, the number of journals with no data-
554 sharing policy in the same subset has decreased substantially from 23 to 10% (i.e., a 57%
555 decrease since 2021). For code, the number of journals mandating or encouraging code-sharing
556 for the smaller subset of 95 journals investigated by Culina *et al.* (2020) also increased from
557 76% in 2020 to 89% in 2024. However, this increase is seemingly slowing. Mislan *et al.* (2016)
558 found that only 15% of those 95 journals had a code-sharing policy in 2015, thus, from an
559 average increase in 12 journals/year adding a code-sharing policy from 2015 to 2020, the
560 increase has slowed down to 3 journals/year from 2020 to 2024. Although data-, and particularly
561 code-, sharing remains generally low in ecology and evolution, with recent meta-research
562 studies suggesting rates between 12 and 79% for data-sharing, and 3 and 27% for code-sharing
563 (e.g., Magee *et al.* 2014: 2001-2013; Culina *et al.* 2020: 2015-2019; O'Dea *et al.* 2021: 2010-
564 2019; Roche *et al.* 2022: Kambouris *et al.* 2024: 2015-2017; Maitner *et al.* 2024: 2010-2022;
565 Sánchez-Tójar *et al.* 2024: 2015-2019), both are nonetheless increasing (Culina *et al.*, 2020;

566 Roche *et al.*, 2022; Maitner *et al.*, 2024; Sánchez-Tójar *et al.*, 2024). This study builds on
567 previous findings and illustrates that more still needs to be done to highlight the importance of
568 data- and code-sharing within the field of ecology and evolution, particularly in relation to the
569 enhancing long-term reproducibility by increasing data and code availability (Magee *et al.*, 2014;
570 Kambouris *et al.*, 2023).

571
572 Our results also indicate that journals have significant power to contribute to increased data-
573 and code-sharing. In *Ecology Letters*, the number of submissions providing a link to data and/or
574 code increased in the post-mandate period, despite the number of submissions adhering to the
575 policy decreasing between the pre- and post-mandate period. Though perhaps counterintuitive
576 at first, this pattern makes logical sense and is unsurprising if the barrier to compliance upon
577 initial submission is higher (i.e., data and code were required upon first submission in 2023
578 compared to simply requiring a data availability statement in 2021) and authors fail to provide
579 the required files upon initial submission. The increase in the number of submissions providing
580 links to data and/or code in the post-mandate period is suggestive of an overall increase and a
581 positive effect of the policy implementation (in addition to editorial policing) by *Ecology Letters*.
582 It's important to note that using *initial* policy compliance upon submission avoids the potentially
583 confounding influence of data editors, which have been in place in *Ecology Letters* since 2023
584 (Thrall *et al.*, 2023) and which actively contribute to increased policy compliance and reusable
585 data and code, typically at a later stage in the peer review process. However, with this data, we
586 can not account for the overall increase in rates of data- and code-sharing over time (which
587 represents a general cultural shift towards more open and reproducible science), which may
588 have contributed to the increased number of submissions providing data and/or code.
589 However, it does appear that when these policies are enforced and have been established for
590 several years, the number of submissions providing data is very high. For *Proceedings B*, we
591 found a level of compliance close to 100% within the submission period (96.5% in Mar 2023 -

