Not So Fast: Inflation in Impact Factors Contributes to Apparent Improvements in Journal Quality

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The Institute for Scientific Information (ISI) impact factor has become an important standard for assessing journal quality. Here we propose that impact factors may be subject to inflation analogous to changes in monetary prices in economics. The possibility of inflation came to light as a result of the observation that papers published today tend to cite more papers than those published a decade ago. We analyzed citation data from 75,312 papers from 70 ecological journals published during 1998–2007. We found that papers published in 2007 cited an average of seven more papers than those published a decade earlier. This increase accounts for about 80% of the observed impact factor inflation rate of 0.23. In examining the 70 journals we found that nearly 50% showed increases in their impact factors, but at rates lower than the background inflation rate. Therefore, although those journals appear to be increasing in quality as measured by the impact factor, they are actually failing to keep pace with inflation.

Keywords: ecology, impact factor, inflation, journal quality, merit

Researchers are constantly required to demonstrate the scientific merit of their work to funding agencies and academic institutions. Evaluating scientific quality is a notoriously difficult undertaking, and many organizations are more frequently using "simple" metrics to evaluate the quality of published research. One such metric is the Institute for Scientific Information (ISI) impact factor (Garfield 1955), which is widely regarded as a useful ranking of journal quality and is used extensively by leading journals in their advertising. In addition to consulting with readers, librarians use impact factors when ranking journals and deciding which to order, maintain, or cancel (Frazier 2001, Wilson 2007). A journal's impact factor is calculated at the end of each year and is defined as the average number of times papers published in the journal in the previous two years have been cited in the current year (*http://isiknowledge.com*). For example, a journal with an impact factor of 2.0 at the end of the year 2000 had papers published in 1998 and 1999 that were cited an average of 2.0 times in 2000. The impact factor calculation includes citations from articles appearing in the same journal as well as those from other journals indexed by the ISI Web of Knowledge.

Impact factors are considered the universal yardstick by which journals are judged; as such, they are often used to evaluate individual scientists or research groups. The key assumption underlying this practice is that the impact factor represents an objective and accurate measure of the journal's scientific quality. Recent studies have raised questions about this assumption, highlighting idiosyncrasies or biases associated with citations, such as dependence on time since publication (i.e., short half-life of citations), the strong influence of highly cited publications such as review articles, the publication volume of the journal, the year of journal founding, and profit or nonprofit status (Statzner 1995, Statzner et al. 1995, Seglen 1997, Kokko and Sutherland 1999, Smith 2006, Wilson 2007, Ogden and Bartley 2008). Although alternative measures of journal and author impact have been proposed, such as the Eigenfactor (Bergstrom 2007) and the *h* index (Hirsch 2005), the impact factor remains the fundamental currency by which the excellence of journal and researcher achievement is assessed (Adam 2002, see also Olden 2007).

Numerous journals now commonly display and advertise their impact factors in an attempt to attract submissions and contributions from leading scientists. Indeed, many managing boards of journals have built their editorial strategies around increasing their impact factors. For example, Smith (2006, p. 1129), a former editor of the *British Medical Journal*, writes of many editors and academics being obsessed with impact factors: "Now editors break open bottles of champagne if their impact factor rises by a tenth of a decimal point or burst into tears if it falls." This obsession may explain why some journals now have a rapid-communication section targeted at their most topical papers, whereas others have introduced sections for review papers. Works appearing in such sections are perceived to attract more citations,

BioScience 60: 455–459. ISSN 0006-3568, electronic ISSN 1525-3244. doi:10.1525/bio.2010.60.6.9

especially in the critical two-year rolling window used to calculate impact factors.

We work in the field of ecology, and our observations—that recently published papers cite more (and perhaps more recent) papers than those from several years ago, and that there is an increasing number of journals in the field—lead us to the conclusion that impact factors could be subject to "inflation" analogous to price inflation in economics (Barro 1997, see also Wilson 2007). Price inflation is the general rise in the level of prices of goods and services in an economy over a period of time, or, stated differently, a loss in the purchasing power of money. Our study had three goals: (1) to determine whether the impact factor displays inflation, (2) to quantify the actual inflation rate, and (3) to determine which journals have demonstrated increases in impact factor above the level of background inflation. With respect to our third goal, we considered only those journals whose associated impact factor has outpaced the inflation rate as truly having increased in impact factor (and presumably quality). Conversely, if the inflation rate is greater than zero, then journals that have increased at a rate slower than inflation, or that have maintained a constant impact factor, will have actually decreased in quality—at least as far as impact factor is concerned.

