Bibliometric Analysis for Papers on Topics Related to Land/Remediation Research

This is a bibliometric analysis of the papers prepared by intramural and extramural researchers of the U.S. Environmental Protection Agency (EPA) on topics related to land/remediation research. For this analysis, 1,141 papers were reviewed. These 1,141 papers, published from 1995 to 2005, were cited 14,477 times in the journals covered by Thomson's Web of Science.[1] Of these 1,141 papers, 1,030 (90.3%) have been cited at least once in a journal.

The analysis was completed using Thomson's Essential Science Indicators (ESI) and Journal Citation Reports (JCR) as benchmarks. ESI provides access to a unique and comprehensive compilation of essential science performance statistics and science trends data derived from Thomson's databases. The chief indicators of output, or productivity, are journal article publication counts. For influence and impact measures, ESI employs both total citation counts and cites per paper scores. The former reveals gross influence while the latter shows weighted influence, also called impact. JCR presents quantifiable statistical data that provide a systematic, objective way to evaluate the world's leading journals and their impact and influence in the global research community.

Summary of Analysis

More than one-quarter of the land/remediation publications are highly cited papers. A review of the citations indicates that 289 (25.3%) of the land/remediation papers qualify as highly cited when using the ESI criteria for the top 10% of highly cited publications. Forty-four (3.9%) of the land/remediation papers qualify as highly cited when using the criteria for the top 1%. Three (0.3%) of these papers qualify as very highly cited (in the top 0.1%). None of the papers meet the highest threshold (the top 0.01%) for highly cited papers.

The land/remediation papers are more highly cited than the average paper. Using the ESI average citation rates for papers published by field as the benchmark, in 11 of the 14 fields in which the EPA land/remediation papers were published, the ratio of actual to expected cites is greater than 1, indicating that the land/remediation papers are more highly cited than the average papers in those fields.

Nearly one-quarter of the land/remediation papers are published in very high impact journals. Two hundred seventy-six (276) of 1,141 papers were published in the top 10% of journals ranked by JCR Impact Factor, representing 24.2% of EPA's land/remediation papers. More than one-fifth of the land/remediation papers are published in the top 10% of journals ranked by JCR Immediacy Factor. Two-hundred forty-three (243) of the 1,141 papers appear in the top 10% of journals, representing 21.3% of EPA's land/remediation papers.

Twenty of the land/remediation publications qualified as hot papers. ESI establishes citation thresholds for hot papers, which are selected from the highly cited papers in different fields, but the time frame for citing and cited papers is much shorter—papers must be cited

[1] Thomson's *Web of Science* provides access to current and retrospective multidisciplinary information from approximately 8,500 of the most prestigious, high impact research journals in the world. *Web of Science* also provides cited reference searching.

within 2 years of publication and the citations must occur in a 2-month time period. Using the current hot paper thresholds established by ESI as a benchmark, 20 of the land/remediation papers, representing 1.8% of the land/remediation publications, were identified as hot papers in the analysis.

The authors of the land/remediation papers cite themselves less than the average self-citation rate. Seven hundred sixty-seven (767) of the 14,477 cites are author self-cites. This 5.3% author self-citation rate is well below the accepted range of 10-30% author self-citation rate.

<u>Highly Cited Land/Remediation Publications</u>

The 1,141 land/remediation papers reviewed for this analysis covered 14 of the 22 ESI fields of research. The distribution of the papers among these 14 fields and the number of citations by field are presented in Table 1.

Table 1. Land/Remediation Papers by ESI Fields

No. of Citations	ESI Field	No. of EPA Ecosystem Papers	Average Cites/Paper
5,428	Environment/Ecology	495	10.96
4,571	Engineering	334	13.68
1,678	Chemistry	129	13.01
1,491	Microbiology	69	21.61
413	Pharmacology & Toxicology	28	14.75
407	Geosciences	47	8.66
153	Physics	11	13.91
115	Biology & Biochemistry	10	11.50
107	Agricultural Sciences	8	13.38
58	Plant & Animal Science	5	11.60
48	Materials Science	2	24.00
6	Multidisciplinary	1	6.00
1	Clinical Medicine	1	1.00
1	Mathematics	1	1.00
Total = 14,477		**Total = 1,141**	**12.69**

