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Number 0408

March 2004

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Influential Publications in Ecological Economics: A Citation Analysis

by

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In Revision for: *Ecological Economics*

Draft as of March 27, 2004

Abstract

We assessed the degree of influence of selected papers and books in ecological economics using citation analysis. We looked at both the internal influence of publications on the field of ecological economics and the external influence of those same publications on the broader academic community. We used four lists of papers and books for the analysis: (1) 92 papers nominated by the *Ecological Economics* (EE) Editorial Board; (2) 71 papers that were published in EE and that received 15 or more citations in all journals included in the Institute for Scientific Information (ISI) Citation Index; (3) 57 papers that had been cited in EE 15 or more times; and (4) 77 monographs and edited books that had been cited in EE 15 or more times. For each publication we counted the total number of ISI citations as well as the total number of citations in EE. We calculated the average number of citations/yr to each paper since its publication in both the ISI database and in EE, along with the percentage of the total ISI citations that were in EE.

Ranking the degree of influence of the publications can be done in several ways, including using the number of ISI citations, the number of EE citations or both. We discuss both the internal and external influence of publications and show how these influences might be considered jointly.

We display and analyze the results in several ways. By plotting the ISI citations against the EE citations we can identify those papers that are mainly influential in EE with some broader influence, those that are mainly influential in the broader literature but have also had influence on EE, and other patterns of influence. There are both overlaps and interesting lacunae among the four lists that give us a better picture of the real influence of publications in ecological economics versus perceptions of those publications' importance.

By plotting the number of citations vs. date of publication, we can identify those publications that are projected to be most influential. Plots of the time series of citations over the 1990-2003 period show a generally increasing trend (contrary to what one would expect for an "average" paper) for the top papers. We suggest that this pattern of increasing citations (and thus influence) over time is one hallmark of a "foundational" paper.

Introduction

How does one assess which publications in a field are the “most important?” This question can have several possible answers. Practitioners in the field certainly have their own subjective opinions about which papers and books have been most important to them, and one could survey these practitioners as a way to assess which are the most important publications. Alternately, if one equates “most important” with “most influential” then some easily accessible quantitative tools are available to help answer the question.

The influence of the ideas contained in an academic publication is related to the number of scholars who read the publication and use the ideas. Influence can be positive or negative – but an influential idea is one that stimulates thought and discussion by others. One way to assess the academic influence of a publication is, therefore, to count the number of times the publication has been cited in subsequent publications by other authors. While in the past this was a tedious and difficult task, in recent years it has become relatively simple and accessible using electronic versions of the citation index produced by the Institute for Scientific Information (ISI). Citation analysis has, therefore, become much more common, and itself influential in assessing the influence of individual authors, articles, books, and journals (Costanza 1996). One recent study (Abt 2000) compared a list of “important” papers nominated by senior practitioners in a field (astronomy in this case) with the number of citations they have generated and concluded that “important papers almost invariably produce many more citations than others, and citation counts are good measures of importance or usefulness.” Oates and Donnelly (1997) reached similar conclusions in a study of influential papers in the field of child abuse.

There are, of course, well-known issues and limitations related to using citation analysis to assess influence, including:

1. The influence of a publication can go well beyond academia and citation analysis will not pick up this non-academic influence.
2. Quantity of citations is not the same as quality. A particular paper might influence only a very few others, but those few might be very deeply influenced and might make tremendous further use of the ideas. Some important ideas have lain dormant and “uncited” until they were rediscovered much later.
3. The ISI databases contain only journal articles from a select (albeit large – more than 8,500 journals) group of journals and are therefore biased toward those fields that do most of their publishing in the included journals. Most of these are English language journals and therefore there is a bias towards the work of English speaking scientists. The journals of some fields are underrepresented and some fields are more focused on books rather than journals as a publication medium. While

citations *in* books are not counted, citations *to* books or book chapters that occur in articles in included journals are counted. Citations *to* journals that are not included in the database are also included in the Citation Index.

4. Because of the slowness of the academic review process it usually takes a year or two for citations to a publication to begin to appear. Citation analysis is, therefore, most useful for publications that are at least a few years old.

Despite these well-known limitations, citation analysis is a powerful quantitative guide to the relative influence a publication has had on the academic community, and we have devised some techniques, discussed below, for overcoming or at least clarifying some of its limitations.

Methods

A major question in any citation analysis is: how does one choose the publications to analyze? In our case, we used four distinct lists derived using different criteria.

The core of our first list was a group of 50 papers nominated by the Editorial Board of *Ecological Economics*. Each member of the editorial board was asked by Mick Common to nominate 5 “foundational” papers to be posted on the International Society for Ecological Economics (ISEE) web site. Thirteen board members responded and the result was 46 papers with a single nomination and 4 papers with two nominations. While “foundational” does not have the same meaning as “influential” (as we discuss more fully further on) we decided to use this list as a starting point, since it represents those papers the editorial board thought were “important” to the field in some sense. To this initial list of 50, we added the papers that were included in *The Development of Ecological Economics* (Costanza et al. 1997a) but that had not already been nominated. This book was another earlier attempt to choose (in this case as judged by the three editors of the book – all also members of the *EE* editorial board) some of the more “important “ papers in the field of *Ecological Economics*. This resulted in an additional 42 papers added to the list for a combined list of 92 papers, which we will refer to as the “editorial board” list.

At the suggestion of Cutler Cleveland (chief editor of *EE*), we constructed a second list to account for the fact that *Ecological Economics* is the premier journal in the field and some important and influential papers published in *EE* may not have been included in the list produced by surveying the subjective opinions of members of the editorial board. We therefore produced a list that included all papers published in *Ecological Economics* that had received 15 or more total ISI citations.

After a review of some preliminary results of this analysis, it was suggested by David Stern that while the second list represented the most influential papers published in EE, many papers published elsewhere were highly influential in the field of ecological economics and may not have been suggested by the editorial board either. A way to capture this effect was to treat the papers published in EE as a representative sample of work in ecological economics and measure which publications were most influential on that work. This is captured by a list of the papers most cited *in* papers published in EE. Assembling this list was a bit more tedious. We assembled a data base of all the references that appeared in all the articles published in EE, excluding references to institutional authors (i.e. excluding authors such as UN, World Bank etc.). This resulted in a list of more than 35,000 individual citations. We then sorted this list and searched for the publications with the greatest number of EE citations. We limited this list to journal articles that had received 15 or more citations in EE. This resulted in a list of 57 journal articles.

Finally, we looked at monographs and edited books separately and assembled a list of these publications from our master list that had been cited in EE 15 or more times in the ten years from 1994 to 2003. This resulted in a list of 77 monographs and edited books. For edited books we counted citations to the book itself and to all the chapters within the book as a single unit.

Citation Analysis

The total number of citations to each paper was estimated using the ISI Web of Knowledge. A cited reference search on each publication in our lists provided the number of times that publication had been cited in the journals monitored by ISI. This option searches the ‘Science Citation Index Expanded,’ ‘Social Sciences Citation Index,’ and ‘Arts and Humanities Citation Index’ databases. Overall, these databases include approximately 8,500 journals and over 23 million articles. The multiple database search was imperative given the transdisciplinary nature of *Ecological Economics*. We performed this analysis for the first two lists between July 10-20, 2003. The ISI data base includes citations in journals published from 1945 (or 1955 for the social sciences) to the present. Only a few of the publication we analyzed were published before 1955 (i.e. Hotelling 1931), so the total number of citations to each article (with few exceptions) represents the total citations in all ISI journals over its lifetime. For the publications in the remaining two lists for which we had not counted citations in July 2003 we counted the total ISI citations as of the end of 2003. The starting point for citations in EE to articles was the first year of publication of the journal (1989), while 1994 – the first year ISI fully archived EE was used as the starting point for citations in EE to books

A variety of techniques were used to ensure that all of the citations to a [publication](#) were counted. For instance, we searched the preceding and succeeding years along with the year a journal article was published. In this way we were able to pick up additional citations that were entered into the database incorrectly. Also, multiple spellings for an author's name were entered. For example the article by Silvio Funtowicz (1994), "The Worth of a Songbird - Ecological Economics as a Post-Normal Science," was searched as:

Cited Author: Funtowicz OR Funtowitz OR Functowicz

Cited Year: 1993 OR 1994 OR 1995

In this way we were able to pick up additional citations that used a misspelling of the author's name or the wrong year. Care was also taken to ensure that alternately coded entries for the same journal were included. When an entry was in question, the source journal was consulted.

For the monographs and edited books a slightly different approach was taken, because the way the titles of these volumes were entered into the ISI data base showed quite a bit of variation. First we searched the author's or editor's name(s) with the publication year in order to pick up all of the various ways a title had been entered in the ISI data base. These variations were then searched without the year and author or editor name. With this sweep we got a large list of possible references to the volume, without the fear of misspellings or incorrectly entered publication dates, and without having to individually enter each contributing author's name in an edited volume. For example, Gretchen Daily's (1997) edited book "Nature's Services: Societal Dependence on Natural Ecosystems" was searched first as:

Cited Author: Daily G*

Cited Year: 1997

This search picked up the following range of title entry variations:

Nature Services Hum, Natures Services Hum, Nature Services Soc, Natures Services Hum, Natures Service Soc, Natures Ec Soc, Ntures Services Soc, Societal Dependence

These were then searched as the "CITED WORK" (while at the same time eliminating "Daily" as the cited author) in order to pick up all of the citations to all the individual contributing authors in the volume.

For each of the four lists, we entered the total ISI citations (by looking up the publication in the ISI data base as described above) and the total EE citations (by counting the citations from our master list).

Many sophisticated indicators have been developed in citation analysis to determine the influence of particular journals, research groups, or authors, or to identify core literatures, scientific networks etc. (Wouters, 1999a,b, Hagens 2000). Authors, journals etc. all extend through a period of time during which they can cite others and be cited mutually. Single publications, however, are points in time. They can only be cited by future publications and cite past publications. Therefore, many of the more sophisticated techniques are not applicable and we simply count citations imported and exported to EE.

Results

Our primary results are displayed in Appendix Tables A1-A4, which list all articles and books ranked (columns 1 and 2) by total number of citations either in ISI (column 3) or in EE (column 5). The articles and books were published over a broad span of time, from 1920 to 2001 (column 8). Older publications can be expected to have received more total citations than younger publications, but total influence should be related to total, cumulative citations, and it does indeed take time for publications to accumulate influence. To compensate for this age effect, we also calculated the average number of citations/yr (columns 4 and 6). The average number of citations/yr is a “predictor” of ultimate influence that can better compare older and younger articles. For example, in Table A1, Ayres and Kneese (1969) has accumulated 197 total ISI citations, but its average citations/yr were only 5.8, implying that many other papers on the list published subsequently have higher rates of citation and would eventually exceed the total number of citations of Ayres and Kneese (if their current citation rate is maintained) when they became as old as that paper is now. Citations/yr is also a closer approximation to the “impact factor” often used to rank journals, which is the average number of citations/yr to all articles published in a journal in the most recent 2 years.

We also calculated the percentage of the total ISI citations to each publication that occurred in EE (column 6). This gives an indication of the relative influence a publication has had on EE compared to the broader academic community. For example, in Table A1 we see that Hardin (1968) received 2,525 total citations, while only 30 of these (1.2%) were in EE. This is an example of a paper that has had a huge influence in the broader academic community, and that has also had a large influence on EE. In contrast, Cleveland et al. (1984) received 76 total citations with 29 (or 38.2%) of these in EE. This is an example of a paper with relatively balanced influence on EE and on the larger community. At the other end of the spectrum, van den Bergh and Verbruggen (1999), with 21 total citations and 19 (90.5%) of those in EE, is an example of a paper whose influence has been mainly in EE.

Table 1 shows the mean values and standard deviations for the citation values and the years of publication listed in Tables A1-A4. One can see, for example, that papers published in EE (Table A2) are on average much younger (1994) than the other three lists (1986-88). This is as it must be, since EE only started publishing in 1989. The standard deviation of publication date is also much smaller, as expected. Books cited in EE (Table A4) had a much higher average ISI citation rate (449.9) than articles cited in EE (Table A3 – 252.6). Articles published in EE (Table A2) had only 27.2 ISI cites on average, while the Editorial Board nominations (Table A1) had 93.4 ISI cites on average. The pattern for ISI cites/yr is similar to that for total cites with the rate for books 2.5 times higher than that for articles (32.8 vs. 13.1). The pattern for average EE cites is similar to that for ISI cites, but the differences are not as pronounced. Books lead with 29.0, followed by articles cited in EE (21.8), the Editorial Board list (11.4) and finally articles published in EE (10.1). The percent EE cites are similar for the Ed. Board list (Table A1 – 27.3%) and for articles cited in EE (Table A3 – 25.3%). Articles published in EE (Table 2) have a significantly higher percent of their citations in EE (36.7%) as one might expect. Book cited in EE (Table A4) on the other hand, have a much lower percentage of their citations in EE (17.7%). Again, this is to be expected since many of the books cited are classics that have accumulated a huge number of ISI citations. Almost half of the books in Table A4 have less than 10% of their cites in EE.

Table 1 about here

Figures 1 and 2 represent a way of displaying this complex set of data that reveals some interesting patterns. Figure 1 is a log-log plot of ISI citations vs. EE citations for all the journal articles included in Tables A1-A3. On a log-log plot, lines indicating a constant ratio of EE citations to ISI citations are straight diagonals, labeled on the plot as 1%, 10%, and 100%. Lines at 15 citations for both the EE and ISI citations are also shown, since this was the cutoff for including papers in Table A2 (15 ISI citations) and Table A3 (15 EE citations). Some of the papers are labeled on the plot.

Figures 1 about here

One can easily see on Figure 1 the degree of overlap of articles in Tables A1-A3. It is clear, for example, that while the Editorial Board list (Table A1 – dark diamonds) included many papers that were in the upper ranges of both ISI and EE cites, it also included many papers (57 out of 92 or 62%) that were not cited in EE 15 or more times.

Among these were several papers (i.e. Pimm 1984, Dasgupta and Heal 1974, Odum and Pinkerton 1955) that had received many ISI citations, but whose influence on EE (as assessed by number of citations in EE) was not as great. Table A1 also included many papers that had been cited only lightly in both ISI and EE. Likewise, the list of papers published in EE (Table A2 – squares) included 53 (out of 71) papers (or 75%) that were not cited in EE 15 or more times though they received 15 or more ISI citations. This is due in part to the relatively recent vintage of EE and the fact that it takes time for articles to accumulate citations.

Table A3 (triangles) thus seems to be the best place to start for an assessment of the influence of papers on both EE and the broader community. It picked up several papers missed by both Tables A1 and A2 that have had a large influence, both in terms of ISI and EE cites (i.e. Coase 1960, Ludwig et al. 1993, Hotelling 1931, Kuznets 1955), and several others whose influence has mainly been on EE. The only papers it “missed” were a few book chapters (book chapters were explicitly not included in Table A3) that were nominated by the Editorial Board (i.e. Ayres 1978, Holling 1986). Seventeen of the 57 papers listed in Table A3 (30%) were published in EE.

