

# NOAA Institutional Repository Annual Operating Report

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*Fiscal Year 2021*

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## Executive Summary

The NOAA Institutional Repository (IR) is a federally mandated<sup>1</sup> publication repository created to ensure that NOAA published research is preserved and made available for all present and future researchers.. As of October 1, 2021 the NOAA IR contains 30,108 items including journal articles, technical memorandum, reports, and policy documents.

Overall, the NOAA IR experienced a significant increase in submissions, logging 7,056 items submitted to the repository (a 41% increase over FY20), and over 5,500 new items added to the system. This large increase in materials submitted to the NOAA IR resulted in a jump in the agency's compliance rate from 23.7% in FY20 to 34.6%. However, the increase in submissions also highlighted a number of challenges for the NOAA IR team, specifically with existing processing and cataloging processes. The NOAA IR team performed a workflow analysis to evaluate how to increase efficiency within our existing processes and look for a long-term solution for managing IR submissions and metadata assignment by scoping out requirements for an integrated system for processing and cataloging.

After briefing the NOAA Science Council in January 2021, NOAA's Research and Development Enterprise Committee (RDEC) and the NOAA Central Library were tasked with proposing solutions to address the issue of NOAA's low FY20 PARR compliance rate. The team worked to identify barriers to PARR compliance, compile recommendations and mechanisms for improving the agency's compliance rate, and named responsible parties to ensure the recommendations are implemented. Early actions taken based on these recommendations did have some impact with a sharp increase in submissions following an all hands email from the Acting Chief Scientist stressing the importance of compliance. These issues and recommendations have further informed the NOAA IR's role within the agency, especially in regards to NOAA's publishing practices. Moving forward, the NOAA IR will play a key role in: advancing the NOAA Libraries Advisory Committee Strategic Goals for the NOAA Library Network (FY22-FY25); combating rising publishing costs associated with open access publishing; and the continued breaking down of information silos across the agency with the incorporation of the National Sea Grant Library holdings into the NOAA Institutional Repository.

Building on work started in Fiscal Year 2020, a key focus for IR staff was to improve user experience, while streamlining workflows to increase efficiency and reduce burden on submitters. At the end of Quarter 1, a new front-end user interface was implemented after being developed with CDC based on feedback from the FY2020 NOAA IR survey and usability study. The new interface included a number of new features and included additional submission information for both staff and grantees. Upgrades to the backend administrative system were also added, including methods for speeding up the ingest process, managing document relationships, and automating migration schedules. In rapid succession, the NOAA IR team also released a revised submission form, combining 3 previous forms, while also allowing users to request changes to metadata or changing files of submissions that were already ingested into the IR.

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<sup>1</sup> The NOAA Institutional Repository was created in 2015 in response to the [White House Office of Science and Technology Policy Memorandum Increasing Access to the Results](#) of Federally Funded Scientific Research and the subsequent [NOAA Plan for Increasing Public Access to Research Results](#) (PARR Plan)

## Introduction

This FY2021 annual operating report provides information on the developments, processes, challenges, outcomes and statistics of all aspects of the NOAA Institutional Repository (IR) operations as managed and performed by the NOAA Central Library (NCL) staff. A breakdown of NOAA IR statistics including submission, ingest, and compliance figures are provided at the agency level. A new feature of this year's report is the addition of compliance figures at the line office level as well as for the NOAA Cooperative Institutes (as a collection, not per CI).

## Section I. System Developments and Enhancements

### ***Developments Resulting from FY2020 Usability Testing***

A large number of FY2021 developments for the NOAA IR were derived from the FY2020 usability study and survey. Our software partner, the Centers for Disease Control (CDC) had already planned to update the system's user interface, but altered existing plans to incorporate feedback from NOAA users on functionality.

In FY2021 the following features were added to the Stacks system:

#### ***Front-end developments***

- ***New User Interface***. A majority of CDC's development efforts were dedicated to the implementation of a new user interface, the bulk of which was released in January 2021, with two subsequent releases completing the overhaul in July 2021. Enhancements included:
  - ***New configuration for feature content***. The rotator display on the NOAA IR's homepage was replaced with static feature content that is still easily customizable by NOAA IR staff. Reasoning for the change came from the aforementioned FY20 usability study, where users stated they did not like or pay attention to the rotator, with some finding it distracting altogether. Early responses to this change have been very positive from internal and external stakeholders.
  - ***Search result display***. While a minor change, an update to the NOAA IR's search result display cards allowing for more metadata to display. Developers were able to condense display fields and reduce whitespace in order to provide room for more data.
  - ***Universal search bar***. The last update of FY20 included a new universal search function; a search bar positioned on the upper right hand corner of all pages on the NOAA IR. Most notably, this search bar was added to document landing pages, allowing users to easily refine their search(es) from a document page, and not requiring them to return to the search page.
- ***Submission Information Page***. This page, added to the navigation bar, was designed to provide submission information to both intramural and extramural submitters. Information is separated by the type of submitter with a special focus on the methods of submission. It is intended to serve as a quick reference guide on submissions, and links to the NOAA Central Library's full NOAA IR FAQ page for a more detailed breakdown of policies and procedures.
- ***GitHub page for API***. Found under the Quick Links option on the NOAA IR homepage, the API information page is marked as "For Developers" and leads users to a GitHub page maintained by NOAA Central Library staff. Included on the page is information about the NOAA IR, how to query the API using either JSON or OAI-PMH. Examples of queries are provided as well as tips for creating a successful data pull. This page was developed to supplement the basic API information/instructions provided by CDC in the NOAA IR Help section.

### ***Backend and metadata developments***

- ***Dataset Linking.*** Staff utilized existing metadata provided by CHORUS (Clearinghouse for the Open Research of the United States) to identify datasets for articles already housed in the NOAA IR. These dataset DOIs and URLs were added as supporting files to the corresponding peer-reviewed publications. In FY21, staff was able to add approximately 250 dataset links to NOAA IR records.
- ***New document types.*** The IR team evaluated a sampling of existing IR documents to identify any unique documents that were not captured in our existing document type options. After this review and consulting with frequent IR submitters, we added 10 new types of documents to the NOAA IR field including: environmental impact statements; planning document; white paper; office note; etc.
- ***Rights/Permissions metadata.*** All items in the NOAA IR were updated to include rights and permission information. For all NOAA publications, documents were marked as being in the public domain to indicate full use permissions. For peer-reviewed journal publications, IR staff noted the type of license each article was published under; whether it was a Creative Commons license, something in the public domain, or if the article housed in the NOAA IR was an accepted manuscript version of the document. Including this information in our metadata provides a level of transparency for IR users and also helps position the NOAA IR for the inclusion of machine readable formats and facilitation of text mining research.
- ***System Workflow Administration Tool (SWAT) upgrades:*** A number of upgrades were made to the NOAA IR's backend workflow management tool to streamline workflows and increase efficiency of cataloging staff. These upgrades include:
  - ***Batch supporting file updating.*** This enhancement allowed IR staff to update all supporting files at once, without having to update individual links in separate records. Allowing for batch and "all item" exports, we have been able to reduce the amount of time spent on supporting file updates and additions.
  - ***Ability to automatically push materials to the production (LIVE) site.*** Prior to this update, IR staff had to approve and push each uploaded item to the live NOAA IR server from our staging environment. Now, staff are able to indicate with each upload that all items present can be moved to the production server immediately.
  - ***Automate data migration process.*** In order for files and metadata to be made "live", a nightly migration was required. Previously this was something that IR staff was required to schedule manually, making the management system unavailable during the process. This became problematic in the remote environment due to varied work schedules and time zone differences. Additionally, if staff forgot to set the migration, uploads would not display on the front end of the IR in a timely fashion. By automating the process to occur overnight, we have been able to ensure all items are pushed live every day and no one is locked out of the system during their designated work hours.

### **Section II. Workflow Analysis and Streamlining**

The NOAA Institutional Repository has seen increased submissions each year of its operation with no increase to staffing levels. In order to keep up with the influx of new submissions the IR team documented, analyzed and streamlined processes in order to eliminate inefficiencies dealing with submission and processing workflows. This increase in efficiency allowed us to address increased submissions and a growing backlog of items in the short-term. These improvements are detailed below.

### ***NOAA IR Submission Form Redesign***

One of the direct results of the workflow analysis was an overhaul of the NOAA IR submission form. Previously we had separate forms for DOI requests, submissions, and 508 remediation requests for journal manuscripts. The new form combined these 3 forms into one and included the ability for submitters to request changes to metadata or changing files of submissions that were already ingested into the IR. The merging of these forms has streamlined the process and increased collaboration and efficiency when processing and cataloging submissions. Integrating the 508 remediation requests into the submission methodology also accounted for an increase in requests as the service was more visible to the submitters; with requests for remediation jumping from 27 in FY20 to 97 in FY21, a 259% increase.