There were 289 (25.3% of the papers analyzed) highly cited EPA land/remediation papers in 11 of the 14 fields—Engineering, Environment/Ecology, Chemistry, Microbiology, Pharmacology & Toxicology, Geosciences, Physics, Agricultural Sciences, Materials Science, Plant & Animal

Science, and Multidisciplinary—when using the ESI criteria for the **top 10% of papers**. Table 2 shows the number of EPA papers in those 11 fields that met the **top 10% threshold in ESI**.

Forty-four (3.9%) of the papers analyzed qualified as highly cited when using the ESI criteria for the **top 1% of papers**. These papers were categorized in five fields—Engineering, Environment/Ecology, Microbiology, Pharmacology & Toxicology, and Materials Science. Table 3 shows the 44 papers by field that met the **top 1% threshold in ESI**. There were three (0.3% of the papers analyzed) very highly cited EPA land/remediation papers in two fields—Engineering and Pharmacology & Toxicology. These three papers met the **top 0.1% threshold in ESI**. None of the land/remediation papers met the highest threshold for highly cited papers (i.e., the **top 0.01% threshold)** in ESI.

Table 2. Number of Highly Cited Land/Remediation Papers by Field (top 10%)

No. of Citations	ESI Field	No. of Papers	Average Cites/Paper	% of EPA Papers in Field
3,967	Engineering	173	22.93	51.80%
2,387	Environment/Ecology	66	36.17	13.33%
776	Chemistry	17	45.65	13.18%
554	Microbiology	8	69.25	11.59%
242	Pharmacology & Toxicology	7	34.57	25.00%
164	Geosciences	7	23.43	14.89%
127	Physics	4	31.75	36.36%
82	Agricultural Sciences	3	27.33	37.50%
47	Materials Science	1	47.00	50.00%
26	Plant & Animal Science	2	13.00	40.00%
6	Multidisciplinary	1	6.00	100.00%
Total = 8,378		**Total = 289**	**28.99**	

Table 3. Number of Highly Cited Land/Remediation Papers by Field (top 1%)

No. of Citations	ESI Field	No. of Papers	Average Cites/Paper	% of EPA Papers in Field
1,707	Engineering	37	46.14	11.08%
234	Environment/Ecology	2	117.00	0.40%
202	Chemistry	2	83.00	3.57%
119	Microbiology	1	119.00	1.45%
83	Pharmacology & Toxicology	1	83.00	3.57%
47	Materials Science	1	47.00	50.00%
Total = 2,392		**Total = 44**	**54.36**	

The citations for the highly cited papers in the top 1% are presented in Tables 4 through 9. The citations for the very highly cited papers are listed in Table 10.

Table 4. Highly Cited Land/Remediation Papers in the Field of Engineering (top 1%)

No. of Cites	First Author	Paper
59	Hopkins GD	Field evaluation of *in-situ* aerobic cometabolism of trichloroethylene and 3-dichloroethylene isomers using phenol and toluene as the primary substrates. *Environmental Science & Technology* 1995;29(6):1628-1637.
53	Helland BR	Reductive dechlorination of carbon-tetrachloride with elemental iron. *Journal of Hazardous Materials* 1995;41(2-3):205-216.
51	Chiu PC	Metallocoenzyme-mediated reductive transformation of carbon-tetrachloride in titanium (III) citrate aqueous solution. *Environmental Science & Technology* 1995;29(3):595-603.
50	Ankley GT	Effects of light-intensity on the phototoxicity of fluoranthene to a benthic macroinvertebrate. *Environmental Science & Technology* 1995;29(11):2828-2833.
103	Pennell KD	Influence of viscous and buoyancy forces on the mobilization of residual tetrachloroethylene during surfactant flushing. *Environmental Science & Technology* 1996;30(4):1328-1335.
57	Siantar DP	Treatment of 1,2-dibromo-3-chloropropane and nitrate-contaminated water with zero-valent iron or hydrogen/palladium catalysts. *Water Research* 1996;30(10):2315-2322.
80	Hughes JB	Transformation of TNT by aquatic plants and plant tissue cultures. *Environmental Science & Technology* 1997;31(1):266-271.

