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ABSTRACT

Approximately 350 English-language journals in the interdisciplinary field of marine science are published. Two groups, one of fifty titles, and one of fourteen are analyzed for price increases between 1997 and 2003. Within the larger context of escalating journal prices in all scientific fields, the marine science journals have increased in price approximately 71% during this period, while general science titles have increased 34%.

MARINE SCIENCE JOURNAL PRICES : A CASE STUDY

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MARINE SCIENCE JOURNAL PRICES : A CASE STUDY

Journals in the marine sciences encompass the fields of chemical, biological, physical and geological oceanography, fisheries, ocean engineering and coastal zone management. They report on developments in the investigation of the ocean and its biota, its physical boundaries with the earth and atmosphere, and the use and management of living and non-living ocean resources. Research articles on issues of crucial importance to human life include studies on marine pollution, the effect of the ocean on climate, and the abundance of fishery resources. Covering 70% of the earth's surface, the oceans hold the resources which are used to produce medicines, plastics, enzymes and other chemical products. Advances in remote sensing, acoustical sensing and computer modeling have extended the boundaries of knowledge. The development of new fields engenders new journals.

Approximately 350 English-language journals in this interdisciplinary field are published, and are geared to academic collections serving students, faculty engaged in scientific research, and technical users. Marine science libraries are found within varied settings, such as universities, federal and state fisheries agencies, oceanographic research stations, natural history museums, and international agencies, for example. There are at least 240 such collections worldwide.¹ All have been gradually depleted of their print journal holdings over the last twenty years because of steadily increasing prices. Journal cancellation projects, once shocking to library users, are now a regular occurrence since library budgets cannot absorb these increases. An added burden is also placed on technical services staff who have to cancel subscriptions and alter catalog records to reflect these cancellations. The author's library, a microcosm within the world of specialized science collections, has experienced continual cuts. No longer can scientists pick up newly arrived issues to keep up with their fields or allied areas. They are forced to use interlibrary loan or document delivery, or to read the journal online if the library subscribes. The e-journal may not satisfactorily reproduce photos or other graphic material. There may be technical difficulties scrolling through and printing articles so that no text is cut off. "Access not ownership" rings hollowly to the scientist. Some titles considered indispensable to marine science libraries have been retained by them, but general academic collections are no longer able to afford them. As a result this field, and many other specialized areas are underrepresented in general academic collections.

While librarians working with collections in all subject disciplines have been lamenting this situation for years, the large commercial publishers such as Elsevier, Academic Press, Springer, Kluwer, and Taylor & Francis, for example, have continued to

raise prices well beyond annual increases in the consumer price index. Charges for e-journals are also high and do not guarantee access to back issues. The roots of the problem lie in the academic system of “publish or perish” and have been analyzed in numerous articles by both librarians and scientists. Scientists send their manuscripts to the journals they consider most prestigious, they serve on these journals’ editorial boards, and they referee articles all without compensation. They return their manuscripts in camera-ready format and turn over their intellectual property rights to the commercial publishers “leaving almost nothing to do for the publishers but count their profits.”²

Recent initiatives such as SPARC (Scholarly Publishing and Academic Resources Coalition), Budapest Open Access Initiative, Public Library of Science and MIT’s Dspace³ offer hope that this situation will be alleviated in the next few years.

The current situation, however, prompted the author to compare the 1997 and 2003 prices of two selected groups of journals likely to be found in marine science libraries. Additionally, marine science journal costs in these two years are compared to price increases in non-marine scientific areas. Because the marine science titles have relatively fewer subscribers, the author hypothesized that price increases would be higher for this applied science field than for chemistry, biology, physics and geology titles. Specialized collections would thus be even more severely impacted than general science libraries. The costs of e-journals, which may be almost as high as their print counterparts, are not considered. The library licenses, rather than purchases them. The complexity of their pricing structure which varies by library makes comparisons meaningless.

Background

The voluminous literature documenting journal price increases during the past twenty-five years includes a number of studies focusing on science journals in general, as well as on specific science subject areas. The Cornell University journal price study of 312 core agricultural and biological journals compared 1988 and 1994 prices.⁴ Elsevier and Academic Press are the predominant publishers in these fields in which “publishing prices have exceeded the consumer price increases in Europe and the U.S. for two decades.”⁵ Elsevier “owns, publishes and distributes breakthrough scientific findings to a worldwide research community, being a monopoly of that information by the sheer fact that it owns the rights to that information.”⁶ A 1991-2001 comparative analysis of science journal cancellations in a medium-sized academic library showed that the average cost of a science journal for that library was more than the amount paid by large research libraries according to a national report.⁷ The proportion of more expensive science journals to less expensive titles was greater in the medium-sized library described in the study than in large research libraries perhaps because less favorable prices are available to smaller institutions, or higher vendor service charges prevail. A study of price increases in academic veterinary medical library journals between 1983 and 2001 reports a rise from \$31,812 in 1983, to \$149,480 in 2001, an increase of 369%.⁸ This is a 9% annual increase. A study of 250 mathematics journals shows an annual price increase of 15% or more “during a time, when, in the western world, the average price inflation was usually below 2% or so. And this is true for both the price increase per volume as well as for the price increase per page”.⁹ The Commonwealth Scientific and Industrial Research Organization (CSIRO) in Australia issued a list of 39 marine science journals with subscriptions over \$1000.¹⁰ These were ranked both by descending order of subscription