The top 20 articles in terms of EE citations (Table A3) are those green triangles above the horizontal dashed line in Figure 1. The top 20 articles in terms of ISI citations are those green triangles to the right of the vertical dashed line in Figure 1. Articles that appear in the top 20 in both rankings are in the upper right quadrant of the intersection of these lines. There are eight papers on this list, none of which were published in EE. Half of them were published in *Science* or *Nature*, by far the most highly cited journals of all (with impact factors above 30). Costanza et al. (1997b) and Arrow et al. (1995) also had the extra advantage of being the subjects of invited “fora” in EE that no doubt increased their EE citations by at least the number of invited commentaries (about 13). Of the other four papers, three were published in mainstream economics journals (2 in *American Economic Review* and 1 in *Journal of Law and Economics*) and one was published in a well-known biological science journal (*BioScience*). All of the articles published in the mainstream economics journals were published before 1969, indicating that they are basic background pieces for important subject areas in EE. Ayres and Kneese (1969) deals with material and energy flow accounting, Coase (1960) deals with social costs, and Krutilla (1967) deals with the economics of conservation, all arguably core subject areas for EE and also for the larger community. Only one of these four (Ayres and Kneese 1969) has received more than 10% of its citations in EE, however. Four of the eight papers have received more than 10% of their citations in EE, and these might be considered the most influential to EE of this group. They deal with material and energy flow accounting (Ayres and Kneese 1969), estimating

the “scale” of the economy (Vitousek et al. 1986), carrying capacity, the environmental Kuznets curve, and resilience (Arrow et al. 1995), and valuation of ecosystem services (Costanza et al. 1997b). These have certainly been core ideas within EE and also ones that have been “exported” to the larger community.

Table 2 is another way of looking at this data. It shows the top 20 papers in Table A3 ranked by total EE cites (on the left) and by total ISI cites (on the right). The eight papers that appear on the top 20 in both rankings are shown in **bold**. Papers below the double line are those that are in the top 20 on at least one ranking (i.e. those in the top 20 in the ISI ranking but not in the EE ranking are shown below the double line in the EE ranking). Three intermediate rankings are also shown, using a simple weighted average index of the EE and ISI ranks of the form Rank Index = $w \cdot \text{EE Rank} + (1-w) \cdot \text{ISI Rank}$. This is just one of the many possible ways to combine the EE and ISI influence, and there is no obvious right way to do this.

Table 2 about here

Figure 2 is a plot (similar to Figure 1) of ISI citations vs. EE citations for all the books included in Table A4. This plot focuses (by definition) on those books cited in EE 15 or more times in the period from 1994 to 2003. As in Figure 1, reading top to bottom one sees the books most cited in EE, while reading right to left, one sees the top books in terms of ISI cites. Costanza (1991) is the most cited book in EE. This makes sense, since it was an edited volume with 42 contributing authors many of whom are prominent throughout Tables A1-A4. It was a product of a workshop following the first ISEE meeting in Washington, DC in 1990. It therefore set the stage and the research agenda for much of the work subsequently published in EE. The third ranking book on the list in terms of EE cites (Jansson et al. 1994) was a similar edited volume that came out of the second ISEE conference in Stockholm in 1992. The second ranking book (Daly and Cobb 1989) is a classic in the field, as is the fourth ranking book (Georgescu-Roegen 1971). Others on the list are similarly well-known in the field for various reasons, including Rees and Wackernagel (1996) on the ecological footprint, Daily (1997) on ecosystem services, Pearce and Turner (1990) on environment and natural resource economics, and Daly (1977) on steady state economics. Starting at the right hand side of Figure 2, the top 4 books in terms of ISI citations are Rawls (1971) on ethics and justice, Keeney and Raiffa (1976) on multi-criteria analysis, Meadows et al (1972) on global systems modeling, and Hicks (1946) on value and capital. These are all mega-classics from a range of perspectives, and show the range of influences that have been important to EE.

Figure 2 about here

Table 3 is a list of the top publishers of books in EE, ranked according to the number of their books appearing in Table A4. Cambridge University Press leads this ranking with 8 books on the list, followed by Island Press and Wiley each with 6 books. Five publishers had 3 books each on the list, and 10 publishers had 2. The remaining 22 publishers had one book each on the list.

Table 3 about here

Patterns of Citation Over Time

The top papers in Tables A1-A3 covered a broad range of key topics in ecological economics. But are these papers “foundational?” Figure 3 is a plot of the number of ISI citations/yr since 1990 for the top 20 papers in Table A1. Likewise, figure 4 is a plot of the number of ISI citations/yr since 1990 for the top 10 papers in Table A2. Note the log scale on the y axis. These plots clearly shows the general upward trend of ISI citations/yr for these groups of papers, indicating that these papers are gaining influence over time, rather than fading from memory (and citation) as most papers do. We suggest that this does indeed indicate the “foundational” nature of these papers.

Figures 3 and 4 about here

Figure 5 is a plot of total ISI citations versus the year of publication for all the papers included in Tables A1-A3. Figure 6 is a plot of total ISI citations versus the year of publication for all the books included in Table A4. This highlights some of the patterns we have been discussing, and reveals some interesting additional patterns. Lines of constant citations/yr have been drawn on the plots. One can immediately see by comparing Figures 1 and 2 the much higher average citation rate for books (32.8 cites/yr) compared to journal articles (7.3 cites/yr). One can also readily see those articles and books that have enduring influence and those that have been published more recently that are on track to achieve high total citations as they age.

Figures 5 and 6 about here

Discussion and Conclusions

Citation analysis provides a rich and easily accessible resource for understanding the complex patterns of influence in the academic literature. Our analysis of influential publications in ecological economics has revealed some interesting patterns, and provided the basis for further discussion and analysis. It can also serve as a guide for those just entering the field.

We conclude that the total number of citations and average citations/yr in both the field of interest (EE in this case) and ISI are useful, but by no means perfect, ways to help assess the degree of influence of academic articles to a field. This is consistent with other recent assessments of the utility of citation analysis in assessing influence or importance (Oates and Donnelly 1997, Abt 2000).

Table A1 and Figure 1 shows that the Editorial Board list included many papers (62/92 or 67%) that had less than 15 citations in EE. This indicates the limitations of subjective expert assessments alone and the importance of quantitative assessments of influence, like the citation analysis we have reported here.

The papers published in EE (Table A2) also turned out to be an inadequate starting point, given the recent vintage of EE and the broad, transdisciplinary range of topics and influences it includes. Papers published in EE are not yet well represented in either EE citations or ISI citations, but this can be expected to change with age, as the high rates of citation to some of these papers indicate.

Figure 1 shows that starting with a list of papers cited in EE (Table A3), is probably a better place to start. Although this method is more tedious than the first two, it yields a list of papers (and books) that are known to be important to the field and represents a more objective and reliable assessment of the full range of influences on the field. This list can be ranked by the number of EE cites, the number of ISI cites or some combination to look at the relative influence of publications in the field and on the broader community. This list overlaps with the Ed Board list for all journal articles that are important to EE, but also captures several that the Ed Board missed (i.e. Coase 1960, Ludwig et al. 1993). Figure 2 applies this approach to books. We would recommend this approach for studying influence in other fields.

The relative influence of journal articles relative to books is an interesting comparison and probably varies significantly across fields. EE, being young and transdisciplinary, has been influenced heavily by books and by journal articles published in other journals, based on our analysis. This might be expected to change somewhat over time as the field matures, but the transdisciplinary nature of EE would indicate an ongoing

broader range of influences than a typical disciplinary field. A more “focused” and mono-disciplinary field might be expected to rely more heavily on journal articles, and more heavily on articles published in its own journal(s).

We have also suggested a way to distinguish “foundational” papers based on the time trend of their citations. We have suggested that papers with an increasing time trend of citations/yr over a number of years are indeed “foundational” since their scope of influence is increasing over time rather than decreasing, as one would expect for the “average” paper. Our top papers definitely exhibits this “foundational” characteristic (Figures 3 and 4). Many of the other publications in Tables A1-A4 are still too young to adequately assess in terms of their ultimate influence, but their high rates of citation (Figure 5 and 6) indicate that they will ultimately become very influential indeed.

Acknowledgements

The idea for this paper arose from an email discussion started by Mick Common, who was asked to assemble a short list of “foundational” papers in ecological economics to post on the ISEE web site. After 6 months of email discussions among members of the editorial board, Mick abandoned the project because of disagreement on the method that should be used to further narrow the list of nominees, which we used as a starting point for our analysis. We would also like to thank Shuang Liu, Joshua Farley, Matthew Wilson, Cutler Cleveland and 2 anonymous referees for helpful comments on earlier drafts, and Dan Dias for his help with collecting some of the data on citations in EE.

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Table 1. Descriptive statistics for the four lists (Tables A1-A4)

List	n	Avg Year of Pub.	<i>SD</i> of Year of Pub.	Avg ISI cites	<i>SD</i> of <i>ISI</i> <i>cites</i>	Avg. ISI cites/ yr	<i>SD</i> of <i>ISI</i> <i>cites</i>/ <i>yr</i>	Avg EE cites	<i>SD</i> of <i>EE</i> <i>cites</i>	Avg EE cites/ yr	<i>SD</i> of <i>EE</i> <i>cites</i>/ <i>yr</i>	Avg. %EE cites	<i>SD</i> of %EE <i>cites</i>
Table A1: Ed Board Nominations	92	1988	10.2	93.4	277.7	5.0	10.6	11.4	11.7	1.0	1.3	27.3%	22.4%
Table A2: Articles Published in EE	71	1994	2.9	27.3	13.5	3.4	1.6	10.0	6.5	1.1	0.9	36.7%	20.7%
Table A3: Articles Cited in EE	47	1986	13.1	252.4	465.7	13.1	16.6	21.8	9.0	2.0	1.4	25.3%	20.2%
Table A4: Books Cited in EE	77	1987	12.4	491.8	984.5	26.6	32.5	29.0	20.5	2.6	2.0	17.7%	15.0%

Table 2. Range of rankings for papers that appear in the top 20 of table A3 ranked by EE cites (left) and by ISI cites (right). Papers in bold appear in the top 20 in both rankings. w is a weighting factor used to produce rankings which combine the EE and ISI rankings as a simple weighted average: Rank Index = w*EE Rank + (1-w)*ISI Rank.

w = 1.0 (EE rank given all weight)				w = 0.75				w = 0.5				w = 0.25				w = 0 (ISI rank given all weight)			
Rank (Tot EE cites)	Rank (Tot ISI cites)	Rank Index w=1	Paper	Rank (Tot EE cites)	Rank (Tot ISI cites)	Rank Index w=.75	Paper	Rank (Tot EE cites)	Rank (Tot ISI cites)	Rank Index w=.5	Paper	Rank (Tot EE cites)	Rank (Tot ISI cites)	Rank Index w=.25	Paper	Rank (Tot EE cites)	Rank (Tot ISI cites)	Rank Index w=0	Paper
1	6		1 Costanza et al 1997	1	6		2.25 Costanza et al 1997	5	1		3.00 Hardin, 1968	5	1		2.00 Hardin, 1968	5	1		1 Hardin, 1968
2	19		2 Arrow et al. 1995	5	1		4.00 Hardin, 1968	1	6		3.50 Costanza et al 1997	11	2		4.25 Coase 1960	11	2		2 Coase, 1960
3	17		3 Ayres and Kneese 1969	2	19		6.25 Arrow et al. 1995	11	2		6.50 Coase 1960	1	6		4.75 Costanza et al 1997	25	3		3 Hotelling,1931
4	24		4 Selden and Song 1994	3	17		6.50 Ayres and Kneese 1969	3	17		10.00 Ayres and Kneese 1969	25	3		8.50 Hotelling,1931	22	4		4 Holling, 1973
5	1		5 Hardin, 1968	11	2		8.75 Coase 1960	2	19		10.50 Arrow et al. 1995	22	4		8.50 Holling, 1973	45	5		5 Kuznets, 1955
6	36		6 Pearce and Atkinson 1993	4	24		9.00 Selden and Song 1994	9	13		11.00 Vitousek et al. 1986	15	7		9.00 Ludwig et al 1993	1	6		6 Costanza, et al. 1997
7	34		7 Cleveland et al. 1984	9	13		10.00 Vitousek et al. 1986	15	7		11.00 Ludwig et al 1993	17	10		11.75 Krutilla 1967	15	7		7 Ludwig, et al. 1993
8	22		8 Grossman and Krueger 1995	8	22		11.50 Grossman and Krueger 1995	22	4		13.00 Holling, 1973	9	13		12.00 Vitousek et al. 1986	47	8		8 Vitousek, et al. 1997
9	13		9 Vitousek et al. 1986	15	7		13.00 Ludwig et al 1993	17	10		13.50 Krutilla 1967	3	17		13.50 Ayres and Kneese 1969	35	9		9 Hanemann 1984
10	31		10 Costanza and Daly 1992	6	36		13.50 Pearce and Atkinson 1993	4	24		14.00 Selden and Song 1994	2	19		14.75 Arrow et al. 1995	17	10		10 Krutilla, 1967
11	2		11 Coase 1960	7	34		13.75 Cleveland et al. 1984	25	3		14.00 Hotelling,1931	45	5		15.00 Kuznets, 1955	36	11		11 Kahnemann and Knetsch 1992
12	45		12 Daly 1992	10	31		15.25 Costanza and Daly 1992	8	22		15.00 Grossman and Krueger 1995	35	9		15.50 Hanemann 1984	27	12		12 Arrow and Fisher 1974
13	35		13 Vatn and Bromley 1994	17	10		15.25 Krutilla 1967	27	12		19.50 Arrow and Fisher 1974	27	12		15.75 Arrow and Fisher 1974	9	13		13 Vitousek, et al. 1986
14	28		14 Bishop 1978	14	28		17.50 Bishop 1978	7	34		20.50 Cleveland et al. 1984	36	11		17.25 Kahnemann and Knetsch 1992	31	14		14 Solow, 1974a
15	7		15 Ludwig et al 1993	22	4		17.50 Holling, 1973	10	31		20.50 Costanza and Daly 1992	47	8		17.75 Vitousek, et al. 1997	54	15		15 Nordhaus 1991
16	46		16 Victor 1991	13	35		18.50 Vatn and Bromley 1994	6	36		21.00 Pearce and Atkinson 1993	31	14		18.25 Solow, 1974a	38	16		16 Solow, 1974b
17	10		17 Krutilla 1967	25	3		19.50 Hotelling,1931	14	28		21.00 Bishop 1978	8	22		18.50 Grossman and Krueger 1995	3	17		17 Ayres and Kneese 1969
18	38		18 Costanza 1980	12	45		20.25 Daly 1992	35	9		22.00 Hanemann 1984	4	24		19.00 Selden and Song 1994	53	18		18 Leontief 1970
19	42		19 Norgaard 1989	18	38		23.00 Costanza 1980	31	14		22.50 Solow, 1974a	38	16		21.50 Solow, 1974b	2	19		19 Arrow et al. 1995
20	43		20 Stern et al. 1996	27	12		23.25 Arrow and Fisher 1974	36	11		23.50 Kahnemann and Knetsch 1992	14	28		24.50 Bishop 1978	44	20		20 Hanemann 1994
22	4		22 Holling, 1973	16	46		23.50 Victor 1991	13	35		24.00 Vatn and Bromley 1994	54	15		24.75 Nordhaus 1991	8	22		22 Grossman and Krueger 1995
25	3		25 Hotelling,1931	19	42		24.75 Norgaard 1989	45	5		25.00 Kuznets, 1955	10	31		25.75 Costanza and Daly 1992	4	24		24 Selden and Song 1994
27	12		27 Arrow and Fisher 1974	20	43		25.75 Stern et al. 1996	38	16		27.00 Solow, 1974b	44	20		26.00 Hanemann 1994	14	28		28 Bishop 1978
31	14		31 Solow, 1974a	31	14		26.75 Solow, 1974a	47	8		27.50 Vitousek, et al. 1997	53	18		26.75 Leontief 1970	10	31		31 Costanza and Daly 1992
35	9		35 Hanemann 1984	35	9		28.50 Hanemann 1984	18	38		28.00 Costanza 1980	7	34		27.25 Cleveland et al. 1984	7	34		34 Cleveland et al. 1984
36	11		36 Kahnemann and Knetsch 1992	36	11		29.75 Kahnemann and Knetsch 1992	12	45		28.50 Daly 1992	6	36		28.50 Pearce and Atkinson 1993	13	35		35 Vatn and Bromley 1994
38	16		38 Solow, 1974b	38	16		32.50 Solow, 1974b	19	42		30.50 Norgaard 1989	13	35		29.50 Vatn and Bromley 1994	6	36		36 Pearce and Atkinson 1993
44	20		44 Hanemann 1994	45	5		35.00 Kuznets, 1955	16	46		31.00 Victor 1991	18	38		33.00 Costanza 1980	18	38		38 Costanza 1980
45	5		45 Kuznets, 1955	47	8		37.25 Vitousek, et al. 1997	20	43		31.50 Stern et al. 1996	19	42		36.25 Norgaard 1989	19	42		42 Norgaard 1989
47	8		47 Vitousek, et al. 1997	44	20		38.00 Hanemann 1994	44	20		32.00 Hanemann 1994	12	45		36.75 Daly 1992	20	43		43 Stern et al. 1996
53	18		53 Leontief 1970	54	15		44.25 Nordhaus 1991	54	15		34.50 Nordhaus 1991	20	43		37.25 Stern et al. 1996	12	45		45 Daly 1992
54	15		54 Nordhaus 1991	53	18		44.25 Leontief 1970	53	18		35.50 Leontief 1970	16	46		38.50 Victor 1991	16	46		46 Victor 1991