Measuring inflation in the impact factor

Using the Thomson Scientific Web of Science (*http://isiknowledge.com*), we compiled a list of ecological journals that have consistently had an impact factor greater than or equal to 1 over the past five years (the range reported by the ISI). We restricted our analysis to those journals to maximize the number of journals with complete records, as the ISI is more apt to track journals with higher impact factors (for a discussion, see Althouse et al. 2009). For each of the 70 journals, we used the ISI Web of Science to download the complete "records" for papers published from 1998–2007, or whatever time during this period the journal published papers (e.g., some journals were created after 1998). We focused on articles, notes, and review articles from each journal and extracted from the records the number of references in each paper. We then used simple linear regression to assess the slope of the relationship between publication year and the number of references per paper. A list of the papers, regression analyses, and impact factors can be found in the appendix of the supplemental material online (*http://publish.uwo.ca/~bneff/papers/IFinflation.pdf*).

To calculate the inflation rate for the impact factor, we also needed to determine the proportion of papers cited by the target paper that were published in the previous two years. To do this, we randomly selected 100 papers and determined the proportion of references to papers published in the two years preceding the publication year of the target paper. For example, for a paper published in 2000, we would calculate the proportion of its references to papers published in either 1998 or 1999. The inflation rate can then be calculated from:

$$\textit{Impact factor inflation rate} = 2 \times m \times P_2; \quad (1)$$

where m is the slope from the regression of the number of references onto the year of publication. This value is multiplied by two to account for the two-year rolling window that the impact factor calculation uses. P_2 is the proportion of references that were published in the two years preceding the publication year of the target paper. Note that our inflation formula thus focuses on the contribution of changes in the number of papers referenced per target paper. Other authors have considered the effect of changes in the ISI coverage of journals within fields (Althouse et al. 2009).

To assess the statistical confidence in the inflation rate we used a randomization routine that resampled (with replacement) the 70 m values and the 100 P_2 values for a total of 1000 data sets. For each resampled data set, the impact factor inflation rate was calculated and the significance level was based on the null distribution of 1000 values. We also calculated the actual change in impact factor for the journals using the rolling five-year window (2003–2007) that the ISI publishes. We expected that the observed change would be equal to the calculated inflation rate insomuch as the mean impact factor across all journals should not increase without there being an increase in the total number of citations—the currency of the impact factor. Finally, for each journal we recorded the proportion of papers published in 2007 that were classified as reviews. We correlated the impact factor and change in impact factor with this proportion to assess the potential influence of review-type papers on journals' impact factors.

Results

We examined 75,312 papers total; we removed 14 (from 10 journals) from consideration because they were substantial outliers falling more than seven standard deviations from the regression line. There was nothing obviously peculiar about these outliers that might explain their extremely unusual numbers of references. Over the 10-year period, published works cited an average of 52 papers that ranged by journal and publication year from a minimum of 8 (*Molecular Ecology Notes,* in 2001) to a maximum of 330 (in the *Bulletin of the American Museum of Natural History,* 2007). Across the journals, papers in 1998 contained an average of 48 references ($n = 57$ journals), whereas papers in 2007 contained an average of 55 references ($n = 67$ journals). Of the 70 journals we examined, the slope of the regression line between the number of references and publication year was positive for 57 (81%) and negative for only 13 (19%); the mean slope across journals was 0.67 ± 0.23 (standard error [SE]; $n = 70$, $p = 0.005$ for comparison to 0; figure 1, online appendix). Thus, on average, over the past 10 years, papers have cited 0.67 additional papers each year.

On the basis of our random sample of 100 papers, we determined that the proportion of references to papers published in the previous two years (P_2) was 0.136 (± 0.007 SE). Using this value and the slope from the regression in our inflation formula (equation 1), we estimated the mean impact factor inflation rate to be 0.18 (2 × 0.67 × 0.136). On the basis of the randomization routine, the 95% confidence interval was calculated to be between 0.06

and 0.30 (p = 0.001 for comparison to 0). We also found that P_2 has steadily increased over the 10 years in our sample (r^2 = 0.042, n = 100, p = 0.041; P_2 = 0.005589 × year – 11.06). Therefore, as we suspected, papers published today tend to cite proportionately more recent papers than papers published several years ago did. This pattern will lead to a yearly increase in the rate of inflation. Indeed, using the P_2 value for 2007, as calculated from the equation of the line provided by the linear regression analysis, impact factor inflation in 2007 was estimated to be 0.21 (2 × 0.67 × 0.153).

