



## Article

# How Did Journals in Water Sciences Survive the COVID-19 Pandemic? A Scientometric Study

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**Abstract:** The COVID-19 pandemic affected nearly all strata of life, including scientific activities. Implementation of nationwide lockdowns, closures of universities, and other measures significantly limiting social mobility precluded field and laboratory research from being pursued at a pre-pandemic pace. On the other hand, working from home could translate into higher productivity of researchers in terms of publication output, ultimately affecting the journals' metrics. This effect has been well evidenced in the biomedical field, but whether it also occurred in aquatic sciences has not been explored. Therefore, this study aimed to analyze and compare various metrics of journals classified in the Scopus evaluations in 2019 (encompassing 2016–2019, the pre-pandemic period) and 2022 (covering 2019–2022, the pandemic period) within three subjects: aquatic science, oceanography, and water science and technology. In general, the number of journals classified into the considered categories increased in 2022 by 12%, and the majority (78%) experienced an increase in the CiteScore metric. The total published articles and received citations also significantly increased in 2022 by 17.5% and 63.5%, respectively, and were even higher in the case of open access journals—69% and 145%, respectively. The overall share of cited articles in the considered period was higher by 5% than in the 2019 Scopus evaluation and by 7% in the case of open access periodicals. However, source normalized impact per paper (SNIP) and the SCImago journal rank (SJR) values decreased by 7% and 8%, respectively. The highest share of citations was generated by *Water Research*, *Water*, and the *Journal of Hydrology*, and the highest number of articles was published by *Water*, *Frontiers in Marine Science*, and *Desalination and Water Treatment*. Only five of the COVID-19-related papers published in journals with the highest CiteScore and total number of citations received more than 200 citations, but their contribution to citations received by the journals was not high. In summary, the present study's findings indicate the high potential of the field dedicated to water sciences to adapt in a period challenged by an infectious disease pandemic. However, they do not exclude the adverse effect that this period could have on the activities of individual scientists and research teams.

**Keywords:** limnology; scientometrics; bibliometrics; CiteScore; Scopus; COVID-19; SARS-CoV-2



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## 1. Introduction

The COVID-19 pandemic has caused a substantial health burden and economic loss while affecting nearly all strata of life, including education and work. It also affected different research activities [1–5]. Closures of universities, switching to online lecturing, sanitary restrictions, and limited social mobility attenuated the progress of various scientific projects, including laboratory and in-field activities unrelated to COVID-19 [6,7]. A survey of principal investigators indicates that representatives of basic science, female researchers, and scientists with young children experienced a substantial decline in time devoted to research [8].

On the other hand, the pandemic was met with unprecedented, interdisciplinary research effort, resulting in an enormous output of publications focusing on various aspects of COVID-19, including the clinical characteristics of the disease, SARS-COV-2 biology and immunology, vaccine and antiviral development, drug repurposing, but also the

economic, sociological, psychological, and behavioral impacts of the pandemic, with rapid sharing of research findings, often with the help of preprint servers [9–11]. Within only the first three months of the outbreak, over 2000 peer-reviewed articles in 578 journals and 1425 preprints on COVID-19 were already published, with scientific contributions from over 70 countries [9]. By the end of 2022, nearly 365 thousand abstracts were searchable in the PubMed database under the “COVID-19” keyword. Such high productivity has even led to concerns over the quality of some papers and their editorial and peer-review processes [12]. Nevertheless, papers dedicated to various aspects of the pandemic were frequently highly cited. More than 8% of them, published during 2020 and 2021, were selected by Clarivate as Essential Science Indicators: Highly Cited Papers, exceeding the global benchmark value of 1% [13]. For example, according to the Scopus database, the first paper reporting the clinical features of COVID-19 received 28,147 citations by the end of 2022 (which is equal to an average of 781.1 citations per month) [14], while an article reporting the results of the pivotal third phase clinical trial of an mRNA vaccine candidate against COVID-19, published at the end of 2021, was cited 6846 times by the end of 2022 [15]. Therefore, as expected, these achievements translated into a boost in peer-review journal metrics, particularly those related to medicine, even though the pandemic had adversely affected research progress in medical disciplines other than infectious diseases, with various clinical trials forced to be delayed or deferred [16]. The metric analysis of highly impactful medical journals (*Annals of Internal Medicine*, *The British Medical Journal*, *Journal of the American Medical Association*, *The Lancet*, *Nature Medicine*, and *The New England Journal of Medicine*) demonstrated that their impact factor values were positively skewed by COVID-19 papers [17]. An increase in the journals’ metrics after the first year of the pandemic was also seen in the medical fields not directly related to infectious diseases, e.g., in dermatology [18].