Table 3. Publishers of 2 or more books listed in Table A4 in order of number of books on the list

Publisher	Number of Books in Table A4
Cambridge University Press, Cambridge, UK	8
Island Press, Washington, DC.	6
Wiley, New York, NY	6
Blackwell, UK.	3
Johns Hopkins University Press, Baltimore MD.	3
Kluwer, Dordrecht, NL	3
Oxford University Press, Oxford.	3
Routledge, London.	3
Becon Press, Boston	2
Columbia University Press, New York, NY	2
Earthscan, London	2
Elsevier, Amsterdam.	2
Harvard Univ Press, Boston MA	2
Macmillan, London	2
MIT Press, Cambridge, MA	2
Resources for the Future, Washington, DC	2
St. Lucie Press, Delray Beach, FL	2
World Bank, Washington, DC.	2

Figure Legends

Figure 1. Log-log plot of ISI citations vs. EE citations for all the articles included in Tables A1-A3. Lines indicating a constant ratio of EE citations to ISI citations are straight diagonals, labeled on the plot as 1%, 10%, and 100%. Lines at 15 citations for both the EE and ISI citations are also shown.

Figure 2. Log-log plot of ISI citations vs. EE citations for all the books included in Table A4. Lines indicating a constant ratio of EE citations to ISI citations are straight diagonals, labeled on the plot as 1%, 10%, and 100%. Lines at 15 citations for both the EE and ISI citations are also shown.

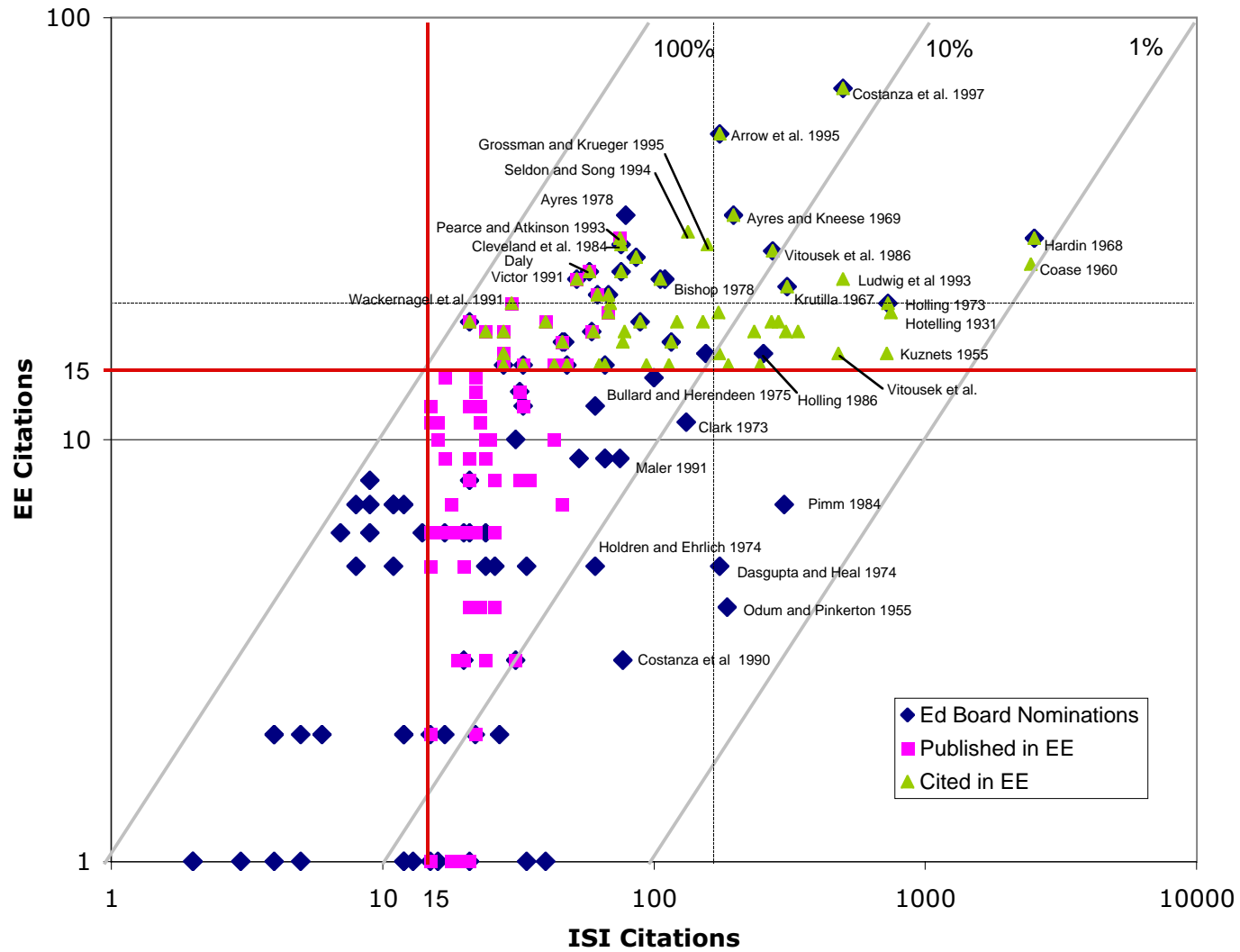
Figure 3. Time trends of ISI citations to the top 20 papers in Table A1. The large number of total citations to Hardin (1968) prevented us from identifying the year of citation before 2000, so we simply extrapolated a straight line back to the publication date consistent with the total citations.

Figure 4. Time series of ISI citations for the top 10 articles ranked by ISI citations published in *Ecological Economics* (Table A2).

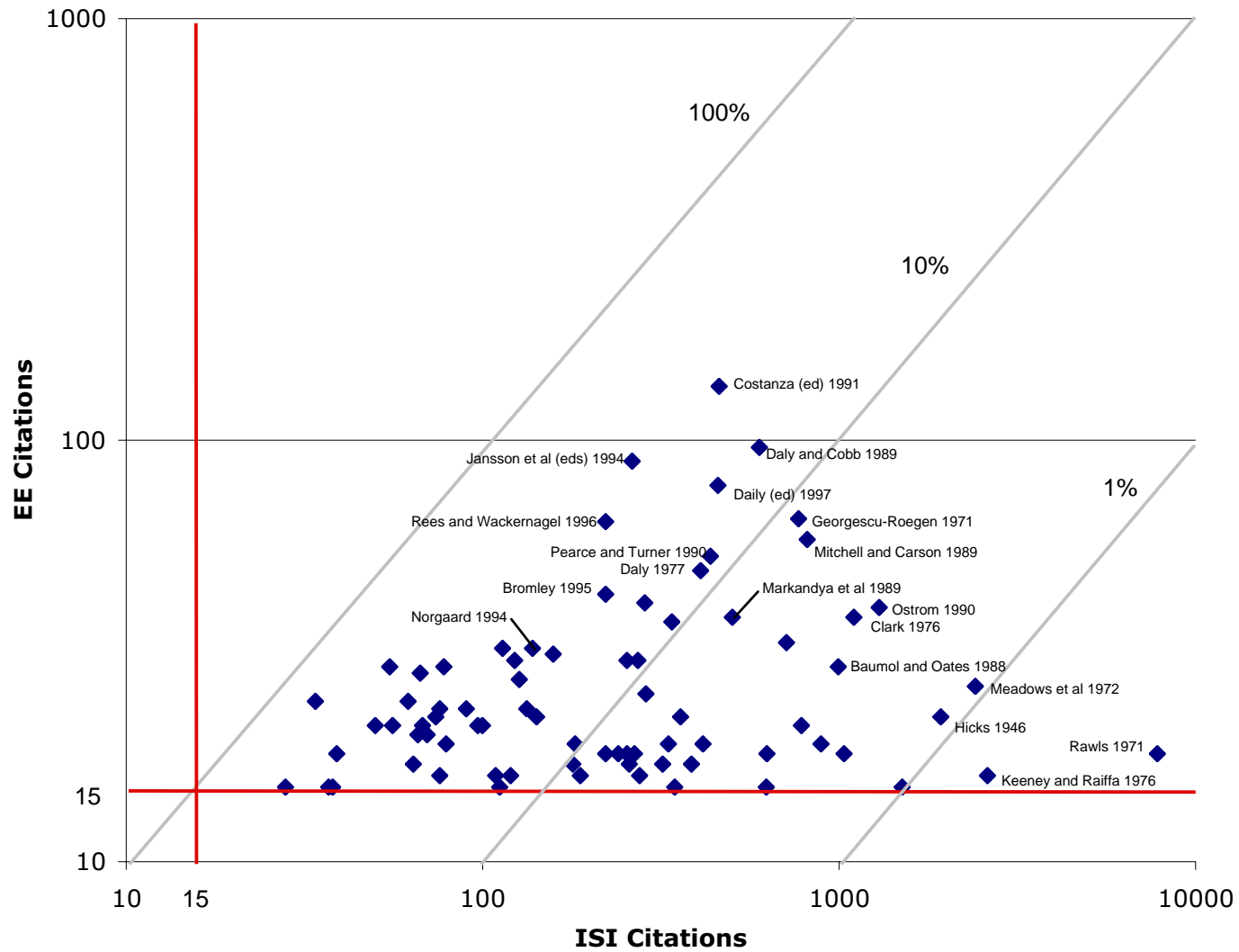
Figure 5. Plot of total ISI citations for the all the articles listed in Tables A1-A3 against their year of publication. Curved lines are constant ISI citations/yr. Note log scale on total citations.

Figure 6. Plot of total ISI citations for the all the books listed in Table A4 against their year of publication. Curved lines are constant ISI citations/yr. Note log scale on total citations.

ISI vs. EE Citations for Papers (Tables A1-A3)



ISI vs. EE Citations for Books (Table A4)



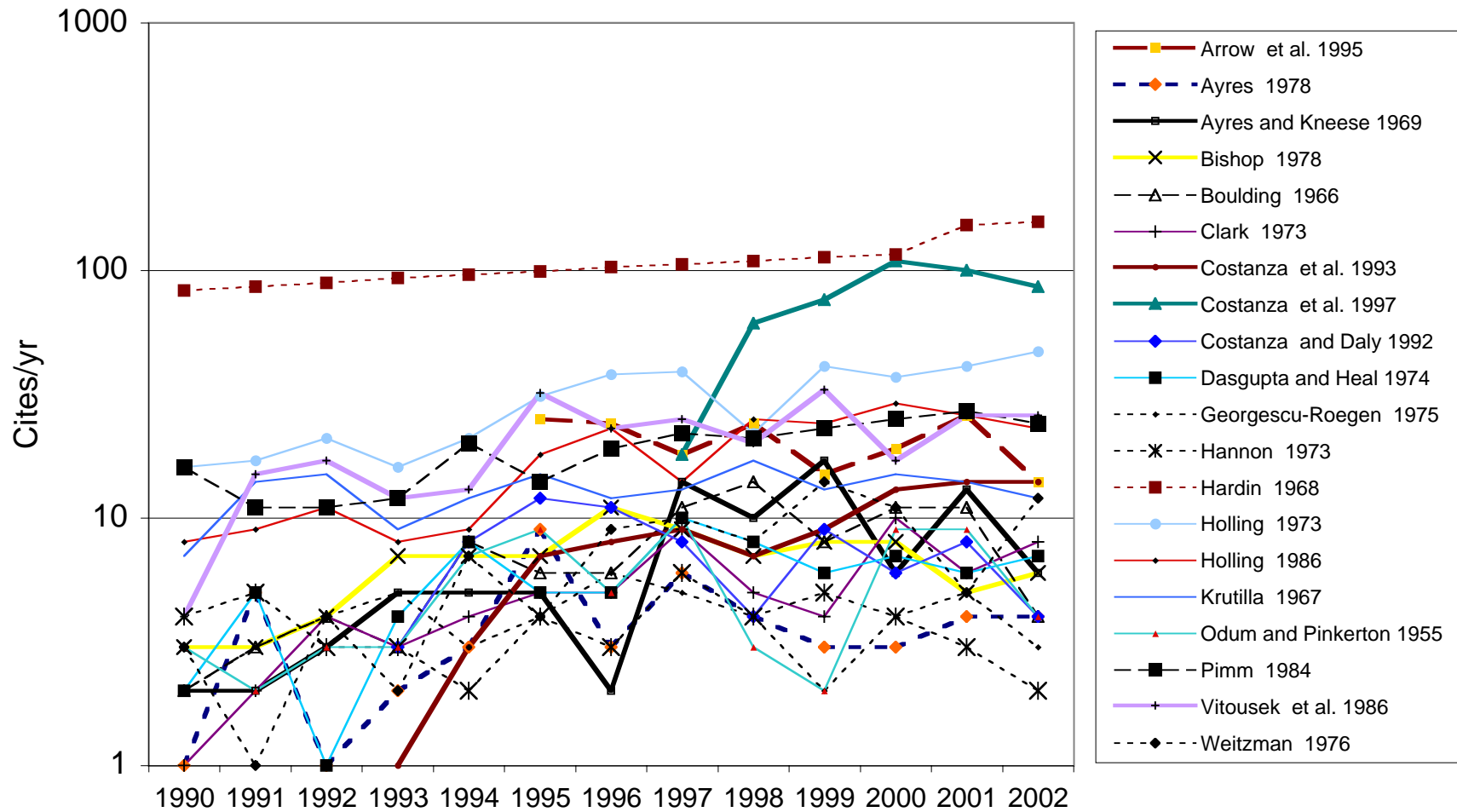


Figure 3. Time trends of ISI citations to the top 20 papers in Table A1. The large number of total citations to Hardin (1968) prevented us from identifying the year of citation before 2000, so we simply extrapolated a straight line back to the publication date consistent with the total citations.