We also calculated the actual change in impact factor for the journals based on the rolling five-year window (2003–2007) that the ISI publishes (figure 2, online appendix). We found that the impact factor increased an average of 0.23 (± 0.05 SE) per year. This increase is close to the calculated inflation rate of 0.18 and is well within the 95% confidence interval. Nevertheless, the observed increase in impact factor is about 28% higher than the inflation rate of 0.18 and 10% higher than the rate for 2007 (0.23/0.21 – 1). From the calculated inflation rate of 0.23, of the 69 journals for which we had impact factor data, 23 (33%) increased at a rate faster than inflation, 3 (4%) increased at a rate equal to inflation, and 43 (62%) fell below the inflation rate (figure 2). Of the latter 43 journals, 34 (49% of the total sample in our analysis) had positive increases in impact factor, although they actually decreased in impact factor when compared to the inflation rate. Across all journals, there was a positive relationship between the change in impact factor and the actual impact factor of the journal (r_S = 0.75, n = 69, $p < 0.001$).

Finally, for papers published in 2007, there was a strong positive relationship between the proportion of review papers published and the impact factor of the journal (r_S = 0.61, n = 67, $p < 0.001$). There was also a strong positive relationship between this proportion and the change in impact factor over the past five years (r_S = 0.58, n = 67, $p < 0.001$).

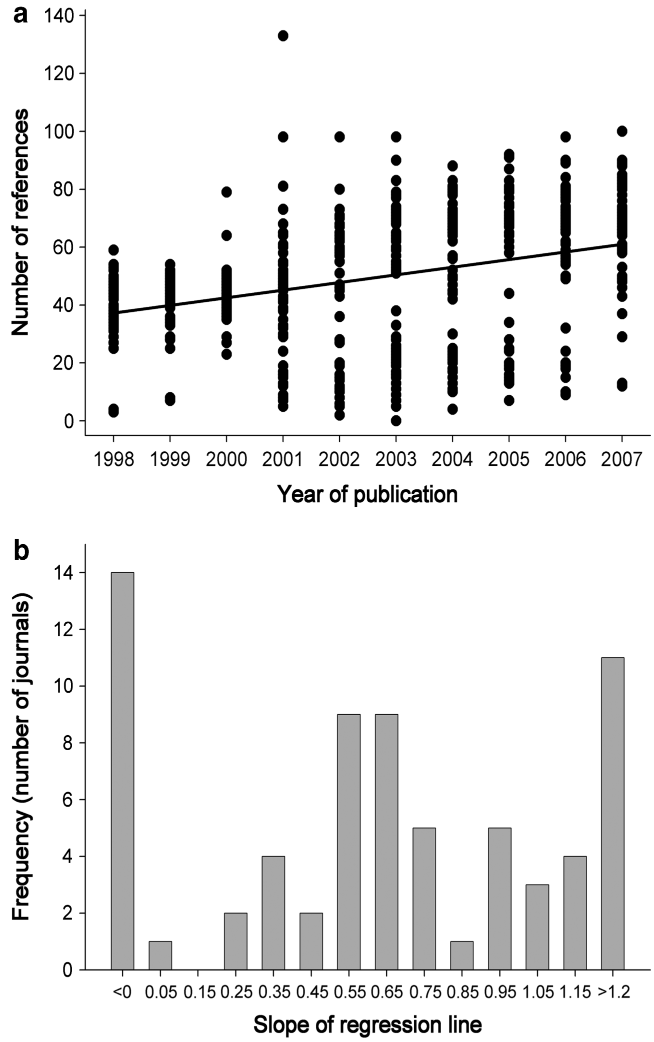

Figure 1. Inflation in the impact factor. (a) The number of references for papers published from 1998 through 2007 in the journal **Trends in Ecology and Evolution** *as an example. The equation of the regression line is* **number of references = *2.64* × year of publication − *5232*** *(*r^2 *= 0.118,* n *= 678,* p *< 0.001). (b) A histogram depicting the distribution of slope values from the linear regression analysis of number of references versus publication year for the 70 journals analyzed in the study. The mean slope value is 0.67 ± 0.23 (standard error). With the exception of the first and last bar, the numbers below each bar denote the midpoint slope value of the range in each category.*