Whether the COVID-19 pandemic affected the metrics of non-medical journals, with a scope far removed from infectious diseases and associated subjects, has so far not been studied. Research in the broad field of water sciences frequently employs laboratory experiments and analyses as well as in-field measurements and sampling. The former could be adversely impacted during the pandemic due to university closures and allocation of resources to COVID-19 studies, while the latter could suffer due to social distancing and travel bans. On the other hand, remote working could, in the case of some individuals, provide extra motivation to prepare original research manuscripts elaborating the data sourced pre-pandemic or write review papers. Moreover, some authors could also explore the potential links between the SARS-CoV-2 and the COVID-19 pandemic in their field, as happened across various non-medical disciplines, e.g., psychology or sociology [19,20]. Individuals working in water sciences could, for example, focus on the surveillance of SARS-CoV-2 in water and wastewater [21,22], the potential coronaviral infections of aquatic biota [23], or the effect of the COVID-19 pandemic on water quality and pollution in freshwater and marine environments [24,25]. In any case, the COVID-19 pandemic’s positive or negative effect should be reflected in the metrics of journals devoted to water sciences.

Therefore, this study aimed to analyze metrics of journals classified into three Scopus categories, i.e., aquatic sciences, oceanography, and water science and technology, during the pre-pandemic and pandemic period to understand the trends in the number of published documents, received citations, and overall scientific impact during the COVID-19 pandemic.

## 2. Materials and Methods

To conduct the present study, the journals’ metrics were retrieved from the Scopus database [26], which was chosen because it is significantly larger in the number of covered journals than Journal Citation Reports [27] and uses a four-year window which is long enough to capture the citation peak for the majority of disciplines, including those that are not characterized by a rapid gain in citations [28], while its CiteScore metric is less

prone than Impact Factor to variation due to the amount of editorial material published in a journal [29].

The following years of evaluation were selected: (i) 2019, which encompassed 2016–2019 (pre-pandemic period), and (ii) 2022, which encompassed 2019–2022 (pandemic period). Journals classified into three categories were considered: (i) aquatic sciences (subject: agricultural and biological sciences category), oceanography (subject: earth and planetary sciences), and water science and technology (subject: environmental science). The following metrics were retrieved:

- (i) CiteScore, which counts the citations received in the four-year window (so CiteScore 2022 encompasses 2019–2022, while CiteScore 2019 covers 2016–2019) and divides this by the number of publications published in the same period;
- (ii) The number of received citations in the four-year window;
- (iii) The number of published articles in the four-year window;
- (iv) The percentage of published articles that received citations in the four-year window
- (v) SCImago Journal Rank (SJR), which measures the weighted citations received by the journal with weighting depending on the subject field and prestige of the citing journal;
- (vi) Source normalized impact per paper (SNIP), which measures actual citations received relative to citations expected for the journal's subject field.

Moreover, the 20 journals that received the highest CiteScore in 2022 and the highest number of total citations were analyzed for the publication of highly referenced COVID-19-related articles (defined as those that received more than 200 citations by the end of 2020). In addition, all journals that experienced at least a 500% increase in the CiteScore in 2022 in relation to their 2019 value were analyzed for COVID-19-associated papers and citations thereof.

For the comparison of CiteScore, SJR and SNIP values, total citations and published articles, and percentage of cited articles between 2019 and 2022 Scopus evaluations, the non-parametric signed-rank Wilcoxon was employed due to its non-Gaussian distribution of data (Shapiro-Wil test of normality,  $p < 0.05$ ). The  $p$ -value was considered statistically significant at  $<0.05$ .

