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Changing Tack

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Introduction

Jaime Goldman
IAMSLIC President 2020/2021
46th IAMSLIC Annual Conference Convener

The 46th IAMSLIC Annual Conference was held virtually for the first time ever due to the COVID-19 global pandemic. The conference was originally scheduled to be hosted in person by Hannah Russel in Wellington, New Zealand, but in May of 2020 the IAMSLIC Executive Board and Conference Planning Committee made the decision to pivot to a virtual conference for the health and safety of all of our members. A total of 122 virtual attendees joined us for this new adventure in virtual conferencing. This included 30 presenters/speakers, 90 IAMSLIC members (including 16 sponsored new memberships from low-middle income countries), one guest, and one sponsor.

The theme of the conference was “Changing Tack: Adjusting our Sails to Navigate Uncertain Waters.” Changing Tack refers to changing direction, position, or course of action in order to adapt to the conditions of the environment you are presented with. It is all about adjusting what you have to continue forward in the right direction during turbulent times. This past year has presented us all with new and unparalleled challenges and obstacles to overcome, and in order to keep sailing on, we have had to adjust and adapt in new and innovative ways.

The conference included four program tracks:

- Jibe: Changing Direction
- Keel: Providing Stability
- Passage Plan: Navigating Rough Waters
- Innovation: Charting a New Course

The conference included a vast array of knowledgeable speaker presentations within those four program tracks, diverse group panels, engaging virtual field trips, informative vendor sponsor presentations, updates and information from the IAMSLIC organization, regional group meet-ups, networking and social time, games, and our annual business meeting.

The conference was also a venue for support and discussion on how we are adopting, negotiating, embracing, and developing strategies to provide the best information services within the storm we currently find ourselves in, while also expanding information to a global and diverse consumer base. We hope that participants left this conference with tools, skills, and information on how to not just stay afloat, but to also thrive in this unpredictable environment.

The past year presented us all with unprecedented challenges and uncertainties. The fact that IAMSLIC as an organization was able to adjust our sails and keep moving forward towards holding a 2020 conference is nothing short of an amazing feat, one

which could never have been accomplished without the hard work and dedication of so many. Our first ever virtual IAMSLIC conference was a resounding success due to the creativity and dedication of the Conference Planning Committee, our committed sponsors and partners, our IAMSLIC members who donated towards sponsored memberships via our virtual Guin Fund, and our speakers who were so willing to embrace this new journey and take the time to share their knowledge. The success of this conference is evident in the post conference survey responses in which 48 respondents of our 122 attendees expressed their satisfaction with this conference and support of virtual conferencing in general as an option moving forward. While we could not meet in person as we traditionally do for the annual IAMSLIC conference, the membership felt connected, engaged, and informed following the 2020 conference in a year where we were all so physically far apart and disconnected.

I want to take this opportunity to thank our “Admiral” level sponsor Inter-Research for funding us at such a generous level that enabled us to reach more of our membership than ever before. Their sponsorship enabled our organization to have the tools and resources vital to supporting virtual events such as this. Thank you!

And finally, I would like to express my very great appreciation of the intrepid members of the IAMSLIC organization for being so flexible and embracing the change in our conference direction in 2020. I could not have done this without their support, encouragement, and engagement in this virtual conference. Thank you to the IAMSLIC members for adjusting your sails and willingly going on this new journey with us with such short notice. You truly helped to make this conference one to remember!

SAILing Through the Pandemic (SAIL Panel)

David Baca
Texas A&M University at Galveston

Christa Albrecht-Vegas
Naval Undersea Warfare Center

Liz DeHart
University of Texas

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Abstract
Pandemic washing over your gunwales? We're all in the same boat! We're all facing lot of challenges. But more importantly what has gotten better with this sea change? What will our futures look like? Come hear from SAIL members of the wonderful things that are happening to them and have a conversation with your colleagues about the bright side of libraries and the pandemic.

Keywords: COVID response – global.

From Metrics and Influence to Telling the Scientific Story: Evaluating Sea Level Rise

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Abstract
Sea level rise is predicted to be one of the most studied fields in the coming decades. With some three billion people living in coastal communities around the world, sea level rise has the potential to affect nearly half the world's population. About 40% of the US population lives in or near a coastal community (NOAA, 2020b). Although the study of sea level rise began in the late 1800s, it has gained momentum in the last 20 years. An interdisciplinary group of scientists, engineers, and geologists in diverse university departments, such as Coastal Engineering, Geological Sciences, and Urban and Regional Planning are studying the various facets of this phenomenon. This paper identifies 1) the knowledge librarians need to understand the various metrics, and 2) how librarians can partner with scientific researchers to select relevant research impact strategies that will convey a compelling scientific story. This story can lead to future grant support, promotion and tenure awards, and perhaps to scientific policy changes.

Keywords*:* Sea level rise, research impact, research metrics, scientific story.

Background

With some three billion people living in coastal communities around the world, sea level rise has the potential to affect nearly half the world's population. Sea level began rising in the late 1800s, coinciding with the burning of coal, gas, and fossil fuel (Smithsonian & Team, 2018). Caused by thermal expansion of the oceans due to an increase in seawater temperature, as well as the melting of glacial ice, sea level is on the rise. With average year-round global temperatures increasing, glaciers are experiencing a disproportionate amount of melting at an accelerated rate (NOAA, 2019). Figure 1 shows that since 1880 global mean sea level has risen approximately 210-240 millimeters (mm) or 8 to 9 inches, with one-third of the rise occurring in the last 25 years (Lindsey, 2020).

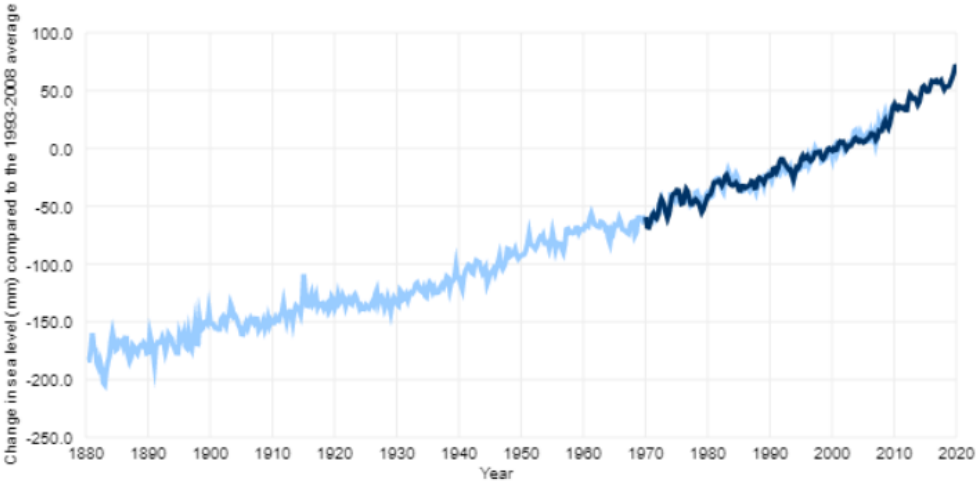

Figure 1. Sea level rise since 1880 (Lindsey, 2020).

Researchers have estimated rates of sea level rise with Douglas et al. (2001) seeing an increase since the middle of the mid-19th century. In October 2020, the world population exceeded 7.7 billion people (US Census, 2020) and it is estimated that nearly 40% of the world's population lives within 100 kilometers, or 62 miles, of a coastline that could potentially be affected by sea level rise (UN, 2007). Eight of the ten largest cities in the world are located by the coast (NOAA, 2019).

Literature Review

Globally, sea level rise as related to climate change is of great interest. Husain and Mushtaq (2015) conducted a research assessment analysis on climate change data related to environmental science and ecology that covered the five-year period from 2009 to 2013. Li et al. (2011) used a science citation index analysis to explore trends on global climate change research during the 18 years between 1992 and 2009. Both of these studies looked at the broader subject of climate change, versus that of focusing on sea level rise, which has more immediate and visible impacts to coastal communities. Nel et al. (2014) reviewed the status of sandy beach science and included a citation analysis on the published literature from 1950 through 2013. Social scientists are also studying sea level rise and potential impacts to populations (Bures and Kanapaux, 2011). The future economic impacts of sea level rise are staggering (Bosello et al., 2012).

The amount of sea level rise depends on location and estimates can be variable. In some ocean basins, sea level has risen dramatically, as much as 6-8 inches (15-20 centimeters) since the start of the satellite record in 1993 (Lindsey, 2020). Coastal communities will be at greater risk for flooding in the next several decades due to storm surges and high tides combined with sea level rise and land subsidence. It is predicted that the oceans will continue to warm and sea level will continue to rise for many centuries (NASA, 2020).

In the United States (US), approximately 39% of the population lived in highly populated coastal areas in 2010 (as of last US census), and that percentage is increasing. Sea level changes will vary by location but are expected to be highest in places like the northern Gulf of Mexico, especially in low-lying areas of Louisiana (NOAA, 2020a). However, in some places such as Alaska, the land surface is actually rising and, consequently, sea level is appearing to decrease. National Oceanic and Atmospheric Administration (NOAA) provides an interactive world map showing predicted sea level trends (https://tidesandcurrents.noaa.gov/sltrends/sltrends.html).

Along the U.S. coastline, flooding during high tide is 300% to 900% more frequent than 50 years ago (NOAA, 2019). Coastal communities, as all communities, require a complex network of infrastructure systems, including transportation, power generation, communication networks, fresh water distribution, and waste collection. But coastal communities have additional issues with which to contend, including storm impacts, flooding from increasingly higher tides, and salt water intrusion; problems all exacerbated by sea level rise. A convergence of scientists, engineers, and geologists from diverse disciplines including Coastal Engineering, Urban and Regional Planning, and Geological Sciences have been studying the various facets of this phenomenon. As expected, universities located in states with large coastal areas are conducting the majority of the research. With Florida's 8,436 miles of coastline, multiple schools, departments and institutes at UF are involved in sea level rise research (University of Florida, 2019). In Florida, sea level rise is predicted to negatively impact heavily populated areas such as Naples, Ft. Myers, Clearwater, Palm Beach, Miami and the Florida Keys (NOAA, 2020a). Places like Miami, Florida already see city streets routinely flooding during high tides.

Ongoing sea level rise will ensure that the study of shoreline responses and impacts will continue to be relevant. Beach erosion is a notable consequence of sea level rise and flooding of low-lying areas is another. The City of Miami already routinely experiences street flooding during high tides and the City of Miami Beach has set aside $100 million to raise roadbeds, install pumps, and modify water mains and sewer conveyances (Flechas, 2017).

The University of Florida (UF) has a long history in research on sea level rise. In 1962, former UF professor Per Bruun, who was chair of the Department of Coastal Engineering from the late 1950's to 1966 (Hager, 2009), authored a now classic paper entitled "Sea level rise as a cause of shore erosion" in the 1962 Proceedings of the American Society of Civil Engineers, Waterways and Harbors Division (Bruun, 1962). In this paper, Bruun identified and described what is now recognized as a fundamental relationship between sea level rise and shoreline erosion. The Bruun theory, as it was named by Schwartz (1967) but now commonly called the Bruun Rule (for example, see Bruun, 1988 or Kerans and Cartwright, 2016), holds that an open, sandy beach coastline will retreat landward some one hundred times the vertical extent of sea level rise. This means that even a modest sea level rise causes substantial shoreline retreat or even the complete disappearance of beaches in situations where the beaches are backed by hard structures or cliffs instead of dunes. Since its original publication, this

seminal article has been cited some 2,247 times (Google Scholar, accessed October 27, 2020). The fact that Bruun (1962) was cited some 90 times in 2018 alone, 57 years after its original publication, suggests that the Bruun Rule has continuing relevance in sea level rise research.

More accurate predictions for future sea level rise are predicated on an understanding of past episodes of sea level fluctuation. The UF Department of Geological Sciences is active in this line of research, working with international groups to investigate the geological record of sea level rise and changes in ice sheet mass, which is used to predict future sea level rise (Dutton et al., 2015).

Purpose

The purpose of our research was to determine the research metrics and impact at UF related to the study of sea level rise. Research impact can be determined at the journal, article and author levels. This research analyzes the impact of the articles written by UF scholars. The multidisciplinary approach to this scholarship leads to three questions:

1. What fields are publishing on sea level rise?
2. Where is the relevant literature being published?
3. What is the correlation between article citations and grant funding?

Methodology

To answer these questions, it was determined to use the vendor Clarivate Analytics Web of Science (WoS) Core Collection to which the UF Libraries has a subscription. The WoS Core Collection provides basic metrics but is limited in scope, breadth and depth of how to cross reference data sets. Clarivate Analytics sells INCITES as a separate research impact tool within the Web of Science Core Collection. To determine research impact using only the Core Collection is labor intensive and some features are not available. Using INCITES allows the researcher to conduct in-depth searching for impact that produces comprehensive picture of overall impact at the world, national, discipline and institutional levels, and to compare to peer universities both regionally and globally, and to find and analyze collaborations and partnerships. The UF libraries do not currently subscribe to INCITES; however the sales representative provided a 30-day free trial. INCITES uses imported datasets from searches conducted in the WoS Core Collection. Table 1 compares the features of the WoS Core Collection to INCITES.

Features	Web of Science Core Collection	Web of Science INCITES
Content	74.8M records, 21,100 active titles from multiple publishers	Core Collection only; 20 custom datasets
Scope of Coverage: Date Range	1900s to present	1980-present. 2 months behind the Core Collection content.
Update Frequency	Daily, Monday-Friday	Monthly

Table 1. Comparison of Web of Science Core Collection to Web of Science INCITES.

The search parameters were as broad as possible to capture all relevant concepts of sea level rise. A topic search that includes title, abstract, author keywords, and KeyWords Plus, a trademark of Clarivate Analytics for “sea level rise” OR “sea level” OR “sea level rising”. Library of Congress the formal subject heading is “sea level” with variants of “mean sea level” and “sea level rise” in the GC89-GC90 Library of Congress classification and is also recognized by the USDA National Agricultural Library. For this study, the variant “sea level rise” will be used exclusively. The publication year range was from 2010-2019. The document type was limited to original research, excluding review articles, book chapters, conference proceedings, and other commentaries. The organization was limited to the “University of Florida.”

Results

Web of Science: This search resulted in a total of 28,438 articles in the Core Collection. Adding the parameters of the search strategy yielded 219 original articles with 3 highly cited in the field, and 61 articles are available via open access. These results can be further analyzed in the Core Collection feature Analyze Results, but they lack the functionality of the cross referencing of data needed to determine research impact. The dataset from the Core Collection search results were exported into INCITES.

Question 1. What fields are publishing on sea level rise?

The majority of the scholarship is from the multidisciplinary field of geosciences, followed by environmental sciences, physical geography, and ecology. Figure 2 shows the number of articles published in a specific research area, or the fields of collaboration between UF researchers and their colleagues around the world. Therefore, UF researchers have published 60 original research articles with colleagues in the geosciences. Table 2 shows the impact of these articles by the number of times the articles have been cited. This is a good overall assessment of which fields are collaborating and producing the most research related to sea level rise.

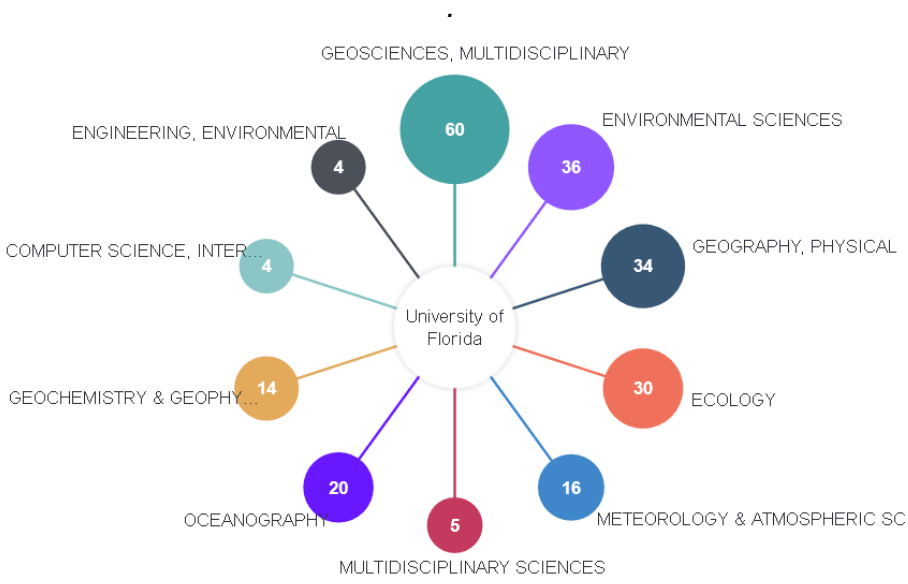

Figure 2. Fields with the most UF researchers and world collaborations.

With INCITES, there are many variables that must be taken into consideration when measuring impact. To answer the question about which fields are publishing on sea level rise, an analysis of research areas, number of published research articles, number of times these articles have been cited by other scholars, and the citation impact for the institution, worldwide collaborations is demonstrated.

Research Area	# of WoS Articles	Category Normalized Citation Impact	Times Cited	% of Articles Cited
Geosciences, Multidisciplinary	60	1.4	1187	87
Environmental Sciences	36	1.1	720	92
Geography, Physical	34	1.0	560	88
Ecology	30	0.8	447	87
Meteorology & Atmospheric Sciences	16	1.5	376	100
Multidisciplinary Sciences	5	2.7	330	100
Oceanography	20	1.3	271	90
Geochemistry & Geophysics	14	1.6	252	79
Computer Science, Interdisciplinary Applications	4	2.5	172	100
Engineering, Environmental	4	1.7	172	100

Table 2. Impact of the published original research.

CNCI. The Category Normalized Citation Impact (CNCI) is calculated by dividing the actual count of citing items by the expected citation rate with the same document type, year of publication and subject area. The research articles (Table 2) have been assigned to more than one subject area (by WoS). The CNCI of these articles is the average of the CNCI values for all the documents in the research area. Therefore, the CNCI is an ideal indicator for benchmarking at all organizational levels including the author, institution, region (INCITES, 2020).

The CNCI value is the average of the values for each of the papers, represented as:

$$CNCI_i = \frac{\sum_i CNCI_{each\ paper}}{p_i}$$

e = the expected citation rate or baseline, c = Times Cited, p = the number of papers, f = the field or subject area, t = year, d = document type, n = the number of subjects a paper is assigned to and i = the entity being evaluated (institution, country/region, person, etc) (INCITES, 2020).

Times Cited/% Cited. This number represents the number of times the articles in the research areas have been cited by other scholars. For example, in the Geosciences, 87% of the articles have been cited 1187 times. These figures are presented in the CNCI calculation. Another example is the Multidisciplinary Sciences where there are five published articles, but the impact of those articles is very high (CNCI=2.7) because each article has been cited (100%), with a total of 330 cites. Therefore, it's not only the number of articles being published but the influence of those articles.

Question 2. Where is the relevant literature being published?

Table 3 shows where highly cited articles by UF researchers are being published. An article published in 2012 in the journal *Geological Sciences of America Bulletin* was cited 202 times. Only looking at original research, we discovered that out of the 60 articles published, these articles were cited approximately 1130 times. The highest cited articles are found in the journals listed in Table 3. When analyzing the impact factor of these journals, the articles on sea level rise are being publishing in high impact journals with evidence of being cited frequently.

Source	Research Area	Publication Date	Times Cited
Geological Society of America Bulletin	Geosciences, Multidisciplinary	2012	202
Journal of Coastal Research	Geography, Physical; Geosciences, Multidisciplinary; Environmental Sciences	2011	103
Quaternary Science Reviews	Geosciences, Multidisciplinary; Geography, Physical	2010	102
		2015	49
Geophysical Research Letters	Geosciences, Multidisciplinary	2011	79
		2012	43
Natural Hazards	Water Resources; Geosciences, Multidisciplinary; Meteorology & Atmospheric Sciences	2014	62
Paleoceanography	Paleontology; Oceanography; Geosciences, Multidisciplinary	2011	56
Climate of the Past	Geosciences, Multidisciplinary; Meteorology & Atmospheric Sciences	2016	46
Marine Geology	Oceanography; Geosciences, Multidisciplinary	2013	43

Table 3. Publications and times cited of UF researchers and their world collaborators.

Question 3. What is the correlation between article citations and grant funding?

The UF researchers are participating on grants from the NSF, Australian Research Council (ARC), National Geographic Society (NGS), Australian National University, Smithsonian Institute, US Geological Society, UF, and NOAA. One requirement when writing the grant is to estimate the number of publications produced, and where the applicants will publish.

Figure 3 shows the correlation of times cited and funding organizations and the number of publications indexed in WoS. For 82 granting agencies worldwide, 255 articles were written and those articles have been cited 5,997 times. The NSF has 78 articles in WoS. From WoS, the dataset in INCITES identified 78 articles, cited 1124 times, with a normalized citation impact of 1.38. Next, ARC had 8 articles from WoS INCITES for 364

times cited with a normalized citation impact of 2.9. NGS also had 8 articles identified, with 316 times cited, and a normalization citation impact of 2.14. This shows that the ARC had a bigger impact than NGS even though they had the same number of articles.

UF researchers received grant funding from 60 agencies which produced 94 articles. Those 94 articles were cited 1,936 times. Most notable was the National Science Foundation (NSF), for which 11 articles indexed in WoS. When analyzed in INCITES, the researchers were cited 143 times with a normalized citation impact of 1.35. Another example is National Environmental Research Council (NERC), which had five articles indexed in WoS. When analyzed in INCITES, they were cited 95 times with a normalized citation impact of 2.6.

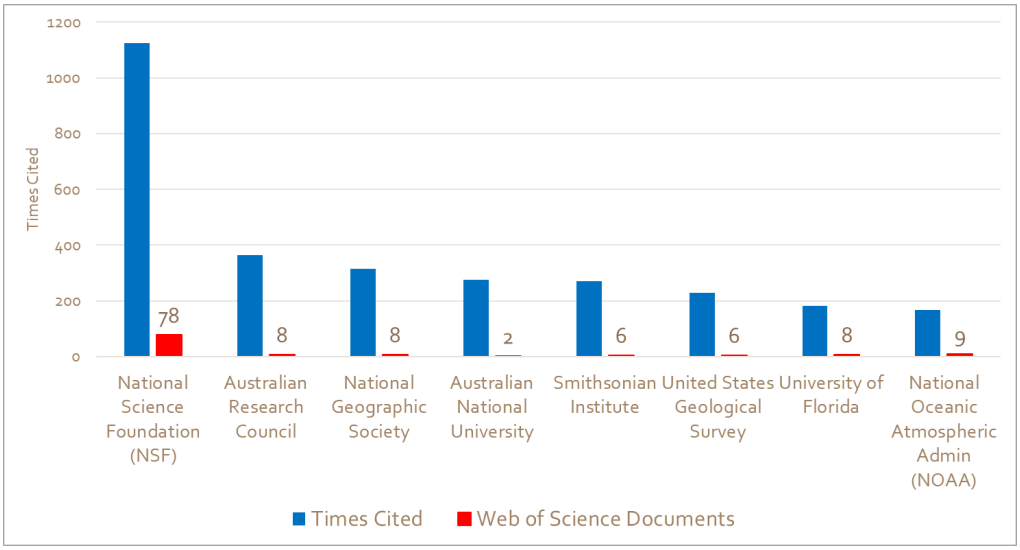

Figure 3. Correlation of times cited and funding organizations.

Discussion

Making research discoverable is a key component that can lead to future grant support, promotion and tenure awards, and perhaps to scientific policy changes. An example from UF is Dr. Andrea Dutton, a researcher in the Geological Sciences Department. Her 2012 article in *Science* has been cited 233 times. Social media such as Twitter posts are a way of broadening impact and reaching a larger maybe untapped audience. Scholarly articles mentioned on Twitter are communicated to a diverse group of readers. Figure 4 shows a recent post on Twitter by the UF Department of Geological Sciences regarding a study in Greenland about climate change. “Likes” on Twitter is a means of measuring impact that is both broader and more immediate than citation counts and is gaining popularity in research as an evaluation and assessment tool. Alternative metrics pull the data from Cross Ref, publishers, and vendors such as

Clarivate Analytics. Scholars should use this opportunity to provide fast accessibility to their research to audiences that may not have subscriptions to the articles that are not open access. This promotion of research to a wide audience creates a level of trust between science and the reader on a global level.

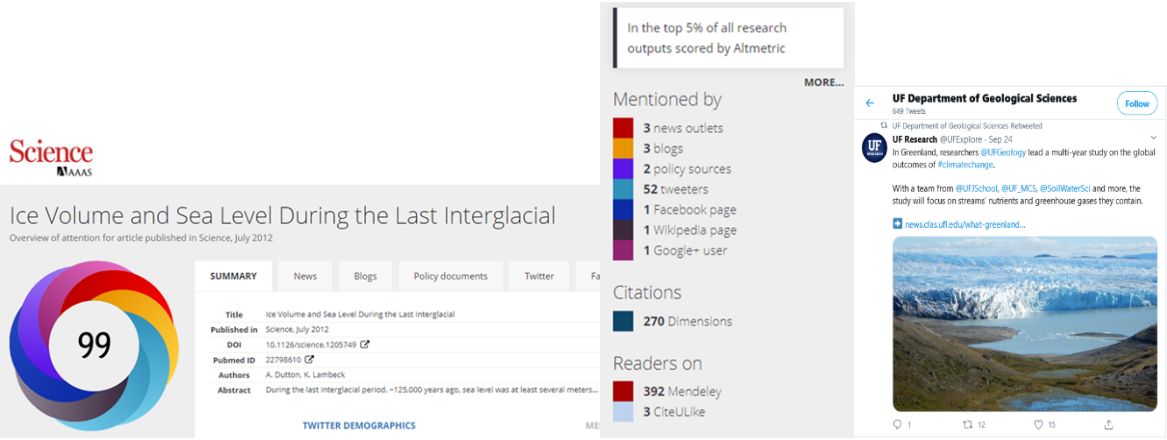

Figure 4. Social media posts.

Conclusion

How can librarians participate in telling the scientific story? Librarians can guide researchers on where to publish. Through offering workshops at pivotal times of the year (i.e., grants, promotion, tenure), librarians can guide their faculty through the often-complex world of grant writing, understanding journal citation reports, measuring productivity of research, and assessing citation impact. By identifying networking and collaboration efforts, librarians can help their faculty make those important connections. Their knowledge of the culture of the disciplines, departments and institutions can be an asset to their institutions. By helping to promote the researcher's visibility for their research output to generate interest through social media, librarians provide that avenue for faculty to tell their scientific story.

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Abstract
Challenges exist to engage students in online learning during non-pandemic times, while social distancing, stay at home orders, and social injustices that we have seen this year have provided further distractions and obstacles for students outside of their coursework. However, during the spring 2020 semester there was a unique opportunity to engage students in discussions about global issues in the context of scientific communication. At a public university of about 10,000 students in the United States, a chemical scientific communications course was taught in an online asynchronous format as a collaboration between a librarian and a chemistry professor. The course content had been re-designed from a previous iteration to include sources of chemical information, methods of oral and written communication, and strategies for evaluating information sources. The course was divided into five modules with lectures developed around reading materials and presented in the form of interactive online discussion forums. These discussions became a way to involve students in the course, while introducing new ideas and encouraging self-reflection as students answered key questions about the course themes. Opportunities for engagement were explored during assigned oral and written summaries of original research articles; interactive discussion forums; and the consideration of global matters such as communication in times of crises, science news, and misinformation. There were learning experiences for both the students and the instructors to see what teaching modalities worked and what tools could be improved.

Keywords: Student engagement; scientific communication; collaboration; chemical information sources.

EURASLIC Libraries during the COVID-19 Pandemic and Other Disasters

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Abstract
Over the decades libraries have encountered challenges in the constantly changing information environment. Libraries adapted quickly, embracing

information technology as an opportunity that enables them to offer efficient and modern library services to patrons. Physical library spaces and traditional library services were complemented by digital, thus forming a hybrid library. Although libraries were on their way towards virtual libraries, no one expected that physical space would be closed one day so abruptly and unexpectedly. Libraries around the world were forced to close their doors to the public overnight due to the COVID-19 pandemic. In order to find out whether EURASLIC libraries were ready for this challenge and how they were coping with the COVID-19 pandemic and whether it was the only disaster they had to deal with in recent times, the EURASLIC Board decided to take a survey. The results of the survey are presented in this paper.

Keywords: Aquatic science libraries; marine science libraries; COVID-19; EURASLIC; remote access; digital collections; working from home; protective measures; lockdown; pandemic; disasters.

Short History of EURASLIC

EURASLIC is a pan-European network of aquatic sciences libraries and information centers and a regional group of the International Association of Aquatic and Marine Science Libraries and Information Centers (IAMSLIC). The main objectives of the association are:

- To provide an organisation for the exchange of ideas and views on issues of mutual concern;
- To collect and present views and proposals on behalf of the members to other organisations;
- To encourage cooperation within Europe and to build links with other national, regional, and international aquatic science libraries and information networks;
- To undertake joint projects to improve the flow, exchange, and dissemination of aquatic information.

The beginnings of the organization go back to 1988, when the idea was developed by the United Kingdom Marine and Freshwater Librarians' Group while preparing for their annual meeting. The invitation was sent to a large number of aquatic libraries and organizations. The meeting gathered 35 participants, including IAMSLIC (International Association of Marine Science Libraries and Information Centers) observers (http://www.euraslic.org/sites/euraslic.org/files/public/images/stories/EuraslicHistory.pdf) The name EURASLIC (European Association of Aquatic Sciences Libraries and Information Centres) was established at the very successful second meeting in Paris in 1990. Another outcome of this meeting was the decision to collect information about aquatic science institutions, which was a basis for publishing EURASLIC Membership Directory (Baron and Varley,1998). Several editions of the directory have been published, the last one in 2003.