Significance of inflation in the impact factor

We found that over the past decade, works appearing in ecology journals have increased their number of references by nearly seven per paper. On the basis of this escalation, we calculated the inflation rate to be 0.18, which is the primary contributor to the observed impact factor inflation of 0.23 per year (0.18/0.23 = 78%). Interestingly, our calculations of inflation were considerably higher than a previous estimate. Wilson (2007) examined a similar number of ecology journals during the period 1996–2005 and estimated inflation to be around 0.12, or about half our observed value of 0.23. Wilson excluded journals that published review papers, which tend to have higher increases in their impact factors. For example, the review journal *Trends in Ecology and Evolution* had a change in impact factor of 0.59, which was well above the mean and may explain the difference in our value and that calculated by Wilson.

The observed change in impact factor across the journals in our sample was 28% higher than the inflation rate calculated from changes in the number of references per paper (0.23/0.18 = 1.28). Although the observed value was well within the 95% confidence interval of the calculated value, the latter value is conservative for several reasons. First, over the past decade many new journals have been introduced and some of these have been added to the ISI. Each new journal effectively increases the number of papers that are tracked by the ISI and hence the number of citations that are calculated in the impact factor. Within the field of ecology, the ISI has added 16 journals over the past seven years (the range of data available), and this new coverage will contribute to at least a minor increase in the rate of inflation. Althouse and colleagues (2009) showed that

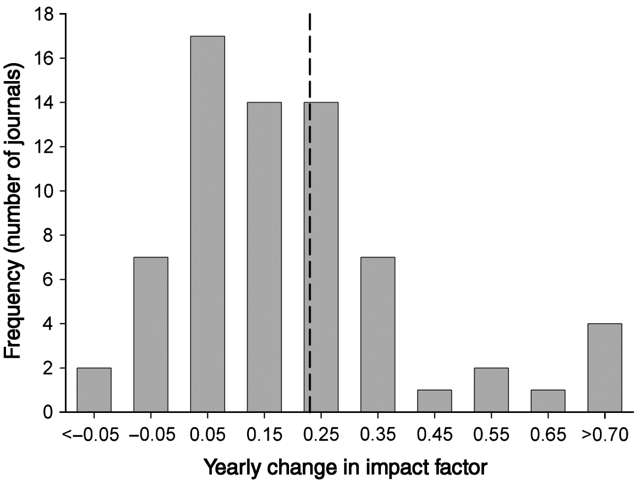

Figure 2. Yearly changes in impact factors. This histogram depicts the distribution of mean yearly changes in impact factor for the 70 journals analyzed in the study over a five-year period. With the exception of the first and last bar, the numbers below each bar denote the midpoint value of the range in each category. The dashed line denotes the observed inflation rate of 0.23. Journals to the left of the line are not keeping pace with inflation, despite many of those journals having shown increases in their impact factor.

the fraction of citations that goes to ISI-listed material explains the greatest proportion of variation in impact factors across fields; thus, changes in journal coverage within a field will contribute to increases in the field's impact factor. Second, it appears that journals with lower impact factors have seen their impact factors increase at a slower rate, or have had decreases in impact factor over the 10-year period in our sample. Because we focused on journals with impact factors of at least 1, which represents about 60% of the ecology journals covered by the ISI, our observed change in impact factor excludes lower-tier journals. Inclusion of these lower-tier journals in our analysis of observed change in impact factors may remove the apparent discrepancy. Finally, it is possible that journals outside the field of ecology (as defined by those journals listed by the ISI) are citing more ecology papers than ecology papers are citing papers from other fields. For example, journals that fall exclusively under "evolutionary biology" might draw on data published in ecology more often than the other way around. Regardless of these other potential sources of inflation, in the field of ecology, a change in the number of references per paper explains most of the observed inflation.