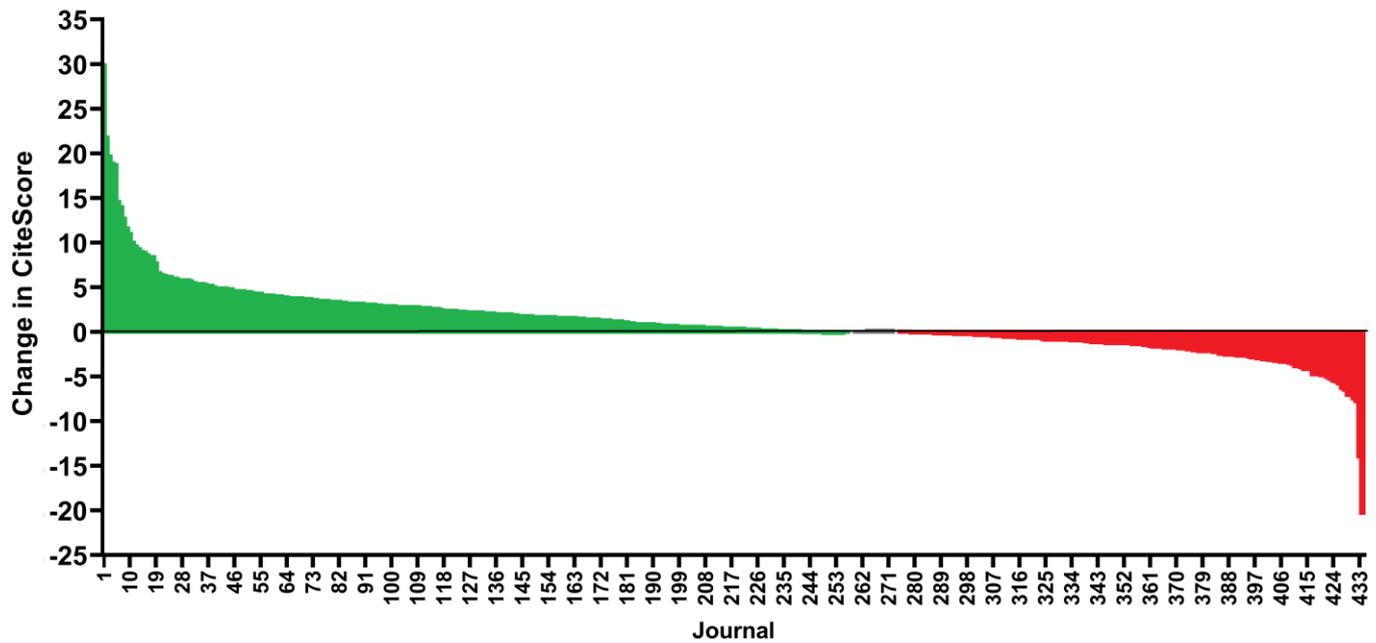
### 3. Results

In the 2022 Scopus evaluation (covering 2019–2022), CiteScore values were available for 514 peer-reviewed journals classified in the subjects of aquatic sciences (within the agricultural and biological sciences), oceanography (within earth and planetary sciences), and water science and technology (within the environmental science category). This represented a 12% increase compared to the 2019 Scopus evaluation (covering 2016–2019 when CiteScore was calculated for 458 periodicals classified within these three areas. In the case of 434 journals for which the CiteScore metric was available in both evaluation editions, the majority ( $n = 339$ ; 78.1%) noted an increase in the CiteScore metric, 24 (5.5%) revealed no change, while a decrease was observed for 71 (16.4%) (Figure 1). The metrics of these 434 journals were used for further comparison in the present analysis.

There was also a substantial increase in the total number of published articles, and the number of citations in the 2022 Scopus evaluation, and the percentage of cited documents was also higher in 2022 than in 2019 (Figure 2). Moreover, the number of articles published in open access journals increased by 69%, while citations of them rose by 145% ( $p < 0.001$  in both cases, Wilcoxon signed-rank test). The percentage of cited documents in these journals also increased, from 62% in the 2019 evaluation to 69% in 2022 ( $p < 0.001$ , Wilcoxon signed-rank test).

The list of 20 journals with the highest number of citations noted in the 2022 evaluation is given in Table 1. These periodicals contributed to 48.1% of all received citations and 34.6% of all published articles in the considered categories, with the highest share of citations of papers published in *Water Research*, *Water*, and *Journal of Hydrology* and the highest gains in citations compared to the 2019 Scopus evaluation noted for *Journal of Marine Science and Engineering*, *Frontiers in Marine Science*, and *Water*. Moreover, the highest share of articles

was published in *Water* and *Frontiers in Marine Science*, contributing to nearly 10% of all papers in the three considered Scopus categories (Table 1).