592 Feb 2024), but note that we did not have access to *initial* submissions that may have been
593 previously unsubmitted by the editorial office for not adhering to the data- and code-sharing
594 policy. Thus, we are likely overestimating the effect of the policy mandate owing to editorial
595 enforcement (although conversely it shows the substantial positive effect of successfully
596 enforcing a mandate). Nevertheless most submissions stated that they have provided data
597 (74.5%), which was far greater than those providing code (32.7%). This discrepancy may be
598 partially explained by the submission system focusing on data sharing without explicitly asking
599 authors to share their code. Therefore, although data-sharing compliance appears high in
600 *Proceedings B*, code-sharing still lags behind, as observed in previous surveys (e.g., Kimmel *et*
601 *al.*, 2023). We note, however, that we were unable to answer two of the pre-registered
602 hypotheses related to the journal-specific submission data due to the type of submission data
603 finally obtained from both journals. Specifically, for *Ecology Letters*, we were not able to
604 separate whether rates of data- and code-sharing differed. For *Proceedings B*, we only obtained
605 data from a post-mandate period so we were unable to test the effects of the introduction of a
606 data- and code-sharing policy on rates of submission compliance, and the data we obtained did
607 not include manuscripts unsubmitted for not initial adhering to the policies. Nonetheless, our
608 analyses clearly show the great potential that submission data provided by journals have for
609 understanding research practices, the efficacy of journal policies, and how to improve them.
610 Ensuring the recording and transparency of a journal's submission data, and treating this as
611 scientific data in its own right, should be of high priority as it provides an invaluable resource for
612 the science of science (i.e., meta-research).

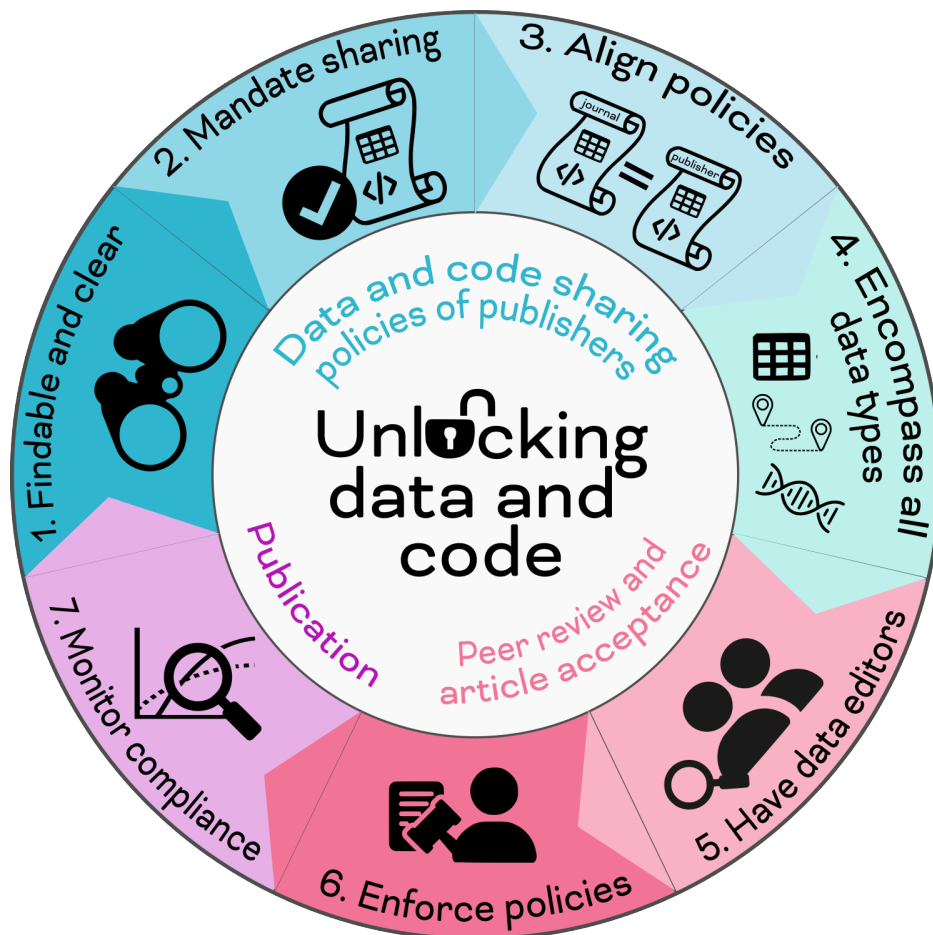
613

614 One thing is clear though, if journals implement data- and code-sharing policies, the overall
615 availability of data and code increases, even when policy compliance is far from ideal (Peng,
616 2011; Vines *et al.*, 2013; Caetano & Aisenberg, 2014; Magee *et al.*, 2014; Evans, 2016;
617 Hardwicke *et al.*, 2018; Cadwallader *et al.*, 2022; Kambouris *et al.*, 2023). Our results highlight

