Anderson, K.L. & C. Thiery (eds.). 2006. Information for Responsible Fisheries : Libraries as Mediators : proceedings of the 31st Annual Conference: Rome, Italy, October 10 – 14, 2005. Fort Pierce, FL: International Association of Aquatic and Marine Science Libraries and Information Centers.

FISHERIES OR OCEANOGRAPHY: DECONSTRUCTING THE LITERATURE OF FISHERIES OCEANOGRAPHY

Joan Parker
Moss Landing Marine Laboratory
8272 Moss Landing Rd.
Moss Landing, CA 95039

Introduction

Fisheries oceanography describes the use of applied oceanography to examine environmental conditions and relate these to fish dynamics and abundance. Given its name, Aquatic Sciences and Fisheries Abstracts (ASFA), one would expect this database to provide extensive coverage of the fisheries oceanography literature. It is also reasonable to assume fisheries oceanography articles would be heavily concentrated in core fisheries journals. But is there a contributing element from the oceanographic literature that must be considered by librarians? Are there indexes that cover the topic better than ASFA, and are a significant number of fisheries oceanography articles published in oceanographic journals not held by most fisheries collections, especially those in developing countries?

Methods

To determine where the literature of this topic is most comprehensively indexed, three traditional scientific bibliographic databases were selected: Aquatic Sciences and Fisheries Abstracts (ASFA), Biosis Previews (BP), and Zoological Record (ZR). Although the original intent of this study was to search each database using the phrase "fisheries oceanography" and compare the retrieval sets, this method proved to be unacceptable as only the ASFA database used this phrase as a descriptor. Substituting synonyms for each concept and combining them with the Boolean "and" resulted in the search strategy described in Figure 1. Searches were limited by field (title, abstract or descriptor only) and date (2000-2004) to avoid the varying indexing and updating policies of each database. Citations were discarded if they were not relevant to fisheries, i.e. marine birds or mammals.

(mesoscale variability or sea surface temperature* or sst or oceanic conditions or oceanographic features or el nino or la nina or enso or regime shift*)

and

(recruitment or community structure or larval assemblages or population dynamics or larval aggregations)

* indicates truncation symbol was used

Figure 1. Search strategy.

To describe the overlap between databases in a quantitative fashion the Index of Similarity was selected using individual citations as the unit of comparison.

$$Si = a/(a+b+c)$$

where

a=common to a and b
b=found in a but not b
c=found in b not a

After retrieval results for all databases were collected, every citation was compared. If the results from one or more databases contained the same citation it was defined as a matched citation. Citations found in all 3 databases were combined and set aside; citations missing from one or more databases were searched again in the relevant database(s) to determine if their absence from the retrieval results was a legitimate absence from the database or an artifact caused by other factors. As a result this study arrived at two measures of similarity: absolute and apparent.

An absolute similarity index was calculated on the results obtained after conducting a second search for unmatched citations in each database. Apparent similarity index values describe results obtained from the original search results with no further determination of the status of unmatched citations. Once the index values were calculated, results, especially those reflecting the absolute, were subjected to additional analyses which are more fully described in the results section.

Results

The final number of citations retrieved from each database for this study was 205 from ASFA; 99 from BP and 298 from ZR for a total of 602 citations. Similarity index values are portrayed in Figure 2 as the values derived from the equation. They may also be converted into percentages if multiplied by one hundred. *Apparent* overlap values for the three database comparisons fall within three points while the *absolute* values for each pair show a much greater range. Furthermore comparing *absolute* to *apparent* for each database pair shows that *absolute* values are consistently higher than *apparent* but are highest for comparisons involving ZR. Looking at the result from another perspective, ASFA and ZR appear to share 44% of the citations retrieved in this study but they actually share 66%. ASFA and BP values are much more similar when comparing *absolute* to *apparent*.

Absolute Overlap		*Apparent Overlap*	
ASFA – Biosis	.51	ASFA – Biosis	.47
Biosis - Zoo Record	.62	Biosis - Zoo Record	.46
ASFA - Zoo Record	.66	ASFA - Zoo Record	.44

Figure 2. Similarity Index comparisons

The next part of this study examined the unmatched citations from the *absolute* overlap results, recording the title of the source publication. Citations unique to one or two databases only were included. Sources were categorized as books, grey literature, or journals. Journals were further subdivided into "Journals: Unique Source" if the citation came from a source only indexed by that database and "Journals: Unique Citations" if the citation was unmatched but the source publication was indexed by the other database. Figure 3 shows the breakdown by type of source for the eighty-nine unique citations that were found across all 3 databases.