cost, and by descending order of price per page. The most expensive journals in the first category were not the same as those in the second category. Thus, the more expensive journals may be considered a better value for libraries using this measure, because they provide more pages than the lower cost titles. The American Library Association's Association for Library Collections and Technical Services' Library Materials Price Index is issued annually and is limited to titles of U.S. publishers. The 2003 compilation reports increases under double digits from 2002.¹¹ "The lowest rate of increase was posted by [LC classes] G – GC Geography, Oceanography at a negative 10%."¹² Since most of the marine science titles, as well as most science titles in all other fields, are published outside of the U.S., this statistic is misleading. This price index would be more valuable if it were extended to include the journals published by foreign publishers, particularly in the science fields.

Method and Discussion.

The 1997 and 2003 prices of fifty selected journals were compared. These titles are taken from two editions of the collection development tool, *Magazines for Libraries*.¹³
¹⁴ Although each edition has more than fifty titles in the marine science and technology section, only those titles which appear in both editions, and for which prices in both years were available, are listed in Table 1. Table 1 is thus an arbitrary choice of journals, not a listing of the most essential or recommended titles. It should be noted also that the titles in each edition of *Magazines for Libraries* vary; some are dropped so that newly published journals may be added. Subscription prices of individual titles in this study may differ from those in other listings because of the practices of the publishers. Some

journals state only “price on request”; price may be negotiated by libraries on an individual basis; prices listed may not agree with the price in Ulrich’s Periodicals Directory.¹⁵ Additionally the price in Ulrich’s may not agree with the price listed on the publisher’s web site, which one would assume is the most accurate and current. Fluctuations in foreign exchange rates also cause different prices to be listed.

The 2003 prices listed in Table 1 are from the publishers’ web sites. Two of the titles, *Marine Log* and *Offshore* are trade publications subsidized by advertising. Their prices remain the same for both years. The price of *Underwater Naturalist*, published by a society, also remains unchanged. For the other titles, published primarily by commercial publishers, prices have risen precipitously from an average cost of \$578 in 1997 to \$982 in 2003, as illustrated in Fig. 1. It is likely that this pattern would be the same if the prices of all marine science journals were tabulated in the same manner. Elsevier is the publisher of 14 of the journals in this set of fifty; Taylor and Francis of 5; other commercial publishers of 16. The average percent increase of 71% in just six years is an annual increase of 9%. It would be even higher (76%) if the three publications mentioned above are omitted. This increase is the same as that for the veterinary journals mentioned above.

Of these fifty journals, fourteen are published by societies and academic institutions, as listed in Table 2. These journals usually cost more for libraries than for individuals. Libraries are thus subsidizing the lower members’ rates. Somewhat surprisingly these journals increased 55 % between 1997 and 2003. This is a 7½% annual increase. Again, if not for *Underwater Naturalist* whose price remained constant, the increase in this subgroup of non-commercial journals would be 59%. Although this is lower than the

increase in price for journals published by commercial publishers, some of these individual society publications increased as much as the commercial titles.

EBSCO provided a list of sixteen selected marine science titles currently subscribed to by the author's library.¹⁶ Prices from 1996 to 2003 were provided; the 1997 and 2003 prices of eleven of these titles are shown in Table 3. Omitted are two titles not subscribed to in 1997; one title judged by the author to be outside of the subject field (*Marine Resource Economics*); and one listing for the American Fisheries Society, rather than for the specific titles it publishes. These titles increased an average of 63% between 1997 and 2003. If not for the unchanged cost of *Asian Marine Biology*, published by the Marine Biological Association of Hong Kong, the average percentage increase would be 70%. Both figures are comparable to the 71% increase in the cost of the titles in Table 1.

Library Journal's 2003 Periodicals Price Survey tabulates the average 2003 price for fifteen scientific disciplines.¹⁷ Of these, six categories are pertinent to the marine sciences: biology, botany, chemistry, geology, physics, zoology. The average 2003 price per title in these fields is \$1482. The percent increase from 1999 to 2003 is biology, 30%; botany, 27%; chemistry, 43%; geology, 33%; physics, 35%; zoology, 36%. This average increase of 34%, a 5% annual percentage increase, is roughly half of that of the marine science titles listed in Table 1. *Library Journal's* compilation of 894 total titles in these categories may provide a more balanced picture overall than can be obtained by considering only fifty titles in one subject field. Nonetheless, the marine science libraries in need of specific titles will find them to be much more expensive.