618 that there is much room for improvement by journals to ensure the long-term reproducibility of
619 scientific findings. In particular, the high percentage of journals failing to mention data- or code-
620 sharing in their policies is concerning given that both data and code are key research products
621 that not only increase the reproducibility and reliability of results but also their credibility (e.g.,
622 Soderberg *et al.*, 2020; Viglione, 2020) and impact (measured here as a citation advantage for
623 data-sharing: (Piwowar *et al.*, 2007; Henneken & Accomazzi, 2011; Piwowar & Vision, 2013;
624 Maitner *et al.*, 2024); and code-sharing: (Vandewalle, 2012; Bonneel *et al.*, 2020; Kang *et al.*,
625 2023; but see Colavizza *et al.*, 2024).

626

627 *Advice for journals*



628

629 **Figure 2.** Visual depiction of the 7 points of advice for journals integrated in the publication
630 process. Suggestions 1-4 involve the publisher, suggestions 5-6 occur during peer review and
631 article acceptance, and 7 occurs after publication to monitor the success of the process. Icons
632 modified from Flaticon: Table-grid by Dave Gandy, Coding by Major Icons, regulation by
633 IwitoStudio, people by Muhazdinata, copy by torskaya, magnifier by Creative Stall Premium, .
634 Figure by RZ and KRBN.

635

636 Our assessment of sharing policies across journals that publish ecology and evolution studies
637 has given us insight into potential areas of improvement for data- and code-sharing policies. We
638 list seven points of advice below.

639 **1. Develop explicit, unambiguous and easy-to-find policies.** Ambiguity in journal
640 requirements can lead to confusion and poor compliance (see Christian et al., 2000).
641 Terms used in the policy should be clearly defined with clear guidance on the timing and
642 specific requirements for data- and code-sharing. For instance, what constitutes
643 “*complying with field standards*” (“All authors are requested to make sure that all data
644 and materials as well as software application or custom code support their published
645 claims and comply with field standards”), “*novel code*” or “*new simulations or analytical*
646 *methods*” (“Novel code must be supplied as private-for-peer review in an external
647 repository during the review process”; “Where a paper describes new simulations or
648 analytical methods, we require authors to make any relevant software publicly available,
649 wherever possible”), “*some types of data*” (“We require some types of data to be
650 provided in manuscripts or deposited in public, community-supported repositories, prior
651 to publication”) or “*when- or wherever possible*” (“We suggest that data be presented in
652 the main manuscript or additional supporting files, or deposited in a public repository
653 whenever possible”). Note, the text has been adjusted to maintain the anonymity of
654 journals.

655 **2. Mandate sharing of both data and code during peer review.** There are numerous
656 benefits to providing both data and code during peer review including early error
657 detection, increased understanding of experimental and statistical methods, and the
658 ability to assess the computational reproducibility and general reliability of results during
659 peer review. Sharing during peer review may also encourage authors to prepare their
660 data and code in a way that is both understandable and reusable. Furthermore, data and
661 code are often promised "upon request", but this promise is rarely fulfilled (Krawczyk &
662 Reuben, 2012; Hussey, 2023). Journals should move away from "request-based" policies
663 and instead require direct and mandated deposition of materials. This shift would eliminate
664 ambiguity and make it easier to track and enforce compliance.

665 **3. Align journal- and publisher-level policies.** In several cases, there was variability
666 between when the journal expected data- and code-sharing and when the publisher
667 expected data- and code-sharing (for instance between Springer Nature journal and
668 publisher policies). A similar mismatch was found with policies on preprint sharing
669 (Purgar *et al.*, *In Prep*). These should remain consistent in terminology (in strictness and
670 timing) and, if possible, be specifically referenced in the journal's author guidelines to
671 reduce confusion.