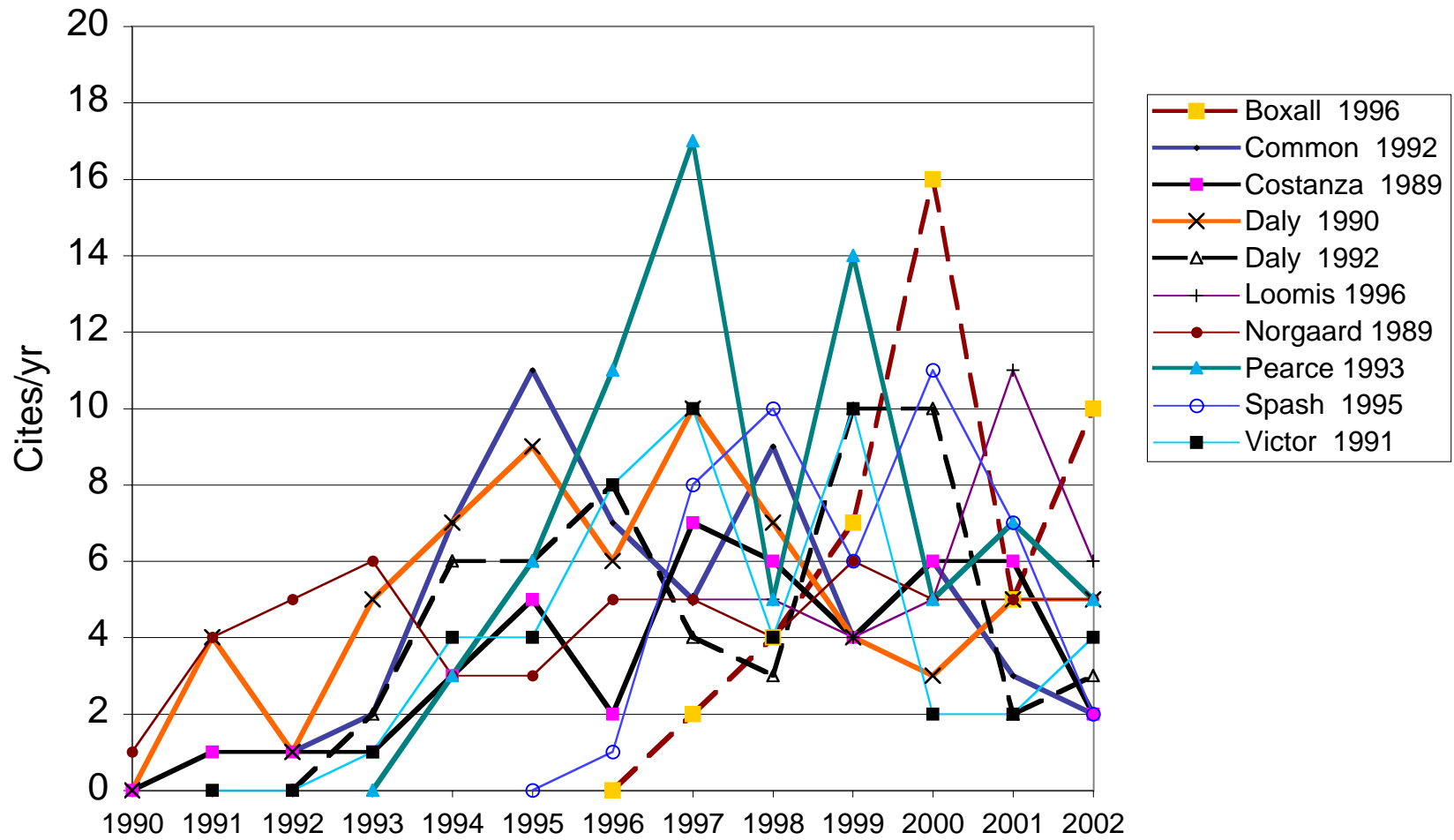


Figure 4. Time series of ISI citations for the top 10 papers ranked by ISI citations published in Ecological Economics (Table A2).

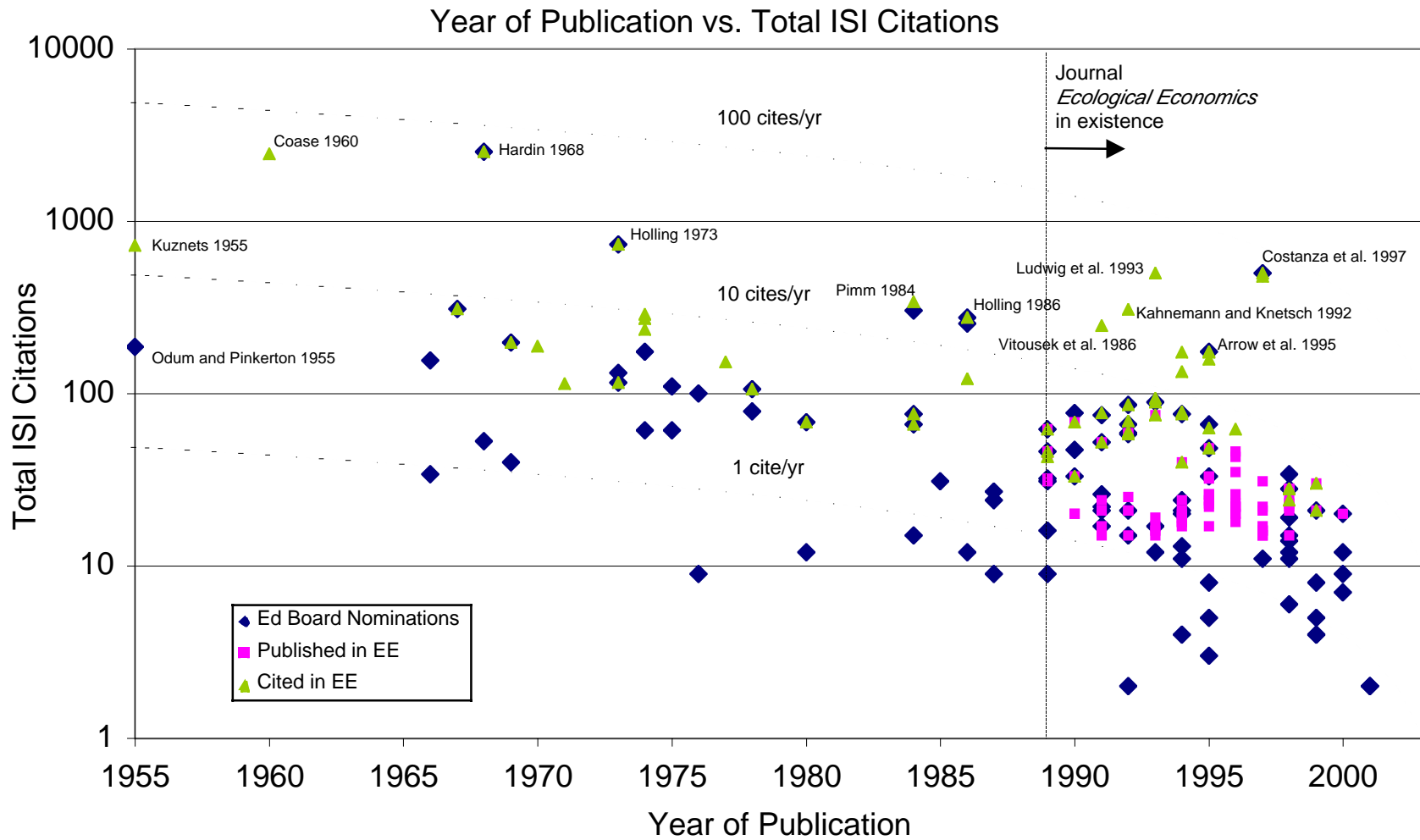


Figure 5. Plot of total ISI citations for the all the papers listed in Tables A1-A3 against their year of publication. Curved lines are constant ISI citations/yr. Note log scale on total citations.

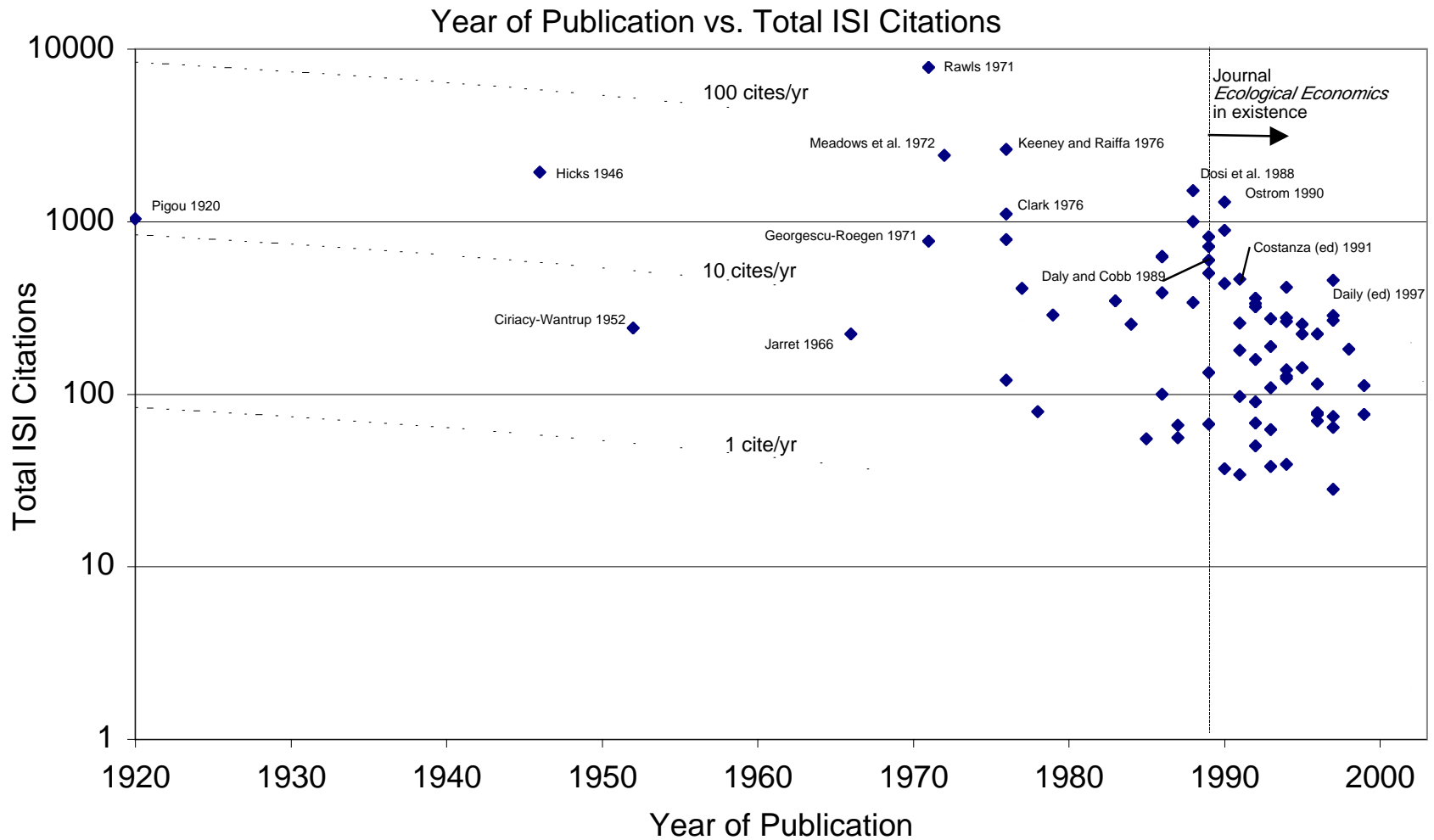


Figure 6. Plot of total ISI citations for the all the books listed in Table A4 against their year of publication. Curved lines are constant ISI citations/yr. Note log scale on total citations.

Table A1. List of all papers nominated by the EE editorial board, ranked total ISI citations. Rows in light gray indicate papers that were included in Costanza et al. 1997b, and not otherwise nominated. See text for additional details