No. of Cites	First Author	Paper
57	Reinhard M	*In situ* BTEX biotransformation under enhanced nitrate- and sulfate-reducing conditions. *Environmental Science & Technology* 1997;31(1):28-36.
49	Burken JG	Uptake and metabolism of atrazine by poplar trees. *Environmental Science & Technology* 1997;31(5):1399-1406.
47	Pennell KD	Solubilization of dodecane, tetrachloroethylene, and 1,2-dichlorobenzene in micellar solutions of ethoxylated nonionic surfactants. *Environmental Science & Technology* 1997;31(5):1382-1389.
74	Yang YR	Competition for hydrogen within a chlorinated solvent dehalogenating anaerobic mixed culture. *Environmental Science & Technology* 1998;32(22):3591-3597.
71	Kan AT	Irreversible sorption of neutral hydrocarbons to sediments: experimental observations and model predictions. *Environmental Science & Technology* 1998;32(7):892-902.
69	Davis JA	Application of the surface complexation concept to complex mineral assemblages. *Environmental Science & Technology* 1998;32(19):2820-2828.
66	Burken JG	Predictive relationships for uptake of organic contaminants by hybrid poplar trees. *Environmental Science & Technology* 1998;32(1):3379-3385.
52	McCarty PL	Full scale evaluation of *in situ* cometabolic degradation of trichloroethylene in groundwater through toluene injection. *Environmental Science & Technology* 1998;21(1):88-100.
51	Annable MD	Partitioning tracers for measuring residual NAPL: field-scale test results. *Journal of Environmental Engineering-ASCE* 1998;124(6):498-503.
50	Jawitz JW	Field implementation of a Winsor type I surfactant/alcohol mixture for *in situ* solubilization of a complex LNAPL as a single phase microemulsion. *Environmental Science & Technology* 1998;32(4):523-530.
46	Till BA	Fe(0)-supported autotrophic dentrification. *Environmental Science & Technology* 1998;32(5):634-639.
43	Butler EC	Effects of solution composition on pH on the reductive dechlorination of hexachloroethane by iron sulfide. *Environmental Science & Technology* 1998;32(9):1276-1284.
43	Herdan J	Field evaluation of an electrochemical probe for *in situ* screening of heavy metals in groundwater. *Environmental Science & Technology* 1998;32(1):131-136.

No. of Cites	First Author	Paper
88	Xia GS	Adsorption-partitioning uptake of nine low-polarity organic chemicals on a natural sorbent. *Environmental Science & Technology* 1999;33(2):262-269.
54	Su CM	Kinetics of trichloroethene reduction by zerovalent iron and tin: pretreatment effect, apparent activation energy, and intermediate products. *Environmental Science & Technology* 1999;33(1):163-168.
37	Bhadra R	Confirmation of conjugation processes during TNT metabolism by axenic plant roots. *Environmental Science & Technology* 1999;33(3):446-452.
41	Ford RG	The nature of Zn precipitates formed in the presence of pyrophyllite. *Environmental Science & Technology* 2000;34(12):2479-2483.
40	Burkhard LP	Estimating dissolved organic carbon partition coefficients for nonionic organic chemicals. *Environmental Science & Technology* 2000;34(22):4663-4668.
56	Su CM	Arsenate and arsenite removal by zerovalent iron: kinetics, redox transformation, and implications for *in situ* groundwater remediation. *Environmental Science & Technology* 2001;35(7):1487-1492.
37	Williams AGB	Kinetics of Cr(VI) reduction by carbonate green rust. *Environmental Science & Technology* 2001;35(17):3488-3494.
27	Ryan JA	Formation of chloropyromorphite in a lead-contaminated soil amended with hydroxyapatite. *Environmental Science & Technology* 2001;35(18):3798-3803.
27	McCormick ML	Carbon tetrachloride transformation in a model iron-reducing culture: relative kinetics of biotic and abiotic reactions. *Environmental Science & Technology* 2002;36(3):403-410.
25	Rockne KJ	Distributed sequestration and release of PAHs in weathered sediment: the role of sediment structure and organic carbon properties. *Environmental Science & Technology* 2002;36(12):2636-2644.
24	Kneebone PE	Deposition and fate of arsenic in iron- and arsenic-enriched reservoir sediments. *Environmental Science & Technology* 2002;36(3):381-386.
21	Lu YF	Demonstration of the “conditioning effect” in soil organic matter in support of a pore deformation mechanism for sorption hysteresis. *Environmental Science & Technology* 2002;36(21):4553-4561.
27	Braida WJ	Sorption hysteresis of benzene in charcoal particles. *Environmental Science & Technology* 2003;37(2):409-417.
10	Nguyen TH	Sorption nonlinearity for organic contaminants with diesel soot: method development and isotherm interpretation. *Environmental Science & Technology* 2004;38(3):3595-3603.