672 **4. Ensure that policy applies to all types of data and code.** Journals should mandate
673 data- and code-sharing for all types of data and code rather than only certain types (e.g.,
674 all data should be mandated rather than simply DNA or protein sequences. Similarly,
675 requiring sharing of all computer code, rather than simply "custom code" which may lead
676 to confusion due to ambiguity). This would make the policy less ambiguous, and improve
677 the general reproducibility of all the results, rather than just some. Although we note that
678 there may be exceptions to this rule in rare circumstances (e.g., sensitive personal
679 information or data involving endangered species; see Jenkins *et al.*, 2023). Journals

680 should ensure that this is clearly mentioned and specified under their data- and/or code-
681 sharing policy section.

682 5. **Have data and code editors.** To assess the adherence of data and code to FAIR
683 principles (Findable, Accessible, Interoperable, and Reusable; see Wilkinson *et al.*,
684 2016; Lamprecht *et al.*, 2020), some journals use the expertise and knowledge of
685 dedicated data editors or reviewers (for example STAR checks in Psychological Science
686 see Hardwicke & Vazire, 2024). While this might require additional resources and would
687 not affect policy compliance upon *initial* submission, it can significantly enhance the
688 rigour of the review process and the reproducibility of the final published study. As a
689 result we encourage all journals to consider data editors as part of their formal review
690 process.

691 6. **Enforce the policy.** Journals should enforce their mandated policies by first checking
692 author compliance (Roche, 2016). This can be done at a basic level by checking if data
693 or code links are provided, higher level checks may require dedicated staff or software
694 (e.g., DataSeer.ai <https://dataseer.ai/>) at journals (see below). Journals should clearly
695 state the consequences of not adhering to initial data- and code-sharing requirements.
696 These consequences could range from simply having to resubmit the manuscript with
697 accompanying data/code during initial submission, to rejection of the manuscript, or to
698 publication of a note highlighting the lack of data and/or code availability. A clear
699 articulation of consequences would motivate authors to comply.

700 7. **Continuous monitoring and evaluation of policy compliance rates.** Journals should
701 carefully curate their submission data and regularly monitor and openly report on
702 compliance rates to their data- and code-sharing policies. This data can be used to
703 identify areas where policies need to be improved or enforcement needs to be
704 strengthened. It also allows funding agencies and institutions to track good scientific
705 practice and institutional data policies, which nowadays more often include mandatory

706 and open data and code-sharing (such an initiative is already being conducted at PLOS,
707 Open Science Indicators (PLOS, 2024).

708

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873 Supplementary materials for “*From Unclear Policy to Practice: Progress*
874 *towards Data- and Code-Sharing is Slow in Ecology and Evolution*”

875

876 **Table S1.** Final list of journals that publish ecology and evolution studies (n = 275).

Number	Journal Name
1	acta amazonica
2	acta ethologica
3	acta oecologica-international journal of ecology
4	african journal of ecology
5	african journal of range & forage science
6	african journal of wildlife research
7	agriculture ecosystems & environment
8	alpine botany
9	ambient science
10	american journal of biological anthropology
11	american naturalist
12	animal behaviour
13	animal biotelemetry
14	animal conservation
15	annales zoologici fennici

16	annals of botany
17	annual review of animal biosciences
18	annual review of ecology evolution and systematics
19	annual review of entomology
20	anthropocene
21	anthropological science
22	aob plants
23	applied ecology and environmental research
24	applied soil ecology
25	applied vegetation science
26	aquatic ecology
27	aquatic invasions
28	aquatic microbial ecology
29	aquatic toxicology
30	arctic science
31	arid ecosystems
32	austral ecology
33	australian journal of botany
34	australian systematic botany