EURASLIC's first website was created by David Moulder of the Marine Biological Association (MBA) / Plymouth Marine Laboratory (PML) UK in 1996. Since 1999 the website has been hosted in Greece by the Hellenic Centre for Marine Research. The domain name euraslic.org was registered in 2001 (Baron and Varley, 1998). The current website was released in 2011, developed and hosted by VLIZ Flanders Marine Institute. In the past, membership data was available as a list on the website. Now the data is gathered directly from the IAMSLIC membership database and displayed on the EURASLIC website.

For communication purposes in order to exchange ideas and information, a mailing list was created. The list is also widely used for interlibrary loan, which is still a very important service for EURASLIC libraries. For the purpose of interlibrary loan, EURASLIC members also use IAMSLIC Z39.50 Distributed Library and Union List of Marine and Aquatic Serials, which makes it difficult to gather the data about interlibrary loan activity.

A EURASLIC Newsletter has been published regurarly since 1989. In the beginning there were several issues per year. During the Lyon conference held in 2011, it was decided that Newsletter should be issued once a year.

One of the most important activities are the conferences where members have the opportunity to present their work, exchange ideas, and meet with colleagues personally. EURASLIC meetings are usually held biennally. So far 18 meetings have been held, some of them as joint EURASLIC/IAMSLIC conferences. The conference proceedings are regularly published after the meetings, and since 2010 they are available online on EURASLIC web pages.

Information about the association can be found on the website, in a leaflet that is available in five languages. Information is also shared through the Facebook page.

And Then Came 2020

Last year, 2019, was very rainy in Europe, and it was bad luck that the EURASLIC conference was accompanied by rain. The year ended with expressions of good wishes for the year to come.

And then the year 2020 came, welcomed with great expectations and grand plans for professional activities. At the beginning of the year, information about an unknown virus and contagious disease in faraway China first started to spread. The virus was coming closer and closer, infecting all European countries by March. As a safety measure, lockdown was implemented in most countries.

As stated by the European Bureau of Library, Information and Documentation (EBLIDA): "Libraries were locked down practically in all European countries although in different ways and with different means of implementation. Library services are being continuously re-designed during the COVID-19 phase and they may continue to be re-oriented in the next three-four months with new ways of working being experimented

with. To mention a few: homeworking was heavily practiced during the crisis; to what extent will it become a new normal? Access to digital resources rose spectacularly; will this trend consolidate? And will new services set up in response to short-term requirements continue after the crisis?" (http://www.eblida.org/news/press-release-covid-19-report.html).

"COVID-19 pandemic and measures applied had significant and ongoing impact on services, spaces, and many other aspects of the profession, with many libraries providing services entirely online and many personnel working remotely" (Craft, 2020).

Due to the COVID-19 outbreak, many conferences were cancelled or turned into online events. The librarians made a huge effort to offer as many services as possible to their patrons. In May many countries began to ease restrictions, and libraries started to re-open their doors, applying safety measures prescribed by the governing bodies.

With respect to that it was assumed that the pandemic affected also the EURASLIC libraries. EURASLIC members are coming from different institutions and different countries. Usual communication is by email, information is shared on the website or via Facebook page. EURASLIC members gather once every two years at EURASLIC biennial conferences. Interlibrary loan, one of the services available to members, is done by email or by online services. At the same time, besides being a member of the association, each library provides services to its patrons, acting within the library community of their country. Among EURASLIC libraries there are a few that are already working mostly virtually, while the majority are hybrid libraries. The COVID-19 pandemic enhanced the transition to virtual environment, and even those that hesitated were forced to transform.

During closure there were not many activities within the association, except for interlibrary loan. Therefore, there was no information about how individual libraries were coping with pandemic, except for personal contacts between members. To determine the actual situation and response of EURASLIC libraries to the COVID-19 threat, the EURASLIC Board decided to perform this survey. The aim was to identify the business patterns and measures taken to provide proper library services within the EURASLIC libraries, paying special attention to the most challenging issues during the stay at home period from the end of March to the end of May (in some areas the beginning of June).

The data were collected via a Google Form survey that was run from September 15 to September 29, 2020. The COVID-19 pandemic is not over and the situation changes every day, as well as the prescribed safety measures. Libraries have to adapt quickly, develop new services and follow new practices in order to meet their patrons' requirements. Taking all that into consideration, as well as the limited time of the survey, the questions were simple.

The survey consisted of 16 questions plus one descriptive and one generic question. The first question was aimed at collecting basic information: Institution, country, and number of staff members. A few questions were simple YES/NO options, while the

majority of the questions offered multiple responses to choose one or more. Not all questions were offered to all respondents, as some depended on answers to previous questions. The last question was descriptive, allowing respondents to describe their own experience in several sentences.

The Results of the Survey

Although the number of EURASLIC members has always varied, a decline in numbers was noticed in recent years. In September 2020, the number of current members was 48, of which five are honorary members. There are also several members not working in libraries, and there are four libraries with more than one librarian who is a EURASLIC member. So the number of libraries is even lower: 35.

The survey was completed by 21 respondents from 14 countries (Figure1): Bulgaria, Belgium, Croatia, France, Germany, Israel, Ireland, Latvia, Poland, Portugal, Russia, Spain, Ukraine, and the UK. There was mostly one response by each country. More than one response was received from Germany (five), Russia (three), and Croatia (two).

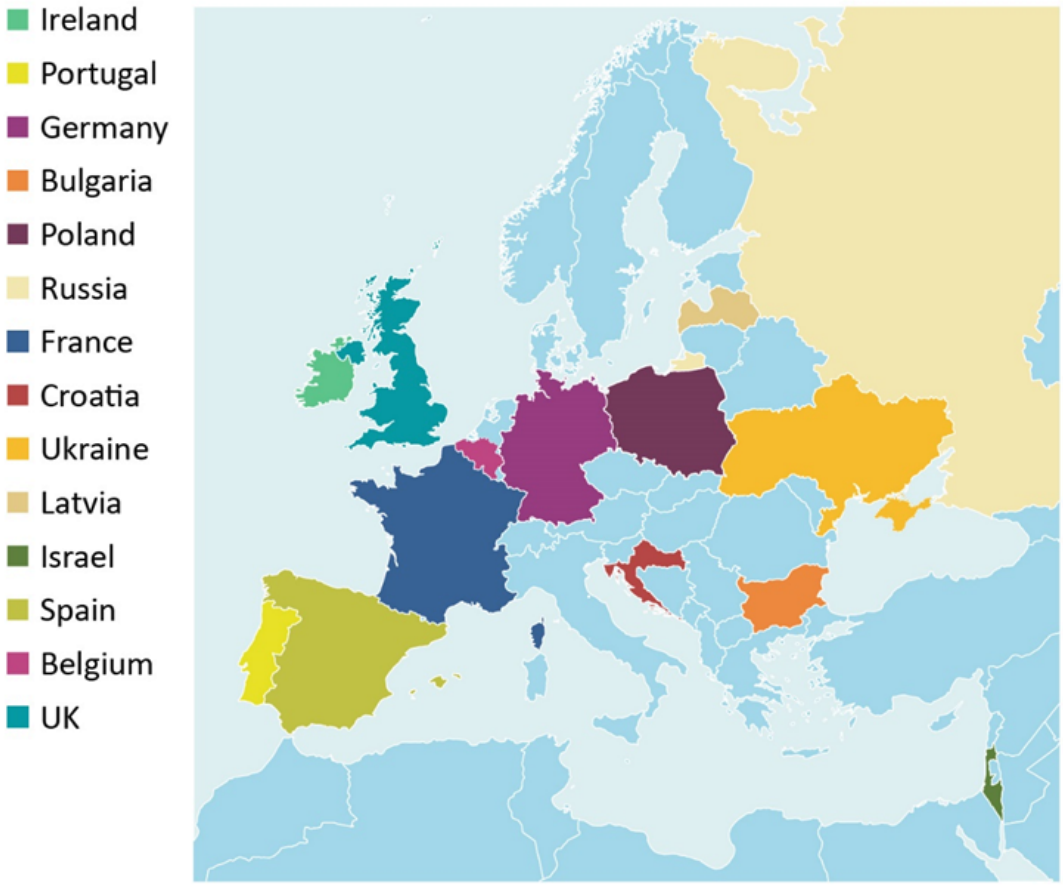

Figure 1: Map of respondents' country of origin.

Of the 21 libraries that completed the survey, most have one or two staff members, whilst seven libraries have more than one member. Out of 48 members, 43,75% completed the survey. If the honorary members are excluded, then it is 48,83% out of 43 members. If comparing the number of respondents to the number of libraries, then **60%** of EURASLIC libraries completed the survey.

EURASLIC Libraries During Lockdown

The majority of EURASLIC libraries closed their doors to the public (42) fully or partially. There were three libraries (14,28%) that remained open all the time (Figure 2). Although most libraries were closed for two months, some were closed longer, from two and a half to four months. There are also libraries that are still closed.

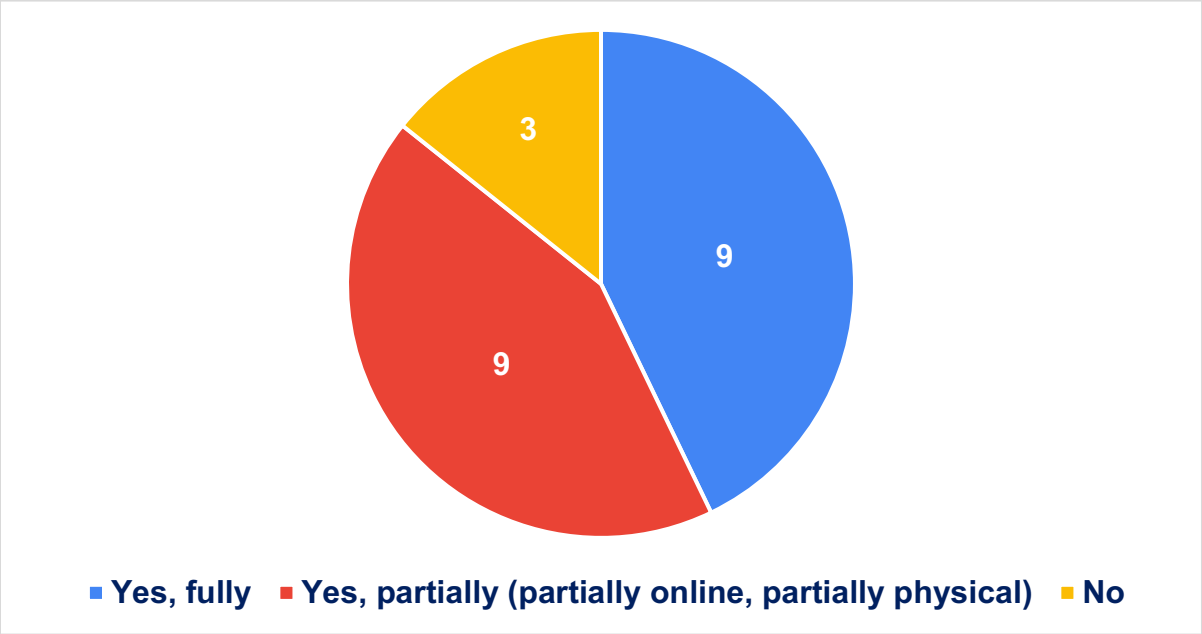

Figure 2: Was your library closed during the COVID-19 pandemic?

Digital content was available to patrons through subscription, open access and free trials. Also, as a support during lockdown, many publishers offered their e-content freely available, which increased the number of the digital collections that were available.

During lockdown almost all of the libraries provided access to digital material to their patrons. More than half of the respondents were actively handling ILL requests. The EURASLIC mailing list – that is mostly used for ILL requests – was still used very frequently, as was confirmed in this survey. Even during lockdown libraries issued bibliometric certificates, and bibliometric services were offered to library patrons. Print library collections were available directly at libraries which were opened or partially opened, but also through scan on demand service. It's no surprise that almost 48% of the respondents offered scan on demand service, provided in respect to copyright law. In this way, researchers were able to quickly obtain materials (e. g. articles, book chapters) from the print collections without physically coming to the library or waiting for

re-opening. Only a few libraries remained open all time, and a few opened the doors to their patrons by appointment mostly. Lending of books or other materials (circulation) was only provided by three libraries. What catches the eye is that of those three libraries that provided circulation services, one was closed, one was partially open, and one was fully open during lockdown.

Access to digital collections (95,24%), bibliometrics, and interlibrary loan (57,14%) were highly valued, and were among the top three services (Image 3).

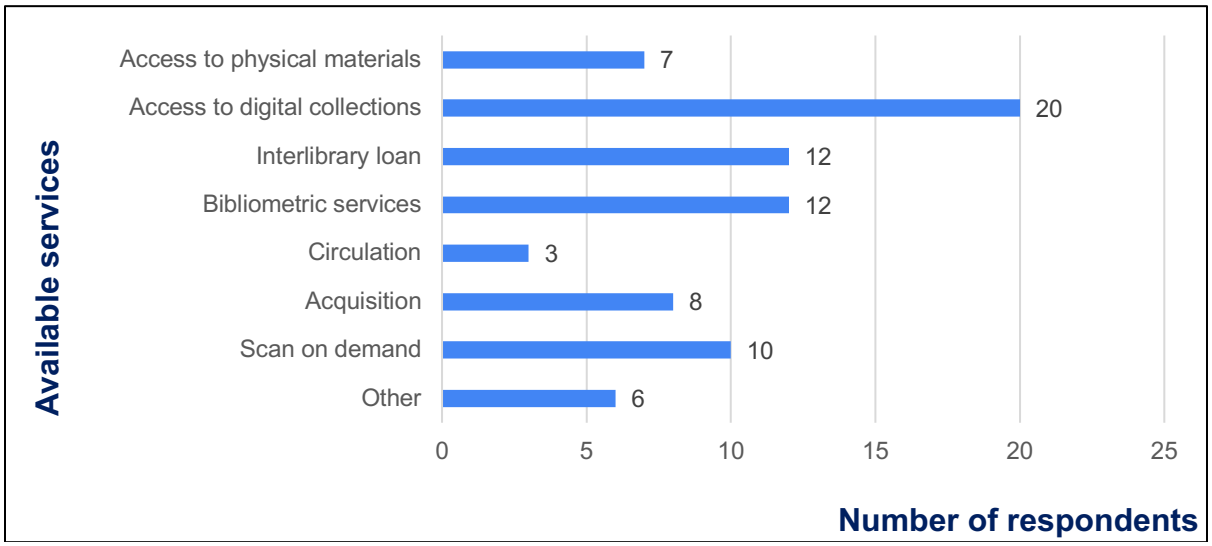

Figure 3: Which services were available to the patrons during the lockdown?

Even during lockdown the library staff stayed in contact with their patrons online and continued to provide them personal assistance (e. g. answering patron inquiries, providing bibliographic searches, etc.).

Participation in online meetings and conferences was the most frequent library activity with 66,66% of libraries taking part. More than half of the respondents were still active in professional associations (e. g. EURASLIC and IAMSLIC). Also a great number of respondents worked on different projects. Many were not only cataloguing library materials but were also engaged in inputting or editing data into different databases. Quite a large number of the librarians (42,85%) were writing papers or guidelines. Some librarians with technical skills seized the opportunity and were working on the development of home made applications. Among other activities libraries were involved in the process of publishing scientific journals, or were handling some administrative tasks (Figure 4).

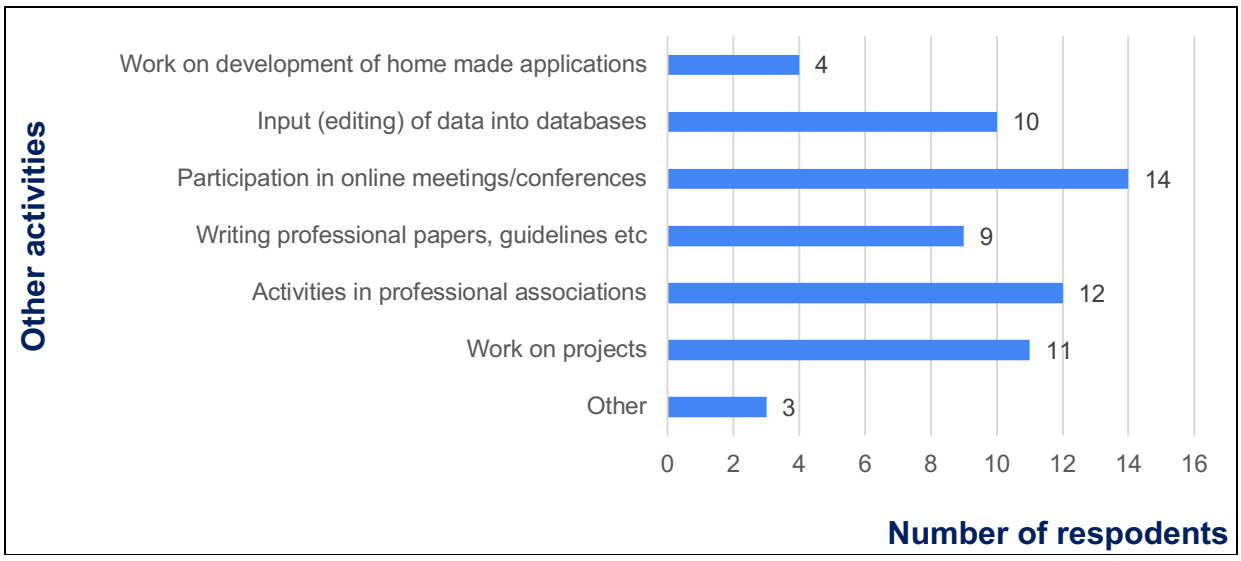

Figure 4: Besides providing services to the patrons, was the staff involved in other activities?

EURASLIC Libraries after Lockdown

After being closed for several months, libraries started the re-opening process. Only three libraries are not yet open to the public; one of them is planning re-opening within a few weeks, and two probably next year, while 61,9% of libraries are fully opened, and 23,81% partially (Figure 5).

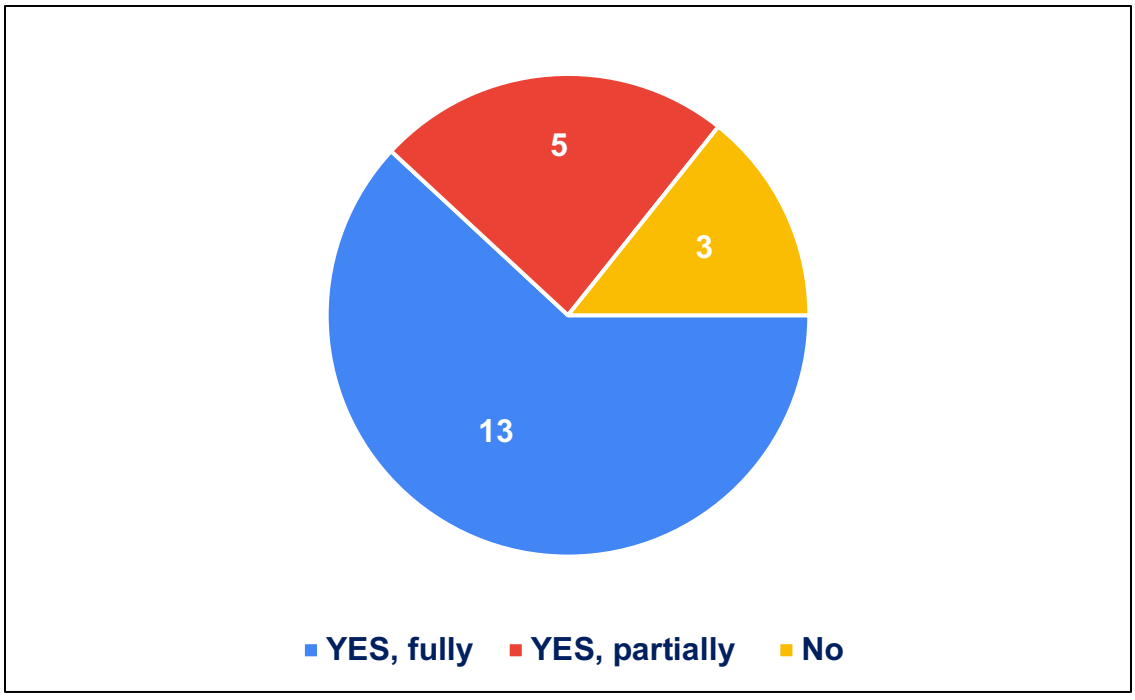

Figure 5: Is your library currently open to patrons?

Re-opening of libraries can bring some issues and obstacles, as there are measures that have to be taken into consideration which did not exist before. Libraries will have to face many challenges in post-COVID-19 times, like personnel security, space redistribution, sanitation of collections, financial hardship, new models of governance. In the already mentioned *European library agenda in the post-COVID-19 age,* EBLIDA identified and suggests five “new normals”:

1. *Exponential social distancing: a well-connected two-meter library*.
   As the measure of two-meters is implemented in the libraries it can impede libraries in their performances, limit their functions, and unstaffed libraries will be obliged to offer “self-service” without surveillance of library staff.
2. *Technologies are mutating and shaping libraries in new ways.*
   The number of available online resources has increased, libraries provide access and promote online resources via their web pages, which is a positive outcome. However, the possibility of a price increase is a little concerning, as well as the quality of the relationship between publishers and libraries and probability that libraries won’t have the possibility to exert control. A challenge in the library agenda is integration of traditional “core” library activities with sustainable development and investment in digital resources and high tech.
3. *Uncharted economic territory: review the library budget composition.*
   There is risk that administrators and politicians will take advantage of the situation in the post-COVID-19 age with excuses of restructuring, core investments, financial cuts and cutting-off non-essential library branches. Librarians have to take action by promoting current activities within a different framework and to look for financial support from other funders. As a framework for reviewing the composition of library budgets can be the European 2030 Agenda for Sustainable Development.
4. *Library governance at central and local levels.*
   The consequence of the COVID-19 crisis is the centralisation of library activities because of health policies, the security of library personnel and other policies of general interest.
   If the libraries are eager to continue their effort in a well-connected two-meter society, in shaping technologies in new ways, and in re-adjusting the library budget composition, they may also need to review existing models of library governance.
5. *Do not forget the climate change opportunity and threat.*
   As many factories and service companies stopped production and delivery, car usage was reduced and carbon emission was reduced almost everywhere, so it seems that year 2020 was a good year for the climate.
   In regard to the climate libraries have two options: either restoring the past state of affairs in libraries, or evolving into the future by following environmental objective.

Effects of the COVID-19 crisis on libraries will be perceptible in the years to come. For the purpose of the EURASLIC survey we underlined current safety and health measures that are required. The usage of measures was covered by three questions in

the survey and applied to staff, patrons, and also to the space, materials, and equipment. As is evident, all EURASLIC libraries implemented at least some safety measures (Figure 6). Three libraries are still closed, so this question didn't apply to them, therefore the total number of libraries that responded is 18.

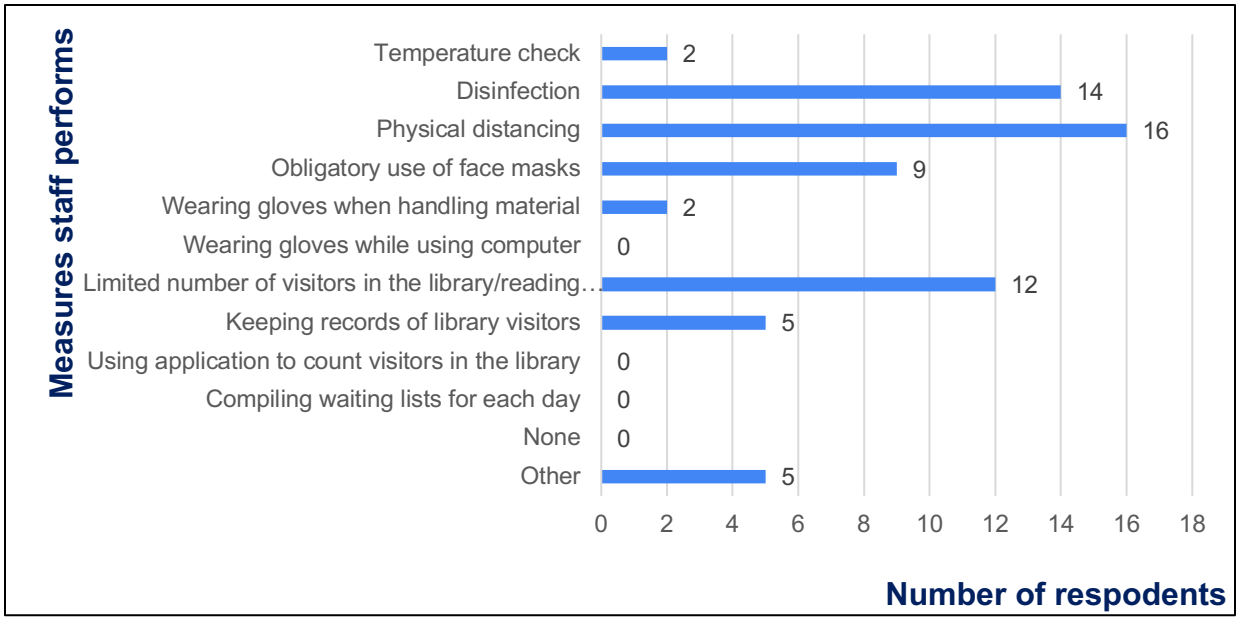

Figure 6: If your library is currently open to patrons, what health and safety measures do staff perform?

As expected, the most used health and safety measures that staff performs are physical distancing (88,88%) and disinfection (77,77%). Although the options in the survey did not specify what exactly is being disinfected, there was only one comment in this regard: disinfection (of hands) is carried out when entering the organization, and a librarian performs keyboard and mouse disinfection on their own initiative. The latter refers rather to measures for the library space which appears in the survey later. The third place is occupied by the restriction on the number of visitors in the library or reading rooms (66,66%) which is in a way related with physical distancing. It seems that usage of face masks was not that obligatory as it is applied in nine libraries (50%). In some institutions only external visitors are obliged to wear the masks.

Making lists and keeping records of library visitors is a measure that helps to track the contacts in case if a disease is detected among visitors or employees. Nevertheless it appears that it's not widely used in EURASLIC community as only five libraries (27,77%) apply that measure. According to comments made in the section *Other*, as a consequence of the limited number of visitors there are not many people in the library, so the measure is superfluous.

The temperature check is commonly used as a strategic measure to combat the COVID-19 disease, but it is obviously less used among EURASLIC libraries (11,11%),), along with wearing gloves when handling material (5,55%). Some libraries do not do temperature checks in the library as it is obligatory upon entering the institution.

The library visitor counter system is used regularly in larger libraries on a daily basis, to calculate the exact number of visitors. That helps them to evaluate their efficiency, provides statistical data and proves their performance to funders. As the pandemic imposed a limited number of visitors in the libraries, the same system is used to detect an allowable number of visitors; it seems that those are not among EURASLIC libraries, as the results show. Obviosly there is no need for waiting lists as there are not too many visitors. In a few EURASLIC libraries' visitors have to make an appointment before visiting the library, to ensure the presence of the staff.

Some of the measures mentioned above apply to both staff and the patrons, such as physical distancing and disinfection which are the most used measures in both categories (Figure 7). As many as 16 libraries (88,88%) apply physical distancing to its patrons. This measure is followed by hand disinfection (66,66%).

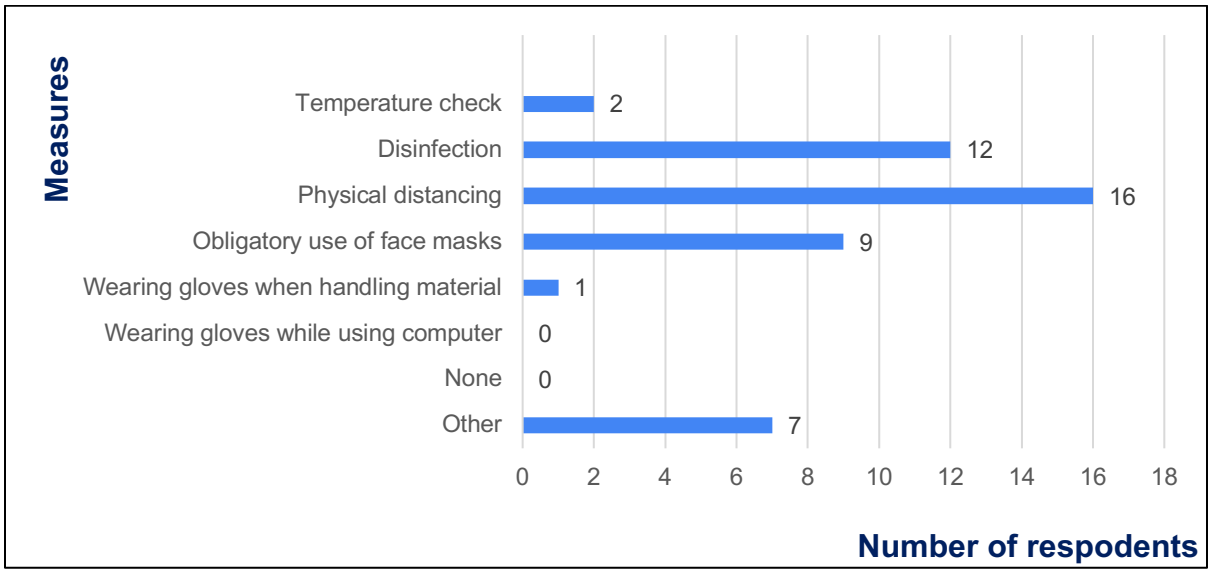

Figure 7: If your library is currently open to patrons, what are health and safety measures for patrons?