The workflow analysis also revealed some inefficiencies on how particular types of submissions were being processed. The IR team identified significant differences in processing batch and single submissions as well as journal manuscripts and NOAA documents. To accommodate the differences, separate instances within the form were set up to differentiate these submissions from each other, which allowed the team to simplify the workflow of each individual submission.

The redesign allowed the IR team to evaluate the metadata that we were collecting from submissions and determine what was useful and what could be improved. Changes were then made to the form to include Line Office, Keywords and the ability for submitters to upload supporting documents. We also added additional metadata including: reasons for revision requests, submission methodology, and a more robust selection of document types on the back-end to enhance our reporting capabilities.

### ***Integrated Submission & Cataloging System Requirements & Development***

The workflow analysis was also used to look for future options to improve efficiency long term by integrating all aspects of the IR process. Specifically, the IR team began to discuss the option of developing an integrated submission and cataloging system. Currently, processes are separated into multiple systems and tools, but ideally all aspects of processing from checking accessibility to cataloging, to DOI assignment, ingests, and even automated email notifications to submitters would be integrated in one dedicated system. Additionally, throughout FY2021, we encountered a large number of submissions from offices that either already existed in the NOAA IR, or had been submitted by another office (very common with CI-NOAA publications). With an integrated system, we would be able to catch these duplicates faster and with less effort, saving staff time. With these elements in mind, the NOAA IR team worked to develop a list of requirements for this system, and over a number of meetings refined them to a prioritized list of must-have features and functionalities. A copy of these requirements is available via [Google Drive](#).

## **Section III. RDEC Collaboration to Improve PARR Compliance**

After the NCL's FY20 briefing to the NOAA Science Council highlighting NOAA's low Public Access to Research Results (PARR) compliance, the NOAA Research and Development Enterprise Committee (RDEC) and the NCL were tasked with proposing solutions to address the issue. RDEC began meeting on this issue in March of 2021.

### ***Identification of Barriers to Compliance***

As a first step, the NCL identified five barriers to PARR compliance as noted by NOAA authors who submit to the NOAA IR, from respondents to the FY20 IR User Survey, respondents to the FY21 NOAA Libraries Advisory Committee all-NOAA Library Survey, and through regular discussions with the library-

led NOAA Publications Group. The NCL was able to identify the following as the primary challenges to increasing PARR compliance within the agency:

1. Unfamiliarity with the NOAA PARR Plan, its requirements, and the NOAA IR.
2. Leadership has not communicated PARR compliance as a priority.
3. Confusion regarding responsibilities related to submission.
4. Lack of clarity on what to submit to be considered compliant.
5. Unsure of how to submit to the NOAA IR to ensure articles are counted towards compliance.

It was determined that Section 508 did not represent a barrier to PARR compliance. While Section 508 compliance remains a barrier for the ingestion of non-journal article NOAA publications (including tech memos, reports, strategic plans, etc.) into the IR, these publications are not currently included in the NOAA PARR compliance rates. Additionally, the NCL performs remediation services for NOAA journal article manuscripts, and whenever possible will use publisher versions of publications which do not require 508 remediation.

### ***Recommendations to Science Council***

After identifying challenges, the RDEC and NCL worked to create a document that described the existing Library outreach efforts related to PARR, as well as proposed new solutions for each specific compliance challenge. Many of these solutions cut across multiple challenges, resulting in the following eight recommendations to the Science Council. The recommendations were sent to the Science Council on June 17, 2021:

1. Increase email communications from leadership highlighting PARR requirements/priority level.
2. Update policy language to explicitly state author, program manager, and supervisor responsibilities related to PARR requirements.
3. Include PARR requirements in performance plan language.
4. Establish regular reminders from the Research Publication Tracking System (RPTS) to submit manuscripts to the IR.
5. Maintain a quarterly list of publications that have not been submitted by offices/programs.
6. Incorporate IR/PARR compliance into training.
7. Additional support and messaging for existing Library outreach related to PARR.
8. Message cost-savings of submission to the NOAA IR.

In addition to the list of recommendations, RDEC and the NCL laid out mechanisms and identified responsible parties to ensure the recommendations are implemented; with indications given for when Science Council action (whether direct or indirect) will be needed (see Appendix A for the full PARR Compliance Challenges and Solutions document).

