

# The Establishment of a Database on Current Research in UNESCO Biosphere Reserves: Limitations and Opportunities

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**ABSTRACT:** The investigation into current research on biosphere reserves is complex and multi-faceted. Numerous factors, including the widespread interests of those publishing on biosphere reserves, publication methods, author languages, and the peculiarity of various search engines makes the determination of gaps, patterns, and opportunities in research a convoluted task. To respond to the question “what is the current state of research on biosphere reserves?” a major university-led research project was developed as a partnership between the University of the Highlands and Islands and Vancouver Island University. Over a two-year period, a database of more than 5000 articles, studies, and research documents was compiled, covering the majority of the EuroMAB biosphere reserves. It is hoped that future research will seek to catalogue similar works across the World Network of Biosphere Reserves. It is hoped that the publication of this article will prompt involvement by the biosphere reserve scientific community in building a complete and detailed database that accurately represents the state of current research across the World Network.

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## Introduction

The publication of research in journals is the primary means of disseminating scholarly ideas, concepts, theories, and findings. For researchers interested in issues relating to biosphere reserves, designated under the Man and the Biosphere (MAB) Programme of the United Nations Education, Scientific, and Cultural Organization (UNESCO), the search for existing research is complicated by a number of issues: 1) while a biosphere reserve may be the region of interest for the research, topics vary widely, across every possible discipline; 2) biosphere reserves have been designated in 120 countries world-wide, so that research results are published in many languages; 3) various terminologies are used to define similar topics or research areas; 4) published information is not always widely available across different nations and through different search engines; 5) some biosphere reserves are named after a urban area or region, and an article about an area may reference that it is in or proximate to a biosphere reserve

without the research necessarily relating in any way to the biosphere reserve; 6) many biosphere reserves include and/or overlap with a protected area (e.g., a national park) which may or may not have the same name, and publications may mention the name of the protected area but not that of the biosphere reserves, 7) little research in biosphere reserves is published in accessible formats.

In 2015, a research project was initiated at the Centre for Mountain Studies at the University of the Highlands and Islands, to better understand the current state of research on biosphere reserves. Focusing first on the three common objectives of all biosphere reserves (sustainable development, education & outreach, and conservation of biodiversity), this project attempted to catalogue the full range of published information on research conducted within the 302 biosphere reserves of the EuroMAB network, which currently includes 36 countries in Europe and North America. Following the meeting of the Scientific Sub-Committee at the 2015 EuroMAB Conference in Estonia, the work was taken on by Vancouver Island University (viu.ca) through the Mount Arrowsmith Biosphere Region Research Institute and further progress was made through the application of extensive student resources.

After approximately two years and hundreds of hours applied to the project, a database ([biospherejournal.org/database](http://biospherejournal.org/database)) has been produced. As it focuses only on the biosphere reserves in the EuroMAB network, it is hoped that scientific researchers in other regional MAB networks will become contributors in adding to the database with information concerning biosphere reserves in their region, and that would be of interest to the global biosphere reserve scientific community. That is, this database should be considered the first phase of a much larger and ongoing project: it is intended that this database will remain a “living document” and will be continually updated as existing information is added from all corners of the globe and new material is published by biosphere reserve researchers. Currently, there are considerations for the database to be editable on the website by visitors, similar to Wikipedia pages.

## Methods

This study began with a literature review and the development of a multi-factoral database platform intended to investigate all biosphere reserves within the EuroMAB network. The database includes country, name of the biosphere reserve, title of the article, author(s), year of publication, type of literature, and keywords. The keywords were examined as an indicator of the content available from each article. First, the three common objectives of all biosphere reserves were investigated (sustainable, development, education, and conservation) then the search was expanded to seek out articles that contained keywords related to the United Nations’ 17 Sustainable Development Goals (UN SDGs), such as poverty, hunger, health, protection, climate, and inequality. Governance and biodiversity were added as keywords. The search was limited to database content of academic and grey literature (produced by government, academics, business, and industry) published since the year 2000 and referring to existing biosphere reserves.

An examination of keywords from approximately 5000 academic books, reports, articles, conference proceedings, and thesis papers revealed some conclusions on the academic information published on biosphere reserves, as outlined below.