Rank (Tot ISI Cites)	Rank (Tot EE Cites)	Total ISI Cites	ISI Cites/y r	Total EE Cites	EE Cites/y r	% EE Cites (EE/ISI Cites)	Author(s)	Year	Title	Journal	Specifics
1	5	2525	70.1	30	2.0	1.2%	Hardin, G.	1968	The tragedy of the commons.	<i>Science</i>	162: 1243-1248.
2	17	731	23.6	21	1.4	2.9%	Holling, C.S.	1973	Resilience and stability of ecological systems.	<i>Annual Review of Ecological Systems</i>	4: 1-24.
3	1	499	71.3	68	9.7	13.6%	Costanza, R., R. d'Arge, R. de Groot, S. Farber, M. Grasso, B. Hannon, S. Naem, K. Limburg, J. Pateulo, R.V. O'Neill, R. Raskin, P. Sutton, and M. van den Belt.	1997	The value of the world's ecosystem services and natural capital.	<i>Nature</i>	387: 253-260.
4	14	310	8.4	23	1.5	7.4%	Krutilla, J. V.	1967	Conservation Reconsidered	<i>American Economic Review</i>	777-784.
5	42	303	15.2	7	0.5	2.3%	Pimm, S.L.	1984	The complexity and stability of ecosystems.	<i>Nature</i>	307: 321-326.
6	7	275	15.3	28	1.9	10.2%	Vitousek, P.M., P.R. Ehrlich, A.H. Ehrlich, and P.A. Matson	1986	Human appropriation of the products of photosynthesis.	<i>Bioscience</i>	34: 368-373.
7	24	254	14.1	16	1.1	6.3%	Holling, C.S.	1986	The resilience of terrestrial ecosystems: Local surprise and global change.	In: W. C. Clark and R. E. Munn (ed.), <i>Sustainable development of the biosphere.</i>	Cambridge University Press, Cambridge.
8	3	197	5.6	34	2.3	17.3%	Ayres, R.U., and A.V. Kneese	1969	Production, consumption and externalities	<i>American Economic Review</i>	59: 282-97.
9	62	187	3.8	4	0.3	2.1%	Odum, H.T., R.C. Pinkerton	1955	Time's Speed Regulator: The Optimum Efficiency for Maximum Power Output in Physical and Biological	<i>American Scientist</i>	43: 331-343.
10	2	175	19.4	53	5.9	30.3%	Arrow, K., B. Bolin, R. Costanza, P. Dasgupta, C. Folke, C.S. Holling, B.-O. Jansson, S. Levin, K.-G. Mäler, C. Perrinas, and D. Pimentel	1995	Economic Growth, Carrying Capacity, and the Environment.	<i>Science</i>	268:520-521.
11	55	175	5.8	5	0.3	2.9%	Dasgupta, P., and G. M. Heal.	1974	The optimal depletion of exhaustible resources	<i>Review of Economic Studies</i>	41: 3-28.
12	25	156	4.1	16	1.1	10.3%	Boulding, K.E.	1966	The economics of the coming spaceship earth.	In: H. Jarret (ed.), <i>Environmental Quality in a Growing Economy.</i>	Johns Hopkins University Press, Baltimore. 181: 630-634.
13	34	132	4.3	11	0.7	8.3%	Clark, C.W.	1973	The economics of overexploitation.	<i>Science</i>	41: 535-546.
14	21	116	3.7	17	1.1	14.7%	Hannon, B.	1973	The Structure of Ecosystems.	<i>Journal of Theoretical Biology</i>	41: 535-546.
15	11	110	3.8	24	1.6	21.8%	Georgescu-Roegen, N.	1975	Energy and Economic Myths	<i>Southern Economic Journal</i>	41
16	12	106	4.1	24	1.6	22.6%	Bishop, R. C.,	1978	Endangered species and uncertainty: the economics of a safe minimum standard.	<i>American Journal of Agricultural Economics.</i>	60: 10-18.
17	30	100	3.6	14	0.9	14.0%	Weitzman, M.	1976	Prices vs Quantities	<i>Quarterly Journal of Economics</i>	91: 385-406.
18	18	89	8.1	19	1.7	21.3%	Costanza, R., L. Wainger, C. Folke, and K.-G. Mäler,	1993	Modeling Complex Ecological Economic Systems: Towards an Evolutionary, Dynamic Understanding of People and Nature.	<i>BioScience</i>	43: 545-555.
19	8	86	7.2	27	2.3	31.4%	Costanza, R., H. Daly.	1992	Natural Capital and Sustainable Development.	<i>Conservation Biology</i>	6: 37-46
20	4	79	3.0	34	2.3	43.0%	Ayers, Robert U.	1978	Application of physical principles to economics	Ch 3 in <i>Resources, Environment and Economics</i>	Wiley, NY
21	63	77	5.5	3	0.2	3.9%	Costanza R, Sklar FH, White ML,	1990	Modeling coastal landscape dynamics	<i>Bioscience</i>	40: 91-107
22	9	76	7.6	25	2.5	32.9%	Vatn, A., Bromley, D.	1994	Choices without Prices without Apologies	<i>Journal of Environmental Economics and Management</i>	26: 129-148
23	6	76	3.8	29	1.9	38.2%	Cleveland, C.J., R. Costanza, C.A.S. Hall and R.K. Kaufmann	1984	Energy and the United States economy: a biophysical perspective.	<i>Science</i>	225:890-897
24	36	75	5.8	9	0.7	12.0%	Maler, Karl-Goran	1991	National accounts and environmental resources	<i>Environmental and Resource Economics</i>	1: 1-15
25	15	68	2.8	22	1.5	32.4%	Costanza, R.	1980	Embodied energy and economic valuation.	<i>Science</i>	210: 1219-1224
26	37	66	7.3	9	1.0	13.6%	Holling, C.S., D.W. Schindler, B.W. Walker and J. Roughgarden.	1995	Biodiversity in the functioning of ecosystems: an ecological synthesis.	In: C. Perring, K.-G. Mäler, C. Folke, C.S. Holling and B.O. Jansson (eds), <i>Biodiversity Loss, Economic and</i>	Cambridge University Press.
27	38	66	5.5	9	0.8	13.6%	Daily, G.C. and P. Ehrlich	1992	Population, Sustainability, and Earth's Carrying Capacity.	<i>Bioscience</i>	42: 761-771
28	26	66	3.3	15	1.0	22.7%	Norgaard, R.B.	1984	Coevolutionary development potential	<i>Land Economics</i>	60: 160-173.
29	16	62	4.1	22	1.5	35.5%	Norgaard, R.B.	1989	The case for Methodological Pluralism	<i>Ecological Economics,</i>	1: 37-57.
30	32	61	2.1	12	0.8	19.7%	Bullard, C. W., and R. Herendeen.	1975	Energy costs of goods and services.	<i>Energy Policy</i>	2:263-278.
31	56	61	2.0	5	0.3	8.2%	Holdren, J. P. and P. R. Ehrlich	1974	Human population and the global environment.	<i>American Scientist</i>	62: 282-292.
32	20	59	4.9	18	1.5	30.5%	Common, M., and C. Perrings	1992	Towards an ecological economics of sustainability.	<i>Ecological Economics</i>	6: 7-34.
33	10	58	4.8	25	2.1	43.1%	Daly, H.E.	1992	Allocation, distribution, and scale: towards an economics that is efficient, just and sustainable.	<i>Ecological Economics</i>	6: 185-193.
34	39	53	1.5	9	0.6	17.0%	Daly, H.E.	1968	On economics as a life science.	<i>Journal of Political Economy</i>	76: 392-406.
35	13	52	4.0	24	1.8	46.2%	Victor, P.	1991	Indicators of Sustainable Development: Some Lessons for Capital Theory	<i>Ecological Economics,</i>	4:191-213
36	27	48	5.3	15	1.7	31.3%	Spash, C., N. Hanley	1995	Preferences, Information and Biodiversity Preservation.	<i>Ecological Economics</i>	12: 191-208
37	22	47	3.4	17	1.2	36.2%	Bromley, D.	1990	The Ideology of Efficiency: Searching for a Theory of Policy Analysis	<i>Journal of Environmental Economics and Management</i>	19: 86-107
38	23	46	3.1	17	1.1	37.0%	Costanza, R., S. C. Farber, and J. Maxwell	1989	The valuation and management of wetland ecosystems	<i>Ecological Economics .</i>	1: 335-361.
39	76	40	1.1	1	0.1	2.5%	Isard, W.	1969	Some notes on the linkage of ecologic and economic systems.	<i>Papers of the Regional Science Association</i>	22: 85-96.
40	57	34	5.7	5	0.8	14.7%	Costanza, R. F. Andrade, P. Antunes, M. van den Belt, D. Boersma, D. F. Boesch, F. Catarino, S. Hanna, K. Limburg, B. Low, M. Mollitor, G. Pereira, S. Rayner, R. Santos, J. Wilson, M. Young.	1998	Principles for sustainable governance of the oceans.	<i>Science</i>	281:198-199.
41	77	34	0.9	1	0.1	2.9%	Crocker, T.	1966	The Structuring of Atmospheric Pollution Control Systems.	In H. Wolozin, (ed.), <i>The Economics of Air Pollution</i>	Norton, New York.
42	33	33	3.7	12	1.3	36.4%	Bockstael N, Costanza R, Strand I, Boynton W, Bell K, Wainher L	1995	Ecological Economic Modeling and valuation of ecosystems	<i>Ecological Economics .</i>	14: 143
43	28	33	2.4	15	1.1	45.5%	Costanza, R., and C. Perrings	1990	A flexible assurance bonding system for improved environmental management.	<i>Ecological Economics</i>	2: 57-76.
44	31	32	2.1	13	0.9	40.6%	Christensen, P.P.	1989	Historical roots for ecological economics: Biophysical versus allocative approaches.	<i>Ecological Economics</i>	1: 17-36.
45	64	31	2.1	3	0.2	9.7%	Ehrlich, P. R.	1989	"The limits to substitution: Metaresource depletion and a new economic-ecological paradigm."	<i>Ecological Economics</i>	1: 9-16
46	35	31	1.6	10	0.7	32.3%	Norgaard, R.B.,	1985	Environmental Economics: An Evolutionary Critique and a Plea for Pluralism.	<i>Journal of Environmental Economics and Management</i>	12: 382-394.
47	29	28	4.7	15	2.5	53.6%	Norton, B., R. Costanza, and R. Bishop	1998	The evolution of preferences: why 'sovereign' preferences may not lead to sustainable policies and what to do about it.	<i>Ecological Economics</i>	24: 193-211.
48	66	27	1.6	2	0.1	7.4%	Braat LC, van Lierop WFJ	1987	Integrated economic-ecological modeling	In <i>Economic-Ecological Modeling in R. Costanza (ed.) Ecological Economics: The Science and Management of Sustainability</i>	Chapter 4
49	58	26	2.0	5	0.4	19.2%	El Serafy, S.	1991	The Environment as Capital	<i>Ecological Economics</i>	Columbia University Press, NY
50	59	24	2.4	5	0.5	20.8%	Larsson J, Folke C, Kautsky N.	1994	Ecological limitations and appropriation of ecosystem support by shrimp farming in Colombia	<i>Environmental Management</i>	18: 663-676
51	48	24	1.4	6	0.4	25.0%	Goodland, Robert and Georg Ledec.	1987	Neoclassical Economics and Principles of Sustainable Development.	<i>Ecological Modelling,</i>	38: 29-46.
52	67	22	1.7	2	0.2	9.1%	Cleveland CJ, Kaufmann RK	1991	Forecasting ultimate oil recovery and its rate of production: Incorporating economics forces into the models of M. King Hubbert	<i>The Energy Journal</i>	225: 890-897
53	19	21	4.2	19	3.8	90.5%	van den Bergh, J.C.J.M., and H. Verbruggen	1999	Spatial sustainability, trade and indicators: an evaluation of the 'ecological footprint'.	<i>Ecological Economics</i>	29: 63-74
54	40	21	2.1	8	0.8	38.1%	Munda, G., P. Nijkamp, and P. Rietveld,	1994	Qualitative multi-criteria evaluation for environmental management.	<i>Ecological Economics</i>	10: 97-112.
55	49	21	1.8	6	0.5	28.6%	Berkes, F. and C. Folke.	1992	A Systems Perspective on the Interrelations between Natural, Human-made and Cultural Capital.	<i>Ecological Economics</i>	5:1-8.

56	78	21	1.6	1	0.1	4.8%	Baker KA, M.S. Fennessy, W.J. Mitsch	1991	Designing wetlands for controlling coal mine drainage: and ecologic-economic modelling approach	<i>Ecological Economics</i>	3: 1-24
57	65	20	5.0	3	0.8	15.0%	Gibson, C.C., E. Ostrom, and T.K. Ahn,	2000	The concept of scale and the human dimensions of global change: a survey.	<i>Ecological Economics</i>	32: 217-239.
58	50	20	2.0	6	0.6	30.0%	Ruitenbeek HJ	1994	Modelling economy-ecology linkages in mangroves	<i>Ecological Economics</i>	10: 233-247
59	89	19	3.2		0.0	0.0%	Costanza, R. and M. Ruth.	1998	Using dynamic modeling to scope environmental problems and build consensus.	<i>Environmental Management</i>	22:183-195.
60	68	17	1.5	2	0.2	11.8%	Stern, D.I.	1993	Energy and Economic Growth in the USA: A Multivariate Approach.	<i>Energy Economics,</i>	15: 137-150
61	51	17	1.3	6	0.5	35.3%	Vandenbergh JCJM, P. Nijkamp	1991	Operationalizing sustainable development: dynamic ecological economic models	<i>Ecological Economics</i>	4: 11
62	79	16	1.1	1	0.1	6.3%	Ayres, Robert U.	1989	Industrial metabolism and global change.	<i>International Social Science Journal</i>	121: 364
63	69	15	2.5	2	0.3	13.3%	Levin et al. (17 authors),	1998	Resilience in natural and socioeconomic systems.	<i>Environment and Development Economics</i>	3: 222-235.
64	80	15	1.3	1	0.1	6.7%	Crocker, T.D., and J. Tschirhart	1992	Ecosystems, externalities and economics.	<i>Environmental and Resource Economics</i>	2: 551-567.
65	90	15	0.8		0.0	0.0%	Ayres, Robert U. and Indira Nair,	1984	Thermodynamics and economics.	<i>Physics Today November</i>	37: 62-71.
66	52	14	2.3	6	1.0	42.9%	Martinez-Alier, J., G. Munda and J. O'Neill	1998	Weak comparability of values as a foundation for ecological economics.	<i>Ecological Economics</i>	26: 277-286.
67	81	13	1.3	1	0.1	7.7%	Liu J., Cubbage F.W. and Pulliam H.R.	1994	Ecological and economic effects of forest landscape structure and rotation length	<i>Ecological Economics</i>	10: 249-263
68	70	12	3.0	2	0.5	16.7%	Costanza, R., H. Daly, C. Folke, P. Hawken, C.S. Holling, A. J. McMichael, D. Pimentel, and D. Rapport.	2000	Managing our environmental portfolio.	<i>BioScience</i>	50:149-155
69	71	12	2.0	2	0.3	16.7%	Perrings, C.	1998	Resilience in the dynamics of economy-environment systems.	<i>Environmental and Resource Economics</i>	11: 503-520.
70	82	12	1.1	1	0.1	8.3%	Hall C.A.S. and Hall M.H.P.	1993	The efficiency of land and energy use in tropical economies and agriculture	<i>Agriculture, Ecosystems and Environment</i>	46: 1-30
71	43	12	0.7	7	0.5	58.3%	Perrings, C.A.	1986	Conservation of mass and instability in a dynamic economy-environment system	<i>Journal of Environmental Economics and Management</i>	13: 199-211
72	83	12	0.5	1	0.1	8.3%	Burness, S. et al.	1980	Thermodynamic and Economic Concepts as Related to Resource-Use Policies	<i>Land Economics</i>	56: 1-9.
73	44	11	1.8	7	1.2	63.6%	Ayres, Robert U.	1998	Eco-thermodynamics: Economics and the second law.	<i>Ecological Economics</i>	26: 189-209.
74	45	11	1.6	7	1.0	63.6%	Stern, D.I.	1997	Limits to substitution and irreversibility in production and consumption: a neoclassical interpretation of ecological economics.	<i>Ecological Economics</i>	22: 197-215.
75	60	11	1.1	5	0.5	45.5%	de Groot R.S.	1994	Environmental functions and the economic value of natural ecosystems	Ch. 9 in <i>Investing in Natural Capital: The Ecological Economics Approach to Sustainability</i>	Island Press, Washington, DC
76	41	9	2.3	8	2.0	88.9%	Campbell, B.M., Doré, D., Luckert, M., Mukamuri, B. and Gambizo, J.	2000	Economic comparisons of livestock production in communal grazing lands in Zimbabwe.	<i>Ecological Economics</i>	33: 413 - 438.
77	46	9	0.6	7	0.5	77.8%	Proops, J.L.	1989	Ecological Economics: Rationale and Problem Areas.	<i>Ecological Economics</i>	1: 59-76.
78	53	9	0.5	6	0.4	66.7%	Cleveland, C.J.	1987	Biophysical Economics: Historical Perspective and Current Research Trends.	<i>Ecological Modelling</i>	38: 47-73.
79	91	9	0.3		0.0	0.0%	Herendeen, R., and J. Tanaka.	1976	Energy cost of living.	<i>Energy</i>	1:163-178.
80	61	8	1.6	5	1.0	62.5%	Söderbaum, P.	1999	Values, ideology and politics in ecological economics	<i>Ecological Economics,</i>	28: 161-170.
81	47	8	0.9	7	0.8	87.5%	Ruth, M.	1995	Information, Order and Knowledge in Economic and Ecological Systems: Implications for Material and Energy Use.	<i>Ecological Economics</i>	13 : 99-114
82	54	7	1.8	6	1.5	85.7%	van den Bergh, J.C.J.M., A. Ferrer-i-Carbonell, and G. Munda	2000	Alternative models of individual behaviour and implications for environmental policy.	<i>Ecological Economics</i>	32: 43-61.
83	72	6	1.0	2	0.3	33.3%	Bernow, S., R. Costanza, H. Daly, R. DeGennaro, D. Erlandson, D. Ferris, P. Hawken, J. A. Horner, J. Lancelot, T. Marx, D. Norland, I. Peters, D. Roodman, C. Schneider, P. Shyamsundar, and J. Woodwell. 1	1998	Ecological tax reform.	<i>Bioscience</i>	48:193-196.
84	84	5	1.0	1	0.2	20.0%	Daly, H.E.	1999	Globalization versus internationalization - some implications.	<i>Ecological Economics</i>	31: 31-37.
85	73	5	0.6	2	0.2	40.0%	Kaufmann R.K.	1995	The economic multiplier of environmental life support: Can capital substitute for a degraded environment?	<i>Ecological Economics</i>	12: 67-79
86	74	4	0.8	2	0.4	50.0%	Ayres, R.U.	1999	The second law, the fourth law, recycling and limits to growth.	<i>Ecological Economics</i>	29: 473-483.
87	75	4	0.8	2	0.4	50.0%	Gowdy, J.M., and A. Ferrer-i-Carbonell	1999	Toward concision between biology and economics: the contribution of Ecological Economics.	<i>Ecological Economics</i>	29: 337-348.
88	85	4	0.4	1	0.1	25.0%	Duchin F, Lange GM	1994	Strategies for environmentally sound economic development	in <i>Investing in Natural Capital: The Ecological Economics Approach to Sustainability</i>	Island Press, Washington, DC
89	86	3	0.3	1	0.1	33.3%	Ayres, R.U.	1995	Thermodynamics and process analysis for future economic scenarios.	<i>Journal of Environmental and Resource Economics</i>	6: 207-230.
90	92	2	0.7		0.0	0.0%	Costanza, R.	2001	Visions, values, valuation and the need for an ecological economics.	<i>BioScience</i>	51:459-468
91	87	2	0.7	1	0.3	50.0%	Hall, C.A.S., D. Lindenberger, R. Kummel, T. Kroeær, and W. Eichhorn.	2001	The need to reintegrate the natural sciences with economics.	<i>BioScience</i>	51: 663-673.
92	88	2	0.2	1	0.1	50.0%	Shogren, J.F. and C. Nowell	1992	Economics and ecology: a comparison of experimental methodologies and philosophies.	<i>Ecological Economics</i>	5: 101-126.