### ***Actions Taken***

On May 25, 2021, a NOAA-wide email (see Appendix B) was sent by Craig McLean, in his role as Acting Chief Scientist and Science Council Chair, regarding the importance of PARR compliance and promoting a NCL webinar focusing on PARR Compliance and submission requirements. This action resulted in a significant increase in publication submissions to the NOAA IR over the following month as well as a large increase in attendees to the library's webinar with a total of 159; more than five times normal attendance levels (most Publishing@NOAA webinars have around 30 attendees). The increase in interest was a direct result of the Chief Scientist's email and promotion of the event, as well as the added emphasis on PARR requirements.

Other Publishing@NOAA webinars held throughout the fiscal year focused on PARR-related topics as identified in the RDEC solutions document, which emphasized continued Library outreach and education efforts; with webinars focusing on author responsibilities and submission methods to the NOAA IR. Furthermore, NCL staff worked to create additional outreach materials and posted these to the NCL maintained [Scholarly Communication & Publishing Guide](#). Included was an infographic highlighting the cost savings of using the NOAA IR as a Green open access option, as opposed to paying article processing charges to publishers for immediate Gold open access; a flowchart illustrating how a manuscript moves through the publishing process (as well as the different types of manuscripts); and a submission decision tree for journal article submissions. A new tab entitled “Manuscripts Explained,” was added to the guide, which highlights key indicators of different versions of publication manuscripts and methods for identifying open access licenses on publisher versions of articles.

To address PARR compliance challenges related to confusion regarding requirements, responsibilities, and how to submit; the NCL focused our Publishing@NOAA seminar series on these issues, with each challenge receiving its own installment. A great deal of emphasis was placed on existing policy and NOAA standard operating procedures related to these tasks (i.e. the Fundamental Research Communications requirements, existing NAOs, etc.) and how they should be interpreted by offices and how authors can ensure they are complying. Portions of each webinar were also dedicated to discussing how the Library supports compliance through our many services and outreach efforts with a special emphasis placed on the NCL’s NOAA IR, Publishing & Section 508 "Office Hours"; a weekly hangout in a drop-in drop-out format staffed by NOAA IR and library reference staff to answer questions, help with Section 508 issues, and more.