	Books	Grey Lit	Journals: Unique Source	Journals: Unique Citation	Total
ASFA	3	14	3	12	32
ZR	1	4	3	8	16
BP	1	3	0	5	9
BP + ZR	0	0	3	29	32
Total	5	21	9	54	89

Figure 3. Analysis of unmatched citations by database and publication type.

Because one of the questions of this study was whether this literature was well-indexed by ASFA, results from Biosis Previews and Zoological Record were not only examined individually but were also lumped to compare these two databases with ASFA. Citations found in ZR + BP but not ASFA were treated as if they came from a single, merged database. These 29 unique citations are a reflection of significant overlap between BP and ZR which is masked when doing a three-way comparison. These results were then not included in the individual database breakdown as doing so would double-count citations.

The raw numbers illustrate that when each database is examined independently ASFA included more unique resources than BP or ZR when looked at individually, especially in the grey literature category. However, it is also notable that 64% of the unmatched citations were due to unique journal citations and furthermore that the majority of these were found in the results retrieved from the combined BP+ZR. Continuing the examination of these unmatched citations, a qualitative assessment of the sources is shown at Appendix 1. For each unique citation the journal title and database was noted.

Finally, the question of locating the core literature of fisheries oceanography was addressed by tallying the number of citations from the final retrieval set for each journal title. Figure 4 shows a ranked list of those journals with three or more citations. For each journal the 2003 impact factor, 2005 price, and availability in Latin American Libraries (from the IAMSLIC union list of serials) was also collected. Since it would be far too time consuming to accurately determine the availability of journals in developing countries this union list was substituted to provide some comparative assessment.

As expected, the top ranked journal was *Fisheries Oceanography*. Although it is a relatively lower priced journal with a comparatively high impact factor, it is not widely held by the eighteen libraries included in the Latin America union list. An unexpected result was the second most ranking of *Marine Ecology Progress Series*. This is a notoriously expensive title with a moderate impact factor. However, it appears to be almost equally available in Latin American libraries. (A further examination of the actual volume holdings provides some evidence that this is an incomplete picture which might be explained by *MEPS* holdings occurring through donations versus subscriptions.) The comparatively high rankings of both *Hydrobiologia* and *Deep Sea Research Part I* were also unexpected.

Journal Title	# Articles	Impact Factor	2005 Price$	L.A. Holdings
Fisheries Oceanography	26	3.294	947	4
Marine Ecology Progress Series	21	2.222	4803	5
Fisheries Research	10	1.079	502	5
ICES Journal of Marine Science	9	1.762	794	4
Canadian Journal of Fisheries and Aquatic Sciences	8	1.965	1218	4
Hydrobiologia	8	.694	8068	3
Estuarine, Coastal and Shelf Science	8	1.201	2288	5
Deep Sea Research Part I	8	2.954	4901	4
Bulletin of Marine Science	7	.826	285	7
Scientia Marina	5	.648	250	4
Ciencias Marinas	5	.403	0	11
Marine Biology	5	1.672	5395	7
Journal of Shellfish Research	4	.611	200	3
Environmental Biology of Fishes	3	.845	1888	4
New Zealand Journal of Marine and Freshwater Research	3	.628	320	2
Fishery Bulletin	3	.934	0	10
Limnology and Oceanography	3	3.169	930	10
North Pacific Anadramous Fish Commission Bulletin	3	0	0	0

Figure 4. Journals ranked by number of articles.

Discussion

In many ways, the entire results of this study were unexpected. First, the retrieval set from ZR was fully one third larger than ASFA, the target database for this study. Second, the magnitude of the variation between absolute and apparent overlap from the ZR and ASFA comparison was greater than twenty points. And finally, the literature of fisheries oceanography published outside the traditional fisheries journals is significant.