Given that we have documented clear impact factor inflation, many journals in the ecological sciences have actually witnessed a decrease in their relative impact factor, despite showing a positive increase in nominal impact factor. In fact, nearly 50% of the journals in our sample had increases in their impact factors over the past five years, but those increases were lower than the observed inflation rate of 0.23 per year. Of course, if changes in impact factors were normally distributed about the true inflation rate, then we would expect that half of the journals would fall below the mean and the other half above the mean. However, it is surprising that so many journals had increases that were below the inflation rate. Indeed, only 9 of the 70 journals did not increase in impact factor. Additionally, many of the journals with increases below the inflation rate had lower impact factors in our sample (i.e., impact factors less than 3) and included, for example, *Behavioral Ecology and Sociobiology* (impact factor = 2.75, change in impact factor = 0.03), *Écoscience* (impact factor = 1.33, change in impact factor = 0.08), and *Population Ecology* (impact factor = 1.31, change in impact factor = 0.09). Conversely, journals with higher impact factors tended to show increases above inflation; for example, we found a strong positive relationship between the changes in impact factor and the actual impact factors of journals. This relationship suggests that top-tier journals are breaking away from the rest of the pack. It is conceivable that this trend is driven partly by the fact that authors are more likely to cite papers from journals with high impact factors to demonstrate the value of their own work. When we looked at a subset of journals, we found that papers published in journals with higher impact factors were more likely to cite papers that were also published in high-impact journals than were papers published in lower-tier journals. This analysis suggests that the quality of a paper, as measured by impact factor, is at least partially reflected by the literature cited by that paper.

How does impact factor inflation in the field of ecology compare with that in other fields? Althouse and colleagues (2009) calculated inflation rates for 50 different fields and found that in all but two, impact factors showed inflation. Those two fields, history and the history and philosophy of science, actually showed deflation of their impact factors. The field of ecology and evolution ranked 10th highest in inflation. The highest inflation was in the field of pharmacology; however, the analysis was based on only 28 journals. The mean inflation rate was 2.6%, which is lower than our observed value for ecology at 7.2% (0.23/3.175, where 3.175 is the mean impact factor in 2007 for the journals covered in our study). Interestingly, Althouse and colleagues (2009) found that the inflation rates were not correlated with size of field or the mean impact factor associated with journals from that field. Furthermore, growth rates of the scientific literature did not appear to contribute to field-specific inflation rates. Instead, as we have shown here for the field of ecology, differences in inflation rates across fields probably relate to variation in the temporal trends in the mean number of papers appearing in reference lists.

How might journals influence their impact factors in ways other than actually increasing the quality of the papers they publish? Over the past several years, several journals that publish primary papers have introduced a new section for reviews (e.g., *Molecular Ecology*). Regardless of intent, such review sections could positively affect a journal's impact factor, as reviews are typically cited more frequently than primary literature. In fact, we found that there were strong positive relationships between the proportion of review papers published and the impact factor of the journal, as well as the change in impact factor over the past five years. These data suggest that impact factors should control for the proportion of reviews published, or perhaps journals could be compared by category—those that publish reviews and those that do not. In addition, it has been suggested that reviews are cited too often, even when primary literature would be more appropriate, and that too many statement-supporting citations are ambiguous or incorrect (Todd et al. 2007). Greater attention by authors to correct citation of original contributions would not only provide appropriate and just recognition of primary work but could also help to alleviate the disproportionate effect reviews appear to have on impact factors.

Journals might also increase their impact factors by increasing their number of self-citations (Biglu 2008). Indeed, some authors have indicated that editors have requested additional citations to papers from their journals, without necessarily naming specific papers, in final revisions (Agrawal 2005). Such requests seem like a clear attempt to boost journal impact factor rather than the quality of the publication. Increases in impact factor may also reflect changes in a journal's accessibility. In the past decade, the promise of open-access scholarship and publishing to improve both readership and citation impact remains a prominent topic of debate (Antelman 2004). The proponents of open access—both in terms of journals that make published articles (e-papers) immediately and freely available, and self-archiving, where authors post articles on their personal or institutional Web sites—argue that "open" work is more quickly recognized, as measured by citations. A recent study in the ecological sciences found that for the *Proceedings of the National Academy of Sciences,* open-access articles were twice as likely to be cited in the first 4 to 10 months after publication than non-open-access articles; this value increased to nearly three times for the period of 10 to 16 months after publication (Eysenbach 2006, but see Davis et al. 2008). Wilson (2007) found that the impact factors of for-profit journals increased 40% faster than nonprofit journals, perhaps as a result of more extensive marketing of the for-profit journals. Thus, changes in impact factors may also be a measure of market reach or dissemination power as opposed to changes in quality.