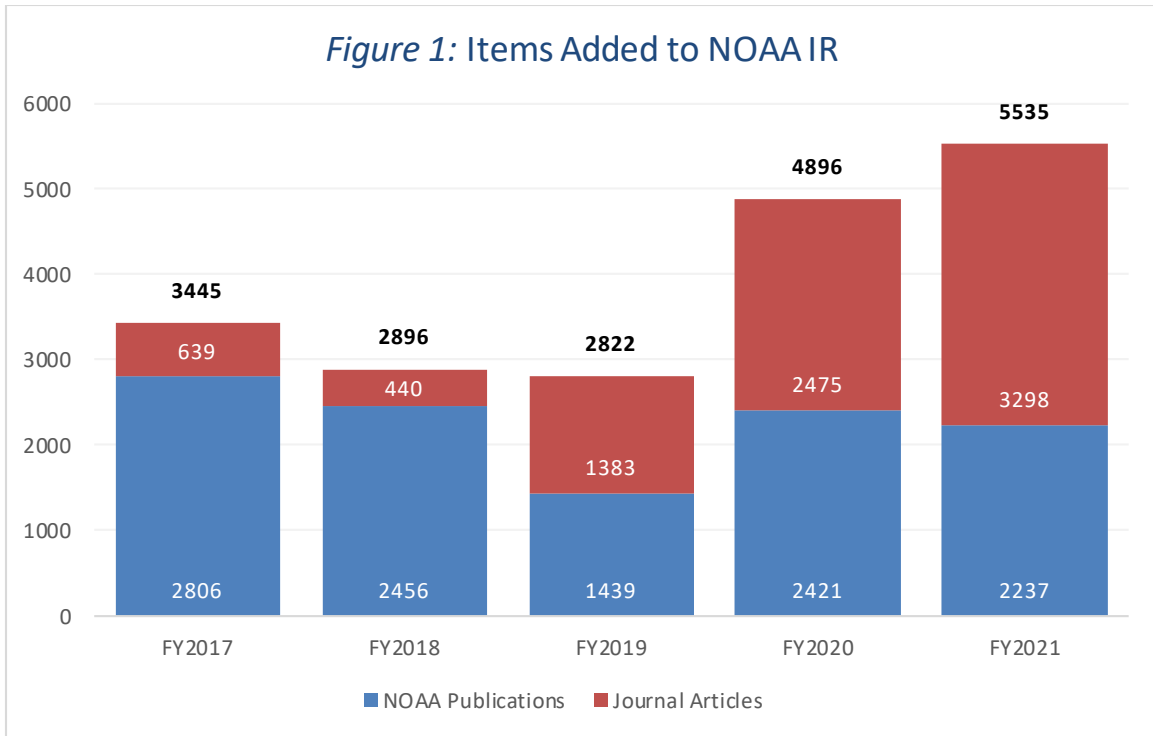
## **Section IV. Metrics**

### ***Agency-Wide***

#### ***Publication Availability***

As of October 1, 2021, the NOAA Institutional Repository contains 30,108 full text items. The NOAA IR contains a number of pre-PARR NOAA documents that the Library had either collected from NOAA offices or produced through in-house scanning projects, in accordance with the [NOAA IR Document Policy](#). Per these guidelines, the NOAA IR contains 21,491 NOAA produced documents (professional papers, atlases, technical reports, technical memorandums, policy documents, etc.). The NOAA IR also contains 7,973 peer-reviewed journal manuscripts or publisher articles published after October 1, 2015 as required by the NOAA PARR Plan.



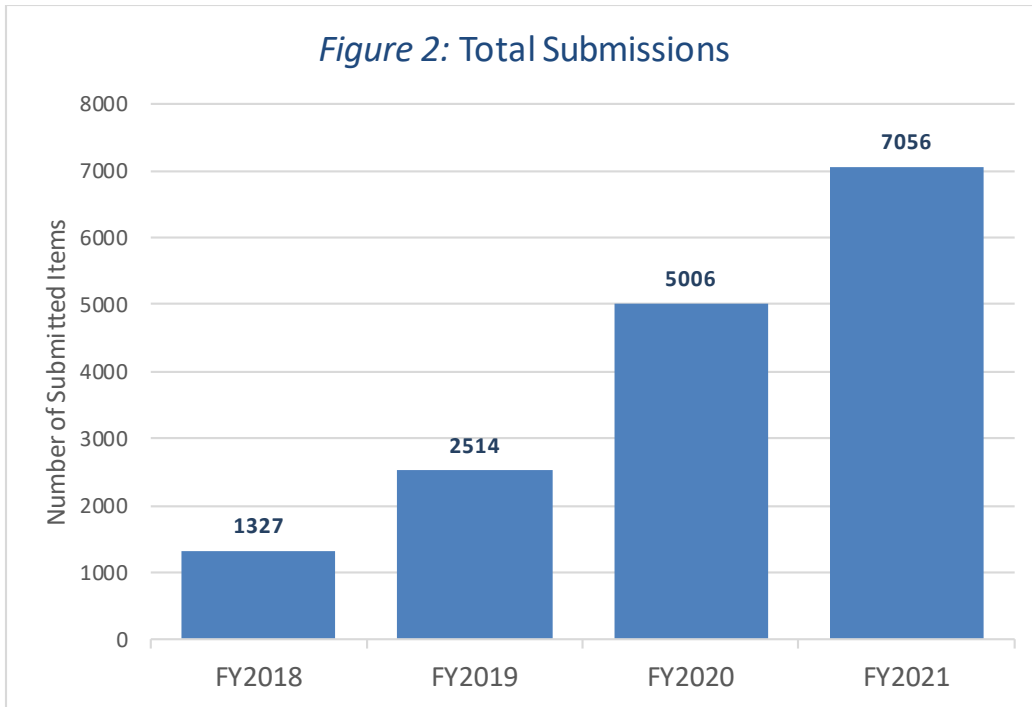


*Figure 1. A non-cumulative comparison of NOAA Publications and journal articles added annually to the NOAA IR from FY2017 through FY2021.*

### Submissions

Per the NOAA PARR Plan, all intramural and extramural researchers are required to submit their publications to the NOAA Institutional Repository, and NOAA Central Library staff is tasked with working with offices to facilitate collection of these materials. Submissions refers to both NOAA publications and journal articles that are either NOAA-authored or NOAA-funded research and are used to estimate compliance rates (see Compliance section below). A submission is defined as a publication that has been sent to the NOAA IR via one of the following methods:

1. Revised NOAA IR Submission and DOI Request Form
2. Email sent to [noaa.repository@noaa.gov](mailto:noaa.repository@noaa.gov)
3. Through the Research Publication Tracking System (RPTS) (implemented in NMFS and some OAR offices)
4. Via NMFS’s ECO tracking system for Biological Opinions



*Figure 2.* Number of total submissions to the NOAA IR through all submission methods, illustrating an over 400% increase in the overall number of submissions fiscal year beginning with FY2018 culminating in 5,006 submissions processed in FY2020 and 7,056 in FY2021.