The temperature check is not the most common measure for the same reasons that apply in regard to staff. It is performed at the entrance to the institution, or it is not required due to a very small number of visitors. Some libraries demand obligatory use of face masks to patrons, and some apply that measure to external users only. Just one library applied the measure of wearing gloves for handling material. Wearing gloves while using computers seems unnecessary. As stated in *Other*, one library took more flexible measures in this sense; since the library was not staffed, the door was open, and an “honest” self-checkout system was organized.

Regarding space and holdings (Figure 8), it is evident that the libraries put emphasis on disinfection of equipment (66,66%); tables and chairs (38,88%); door and window

handles (5,55%) and on deep cleaning (66%). Sanitizing and quarantine of materials is also widespread (33,33%).

An important issue concerns items returned to the library after lending. The suggested quarantine for books is normally set at 72 hours, but rules differ in Europe from state to state (A European library agenda for the post-Covid 19 age Work in Progress. http://www.eblida.org/Documents/EBLIDA-Preparing-a-European-library-agenda-for-the-post-Covid-19-age.pdf). According to comments, it seems that some EURASLIC libraries have even longer quarantine periods as the returned books remain in quarantine for five days in a special box. There are four EURASLIC libraries, or 22,22%, that didn't implement any measures regarding space and holdings, although all of them were opened fully or partially during lockdown.

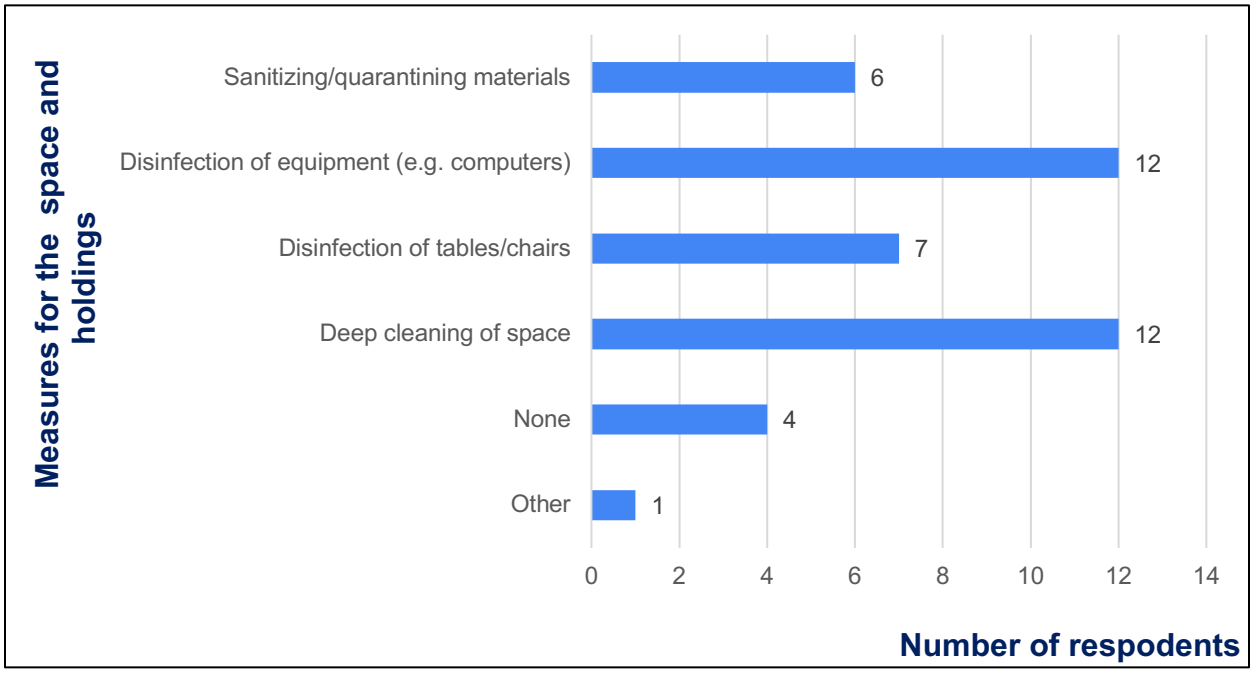

Figure 8: What are health and safety measures for the library space and holdings?

In order to implement the measures for the usage of library premises, eight libraries (38.09%) issued their own guidelines, three libraries (14,28%) didn't issue any guidelines, and seven (33,33%) followed guidelines issued by some other bodies (National and University Library, head organization or institution) or followed some recommendations (the answers did not specify which ones) (Figure 9). All 21 libraries replied to this question.

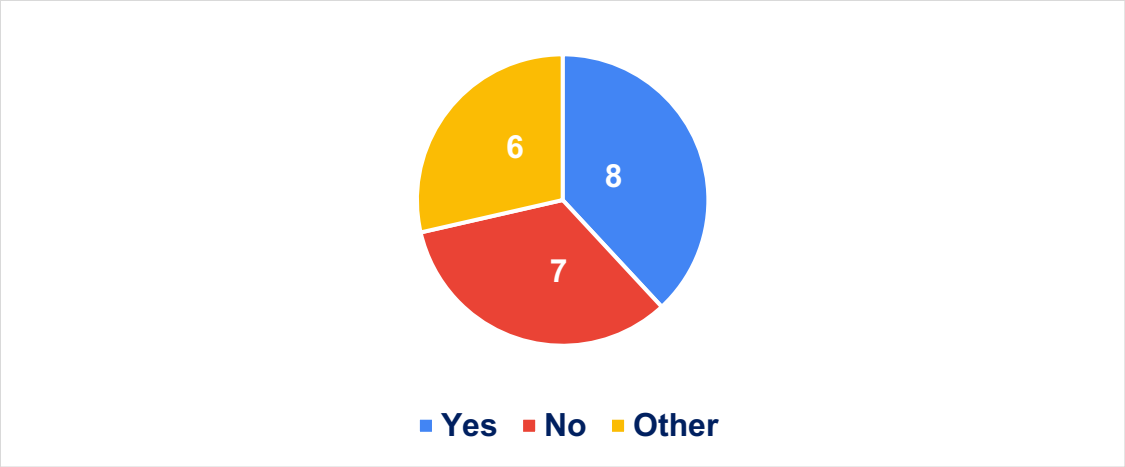

Figure 9: Did your library issue official guidelines and recommendations for library services/library functioning during the pandemic?

The intent of following the strict guidelines is to protect both the staff and patrons/researchers. The disinfection of equipment and deep cleaning of space provided a neat and safe environment, which is evidenced by the very low number of the COVID-19 infected patients among the library staff. The question regarding infection of the staff wasn't mandatory, as it might be considered as an invasion of privacy. However, almost all respondents (20 out of 21) responded (Figure 10). Unfortunately, one response indicated that a library staff member was infected by COVID-19. All the other librarians "stayed safe and healthy,, and hopefully it will remain that way in the future. The survey also shows that physical distancing appears to be the most applicable measure in the library spaces, which indicates that so far the libraries are a safe spot in disseminating information and even encouraging for staff's enthusiasm.

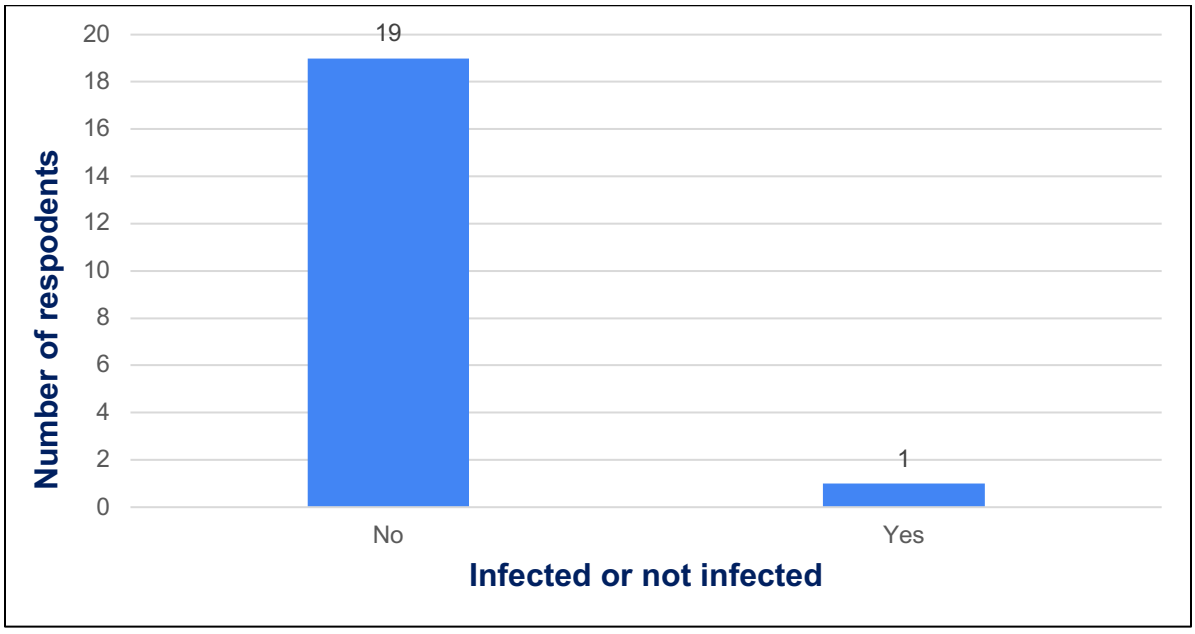

Figure 10: Was any library staff member infected by COVID-19?

Crisis situations can lead to an unstable environment, opening the risk of staff dismissal or even closure of libraries. Still, most of the libraries (80,95%) continued to exist and kept the same number of staff members. One library faced both staff dismissal and closure and one had staff dismissal. Small one-man libraries pointed out that in their case a dismissal would also mean a closure of the library (Figure 11).

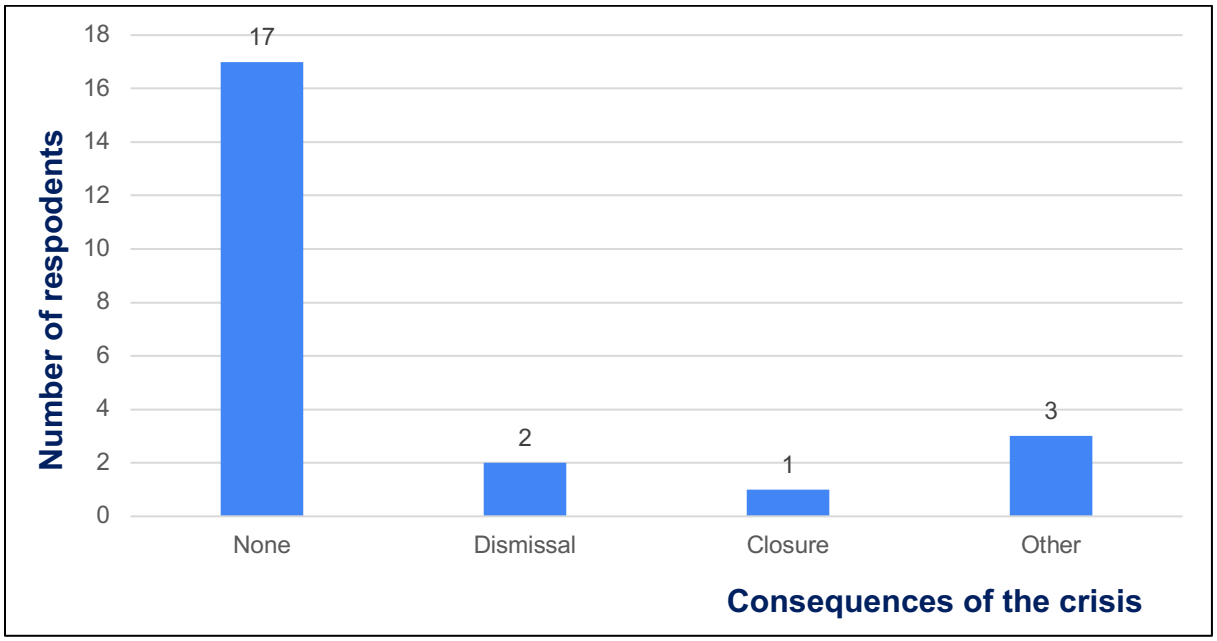

Figure *11: Did the crises cause threat of dismissal of staff or closure of your library?*

Even confronted with unprecedented challenges, it is evident that EURASLIC libraries responded to the crises efficiently. There is no library whose efficiency was poor. Only two libraries (9,52%) rated their services as fair. One of the reasons was the fact that access to digital collections was provided via IP addresses of the institution and therefore accessible only from the institution, but not from home. Consequently the library was unable to provide remote access. The majority of respondent libraries rated their effectiveness as very good (33,33%), and six libraries (28,57%) evaluated their effectiveness either good or even excellent (Figure 12).

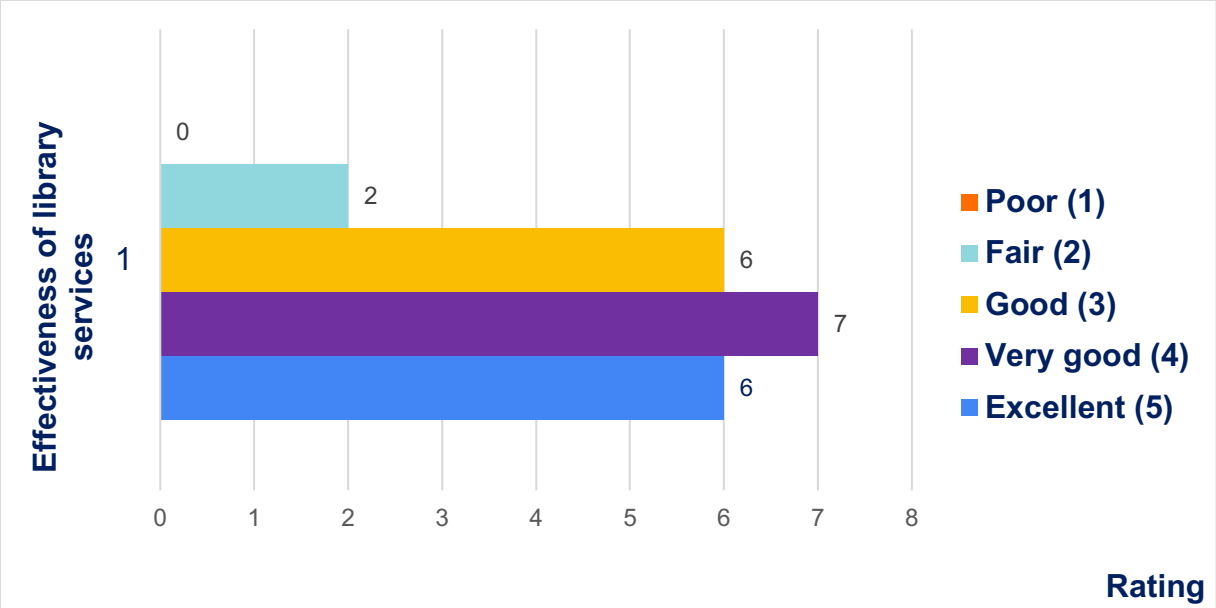

Figure 12: How would you rate the effectiveness of library services throughout this period ?

During the time when all attention was directed to COVID-19, three EURASLIC libraries had to confront other difficulties or disasters as well. At the end of last year one EURASLIC library along with its parent institute was burnt down in a fire. The scientific library with all its collections was completely destroyed. A few months before pandemic the employees started to work from home or from substitute offices and laboratories. Since that day the physical library has ceased to exist. Remote access to digital collection is provided. The librarian also performs some administrative duties. The institute is in the process of re-organizing with the aim of ensuring a return to normal.

Two days after lockdown started, another EURASLIC library was hit by an earthquake. Fortunately the damage was not that bad. Damage was in the reading rooms and staff offices. Some shelves fell, some tilted and several walls cracked. There was small damage to the IT equipment, too. After the library re-opened, not all reading rooms were immediately open to the public, not because of the pandemic, but due to repair work and fixing of shelves after the earthquake. By the end of the year, it is expected that all reading rooms will be open to the public.

During lockdown nature recovered and animals have started to take advantage and to appear in places they were not seen before - even in the libraries. During the time that people were away, cockroaches came to power within one of the EURASLIC libraries. Cockroaches haven't been seen there since the 1990's, and now regiments of cockroaches populate library space. Even though the collection is not damaged, their presence is very stressful to library staff and will require a long-term extermination process.

Although one of the libraries didn't claim to be affected by any other disaster, in the comments it was mentioned that they have to move to other premises, and packing all the holdings during the pandemic can be considered as an equivalent to disaster.

Conclusion

The year 2020 was quite turbulent, marked by the COVID-19 pandemic. Many governments in the world and in Europe implemented lockdown as a preventive measure, although in a different way. However, all those measures brought some impediments in our personal and professional lives, and had its implications on libraries as well. For the first time libraries around the world were closed to the public and most of the services were moved to a virtual environment. For many years libraries were developing online services, providing access to digital collections and moving slowly towards digital libraries; nevertheless closure emphasized its importance.

The pandemic forced libraries to redesign services, introduce new ones, and redefine strategies. As some suggest (Guo, 2020) the duty of libraries is to provide guidelines for patrons to use library digital resources conveniently, integrate all kinds of digital resources and improve the online access mode of digital resources and negotiate and cooperate with database suppliers. Reference services should be provided by email, live chat, online forms, social media, etc. Libraries should provide education and training services to help patrons to improve their information literacy.

COVID-19 has become one of the main research subjects in the current year. It is studied from different angles, and from different disciplines. Most frequent are researches from the medical, psychological, sociological or legal point of view. Also there are many studies on the impact of COVID-19 on the economy, finance, culture or society as a whole. The researchers within library and information science are giving attention to the COVID-19 pandemic impact on libraries and their response to the crisis.

The lockdown period was certainly a new experience for EURASLIC libraries and also an opportunity to learn new things and do things differently in order to provide patrons with better services. Libraries whose services and activities were already based on IT technologies and on an online environment have not noticed significant changes, and were able to perform their usual tasks and to keep a high level of services. As some claim, researchers are quite familiar with remote access and it is possible for many of them to work from home; therefore the physical library is less used and there is a certain concern about implementing the option of working from home permanently after COVID-19, which could lead to closure of physical libraries. There are some that found working from home effective, as most services were provided as before, and their digital collection enlarged in respect.

According to the survey results, it becomes clear that the majority of the aquatic and marine science libraries throughout Europe showed an appropriate response in providing the scientific staff with information services. The majority of respondents claimed that their services were either partly or fully accessible online, including access to print/digital collections, interlibrary loan, and bibliometric services, reachable during

the normal working hours and also via online research support. Participation in the international and national library events was not terminated either. Although correlation analysis was not performed, it is notable that the libraries with just one or two staff members provided an equal amount of services as those with more staff.

Concern about permanent work from home in the future was mentioned, leading to the conclusion that physical libraries might become obsolete. It should not be forgotten that libraries are not just storage of print books or journals, they are also meeting points and its space can be used for studying, workshops, meetings and other activities. As the online meetings via Zoom, BigBlueButton and other applications became popular during the pandemic, after re-opening it was noticed that libraries proved to be a quiet spot to perform those online meetings. In their comments respondents claim that what was missed most is social interaction in person with colleagues and patrons.

Upon analyzing the results, one thing was obvious: during the COVID-19 pandemic, all libraries on the list fulfilled their duties and received positive feedback from their customers, which helped the administration of the institutes keep up the regular workflow of the departments. Once again the libraries proved that even staying at home, librarians can be efficient and valuable for their target users.

As the COVID-19 pandemic is not over yet, the results shown in this survey represent the situation until September 2020. As autumn came, the number of infected people increased, therefore some countries announced more restrictive measures and even the possibility of new lockdown. As the situation has changed for the worst, even some EURASLIC libraries introduced a new lockdown or advised staff over 65 to stay and work from home, while some started to work partially. Thus, the overall impact of the crises on the libraries, including the EURASLIC libraries, and effects of the measures implemented, will be visible only in the foreseeing future.

Relying on the results of this survey, it is to be expected that EURASLIC and all other libraries will successfully overcome the crisis and continue to exist in both physical and virtual environments, continually providing all necessary services and introducing new ones.

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CYAMUS Panel

Playing to Our Strengths: Sharing Lessons Learned from Libraries' Changing Contributes During a Pandemic

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Abstract
As with all institutions, libraries serving marine science programs pivoted abruptly to remote work during this global pandemic. In many ways, libraries were well-positioned to quickly make the necessary changes to continue serving our researchers, faculty, and student constituents. This panel session will explore how libraries have counterbalanced the challenges faced during this time. Panelists will share solutions employed at several IAMSLIC libraries in the areas of managing people and systems; supporting remote workers; supporting remote access to library resources; and keeping the library as a center for community on campus.

Keywords: Collection development; instruction; interlibrary loan; document delivery; employee management; remote service.

Lockdown, an Opportunity to Open Up the Archive

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Abstract
The Irish Marine Institute library has a specialist archive collection with scientific reports, books and publications prepared by Irish and international researchers dating from the 1700s. This presentation outlines how during the COVID-19 lockdown and subsequent 'working from home', the library was able to finalise the digitisation of a specialised collection, make it openly available, and build an exhibition website. The collections digitised are the Sea and Inland Fisheries Reports, a series of annual reports and scientific advice spanning from 1852-1987 and the Scientific investigation collection which spans from 1901-1926. While the reports focus on the yields and species, the investigations series is similar to modern peer reviewed journals, examining the methods and outcomes of the science undertaken. Through a collaborative effort with the FEAS (Fisheries Ecosystems Advisory Services) department, funding was secured from the European Maritime and Fisheries Fund (EMFF) for this project. The digitisation of this unique, special collection, and the subsequent data extracted for the Institutional Repository, the exhibition timeline, visualisation map and information pages of the website will inform scientists and the public about this rich resource. Through this collection scientist can establish essential baseline habitat data, adding value to existing data sets and developing multiple data products for different end-user and policy needs. The success of Changing Tack and proceeding with this project remotely will be highlighted throughout this presentation.

Keywords: Open data; open access; virtual collaboration; Sea and Inland Fisheries Reports, Irish Marine Institute.

Linking People to Information Using Artificial Intelligence: A Case Study

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Abstract: An interdisciplinary team of Cal Poly State University faculty, staff, and students from the Library, Swanton Pacific Ranch, and Computer Science and Software Department are working together on a proof-of-concept project to share the history of Swanton Pacific Ranch through Artificial Intelligence (AI). Over 230GB of digital documents, images, video, audio, data and more will be processed to create a knowledge repository and an interactive software platform that will allow conversations between the platform and a person specifically about the history of Cal Poly's Swanton Pacific Ranch (think Apple's Siri, Amazon's Alexa, or Google's Assistant). Though audio, video and internet self-paced tours and displays in museums and historical sites exist, two-way conversational devices are unusual. AI has not been deployed widely to share government information, data, information resources, archival materials, etc. New tools need to be created to encourage patrons to use the hand held devices they are comfortable with to discover information. Self-directed learning through information gathering tools patrons use every day may create a connection that will drive people to engage more fully with information resources. As patrons interact with the platform, the questions they ask will train the software to respond with more detailed answers and anticipate unique questions.

Keywords: Artificial intelligence; AI; case study; chatbot; knowledge repository.

Data Services at an Undergraduate-Research and Teaching-Centered University: Supporting Faculty and Students

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Abstract
California Polytechnic State University (Cal Poly) is one of the 23 campuses within the California State system. It is a four-year, public university, emphasizing comprehensive undergraduate education with a total enrollment of ~20,000 undergraduate and graduate students (96% undergraduate). Teaching and scholarship are both required by faculty but with limited research support services. A survey of faculty research data services needs was conducted in 2012. Survey invitations were emailed to a stratified random sample of 449 faculty (tenure-track or tenured assistant, associate and full professors only) and 226 responded for an overall response rate of 50%. The survey results provided a foundation from which services were created and have evolved over the last eight years in the Robert E. Kennedy Library and the university. This paper also shares the evolution and repurposing of research resources and services to support both faculty and students.

Keywords: Data curation in libraries, data services librarians, learning and scholarship, geographical information systems (GIS), education, library surveys, data literacy, researchers.

Introduction

Data comes in many forms from text to numbers to images to code and more. Data is the basis for all scholarly and professional communication. Data literacy, discovery, and reuse are growing in importance as these practices will support effective problem solving, innovation, collaboration and other activities across a wide array of disciplines and professions. With the deluge of data generated from contemporary research, scholars are now faced with greater challenges of storing, presenting, and managing datasets. This has become especially acute since most funding agencies now require data management plans, and funders and many publishers are requiring that the data underlying research findings to be accessible.

Support tools for data preservation, discovery, access, and education need to evolve along with the methods used in research and educational pedagogy. This requires a culture of flexibility, immediacy, and service through a mix of cross-institutional and cross-disciplinary structures that can take multiple forms. Needs can best be identified and matched with capabilities by fostering librarian-researcher partnerships and establishing programs for mutual engagement and education.

Librarians recognize the need to provide data services for their patrons. The challenge for libraries is to determine the data services that can assist faculty, but that are practical and sustainable to provide. Recognizing that the use of data is quickly evolving and data skills are becoming critical professional skills for college graduates, Cal Poly's Library has evolved to support the data service needs of both students and faculty through the creation of new units, physical spaces, and services. Effective needs-based services require out of the box thinking, flexibility, and shifting the paradigm of the profession. It also requires building relationships outside the library with the office of research, office of grants development, office of graduate education, office of institutional assessment, etc. to coordinate efforts.

Background

Most faculty data service research conducted by libraries up to 2012 was focused on Ph.D. granting universities and research institutions. Tool creation, methods, and analysis lacked non-librarian participation, particularly by statisticians; the number of researchers interviewed and surveyed was small; and the process for developing survey tools was not clearly articulated. Work often focused on collection of individual researcher profiles or assessment of an organization's researcher data management plans. In most cases libraries were developing data services without including other campus stakeholders. Services focused on creating institutional repositories, using big data, preparing data management plans, and supporting metadata requirements for discipline specific data repository deposit.

In contrast, this research was conducted at a primarily undergraduate institution, the survey tool was developed in concert with a faculty statistician over more than six months including pilot testing, and the number of responses was large for any organization. The survey included faculty from all disciplines represented on the campus, not just researchers in specific disciplines, researchers that utilize large amounts of data, or researchers that produce a lot of data. The 2012 survey results in conjunction with results from a complementary survey conducted in 2010 (Scaramozzino, Ramírez and McGaughey, 2012) were part of the foundation from which data services were created and the survey results continue to inform the evolution of services.

Survey Methods

The survey was conducted between April 30 and May 11, 2012 at Cal Poly. Following IRB approval, survey invitations were emailed to a stratified random sample of 449 faculty (assistant, associate and full professors only). The campus had a total of 631 full-time, assistant, associate and full professors, so the sample represents 71% of the population. Strata were defined using the college/unit in which faculty members are employed. In addition to the Library (LIB), Cal Poly is made up of six colleges: the College of Science and Mathematics (COSAM), the College of Liberal Arts (CLA), the College of Engineering (CENG), the College of Architecture and Environmental Design (CAED), the College of Agriculture, Food and Environmental Sciences (CAFES), and the Orfalea College of Business (OCOB). The random sample was chosen in proportion to the population within each of the colleges/units listed above. An e-mail invitation sent out on April 30, 2012 included a description of the survey/project goals, a link to the online survey in SurveyMonkey, and a gift card incentive for survey completion. An e-mail reminder was sent one week after the survey opened.

Of the 449 faculty to whom survey invitations were sent, 226 responded, for an overall response rate of 50%. Response rates and sample demographics by college/unit are shown in Table 1. Table 2 shows sample demographics by college/unit and academic rank.

Table 1: Response Rate by College/Unit

College/Unit	Random Sample Invitations n	Number Responding n	Response Rate %
College of Agriculture, Food & Environmental Sciences	63	31	49.2%
College of Architecture & Environmental Design	46	15	32.6%
College of Engineering	85	41	48.2%
College of Liberal Arts	108	54	50.0%
College of Science & Mathematics	103	65	63.1%
Library	4	3	75.0%
Orfalea College of Business	40	17	42.5%

Table 2: Sample Demographics by College/Unit and Academic Rank

College/Unit	Academic Rank		
	Assistant Professor n (%)	Associate Professor n (%)	Full Professor n (%)
College of Agriculture, Food & Environmental Sciences	8 (25.8%)	7 (22.6%)	16 (51.6%)
College of Architecture & Environmental Design	6 (40%)	3 (20%)	6 (40%)
College of Engineering	7 (17.1%)	17 (41.5%)	17 (41.5%)
College of Liberal Arts	25 (46.3%)	8 (14.81%)	21 (38.9%)
College of Science & Mathematics	25 (38.5%)	26 (40%)	14 (21.5%)
Library	1 (33.3%)	2 (66.7%)	0 (0%)
Orfalea College of Business	2 (11.8%)	6 (35.3%)	9 (52.9%)

The survey was composed of 16 questions which were developed to collect information on the data creation and use needs of Cal Poly faculty and disciplinary differences. See Appendix 1 to review the survey. Specifically, questions addressed the following hypotheses: (H1) Cal Poly faculty generate a variety of digital data in their research, scholarly, and professional creative activities; (H2) Cal Poly faculty frequently rely on storage methods outside of campus control for their digital data; (H3) Cal Poly faculty believe it is important to share their digital data with others; and (H4) Cal Poly faculty are interested in workshops, lectures and consultative services on data-related topics. There were three types of questions in the survey: (1) those with a dichotomous response (Yes/No), (2) those with a 5-point Likert response (Always, Frequently, Occasionally, Rarely, Never), (3) and those where participants were allowed to select all that applied.