Table A2. List of all papers published in *Ecological Economics* which received 15 or more total ISI citations, ranked in order of total number of ISI citations.

Rank (Tot ISI cites)	Rank (Tot EE cites)	Total ISI Cites	ISI Cites /yr	Total EE Cites	EE Cites/yr	% EE Cites (EE/ISI Cites)	Author(s)	Year	Title	Journal	Specifics
1	1	75	6.8	30	2.7	40.0%	Pearce DW and G. Atkinson	1993	Capital theory and the measurement of sustainable development: an indicator of weak sustainability	<i>Ecological Economics</i>	8: 103-108
2	6	68	5.2	20	1.4	29.4%	Daly, H.E.	1990	Toward some operational principles of sustainable development.	<i>Ecological Economics</i>	2: 1-6.
3	4	62	4.4	22	1.5	35.5%	Norgaard, R. B.	1989	The case for Methodological Pluralism	<i>Ecological Economics</i>	1: 37-57.
4	9	59	5.4	18	1.5	30.5%	Common, M., and C. Perrings	1992	Towards an ecological economics of sustainability	<i>Ecological Economics</i>	6: 7-34.
5	2	58	5.3	25	2.1	43.1%	Daly, H.E.	1992	Allocation, distribution, and scale: towards an economics that is efficient, just and sustainable.	<i>Ecological Economics</i>	6: 185-193.
6	3	52	4.3	24	1.8	46.2%	Victor, P.	1991	Indicators of Sustainable Development: Some Lessons for Capital Theory	<i>Ecological Economics</i>	4:191-213
7	14	48	6.0	15	1.7	31.3%	Spash, C., N. Hanley	1995	Preferences, Information and Biodiversity Preservation.	<i>Ecological Economics</i>	12: 191-208
8	12	46	3.3	17	1.1	37.0%	Costanza, R., S. C. Farber, and J. Maxwell	1989	The valuation and management of wetland ecosystems	<i>Ecological Economics</i>	1: 335
9	41	46	6.6	7	0.9	15.2%	Boxall PC, Adamowicz WL, Swait J, Williams M, Louviere J	1996	A comparison of stated preference methods for environmental valuation	<i>Ecological Economics</i>	18: 243
10	15	43	3.1	15	1.0	34.9%	Costanza R	1990	What is ecological economics?	<i>Ecological Economics</i>	1: 1-7
11	30	43	6.1	10	1.3	23.3%	Loomis JB, White DS	1996	Economic benefits of rare and endangered species: Summary and meta-analysis	<i>Ecological Economics</i>	18: 197
12	7	40	4.4	19	1.9	47.5%	Funtowicz SO, Ravetz JR	1994	The Worth of a Songbird - Ecological Economics as a Post-Normal Science	<i>Ecological Economics</i>	10: 197-207
13	37	35	5.0	8	1.0	22.9%	Azar C, Sterner T	1996	Discounting and distributional considerations in the context of global warming	<i>Ecological Economics</i>	19: 169
14	16	33	2.5	15	1.1	45.5%	Costanza, R., and C. Perrings	1990	A flexible assurance bonding system for improved environmental management.	<i>Ecological Economics</i>	2: 57-76.
15	23	33	4.1	12	1.3	36.4%	Bockstael N, Costanza R, Strand I, Boynton W, Bell K, Wainher L	1995	Ecological Economic Modeling and valuation of ecosystems	<i>Ecological Economics</i>	14: 143
16	20	32	2.3	13	0.9	40.6%	Christensen, P.P.	1989	Historical roots for ecological economics: Biophysical versus allocative approaches.	<i>Ecological Economics</i>	1: 17-36.
17	38	32	4.0	8	0.9	25.0%	Bateman IJ, Langford IH, Turner RK, Willis KG, Garrod GD	1995	Elicitation and Truncation effects in contingent valuation studies	<i>Ecological Economics</i>	12: 161
18	59	31	2.2	3	0.2	9.7%	Ehrlich, P. R.	1989	The limits to substitution: Metaresource depletion and a new economic-ecological paradigm.	<i>Ecological Economics</i>	1: 9-16
19	60	31	5.2	3	0.4	9.7%	Geoghegan J, Wainger LA, Bockstael NE	1997	Spatial landscape indices in a hedonic framework: an ecological economics analysis using GIS	<i>Ecological Economics</i>	23: 251
20	5	30	7.5	21	4.2	70.0%	Wackernagel M, Onisto L, Bello P, Linares AC, Falfan ISL, Garcia JM, Guerrero AIS,	1999	National natural capital accounting with the ecological footprint concept	<i>Ecological Economics</i>	29: 375
21	17	28	5.6	15	2.5	53.6%	Norton, B., R. Costanza, and R. Bishop	1998	The evolution of preferences: why 'sovereign' preferences may not lead to sustainable policies and what to do about it.	<i>Ecological Economics</i>	24: 193-211.
22	10	28	5.6	18	3.0	64.3%	Torras M, Boyce JK	1998	Income, inequality, and pollution: a reassessment of the environmental Kuznets Curve	<i>Ecological Economics</i>	25: 147
23	13	28	5.6	16	2.7	57.1%	Rothman DS	1998	Environmental Kuznets curves - real progress or passing the buck?	<i>Ecological Economics</i>	25: 177
24	39	26	3.3	8	0.9	30.8%	Martinez-Alier J	1995	The environment as a luxury good or too poor to be green	<i>Ecological Economics</i>	13: 1
25	43	26	3.3	6	0.7	23.1%	Nortongriffiths M, Southey C.	1995	The opportunity costs of biodiversity conservation in Kenya	<i>Ecological Economics</i>	12: 125
26	56	26	3.7	4	0.5	15.4%	Tol, R. S. J.	1996	The damage costs of climate change towards a dynamic representation	<i>Ecological Economics</i>	9: 67
27	31	25	2.3	10	0.8	40.0%	Ruitenbeek HJ	1992	The rainforest supply price: a tool for evaluating rainforest conservation expenditures	<i>Ecological Economics</i>	6: 57
28	61	24	2.0	3	0.2	12.5%	Hanley, N., S. Craig	1991	Wilderness development decisions and the Krutilla-Fisher model:	<i>Ecological Economics</i>	4: 145
29	34	24	2.7	9	0.9	37.5%	Boyce JK	1994	Inequality as a cause of environmental degradation	<i>Ecological Economics</i>	11: 169
30	32	24	3.0	10	1.1	41.7%	Bingham G, Bishop R, Brody M, Bromley D, Clark E, Cooper W, Costanza R, Hale T, Suri V, Chapman D	1995	Issues in Ecosystem Valuation - Improving information for decision makers	<i>Ecological Economics</i>	14: 73
31	11	24	4.8	18	3.0	75.0%		1998	Economic growth, trade and energy: implications for the environmental Kuznets curve	<i>Ecological Economics</i>	25: 195
32	24	23	2.9	12	1.3	52.2%	Costanza R, Patten BC	1995	Defining and predicting sustainability	<i>Ecological Economics</i>	15: 193
33	57	23	3.3	4	0.5	17.4%	Azar C, Holmberg J, Lindgren K	1996	Socio-ecological indicators for sustainability	<i>Ecological Economics</i>	18: 89
34	27	23	4.6	11	1.8	47.8%	Sagoff M	1998	Aggregation and deliberation in valuing environmental public goods: A look beyond contingent pricing	<i>Ecological Economics</i>	24: 213
35	21	22	2.8	13	1.4	59.1%	MaxNeef M	1995	Economic growth and quality of life: A threshold hypothesis	<i>Ecological Economics</i>	15: 115
36	65	22	3.1	2	0.3	9.1%	Moran EF, Packer A, Brondizio E, Tucker J	1996	Restoration of vegetation cover in the eastern Amazon	<i>Ecological Economics</i>	18: 41
37	22	22	3.1	1.6	59.1%	Ohara SU	1996	Discursive ethics in ecosystems valuation and environmental policy	<i>Ecological Economics</i>	16: 95	
38	18	22	3.7	14	2.0	63.6%	Hinterberger F, Luks F, SchmidtBleek F	1997	Material flows vs. natural capital - What makes an economy sustainable?	<i>Ecological Economics</i>	23: 1
39	44	22	4.4	6	1.0	27.3%	Costanza R, d'Arge R, de Groot R, Farber S, Grasso M, Hannon B, Limburg K, Naeem S, Baker KA, M.S. Fennessy, W.J. Mitsch	1998	The value of the world's ecosystem services and natural capital (Reprinted from Nature, vol 387, pg 253, 1997)	<i>Ecological Economics</i>	25: 3
40	67	21	1.8	1	0.1	4.8%		1991	Designing wetlands for controlling coal mine drainage: and ecologic-economic modelling approach	<i>Ecological Economics</i>	3: 1-24
41	45	21	1.9	6	0.5	28.6%	Berkes, F. and C. Folke.	1992	A Systems Perspective on the Interrelations between Natural, Human-made and Cultural Capital.	<i>Ecological Economics</i>	5:1-8.
42	35	21	1.9	9	0.8	42.9%	Kaufmann RK	1992	A biophysical analysis of the energy/real GDP ratio: implications for substitution and technical change	<i>Ecological Economics</i>	6: 35
43	40	21	2.3	8	0.8	38.1%	Munda, G., P. Nijkamp, and P. Rietveld,	1994	Qualitative multi-criteria evaluation for environmental management.	<i>Ecological Economics</i>	10: 97-112.
44	58	21	3.5	4	0.6	19.0%	Fearnside PM	1997	Environmental services as a strategy for sustainable development in rural Amazonia	<i>Ecological Economics</i>	20: 53
45	25	21	4.2	12	2.0	57.1%	de Bruyn SM, van den Bergh J CJM, Opschoor JB	1998	Economic growth and emissions: reconsidering the empirical basis of environmental Kuznets curves	<i>Ecological Economics</i>	25: 161
46	8	21	5.3	19	3.8	90.5%	van den Bergh, J.C.J.M., and H. Verbruggen,	1999	Spatial sustainability, trade and indicators: an evaluation of the 'ecological footprint'.	<i>Ecological Economics</i>	29: 63-74
47	54	20	1.5	5	0.4	25.0%	Bergstrom J.C., J.R. Stoll, J.P. Titre, V.L. Wright	1990	Economic value of wetland-based recreation	<i>Ecological Economics</i>	2: 129
48	62	20	1.5	3	0.2	15.0%	Tisdell C.	1990	Economics and the debate about preservation of species, crop varieties and genetic diversity	<i>Ecological Economics</i>	2: 77
49	46	20	2.2	6	0.6	30.0%	Ruitenbeek HJ	1994	Modelling economy-ecology linkages in mangroves	<i>Ecological Economics</i>	10: 233-247
50	47	20	2.9	6	0.8	30.0%	Brown MT, Herendeen RA	1996	Embodied energy analysis and EMERGY analysis: A comparative view	<i>Ecological Economics</i>	19: 219
51	68	20	2.9	1	0.1	5.0%	Walker R, Homma AKO	1996	Land use and land cover dynamics in the Brazilian Amazon: An overview	<i>Ecological Economics</i>	18: 67
52	63	20	6.7	3	0.8	15.0%	Gibson, C.C., E. Ostrom, and T.K. Ahn,	2000	The concept of scale and the human dimensions of global change: a survey.	<i>Ecological Economics</i>	32: 217-239.
53	64	19	1.9	3	0.3	15.8%	Altieri MA, Masero O	1993	Sustainable Rural Development in Latin America - Building from the Bottom Up	<i>Ecological Economics</i>	7: 93
54	48	19	2.1	6	0.6	31.6%	Ruitenbeek HJ	1994	Neoclassical Economics and Principles of Sustainable Development.	<i>Ecological Economics</i>	10: 233
55	69	18	2.0	1	0.1	5.6%	Izac Amn, Swift MJ	1994	On agricultural sustainability and its measurement in small-scale farming in sub-saharan Africa	<i>Ecological Economics</i>	11: 105
56	71	18	2.0	0.0	0.0%	0.0%	Rothman DS	1994	Trade, development and sustainability - a critical assessment of the free-trade dogma	<i>Ecological Economics</i>	9: 13