35	avian conservation and ecology
36	basic and applied ecology
37	behavior research methods
38	behavioral ecology
39	behavioral ecology and sociobiology
40	biochemical systematics and ecology
41	biodiversity and conservation
42	biogeosciences
43	biological conservation
44	biological invasions
45	biological journal of the linnean society
46	biological reviews
47	biology letters
48	biology open
49	biosystems diversity
50	biotropica
51	bird conservation international
52	bmc ecology and evolution
53	bulletin of the american museum of natural history

54	bulletin of the peabody museum of natural history
55	chemistry and ecology
56	chemoecology
57	cladistics
58	communications biology
59	community ecology
60	compost science & utilization
61	conservation biology
62	conservation letters
63	conservation physiology
64	contemporary problems of ecology
65	current biology
66	current opinion in insect science
67	development genes and evolution
68	diversity-basel
69	diversity and distributions
70	eco mont-journal on protected mountain areas research
71	ecography

72	ecohydrology
73	ecohydrology & hydrobiology
74	ecologia aplicada
75	ecological applications
76	ecological complexity
77	ecological economics
78	ecological engineering
79	ecological indicators
80	ecological informatics
81	ecological management & restoration
82	ecological modelling
83	ecological monographs
84	ecological processes
85	ecological questions
86	ecological research
87	ecological restoration
88	ecology
89	ecology and evolution
90	ecology and society
91	ecology letters

92	ecology, environment and conservation
93	ecoscience
94	ecosistemas
95	ecosphere
96	ecosystem health and sustainability
97	ecosystem services
98	ecosystems
99	ecotoxicology
100	elife
101	environmental biology of fishes
102	environmental evidence
103	environmental pollution
104	ethology
105	ethology, ecology and evolution
106	european journal of soil biology
107	european journal of wildlife research
108	evodevo
109	evolution
110	evolution & development
111	evolution letters

112	evolution medicine and public health
113	evolutionary applications
114	evolutionary bioinformatics
115	evolutionary biology
116	evolutionary ecology
117	fems microbiology ecology
118	fire-switzerland
119	fire ecology
120	fish and fisheries
121	flora
122	folia oecologica
123	food webs
124	freshwater biology
125	freshwater science
126	frontiers in ecology and evolution
127	frontiers in ecology and the environment
128	frontiers in forests and global change
129	frontiers in zoology
130	functional ecology
131	fungal diversity

132	fungus ecology
133	genome biology and evolution
134	global change biology
135	global ecology and biogeography
136	global ecology and conservation
137	global environmental change
138	heredity
139	human-wildlife interactions
140	human ecology
141	ideas in ecology and evolution
142	insect systematics & evolution
143	integrative organismal biology
144	intercencia
145	international journal for parasitology-parasites and wildlife
146	international journal of ecology & development
147	international journal of sustainable development and world ecology
148	invertebrate systematics
149	isme journal

150	israel journal of ecology & evolution
151	journal for nature conservation
152	journal of animal ecology
153	journal of applied ecology
154	journal of arid environments
155	journal of avian biology
156	journal of biogeography
157	journal of biological dynamics
158	journal of chemical ecology
159	journal of comparative physiology b: biochemical, systemic and environmental physiology
160	journal of ecology
161	journal of evolutionary biochemistry and physiology
162	journal of evolutionary biology
163	journal of experimental biology
164	journal of experimental marine biology and ecology
165	journal of experimental zoology part b- molecular and developmental evolution

166	journal of fish and wildlife management
167	journal of freshwater ecology
168	journal of heredity
169	journal of human evolution
170	journal of molecular evolution
171	journal of natural history
172	journal of plant biology
173	journal of plant ecology
174	journal of soil and water conservation
175	journal of systematic palaeontology
176	journal of thermal biology
177	journal of tropical ecology
178	journal of vegetation science
179	journal of wildlife and biodiversity
180	journal of wildlife management
181	journal of zoological systematics and evolutionary research
182	landscape and ecological engineering
183	landscape and urban planning
184	landscape ecology