The survey format, question wording, length of the survey, the use of an incentive, and the use of the online survey tool, SurveyMonkey, were all chosen with the aim to reduce the burden on respondents, increase the response rate and eliminate bias. The survey was pre-tested on a group of nine Cal Poly faculty who were not part of the random sample. Changes were made to the survey format and question wording to reflect concerns and eliminate points of confusion as indicated by the pre-testers.

While appropriate measures were taken to reduce any potential sources of bias, with an overall response rate of 50% there is the possibility of bias due to nonresponse. The individuals who did not respond to the survey might have answered differently than those who did respond. Additional sources of bias may have been introduced by allowing individuals to skip questions, scroll backwards and forwards, change their answers, and exit at any time.

Survey Results

The results are divided into five subsections addressing each of the five hypotheses of interest. For results based on the entire sample, the maximum margin of error is ± 5.2%.

Hypothesis 1

Hypothesis 1 assesses the variety and amount of digital data produced by Cal Poly faculty in their research, scholarly, and professional creative activities. Cal Poly faculty generate a variety of digital data in these activities. Faculty were asked to select all of the digital data types that they produce in their scholarly activity; choices included: digital images, audio/video files, textual data, spreadsheets, GIS data, CAD data, and other. Ninety-one percent of the respondents produce text files, 72% produce some sort of digital images, 65% produce spreadsheets, 36% of the sample produce digital audio/video, 15% produce CAD files, 11% produce GIS files, and 13% produce other types of digital files, such as computer software (mobile phone applications, video games), statistical data (Minitab, SAS, JMP files), and others. Table 3 contains all the digital data format(s) generated by faculty in their research, scholarly, and creative activities (RSCA).

Table 3: Digital data format(s) generated during faculty RSCA. The percentages listed are comprehensive and independent of college or unit.

Digital Data Format	Respondents
Textual documents (e.g. .txt, .doc, .docx, .rtf)	90.6 %
Digital images (e.g. .bmp, .jpg, .gif, .tiff, x-rays)	70.6 %
Spreadsheets (e.g. .xls, .sdq, .spv, .sav, .csv)	66.4 %

Digital audio or video files (e.g. .mp3, .aiff, .wav, .avi, .mov, .mxf)	36.2 %
Computer-Aided Design (CAD) files (e.g. .dwg, .dxf, .pln)	15.3 %
Geographic Information Systems (GIS) files (e.g. .gpx, .kml)	11.1 %

Data formats reported by college showed that a significant number of College of Science and Mathematics respondents indicated that most of their data is composed of digital images or other file types while the majority of the College of Liberal Arts respondents indicated having digital audio and video files. The College of Agricultural, Food and Environmental Sciences generated the most GIS data, the majority of the College of Architecture and Environmental Design and the College of Engineering faculty reported generating Computer Aided Design (CAD) Software files, and the Business college primarily created spreadsheets.

As noted above approximately 13% of digital data were identified as other, including: custom formats from digital chart-recorder software, images and data from instrument software, digital humanities webpages, multimedia learning objects, Mathematica notebooks, video games, programming languages/software code/computer programs, remote sensing data formats, musical scores, DNA sequencing files, and metadata. There is a need for support of file types that result from varied and numerous open source and proprietary software and hardware. Though certain repositories like GitHub are now regularly are used for code and software, many types of data still have no clear repositories, no established disciplinary or worldwide metadata standards, no version control parameters, and no standard long-term storage options. This is particularly problematic when looking for long-term storage options for content created with newly developed tools and/or short-term grants or soft-money instead of the campus base budget.

The amount of digital data stored by the faculty person or their undergraduate and graduate student researchers and other research assistants is shown in Table 4. Approximately 73% of survey participants have less than 100 GB of stored data. Seven percent have two or more terabytes of stored data. When asked about future data storage capacity needs, 75% of responding faculty indicated that they would require less than 1 GB, up to 1 TB. About 18% indicated they would have large storage demands of 2 to 11 or more TB.

Table 4: Amount of current and future digital data generated during RSCA.

Digital Data	**Total Amount of Current Data % (n)**	**Total Amount of Future Data % (n)**
Less than 1 GB	26.1% (59)	15.0% (34)
1 to 100 GB	146.5% (105)	33.2% (75)
101 GB to 1 TB	15.5% (35)	27.4% (62)
2 to 10 TB	4.9% (11)	12.8% (29)
11 or more TB	2.2% (5)	5.8% (13)
Other	4.9% (11)	5.8% (13)

Hypothesis 2
Hypothesis 2 assesses the digital data storage methods upon which Cal Poly faculty most frequently rely. Cal Poly faculty frequently rely on storage methods outside of campus control for their digital data. Respondents were asked to rate the frequency with which they use various storage media on a 5-point Likert scale (Always, Frequently, Occasionally, Rarely and Never). The storage methods and results can be seen in Table 5.

An overwhelming majority of 76% of surveyed faculty reported storing their digital data locally. More secure forms of storage, such as departmental and/or centrally provided servers were rarely if ever used. Only about 25% of those responding to the survey reported always or frequently using network-attached devices provided by their research group, department and/or college/university. Similarly, about 25% of respondents reported that they store their digital data in the cloud.

Table 5: Number and percentage of stated storage method(s) used currently by faculty.

Storage Method	Always % (n)	Frequently % (n)	Occasionally % (n)	Rarely % (n)	Never % (n)
Local (CDs, DVDs, memory sticks, computer hard drive, local external hard drive)	76.0% (171)	20.4% (46)	2.7% (6)	0.4% (1)	0.4% (1)
Network-attached device managed by research group	11.4% (23)	13.4% (27)	12.4% (25)	14.9% (30)	48.0% (97)
Departmental server	8.4% (17)	13.4% (27)	14.9% (30)	13.9% (28)	49.5% (100)
Centrally-provided storage (e.g., a Cal Poly server provided by college or IT support services)	10.8% (22)	15.8% (32)	12.8% (26)	12.3% (25)	48.3% (98)
In the cloud (e.g. Amazon S3, disciplinary repository)	11.0% (22)	13.4% (27)	11.4% (23)	10.0% (20)	54.2% (109)

Anticipating that faculty tend to use the storage methods that are the most convenient, respondents were asked to identify all of the storage methods they would consider using if they were readily available. While 85% reported some continued use of local storage formats, over 50% of respondents reported they would consider using network-based resources. When asked how often they would use each of the storage formats if they were readily available, close to 50% of faculty responded they would always or frequently use network-attached devices managed by their research group or departmental servers; over 50% responded that they would use centrally-provided servers or the cloud. Results can be seen in Table 6.

Table 6: Number and percentage of stated storage method(s) considered by faculty.

Storage Method	Always % (n)	Frequently % (n)	Occasionally % (n)	Rarely % (n)	Never % (n)
Local (CDs, DVDs, memory sticks, computer hard drive, local external hard drive)	67.0% (144)	23.3% (50)	5.6% (12)	2.3% (5)	1.9% (4)
Network-attached device managed by research group	17.9% (32)	28.5% (51)	24.0% (43)	14.0% (25)	15.6% (28)
Departmental server	14.3% (26)	31.3% (57)	26.4% (48)	11.0% (20)	17.0% (31)
=Centrally-provided storage (e.g., a Cal Poly server provided by college or IT support services)	20.2% (40)	37.4% (74)	20.2% (40)	8.6% (17)	13.6% (27)
In the cloud (e.g. Amazon S3, disciplinary repository)	26.8% (51)	25.3% (48)	15.3% (29)	10.5% (20)	22.1% (42)
Local (CDs, DVDs, memory sticks, computer hard drive, local external hard drive)	67.0% (144)	23.3% (50)	5.6% (12)	2.3% (5)	1.9% (4)

Over 90% of faculty in all colleges report using local storage devices always or frequently. For the other storage methods, over 50% of engineering faculty report always or frequently using network-attached devices managed by a research group or departmental servers. Fifty percent of business faculty, 43% of architecture faculty and 67% of library faculty report always or frequently using cloud-based storage methods. Results can be seen in Table 7.

Table 7: Number and percentage of faculty responding they "Always" or "Frequently" use the stated storage method, tabulated by college/unit.

Storage Method	CAFES % (n)	CAED % (n)	CENG % (n)	CLA % (n)	COSAM % (n)	LIB % (n)	OCOB % (n)
Local (CDs, DVDs, memory sticks, computer hard drive, local external hard drive)	96.8% (30)	93.3% (14)	92.7% (38)	100% (54)	98.4% (63)	33.3% (1)	100% (17)
Network-attached device managed by research group	0% (0)	30.8% (4)	51.3% (19)	21.7% (10)	22.6% (14)	0% (0)	21.4% (3)

Departmental server	11.1% (3)	25.0% (3)	55.0% (22)	30.4% (14)	1.6% (1)	33.3% (1)	0% (0)
Centrally-provided storage (e.g., a Cal Poly server provided by college or IT support services)	20.6% (6)	30.8% (4)	38.9% (14)	31.9% (15)	19.7% (12)	66.7% (2)	7.1% (1)
In the cloud (e.g. Amazon S3, disciplinary repository)	21.4% (6)	42.8% (6)	22.2% (8)	20.0% (9)	18.1% (11)	66.7% (2)	50.0% (7)

Hypothesis 3

Hypothesis 3 assesses the attitudes of Cal Poly faculty regarding sharing of digital data. Thirty-two percent of responding faculty believed it is important to make their digital data freely available to colleagues. Twenty-two percent said it is not important, and 46% believed it depends on the type of data (e.g. whether or not the data is proprietary). For attitudes regarding sharing of data with the general public, only 18% believed it is important, while 36% said they do not believe their data should be made freely available, and 45% believed it again depends on the type of data (e.g. whether or not the data is proprietary). Some faculty provided comments which gave context for their answers. Comments fell into a number of general categories including differences regarding in-progress/unpublished data and data used in publications, issues associated with confidentiality and non-disclosure agreements, whether the data was collected by an individual researcher or their lab or as part of a larger research program collective, lack of clarification of data ownership, ignorance of data repository options, and metadata requirements necessary for sharing data. These comments were mirrored in faculty interest in educational opportunities.

Hypothesis 4

The survey questions that addressed hypothesis 4 focused on Cal Poly faculty interest in workshops, lectures and consultative services on data-related topics. Respondents were asked to indicate their interest in various lectures, seminars, trainings and workshops and were given the option to check all that applied. The choices provided were varied with some that were software specific and others that were topical. Please see Table 8 for the list of topics and the percentage of faculty indicating interest. Note that there were options for instruction in everything from statistical and spatial software to digital humanities and visualization. Results indicated that GIS and other spatial literacy programming were of the most interest. Faculty, primarily those that produced digital image data, were interested in ways to visually communicate the results of their research. These results are still relevant today as the majority of faculty and student support requests surround research and instructional support in spatial reasoning, quantitative literacy, and visualization.

Table 8: Topics and percentage of faculty interest(s) in educational opportunities.

Topics	Responses	
	Percent	n
Google Earth for Educators	27.8 %	63
SPSS (statistical software)	26.0 %	59
SAS (statistical software)	22.9 %	52
Introduction to Data Mining	22.5 %	51
Opportunities to Use Geographic Information Systems (GIS) in Research	20.7 %	47
None of the Above	19.8 %	45
R (statistical software)	19.4 %	44
2010 Census / American Community Data Workshop	17.2 %	39
Locating and Using Social Science Data	15.4 %	35
Getting Started with ESRI ArcGIS	14.5 %	33
Using Smart Phones for GIS Field Work	14.5 %	33
Introduction to Google Map Maker	14.1 %	32
JMP Statistical Discovery Software (data visualization and analytics)	12.8 %	29
Digital Humanities	11.0 %	25
Web Privacy	10.6 %	24
Advanced ESRI ArcGIS (e.g. ArcGIS and 3D Visualization, Raster Data, Topology)	9.7 %	22
Integrating Technology into Humanities Research	9.7 %	22
Visualizing Social Connections (commercial implications, political implications, etc.)	9.7 %	22
ESRI Geodatabases (spatial data repositories)	9.3 %	21
Other (please specify other possible topics for lectures, seminars, trainings or workshops of interest):	8.4 %	19
Literary Analysis and Digital Technology	7.9 %	18
Locating, Utilizing, and Creating Digitized Historical Maps	7.9 %	18
Integrating Technology into Humanities Research	7.5 %	17
Big Data in Business	7.1 %	16
Introduction to OpenStreetMap	5.3 %	12
Music Visualization	5.3 %	12
ESRI Business Analyst	4.4 %	10
ESRI Community Analyst	4.4 %	10
Managing Lidar Data	4.4 %	10
Introduction to Scribble Maps	4.0 %	9

Respondents were also asked to indicate their interest in various consultative services and were given the option to check all that applied. Please see Table 9 for the list of topics and the percentage of faculty indicating interest. Across all college faculty, learning about the best practices for storing and preserving digital data was of the most interest at over 50%, as well as support to visually communicate their research data at 41% (e.g. use of graphs, charts, infographics), 38% were interested in better understanding data intellectual property, copyright and attribution, and 38% were interested in methods for identifying new colleagues with complementary research interests.

Table 9: Topics and percentage of faculty interest(s) in consultative services.

Topics	Responses	
	Percent	n
Ways to Communicate Visually the Results of My Research (e.g. use of graphs, charts, infographics)	41.0 %	93
Information on How to Develop a Data Management Plan Required by Funding Agencies	24.7 %	56
Methods for Sharing Digital Data with Everyone via the Internet	22.0 %	50
Best Practices for Storing and Preserving Digital Data	51.5 %	117
Information on Ownership, Attribution and Copyright of Digital Data	38.3 %	87
Ways to Discover and Access Other Researchers' Digital Data	25.6 %	58
Methods for Identifying New Colleagues with Complementary Research Interests	31.3 %	71
None of the Above	21.2 %	48
Other (please specify other consultative services of interest):	1.8 %	4

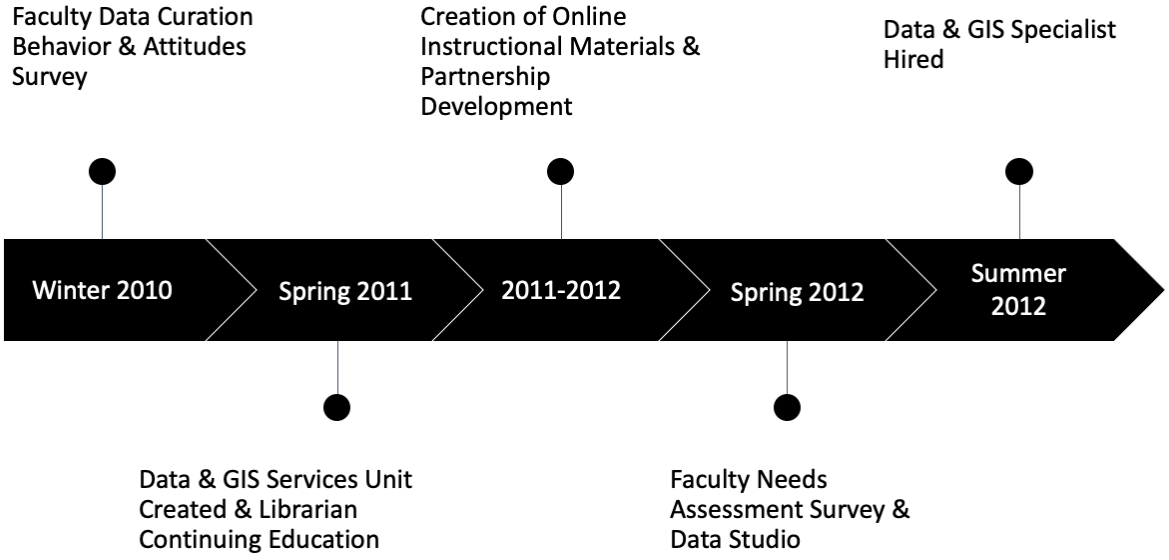
Discussion

The creation of a data services program moved quickly after the Library's first survey in 2010, "A Study of Faculty Data Curation Behaviors and Attitudes at a Teaching-Centered University" (Scaramozzino, Ramírez and McGaughey, 2012). This survey garnered 82 responses from 131 survey invitations for a 63% response rate, and survey questions were directly mapped to attitudes and actual behaviors of faculty. Results of this initial survey clearly indicated that the Library was not seen as a resource for any data related needs. After the 2010 survey was deployed faculty began to see the Library as a resource for data services, and as it started offering services, word spread through the campus community. The campus is unusual in that a research senior project or practical culminating experience is required for undergraduate graduation. While supporting data service needs of faculty it became apparent that students had many similar needs but also had some unique needs. As a result, the Library started exploring different services options and testing them out, and used information gleaned from the increasing volume of data reference questions and the 2012 data services needs survey to optimize resources. Figure 1a and 1b show major events regarding the evolution of Library's data needs support system from 2010 to 2017.

The Library was nimble and learned to accommodate the real needs that were expressed by campus patrons and campus partners. The Library intentionally did not reinvent the wheel, and

instead focused on partnering with colleagues from other universities to examine their campus data curation needs, reuse their tools and educational materials, and share experiences. An informal monthly online meeting was instituted with staff and faculty at four other institutions that were also developing or expanding their data services. These discussions resulted in a paper: "Map Room to Data and GIS Services: Five University Libraries Evolving to Meet Campus Needs and Changing Technologies" (Scaramozzino et al., 2014). This working group provided a two-way teaching-learning environment regarding all aspects of data services. A specific example of something learned was how Data Services adjusted the interviewing process for GIS student assistants to truly assess their knowledge of tools and concepts. Prospective hires were required, without previous warning, to demonstrate their skills by completing GIS software tasks and answering reference questions as part of the interview.

Figure 1a: Data Service Program Development Timeline - 2010-2012



A number of ancillary benefits were derived from the distribution of the surveys. Informal word of mouth generated interest among faculty who wanted to learn more about data. Consequently, the library was asked to give presentations to faculty and graduate students about library services, resources, and infrastructure to support research and grant writing. Departmental faculty began to contact their subject librarians for help with data management plans, requesting lists of discipline-specific repositories, information on how to deposit data in the library's institutional repository, and grant writing assistance. Additional attention was generated from a broad cross-section of groups across campus. For example, the campus Grants Development Office regularly handles numerous Department of Defense and Office of Naval Research grants, and they asked the library to coordinate workshops on data management plans in order to support their office, the Center for Teaching and Learning and the Office of Research and Graduate Programs.

In Spring 2011 the Data Services unit was officially created with a team that included half of a librarian and 2-3 GIS student assistants. The Data Services librarian was able to secure a physical space for 1-2 Statistics Department student tutors, financially support by the College of

Science and Math, in order to support all students. The unit focused on supporting students and faculty in finding and using data for classwork, scholarship, teaching, and learning. After the Spring 2012 survey the challenge for the library was to determine the data curation services that could assist faculty the most while also creating opportunities to promote library strengths and expertise. During that same quarter, a donor supported the renovation of library space into the Data Studio. This renovation included the provision of specialized hardware and software in order to provide a flexible space for computing, data display and visualization, group work, peer instruction, and presentations. In Summer of 2012 a temporary half-time Data and GIS Specialist was hired and the position was upgraded to a permanent full-time hire in Fall 2012.

Figure 1b: Data Service Program Development Timeline - 2012-2017

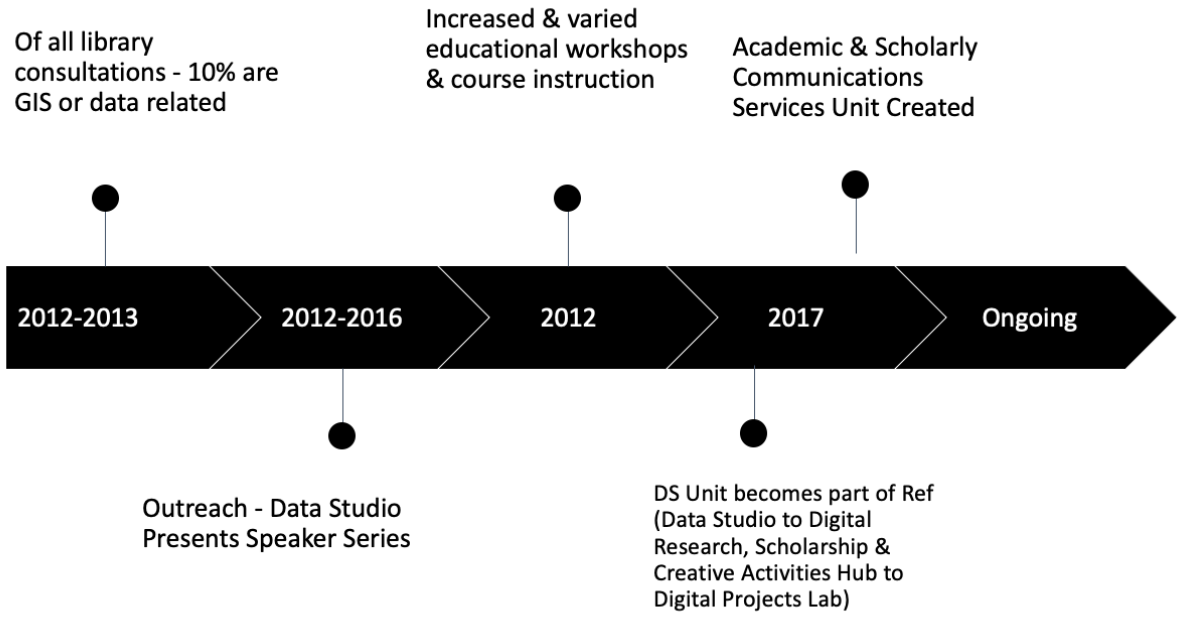


Figure 1b shows the continued evolution of the program and major milestones. GIS and data-related questions constituted approximately 10% of the ~4,000 general reference questions recorded by all Library staff in the academic year 2012-2013. General data reference questions come in several forms, ranging from simple directional guidance in locating known data sets to more complex questions involving research methodology. There was clear evidence of a need to provide outreach and instruction, all of which was financially supported by the Library administration and other campus stakeholders. With GIS activities distributed across several departments and colleges on campus and without any other center for geographic research, the Data Studio served as a hub for coordinating common GIS data sets, communications, training, and other resources.

Outreach and education increased and diversified. Data curation research guides were the modest first step which included information on basics of data management, educational resources, backup practices, ethical/legal and copyright issues, funder requirements, grant writing best practices, creation of data management plans, links to data repositories and databases, and links to other data management resources. The research guides were promoted during presentations to new faculty and graduate students and used in relevant seminars organized by Cal Poly's Office of Research and Graduate Programs. Feedback was positive, and the online usage statistics indicated growing interest in the resources. Over time these

initial research guides developed into a significant number of diverse, in-depth, and information-rich guides.

Key outreach programs were developed and supported by Data Services throughout the year in order to promote engagement of data and GIS users from across campus. These included The Data Studio Presents speaker series, GIS Day, Geography Awareness Week, and the Annual Data Studio Open House. The Data Studio Presents speaker series provided educational outreach for a range of data-and GIS-related topics, offering an accessible and informal setting for students and faculty interested in working with data in new ways. The speaker series was hosted within the Data Studio with an audience of approximately thirty attendees per event and intended for brief intermittent discussion on a variety of topics in the rapidly advancing data and GIS fields. In four years, almost 30 presentations, workshops, and events were held including an overview of military and historic applications of GIS, OpenStreetMap resources, new GIS tools on the Web from ESRI and Google, open data and repositories resources, data management planning tools, cybersecurity, STEAM events with scientist/artists co-hosted with a local museum and more. These initial programs and their assessment followed similar best practices developed in the Science Café Speaker Series (Scaramozzino and Trujillo, 2010). See Appendix 2 for a listing of events with descriptions, number of attendees, cursory impact data and more.

In 2017 Data Services was ingested into the Reference unit and the Data Studio physical space became the Digital Research, Scholarship and Creative Activities Hub and later the Digital Projects Lab. The Reference coordinator oversees 1 staff member and a number of GIS, programming, and statistics student assistants. The staff of the Digital Projects Lab focuses on support of faculty course instruction and consultation on research projects. These individuals collaborate with the First Year Experience Librarian around metaliteracy.

A separate Academic and Scholarly Communication Services unit was formed in 2017, consisting of one-third of a librarian, a specialist in research, scholarship and publishing, and student assistants; this unit focuses on advancing the collection, discovery, accessibility, preservation, and impact of research and scholarship by Cal Poly students, staff, and faculty. Academic and Scholarly Communications Services focuses on outreach to and collaboration with external campus stakeholders, education and training surrounding a variety of researcher tools, researcher reputation management, scholarly publishing, technological infrastructure including the management of the institutional repository, assessment of research impact, and collection development of content created and related to Cal Poly undergraduate, graduate, and faculty research.

Conclusion

Other university libraries continue to use modified versions of the 2010 survey at their campuses and the 2012 survey can easily be adapted for reuse. The survey tool is valuable for identifying trends and how individual disciplines and researchers differ regarding data service needs. The results provided Cal Poly information to move forward, to explore options, and to adapt to significant changes in human resources, and library and campus data service priorities.

As data services evolve it is critical that the Library continue to: prioritize sustainability and flexibility; nurture a culture that is always prepared for unexpected and sudden changes; identify what researchers want and need; and determine what resources are available. No library has all the resources it needs but all libraries can connect people to the information they need, whether directly to the information or to a path to the information.

As the world of information sciences and data curation moves forward into uncharted waters libraries will have to find ways to be more sustainable and flexible. As unforeseen and unexpected changes arise, partnerships and collaborations will allow libraries to continue to participate in and influence transformations in data creation, data sharing workflows, data visualization, scholarly communication models, and technical infrastructure. Hopefully the future will bring a reciprocal flow of influence: librarians influencing the data practices of researchers and researchers and their data practices influencing the services provided by libraries.

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This work was financially supported by California Polytechnic State University's Robert E. Kennedy Library. We would like to thank the Library Administration and staff for its support of the Data Services unit. We also thank the University Librarian's Administrative staff, Facilities and Information Technology Services staff and students, and Communications and Public Programs staff and students for pre, post and day of presentation support. We would like to thank the Cal Poly teaching faculty for their invaluable support and contributions to this research. We would specifically like to thank Russ White (Data and GIS Specialist), Brett Bodemer (Reference and Digital Projects Lab Coordinator), and Danielle Daughtery (Research, Scholarship and Publishing Specialist) who continue to develop and reimagine the scope of data services at the library. Our work could not have been completed without the incredible work and support from numerous Library student assistants and Department of Statistics undergraduate students. We would like to thank Khue Duong (CSULB Science Librarian), Dr. Jason Blank (Cal Poly Department of Biology), and Library student assistants Duncan Davis-Hall and Diana Hernandez for their constructive feedback on the manuscript. In the past eight years so many individuals have contributed to the Library's work in this area and we are sorry we cannot list them all.

APENDICES

Appendix 1
Survey of Faculty Research Data Services Needs

CAL POLY LIBRARY SERVICES
ROBERT E. KENNEDY LIBRARY

Exit

Cal Poly Faculty Data Services Survey

Informed Consent

A research project on data service needs of the Cal Poly faculty is being conducted by Robert E. Kennedy Librarians Jeanine Scaramozzino and Marisa Ramirez and Karen McGaughey of the Statistics Department.

A number of other universities have successful data service programs including Stanford University's Social Science Data and Software Services, New York University's Data Service Studio and UCLA's Center for Digital Humanities.

This online survey contains sixteen questions and may take up to ten minutes to complete. If you choose, at the end of the survey you may submit your email address and name to be entered into a drawing for an El Corral gift certificate. The first 50 respondents will be entered into a drawing for one of two $25 El Corral gift certificates. All respondents will be entered into a drawing for one of twenty $10 El Corral gift certificates.

Please read the informed consent information below. If you agree to participate voluntarily in this research project as described, please indicate your agreement by clicking "Yes, I volunteer" below and completing the online survey.

You are being asked to take part in this study by completing the following questionnaire. Please be aware that you are not required to participate in this research and you may discontinue your participation at any time without penalty. You may also choose to omit questions that you would prefer not to answer. The risks associated with participation in this study are no more than the participant would encounter in everyday life. Your responses will be confidential. The results of the survey will be aggregated and shared as a whole. After the drawing has been completed all identifiers will be deleted. Potential benefits associated with the study include a deeper understanding of faculty interest in data services.

If you have questions regarding this study or would like to be informed of the results when the study is completed, please feel free to contact: Jeanine Scaramozzino, College of Science and Math, School of Education, and Data Services Librarian (jscaramo@calpoly.edu), Marisa Ramirez, Digital Repository Librarian (mramir14@calpoly.edu) or Karen McGaughey, Assistant Professor of Statistics (kmcgaugh@calpoly.edu). If you have concerns regarding the manner in which the study is conducted, you may contact Dr. Steve Davis, Chair of the Cal Poly Human Subjects Committee (sdavis@calpoly.edu) or Dr. Susan Opava, Cal Poly Dean of Research and Graduate Programs (sopava@calpoly.edu). Please print out this consent form for your reference.

Thank you for your participation in this research!

1. Do you volunteer to participate in this survey?

- ○ Yes, I volunteer.
- ○ No thank you.

1

[1]

Digital Data

Data includes any recorded information or statistics that can be brought together for reference or analysis. The term “digital data” used in this survey refers to any data, either used in or produced by research, scholarship or professional creative activities that can be stored in digital form. These include: text, numbers, images, video or movies, audio, software, algorithms, equations, animations, models, simulations and so forth. Such data may be generated by various means including observation, computation, experimentation and derivation.