**Figure 1.** Change in the CiteScore value for the analyzed set of journals ( $n = 434$ ) between the 2022 and 2019 Scopus evaluations.

**Table 1.** The list of 20 journals classified by Scopus into aquatic science, oceanography, or water science and technology that received the highest number of citations in the 2022 evaluation (encompassing 2019–2022 period) and the respective change (%) in relation to the Scopus 2019 metrics (encompassing 2016–2019 period).

Journal Title	Citations	Share in All Citations [%]	Articles	Share in All Articles [%]
<i>Water Research</i>	88,716 (+76%)	7.6	4491 (+29%)	2.1
<i>Water</i>	74,947 (+311%)	6.5	13,633 (+128%)	6.5
<i>Journal of Hydrology</i>	52,147 (+119%)	4.5	4996 (+52%)	2.4
<i>Marine Pollution Bulletin</i>	40,994 (+89%)	3.5	4072 (+26%)	1.9
<i>Aquaculture</i>	37,137 (+200%)	3.2	4674 (+78%)	2.2
<i>Frontiers in Marine Science</i>	34,366 (+321%)	3.0	6608 (+252%)	3.2
<i>Desalination</i>	25,725 (+49%)	2.2	1692 (+21%)	0.8
<i>Fish and Shellfish Immunology</i>	25,537 (+63%)	2.2	2847 (−1%)	1.4
<i>Agricultural Water Management</i>	23,940 (+147%)	2.1	2229 (+46%)	1.1
<i>Water Resources Research</i>	22,106 (+46%)	1.9	2514 (+12%)	1.2
<i>Marine and Petroleum Geology</i>	19,757 (+102)	1.7	2115 (+39%)	1.0
<i>Journal of Marine Science and Engineering</i>	18,224 (+1227)	1.6	4901 (+553%)	2.3
<i>Applied Clay Science</i>	14,535 (+12)	1.3	1348 (−21%)	0.6
<i>Environmental Earth Sciences</i>	13,212 (−11)	1.1	2559 (−32%)	1.2
<i>Marine Policy</i>	11,889 (+63)	1.0	1703 (+22%)	0.8

Table 1. Cont.

Journal Title	Citations	Share in All Citations [%]	Articles	Share in All Articles [%]
<i>Hydrology and Earth System Sciences</i>	11,791 (+17%)	1.0	1235 (−5%)	0.6
<i>Desalination and Water Treatment</i>	11,662 (−40%)	1.0	5096 (−30%)	2.4
<i>Natural Hazards</i>	10,931 (+24)	0.9	1985 (+13%)	0.9
<i>Palaeogeography, Palaeoclimatology, Palaeoecology</i>	10,802 (+20%)	0.9	1768 (−1%)	0.8
<i>Journal of Experimental Biology</i>	10,218 (+2%)	0.9	1850 (−6%)	0.9