Overall submissions for FY2021 show a 41% increase over FY2020. Factors contributing to the large increase include offices transferring large backlogs of articles and historical NOAA publications, and increased messaging about NOAA PARR Plan requirements. A large influx of OAR publications was received after the all-hands email sent from Craig McLean, resulting in nearly 900 submissions in a matter of 2 weeks. Additionally, the increased use of RPTS (as previously mentioned) and the new streamlined IR submission form (with manuscript remediation requests incorporated) contributed to the increase. This year many offices submitted backlogs (pre-FY2021 publications), accounting for a large portion of the journal submissions that were received by the NOAA IR. This increase will trail off as more offices work to submit their historical publications.

Of special note this year was a 900% increase in submissions via the Research Publication Tracking System (RPTS). Submissions via this method ballooned from 46 in 2020, to 473 in 2021. Though RPTS is not used by all of NOAA, it has been more fully integrated in certain Line Offices and offers an additional way for publications to be submitted to the NOAA IR. In order to streamline RPTS submissions, the IR staff created a script to transfer metadata from RPTS formatted emails to expedite processing these submissions. The IR team is continuing to work with NMFS' RPTS team to mitigate inefficiencies and develop ways for the system to integrate with submitters and the IR.

Not all submissions are accepted to the NOAA Institutional Repository and these numbers indicate the total number of items that were sent to and processed by NOAA IR staff to determine if the documents fall under the NOAA IR Document Policy and for Section 508 compliance. If issues with 508 compliance are identified, the submitter is notified; once a revised version is sent and passes accessibility checks it will be added to the NOAA IR. In these instances, this is still considered one submission.

Through discussions with our stakeholders and the IR team, it was determined additional data points would be valuable as part of our ongoing evaluation of our submission procedures. Beginning in March 2021, we began to record why submissions were sent back to the submitters. Typical reasons include: 508 compliance mistakes, duplicate submissions, version issues (requesting a manuscript), and submission of a document that does not comply with the NOAA IR Document Policy. Tracking these metrics will inform our long-term guidance and outreach efforts, while allowing us to identify areas of policy that may require better communication with the community.

### Compliance Calculation

Compliance with the PARR policy is defined as the ratio of: (1) the number of peer-reviewed scholarly articles subject to NOAA's public access policy that have been submitted and accepted to the NOAA IR (including those still under embargo) divided by (2) the total number of peer-reviewed scholarly articles that are subject to NOAA's public access policy, and is expressed as a percentage. This method of calculation is consistent with the Office of Science and Technology Policy (OSTP)'s reporting method.

The NOAA Central Library estimates the number of published articles subject to the NOAA PARR policy by searching Web of Science (WoS) for NOAA-produced and NOAA-funded journal articles. This count underestimates the number of publications due to two factors. First, WoS contains most but not all of the journal titles in which NOAA publishes, so it will always lack an unknown but assumed small number of publications. Second, there may be a lag of several months between publication and the appearance of a citation in WoS. The number of peer-reviewed publications given represents an actual count of WoS articles identified by the NOAA Central Library as NOAA-produced or NOAA-funded, published October 2015 to present.

Another reason for limiting the scope of publications included in compliance rate estimations to journal articles is the fact that the total number of NOAA publications that are produced in a given year is unknown. Furthermore, the category of NOAA publications includes a wide range of publication types, adding to the variability of this metric. Until a process for tracking all NOAA publications is devised, either through the establishment of a central publishing unit within the agency or office level reporting on these publications, we will not be able to include them in our compliance figures.

For the purpose of calculating compliance, we have included articles identified and pulled from PubMed Central (PMC) because those articles were submitted to NIH's PARR policy repository. The decision to count these articles towards the overall rate of compliance was made as part of an effort to decrease the burden on authors and offices and allow them to avoid having to submit publications to multiple repositories. However, as these articles are not submitted directly to the IR either through the submission form or via email, they are not included in any counts of submissions or figures illustrating those counts.