2. Do you produce digital data from your research, scholarly and professional creative activities? (please select one response)

- ◯ Yes
- ◯ No

Digital Data Formats

3. What digital data format(s) do you generate in your research, scholarly and professional creative activities? (please select all that apply)

- ☐ Digital images (e.g. .bmp, .jpg, .gif, .tiff, x-rays)
- ☐ Digital audio or video files (e.g. .mp3, .aiff, .wav, .avi, .mov, .mxf)
- ☐ Textual documents (e.g. .txt, .doc, .docx, .rtf)
- ☐ Spreadsheets (e.g. .xls, .sdq, .spv, .sav, .csv)
- ☐ Geographic Information Systems (GIS) files (e.g. .gpx, .kml)
- ☐ Computer-Aided Design (CAD) files (e.g. .dwg, .dxf, .pln)
- ☐ Other (please specify):

Storage Options

The answers to the following five questions may help to inform campus decisions regarding the storage of digital data.

4. Please estimate the TOTAL amount of CURRENT digital data stored by you, your undergraduates, graduates and research assistants as a result of your research, scholarly and professional creative activities. (please select one response)

- ◯ ≤1 Gigabyte (GB)
- ◯ >1 GB and ≤100 Gigabytes
- ◯ 101 Gigabytes to 1 Terabyte (TB)
- ◯ 2 Terabytes to 10 Terabytes
- ◯ >11 Terabytes
- ◯ Other (please specify):

5. Please estimate the TOTAL amount of digital data storage you, your undergraduates, graduates and research assistants might need in the FUTURE as a result of your research, scholarly and professional creative activities. (please select one response)

- ○ ≤1 Gigabyte (GB)
- ○ >1 GB and ≤100 Gigabytes
- ○ 101 Gigabytes to 1 Terabyte (TB)
- ○ 2 Terabytes to 10 Terabytes
- ○ >11 Terabytes
- ○ Other (please specify):

6. Please estimate the TOTAL amount of digital data storage you, your undergraduates, graduates and research assistants might need in the FUTURE as a result of your research, scholarly and professional creative activities. (please select one response)

- ○ ≤1 Gigabyte (GB)
- ○ >1 GB and ≤100 Gigabytes
- ○ 101 Gigabytes to 1 Terabyte (TB)
- ○ 2 Terabytes to 10 Terabytes
- ○ >11 Terabytes
- ○ Other (please specify):

7. Please indicate the frequency with which you use each format listed below to store digital data generated by your research, scholarly and professional creative activities.

	Always	Frequently	Occasionally	Rarely	Never
Local storage formats (e.g. CDs, DVDs, memory sticks, computer hard drive, local external hard drive)	○	○	○	○	○
Network-attached storage device managed by my research group	○	○	○	○	○
Departmental server	○	○	○	○	○
Centrally-provided storage (i.e. on a Cal Poly server provided by my college or IT support services)	○	○	○	○	○
In the cloud (e.g. Amazon S3, disciplinary repository)	○	○	○	○	○
Other	○	○	○	○	○

Other (please specify):

8. If all of the methods listed below were readily available for storage of digital data generated by your research, scholarly and professional creative activities, which of the following would you consider using? (please select all that apply)

- ☐ Local storage formats (e.g. CDs, DVDs, memory sticks, computer hard drive, local external hard drive)
- ☐ Network-attached storage device managed by my research group
- ☐ Departmental server
- ☐ Centrally-provided storage (i.e. on a Cal Poly server provided by your college or IT support services)
- ☐ In the cloud (e.g. Amazon S3, disciplinary repository)
- ☐ Other (please specify):

9. If all of the methods listed below were readily available for storage of digital data generated by your research, scholarly and professional creative activities, please indicate the frequency with which you would use each method.

	Always	Frequently	Occasionally	Rarely	Never
Local storage formats (e.g. CDs, DVDs, memory sticks, computer hard drive, local external hard drive)	○	○	○	○	○
Network-attached storage device managed by my research group	○	○	○	○	○
Departmental server	○	○	○	○	○
Centrally-provided storage (i.e. on a Cal Poly server provided by my college or IT support services)	○	○	○	○	○
In the cloud (e.g. Amazon S3, disciplinary repository)	○	○	○	○	○
Other	○	○	○	○	○

Other (please specify):

Information Sharing

10. Do you think that it is important to make your digital data freely available to your colleagues?

- ○ Yes
- ○ No
- ○ It depends

Please explain your answer:

11. Do you think that it is important to make your digital data freely available to the general public?

- ○ Yes
- ○ No
- ○ It depends

Please explain your answer:

Educational and Consultative Services

The Kennedy Library is currently developing a suite of educational and consultative services surrounding data in the form of workshops, seminars, trainings, online informational guides, in-person consultations and online tools. The Kennedy Library would like to gauge your interest in the following topics and services.

12. Please indicate your interest in the following topics for lectures, seminars, trainings or workshops for faculty (please check all that apply):

- [ ] 2010 Census / American Community Data Workshop
- [ ] Opportunities to Use Geographic Information Systems (GIS) in Research
- [ ] Getting Started with ESRI ArcGIS
- [ ] Advanced ESRI ArcGIS (e.g. ArcGIS and 3D Visualization, Raster Data, Topology)
- [ ] ESRI Geodatabases (spatial data repositories)
- [ ] ESRI Business Analyst
- [ ] ESRI Community Analyst
- [ ] Google Earth for Educators
- [ ] Managing Lidar Data
- [ ] Using Smart Phones for GIS Field Work
- [ ] Introduction to OpenStreetMap
- [ ] Introduction to Scribble Maps
- [ ] Introduction to Google Map Maker
- [ ] Integrating Technology into Humanities Research
- [ ] Digital Humanities
- [ ] Locating and Using Social Science Data
- [ ] Integrating Technology into Humanities Research
- [ ] Web Privacy
- [ ] Music Visualization
- [ ] Literary Analysis and Digital Technology
- [ ] Visualizing Social Connections (commercial implications, political implications, etc.)
- [ ] Locating, Utilizing, and Creating Digitized Historical Maps
- [ ] Big Data in Business
- [ ] Introduction to Data Mining
- [ ] JMP Statistical Discovery Software (data visualization and analytics)
- [ ] SAS (statistical software)
- [ ] SPSS (statistical software)
- [ ] R (statistical software)
- [ ] None of the Above
- [ ] Other (please specify other possible topics for lectures, seminars, trainings or workshops of interest):

13. Please indicate your interest in the following consultative services (check all that apply):

- [ ] Ways to Communicate Visually the Results of My Research (e.g. use of graphs, charts, infographics)
- [ ] Information on How to Develop a Data Management Plan Required by Funding Agencies
- [ ] Methods for Sharing Digital Data with Everyone via the Internet
- [ ] Best Practices for Storing and Preserving Digital Data
- [ ] Information on Ownership, Attribution and Copyright of Digital Data
- [ ] Ways to Discover and Access Other Researchers' Digital Data
- [ ] Methods for Identifying New Colleagues with Complementary Research Interests
- [ ] None of the Above
- [ ] Other (please specify other consultative services of interest):

Demographics

14. What is your academic title?

15. Please select your college

16. What academic department, unit or area do you belong to?

17. What on campus research group, center or institute(s) are you affiliated with?

- [ ] Ag Safety Institute
- [ ] Agricultural Research Initiative (ARI)
- [ ] Bonderson Projects Center
- [ ] Brock Center for Agricultural Communication
- [ ] CAFES Center for Sustainability
- [ ] California Center for Construction Education
- [ ] California Institute for the Study of Specialty Crops
- [ ] Center for Coastal Marine Sciences
- [ ] Center for Excellence in Accounting Education
- [ ] Center for Excellence in Science and Mathematics Education (CESaME)
- [ ] Center for Innovation and Entrepreneurship (CIE)
- [ ] Center for Sustainability in Engineering
- [ ] Center for Teaching and Learning (CTL)
- [ ] Central Coast Science Project
- [ ] CIRM Bridges program: MS Specialization in Stem Cell Research
- [ ] Coastal Resources Institute
- [ ] Collaborative Agent Design Research Center (CADRC)
- [ ] Dairy Products Technology Center
- [ ] Electric Power Institute
- [ ] Environmental Biotechnology Institute
- [ ] Other (please specify):
- [ ] Geographic Information Systems (GIS)
- [ ] Global Waste Research Institute
- [ ] Graphic Communication Institute
- [ ] Irrigation Training and Research Center
- [ ] National Pool Industry Research
- [ ] Planning, Design and Construction Institute
- [ ] Poly GAIT (Laboratory for Global Automatic Identification Technologies)
- [ ] Polymers and Coatings
- [ ] Renewable Energy Institute
- [ ] San Luis Obispo Science and Ecosystem Alliance
- [ ] Science Through Translational Research in Diet and Exercise (STRIDE)
- [ ] SustainSLO
- [ ] Swanton Pacific Ranch
- [ ] University Center for Innovation and Entrepreneurship
- [ ] University Writing & Rhetoric Center
- [ ] Urban Forest Ecosystems Institute
- [ ] W.M. Keck Engineering Education Research and Development Center
- [ ] Western Coatings Technology Center
- [ ] None of the Above

Thank you for your time!

18. If you would like to be entered into a drawing for an El Corral gift certificate please enter your name and email address. The first 50 respondents will be entered into a drawing for one of two $25 El Corral gift cards. All respondents will be entered into a drawing for one of twenty $10 El Corral gift cards. After the drawing has been completed all identifiers will be deleted.

Name: _____

Email Address: _____

19. If you would like for us to share the results of this survey or would be willing to participate further in a focus group or case study, please enter your name and email address.

Name: _____

Email Address: _____

Appendix 2
The Data Studio Presents

Overview
Before The Data Studio Presents officially began, programming related to the annual celebration of GIS Day and National Geography Awareness Week allowed Library faculty and staff networking opportunities. The new speaker series provided an educational outlet to the latest research in and ideas about data. The informal format was constructed in a way that all members of the audience could take something new away. Events were free and open to Cal Poly students, faculty, and staff and local community.

The Data Studio Presents speaker series spawned from a presentation given at the grand opening celebration of the Data Studio. Quentin Hardy, Deputy Technology Editor for The New York Times and formerly Bureau Chief for the Silicon Valley at Forbes addressed the implications of big data in science, politics, society and more, in his talk “Fact as Verb: How Data is Changing Nouns Into Verbs.” The grand opening also provided Cal Poly students the opportunity to demonstrate how they were working with data. Student projects included Twitter-tracking tools to help Netflix identify service outages, and applications of spatial data in architecture and wildlife biology. The ribbon cutting was attended by the donor, Peter Wiley, Cal Poly’s President, and its Provost. The success of this event led to the idea to invite additional speakers and ultimately developed to become the most popular outreach mechanism for Data Services.

Hardy was quickly followed by MacKenzie Smith, UC Davis University Librarian, who discussed data sharing, repurposing data, citing data, peer-review of data, and formal publications whose primary purpose is to expose and describe data, as opposed to analyze and draw conclusions from it. Then Dr. Greg Bohr brought his Geography 440: Advanced GIS undergraduate and graduate students to present their final projects to the campus community in The Data Studio. There were more than ten different individual and group projects presented. This included a presentation by student on publishing his data on ArcGIS Online (this tool had only recently been released). See Table 1 for early programming and event information.

Appendix Table 1: Early event presenters name, organization, presentation title, date, and total attendance.

Presenter(s)	Organization	Presentation	Date	Attendance
Quentin Hardy, Deputy Technology Editor	The New York Times	Fact as Verb: How Data is Changing Nouns Into Verbs (Open House Plenary)	26-Apr-2012	>150
MacKenzie Smith, University Librarian	University of California Davis	Data Papers in the Network Era	24-May-2012	17
Dr. Greg Bohr and Students	Department of Social Sciences, Cal Poly	Geography 440: Advanced Applications in GIS Student Research Papers	1-Jun-2012	27

Assessment
Planning and promoting events involves an investment of time and money. Subsequently a basic survey was conducted to assess attendee satisfaction, impact of attendance, gauge interest in other topics, and collect information to improve the program. Following IRB approval an assessment went forward. Immediately following a The Data Studio Presents an announcement was made asking people to take a few minutes to fill out a paper survey or take home a slip of paper with a URL to the online version.

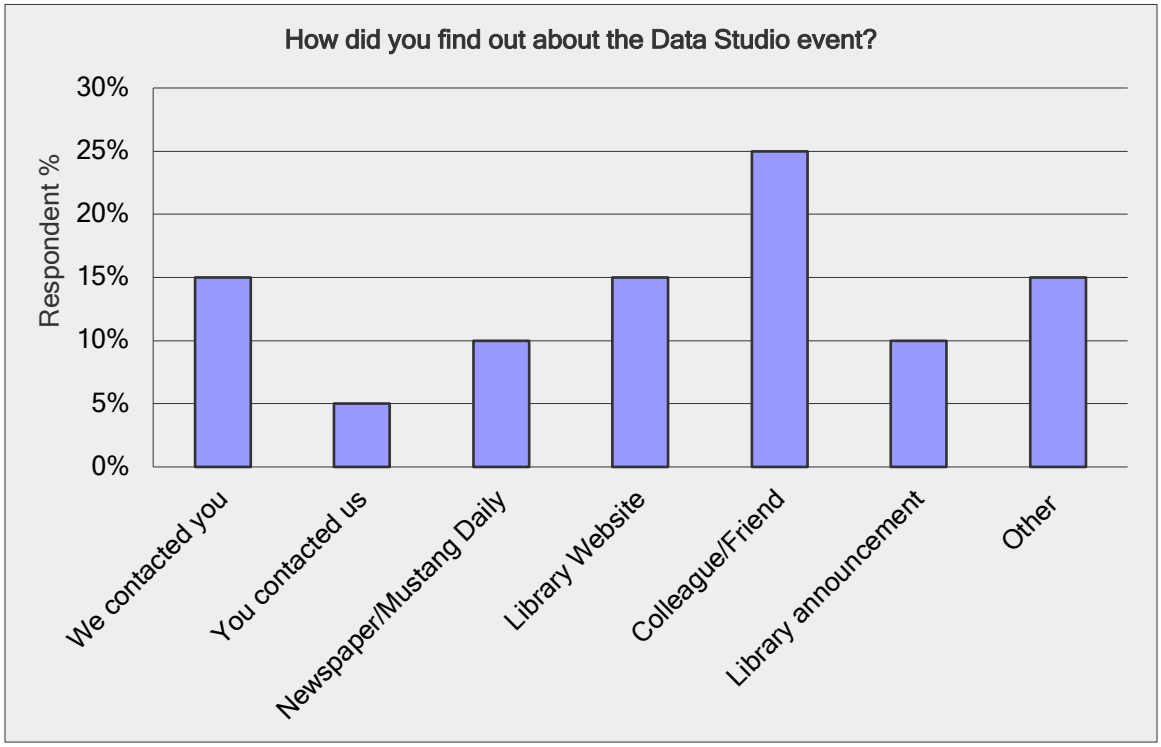
The survey was deployed from January 2013 – February 2014 at 17 events. It consisted of 18 questions, including demographics, and took less than 5 minutes to complete. There were four types of questions in the survey: (1) those with a trichotomous response (Yes/No/Maybe), (2) those with a 5-point Likert response, (3) those where participants were allowed to select all that applied, and (4) open text response. See Appendix 3 for a copy of the online version. Based on total event attendance there was a pool of at least 400 unique respondents. Only 24 surveys were recieved (n=15 print; n=9 online). The issues with the response rate and bias are too numerous to unpack. However, those that responded to the survey gave similar feedback as information provided to Library and Data Services staff directly or second-hand. This non-survey feedback came via verbal interaction, email, written notes, comments on Library social media, and more. A cursory review of the survey results is presented below.

Results
In an effort to determine the best means of advertising for the speaker series participants were asked to identify how they learned about the event. It would appear as though word of mouth between friends and colleagues was the optimal means of attracting participants considering 25% of the survey participants heard of the event in that manner, with the library's website and direct participant contact being the next most effective with response rates of 15% each (Table 2). However, how those "friends and colleagues" learned about the event was not distinguishable.

When asked why participants decided to attend an event they were given the option to check all that applied. Seventy-two percent of respondents attended the event because they were intrigued by the topic and 64% wanted to learn something new (Table 3).

What participants did with the information they learned after the event was of interest with 85% of participants reporting they discussed the topic(s) with family, friends, and/or colleagues. And 64% said they would attempt to stay up to date on the topic presented (Table 4).

Appendix Table 2: How participants learned about the Data Studio event.



Appendix Table 3: Why participants decided to attend.

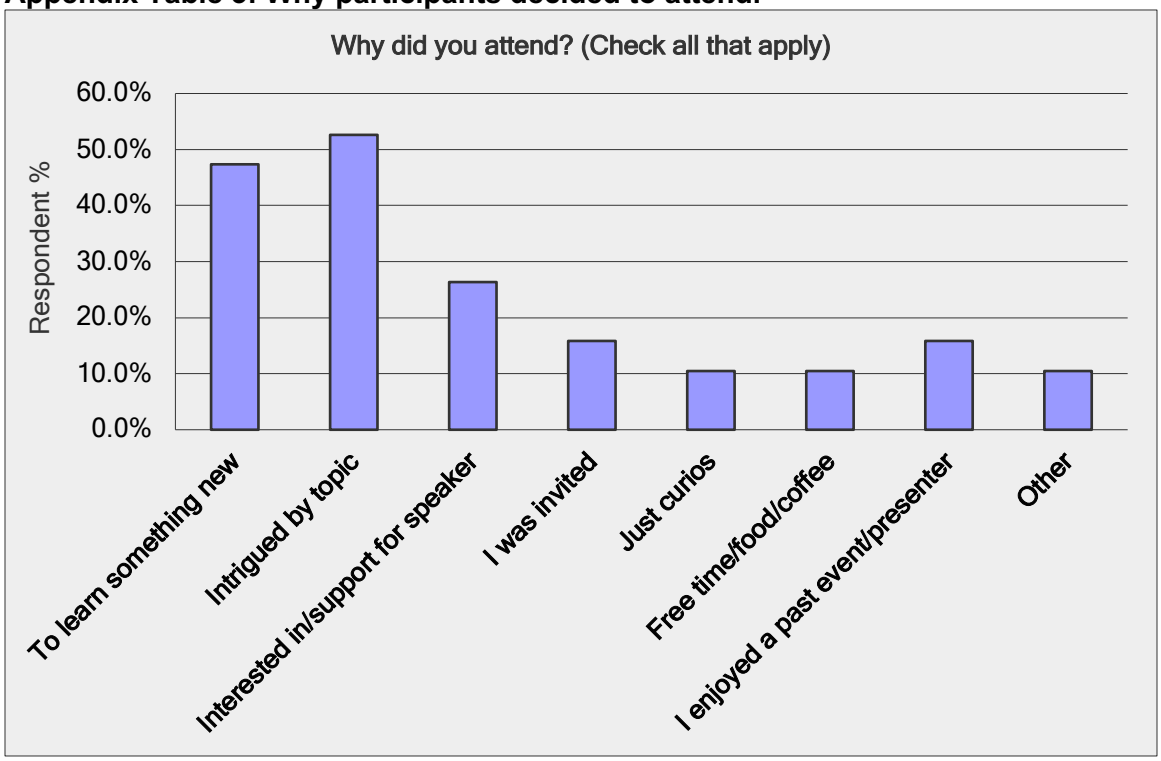
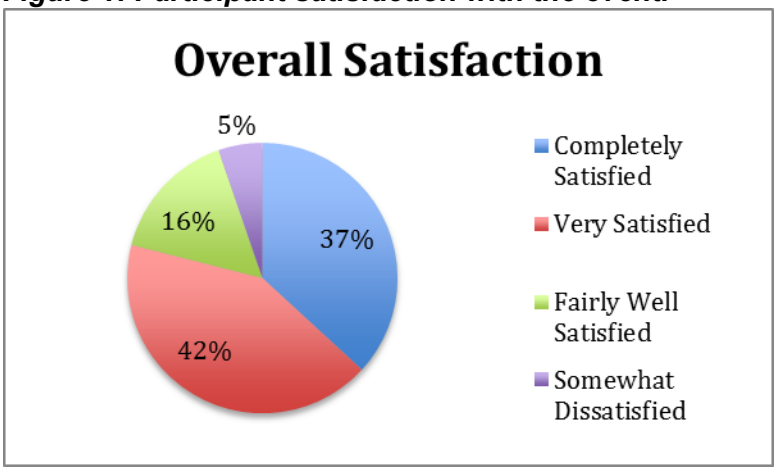


Table 4: What participants did with the information they learned.

What, if anything, did you do as a result of attending the Data Studio event? Check all that apply.		
Answer Options	Response Percent	Response Count
Discussed the topic(s) with family, friends, or colleagues	84.6%	11
Attempt to stay up to date on the topic	69.2%	9
Read a book or article about the topic	23.1%	3
Read a science magazine or journal about the topic	15.4%	2
Visited the Library's website to access the event video/podcast	15.4%	2
Visited website(s) about the topic	23.1%	3
Other	7.7%	1

The overall satisfaction level of attendees was resoundingly high. Seventy-five percent of participants stated that not only would they be interested in attending another The Data Studio Presents, but also that they would recommend attending the event to others. Not one participant who completed a survey stated they would not want to attend another event or would not recommend the event to others, with the remaining 25% in each category opting with *maybe.* Respondents were also provided a 5 point Likert scale to convey their general satisfaction with the event which resulted in 79% responding either completely or very satisfied, 16% fairly satisfied, and 5% somewhat dissatisfied (Figure 1).

Figure 1: Participant satisfaction with the event.



Discussion

Questions regarding how speakers or topics were chosen are often asked. The answer is no particular process was employed. There was quite a bit of serendipity and luck involved with securing most of the speakers. Topics were suggested to the Library directly by members of the campus and local community. Topics were suggested to Data Services staff indirectly during reference consultations, through attendance at conferences, reading news stories, reviewing journal articles, and the like.

Individuals invited to present at The Data Studio Presents represented the organizational spectrum: industry, government, academia and non-profits. Speaker name recognition ran the gambit from international, national, and local. The majority of speaker(s) were provided roughly 50 minutes to present and interact with participants, as well as to field any questions specific to the topic at hand or about data in general. To increase attendance, events were primarily scheduled on Thursdays during “university hour” in which no classes are taught on campus. Though specific open house events and internationally and nationally recognized speakers were given more time.

Table 5 provides information on the events that were included as part of the assessment and Table 6 details the events post-assessment. Although data was the underlying theme of the series, for the program to be focused solely on one subject would have been disadvantageous considering the nature of data and its continuous spread into new arenas. Current programming topics within the Library include open access, copyright, open educational resources, census data, programming, visualization, digital humanities, persistent identifiers, and more.

Even though the survey only provided a little glimpse into participants experience the exercise itself was important. Number of attendees and continued attendance at Library events does not provide any data on which to improve. A suggestion for the future would be to take the survey that was developed for this series and revisit the tool and the deployment with a campus statistician for use generally at Library outreach and workshop events. Additional participant demographic data should be collected (ex. alumni, emeriti, former employee, vacationer, community college student, parent).

Table 5: Assessment event presenters name, organization, presentation title, date, and total attendance given during survey deployment. See descriptions of the events directly below the table.

Presenter(s)	Organization	Presentation	Date	Attendance
Mark Belrose, Chief of the Western Range NGA, Vandenberg Air Force Base	National Geospatial-Intelligence Agency (NGA), Department of Defense	Military Applications of GIS	24-Jan-2013	37
Joe Larson, GIS Specialist	CAL FIRE (California Department of Forestry and Fire Protection)	Navigating OpenStreetMap	31-Jan-2013	35

Ron Nakao, Social Science Data Librarian and Technology Specialist	Stanford University	Working with Data at its Source	7-Mar-2013	27
Dr. Carly Strasser, Data Curation Specialist	California Digital Library, University of California	DataUp: Helping Manage and Archive Data	18-Apr-2013	23
Dr. Melissa Cragin, AAAS Science and Technology Policy Fellow	Office of the Assistant Director of the Directorate for Biological Sciences, National Science Foundation	Pioneering in the Data Frontier: Discovering the World Anew (Open House Plenary)	3-May-2013	>100
Rita Blaik, doctoral student and Dr. Ruta Saliklis, Director of Exhibitions and Development	University of California Los Angeles and San Luis Obispo Museum of Art	Under the Scope: Looking at the Body Through Art and Science	3-Oct-2013	50
Dr. Carly Strasser, Data Curation Specialist	California Digital Library, University of California	Data Management for Researchers: Tips, Tools, and Why You Should Care	17-Oct-2013	9
Dr. Carly Strasser, Data Curation Specialist	California Digital Library, University of California	The DMPTool: Helping You Create Great Data Management Plans	17-Oct-2013	10
Dr. Carly Strasser, Data Curation Specialist	California Digital Library, University of California	Data Management: Who Knew It Could Be a Hot Topic?	17-Oct-2013	12
Dr. Carly Strasser, Data Curation Specialist	California Digital Library, University of California	The Future of Scholarly Research and Communication Will Be Open	18-Oct-2013	15
Dr. Carly Strasser, Data Curation Specialist	California Digital Library, University of California	Data Management for Researchers: Tips, Tools, and Why You Should Care	18-Oct-2013	7

Dr. Carly Strasser, Data Curation Specialist	California Digital Library, University of California	The DMPTool: Helping You Create Great Data Management Plans	18-Oct-2013	11
Russ White, Data and GIS Specialist	Robert E. Kennedy Library, Cal Poly	Open Opportunities: Exploring Open Data	24-Oct-2013	32
Cal Poly Researchers	Cal Poly	GIS on Campus: Student, Faculty and Staff Geospatial Project Lightning Talks	18-Nov-2014	>50
Russ White, Data and GIS Specialist	Robert E. Kennedy Library, Cal Poly	GIS on the Web	19-Nov-2013	4
Dr. Anne Kelly Knowles, Professor	Department of Geology, Middlebury College	Visualizing History with GIS	13-Jan-2014	135
Russ White, Data and GIS Specialist	Robert E. Kennedy Library, Cal Poly	Social Explorer: Introductory Workshop	20-Feb-2014	9

Table 5 Event Descriptions*

“Military Applications of GIS with Mark Belrose”
Mark Belrose, Chief of the Western Range National Geospatial Intelligence Agency (NGA) Support Branch at Vandenberg Air Force Base spoke about the nation’s primary source of geospatial intelligence, or GEOINT. As a Department of Defense combat support agency and a member of the U.S. Intelligence Community, the National Geospatial-Intelligence Agency collects remotely sensed data, physical geography, land cover and cultural data around the world. He discussed how the data he has collected helps the agency’s mission partners visualize the world, support the safe navigation of land, air, and sea, as well as provide timely, relevant and accurate geospatial intelligence to support the U.S. in national defense and during natural disasters.

“Navigating OpenStreetMap with Joe Larson”
As a GIS Specialist with CAL FIRE (the agency responsible for fire protection in State Responsibility Areas of California, as well as the administration of the State's private and public forests), Joe Larson shared how CAL FIRE uses OpenStreetMap (OSM), an open access geographic information system (GIS) resource, to create detailed maps of the local community that include various assets and structures. He also talked about how OSM also includes mobile applications that can be used when teaching and allows users to contribute data. OSM is an open access application compared to the industry proprietary system ESRI; sharing how this free open access tool is used by the government of California effectively

provided students an opportunity to understand that after graduation they may not have access to tools with expensive licenses and that great work can still be done.

“Working with Data at its Source with Ron Nakao”
Stanford University’s Ron Nakao, Social Science Data Librarian and Technology Specialist, discussed data sharing, discovery, access, long-term preservation and metadata creation. He explained how to overcome obstacles in data archiving and about the success of the Inter-university Consortium for Political and Social Research and the Stanford Digital Repository. This helped demonstrate implementation at a college and clearly showed why it is important to deposit and share datasets with other researchers.

“DataUp: Describe, Manage, & Share Your Data with Carly Strasser”
California Digital Library's Data Curation Specialist and DataUp Project Manager Dr. Carly Strasser discussed a free open source tool that helps researchers document, manage, and archive their tabular data via integration with Microsoft Excel. She also went into detail on libraries’ role in data education and data management in education today. This presentation provided faculty an example of how to deposit and share data in an effective but low barrier way. The library's relationship with Strasser and overwhelming faculty interest would lead her to return for a future event.

Second Annual Open House Plenary with Melissa Cragin: “Pioneering in the Data Frontier: Discovering the World Anew”
The Data Studio celebrated its first anniversary with presentations from both students and Dr. Melissa Cragin, American Association for the Advancement of Science (AAAS) Science and Technology Policy Fellow, Office of the Assistant Director of the Directorate for Biological Science. In her talk, Cragin explored the idea that big data and data science will lead to stronger economies and new solutions for global problems, as well as the risks of big data's presence in our daily lives. Cragin also explored how data has become universal in the modern world through tools like Google Maps and technology like smartphones, making large amounts of information available at your fingertips.

Prior to her presentation, Cal Poly students were provided the opportunity to present their own projects generating and analyzing data for future use. The students ranged from undergraduates to masters’ candidates, and again represented various colleges and majors throughout campus. A student shared her graduate research into fish populations off California’s coasts, while a mechanical engineering student’s work with a team of students to create a LiDAR-based autonomous vehicle. A student shared her work with OpenStreetMap, mapping paths, which earned her the title of one of the top 50 mappers in the United States through the program. A graduate student used GIS to map the vegetation and pronghorn antelope distribution on the Carrizo Plain, while one of the two Library GIS peer assistants showed how GIS could be utilized in city and regional planning, and within local fisheries, respectively.