This article reveals a significant rate of inflation in the ISI impact factor for ecological journals. Forty-nine percent of ecological journals showed improvements in their impact factors over the past five years that were lower than the observed inflation rate of 0.23 per year. Therefore, much in the same way a modest salary raise effectively means very little in an increasingly costly economy, an increase in a journal's impact factor must be interpreted with respect to background levels of inflation. We believe that researchers should be well aware of the caveats associated with any metric of quality and should carefully consider the use of impact factor when selecting journals for submission of their work. Simple metrics such as the impact factor are convenient, but may be driven by many factors—not all of which reflect scientific quality.

Acknowledgments

This work was supported by the Natural Sciences and Engineering Research Council of Canada (B. D. N.), and the US Geological Society and US Environmental Protection Agency (J. D. O.). Karrianne DeBaeremaeker assisted with collection of the citation data and Tim Hain, Shawn Garner, and three anonymous reviewers provided helpful comments on the manuscript.

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Appendix. Regression analysis of number of citations per paper and publication year for 70 ecological journals. Presented values include the regression coefficient (r^2), slope of the regression line, standard error associated with the slope and the number of papers in the data set. The data were collected using the ISI Web of Science and span a 10-year period from 1998 through 2007. Also included are the proportion of papers published in 2007 that were reviews, the 2007 impact factor (IF), and the mean yearly change in the impact factor.

Journal	**r^2**	**Slope**	**SE**	**N**	**Prop. Reviews**	**IF**	**Δ IF[a]**
Acta Oecologica	0.019	0.76	0.22	596	0.01	1.31	0.04 (-)
Advances in Ecological Research	0.032	-5.22	3.08	89		1.08	-0.60 (-)
Agriculture Ecosystems & Environments	0.004	0.64	0.26	1633	0.04	2.31	0.22 (-)
American Naturalist	0.003	0.54	0.27	1517	0.06	4.54	0.12 (-)
Animal Conservation	0.017	1.12	0.45	356	0.02	2.50	0.25 (+)
Annual Review of Eco. Evol. & Syst.	0.067	-6.90	2.30	131	1.00	10.3	1.04 (+)
Applied Vegetation Science	0.017	0.95	0.49	224	0.00	1.43	0.14 (-)
Aquatic Microbial Ecology	0.004	0.39	0.19	987	0.01	2.39	0.07 (-)
Austral Ecology	0.006	0.75	0.38	616	0.07	1.67	0.09 (-)
Behavioral Ecology	0.004	0.54	0.24	1190	0.01	3.02	0.14 (-)
Behavioral Ecology and Sociobiology	0.000	0.00	0.34	1382	0.05	2.75	0.03 (-)
Biodiversity and Conservation	0.001	0.31	0.22	1533	0.04	1.42	0.09 (-)
Biological Conservation	0.039	1.78	0.18	2467	0.07	3.30	0.31 (+)
Biotropica	0.022	1.00	0.23	810	0.01	1.70	0.24 (+)
Bulletin of the Am. Mus. of Nat. History	0.000	1.91	8.33	117	0.67	16.4	3.36 (+)
Chemoecology	0.004	0.52	0.54	245	0.00	1.25	0.01 (-)
Conservation Biology	0.002	0.37	0.19	1666	0.02	3.93	0.16 (-)
Conservation Ecology	0.109	7.96	2.14	116	-	-	-
Diversity and Distributions	0.032	-2.13	0.74	256	0.02	2.97	0.29 (+)
Ecography	0.017	0.99	0.27	772	0.01	3.07	0.35 (+)
Ecological Applications	0.002	0.54	0.34	1560	0.04	3.57	0.18 (-)
Ecological Complexity	0.002	2.00	5.64	81	0.23	1.66	0.13 (-)
Ecological Economics	0.012	0.94	0.20	1876	0.02	1.55	0.08 (-)
Ecology Letters	0.110	3.59	0.31	1039	0.13	8.20	1.00 (+)
Ecological Modelling	0.016	1.17	0.17	2589	0.04	2.08	0.13 (-)
Ecological Monographs	0.022	-2.17	0.84	285	0.34	8.12	0.83 (+)
Ecology	0.038	-1.72	0.15	2962	0.01	4.82	0.28 (+)
Écoscience	0.006	0.62	0.31	604	0.02	1.33	0.08 (-)
Ecosystems	0.000	-0.01	0.35	634	0.06	2.60	-0.16 (-)
Ecotoxicology	0.012	1.11	0.44	511	0.14	2.41	0.23 (=)
Evolution	0.012	1.07	0.21	2315	0.12	4.50	0.17 (-)
Evolutionary Ecology	0.008	0.67	0.35	436	0.04	2.91	0.22 (-)
Evolutionary Ecology Research	0.005	0.65	0.32	713	0.01	1.41	-0.04 (-)
Frontiers in Ecology & the Environ.	0.032	-2.13	0.74	256	0.35	4.27	0.30 (+)
Functional Ecology	0.041	1.43	0.20	1078	0.10	3.16	0.20 (-)
Global Change Biology	0.013	1.11	0.26	1299	0.25	4.79	0.16 (-)
Global Ecology and Biogeography	0.007	0.78	0.43	473	0.04	4.44	0.60 (+)
Journal of Animal Ecology	0.001	-0.18	0.22	1078	0.00	3.75	0.23 (=)
Journal of Applied Ecology	0.008	0.66	0.22	1038	0.02	4.22	0.25 (+)