57	42	18	2.6	7	0.9	38.9%	Darwin R, Tsigas M, Lewandrowski J, Raneses A	1996	Land use and cover in ecological economics	<i>Ecological Economics</i>	17: 157
58	49	17	1.4	6	0.5	35.3%	Vandenbergh JCJM, P. Nijkamp	1991	Operationalizing sustainable development: dynamic ecological economic models	<i>Ecological Economics</i>	4: 11
59	50	17	1.7	6	0.5	35.3%	Bergstrom S	1993	Value standards in sub-sustainable development - on limits of ecological economics	<i>Ecological Economics</i>	7: 1
60	19	17	1.9	14	1.4	82.4%	Daly HE, Goodland R	1994	An ecological economic assessment of international commerce under GATT	<i>Ecological Economics</i>	9: 73
61	51	17	2.1	6	0.7	35.3%	Norton BG	1995	Evaluating ecosystem states - 2 competing paradigms	<i>Ecological Economics</i>	14: 113
62	36	17	2.8	9	1.3	52.9%	Higgins SI, Turpie JK, Costanza R, et al.	1997	An ecological economic simulation model of mountain fynbos ecosystems - Dynamics, valuation and management	<i>Ecological Economics</i>	22: 155
63	33	16	1.6	10	0.9	62.5%	Binswanger M	1993	From microscopic to macroscopic theories: entropic aspects of ecological and economic processes	<i>Ecological Economics</i>	8: 209
64	28	16	2.7	11	1.6	68.8%	Rennings K, Wiggering H	1997	Steps towards indicators of sustainable development: Linking economic and ecological concepts	<i>Ecological Economics</i>	20: 25
65	52	16	2.7	6	0.9	37.5%	Wackernagel M, Rees WE	1997	Perceptual and structural barriers to investing in natural capital: Economics from an ecological footprint perspective	<i>Ecological Economics</i>	20: 3
66	66	15	1.3	2	0.2	13.3%	Colby M. E.	1991	Environmental management in development: the evolution of	<i>Ecological Economics</i>	3: 193
67	70	15	1.4	1	0.1	6.7%	Pinedo-Vasquez M, D. Zarín, P. Jipp	1992	Economic returns from forest conversion in the Peruvian Amazon	<i>Ecological Economics</i>	6: 163
68	26	15	1.5	12	1.1	80.0%	Bianciardi C, Tiezzi E, Ulgiati S	1993	Complete recycling of matter in the frameworks of physics, biology and ecological economics	<i>Ecological Economics</i>	8: 1
69	29	15	2.5	11	1.6	73.3%	deBruyn SM, Opschoor JB	1997	Developments in the throughput-income relationship: Theoretical and empirical observations	<i>Ecological Economics</i>	20: 255
70	53	15	2.5	6	0.9	40.0%	Hanna SS	1997	The new frontier of American fisheries governance	<i>Ecological Economics</i>	20: 221
71	55	15	3.0	5	0.8	33.3%	Bystrom O	1998	The nitrogen abatement cost in wetlands	<i>Ecological Economics</i>	26: 321

Table A3. Journal articles most cited in *Ecological Economics*, ranked by total EE citations. Articles receiving 15 or more citations in EE are included.

Rank (Tot EE Cites)	Rank (Tot ISI Cites)	Total ISI Cites	ISI Cites/r	Total EE Cites	EE Cites/r	% EE Cites (EE/ISI Cites)	Author(s)	Year	Title	Journal	Specifics
1	6	499	71.3	68	9.7	13.6%	Costanza, R., R. d'Arge, R. de Groot, S. Farber, M. Grasso, B. Hannon, S. Naem, K. Limburg, J. Paruelo, R.V. O'Neill, R. Raskin, P. Sutton, and M. van den Belt.	1997	The value of the world's ecosystem services and natural capital.	<i>Nature</i>	387:253-260.
2	19	175	19.4	53	5.9	30.3%	Arrow, K., B. Bolin, R. Costanza, P. Dasgupta, C. Folke, C.S. Holling, B.-O. Jansson, S. Levin, K.-G. Mäler, C. Perrinos, and D. Pimentel	1995	Economic Growth, Carrying Capacity, and the Environment.	<i>Science</i>	268:520-521.
3	17	197	5.6	34	2.3	17.3%	Avres, R.U. and A.V. Kneese	1969	Production, consumption and externalities	<i>American Economic Review</i>	59: 282-297.
4	24	134	13.4	31	3.1	23.1%	Costanza, R. and H. E. Daly.	1994	Environmental-Quality and Development - Is there a Kuznets Curve for Air-Pollution Emissions	<i>Journal of Environmental Economics and Management</i>	27: 147-162.
5	1	2525	70.1	30	2.0	1.2%	Hardin, G.	1968	The tragedy of the commons.	<i>Science</i>	162: 1243-1248.
6	36	75	6.8	30	2.7	40.0%	Pearce, D.W. and G. D. Atkinson	1993	Capital theory and the measurement of sustainable development: an indicator of "weak" sustainability	<i>Ecological Economics</i>	8: 103-108.
7	34	76	3.8	29	1.9	38.2%	Cleveland, C.J., R. Costanza, C.A.S. Hall, and R. Kaufmann	1984	Energy and the United States economy: a biophysical perspective.	<i>Science</i>	225: 890-897.
8	22	158	17.6	29	3.2	18.4%	Grossman G. M. and A. B. Krueger	1995	Economic-Growth and the Environment	<i>Quarterly Journal of Economics</i>	110: 353-377.
9	13	275	15.3	28	1.9	10.2%	Vitousek, P.M., P.R. Ehrlich, A.H. Ehrlich, and P.A. Matson	1986	Human appropriation of the products of photosynthesis.	<i>BioScience</i>	34: 368-373.
10	31	86	7.2	27	2.3	31.4%	Costanza, R. and H. E. Daly.	1992	Natural Capital and Sustainable Development.	<i>Conservation Biology</i>	6: 37-46.
11	2	2452	55.7	26	1.7	1.1%	Coase, R. H.	1960	The Problem of Social Cost	<i>Journal of Law and Economics</i>	3: 1-44.
12	45	58	4.8	25	2.1	43.1%	Daly, H.E.	1992	Allocation, distribution, and scale: towards an economics that is efficient, just and sustainable.	<i>Ecological Economics</i>	6: 185-193.
13	35	76	7.6	25	2.5	32.9%	Vatn, A. and D. W. Bromley	1994	Choices without Prices without Apologies	<i>Journal of Environmental Economics and Management</i>	26: 129-148.
14	28	106	4.1	24	1.6	22.6%	Bishop, R. C.	1978	Endangered species and uncertainty: the economics of a safe minimum standard.	<i>American Journal of Agricultural Economics</i>	60: 10-18.
15	7	499	45.4	24	2.2	4.8%	Ludwig, D., R. Hilborn, and C. Walters	1993	Uncertainty, Resource Exploitation, and Conservation - Lessons from History	<i>Science</i>	260: 17-36.
16	46	52	4.0	24	1.8	46.2%	Victor, P.	1991	Indicators of Sustainable Development: Some Lessons for Capital Theory	<i>Ecological Economics</i>	4: 191-213.
17	10	310	8.4	23	1.5	7.4%	Krutilla, J. V.	1967	Conservation Reconsidered	<i>American Economic Review</i>	57: 777-784.
18	38	68	2.8	22	1.5	32.4%	Costanza, R.	1980	Embodied energy and economic valuation.	<i>Science</i>	210: 1219-1224.
19	42	62	4.1	22	1.5	35.5%	Norgaard, R. B.	1989	The case for Methodological Pluralism	<i>Ecological Economics</i>	1: 37-57.
20	43	62	7.8	22	2.8	35.5%	Stern, D. I., M.S. Common, and E. B. Barbier	1996	Economic growth and environmental degradation: The environmental kuznets curve and sustainable development	<i>World Development</i>	24: 1151-1160.
21	37	69	5.8	21	1.8	30.4%	Beckerman, W.	1992	Economic-Growth and the Environment - Whose Growth - Whose Environment	<i>World Development</i>	20: 481-496.
22	4	731	23.6	21	1.4	2.9%	Holling, C.S.	1973	Resilience and stability of ecological systems.	<i>Annual Review of Ecological Systems</i>	4: 1-24.
23	52	30	6.0	21	4.2	70.0%	Wackernagel, M., L. Onisto, P. Bello, A. C. Linares, I. S. L. Falfan, J. M. Garcia, A. I. S. Guerrero, and C. S. Guerrero	1999	National natural capital accounting with the ecological footprint concept	<i>Ecological Economics</i>	29: 375-390.
24	39	68	4.9	20	1.4	29.4%	Daly, H.E.	1990	Toward some operational principles of sustainable development	<i>Ecological Economics</i>	2: 1-6.
25	3	747	12.7	20	1.3	2.7%	Hottelina, H.	1931	The Economics of Exhaustible Resources	<i>Journal of Political Economy</i>	36: 137-175.
26	21	173	19.2	20	2.2	11.6%	Porter, M. E., C. van der Linde	1995	A New Conception of the Environment-Competitiveness Relationship	<i>Journal of Economic Perspectives</i>	9: 97-118.
27	12	288	9.6	19	1.3	6.6%	Arrow K. J. and A. C. Fisher	1974	Environmental Preservation, Uncertainty, and Irreversibility	<i>Quarterly Journal of Economics</i>	88: 312-319.
28	30	89	8.1	19	1.7	21.3%	Costanza, R., L. Wainger, C. Folke, and K.-G. Mäler.	1993	Modeling Complex Ecological Economic Systems: Towards an Evolutionary, Dynamic Understanding of People and Nature.	<i>BioScience</i>	43: 545-555.
29	50	40	4.0	19	1.9	47.5%	Funtowicz, S.O. and J. R. Ravetz	1994	The Worth of a Songbird - Ecological Economics as a Post-Normal Science	<i>Ecological Economics</i>	10: 197-207.
30	23	152	5.6	19	1.3	12.5%	Hartwick, J.M.	1977	Intergenerational Equity and Investing of Rents from Exhaustible Resources	<i>American Economic Review</i>	5: 972-974.
31	14	272	9.1	19	1.3	7.0%	Solow, R.M.	1974	Economics of Resources or Resources of Economics	<i>American Economic Review</i>	64: 1-14.
32	25	122	6.8	19	1.3	15.6%	Solow, R.M.	1986	On the intergenerational allocation of natural resources	<i>Scandinavian Journal of Economics</i>	88: 141-149.
33	57	21	4.2	19	3.8	90.5%	van den Bergh, J.C.J.M. and H. Verbruggen,	1999	Spatial sustainability, trade and indicators: an evaluation of the 'ecological footprint'.	<i>Ecological Economics</i>	29: 63-74.
34	44	60	5.0	18	1.5	30.0%	Common, M. S. and C. A. Perrins	1992	Towards an ecological economics of sustainability.	<i>Ecological Economics</i>	6: 7-34.
35	9	340	17.0	18	1.2	5.3%	Hanemann W.M.	1984	Welfare Evaluations in Contingent Valuation Experiments with Discrete Responses	<i>American Journal of Agricultural Economics</i>	66: 332-341.
36	11	307	25.6	18	1.5	5.9%	Kahnemann D. and J. L. Knetsch	1992	Valuing Public-Goods - The Purchase of Moral Satisfaction	<i>Journal of Environmental Economics and Management</i>	22: 57-70.
37	32	78	7.8	18	1.8	23.1%	Shafik N.	1994	Economic-Development and Environmental-Quality - An Econometric-Analysis	<i>Oxford Economic Papers-New Series</i>	46: 757-773.
38	16	235	7.8	18	1.2	7.7%	Solow, R.M.	1974	Intergenerational Equity and Exhaustible Resources	<i>Review of Economic Studies</i>	41: 29-45.
39	56	24	4.0	18	3.0	75.0%	Suri, V. and D. Chapman	1998	Economic growth, trade and energy: implications for the environmental Kuznets curve	<i>Ecological Economics</i>	25: 195-208.
40	53	28	4.7	18	3.0	64.3%	Torrás, M. and J. K. Boyce	1998	Income, inequality, and pollution: a reassessment of the environmental Kuznets Curve	<i>Ecological Economics</i>	25: 147-160.
41	48	46	3.1	17	1.1	37.0%	Costanza, R., S. C. Farber, and J. Maxwell	1989	The valuation and management of wetland ecosystems	<i>Ecological Economics</i>	1: 335-361.
42	26	116	3.7	17	1.1	14.7%	Hannon, B.	1973	The Structure of Ecosystems.	<i>Journal of Theoretical Biology</i>	41: 535-546.
43	33	77	5.9	17	1.3	22.1%	Stevens, T.H.	1991	Measuring the Existence Value of Wildlife: What Do CVM Estimates Really Show?	<i>Land Economics</i>	4: 390-400.
44	20	174	17.4	16	1.6	9.2%	Hanemann, W. M.	1994	Valuing the Environment Through Contingent Valuation	<i>Journal of Economic Perspectives</i>	8: 19-43.
45	5	722	14.7	16	1.1	2.2%	Kuznets, S.	1955	Economic Growth and Income Inequality	<i>American Economic Review</i>	49: 1-28.
46	54	28	4.7	16	2.7	57.1%	Rothman, D.S.	1998	Environmental Kuznets curves - real progress or passing the buck? A case for consumption-based approaches	<i>Ecological Economics</i>	25: 177-194.
47	8	479	68.4	16	2.3	3.3%	Vitousek, P.M., H.A. Mooney, J. Lubchenco, and J. M. Melillo	1997	Human domination of Earth's ecosystems	<i>Science</i>	277: 494-499.
48	49	43	2.9	15	1.0	34.9%	Costanza, R.	1989	What is ecological economics?	<i>Ecological Economics</i>	1: 1-7.
49	51	33	2.4	15	1.1	45.5%	Costanza, R. and C. A. Perrings	1990	A flexible assurance bonding system for improved environmental management.	<i>Ecological Economics</i>	2: 57-76.
50	27	114	3.5	15	1.0	13.2%	Ehrlich, P.R. and J.P. Holdren	1971	Impact of Population Growth	<i>Science</i>	171: 1212-1217.
51	29	94	8.5	15	1.4	16.0%	Gregory R., S. Lichtenstein, and P. Slovic	1993	Valuing Environmental Resources - A Constructive Approach	<i>Journal of Risk And Uncertainty</i>	7: 177-197.
52	41	63	7.0	15	1.7	23.8%	Holtz-Eakin D. and T. M. Selden	1995	Stoking the Fires - Co2 Emissions and Economic-Growth	<i>Journal of Public Economics</i>	57: 85-101.
53	18	188	5.5	15	1.0	8.0%	Leontief W	1970	Environmental Repercussions and Economic Structure - Input-Output Approach	<i>Review of Economics and Statistics</i>	52: 262-271.
54	15	247	19.0	15	1.2	6.1%	Nordhaus W.D.	1991	To Slow or Not to Slow - The Economics of the Greenhouse-Effect	<i>Economic Journal</i>	101: 920-937.
55	40	66	3.3	15	1.0	22.7%	Norgaard, R.B.	1984	Coevolutionary development potential	<i>Land Economics</i>	60: 160-173.
56	55	28	4.7	15	2.5	53.6%	Norton, B., R. Costanza, and R. Bishop	1998	The evolution of preferences: why 'sovereign' preferences may not lead to sustainable policies and what to do about it.	<i>Ecological Economics</i>	24: 193-211.
57	47	48	5.3	15	1.7	31.3%	Spash, C. and N. Hanley	1995	Preferences, Information and Biodiversity Preservation.	<i>Ecological Economics</i>	12: 191-208.