“Under the Scope: Looking at the Body through Art and Science with Rita Blaik and Ruta Saliklis”
Rita Blaik, a materials engineering Ph.D. student at UCLA sat down with Dr. Ruta Saliklis, Director of Exhibitions and Development at the San Luis Obispo Art Museum, to talk about her work in the context of the burgeoning STEAM (Science, Technology, Engineering, Arts, Math) movement, which incorporates the arts into STEM (Science, Technology, Engineering, Math) subjects. This conversation was offered in partnership with the San Luis Obispo Art Museum which showcased an exhibit featuring Rita Blaik’s photography using

data from the human biome and physiology as inspiration. This program was an exciting step to show how communication can move beyond the traditional idea of numeric data, the creation of and delivery of data by engineers.

Data Management and Curation Workshops – Two Days with Carly Strasser
"Data Management For Researchers: Tips, Tools, and Why You Should Care"
Researchers rarely learn about good data management practices. Dr. Carly Strasser discussed how instead they develop their own systems that are often unintelligible to others. In this talk, Strasser focused on the common mistakes that scientists make and how to avoid them, as well as provide best practices and tools for data management, which facilitate data sharing and reuse.

"The DMPTool: Helping You Create Great Data Management Plans"
Many private and all government funders require that researchers submit at Data Management Plan alongside their project proposals. Strasser walked through the US based Data Management Planning Tool, the DMPTool. The online tool helps create unique research project data management plans based on specific project funders guidelines and provides links and resources for ensuring success.

"Data Management: Who Knew It Could Be a Hot Topic?"
New mandates, announcements, memos, and requirements are emerging that encourage better data management, data sharing, and data preservation. In this presentation, Strasser offers a lay of the data management land by discussing recent events, resources, and new directions for data stewardship.

"The Future of Scholarly Research and Communication will be Open"
Strasser posed two questions: (1) What does Open really mean for how we do science? (2) How are things changing, and what are the implications for individual researchers? She presented on all things "open" and allowed for plenty of audience discussion.

"GIS on the Web with Russ White"
This was a Geography Week edition of Data Studio Presents were Russ White, Numeric and Spatial Data Specialist at Kennedy Library, presented on various GIS tools. These included tools from ESRI and Google including Google Maps Engine Lite, Fusion Tables, Google Earth, and Google Earth Engine. Plus developments to ESRI's ArcGIS Online including new opportunities to access and share data over the web via mobile devices.

"Open Opportunities: Exploring Open Data, Tools, and Repositories to Extend Scholarship and Sharing with Russ White"
As part of Open Access Week 2013 at Kennedy Library, this presentation explored Open Data, Open Source Tools, and Open Repositories; resources that provide free and timely access to data, powerful tools, as well as avenues to share data and collaborate. By exploring these tools Russ White, Cal Poly's Library Data and GIS Specialist, discussed how one can find new data, extend technical skills, and engage in new forms of inquiry, problem solving, and collaboration.

"Visualizing History with GIS with Anne Kelly Knowles"
Dr. Anne Kelly Knowles, the Professor of Geography at Middlebury College and recipient of the 2012 Smithsonian American Ingenuity Award spoke about the connections historical GIS can reveal in terms of unknown patterns and relationships between different historical events. Examples explored included the American Industrial Revolution, the Battle of

Gettysburg and the Holocaust. Note: This was an especially popular event that attracted faculty and students from multiple departments, and community members. There was standing room only and required the need for the last minute set-up of an overflow room with a display.

"Social Explorer Workshop with Russ White"
Russ White, Cal Poly's Library Data and GIS Specialist, held a small workshop on how to use Social Explorer, a licensed demographic data resource. He explained how Social Explorer provides quick and easy access to current and historical census data and demographic information. He reviewed in detail the easy-to-use web interface that lets users create maps and reports to illustrate, analyze, and understand demography and social change. Note: This tool was licensed by the Library when the unit realized there was a need for this data interface based on the types and number of reference questions.

Table 6: Post-assessment event presenters name, organization, presentation title, date, and total attendance post assessment. See descriptions of the events directly below the table.

Presenter(s)	Organization	Presentation	Date	Attendance
Josie Iselin	Loving Blind Productions	Art, Science and the Natural World - The Seaweed Specimen	6-Feb-2015	12
Jon Jablonski, Director	Map and Imagery Laboratory, University of California Santa Barbara	Geospatial Data: Where does it go?	12-Feb-2015	35
Dr. Zachary Peterson, Assistant Professor	Department of Computer Science and Software Engineering and Cybersecurity Center, Cal Poly	Cyber CSI: Working to Solve the Data Security Crisis	16-Apr-2015	48
David Yun, GIS Supervisor and Lecturer	City of San Luis Obispo and Department of Natural Resources Management, Cal Poly	Historic San Luis Obispo Shared Through GIS	30-Apr-2015	54
Jenny Kendler, Artist-in-Residence and Dr. Ruta Saliklis, Director of Exhibitions and Development	Natural Resources Defense Council (NRDC) and San Luis Obispo Museum of Art	Bewilder | Be Wilder – the Natural World and Art	30-Mar-2016	32

Dr. Zachary Peterson, Assistant Professor	Department of Computer Science and Software Engineering and Cybersecurity Center, Cal Poly	Cyber CSI II: Apple vs. FBI – Encryption, Privacy, and Policy	7-Apr-2016	65
Leslie Love Stone and Dr. Ruta Saliklis, Director of Exhibitions and Development	Paseo Robles Artist and San Luis Obispo Museum of Art	The Intersection of Science and the Art of California's National Parks	1-Dec-2016	22

Table 6 Event Descriptions*

"The Seaweed Specimen"
Josie Iselin, a photographer, writer, and book designer based in San Francisco, talked about her work in the context of the STEAM (Science, Technology, Engineering, Arts, and Math) movement. The focus of her presentation was her 2014 book featuring seaweed, *An Ocean Garden*, and her infatuation with seaweed as a subject. Throughout her talk Iselin named collaborators, artists, scientists, curators and writers who have inspired her work.

"Geospatial data: Where does it go?"
Jon Jablonski, head of University of California Santa Barbara's Map and Imagery Laboratory, gave a talk that discussed the status of building geospatial libraries for storage, discovery, and access in an academic setting. His work revolves around the management of large bodies of worldwide spatial information and practical applications of geodata, so naturally, this discussion focused on UCSB's efforts to spatially enable the new Alexandria Digital Research Library. In addition, he discussed Stanford University's Geospatial Center and Harvard's Geospatial Library.

"Cyber CSI: Working to Solve the Data Security Crisis"
Dr. Zachary Peterson, Assistant Professor in the Cal Poly Computer Science Department and Cybersecurity Center, discussed the security implications of data storage systems and issues with encrypting mobile device data. Specifically, he addressed the challenges of digital forensics, a branch of forensic science encompassing the recovery and investigation of material found in digital devices, often in relation to computer crime. In addition, he spoke about cryptography as a means of protecting our information and its rise as one of the most popular ways to protect digital data in the past 20 years.

"Historic San Luis Obispo Shared Through GIS"
David Yun, Lecturer for Cal Poly's Natural Resources Management and Environmental Sciences (NRMES) and City of San Luis Obispo Geographic Information Services Supervisor, discussed how the scanning of historic maps and documents using GIS tools has provided new ways to visualize and connect to information from the past. Yun demonstrated online mapping and web apps to show users how to find and view historic buildings, chart the growth of the city over the decades, and compare side-by-side maps of San Luis Obispo as it is today with as it was more than 100 years ago. Specifically, Yun discussed how the scanning of San Luis Obispo historic documents and maps provides easy access and management of this information.

“Cyber CSI II: Apple vs. FBI – Encryption, Privacy, and Policy” (Joint Science Café/Data Studio Presents)
Dr. Zachary Peterson, Cal Poly Assistant Professor of computer science and a faculty member of the university’s Cybersecurity Center, returned to provide a second program on Cyber CSI. Peterson used issues being discussed in the media surrounding the court case between Apple and the FBI regarding the December 2015 domestic terrorist attack in San Bernardino, California, to delve into the implications of encrypting data on mobile devices, and the challenges of maintaining data privacy in the digital age. He also examined the implications of the high-profile case for both government policies and the private sector.

“Jenny Kendler: Bewilder | Be Wilder – the Natural World and Art”
The presentation featured a conversation between Jenny Kendler, nationally and internationally recognized interdisciplinary artist, environmental activist, wild forager, naturalist, and social entrepreneur and Ruta Saliklis, San Luis Obispo Museum of Art Exhibitions and Development Director, about the intersection of art, activism, and the natural sciences. Kendler was the first Artist-in-Residence with the Natural Resources Defense Council (NRDC) and is based in Chicago.

“The Intersection of Science and the Art of California’s National Parks”
Leslie Love Stone, Paso Robles based artist, sat down with Ruta Saliklis, Curator and Director of Exhibitions at the San Luis Obispo Museum of Art, to talk about the painter’s work and California National Parks in the context of the STEAM (Science, Technology, Engineering, Art, Math) movement. Ms. Stone consulted with a Cal Poly botanist, soil scientist, and data and GIS specialist, to transform data about the natural world into geometric shapes using her own numeric representation system and book cipher algorithm. The result was a series of paintings of nine national parks in California.

* Event descriptions have been paraphrased or directly quoted from the Library and Cal Poly websites. These descriptions were written by or based on the authors descriptions of the events.

Appendix 3
The Data Studio Presents Participant Online Survey

Perspectives of Data Studio Event Participants

Introduction and Informed Consent

A research project on perspectives of Cal Poly State University Data Studio event Presenters and Participants is being conducted by Jeanine Scaramozzino, Data Services Librarian, California Polytechnic State University – San Luis Obispo. This online survey has been developed to collect data on the perspectives of Cal Poly State University Data Studio event Participants and Presenters (1) on the effectiveness of programs, (2) their satisfaction with the experience, and (3) to collect new ideas to improve the program.

You are being asked to take part in this study by completing the following questions. Please be aware that you are not required to participate in this research and you may discontinue your participation at any time without penalty. You may also omit questions that you would prefer not to answer. The risks associated with participation in this study are no more than the participant would encounter in everyday life.

Your responses will be kept anonymous. The results of the survey will be aggregated and shared as a whole. If you have questions regarding this study or would like to be informed of the results when the study is completed, please feel free to contact: Jeanine Scaramozzino, College of Science & Mathematics, School of Education, and Data & GIS Services Librarian, California Polytechnic State University – San Luis Obispo, at jscaramo@calpoly.edu.

If you have concerns regarding the manner in which the study is conducted you may contact Dr. Steve Davis, Chair of the Cal Poly Human Subjects Committee, at 756-2754, sdavis@calpoly.edu, or Dr. Dean Wendt, Interim Dean of Research, at 756-1508, dwendt@calpoly.edu.

This survey contains 18 questions and should take about 5 minutes to complete. Thank you for your participation in this research.

If you agree to voluntarily participate in this research project as described, please indicate your agreement by marking “Yes” next to the statement “I am voluntarily participating in this survey”. Please print and retain this informed consent form now for your reference.

*** 1. I am voluntarily participating in this survey:**

- ◯ Yes

2. Have you attended any Data Studio events, presentations, or workshops?

- ◯ Yes
- ◯ No

3. If you answered yes to the previous question, please specify which program(s) you've attended:

- [ ] Data Studio Grand Opening
- [ ] Quentin Hardy - New York Times, "How Data is Changing Nouns into Verbs"
- [ ] MacKenzie Smith - UC Davis Librarian, "Data Papers in the Network Era"
- [ ] Geography 440 Final Project Presentations
- [ ] Mark Belrose - NGIA, "Military Applications of GIS"
- [ ] Joe Larson - CAL FIRE, "OpenStreetMap"
- [ ] Ron Nakao - Stanford, "Working w/Data at its Source"
- [ ] Carly Strasser - California Digital Library, "DataUp"
- [ ] Melissa Cragin - National Science Foundation, "Making a place for Data"
- [ ] Data Studio Open House 2013
- [ ] Rita Blaik, UCLA, and Ruta Saliklis, SLOMA - "Under the Scope: Looking at the Body Through Art & Science"
- [ ] Carly Strasser - California Digital Library, "Data Management for Researchers"
- [ ] Carly Strasser - California Digital Library, "The DMPTool"
- [ ] Carly Strasser - California Digital Library, "Data Management: Who Knew It Could Be a Hot Topic?"
- [ ] Carly Strasser - California Digital Library, "The Future of Scholarly Research & Communication Will Be Open"
- [ ] Other

Other (please specify)

4. How did you find out about the Data Studio event? (Check all that apply)

- [ ] We contacted you
- [ ] You contacted us
- [ ] Facebook page/ad
- [ ] Poster
- [ ] Newspaper/Mustang Daily
- [ ] Podcast/radio
- [ ] Other (please specify)
- [ ] Library Website
- [ ] Colleague/Friend
- [ ] Library announcement
- [ ] Blog
- [ ] Cal Poly Report
- [ ] Data Studio Email List

5. Why did you attend? (Check all that apply)

- [ ] To learn something new
- [ ] Intrigued by topic
- [ ] Interested in speaker
- [ ] Informal venue for discussion
- [ ] Extra credit for class
- [ ] Class requirement
- [ ] Moral support for speaker
- [ ] Other (please specify)
- [ ] I was invited
- [ ] Just curios
- [ ] Killing time
- [ ] Food/coffee
- [ ] Club support
- [ ] Past presenter at the Data Studio
- [ ] I enjoyed a previous event

6. What, if anything, did you do as a result of attending the Data Studio event? Check all that apply.

- [ ] Discussed the topic(s) with family, friends, or colleagues
- [ ] Attempt to stay up to date on the topic
- [ ] Read a book or article about the topic
- [ ] Read a science magazine or journal about the topic
- [ ] Visited the Library's website to access the event video/podcast
- [ ] Visited website(s) about the topic
- [ ] Other (please specify)

7. Would you be interested in attending another Data Studio Event?

- ( ) Yes
- ( ) No
- ( ) Maybe

8. Would you recommend attending to others?

- ( ) Yes
- ( ) No
- ( ) Maybe

9. Please rank your overall satisfaction with the Data Studio event experience:

Completely Satisfied	Very Satisfied	Fairly Well Satisfied	Somewhat Dissatisfied	Very Dissatisfied
○	○	○	○	○

10. Please indicate the extent to which you agree/disagree with the following:

	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree
There were sufficient opportunities for active learning.	○	○	○	○	○
There were sufficient opportunities for interaction among participants.	○	○	○	○	○
I can implement what I learned at this presentation/workshop.	○	○	○	○	○
I would recommend this presentation/workshop to a colleague.	○	○	○	○	○

11. How could the event be improved?

12. Which part of the event was most useful to you?

13. Which topic(s) or presenter(s) would you like to see in a future event?

Demographics

14. Gender:

- ◯ Male
- ◯ Female

15. Age:

- ◯ 17 and under
- ◯ 18-24
- ◯ 25-34
- ◯ 35-49
- ◯ 50-64
- ◯ 65 and older

16. What is your position at Cal Poly?

- ◯ Lecturer
- ◯ Assistant professor or equivalent
- ◯ Associate professor or equivalent
- ◯ Professor or equivalent
- ◯ Management program position (MPP)
- ◯ Other (please specify)
- ◯ Undergraduate student
- ◯ Graduate student
- ◯ Staff member
- ◯ Community member
- ◯ N/A

17. Department/College:

- ◯ COSAM
- ◯ CLA
- ◯ CENG
- ◯ OCOB
- ◯ CAED
- ◯ CAFES
- ◯ Library
- ◯ University Advancement
- ◯ N/A
- ◯ Other (please specify)
- ◯ Athletics
- ◯ Cal Poly Corporation
- ◯ Continuing Education
- ◯ Information Services: IT and Library
- ◯ President's Office
- ◯ Provost's Office
- ◯ Student affairs
- ◯ Administration and Finance

18. Years on Cal Poly Campus:

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6-10
- ◯ 11-15
- ◯ 16-20
- ◯ 21+
- ◯ N/A

19. Optional: If you would like to be notified of future Data Studio or GIS events, please provide your name and email.

Name

Email

20. Optional: If you would like to be entered in a drawing for a Starbucks coffee card, please provide us with your name and email.

Name

Email

Thank you for participating in this survey, your responses are greatly appreciated.

Vendor Presentation: 'Admiral Sponsor' IAMSLIC Virtual Conference 2020

Inter-Research: Changing Tack in the Plan-S Open Access World

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Abstract
For over 40 years, Inter-Research (IR) has been a small, family-owned publisher, well-respected for its high-quality science journals. IR commits the majority of its income to a rigorous peer review process, intensive in-house copy- and sub-editing, and attention to clarity of presentation in typography and layout. It currently publishes 8 titles—4 Hybrids and 4 Fully Open Access, of which 5 titles directly relate to the Aquatic Sciences. By far dominant among these is the flagship journal *Marine Ecology Progress Series*. While IR embraces change (e.g. online publication was introduced in 2000 and open (or free) access (OA) publication in 2005), the focus on traditional production quality means the journals have remained a comfortable and unchanging constant over the decades. IR's founder, Prof. Dr. Otto Kinne, believed strongly in making scientific research widely accessible. However, the cautious program of transforming the subscription journals towards Fully OA publications that began in 2013 was suspended in 2015 when article submissions to the journal *Aquatic Biology* immediately, significantly and unexpectedly dropped almost immediately on "OA flipping", a clear signal that globally financial support for the OA publication model was not matching the hype promoting its benefits and the degree to which it was desired. European funder-based "Plan S", integrated into European Commission policy and initiated in 2020, promises to provide OA funding and forces European academic publishers to transform to Fully OA publication by end of 2024. In addition to introducing IR, its products, its products and its publication philosophy, this "Vendor Demonstration" describes how one small and not greatly resourced publisher (compared to the big conglomerates) is cautiously changing tack in the Plan S–Covid-19 world. IR's journey to Fully OA publication faces many challenges and uncertainties, but also great expectations.

Keywords: Inter-Research Science Publisher; Plan S; Science--Periodicals—Publishing; Open access publishing; Science publishing.

1. 1979–1999: Fair Winds and Following Seas

When the fourth volume of the five-volume book series *Marine Ecology: A Comprehensive Treatise on Life in Oceans and Coastal Waters*[2] was published in 1978, the first volume was already eight years old. The series was the first attempt to concisely bring together all knowledge of marine ecology. The work was planned, collated and edited by the outstanding marine ecologist, Otto Kinne (1923–2015), who also contributed about one-quarter of its content[3]. From his vantage point surveying the rapid advancements in marine ecology research over the 1970s, Kinne approached Wiley with the suggestion of a companion journal*: Marine Ecology – Progress Series*, to keep the treatise current. Kinne, author of over 100 research papers[4], initiator of the European Symposium on Marine Biology (EMBS)[5], long-standing Director of the Biologische Anstalt Helgoland (BAH)[6], founder and Editor-in-Chief of the journal *Marine Biology* (Springer), was no novice to academic publishing. However, Wiley turned down the proposal[7]. Not one to accept defeat, Kinne founded the publishing company Inter-Research (IR)[8], with an initial staff of 3 including himself as Editor-in-Chief, based at his home in Hamburg (Germany). It launched with the first issue of *Marine Ecology – Progress Series* (MEPS)[9] on July 31, 1979, containing 13 articles. The journal quickly attracted much attention, growing at the rate of one extra volume per year[10]. Kinne followed the *Marine Ecology* treatise with a four-volume series *Diseases of Marine Animals*[11]. Following pattern, in 1985 he founded a second supporting journal, *Diseases of Aquatic Organisms* (DAO)[12].

The success of MEPS[13], however, forced a change of vision on its creator. "[MEPS] grew in a direction that differed from the original plan (…) a new scientific journal behaves somewhat similarly to a human baby (…) as the baby grows up it begins to unfold its own preferences[14]." Kinne took early retirement[15] from the BAH in 1984, after 22 years as its Director, and settled on a country property on the outskirts of the small village of Oldendorf (Luhe), near the beautiful medieval city of Lüneburg. There he embarked on the "second part of [his] professional life achievement"[16], establishing, driving and expanding the publishing activities of Inter-Research, all located in Oldendorf.

[2] Kinne (1970–1984). PDFs of the entire series can be freely downloaded from www.int-res.com/book-series/marine-ecology-books/
[3] Smetacek (2015).
[4] A comprehensive list can be found at www.int-res.com/about-ir/irs-founder-otto-kinne/list-of-scientific-publications/
[5] www.marinestations.org/embs-european-marine-biology-symposium
[6] See Wiltshire (2017).
[7] Smetacek (2015).
[8] Still in Kinne family ownership, registered as an e.K. (i.e. sole proprietorship) in the Handelsregister of the Amtsgericht Lüneburg.
[9] The dash in the MEPS title was dropped from Vol. 50 (1988) onwards.
[10] This can be seen on the MEPS homepage www.int-res.com/journals/meps/meps-home. Initial growth rate was one volume per year to 16 volumes in 2006. After 1996, the growth rate of MEPS slowed but continued to a maximum of 25 volumes annually (2007) followed by some fluctuations before settling into the present 23 volumes.
[11] Kinne (1980–1990). PDFs of the whole series can be freely downloaded from www.int-res.com/book-series/diseases-of-marine-animals-books
[12] https://www.int-res.com/journals/dao/dao-home/
[13] Kinne took evident pride in reporting (Kinne, 1985) that MEPS had within 10 years achieved status as the world's no. 1 in marine ecological journal publication based on Garfield (1987) and Fuseler-McDowell (1989, 1990) (note the latter are IAMSLIC conference papers!), and unspecified questionnaires and letters addressed to the Editor.
[14] Kinne (2005a, p. 1).
[15] He had severe hearing difficulty through physical damage to his ears as a youth and this condition was worsening (Smetacek, 2015).
[16] Kinne (2005a, p. 2).

Within academia, awareness was dawning that during the 1960s and 1970s the control of academic publishing[17] had been unwittingly handed over to big, profit-oriented publishers[18]. Technically a commercial publisher, Kinne structured and presented IR in the traditional Learned Society publication model: scientific credibility from a scientific institute in the background whose membership consisted of outstanding ecologists; close international cooperation "across all major cultural nations;" a large editorial board; close and enthusiastic interaction between editors and referees; high review and production standards—all managed or performed in-house under the direct oversight of an undisputed scientific giant (i.e. Kinne)—and most importantly, "spending a significant part of its income on promoting research" (as opposed to lining the pockets of investors and directors not connected to academia)[19]. Here he was referring not only to the publishing activities, but also the establishment in 1984 of a new institute, the International Ecology Institute (ECI). The main vehicles for its aims[20] are the annual (from 2019, biennial) ECI and International Recognition of Professional Excellence (IRPE) Prizes[21] awarded to scientists for outstanding and sustained achievements in marine, freshwater and terrestrial ecology research, in rotation. The ECI Prize comes with the "attached string"[22] of writing a book for the *Excellence in Ecology* book series[23]. Apart from the philanthropic work[24] nearly all income generated by IR is returned back into the publishing activities. The ECI had another important role in providing a separation between Kinne's activities as Editor-in-Chief (Kinne and in-house Assistant Editors-in-Chief and Production Editors were formerly listed in the journals as affiliated to the ECI)[25] and Kinne's activities as publisher and owner of IR.

Over the years six more journal titles were added to MEPS and DAO: *Climate Research* (CR; founded 1990), *Aquatic Microbial Ecology* (AME; founded 1995)[26], *Ethics in Science & Environmental Politics* (ESEP; founded 2000)[27], *Endangered Species Research* (ESR; founded 2004)[28], *Aquatic Biology* (AB; founded 2007)[29]; and *Aquaculture Environment Interactions* (AEI; founded 2009)[30]. Fig. 1 provides a summary of vital statistics for each title as of October 2020. A ninth journal, *Sexuality and Early*

[17] With university presses, the aim was to shed non-core research and teaching functions to cut costs.
[18] The beginnings of the so-called "serials crisis". For a definition of that, see e.g., Panitch & Michalak (2005).
[19] Kinne (1988a, p. 1) and many other Editorials penned by Kinne, see https://www.int-res.com/journals/editorials/
[20] For its aims, see https://www.int-res.com/ecology-institute/eci-home/
[21] ECI prize: see https://www.int-res.com/ecology-institute/eci-prize/ , IRPE Prize: see https://www.int-res.com/ecology-institute/irpe-prize/
[22] As described by the first winner, Fenchel (1987, p. xix).
[23] To date (2021), there have been 34 ECI Prizes and 25 IRPE Prizes awarded, and 23 volumes of the *Excellence in Ecology* book series (published by the ECI but produced by IR).
[24] In addition to the ECI, see also the Otto Kinne Foundation https://www.int-res.com/ecology-institute/okf/
[25] Nonetheless a totally transparent one since the street addresses of the ECI and IR were identical. Now that all the journal Editors-in-Chief are external to IR, affiliation to the ECI is no longer used. The position of Managing Editor is an administrative role within the publishing company.
[26] Labelled as a companion journal to MEPS, AME is the continuation of the journal *Marine Microbial Foodwebs* originally published by the Institut Océanographique, Fondation Albert 1er Prince de Monaco, Paris.
[27] Originally conceived as a forum to discuss the ethical concepts of the (now defunct) Ecoethics International Union (EEIU), also founded by Kinne.
[28] Endangered species became a new focus for Kinne, due to his discovery of the extremely rare fire-bellied toad *Bombina bombina* on his property in Oldendorf and his attempts to establish there a breeding centre to aid species recovery.
[29] To give an alternative outlet for the increasing number of articles pre-rejected by MEPS for being out-of-scope as too biological and not ecological.
[30] Kinne was persuaded by T. Dempster and M. Holmer to establish the journal.

Development in Aquatic Organisms (SEDAO; founded 2012)[31] was absorbed into AB in 2016. None of the journals established after MEPS reached its growth or output; taken together they equal approximately three-fifths of the publishing output of MEPS, which is clearly the IR flagship[32].

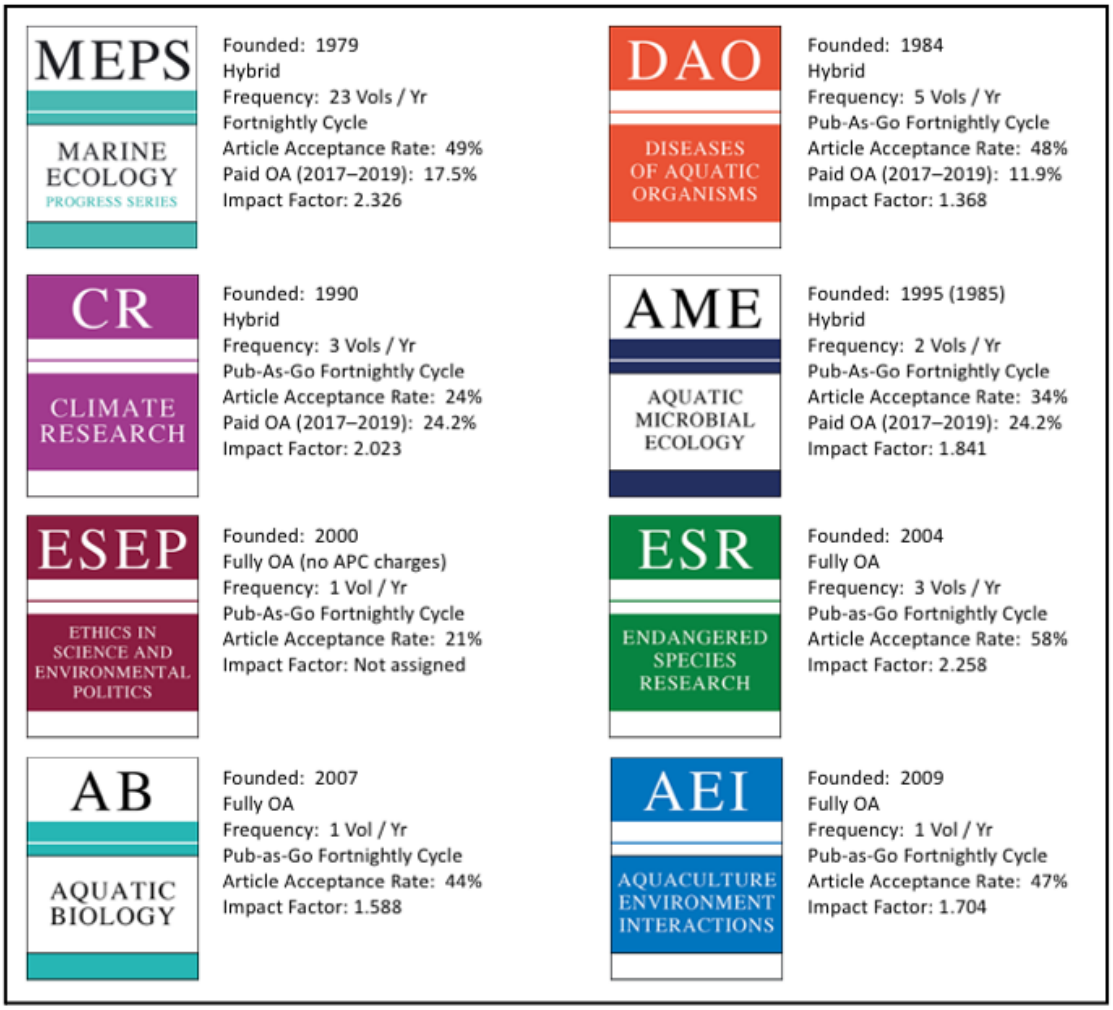

Fig. 1. Foundation year, publication model, publication frequency and cycle, article acceptance rates and impact factors for each of the Inter Research (IR) journals, October 2020. APC: Article Processing Charge; OA: Open Access.