No. of Cites	First Author	Paper
10	Williams AGB	Spectroscopic evidence for Fe(II)-Fe(III) electron transfer at the iron oxide-water interface. *Environmental Science & Technology* 2004;38(18):4782-4790.
7	Ryan JA	Reducing children's risk from lead in soil. *Environmental Science & Technology* 2004;38(1):18A-24A.
5	Kuder T	Enrichment of stable carbon and hydrogen isotopes during anaerobic biodegradation of MTBE: microcosm and field evidence. *Environmental Science & Technology* 2005;39(1):213-220.

Table 5. Highly Cited Land/Remediation Papers in the Field of Environment/Ecology (top 1%)

No. of Cites	First Author	Paper
125	Ankley GT	Technical basis and proposal for deriving sediment quality criteria for metals. *Environmental Toxicology and Chemistry* 1995;15(12):2056-2066.
109	Haggerty R	Multiple-rate mass-transfer for modeling diffusion and surface-reactions in media with pore-scale heterogeneity. *Water Resources Research* 1995;31(10):2383-2400.

Table 6. Highly Cited Land/Remediation Papers in the Field of Chemistry (top 1%)

No. of Cites	First Author	Paper
113	Wang J	Sol-gel-derived thick-film amperometric immunosensors. *Analytical Chemistry* 1998;70(6):1171-1175.
89	Ravikovitch PI	Unified approach to pore size characterization of microporous carbonaceous materials from N-2, Ar, and CO_2 adsorption isotherms. *Langmuir* 2000;16(5):2311-2320.

Table 7. Highly Cited Land/Remediation Papers in the Field of Microbiology (top 1%)

No. of Cites	First Author	Paper
119	Macnaughton SJ	Microbial population changes during bioremediation of an experimental oil spill. *Applied and Environmental Microbiology* 1999;65(8):3566-3574.

Table 8. Highly Cited Land/Remediation Papers in the Field of Pharmacology & Toxicology (top 1%)

No. of Cites	First Author	Paper
83	Ding XX	Human extrahepatic cytochromes P450: function in xenobiotic metabolism and tissue-selective chemical toxicity in the respiratory and gastrointestinal tracts. *Annual Review of Pharmacology and Toxicology* 2003;43:149-173.

Table 9. Highly Cited Land/Remediation Papers in the Field of Materials Science (top 1%)

No. of Cites	First Author	Paper
47	Neimark AV	Capillary condensation in MMS and pore structure characterization. *Microporous and Mesoporous Materials* 2001;44:697-707.

Table 10. Very Highly Cited Land/Remediation Papers (Top 0.1%)

Field	No. of Cites	First Author	Paper
Engineering	27	Braida WJ	Sorption hysteresis of benzene in charcoal particles. *Environmental Science & Technology* 2003;37(2):409-417.
	5	Kuder T	Enrichment of stable carbon and hydrogen isotopes during anaerobic biodegradation of MTBE: microcosm and field evidence. *Environmental Science & Technology* 2005;39(1):213-220.
Pharmacology & Toxicology	83	Ding XX	Human extrahepatic cytochromes P450: function in xenobiotic metabolism and tissue-selective chemical toxicity in the respiratory and gastrointestinal tracts. *Annual Review of Pharmacology & Toxicology* 2003;43:149-173.