185	limnology and oceanography
186	mammal review
187	marine biology
188	marine biology research
189	marine ecology progress series
190	methods in ecology and evolution
191	microbial ecology
192	molecular biology and evolution
193	molecular ecology
194	molecular ecology resources
195	molecular phylogenetics and evolution
196	movement ecology
197	natural areas journal
198	nature
199	nature climate change
200	nature communications
201	nature ecology & evolution
202	neobiota
203	new phytologist
204	new zealand journal of ecology

205	northeastern naturalist
206	northwest science
207	oecologia
208	oikos
209	organisms diversity & evolution
210	oryx
211	paleobiology
212	pedobiologia
213	people and nature
214	perspectives in plant ecology evolution and systematics
215	philosophical transactions of the royal society b: biological sciences
216	phytocoenologia
217	plankton and benthos research
218	plant biology
219	plant ecology
220	plant ecology and diversity
221	plant physiology
222	plant species biology

223	plant systematics and evolution
224	plants people planet
225	plos biology
226	polar biology
227	polar record
228	polar research
229	polar science
230	polish journal of ecology
231	polish polar research
232	population ecology
233	proceedings of the academy of natural sciences of philadelphia
234	proceedings of the linnean society of new south wales
235	proceedings of the national academy of sciences: usa
236	proceedings of the royal society b-biological sciences
237	rangeland ecology & management
238	rangeland journal
239	regional studies in marine science

240	remote sensing
241	remote sensing in ecology and conservation
242	restoration ecology
243	reviews in fish biology and fisheries
244	revista chilena de historia natural
245	russian journal of biological invasions
246	russian journal of ecology
247	science
248	science advances
249	science of the total environment
250	scientific reports
251	soil ecology letters
252	south of russia-ecology development
253	southeastern naturalist
254	southwestern naturalist
255	systematic biology
256	systematic botany
257	systematic entomology
258	taxon
259	theoretical and applied ecology

260	theoretical ecology
261	theoretical population biology
262	trends in ecology & evolution
263	tropical ecology
264	tropics
265	urban ecosystems
266	vestnik tomskogo gosudarstvennogo universiteta-biologiya
267	vie et milieu-life and environment
268	web ecology
269	western north american naturalist
270	wetlands
271	wetlands ecology and management
272	wildlife biology
273	wildlife monographs
274	wildlife research
275	zoologica scripta

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879 **Table S2.** List of variables extracted by data extractors. Data entry used a standard template

880 provided as a Google Form.

General information section	Data extractor's email address
	Name of the data extractor
	Name of journal
Data-sharing policy section	When was the earliest the journal expected data to be provided? (Categorical: Not Expected At All; During Peer Review; After Acceptance (Post-Publication); Unclear; Other.)
	How strict is this policy? (Ordinal: Not Mentioned; Encouraged; Optional for Authors; On Reviewer Request; Mandated.)
	Provide the text that mentions the above statement (if possible). (Long answer text)
	How clear do you think this statement is? (Quantitative: 1 (Totally Unclear) - 5 (Totally Clear) [5 levels])
	Where was the data policy located? (provide a URL to the specific page; if any) (Short answer text)

	Any other comments. (Long answer text, optional)
Code-sharing policy section	When was the earliest the journal expected code to be provided? (Categorical: Not Expected At All; During Peer Review; After Acceptance (Post-Publication); Unclear; Other.)
	How strict is this policy? (Ordinal: Not Mentioned; Encouraged; Optional for Authors; On Reviewer Request; Mandated.)
	Provide the text that mentions the above statement (if possible). (Long answer text)
	How clear do you think this statement is? (Quantitative: 1 (Totally Unclear) - 5 (Totally Clear) [5 levels])
	Where was the code policy located? (provide a URL to the specific page; if any) (Short answer text)
	Any other comments. (Long answer text, optional?)