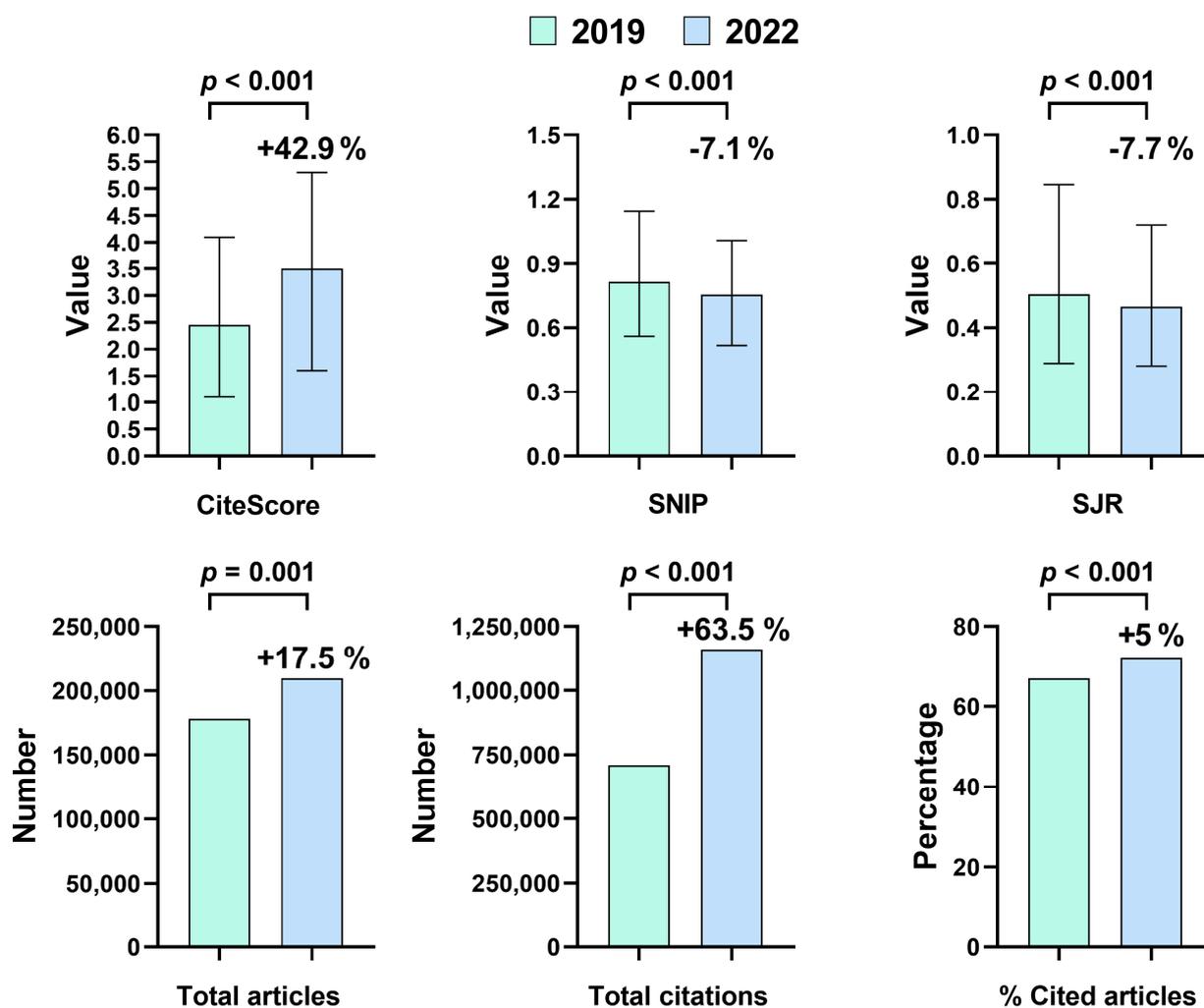


Figure 2. Change in different metrics for the analyzed set of journals ( $n = 434$ ) between 2022 (blue bars) and 2019 (green bars) Scopus evaluation. Data for CiteScore, SNIP, and SJR are presented as median with interquartile range.  $p$ -value refers to the Wilcoxon signed-rank test.

In the case of nineteen periodicals, an increase in CiteScore exceeded 500%: *Journal of Island and Coastal Archaeology* (4500%), *Advances in Statistical Climatology, Meteorology and Oceanography* (3200%), *Journal of Sustainable Development of Energy, Water and Environment Systems* (2350%), *Journal of Environmental Quality* (2100%), *Physical Oceanography* (1300%), *Squalen Bulletin of Marine and Fisheries Postharvest and Biotechnology* (1300%), *International Journal of Aquatic Biology* (1100%), *Journal of Hydrology X* (963%), *Fundamentalnaya i Prikladnaya Gidrofizika* (900%), *Journal of Fisheries and Environment* (900%), *Water Research X* (853%),

*Marine Biological Journal* (800%), *TransNav* (750%), *Limnological Review* (650%), *Australian Journal of Water Resources* (629%), *Marine Fisheries Review* (500%), *International Journal of Aquatic Research and Education* (500%), and *Terra* (500%). Among these, only *Water Research X*, launched in 2018 as the gold open access sister journal of *Water Research*, was among the top 20 journals, according to 2022 CiteScore. All of these twenty journals other than *Fish and Fisheries* noted an increase in CiteScore in 2022 compared to 2019, ranging from 4 to 853%, and all of them except *Reviews in Fisheries Science and Aquaculture*, published more documents (by 4–3348%). However, only 35% (7 journals) and 65% (13 journals) noted an increase in SNIP and SJR values, respectively (Table 2).