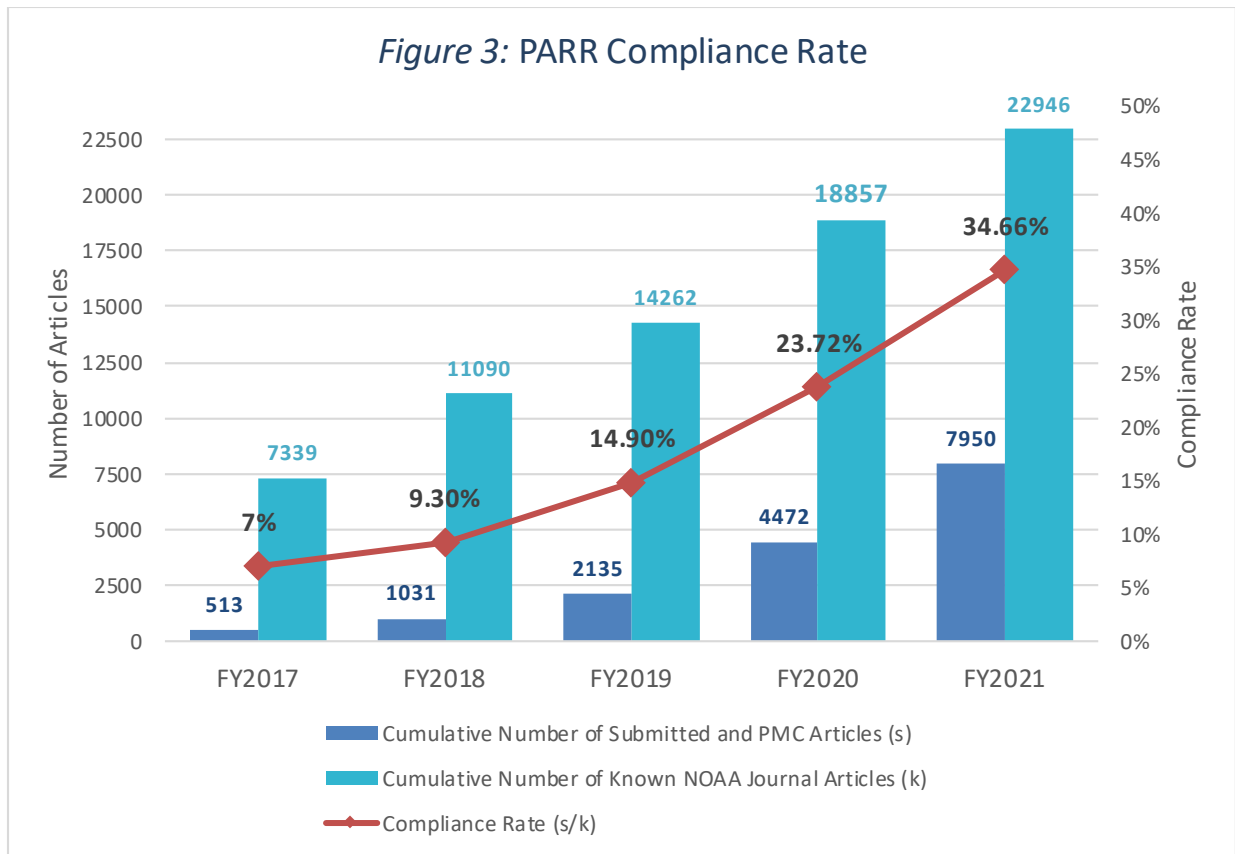


Figure 3. Cumulative number of journal articles submitted for inclusion in the NOAA IR compared to the cumulative number of known journal articles published since FY2016 (October 2015). Also shown is the rate of compliance as reported to the OSTP for each fiscal year

Line Office and CI Compliance

Prior to FY2021, we were unable to calculate compliance at the line office level due to a number of factors. However, in October 2020 NCL staff began adding additional metadata to articles identified as having been authored by NOAA grantees in order to identify the funding source within NOAA, enabling us to calculate PARR compliance at the line office level as well as for the Cooperative Institutes as a whole. For the purposes of this report line office compliance is defined as the ratio of: (1) the number of peer-reviewed scholarly articles subject to the agency’s public access policy that have been submitted and accepted to the NOAA IR (including those still under embargo) and identified as having been authored by an employee, contractor or grantee of an office divided by (2) the total number of peer-reviewed scholarly articles that are subject to the agency’s public access policy and identified as having been authored by an employee, contractor or grantee of an office.

Journal articles must contain an author affiliation or source of funding statement associated with a line office, program or cooperative institute to be included in these calculations. If a journal article contains affiliations from multiple NOAA line offices or programs, all receive credit in their PARR compliance count. Of the 3,525 articles identified as being either authored by NOAA staff or contractors or by authors funded through NOAA programs, 164 articles did not contain sufficient information to identify the source of funding within NOAA. In some cases, recipients receiving funding from NOAA base funds may have authored these articles.