Conclusion

Within the larger picture of steadily rising scientific journal prices the marine science area is particularly vulnerable because of the smaller subscription base. Prices of a selected group of fifty journals have increased 71% between 1997 and 2003 as shown above. This is twice the level of the cost increase of science publications in six major disciplines compiled by the Library Journal survey cited above. Most of the titles in all scientific fields are published by Elsevier, Taylor & Francis, Kluwer, and other commercial publishers. These companies have established and maintained a stranglehold on the network of scientific communication. Librarians and scientists must work together to convince both university administrations and scientific and professional societies and organizations that the peer review system employed by refereed journals is transferable to the new online approaches such as SPARC mentioned above. Other solutions should also be developed. Scientists must be convinced to eschew the publishers charging the greatest price increases when submitting articles to journals. The marine science area is only one of many that have been severely impacted by rising journal prices that have the end result of limiting scientific communication. Hopefully, the publishers will recognize the problem and contribute to an imaginative and satisfactory solution for all parties.

Table 1. MARINE
SCIENCE
JOURNAL
PRICES

Journal	1997 \$	2003 \$	%increase
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Aquatic Conservation	265	755	185
Aquatic Ecology	179	289	61
Aquatic Geochemistry	253	348	38
Aquatic Living Resources	296	336	14
Atlantic Geology	48	60	25
Botanica Marina	890	938	5
Bulletin of Marine Science	180	230	28
Cahiers de Biologie Marine	215	253	18
Coral Reefs	294	551	87
Deep Sea Research, Pt.1	993	1413	42
Deep Sea Research, Pt.2	1106	2960	168
Estuaries	215	375	74
Estuarine, Coastal & Shelf Science	774	1890	144
Global and Planetary Change	549	1376	151
Global Atmosphere and Ocean Systems	654	757	16
Global Biogeochemical Cycles	185	528	185
ICES Journal of Marine Science	534	707	32
IEEE Journal of Oceanic Engineering.	115	215	87
Journal of Coastal Conservation	115	176	53
Journal of Coastal Research	135	155	15
Journal of Experimental Marine Biology and Ecology	2445	4008	64
Journal of Marine Research	100	120	20
Journal of Marine Systems	549	2048	273
Journal of Physical Oceanography	295	485	64
Journal of Plankton Research	415	674	62
Journal of the Marine Biological Assn. of the U.K.	376	558	48
Limnology and Oceanography	175	378	116
Marine and Freshwater Research	350	700	100
Marine Biology	3161	4564	44
Marine Chemistry	1183	1912	62
Marine Ecology Progress Series	3418	4142	21
Marine Environmental Research	862	1369	59
Marine Geodesy	177	367	107
Marine Geology	2049	3169	55
Marine Geophysical Research	637	688	8
Marine Georesources and Geotechnology	162	324	100
Marine Log	35	35	0
Marine Policy	482	828	72
Marine Pollution Bulletin	589	1049	78
Marine Technology Society Journal	70	120	71
Maritime Policy and Management	435	773	78
Ocean and Coastal Management	740	1303	76
Ocean Engineering	795	2223	180
Oceanography	100	125	25
Offshore	75	75	0
Ophelia	215	245	14
Progress in Oceanography	891	2246	152
Sarsia	80	199	149
Sea Technology	30	40	33
Underwater Naturalist	30	30	0
AVERAGE JOURNAL COST	578	982	
AVERAGE PERCENTAGE INCREASE			71

Table 3
EBSCO

LIST

Journal	1997	2003	% increase
	\$	\$	
Aquatic Conservation	295	755	156
Asian Marine Biology	29	29	0
Atlantic Geology	48	60	25
Canadian Journal of Fisheries and Aquatic Sciences	461	758	64
Geo-Marine Letters	371	599	61
Journal of Coastal Research	135	155	15
Journal of Fish Diseases	633	1230	94
Journal of Marine Research	110	120	9
Journal of Oceanography (Tokyo)	299	564	89
Marine and Freshwater Research	350	700	100
Russian Journal of Marine Biology	835	1530	83
AVERAGE PERCENTAGE INCREASE			63

Table 2.
MARINE
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E
PUBLICA
TIONS
OF
SOCIETI
ES AND
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IC
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TIONS

	% increase (1997-2003)
Atlantic Geology (Atlantic Geoscienc e Society)	25
Bulletin of Marine Science (Rosensti el School, Univ. of Miami)	28
Cahiers de Biologie Marine (Station Biologiqu	18

e de Roscoff, France)	
Estuaries (Estuarine Research Federation)	74
Global Biogeochemical Cycles (American Geophysical Union)	185
IEEE Journal of Oceanic Engineering (Oceanic Engineering Society)	87
Journal of Coastal Research (Coastal Education & Research Foundation)	15
Journal of Marine Research (Sears Foundation for Marine Research, Yale)	20
Journal of Physical Oceanography (American Meteorological Society)	64
Limnology and	116

Oceanography (American Society of Limnology and Oceanography)	100
Marine and Freshwater Research (CSIRO)	25
Oceanography (Oceanography Society)	14
Ophelia (Marine Biological Laboratory, Helsingør, Denmark)	0
Underwater Naturalist (American Littoral Society)	
AVERAGE PERCENTAGE INCREASE	55

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¹²*Ibid.*

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¹⁵ *Ulrich's Periodicals Directory* (2003). (41st ed.) New Providence, NJ : R.R. Bowker.

¹⁶ E-mail from Mary Coombs of EBSCO to Michael Vocino, University of Rhode Island Library, Feb. 20, 2003.

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