The large retrieval set recovered from ZR speaks to the overall scope of the database and the question of whether it has been extended by the database producer. Although most of the journals listed at Appendix A are quite reasonable for ZR to selectively cover, it is puzzling that *Geology* was uniquely found in this database. A cursory search of ZR using search terms that fall outside zoology, such as harmful algal blooms and red algae (conducted as a matter of curiosity) did indeed produce results from a wide array of non-zoological literature. Some, but not all, can be explained by its inclusion of paleontological literature. The surprising yet puzzling performance of Zoological Record may lead some of us to use it in searches where it would not have previously been included.

Reviewing citations that were missing from the results but present in the database in order to explain the variation found between absolute and apparent overlap pointed out several problems. Lack of an abstract was the most frequent explanation. Absence of a controlled vocabulary was another contributing factor. Issues of quality control, such as substituting the number 1 for the letter l, contributed in a minor way. One obvious conclusion is that searching of multiple databases provides the only means of obtaining comprehensive results and librarians must consistently remind users of this reality.

Unfortunately some of the variation between absolute and apparent values can be linked to the gaps in ASFA coverage stemming from missing issues of commercial journals. This unfortunate circumstance is known to both librarians and CSA, the database's producer, and it consistently weakens the overall performance of the ASFA database in comparative studies. Is this problem mitigated by its strength in the coverage of international grey literature?

How well is fisheries oceanography represented in the traditional fisheries journals and covered by ASFA. The answer is not as much as expected. The ranking of *Marine Ecology Progress Series* second only to *Fisheries Oceanography* combined with the relatively high ranking of *Hydrobiologia* and *Deep Sea Research Part I* indicate that a substantial body of literature exists within the more oceanographic literature. This list is also populated with journals whose prices are well beyond the reach of libraries in developing countries.

And finally, are there any consequences for this study from the recent introduction of Google Scholar. Unfortunately, it could not be included in this study because it lacks the advanced search features required to retrieve results suitable for analysis. However,

weaknesses of commercial databases which continue to be highlighted by studies of this nature could ultimately tip the balance and end libraries' long-standing practice of maintaining subscriptions to commercial bibliographic databases at all costs, especially if Google Scholar continues to dominate the search strategies of researchers and students. Database producers should be examining ways in which these weaknesses can be addressed in their products to insure continued relevance in the marketplace.

Appendix A

List of corresponding journal titles for unique citations within the database they were uniquely found it.

JOURNAL	ASFA	Biosis Not ZR	ZR Not Biosis	Biosis and ZR (not ASFA)
Archive of Fishery and Marine Research				x
Biological Conservation				x
Boletin Instituto del Mar del Peru	x			
Bulletin Hokkaido National Fisheries Research Inst.				x
Bulletin of Marine Science	x			x
Bulletin of the S. California Academy of Science		x		
Canadian Journal of Fisheries & Aquatic Sciences				x
Canadian Tech. Report Fisheries & Aquatic Sciences		x		
Caribbean Journal of Science				x
CCAMLR Science			x	
Ciencias Marinas				x
Dana	x			
Deep Sea Research Part II	x		x	
Ecological Applications				x
Ecology Letters				x
Estuaries	x			
Fish and Fisheries				x
Fisheries	x	x		
Fisheries Oceanography				x
Fisken og Havet	x			
Geology			x	
Helgoland Marine Research				x

ICES Journal of Marine Science	x			x
Journal of Fish Biology		x		
Journal of Ichthyology			x	
Journal of Marine Systems			x	
Journal of Oceanography			x	
Journal of Phycology	x			
Journal of Sea Research				x
Journal of Shellfish Research	x	x		
Journal of the Fisheries Society of Taiwan				x
Journal of the Marine Biological Assoc of the UK				x
Marine and Freshwater Research				x
Marine Biology				x
Marine Micropaleontology				x
Micropaleontology				x
New Zealand J. Marine and Freshwater Research	x			x
Philippine Scientist			x	
Polar Biology				x
Proceedings of the Royal Society of London B				x
Progress in Oceanography	x		x	
Reviews in Fisheries Science				x
Revista Chilena de Historia Natural				x
Revista de Biologia Tropical				x
Scientia Marina				x
Senckenbergiana Martima				x
South African Journal of Science				x