Ratio of Actual Cites to Expected Citation Rates

The expected citation rate is the average number of cites that a paper published in the same journal in the same year and of the same document type (article, review, editorial, etc.) has received from the year of publication to the present. Using the ESI average citation rates for papers published by field as the benchmark, in 11 of the 14 fields in which the EPA land/remediation papers were published, the ratio of actual to expected cites is greater than 1, indicating that the EPA papers are more highly cited than the average papers in those fields (see Table 11).

Table 11. Ratio of Average Cites to Expected Cites for Land/Remediation Papers by Field

ESI Field	Total Cites	Expected Cite Rate	Ratio
Environment/Ecology	5,428	4,264.93	1.27
Engineering	4,571	1,115.34	4.10
Chemistry	1,678	1,261.94	1.33
Microbiology	1,491	1,183.65	1.26
Pharmacology & Toxicology	413	293.85	1.40
Geosciences	407	399.33	1.02
Physics	153	82.22	1.86
Biology & Biochemistry	115	123.21	0.93
Agricultural Sciences	107	42.32	2.53
Plant & Animal Science	58	30.35	1.91
Materials Science	48	11.84	4.05
Multidisciplinary	6	2.28	2.63
Clinical Medicine	1	1.70	0.59
Mathematics	1	3.77	0.26

JCR Benchmarks

The Impact Factor is a well known metric in citation analysis. It is a measure of the frequency with which the *average article* in a journal has been cited in a particular year. The Impact Factor helps evaluate a journal's relative importance, especially when compared to others in the same field. The Impact Factor is calculated by dividing the number of citations in the current year to articles published in the 2 previous years by the total number of articles published in the 2 previous years.

Table 12 indicates the number of land/remediation papers published in the top 10% of journals, based on the JCR Impact Factor. Two hundred seventy-six (276) of 1,141 papers were published in the top 10% of journals, representing 24.2% of EPA's land/remediation papers.

Table 12. Land/Remediation Papers in Top 10% of Journals by JCR Impact Factor

EPA Land/Remediation Papers in that Journal	Journal	Impact Factor (IF)	JCR IF Rank
180	Environmental Science & Technology	3.557	540
23	Applied and Environmental Microbiology	3.810	470
12	Environmental Health Perspectives	3.929	439
11	Analytical Chemistry	5.450	243
8	Journal of Bacteriology	4.146	385
6	Drug Metabolism and Disposition	3.836	461
5	Electrophoresis	3.743	482
4	Langmuir	3.295	622
3	Applied Catalysis B-Environmental	4.042	411
3	Toxicological Sciences	3.391	591
2	Journal of Chromatography A	3.359	602
2	Geochimica et Cosmochimica Acta	3.811	468
2	Journal of the American Society for Mass Spectrometry	3.760	479
2	Biosensors & Bioelectronics	3.251	636
1	Current Opinion in Biotechnology	8.080	129
1	Siam Review	6.118	203
1	Journal of Pharmacology and Experimental Therapeutics	4.335	356
1	Ecology	4.104	394
1	Journal of Analytical Atomic Spectrometry	3.926	440
1	Pediatrics	3.903	447
1	TRAC-Trends in Analytical Chemistry	3.888	452
1	Biochemical Pharmacology	3.436	581

EPA Land/Remediation Papers in that Journal	Journal	Impact Factor (IF)	JCR IF Rank
1	Ecological Applications	3.287	623
1	Advances in Agronomy	3.212	652
1	Chemical Geology	3.174	670
1	Journal of Mass Spectrometry	3.056	722
1	Limnology and Oceanography	3.024	737
Total = 276			

Immediacy Index

The journal Immediacy Index is a measure of how quickly the *average article* in a journal is cited. It indicates how often articles published in a journal are cited within the year they are published. The Immediacy Index is calculated by dividing the number of citations to articles published in a given year by the number of articles published in that year.