**Table 2.** Main Scopus 2022 metrics for 20 journals classified by Scopus into aquatic science, oceanography, or water science and technology with the highest CiteScore and their respective change (%) in relation to the Scopus 2019 metrics.

Journal Title	CiteScore	Articles	SNIP	SJR
<i>Annual Review of Marine Science</i>	31.2 (+4%)	85 (+9%)	4.845 (−19%)	5.097 (−29%)
<i>Critical Reviews in Environmental Science and Technology</i>	23.4 (+76%)	311 (+203%)	2.984 (+15%)	2.899 (+400%)
<i>Reviews in Fisheries Science and Aquaculture</i>	20.5 (+220%)	100 (−64%)	3.579 (+75%)	2.064 (+74%)
<i>Reviews in Aquaculture</i>	20.1 (+119%)	401 (+232%)	3.119 (+5%)	2.117 (+5%)
<i>Water Research</i>	19.8 (+37%)	4491 (+407%)	2.421 (−3%)	3.338 (+14%)
<i>Environmental Science and Technology Letters</i>	16.2 (+47%)	536 (+76%)	1.888 (±0%)	2.909 (+17%)
<i>Desalination</i>	15.2 (+23%)	1692 (+97%)	1.851 (−6%)	1.471 (−19%)
<i>Exposure and Health</i>	15.0 (+35%)	204 (+49%)	1.846 (+28)	1.467 (+17)
<i>Water Research X</i>	14.3 (+853%)	116 (+167%)	1.969 (+308%)	2.056 (+128%)
<i>Information Processing in Agriculture</i>	13.7 (+121%)	193 (+3348%)	2.559 (+7%)	0.963 (+27%)
<i>International Soil and Water Conservation Research</i>	11.9 (+95%)	193 (+176%)	2.567 (−7)	1.696 (+32)
<i>Current Pollution Reports</i>	11.6 (+76%)	132 (+152%)	1.678 (−16%)	1.619 (+38%)
<i>Fish and Fisheries</i>	11.4 (−8%)	326 (+152%)	2.226 (−21%)	1.868 (−38%)
<i>Reviews in Fish Biology and Fisheries</i>	10.9 (+76%)	175 (+5%)	2.069 (−5%)	1.56 (−10%)
<i>Applied Clay Science</i>	10.8 (+42%)	1348 (+80%)	1.271 (−22%)	0.985 (−8%)
<i>Agricultural Water Management</i>	10.7 (+70%)	2229 (+12%)	2.018 (−5%)	1.524 (+11%)
<i>Groundwater for Sustainable Development</i>	10.4 (+181%)	676 (+147%)	1.646 (−5%)	1.08 (+25%)
<i>Journal of Hydrology</i>	10.4 (+44%)	4996 (+640%)	1.731 (−5%)	1.67 (−1%)
<i>Marine Pollution Bulletin</i>	10.1 (+51%)	4072 (+119%)	1.305 (−2%)	1.49 (+17%)
<i>Harmful Algae</i>	10.0 (+14%)	495 (+19%)	1.701 (−8%)	1.44 (−27%)

nc—not calculated.

Analysis of COVID-19 papers published in the top 20 journals by CiteScore values and the number of received citations revealed that only five articles published in three journals received more than 200 citations—all of these papers were published in 2020, and most of them focused on surveillance of SARS-CoV-2 in water and wastewater. However, only one contributed more (8%) to the journal's overall citations, while the other's impact was minimal (Table 3). Moreover, an analysis of all journals that experienced at least a 500% increase in their 2022 CiteScore compared to their 2019 values revealed that no COVID-19-related papers were among the 50 journal's highly cited articles, except for four

papers published in *Water Research X*, which contributed 8.4% to the total citations the journal received in the 2019–2022 period (Table 4).

**Table 3.** Main Scopus 2022 metrics for 20 journals classified by Scopus into aquatic science, oceanography, or water science and technology.