Journal of Biogeography	0.001	0.42	0.32	1240	0.08	3.54	0.36 (+)
Journal of Chemical Ecology	0.007	0.52	0.15	1824	0.00	1.94	0.07 (-)
Journal of Ecology	0.001	0.33	0.32	981	0.03	4.42	0.40 (+)
Journal of Evolutionary Biology	0.014	0.99	0.22	1310	0.05	3.92	0.23 (=)
J. of Experimental Marine Bio. & Eco.	0.006	0.65	0.18	2284	0.03	1.75	0.04 (-)
Journal of Soil & Water Conservation	0.016	0.81	0.27	589	0.03	1.08	0.06 (-)
J. of the North Am. Benthological Soc.	0.010	0.76	0.32	542	0.02	2.22	-0.04 (-)
Journal of Tropical Ecology	0.000	-0.03	0.26	701	0.00	1.37	0.10 (-)
Journal of Vegetation Science	0.000	-0.02	0.22	924	0.01	2.25	0.15 (-)
Journal of Wildlife Management	0.007	0.56	0.16	1595	0.01	1.53	0.01 (-)
Landscape Ecology	0.015	0.92	0.28	636	0.05	2.06	0.25 (+)
Landscape and Urban Planning	0.103	2.10	0.21	896	0.04	1.63	0.18 (-)
Marine Ecology Progressive Series	0.000	-0.22	0.12	4980	0.02	2.55	0.10 (-)
Microbial Ecology	0.005	0.53	0.23	957	0.01	2.56	0.06 (-)
Molecular Ecology	0.214	4.14	0.14	3195	0.06	5.17	0.32 (+)
Molecular Ecology Notes	0.041	0.52	0.06	1851	0.00	1.26	0.03 (-)
Northeastern Naturalist	0.002	-0.46	0.54	336	0.00	0.54	0.08 (-)
Oecologia	0.011	0.65	0.11	2987	0.01	2.97	-0.04 (-)
Oikos	0.002	0.42	0.19	2355	0.03	3.14	0.25 (+)
Oryx	0.000	0.01	0.29	425	0.03	1.04	-0.05 (-)
Paleobiology	0.000	0.63	0.99	390	0.26	3.23	0.39 (+)
Perspectives in Plant Eco., Evol. & Sys.	0.012	3.25	3.35	77	0.33	3.05	0.30 (+)
Plant Ecology	0.007	0.61	0.20	1282	0.01	1.24	0.06 (-)
Polar Biology	0.018	1.00	0.21	1223	0.01	1.73	0.10 (-)
Population Ecology	0.001	0.27	0.61	256	0.00	1.31	0.09 (-)
Restoration Ecology	0.001	0.24	0.26	626	0.04	1.93	0.27 (+)
Theoretical Population Biology	0.006	0.56	0.30	599	0.00	1.95	-0.08 (-)
Trends in Ecology & Evolution	0.118	2.64	0.28	678	0.79	14.8	0.59 (+)
Wetlands	0.000	-0.10	0.35	784	0.00	0.97	-0.08 (-)
Wildlife Monographs	0.160	7.09	2.91	32	1.00	3.90	0.58 (+)
Wildlife Society Bulletin	0.008	0.75	0.23	1227	-	0.95	-0.04 (-)

[a] *Mean change in impact factor per year based on the past five years, [IF(2007) – IF(2003)] / 5 years. Proportion of reviews and impact factor data were unavailable for some journals. The symbols in parentheses denote an increase (+),decrease (-) or a change equivalent (=) to the observed inflation rate in impact factor of 0.23.*