Table 13 indicates the number of EPA papers published in the top 10% of journals, based on the JCR Immediacy Index. Two hundred forty-three (243) of the 1,141 papers appear in the top 10% of journals, representing 21.3% of EPA's land/remediation papers.

Table 13. Land/Remediation Papers in Top 10% of Journals by JCR Immediacy Index

EPA Land/Remediation Papers in that Journal	Journal	Immediacy Index (II)	JCR II Rank
180	Environmental Science & Technology	0.623	617
12	Environmental Health Perspectives	1.202	202
11	Analytical Chemistry	0.885	346
8	Journal of Bacteriology	0.827	383
6	Drug Metabolism and Disposition	0.590	676
5	Electrophoresis	0.575	697
4	Langmuir	0.566	717
2	Tetrahedron Letters	0.583	681
2	Hydrobiologia	0.681	532

EPA Land/Remediation Papers in that Journal	Journal	Immediacy Index (II)	JCR II Rank
2	Geochimica et Cosmochimica Acta	0.680	535
2	Journal of the American Society for Mass Spectrometry	0.575	697
1	Ecotoxicology	1.450	151
1	Pediatrics	0.935	311
1	TRAC-Trends in Analytical Chemistry	0.583	681
1	Ecology	0.590	676
1	Current Opinion in Biotechnology	0.919	322
1	Marine Geology	0.842	373
1	Journal of Pharmacology and Experimental Therapeutics	0.797	419
1	Ecological Applications	0.747	466
1	Journal of Analytical Atomic Spectrometry	0.641	588
Total = 243			

Hot Papers

ESI establishes citation thresholds for hot papers, which are selected from the highly cited papers in different fields, but the time frame for citing and cited papers is much shorter—papers must be cited within 2 years of publication and the citations must occur in a 2-month time period. Papers are assigned to 2-month periods and thresholds are set for each period and field to select 0.1% of papers. There were no hot papers identified for the current 2-month period (i.e., September-October 2005), but there was one hot paper identified from previous periods.

Using the current hot paper thresholds established by ESI as a benchmark, 20 hot papers, representing 1.8% of the land/remediation papers, were identified in the fields of Engineering, Environment/Ecology, Pharmacology & Toxicology, and Microbiology. The hot papers are listed in Table 14.

Table 14. Hot Papers Identified Using Current ESI Thresholds

Field	ESI Hot Papers Threshold	No. of Cites in 2-Month Period	Paper
Engineering	5	6 cites in February-March 2003	Williams AGB, Scherer MM. Kinetics of Cr(VI) reduction by carbonate green rust. *Environmental Science & Technology* 2001;35(17):3488-3494.
	5	6 cites in August-September 1999	McCarty PL, et al. Full scale evaluation of in situ cometabolic degradation of trichloroethylene in groundwater through toluene injection. *Environmental Science & Technology* 1998;32(1):88-100.
	5	5 cites in November-December 2001	Ford RG, Sparks DL. The nature of Zn precipitates formed in the presence of pyrophyllite. *Environmental Science & Technology* 2000;34(12):2479-2483.
	5	5 cites in July-August 1999	Herdan J, et al. Field evaluation of an electrochemical probe for in situ screening of heavy metals in groundwater. *Environmental Science & Technology* 1998;32(1):131-136.
	4	5 cites in September-October 2005	Nguyen TH, et al. Sorption nonlinearity for organic contaminants with diesel soot: method development and isotherm interpretation. *Environmental Science & Technology* 2004;38(13):3595-3603.
	4	5 cites in January-February 2005	Ryan JA, et al. Reducing children's risk from lead in soil. *Environmental Science & Technology* 2004;38(1):18A-24A.
	4	5 cites in August-September 2005	Williams AGB, Scherer MM. Spectroscopic evidence for Fe(II)-Fe(III) electron transfer at the iron oxide-water interface. *Environmental Science & Technology* 2004;38(18):4782-4790.
	4	5 cties in August-September 2002	Pruden A, et al. Biodegradation of methyl tert-butyl ether under various substrate conditions. *Environmental Science & Technology* 2001;35(21):4235-4241.