Article Title	Year of Publication	Journal	Number of Citations	Share in Journal's Citations [%]
SARS-CoV-2 RNA in wastewater anticipated COVID-19 occurrence in a low prevalence area [30]	2020	<i>Water Research</i>	603	0.7
Presence of SARS-Coronavirus-2 RNA in sewage and correlation with reported covid-19 prevalence in the early stage of the epidemic in the Netherlands [31]	2020	<i>Environmental Science and Technology Letters</i>	721	8.3
Coronavirus in water environments: Occurrence, persistence and concentration methods—A scoping review [32]	2020	<i>Water Research</i>	284	0.3
Surgical face masks as a potential source for microplastic pollution in the COVID-19 scenario [33]	2020	<i>Marine Pollution Bulletin</i>	280	0.7
COVID-19 surveillance in Southeastern Virginia using wastewater-based epidemiology [34]	2020	<i>Water Research</i>	221	0.3

**Table 4.** The COVID-19-related papers published in *Water Research X* and their impact on the journal's total citations received in 2019–2022.

Article Title	Year of Publication	Number of Citations	Share in Journal's Citations [%]
COVID-19 and the call for 'Safe Hands': Challenges facing the under-resourced municipalities that lack potable water access—A case study of Chitungwiza municipality, Zimbabwe [35]	2020	17	0.8
Early-pandemic wastewater surveillance of SARS-CoV-2 in Southern Nevada: Methodology, occurrence, and incidence/prevalence considerations [36]	2021	99	6.0
Co-quantification of crAssphage increases confidence in wastewater-based epidemiology for SARS-CoV-2 in low prevalence areas [37]	2021	40	0.2
Tools for interpretation of wastewater SARS-CoV-2 temporal and spatial trends demonstrated with data collected in the San Francisco Bay Area [38]	2021	23	1.4

#### 4. Discussion

The present study is the first comprehensive evaluation of the impact of the COVID-19 pandemic on research devoted to water and aquatic environments. By employing and analyzing the data collected by the Scopus database, which covers more periodicals than Journal Citation Reports, this research shows that peer-reviewed journals classified into three categories related to water sciences revealed general progress compared to the pre-pandemic period as evidenced by various metrics. These findings demonstrate the high potential of water sciences, as a broad field of study, to adapt during a period challenged by an infectious disease pandemic.

As shown, during the 2020 Scopus evaluation, there was a significant increase in the total number of published papers in the considered set of journals. These observations indicate that researchers working in the field of water sciences were more active in preparing and submitting manuscripts in 2019–2022, at least compared to the 2016–2019 period, and contradicts findings that the COVID-19 pandemic has harmed researcher productivity and decreased time spent on scientific work [8,39]. However, these studies focused on the first year of the pandemic, while the present research encompassed three years of its duration.(2020–2022) Therefore, the findings of the present study suggest that the adverse effect of the COVID-19 outbreak could be temporary and overcome by the community associated with aquatic sciences, oceanography, water science, and technology. Although a decline in the initiation of novel projects and delays in ongoing ones was likely, it is plausible that researchers transited their efforts to the elaboration of existing data. One should note that the growing trend in the number of papers during the pandemic period was also observed in other fields, e.g., sustainability [40], which rather reflects the long-term trend in science [41]. Therefore, the present study's results provide evidence that water science journals complied with the trend in the challenging times of the acute COVID-19 pandemic phase.

Apart from the total number of published articles, the present study indicates a significant increase in the number of citations o papers published in the considered journals. Moreover, the percentage of works that received citations was also higher for the 2019–2022 window compared to the 2016–2019 period. Obviously, these metrics were not as high as in other disciplines, such as medicine, for which the 20 most cited journals in the 2022 Scopus evaluation received twice as many citations as all 434 journals included in the present analysis [26]. This is a well-known phenomenon related to the nature of a particular scientific field and the pace at which the papers are published and referred to [42]. Nevertheless, an evidenced increase in citations of papers published in journals classified in Scopus in the categories of aquatic sciences, oceanography, and water science and technology is a marker of ongoing scientific interest in these subjects and their improved visibility. This effect may also be due to the substantially higher number of articles published by open access journals and increased citations of such articles in the 2019–2022 period compared to 2016–2019. As found by a systematic review of 134 studies, an open access publication may lead to citation advantage [43].