Table A4. Monographs and edited books most cited in *Ecological Economics*, ranked by total EE cites. Edited books are denoted by Ed. or Eds. after the author's name(s).

Rank (Tot EE cites)	Rank (Tot ISI Cites)	Total ISI Cites	ISI Cites/yr	Total EE Cites	EE Cites/yr	% EE Cites (EE/ISI Cites)	Author/Editor	Earliest Year	Title	Publisher
1	19	462	35.5	134	10.3	29.0%	Costanza R. (Ed.)	1991	Ecological Economics: The Science and Management of Sustainability	Columbia University Press, New York
2	17	598	39.9	96	6.4	16.1%	Daly H. E. and J. B. Cobb	1989	For the Common Good: Redirecting the Economy toward Community, the Environment, and a Sustainable Future	Beacon Press, Boston
3	35	263	26.3	89	8.9	33.8%	Jansson A. M., M. Hammer, C. Folke, and R. Costanza (Eds.)	1994	Investing in Natural Capital: The Ecological Economics Approach to Sustainability	Island Press, Washington, DC.
4	20	458	65.4	78	11.1	17.0%	Daly G. C. (Ed.)	1997	Nature's Services: Societal Dependence on Natural Ecosystems	Island Press, Washington, DC.
5	13	771	23.4	65	4.3	8.4%	Georgescu-Roegen N.	1971	The Entropy Law and the Economic Process	Harvard Univ Press, Boston MA
6	40	222	27.8	64	8.0	28.8%	Rees W., and M. Wackernagel	1996	Our Ecological Footprint: Reducing Human Impact on the Earth	New Society Publishers, San Francisco
7	11	815	54.3	58	3.9	7.1%	Mitchell R. C., R. T. Carson	1989	Using Surveys to Value Public Goods: The Contingent Valuation Method	Resources for the Future, Washington, D.C.
8	21	437	31.2	53	3.8	12.1%	Pearce D. W., R. K. Turner	1990	Economics of Natural Resources and the Environment	Johns Hopkins Univ Press, Baltimore, MD
9	23	410	15.2	49	3.3	12.0%	Daly H. E.	1977	Steady-State Economics	W H Freeman, San Francisco, CA
10	41	222	24.7	43	4.8	19.4%	Bromley D. W. (Ed.)	1995	Handbook of Environmental Economics	Blackwell, UK
11	31	285	40.7	41	5.9	14.4%	Birkeland C. (Ed.)	1997	Life and Death of Coral Reefs	Kluwer Academic Publishers, Dordrecht.
12	6	1296	92.6	40	2.9	3.1%	Ostrom E.	1990	Governing the Commons: The Evolution of Institutions for Collective Action	Cambridge University Press, Cambridge, UK
13	18	502	33.5	38	2.5	7.6%	Markandya A., E. B. Barbier, D. W. Pearce	1989	Blueprint for a Green Economy	Earthscan Publications, Ltd, London
14	7	1103	39.4	38	2.5	3.4%	Clark C. W.	1976	Mathematical Bioeconomics: The Optimal Management of Renewable Resources	Wiley-Interscience, New York, NY
15	27	340	21.3	37	2.5	10.9%	Sagoff M.	1988	The Economy of the Earth: Philosophy, Law and the Environment	Cambridge University Press, Cambridge, UK
16	14	714	47.6	33	2.2	4.6%	Wilson E. O. (Ed.)	1989	Biodiversity	National Academy Press, Washington, D.C.
17	53	114	14.3	32	4.0	28.1%	Daly H. E.	1996	Beyond Growth: the Economics of Sustainable Development	Beacon Press, Boston, MA
18	48	138	13.8	32	3.2	23.2%	Norgaard R. B.	1994	Development Betrayed: The End of Progress and A Coevolutionary Revisioning of the Future	Routledge, London.
19	46	158	13.2	31	2.6	19.6%	Low P. (Ed.)	1992	International Trade and the Environment	World Bank, Washington, DC.
20	33	273	24.8	30	2.7	11.0%	Freeman A. M.	1993	The Measurement of Environmental and Resource Values	Resources for the Future, Washington, DC
21	37	254	28.2	30	3.3	11.8%	Gunderson L. H., C. S. Holling and S. S. Light (Eds.)	1995	Barriers and Bridges to the Renewal of Ecosystems and Institutions	Columbia University Press.
22	51	123	12.3	30	3.0	24.4%	Brown K, and D. W. Pearce (Eds.)	1994	The Causes of Tropical Deforestation	UCL Press, London.
23	9	995	62.2	29	1.9	2.9%	Baumol W. J., W. E. Oates	1988	The Theory of Environmental Policy	Cambridge University Press, Cambridge, UK
24	60	78	9.8	29	3.6	37.2%	Costanza R., O. Segura, and J. Martinez-Alier (Eds.)	1996	Getting Down to Earth: Practical Applications of Ecological Economics	Island Press, Washington, DC
25	71	55	2.9	29	1.9	52.7%	Kneese A. V. and J. L. Sweeney (Eds.)	1985	Handbook of Natural Resource and Energy Economics	Elsevier, Amsterdam
26	66	67	4.5	28	1.9	41.8%	Ahmed, Y., S. El Serafy, and E. Lutz (Eds.)	1989	Environmental Accounting for Sustainable Development, a UNEP-World Bank Symposium	The World Bank, Washington, D.C.
27	50	127	12.7	27	2.7	21.3%	Ayres R. U. and U. Simonis (Eds.)	1994	Industrial Metabolism: Restructuring for Sustainable Development	United Nations University Press, Tokyo.
28	3	2417	75.5	26	1.7	1.1%	Meadows D. H., D. L. Meadows, J. Randers, W. W. Behrens	1972	The Limits to Growth	Universe Books, New York, NY
29	30	288	11.5	25	1.7	8.7%	Smith V. K. (Ed.)	1979	Scarcity and Growth Reconsidered	The John's Hopkins University Press, Baltimore
30	76	34	2.6	24	1.8	70.6%	Kuik O. and H. Verbruggen (Eds.)	1991	In Search of Indicators of Sustainable Development.	Kluwer Academic, Dordrecht.
31	69	62	5.6	24	2.2	38.7%	Daly H. E. and K. N. Townsend (Eds.)	1993	Valuing the Earth: Economics, Ecology, Ethics	MIT Press, Cambridge, MA
32	49	133	8.9	23	1.5	17.3%	Repetto R., W. McGrath, M. Wells, C. Beer, F. Rossini	1989	Wasting Assets: Natural Resources in the National Accounts	World Resources Institute, Washington, DC
33	61	76	15.2	23	4.6	30.3%	van den Bergh J. C. J. M. (Eds.)	1999	Handbook of Environmental and Resource Economics	Edward Elgar, Cheltenham.
34	58	90	7.5	23	1.9	25.6%	Ekins P. and M. Max-Neef (Eds.)	1992	Real-Life Economics	Routledge, London.
35	25	359	29.9	22	1.8	6.1%	Meadows D. H., D. L. Meadows, J. Randers	1992	Beyond the Limits: Confronting Global Collapse, Envisioning a Sustainable Future	Chelsea Green Publishing
36	4	1931	33.3	22	1.5	1.1%	Hicks J. R.	1946	Value and Capital	Oxford Univ. Press, Oxford, UK
37	47	142	15.8	22	2.4	15.5%	Perrings C. A., K.-G. Maler and C. Folke, C. S. Holling, B.-O. Jansson (Eds.)	1995	Biodiversity Loss: Economic and Ecological Issues	Cambridge Univ. Press, Cambridge, UK
38	63	74	10.6	22	3.1	29.7%	Foster J. (Ed.)	1997	Valuing Nature? Economics, Ethics and Environment	Routledge, London.
39	65	68	5.7	21	1.8	30.9%	De Groot R.S.	1992	Functions of Nature: Evaluation of Nature in Environmental Planning, Management and Decision-Making	Volters-Noordhoff B.V., Amsterdam
40	70	56	3.3	21	1.4	37.5%	Perrings C. A.	1987	Economy and Environment: A Theoretical Essay on the Interdependence of Economic and Environmental Systems	Cambridge University Press, Cambridge, UK
41	56	100	5.6	21	1.4	21.0%	Hall C. A. S., C. J. Cleveland, R. K. Kaufmann	1986	Energy and Resource Quality: The Ecology of the Economic Process	Wiley Interscience, NY
42	12	785	28.0	21	1.4	2.7%	Hirsch F.	1976	Social Limits to Growth	Harvard Univ Press, Boston
43	72	50	4.2	21	1.8	42.0%	Costanza R., B. Norton and B. J. Haskell (Eds.)	1992	Ecosystem Health: New Goals for Environmental Management	Island Press, Washington, DC.
44	57	97	7.5	21	1.6	21.6%	Goodland R., H. E. Daly and S. El Serafy (Eds.)	1991	Environmentally Sustainable Economic Development: Building on Brundtland	World Bank, Washington, DC.
45	67	66	3.9	20	1.3	30.3%	Martinez-Alier J.	1987	Ecological Economics: Energy, Environment, and Society	Blackwell, UK.
46	64	70	8.8	20	2.5	28.6%	Hanna S., C. Folke and K. G. Maler (Eds.)	1996	Rights to Nature--Ecological, Economic, Cultural, and Political Principles of Institutions for the Environment.	Island Press, Washington, DC.
47	10	890	63.6	19	1.4	2.1%	Greene W. H.	1990	Econometric Analysis	Prentice Hall, NY
48	59	79	3.0	19	1.3	24.1%	Ayres R. U.	1978	Resources, Environment, and Economics: Applications of the Materials/Energy Balance Principle	Wiley, NY
49	44	182	30.3	19	3.2	10.4%	Berkes F. and C. Folke (Eds.)	1998	Linking Social and Ecological Systems. Management Practices and Social Mechanisms for Building Resilience.	Cambridge University Press, Cambridge, UK
50	28	333	27.8	19	1.6	5.7%	Cowling R.M. (Ed.)	1992	The Ecology of Fynbos: Nutrients, Fire, and Diversity	Oxford University Press, Cape Town.
51	22	415	41.5	19	1.9	4.6%	Davis S. M. and J. C. Ooden (Eds.)	1994	Everglades: The Ecosystem and Its Restoration	St. Lucie Press, Delray Beach, FL
52	38	254	12.7	18	1.2	7.1%	Tietenberg T. H.	1984	Environmental and Natural Resource Economics	Pearson Addison Wesley, NY
53	1	7823	237.1	18	1.2	0.2%	Rawls J.	1971	A Theory of Justice	Clarendon Press
54	39	241	4.6	18	1.2	7.5%	Ciriacy-Wantrup S. V.	1952	Resource Conservation: Economics and Policies	University of California Press, Berkeley
55	8	1035	17.5	18	1.2	1.7%	Pigou A. C.	1920	The Economics of Welfare	Macmillan and Co, London
56	42	222	5.8	18	1.2	8.1%	Jarret H. (Ed.)	1966	Environmental Quality in a Growing Economy	John Hopkins University Press, Baltimore MD.
57	15	628	34.9	18	1.2	2.9%	Clark W. C. and R. E. Munn (Eds.)	1986	Sustainable Development of the Biosphere	Cambridge University Press, Cambridge.
58	34	267	38.1	18	2.6	6.7%	Kohn K. A. and J. F. Franklin (Eds.)	1997	Creating a Forestry for the 21st Century: The Science of Ecosystem Management	Island Press, Washington DC.
59	73	39	3.9	18	1.8	46.2%	Cobb C. and J. Cobb (Eds.)	1994	The Green National Product: A Proposed Index of Sustainable Welfare	University Press of America, New York.
60	68	64	9.1	17	2.4	26.6%	Costanza R., J. Cumberland, H. E. Daly, R. Goodland, R. B. Norraard	1997	An Introduction to Ecological Economics	St. Lucie Press, Delray Beach, FL
61	29	320	26.7	17	1.4	5.3%	Cline W. R.	1992	The Economics of Global Warming	Institute for International Economics, Washington, DC
62	45	179	13.8	17	1.3	9.5%	Bromley D. W.	1991	Environment and Economy: Property Rights and Public Policy	Blackwell, Oxford, UK
63	36	258	19.8	17	1.3	6.6%	J. B. Braden and C. D. Kolstad (Eds.)	1991	Measuring the Demand for Environmental Quality	Elsevier, Amsterdam.
64	24	386	21.4	17	1.1	4.4%	Cummings R. G., D. S. Brookshire, and W. D. Schulze (Eds.)	1986	Valuing Environmental Goods: An Assessment of the Contingent Valuation Method	Rowman and Allanheld, Totowa, NJ.
65	32	276	27.6	16	1.6	5.8%	Nordhaus W. D.	1994	Managing the Global Commons: The Economics of Climate Change	MIT Press, Cambridge, MA
66	2	2609	93.2	16	1.1	0.6%	Keeney R. L., H. Raiffa	1976	Decisions with Multiple Objectives	Wiley, NY
67	52	120	4.3	16	1.1	13.3%	Georgescu-Roegen N.	1976	Energy and Economic Myths: Institutional and Analytical Economic Essays	Pergamon Press, NY
68	43	188	17.1	16	1.5	8.5%	Ferber M. and J. Nelson (Eds.)	1993	Beyond Economic Man: Feminist Theory and Economics	University of Chicago Press, Chicago IL.
69	62	76	9.5	16	2.0	21.1%	Campbell B. (Ed.)	1996	The Miombo in Transition: Woodlands and Welfare in Africa	Center for International Forestry Research, Bogor.
70	55	109	9.9	16	1.5	14.7%	Turner R. K (Ed.)	1993	Sustainable Environmental Economics and Management	John Wiley and Sons, Chichester, Sussex.
71	77	28	4.0	15	2.1	53.6%	Von-Weizsacker E. U., A. Lovins, H. Lovins	1997	Factor Four -- Doubling Wealth, Halving Resource Use	Earthscan, London
72	74	38	3.5	15	1.4	39.5%	Ruth M.	1993	Integrating Economics, Ecology and Thermodynamics	Kluwer, Dordrecht, NL.
73	75	37	2.6	15	1.1	40.5%	North D. C.	1990	Institutions, Institutional Change and Economic Performance	Cambridge Univ. Press, Cambridge, UK
74	16	625	34.7	15	1.0	2.4%	Walters C. J.	1986	Adaptive Management of Renewable Resources	Macmillan, London
75	26	347	16.5	15	1.0	4.3%	Odum H. T.	1983	Systems Ecology: An Introduction	Wiley Interscience, NY
76	5	1508	94.3	15	1.0	1.0%	Dosi G., C. Freeman, R. Nelson, G. Silverberg, and L. Soete (Eds.)	1988	Technical Change and Economic Theory	Pinter Publishers, London.
77	54	112	22.4	3	3.0	13.4%	Bateman I. J. and K. G. Willis (Eds.)	1999	Valuing Environmental Preferences - Theory and Practice of the Contingent Valuation Method in the US, EU, and Developing Countries.	Oxford University Press, Oxford.