Field	ESI Hot Papers Threshold	No. of Cites in 2-Month Period	Paper
Engineering	4	5 cites in December 1999-January 2000	Davis JA, et al. Application of the surface complexation concept to complex mineral assemblages. *Environmental Science & Technology* 1998;32(19):2820-2828.
	4	5 cites in May-June 1997	Schnoor JL, et al. Phytoremediation of organic and nutrient contaminants. *Environmental Science & Technology* 1995;29(7):A318-A323.
	4	4 cites in April-May 2003	Rockne KJ, et al. Distributed sequestration and release of PAHs in weathered sediment: the role of sediment structure and organic carbon. *Environmental Science & Technology* 2002;36(12):2636-2644.
	4	4 cites in February-March 2002	Reddy CM, et al. Stable chlorine isotopic compositions of aroclors and aroclor-contaminated sediments. *Environmental Science & Technology* 2000;34(13):2866-2870.
	4	4 cites in June-July 1998	Hurst CJ, et al. Soil gas oxygen tension and pentachlorophenol biodegradation. *Journal of Environmental Engineering-ASCE* 1997;123(4):364-370.
	3	3 cites in June-July 1997	Anderson JE, McCarty PL. Effect of three chlorinated ethenes on growth rates for a methanotrophic mixed culture. *Environmental Science & Technology* 1996;30(12):3517-3524.
Environment/ Ecology	8	13 cites in November-December 1996	Berry WJ, et al. Predicting the toxicity of metal-spiked laboratory sediments using acid-volatile sulfide and interstitial water normalizations. *Environmental Toxicology and Chemistry* 1996;15(12):2067-2079.
	8	11 cites in December 1996	Hansen DJ, et al. Chronic effect of cadmium in sediments on colonization by benthic marine organisms: an evaluation of the role of interstitial cadmium and acid-volatile sulfide in biological availability. *Environmental Toxicology and Chemistry* 1996;15(12):2126-2137.

Field	ESI Hot Papers Threshold	No. of Cites in 2-Month Period	Paper
Environment/ Ecology	8	10 cites in December 1996	Hansen DJ, et al. Predicting the toxicity of metal-contaminated field sediments using interstitial concentration of metals and acid-volatile sulfide. *Environmental Toxicology and Chemistry* 1996;15(12):2080-2094.
	8	9 cites in December 1996	Liber K, et al. Effects of acid-volatile sulfide on zinc bioavailability and toxicity to benthic macroinvertebrates: a spiked-sediment field experiment. *Environmental Toxicology and Chemistry* 1996;15(12):2113-2125.
Pharmacology & Toxicology	5	9 cites in September-October 2004	Ding XX, Kaminsky LS. Human extrahepatic cytochromes P450: function in xenobiotic metabolism and tissue-selective chemical toxicity in the respiratory and gastrointestinal tracts. *Annual Review of Pharmacology and Toxicology* 2003;43:149-173.
Microbiology	3	3 cites in May-June 1995	Ely RL, et al. A cometabolic kinetics model incorporating enzyme-inhibition, inactivation, and recovery. 2. Trichloroethylene degradation experiments. *Biotechnology and Bioengineering* 1995;46(3):232-245.

Author Self-Citation

Self-citations are journal article references to articles from that same author (i.e., the first author). Because higher author self-citation rates can inflate the number of citations, the author self-citation rate was calculated for the land/remediation papers. Of the 14,477 total cites, 767 are author self-cites—a 5.3% author self-citation rate. Garfield and Sher[2] found that authors working in research-based disciplines tend to cite themselves on the average of 20% of the time. MacRoberts and MacRoberts[3] claim that approximately 10% to 30% of all the citations listed fall into the category of author self-citation. Therefore, the 5.3% self-cite rate for the land/remediation papers is well below the range for author self-citation.

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[2] Garfield E, Sher IH. New factors in the evaluation of scientific literature through citation indexing. *American Documentation* 1963;18(July):195-201.

[3] MacRoberts MH, MacRoberts BR. Problems of citation analysis: a critical review. *Journal of the American Society of Information Science* 1989;40(5):342-349.