## Findings

Figure 1 below illustrates the results of the keyword search and the respective number of content “hits” found through the search. Out of the original three common objectives, “conservation” was most frequently found. When the UN SDGs keywords were examined, “climate” occurred most frequently. There was much variation in the number of articles referencing individual biosphere reserves. For example, for the North-east Greenland Biosphere Reserve only two academic articles could be located, while Serbia’s Golija-Studenica Biosphere Reserve yielded more than 60 potential sources.

As to limitations, the results are, in many respects, self-defining. The search for a defined set of terms will yield the results expected of that list. That is, by creating a list of defined search terms, the results

became self-limiting. However, these limitations were required to enable students to make progress with the project and build this initial research database. It is recognized that a more robust research method would have been to search out “biosphere reserve” as the only search term, then catalogue the abstract of each article. The database user could then enter in their own selected keyword and search through the database for the abstract of any article that contained that word, then follow a link to the full article (or to the saved .pdf where possible). A second issue is the limited opportunity presented by only searching keywords. For the SDGs, for example, results more directly tied to each SDG may have been better revealed if a phrase or grouping of terms was searched instead on individual words. That is, the results may have been more directly linked to the SDGs if terms such as “extreme poverty”, “maternal health”, and “universal primary education” were investigated. It was presumed that the search for individual words would lead to articles containing phrases relating to the SDGs, so the method was not changed to address this issue.

Beyond this, due to the limitations of languages spoken commonly by the research team, the search was limited to articles published in English. No attempt was made to translate articles produced in any other language to permit the keyword search. It was presumed that the literature referring to biosphere reserves within the EuroMAB network would have been either originally produced in English or translated to English by the authors; therefore, the results should be largely representative of the entire body of available literature. It is recognized, however, that this may become less accurate as the search for academic articles extends to other biosphere reserve networks where English may not always be the language of publication. The involvement of the world-wide biosphere reserve scientific community is needed to address this shortcoming, as ideally individuals with local and regional knowledge and language skills will be best suited to locate relevant literature.

Terminology may also be a factor. The keyword search required that the term “Biosphere” or “Biosphere Reserve” be mentioned at least once in an article. It is possible that some articles did not use these key terms, even if the topics under discussion could be highly relevant to the biosphere reserve scientific community. For example, an article on the governance of a watershed region, or a protected area within a biosphere reserve, could be of great interest to researchers investigating potential options for biosphere reserve management, but this article would not be included in the database as it did not specifically reference the required search terms. These terms were necessary; however, to put some limitations on the database, specificity was required to ensure the usefulness and applicability of the database to the biosphere community.

Additionally, for approximately 15 percent, there were no keywords; others only included the name of their respective biosphere reserve as a keyword. This resulted in a partial misrepresentation of the overall findings, topic, content, and conclusions. However, with analysis of abstracts or summaries, this problem will be diminished.

A final factor is the availability of published data through available search engines. Google Scholar was the primary search engine used by the research team, along with the secondary use of Web of Science, Academic Search, and Science.gov. There was some discussion on accessing only articles that were free and universally available through open access platforms, but this was not pursued as it was presumed that accessibility would be similar for all nations within the EuroMAB region. Again, as the database search extends across other regional MAB networks, the accessibility of information to individuals may become a factor. Further research into the search limitations will be required as the project advances.