The growth in publishing output needed a parallel growth in staff and facilities. Kinne purchased houses in the quiet residential cul-de-sac bordering his property to provide offices for IR activities. Along with his wife Helga Kinne the original staff of three expanded to Assistant Editors-in-Chief, Production Editors, Managing Editors,

[31] Kinne was persuaded by T. J. Pandian, a distinguished scientist and former PhD student of Kinne's, to establish the journal. There were several reasons for its lack of success, but mainly that its subject niche was too specialised and small. Some researchers later informed IR they had assumed from the title that the journal was spurious.

[32] Output in terms of total articles published annually across all journals peaked at 1,111 in 2012, i.e. 88 articles in 1980 (first full year of operation); 1,111 articles in 2012; and 706 articles in 2020 (compiled from counting in publications or IR internal production databases).

Production Managers and "Assistants to the Editors"—the latter comprise clerks that help with the logistics of the review process, administrative and financial clerks, secretaries, copy- and sub-editors, typesetters / graphic designers, and IT specialists. In 2005 Kinne calculated the total number of persons associated with IR to be 3,793[33], today (2021) it is nearly 27,000[34,35]. Kinne was intensely proud that almost the entire publication process was managed or carried out either by staff directly employed or under freelance directly to IR[36]. Only printing and some software management systems are in the hands of third parties.

IR's rapid growth in the late 20th Century can be attributed to Otto Kinne's immense stature as a scientist and editor, his insistence on rigorous but fair peer review and high-quality sub-editing and production standards, the burgeoning research in marine ecology within the relatively small market of marine ecology journals[37], and its establishment at the height of the "golden era" of commercial academic publishing before the serious effects of the "serials crisis" set in[38].

2. 2000–2019: Variable Winds and Increasing Seas

The 21st Century opened with two developing tools that Academia would wield to combat the serials crisis: technology that allowed do-it-yourself document production and instantaneous global distribution[39] and a new, reader-friendly publication model, Open Access[40], both of which brought challenges and change to the traditional academic research publication model on which IR was built.

In a 1988 keynote address Kinne observed: "Authors are interested in maximum dissemination of their work; editors, in maximizing quality; publishers, in maximizing income; users, in maximizing access to information. The problems of coordinating and harmonizing such conflicting interests are considerable (…)[41]." Few had better direct experience of these problems: as an established researcher and author Kinne understood the drive for maximum dissemination and maximum access; as an editor (and researcher) he was passionate about maximising the quality of research; as a publisher he needed to secure the survival of his business. Where he (and thus IR) stood with regards to individual 21st Century forces and changes in academic publishing was greatly influenced by the balancing act among these interests.

[33] Kinne (2005a).
[34] Counts from from IR internal databases. Consider the effort cost alone needed to maintain the oversight, relevancy and currency of ca. 27,000 worldwide contacts and subject specialities of highly mobile scientists.
[35] 2020/2021 Covid-19 pandemic effects aside, 22 permanent staff based in Oldendorf (not all full-time and as in most small businesses, many have multiple roles) with an additional 9 freelancers directly contracted by IR. Outside IR on the editorial and peer review side, there are 14 Editors-in-Chief, 211 Contributing Editors, 353 Review Editors, and 26,188 peer reviewers.
[36] See e.g. Kinne (2005a).
[37] For standards and position see Garfield (1987), Kinne (1988a), Fuseler-McDowell (1989, 1990).
[38] For a definition / explanation of the "serials crisis", see Panitch & Michalak (2005).
[39] That is, ubiquitous word processing software and the Internet, which weakened the industrial monopoly of publishers, booksellers and their distribution networks.
[40] I've assumed this readership does not need the Open Access publication model explained, otherwise see e.g. Suber (2009).
[41] Kinne (1988b, p. 278).

Kinne the researcher welcomed the Internet for maximising dissemination and access[42], particularly for *informal* communications between scientists, but as an editor he was greatly concerned at potential threats to the quality and established rigor of formal scientific research publication. In a remarkably percipient Editorial[43] he outlined what he saw to be the risks in electronic publishing, which can be summarised as pressure, speed, quantity and muddiness versus the benefits of the established system: composure, digestion, quality and clarity[44]. Thus, he remained an advocate of the traditional, centuries-proven model of editor-moderated peer-review and publication in established journals[45]. Possibly from his experience battling German bureaucrats when Director of the BAH[46], he was strongly against political or lobbyist intervention in science[47]. It would have been interesting to read his position on the political interference in scientific integrity made by the former U.S. President Donald Trump[48], the European Commission's Open Science policies and the development of its own publisher Open Access Platform[49], and cOAlition S funders (ultimately governmental) controlling research publication outlet choice[50]. He was (naturally) protective of his business interests, especially against the distribution of "cheap copies" of articles, which he argued contributed to the serials crisis[51]. Similarly, with indexing and abstracting services. On one hand he appreciated their usefulness against information overload, on the other, he viewed them as "secondary" publications living off the work of others[52].

[42] MEPS Volume 201 (August 9, 2000) was the first published online, pre-announced in Kinne (2000), though IR already had a heavily visited (for that time) website—Kinne reports 180,000 to 250,000 visits per month.
[43] Kinne (1999)
[44] "The scientific process will be damaged where quality submits to quantity, where speed overrules exactness and performance. Computers are not only great in producing progress, they are also great in producing trash (…) The scientific process abounds with risks of becoming blurred and distorted: neglect of copyright, intellectual property, scientific correctness and honesty; falsification of priority claims; concealed plagiarism or downright stealing of foreign findings and ideas; inappropriate application of scientific techniques and statistical methods; misquotations and misinterpretations of the works of peers; misspellings and misuse of scientific names and of taxonomic rules. In an overall scenario of increasing competition for jobs and professional standing, the pressure to publish and to perform grows, and with it grow numerous temptations. These offer themselves, more conveniently than anywhere else, in insufficiently controlled electronic publishing." (Kinne, 1999, p. 4)
[45] Presenting the ingenuous ecological argument: "[Views that the network will be the ultimate equalizer for dismantling hierarchy] are bound to fail. As witnessed by human history, equalization attempts have always failed. Why? Because competitive diversity is the very life blood of nature (and human culture). Science has relied on hierarchies and it must continue to do that." (Kinne, 1999, p. 4).
[46] See e.g. Smetacek (2015).
[47] "The growing influence of science on human societies and their multiple activities has recently caused forces to enter the scene that are not part of the scientific process in its original sense; forces that are primarily fuelled not by scientific fact or argument but by political or economical interests. These forces must not be allowed to compromise or distort established and proven methods of 'truth finding'. We cannot have lobbyists and pressure groups in science!" Kinne (2003).
[48] E.g. Goldman et al. (2020).
[49] See https://ec.europa.eu/info/research-and-innovation/strategy/goals-research-and-innovation-policy/open-science/open-access_en#latest
[50] E.g. "cOAlition S urges individual researchers, research institutions, other funders, and governments not to financially support 'hybrid' Open Access publishing when such fees are not part of transformative arrangements. cOAlition S emphasises that the individual cOAlition S members are not obliged to enter into transformative arrangements nor to fund publication costs that are covered by such arrangements." https://www.coalition-s.org/addendum-to-the-coalition-s-guidance-on-the-implementation-of-plan-s/principles-and-implementation/ p. 2
[51] IR is not a member of any Copyright Clearance scheme and does not receive any monies from such schemes. All reproduction permissions are handled directly in-house. Depending on the copyright circumstances, these are generally forthcoming for no fee. Kinne trialled the U.S. Clearance system in the 1980s (one can see the system reference numbers and price printed at the bottom of early article first pages), but the annual returns were so low (a few dollars annually) he abandoned it as not worth the effort. IR does work in partnership with Research Solutions Reprints Desk in the USA.
[52] "This augmented information spread supports and catalyzes the scientific process; it assists in preselection and uptake of information, and it represents a significant measure against getting buried by an ever-increasing output of primary information. However, commercial secondary publishers sell information which they have neither produced, nor quality-controlled, nor published in the first place. Often including only "the better publications" in their products, secondary publishers can build on the success of others and thus minimize their financial investment and risk (…). True, secondary publications reduce the information clog, but they also increase the information fog". Kinne (1988b, p. 278).

Finally, he saw the publication model where authors are charged publication costs (rather than readers a purchase cost) as an *undemocratic* cost shift that would make science publication only for the rich and exclude thousands of scientists unable to raise the funds[53].

Within the context of the serials crisis, total subscriptions (to the then five IR subscription journals MEPS, AME, DAO, CR and ESR) peaked in 2007[54]. The many and varied reasons for the gradual industry-wide cancellation trend of the past decades all sum to the subscribers' need to extract more (against ever-increasing publisher prices, exponentially increasing research output) from stagnant or decreasing budgets[55] and the aim to break the pricing "tyranny" of the large publishers by demonstrating the subscriber market was not so "captive" as believed by favouring OA publication initiatives and eschewing subscription purchases. However, non-core research / teaching subscription cancellations aside, library amalgamations and/or closures and their replacement by expanding online networks may temporarily relax library budgets and increase accessibility for users but they decrease the overall number of subscribers available in the market, feeding the spiral. Additionally, there is the belief that online publication and distribution must be significantly cheaper for the publisher than print, so any price rises to maintain the same income over fewer and larger customers is "greediness"[56]. IR was able to keep subscription prices relatively stable until 2016[57]. Fluctuations in the annual subscription prices were mainly linked to increases / decreases in the number of volumes produced annually. For example, the online-only price per MEPS volume gradually increased by € 12 over the period 2008–2011, then remained constant for the period 2011–2015, and then increased by € 7 in 2016[58].

Open Access fundamentally returns to the pre-17th Century economic model of publishing: the (wealthy) author contracts the publisher to reproduce (multiple) copies of their work in a higher quality than the author's manuscript and pays the printer / publisher for the service. Combined with 21st Century digital technology, the advantages

[53] Kinne (1999, p. 3).
[54] The actual values are commercially sensitive information and cannot be presented here. ESR converted to full OA in 2015 (see below, this section).
[55] Not only due to the "serials crisis". Kinne wrote: "Critics have made out the black sheep: science publishers. (…) Strangely, the increasing cost of producing the scientific knowledge (more scientists, more universities, additional research facilities, new equipment, etc.) provoke less criticism than the increasing cost of publishing the end product of it all: the manuscript" (Kinne, 1999). I do not think professional librarians reading here will disagree that by 2007 those increasing research production costs were also being squeezed out of University Library budgets.
[56] On this Kinne wrote: "Electronic publishing eliminates the cost of printing, binding and posting. But it will never be free (…) Except for printing, binding and posting, the fixed costs remain the same whether MEPS appears on print-on-paper or electronic." (Kinne, 1999, p. 3). While this is true (production is a single line right up to the point where one set of outputs is generated to upload to the website and another set is generated to go the commercial printer), Kinne did not foresee the considerable IT component cost (servers, internet providers, network and software licensing fees) that has replaced (in fact, well-exceeded) the former printing costs. Additionally, the cost of maintaining permanent access to an ever-expanding information set has shifted from keeping the printed issue permanently available from the library to keeping the digital issue permanently stored and accessible on the publisher's server, i.e. shifted from the library to the publisher. I think the belief that digital publication must be significantly cheaper exists mostly because those who have similar digital tools and services delivered to their work desktops never see the true commercial cost of maintaining the provision of those services (and even then, there may be significant bulk discounts for a very large organisation such as University that are not available to a smaller commercial entity such as IR). Additionally, the ever-increasing number of post-publication services provided free of charge to individual researchers (e.g. Alt-Metrics, CrossMark, CrossRef, ORCID, etc.) are financed by charging the publishers to participate, which they are forced to do by customer demand, but at the same time discouraged from those costs accordingly.
[57] IR internal historical subscription price data.
[58] Calculated from historical subscription price data.

are that access to the publication is not restricted to subscribers only. Barrier-free global access is demonstrably better for research, education and society as a whole, and the author's personal recognition and career advancement in particular. The disadvantages are that publication is only achieved by the wealthy (thus risking a skew to the pool of knowledge), the cost is borne by one rather than spread across many, and the model is only economically sustainable when there is a large publication output, i.e. by large publishers or government subsidised platforms. This can be illustrated thus: Under the Subscription Model, let us imagine a single journal publishes 200 articles per year (note that with an article rejection rate of 51% this requires over 400 articles to have been submitted for peer review). Let us assume it has 250 library subscribers who pay a subscription of $3000 each, bringing the journal $750,000 or $3750 per article annually (but each subscriber only pays $15 per article). Under the Fully OA model, to maintain the same total income, either the journal charges the author an APC of $3750, or, if the APC price is capped to e.g., $750[59], the journal needs to increase publication 5-fold to 1000 published articles—without increasing any costs. Additionally, to maintain the scientific quality represented by the 51% rejection rate, that increase would require the submission of 2100 articles for peer review–again, without increasing costs (e.g. the licence fees charged to publishers by article submission software systems are linked to the number of submitted manuscripts).

Support for the OA model as fundamental to academic publishing became louder and increasingly fervent. Despite his concerns, Kinne introduced the "Gold" OA publication model was into IR publications in 2005[60], thus converting the former subscription-only journals into so-called "Hybrids[61]". Labelled "Open Access", the model was what is now termed "Free Access[62]". True OA publication under the Creative Commons by Attribution License (CC-BY)[63] was introduced in 2013. To keep a wider range of pricing options available for authors / funders, the renamed Free Access model remained on offer at cheaper APC charges until it was phased out at the start of 2016[64]. Otto Kinne lived to oversee the introduction of the CC-BY model but not to steer much of its subsequent progress, passing away at the age of 91 in early March 2015 after a prolonged period of deteriorating health, but standing ever with his hand firmly on the tiller of IR[65].

[59] As cOAlition S has indicated it will do. See Section 5 of e.g. https://www.coalition-s.org/guidance-on-the-implementation-of-plan-s/. Note the funder can anyway decide to cap the fee to any level, regardless of what the individual publisher needs to receive to break even. The figure of 750 was mooted in the initial draft Plan S, but taken out during the stakeholder feedback process.
[60] Announced in Kinne (2005b), perhaps with less enthusiasm than normal for new IR developments. He did not present the normal description of benefits of OA publication, but instead: "To remain at the forefront of scientific publishing, we are constantly exploring new avenues of making sound scientific knowledge available to a world-wide audience. Towards this end, we are pleased to introduce an open access initiative for MEPS and our other journals …". The first OA publication was the Theme Section "Politics and socio-economics of ecosystem-based management of marine resources" in that same volume (MEPS Vol. 300). "Gold" describes OA publishing for the payment of an APC.
[61] "Hybrids" are journals that are a mixture of subscription and OA publishing in the same title.
[62] Anyone could access the articles immediately on publication, but re-use was subjected to standard copyright law (with copyright transfer to IR), not under a Creative Commons type license.
[63] Use, distribution and reproduction are nearly unrestricted, provided the authors and original publication are credited. Copyright is not transferred to IR and remains with the present copyright holders. See https://creativecommons.org/licenses/by/4.0/
[64] To encourage the use of OA and the Creative Commons Licenses (generally Free Access was no longer considered desirable by academia), reduce confusion among authors and users over the difference in the models and simplify production procedures.
[65] "A major problem with patriarchs of Otto Kinne's calibre is the large gap they leave behind at their passing; they are remembered because they are missed, so what they established becomes the tradition followed by their successors." (Smetacek, 2015, p. 6).

No limits have ever been placed by IR on the amount of OA publishing—whoever selects the option and pays the APC, can have it[66]. Until 2021, the APC prices were tiered based on article length, and from 2008 were set to partially offset subscription price increases, but also to remain realistically affordable for authors / funders[67]. The APCs, however, do not reflect the actual publication cost[68]. While fair in relation to the time spent on article production, the downside of the length-tiered system is that the final price is not known until after the author proof stage. This is too late for funding approval for many authors under Plan S (see Section 3), and so for articles submitted after 1 June 2021 a new scheme of fixed prices based on article type (Research, Note, Comment, etc.) is being applied, in line with many STEM publishers[69]. Feature Articles and articles authored by Contributing Editors of the journal are granted Open Access free of charge. ESEP is presently published OA completely free of charge[70]. For the Fully OA journals, APC waivers or discounts are available based on degree of contribution to the study by World Bank Low or Lower Middle Income country classification schedules; other needs are considered. Theme Sections are offered the chance to publish completely OA for a discounted price. APC prices have been increased roughly every 2 to 3 years[71]. Over the last eight years there has been increasing relaxation of control over author self-archiving on websites or repositories ("Green" OA). Preprints, the Author Accepted Manuscript (AAM) and the Version of record (VoR) may be archived under various embargoes or conditions[72]. Additionally, in the third quarter of the fifth year after publication, the subscriber-locked articles are unlocked and made accessible to all users quasi under the Free Access model.

However, despite the hype and demand for the OA publication, the percentage of paid OA publishing of the total IR publication output has remained static over the last six years (Fig. 2). This is because in general, funding for the payment of APCs is not available[73]. If, e.g., MEPS were to completely "OA flip"[74] tomorrow, there would presumably be ca. 60 to 80% fewer submissions of articles to the journal as the majority of authors have no funding to pay APC charges[75]. IR journals are also highly international journals. Progress and / or the desire to make funding available for APCs are at quite different stages, e.g.,between Europe and the USA. Both geographical

[66] I make this point because there seems to be a perception that publishers have sought to restrict or minimise OA publishing, especially in hybrid journals. Additionally, the language of Plan S (see Section 3) puts the onus for OA growth on the publisher, but the publishers have little to no control over this.
[67] The APC income was used to offset price increases necessary to cover the dropping income from the declining subscriptions, which would have been otherwise far greater increases. This is how IR kept its prices relatively stable until 2016. It is frustrating that proponents of the "double-dipping" theory (that publishers of Hybrids were reaping two lots of income from the same articles–from subscribers and from APCs) did not want to believe this is how APC income was being used.
[68] Data to show this is commercially sensitive, however from the initial processing of the article submission through upload online right to the mail-out of the printed journals, the average time spent on processing each manuscript by paid IR staff is around 40 hours. More detail on what proportion of the APC is spent on particular activities will become available later on the IR website as a condition of Plan S.
[69] See e.g. https://www.int-res.com/journals/meps/about-the-journal/#tab2box
[70] Completely subsidised by the income from all the other journal subscriptions and APCs.
[71] The last in 2019. The pricing structure change for articles submitted after June 1, 2021 will unfortunately represent an increase for some authors, but it is simpler and easier to calculate and conforms to Plan S transition requirements.
[72] See https://www.int-res.com/journals/open-access/
[73] "Plan S" is built on this premise, see Section 3.
[74] "OA flip" is when a subscription or hybrid journal switches immediately to Fully OA publication.
[75] At present APC discounts and waivers are not available for the hybrid journals, because the authors always have the option of publishing subscriber access at no cost. However, since Plan S transformative journals (see Section 3) should be promoting OA publication, this is presently under review.

areas are significant contributors of articles to MEPS; but to force or exclude either OA publication or subscription publication at the present time will include or exclude one market over the other. Either way, it can be said that enforced OA publication potentially restricts the market for overall article submissions to IR journals.

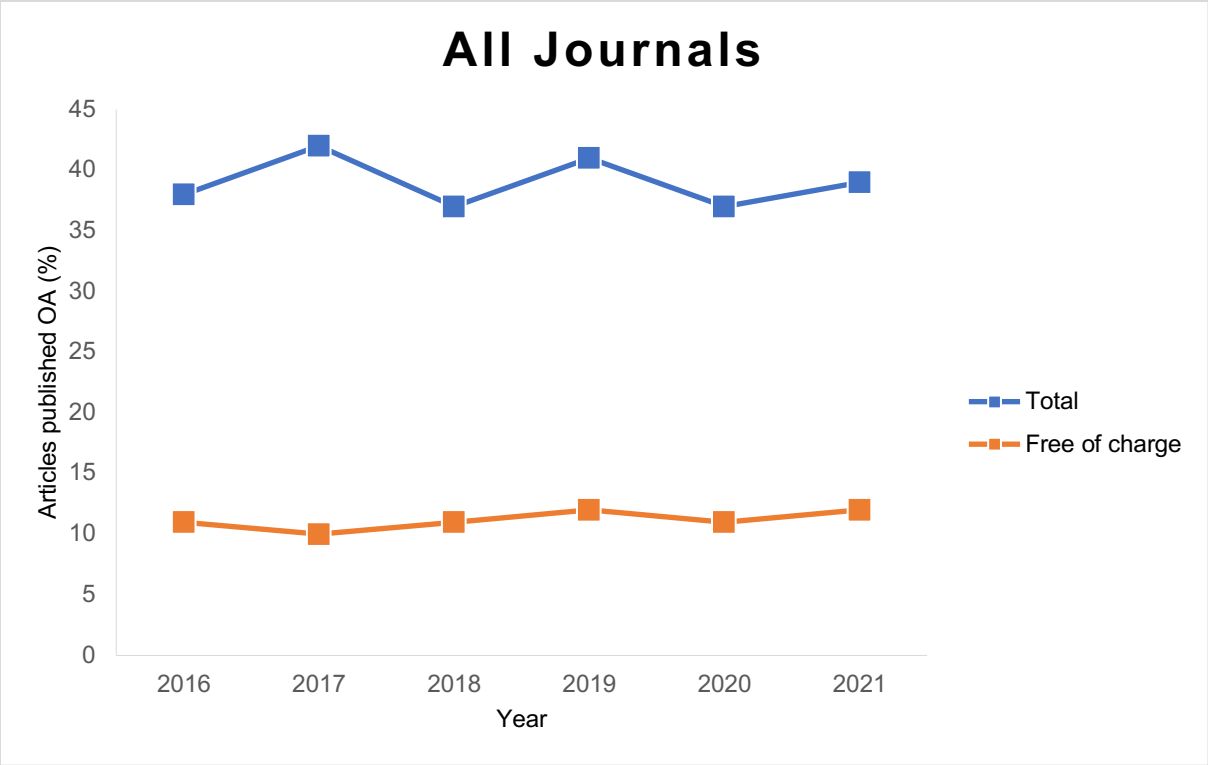

Fig. 2. Percentage of articles published with Open Access (OA) for the period 2016–2021 across the total Inter-Research publication output (representing 4 Hybrid and 4 Fully OA journals) (blue line). Also shown are the percentage published OA at no charge (orange line). The data for 2021 are from 1 January to 31 May. It can be seen that the proportion of authors selecting OA publication has remained static over the last 5 years.

Acknowledging the benefits of OA publication to science and society[76], and accepting that it was what authors and Editorial Board members wanted, in 2015 IR cautiously experimented with Fully OA publication by OA flipping AB and ESR[77]. Until this time, while popular with authors (from the high numbers of submissions, especially ESR which occupies a fairly unique subject niche), both journals had few subscribers and were otherwise candidates for cancellation. Conversion to full OA publication was seen as the way to save both. Given the political drive behind the OA movement, it was

[76] See e.g. https://www.enago.com/academy/benefits-of-open-access-publications/
[77] Though in the first years not marked as Free Access in any particular way, ESEP had always been freely available and not locked behind the subscription barrier since its establishment in 2000. AEI was founded as a Fully OA journal, initially Free Access in 2009 and then Open Access from 2013. It never went through a subscriber-based hybrid stage.

expected this change would be popular and that both journals should subsequently thrive[78].

However, this was not the case. AB makes an interesting study. On its founding in 2007, it was initially Free Access at no cost to attract authors and to get the journal established. It converted to a Hybrid Journal in 2010 but attracted very few subscribers. Submissions however dramatically rose to a peak in 2012, and then went into a small decline. In 2013 it was announced that the journal would convert to Fully OA in 2014 (thus articles submitted in 2013 would be subject to paying an APC when published in 2014). Article submissions dropped 52% during 2013–2014 (Fig. 3) and have not yet recovered to the 2012 levels. While other (unknown) factors cannot be ruled out, it does seem that a Fully OA journal is not a major attraction to AB authors.

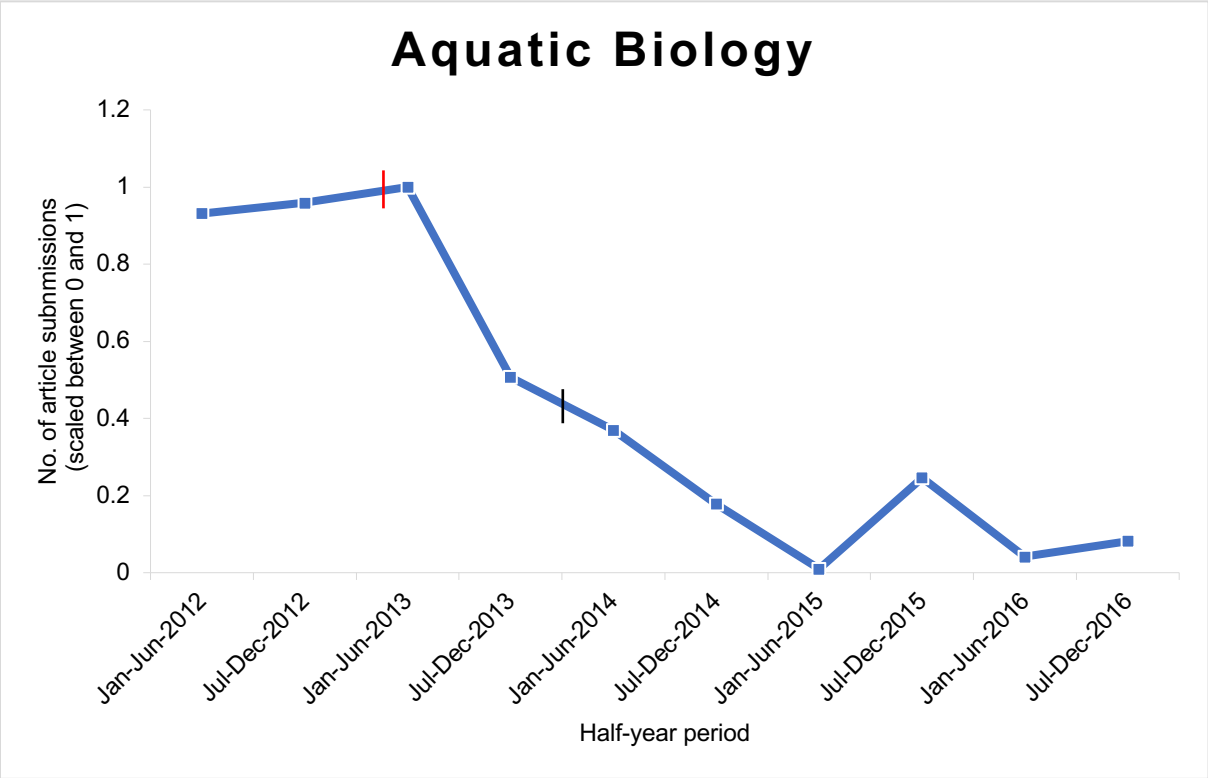

Fig. 3. January to June and June to December total article submissions to *Aquatic Biology* (scaled to between 0 and 1 to protect commercially sensitive data) showing the sudden drop in submissions after the journal "OA-flipped" (announced in April 2013 (red line) and coming into force from Vol. 21, 2014 (black line)).

Of the other two "paid" Fully OA journals, ESR submissions fluctuate, but the overall trend is stable. AEI shows consistent but very slow growth, but the overall number of submissions (and acceptances) are still too low for Fully OA to be self-supportive.

[78] See e.g. the optimistic Section 5 of Seaman & Stewart (2014).

The sudden drop in submissions to AB and the static nature of ESR and AEI created sufficient alarm to suspend the OA-flipping of the remaining Hybrid journals (AME, CR, DAO, MEPS), and a manageable and successful economic equilibrium among the four Hybrids and the four Fully OA journals was reached that met the needs of most authors and IR.
Then along came “Plan S”.

3. 2020–2021: Rogue Wave: Adjusting the Sails and Navigating the Safe Passage
cOAlition S is a consortium of “research funding and performing organisations”[79], international but predominantly European, whose goal is to promote the publication of all research using the OA model[80]. In 2018 they launched “Plan S”[81], which requires that publications stemming from public grants must be published in *compliant* Open Access journals or platforms. By compliant, they specify conditions that have the goal of forcing the Hybrid publication model out of the academic publishing market, which has reached a too-comfortable equilibrium and therefore not actively progressing the goal of full OA publication for all science research.

Beginning 2021, studies funded by Plan S signatories[82] must be published with Open Access in a fully OA Journal, or in a Subscription-only journal that allows the AAM or VoR to be deposited in an OA Repository without any embargo period. In principle APC funding will not be available for Hybrid Journals (such as MEPS, AME, DAO and CR), but APC funding *may* be available for Hybrid Journals within the “Transformative Period” 2021–2024 if the journals become ‘Plan S compliant’, register with Plan S as “Transformative Journals,” and aim to flip to Fully OA by the end of 2024, or when a certain threshold of OA publication is met. It is quite important to note here that even if a Hybrid Journal is compliant, the funder can still refuse to fund the authors’ APC (additionally, the author will be heavily penalised by the funder if they still submit to the journal and pay the fee themselves) simply because the journal is a hybrid. Certain annual levels of growth in OA publication within the journal must be demonstrated for the journals to remain compliant and registered. In addition, the funding must be approved specific to the journal *before the article is submitted for peer review*. There is a “compliancy tool” (accessible to authors but not to publishers) where a journal’s compliancy specific to the requirements of the funding institutions can be checked. Presently no caps are placed on APC charges, though there are threats to introduce them if it is felt prices become unrealistic.

Though study funding sources are often quite nebulous to identify (e.g. the credited organisation in the article Acknowledgements may receive its funds from a not-obviously-connected government funder much higher up), it was calculated Plan S signatories represented a reasonable proportion of IR’s present author market and thus IR should work towards Plan S compliancy.