Interestingly, though, the median SJR and SNIP values of the considered journals experienced a 7–8% decline in the 2022 Scopus evaluation compared to the 2019 one. The former metric considers the prestige of the citing journal by weighing whether the citations originate from a journal with a high or low SJR [44]. The noted decline may be potentially a result of the pandemic affecting the content of prestigious peer-reviewed journals that increased their focus on SARS-CoV-2 and COVID-19, likely at the expenses of other subjects. At the same time, one should note that the majority of the twenty journals with the highest CiteScore in the 2022 evaluation increased their SJR values, which mostly exceeded 1.0, indicating that they have above-average citation potential. This suggests that a general decline in SJR could result from less visibility of less-profiled journals during the pandemic. On the other hand, SNIP, the value of which also decreased in 2022, is a measure of a publication's contextual citation impact as it takes into account the source's subject field, including the frequency at which authors cite other papers and the speed at which citation impact matures—parameters that vary across the scientific disciplines [44]. However, the journals with the highest CiteScore had SNIP values decidedly exceeding 1.0, although more than half of them revealed a decline compared to the 2019 Scopus evaluation. This, along with findings relying on SJR, suggests that during the COVID-19 pandemic, the publications in the broad field of water sciences were overshadowed by those in other fields, particularly medicine. Despite this, they managed to publish more articles and gain more citations in 2019–2022 than in 2016–2019, which again highlights the potential of these journals and the covered scientific (sub)disciplines.

Moreover, the present study clearly evidences that, contrary to various medical peer-reviewed periodicals [17], citations of the analyzed journals were mostly not altered by publishing COVID-19-related papers. Although selected journals published highly cited COVID-19-related articles, mainly concerning surveillance of SARS-CoV-2 in wastewater and pandemic-related pollution in the aquatic environment, these papers did not contribute significantly to overall citations gained in 2019–2022, except for one paper published in *Environmental Science and Technology Letters* that had an 8% contribution to the journal's citations and the collective effect of four articles published in *Water Research X*. On the one hand, it indicates that the analyzed group of journals may likely benefit in citations and associated metrics by investing in special issues dedicated to some aspects of COVID-19, an activity pursued by various medical and non-medical journals [45–48]. On the other hand, the observed increase in the total number of citations, published articles, percentage of cited articles, and CiteScore values, despite no substantial efforts to publish COVID-19-related papers, indicates the strength of the field devoted to water sciences and its ability to overcome the crisis caused by the pandemic.

The limitations of the study must be stressed. One should note that it may not provide a full picture of all productivity of those working in the field of water sciences as some of the articles may have been published in journals that are not classified within the considered Scopus subjects but represent other subjects of the environmental science category, e.g., *Science of the Total Environment*, *Environmental Pollution*, or *Environmental Science and Pollution Research*, the scope of which still encompasses issues related to aquatic ecosystems. Moreover, some COVID-19-related articles prepared by research groups working in water sciences may have been submitted to journals oriented more to medicine and biotechnology. For example, articles devoted to the wastewater-based epidemiology of SARS-CoV-2 were published in *Jama Network Open* [49], *The Lancet Microbe* [50], *Nature Biotechnology* [51], and *PNAS* [52]. However, this only implies that the productivity of researchers working in the field of water science may be even larger than already indicated in the present work. Last but not least, the journal's metrics do not reflect the impact of the COVID-19 pandemic on individual researchers or research teams. Survey research demonstrates that various scientists, particularly those who did not work on COVID-19-related projects, reported a drop in published articles and submissions, especially during the first year of the pandemic, while the overall number of research projects decreased by 26% compared to 2019 [39]. Therefore, the present study is only a general indicator of progress in the broad field of water sciences measured through the lenses of journal metrics, not individual achievements that may have been altered to a different extent by the epidemiological situation and associated restrictions.

## 5. Conclusions

Although the COVID-19 pandemic most certainly adversely affected individual scientists and research teams working in water science, the results of the present study indicate that, as a whole, the field continued to progress, with an increased number of published articles, citations these articles received, and the overall impact of journals classified by Scopus into aquatic sciences, oceanography, and water science and technology. Contrary to various other fields of science, this effect did not result from the boost created through the publication of COVID-19-related articles that would likely act as citation bait, although some influential papers in this regard, mostly related to wastewater SARS-CoV-2 surveillance and the effect of the pandemic on water quality, were also published by selected periodicals. These findings show the high potential of fields dedicated to water sciences to adapt in a period challenged by an infectious disease pandemic.

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**Data Availability Statement:** Data supporting the results reported in this work can be found in the Scopus database, <https://www.scopus.com> (accessed on 20 August 2023).

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**Conflicts of Interest:** The author declares no conflict of interest.

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