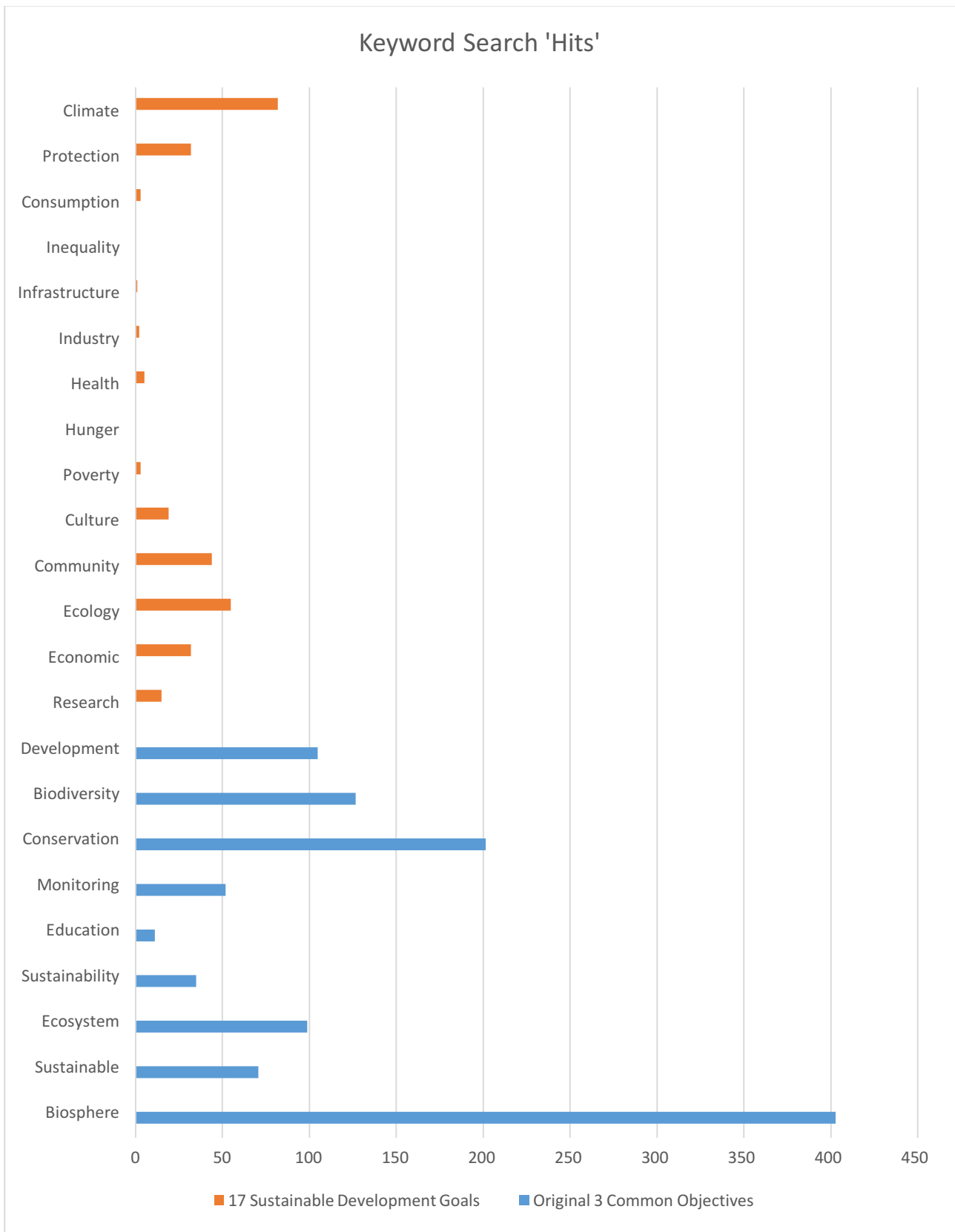


Figure 1. Graph illustrating the keywords searched and the number of results found

### **Future Research**

The future of this project is best defined as “the search continues...” The two initial partners in this research will continue to commit resources to improving the quality of the database. Over the next year, the database will be improved by adding abstracts (when available) to each of the existing articles. It is also anticipated that other members of the World Network of Biosphere Reserves and the scientific community will engage in this project and expand the research to other networks: this in no way requires links to student resources or university research institutes. Any individual interested in contributing to the database is encouraged to pursue this opportunity: the first page of the database lists the search protocols, and all contributors are asked to consider these as they add items to the database. As new items are added, the database will be updated, and as always will remain free and open access to anyone interested in the current state of biosphere reserve research.

### **For Action**

The database is available from the website of the International Journal of UNESCO Biosphere Reserves

([www.biospherejournal.org/database](http://www.biospherejournal.org/database)).

***If you are interested in updating any section of the database, please contact Pam Shaw at [pam.shaw@viu.ca](mailto:pam.shaw@viu.ca) in advance of initiating your work, to ensure we are not duplicating efforts across the world network of Biosphere Reserves.***