[79] See https://www.coalition-s.org/organisations/ and https://www.coalition-s.org/supporters/
[80] Also official policy of the European Commission, see https://www.coalition-s.org/about/
[81] See https://www.coalition-s.org/why-plan-s/
[82] See https://www.coalition-s.org/organisations/ and https://www.coalition-s.org/supporters/

The 4 Hybrid Journals have been registered as Transformative Journals with Plan S. Work is underway on the technical and other requirements (e.g. IR have recently joined Crossmark). IR has updated its Publication License to permit the sharing of the AAM version of articles funded by Plan S signatories under a CC-BY License with copyright retained by the authors (as required by cOAlition S) when the article is not published with Open Access. For the first time, subscription pricing for 2021 was calculated using an algorithm that accounted for the supposed double-dipping effect of the Hybrid APC fees. As already mentioned, IR is changing the APC fee structure so that authors have the final price before article submission in order to meet their funding application processes. On the IR website over the next year will appear more transparent statistics (levels of article submission and acceptance, times of review and publication, volume of OA publishing) and review and production cost information. Presently we are investing considerable resources into upgrading our internal digital systems and technologically enhancing the backend of the website, so that we can in a few years shift from what still largely a print-oriented publication system to a digital one.

As if the economic uncertainty around Plan S and its compliancy to it was not enough, along came the Covid-19 pandemic. Two unexpected advantages of the pandemic were the rapid digitisation our remaining paper-based systems, mostly in the area of proof-reading, and production control[83] to facilitate Home Office work, and the mitigation of office crowding that had resulted from one of our buildings suffering severe flood damage a month earlier. Apart from the very small effects of introducing the OA “double dipping“ mitigation pricing model, IR held the 2021 subscription prices more-or-less at the 2020 values as Covid-19 support measures for customers.

4. Beyond 2021: On Deck at Night Alone: Challenges and Uncertainties

With Plan S, small Learned Society and commercial publishers such as IR with a relatively low annual article output and a long-established reputation focusing on the integrity of the science and the quality of the production (which come with costs likely difficult to sustain under the APC publishing model), are in a challenging position, whichever way they jump. Not complying with Plan S as Transformative Journals will block article submissions from a significant proportion of the market that requires Plan S compliancy. On the other hand, immediate flipping to Fully OA publication risks the loss of submissions from a significant proportion of non-Plan S signatories worldwide where APC funding is not similarly available or provided on a different basis. Then, even if Plan S compliant, there is no guarantee that an author’s application to submit an article to the journal will be accepted by the funder. For the author (and publisher) all choice is removed. The present IR APC fees alone do not cover present publication costs (and the threatened caps even less so), if the traditional rigor of scientific research presentation to be maintained. Fully OA publication will represent a significant drop in income per published article for small publishers. What effect will this have? It will likely drive small commercial and Learned Society publishers into cooperation with large OA “platforms”. Eventually the monopoly of the two or three large commercial subscription publishers will be replaced by a monopoly of two or three large OA platforms, either in

[83] Long-desired but always blocked but some seemingly unsurmountable hurdle to overcome.

highly subsidised governmental ownership, or in highly priced private ownership; that is, with the latter, little will have changed economically from the present situation. In the Plan S Transformative Period, the *Publisher* must demonstrate an annual increase in OA publishing. *But since whether or not an article can be submitted to a hybrid journal is solely the decision of the funder, this is not under the control of the Publisher.* Thus, government funders have a tool to potentially target and shut down commercial publishers. For the publishers, there is great uncertainty in the economic future. This makes not only planning, but actual moving in any new direction extremely challenging (change, even towards better efficiency and economy, always requires initial extra expenditure). Finally, the funding that Plan S signatories originally planned in 2018-2019 to set aside for APC charges will be affected by the economic fallout of the Covid-19 pandemic. Additionally, so will library subscription budgets.

Little or no article production (copy-editing, layout, homogeneity of style) has become the accepted norm even with authors and is now the area where publishers are expected to cut costs to make OA publication viable. This is ironic as previously many have lamented the high prices set for journal subscription packages by large publishers who were then clearly increasing the profit margin by reducing quality and cutting expenditure on the fundamentals of publication: rigorous review, attentive editing, clarity in typography and presentation. Open Access is seen as the means to address this problem. However, rather than working to restore the quality-control procedures in science publishing that are accused of been short-cut in the last decades, the OA Publishing Model accepts them, encouraging further cuts by seeking ever cheaper pricing[84]. Advances in post-publication distribution and services (e.g. alt-metrics) come at increased technological and financial cost. Essentially, the new OA models of academic publication are not article publication at all, but simply text distribution. The universal desire is to pay little for distribution and nothing for publication.

As I finalise this article, we are approaching half-way into 2021. As yet there is no positive impact of Plan S on the level of OA publication at IR (Fig. 2), hopefully because of the lag between article submission and publication (the articles being published now went into review when Plan S was not yet in operation). This is concerning though, because each IR Hybrid Journal needs to demonstrate an increase in OA publishing in this year (2021) to keep its registration as a Transformative Journal. What will happen if registration is lost, is uncharted territory.

Kinne made three predictions with regards to electronic publication: “With respect to science, three things are certain, however: (1) There will be no principal changes in the way knowledge is created, quality-controlled and utilized by researchers. (2) There will be significant changes in the ways scientists communicate with each other, in which

[84] For example, the *Journal of Open Source Software* (JOSS), publishes Open Access for USD $ 3 per article (Katz & Smith, 2021). However, it achieves this by relying entirely on volunteer effort; by borrowing heavily on Open Source software; by not having any business premises; and by dumbing down the review process (“reviews are checklist driven”). There is no publication production (no copy-editing, typesetting, etc.; the authors do all the work in mark-up language). The articles it publishes are simple descriptions of software, there is little analysis or critique of using it (critique and analysis require more in-depth reviewer effort). Roughly 30% of submitted articles are not accepted for review, and only roughly 5% are rejected after review. Speed and automation are the catchcry: “… fully open, fast, iterative, and including a bot …”. This is what Kinne feared. In my opinion, this is simply rapid article distribution, not publication.

research results are presented, and in which knowledge is analyzed, disseminated, and digested. (3) There will be risks that endanger science as we know it today[85]." Two decades on, in retrospect he was right about (2) and (3), and because he was right about (3), his trust in (1) was misguided[86]. In the 21st Century world where any study can be uploaded to an OA platform with minimal to no control, review or rejection, the way knowledge is quality-controlled and utilised by researchers and the general public is significantly changing. Quality is submitting to quantity, speed [and cheapness] are over-ruling exactness and performance[87]. It is worth noting that just as the academic community seeks to abandon the subscription model in the economics of publishing, the software industry appears to be embracing it in the economics of selling or supplying software.

The continued support by funders, authors and subscribers of the IR Hybrid Journals over the next three years as IR navigates through the Plan S Transformative Period will be crucial for it to find the safe passage and reach port with both Fully OA Publishing and the IR brand quality intact. IR has been a proud sponsor of the IAMSLIC Conference annually since 2009. It has been a highly rewarding mutual relationship on business, professional, and personal levels. If the goals of cOAlition S are reached at the end of 2024, subscribers as a customer base will cease to exist, and a new basis on which to continue the relationship with IAMSLIC will need to be found. In the meantime, thank you all for your past, present, and future support for IR.

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[85] Kinne (1999, p. 1).

[86] For example: there was recently (2021) an accepted article where the authors were asked by the IR in-house sub-editors to clarify some fuzziness in their sampling methodology description. The authors seemed, despite repeated requests, unable to supply the answer. As it was a simple question that every researcher should have been able to answer from their field notes, this rang an alarm during final checks a couple of days before publication. Deep investigation revealed the authors were reporting as their own sampling dataset the summary data of an earlier, almost identical sampling study (by different authors) on the same species in a different geographic area, down to the means and standard deviations to 3 decimal places, which in nature is highly unlikely to occur. This would have been extremely difficult to detect by the reviewers unless one intimately knew the earlier study or sensed (as we eventually did) that something was not right. It took the intensive reading of the production process to pull at the initial loose thread. I highly doubt a "review checklist" procedure (followed by a production process of author self-correction) would have uncovered it.

[87] See Footnote 43, and Section 5 of Seaman & Stewart (2014).

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Information-Seeking Behavior and Levels of Knowledge, Precaution, and Fear of Students in Iloilo, Philippines Amidst the COVID-19

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Abstract
In Iloilo, Philippines, college students are knowledgeable about the basic facts of the highly infectious COVID-19 - facts including cause, modes of transmission, and adverse effects. However, the majority were inclined to believe myths and misinformation regarding the pandemic. Mass media is the primary, most believable, and preferred source when seeking information about the pandemic. Interestingly, despite being rated as the least believable source, social media, particularly Facebook, was identified as the primary source of information among a considerable number of students. The Internet, as a preferred source of information, is significantly associated with a high level of knowledge about COVID-19. Identified as one of the least preferred sources, YouTube or vlogs were found to be significantly associated with a high level of knowledge. Information sourced from interpersonal channels such as medical personnel, local government units, and friends or classmates were found to make college students very cautious and practice preventive measures. The local presence of COVID-19 cases has caused college students to fear, likely exacerbated by the plethora of information about the pandemic. Information sourced on Facebook was found to be positively associated with a high level of fear.

Keywords: COVID-19; pandemic; information-seeking behavior; students; Philippines.

Changing the Direction of Collection Development to Support Online Learning: Negotiating Ebook Purchases with a Society Publisher

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Abstract
With many higher education institutions transitioning to online education in the wake of the COVID-19 pandemic, academic libraries have increasingly been forced to adjust collection development approaches. This furthers the existing trend towards electronic content and libraries will need to respond by seeking out non-traditional sources; one potential source is society publishers. Society publishers produce important literature in niche fields, but their collections are not always available for library use in electronic format. The American Fisheries Society (AFS) is one such publisher, with 106 monograph titles only available to libraries in print. The faculty, staff, and students in the Fisheries and Wildlife Department at Michigan State University (MSU) rely heavily on AFS monographs, leading the MSU Library to contact AFS to inquire about purchasing ebooks for the library. Electronic access to these texts would allow students, instructors, and researchers to access any title remotely, greatly enhancing their usefulness for remote learning. This paper will describe the negotiation process, MSU's internal accessibility review of the materials, and the logistics of making the ebook collection available to users.

Keywords: Fishery libraries, publishing, negotiation, professional associations, electronic books, collection development (libraries).

Background

Michigan State University (MSU) is a large research institution, of approximately 50,000 students, with a campus in East Lansing Michigan. The MSU Libraries support teaching, learning, and community education by building and sharing a collection of over 7 million individual titles. Like many institutions, MSU had to drastically change educational models in response to the COVID-19 pandemic. Nearly all courses at MSU have been taught virtually since March 2020 and operations at the MSU Libraries have also mirrored this shift (Joe, 2020; Tîrziman, 2020). The majority of librarians and staff have worked from home for the duration of the pandemic, with only those unable to perform their job duties remotely continuing to work in the library building.

By forcing the move to virtual library services, the pandemic is accentuating several trends that have been ongoing within the MSU Libraries for years. Chat and email

reference services have played an increasing role in delivering references services at the MSU Libraries, but with the closing of the in-person reference desk those modes have become the primary way for users to interact with reference librarians. Collection development has followed a similar trajectory, with the need to support remote research and online learning accelerating the ongoing trend towards electronic resources and textbooks.

Prior to the pandemic, the MSU Libraries participated in the trend of converting large portions of the collection to an electronic platform (Boateng, 2013). Nearly all current journals and periodicals, many large backfiles, comprehensive ebook packages, and streaming media services are available electronically. With the pivot to remote, however, the Libraries needed to substantially increase support for remote teaching and research capabilities at MSU. One area of potential growth for expanding the available electronic resources is by engaging with small society publishers.

The American Fisheries Society (AFS) is a 150 year old professional association with a mission to conserve North American Fisheries and aquatic resources. They publish significant journals in the field of fisheries, including the North American Journal of Fisheries Management, and monographs that are heavily used by the faculty, staff, and students in the MSU Fisheries and Wildlife (FW) Department. Housed in the College of Agriculture and Natural Resources, the FW Department is home to over 40 core faculty members, approximately 100 graduate students, 240 undergraduate students, and 30 research associates. The FW Department is also affiliated with several research centers, including the Water Science Network, the Center for PFAS Research, the Quantitative Fisheries Center, and the Kellogg Biological Station (KBS), a remote field station that includes both an experimental pond lab and aquatic field sites. Given the rise in use of electronic devices in the field (Gutowsky et al., 2013) and the remote nature of KBS, the need for virtual resources continues to increase as the print holdings at their small branch library cannot meet all the teaching and research needs of the students and faculty stationed there.

AFS has a very active publishing branch to advance fisheries research, producing both journals and monographs. The AFS Library of monographs currently holds 106 titles, many of which are influential and in high demand for the FW students at MSU. These titles are not available as part of any existing ebook package or through any of the established ebook purchasing channels. While AFS does offer full book PDFs for sale on their society website, they are licensed for individual use and are not available for libraries. Although MSU has nearly 70% of AFS titles already in print, the high demand for these titles combined with the need for digital support for teaching and research in response to the pandemic led the MSU Libraries to reach out to AFS to open negotiations into direct access to their ebook collection.

AFS Ebook Collection

AFS responded to initial inquiries with information on their institutional subscription model for ebook access. This model is designed for state fisheries agencies and offers access to the full library for a 5 year subscription period. Pricing for this model is tiered

based on staff size and access is mediated through AFS. The files are hosted by AFS and users must request a “coupon code” that would facilitate downloading each individual title from the AFS online bookstore.

This subscription model has several drawbacks that made it impractical for use in a university setting. The pricing model’s narrow focus on staff size leaves open how to account for student use. This is a particularly relevant issue for universities with large student populations, as a tiered approach can quickly become cost prohibitive. Similarly, the mediated access via “coupon code” would be impractical for MSU students and staff who are accustomed to accessing electronic resources via IP authentication. The added complexity and delay would be less than ideal for MSU’s users and the volume of requests coming from a large research institution could potentially overwhelm AFS staff. Finally, the subscription nature of the collection also posed a challenge, albeit a lesser one. The MSU Library prefers to purchase perpetual access to materials over subscriptions whenever possible in order to ensure the continuity of collections. While perpetual access is not possible in all situations and with all vendors, it is the preferred means of electronic access.

Taken together, these issues made clear that the institutional subscription model would not work for the MSU Libraries. As a result, the negotiations turned to developing a completely new perpetual access ebook purchase package with AFS. With this new option, AFS’s offer positively addressed all of the issues that made the subscription package untenable. The new offer granted the MSU Libraries permanent ownership of the entire AFS ebook collection with the MSU Library hosting the PDFs on a local library server. The local hosting component is key to the viability of this model, as it allows the MSU Library to make the PDFs available to users via their standard IP authentication system and eliminating the need for a download “coupon code” system. AFS also simplified their pricing, offering a flat rate price that eliminated the need to account for individual staff and student use. Finally, the AFS offer included a prepay option for future publications over a set number of years, a promising feature given the uncertainty around future budgets due to the COVID-19 pandemic.

Accessibility Review and Negotiations

Having addressed the drawbacks inherent in the subscription based model, AFS and the MSU Libraries were able to proceed with negotiating the perpetual access option. Negotiations revolved around two central issues: updating the terms of use to reflect the details of the purchase option and the accessibility of the files. For electronic files, accessibility means that programs and products are “designed and developed so that people with disabilities can use them” (W3C Web Accessibility Initiative, 2019). The MSU Libraries are committed to building a collection of materials accessible for all users and utilizes a Libraries Accessibility Working Group that assesses materials under consideration for purchase or subscription. AFS provided a sample PDF of one of their titles for assessment, which utilized both automated software and manual methods. The automated tools include the Web Accessibility Evaluation Tool (https://wave.webaim.org/) and color contrasting software to ensure appropriate contrast between texts and background images and colors. The manual methods include screen

reader compatibility review and checking images for alternative text, which would allow screen reading software to describe the image to a visually impaired user. The sample PDF provided by AFS revealed a largely accessible document, although issues with labeling elements such as headings, tables, and alternative text for images did exist. These issues were minor and were not cause for concern.

The other issue involving negotiation was updating the terms of use document, which was written for use with the subscription model and required an update to reflect the purchase agreement. The terms need rewritten sections on the pricing model, hosting and access options, adding future published materials, and excising all language referencing the subscription package. The updated terms of use have the potential to simplify future AFS negotiations with libraries, as future purchase agreements will be able to make use of these updated terms of use with only minimal negotiation and editing.

Next Steps and Lessons Learned

With the negotiations complete, the purchase order proceeded, drawing on multiple collection funds, including the environmental sciences, general sciences, and the Russell and Laura Whalls Endowment. The Whalls Endowment Fund provides money for the purchase of monographs published on the topics of limnology, freshwater ecology, and fisheries, of which there are many in the AFS collection. Following the order AFS shared access information with the MSU Libraries Electronic Resources Librarian, who proceeded to download the PDFs for storage on an MSU Libraries server. The titles did not come equipped with MARC records associated with them, so original cataloging is currently underway by library technical services staff. Once complete, individual titles will be searchable within the catalog while also collectively linking the entire collection as a series to facilitate online browsing.

The primary lesson learned from this interaction centers on the benefits and challenges of working with a small society publisher. This project would not have been possible if not for AFS' flexibility in developing an entirely new purchasing model from scratch, something many larger publishers would not consider. The challenges came from the limited resources available to smaller organizations to apply to developing MARC records or to ensure full compatibility of materials.

Conclusion

Although responses have varied by institution, the COVID-19 pandemic has altered higher educational systems in fundamental ways, including library service models and collection development strategies. While electronic materials were a core component of library collections prior to the pandemic, the need for supporting remote research and online teaching ensures that these resources will only grow in impact. In seeking ways to support the MSU FW Department in this way, the MSU Libraries identified the AFS as a society publisher producing valuable monographs that are not otherwise available for library use. Following the development of an acceptable purchase model, an accessibility review, and negotiations to update the terms of use, the MSU Libraries were able to purchase the entire AFS Ebook Collection. Working with a small publisher

on a new package had the benefit of the flexibility to negotiate a custom deal, but also the challenge of limited resources for applying accessibility principles or creating MARC records. Ultimately, this new collection will be a benefit for FW faculty, staff, and students as they continue to work and learn remotely.

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ASFA at 50: Adapting to Meet Aquatic Science Information Needs

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Abstract
First published as a printed journal in 1971, Aquatic Sciences and Fisheries Abstracts (ASFA) is set to celebrate its 50th year anniversary in 2021 with a number of user focused adaptations. This presentation will launch the ASFA White Paper, setting out the vision and objectives of the ASFA Partnership as it seeks to adapt to a changing aquatic science information landscape. Whilst COVID-19 presents challenges to delivering services, ASFA's role of supporting librarians and information managers is more needed than ever. This presentation presents an overview of how ASFA plans to make these adaptations in 2021 and beyond, namely: Launch of OPEN-ASFA, a virtual research environment to create records and search records free of charge; developing multi-lingual aspects of the ASFA vocabulary; updating its partnership and business models to benefit stakeholders.

Keywords: Partnerships, international cooperation, information systems, vocabularies, information management.

Introduction

Preparing for its fiftieth anniversary has provided ASFA with the opportunity to reflect on its work to promote and disseminate the world's aquatic sciences, fisheries and aquaculture research. To consolidate these reflections and ensure ASFA develops its products and services, a White Paper was produced to outline the direction ASFA will take in the coming years. These changes can broadly be grouped into three areas which are discussed in this paper:

1. ASFA Services – including OpenASFA and the ASFA Subject Vocabulary.
2. Collaborations – ASFA seeks to benefit from expertise outside of its partnership network by building new collaborations.
3. Structure and Governance – revising ASFA's partnership structure will increase the opportunities for relevant organizations and individuals to contribute to ASFA.

This paper introduces the changes ASFA is seeking to make in 2021 and beyond as ASFA transitions from a partnership known best for its abstracting and indexing

database, to a modern information service serving the needs of aquatic sciences, fisheries and aquaculture researchers worldwide.

ASFA Services

At the 2020 IAMSLIC conference, participants were asked what first came to mind when they heard the word ASFA – the majority answered that for them, ASFA meant the ASFA database published on the ProQuest platform. Whilst this has certainly been the major component of the ASFA information service, it is by no means the only service ASFA provides. By increasing access to the ASFA records created by Partners and the availability of the ASFA Subject Vocabulary, we hope to demonstrate the breadth of work undertaken by the ASFA Partnership. In addition to these two services, ASFA is also an active publisher, the ASFA magazine is published twice a year and features contributions from Partners and a number of infographics and promotional materials are published throughout the year. We hope that taken together, the improvement and promotion of these services will change the perception that ASFA's only service is the database on the ProQuest platform.

OpenASFA

Currently in development, OpenASFA is a data portal to create, store, search and export ASFA records. Previous to OpenASFA, records were created using CDS-ISIS software and exported to ProQuest as .ISO files. Therefore, CDS-ISIS did not allow ASFA Partners to make their records freely available, meaning their work was only accessible on the ProQuest platform. OpenASFA not only updates the CDS-ISIS software by providing an online service to create records, but will also provide a catalogue of freely searchable records created by ASFA Partners, which is often hard-to-access grey literature. To further assist partners, ASFA will look to harvest from OAI-PMH compliant repositories to reduce the need for duplication of efforts by those who already create records on their institutional repository. This service will extend to AquaDocs, with ASFA hoping to arrange harvesting from this site in order to increase the reach of records created on this repository.

The ASFA database on the ProQuest platform will continue, with records from OpenASFA being exported to ProQuest. In recent years, ProQuest has provided 80% of the records on ASFA and certainly ProQuest has provided the vast majority of records for primary and commercial literature. ASFA very much looks forward to continuing its relationship with ProQuest and believes that the full database on the ProQuest platform will remain the first port of call for in-depth literature searches by librarians, researchers and students. In addition to exporting to ProQuest, ASFA will explore other services it can contribute to, such as OpenAIRE, thereby maximizing the reach of ASFA records.

ASFA Subject Vocabulary

Since its beginnings in 1971, ASFA has used and maintained its own subject vocabulary to index its records. In 2019, the vocabulary was converted to SKOS-XL and migrated to VocBench where it is being aligned to AGROVOC, FAO's main subject vocabulary. These processes mean the ASFA vocabulary is now available to search and download online: https://agrovoc.uniroma2.it/skosmosAsfa/asfa/en/index

In addition, the alignment with AGROVOC has provided multilingual capabilities, with 39 languages now present in the ASFA vocabulary. For an international partnership, it is essential that ASFA provides information services in multiple languages and the thesaurus is a key way to ensure users can index and search for research in different languages.

Collaborations

In order to benefit from expertise outside of the ASFA Partnership, new collaborations are needed to ensure ASFA stays at the forefront of developments in aquatic science information management. Examples of three collaborations that are already in development are described below. As ASFA services grow we hope to build new collaborations to ensure the work of the ASFA Partnership benefits relevant projects and services.

AquaDocs

ASFA has agreed to provide a small financial contribution to AquaDocs repository. Each year, ASFA funds a number of projects by Partners to digitize research which has typically been deposited on Aquatic Commons. For future projects, we will stipulate that any digitization projects funded by ASFA will be deposited on AquaDocs, thereby ensuring its place as a central repository of aquatic science research. In addition, we hope to initiate joint promotional and training activities with AquaDocs and that this will form the start of closer collaboration between ASFA and IAMSLIC.

CECAF-PESCAO

The CECAF-PESCAO project aims to promote the sustainable utilization of the living marine resources across the Eastern Central Atlantic between Cape Spartel and the Congo River through informed development of fisheries management actions. ASFA participates in the CECAF-PESCAO project, “Improved Regional Fisheries Governance in Western Africa,” specifically on Output 1.2:

> 1.2 Collaboration on data and information sharing procedures and research enhanced between relevant countries, sub-regional and regional organizations to harmonize data and knowledge.

ASFA seeks to contribute to this output by producing an inventory of marine fisheries research in the CECAF region. The ASFA CECAF-PESCAO project is focused on the nine CECAF member countries, in most of which ASFA has existing partnership arrangements. These are: Benin, Cote d’Ivoire, Ghana, Guinea, Mauritania, Morocco, Nigeria, Senegal, and Spain. To date, ASFA has produced an inventory of 2,162 marine fisheries references in the region. This will be made available online with further activities organised to promote and increase access to this important and often overlooked research.

AGROVOC

As mentioned above, ASFA is collaborating with AGROVOC to manage and develop its subject vocabulary. Having already shown a number of benefits, such as multilingual capability and online availability, ASFA hopes to further the collaboration in 2021 by enhancing the coverage of aquatic sciences on both thesauri, in particular looking to cover aquatic genetic resources and emerging subjects more fully.

Governance and Structure of the ASFA Partnership

ASFA has a strong network of over 100 aquatic science, fisheries and aquaculture institutions worldwide. The structure of the ASFA Partnership has remained unchanged for almost fifty years, with three different types of Partners (Co-Sponsoring, International, National) who each sign an Agreement to monitor and record relevant literature for ASFA. In the case of National Partners, this has meant covering all literature produced in their country for ASFA, which is an impossible task in today's digital age where hundreds of documents are published daily. In order to make joining the ASFA Partnership attractive to a wider range of institutions, ASFA will update the structure of its partnership. Instead of the rigid requirements ASFA Partners currently have to agree to, we will introduce a more flexible structure to allow institutions to contribute where their skills and availability allow, with the option to contribute to different facets of the ASFA network. ASFA is currently negotiating with Partners the details of this new structure, however the below options have received positive feedback:

- **Co-sponsoring Partners** – Each co-sponsoring partner would agree a workplan and budget with ASFA to deliver work on a particular area of ASFA (Services, promotion, communication products) with appropriate budget and skills assigned.
- **International and National Partners** – International and National Partners would be responsible for contributing the research of their institution to OpenASFA, and other relevant research where possible. International and National Partners would also contribute to ASFA's Working Groups which are responsible for different components of ASFA.
- **Collaborating Centres** – As with the previous structure, Collaborating Centres support the work of National Partners without signing a formal agreement.
- **Associates** – ASFA Associates explore contributing to OpenASFA or one of the Working Groups for an initial period of two years, with the idea that they become Partners. In return, they receive complimentary access to the ASFA database on ProQuest.

Conclusion

ASFA can be proud of its fifty year history to promote and disseminate the world's aquatic science, fisheries and aquaculture research. However, with rapid changes in information storage, delivery and search, ASFA must update its products and services in order to continue to meet its goal and provide the worldwide scientific community with access to research. Work is already underway to improve the ASFA Subject Vocabulary and OpenASFA will provide a new, freely searchable way to access ASFA Partner records. In addition, the collaborations ASFA is currently building, and seeks to build in

the future, will ensure the partnership benefits from a wide range of outside expertise. The ASFA Partners, Collaborating Centres and Associates form a network of over 100 institutions worldwide and have demonstrated a high level of commitment to ASFA, as well as skills in key areas that will benefit ASFA. We hope that a revised partnership structure will provide more ways for Partners to share their skills, and also help to grow the ASFA partnership so that more institutions are able to contribute their time and effort to ASFA. We welcome feedback on the direction ASFA is taking; if you have any questions or would like further information, please contact the authors of this paper.

Land Ho! Using Zoom and Google Docs to Create an information Literacy Island In Synchronous Online Instruction

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Abstract

Academic librarian instruction used to be such a simole affair. As a subject specialist, the author would usually be found hopping from class to class throughout the semester, sometimes literally running around the Florida State University (FSU) campus. With the upheaval of COVID019 and the closing of campus in March 2020, instruction was definitely thrown for a loop for the rest of the spring semester. In preparation for the fall 2020 semester, the author decided to explore ho to utilize virtual services more effectively. Enter one willing instructor, two willing librarians, and one large instruction session of a lifetime. This presentation shares the background of embedding in a large mixed undergraduate and graduate Environments Science class with a focus on an information literacy session devoted to citations, EndNote Online, and general information literacy skills. Attendees will learn some tips and tricks for using Zoom and Google Docs to create groups, teach skills based on these focus areas, and get an overall sense of how adaptable synchronous library instruction can be in these times of change. The author will also share what went right, what went wrong, and how they adapted the lessons for their future instruction sessions.

Keywords: Information literacy, citations, Zoom, academic, instructor collaboration.

How a Small Special Library Remained Relevant During Unprecedented Times

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Abstract
The SPREP Library is a special environmental library for the Pacific. It is now over 25 years since establishing itself in Apia, Samoa. Our main target audiences are our staff members of about 130 that scattered throughout in Samoa, USA, Australia, New Zealand, Fiji, Marshall Islands, Papua New Guinea, Solomon Islands and Vanuatu, all of our 21 member countries as well as the general public. Our main office was partially closed for three months (March-May 2020) since the beginning of the pandemic and so we had no choice but to close our services to the public but open only to our main clients for mornings only. Our library is a hybrid one with most of our collection available in hard copies. During these trying times we had to rethink the focus of our collection to suit our clients' needs. Some of our staff members have returned to their home countries to work from. Hence, our collection would have to be accessible everywhere and anywhere at any given time. This simply means that we would have to digitise our most common knowledge products at this stage and boost the connectivity of our virtual library. Currently we are working on a project to upgrade our virtual library so that our information and knowledge can be shared to our other repositories around the region and globally for easy access by anyone with an internet connection. Despite that, we ought to also keep in mind our member countries with lesser infrastructure capabilities. Hence, our library collection will always remain hybrid because not all our clients are blessed with fast and up to date internet infrastructures. Hard copies are still preferred and only options for some of our clients in this part of the world.

Keywords: Virtual library services; hybrid library; special library; Pacific libraries; environmental libraries, Secretariat for the Pacific Regional Environment Programme (SPREP).