Line Office and Cooperative Institute rates have only been calculated for calendar year 2021 due to limited availability of data and will not be reported to OSTP. Last, the IR team, in coordination with the NOAA Publications group, have been collaborating on a publication style guide, which will provide guidance to NOAA authors and fund recipients on how to represent their affiliation with NOAA through well-formatted affiliation statements so that their future articles can be identified in their offices' compliance rates.

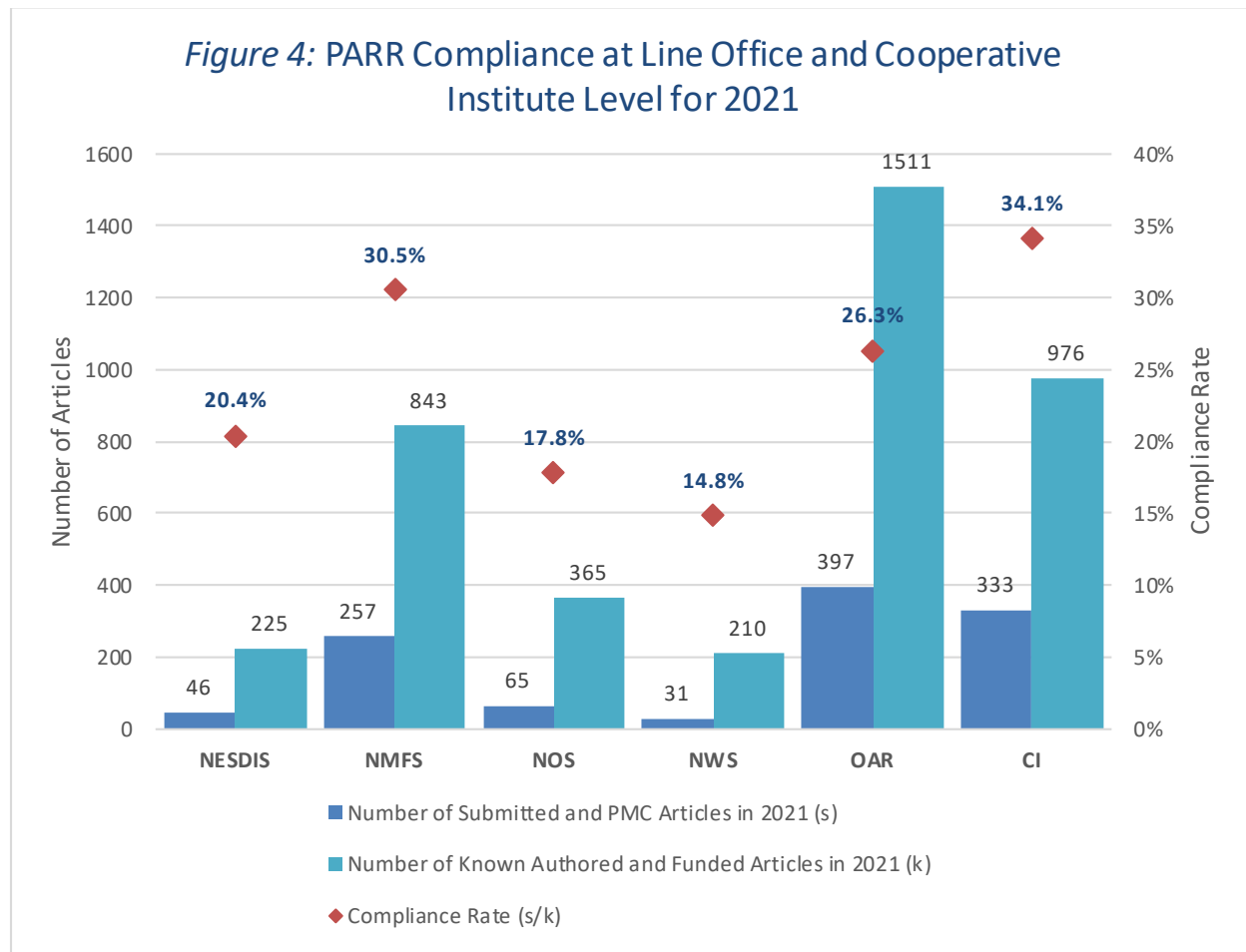


Figure 4. Number of articles authored or funded by each line office submitted to the NOAA IR compared to the number of articles known to have been authored or funded by each line office which were published in calendar year 2021

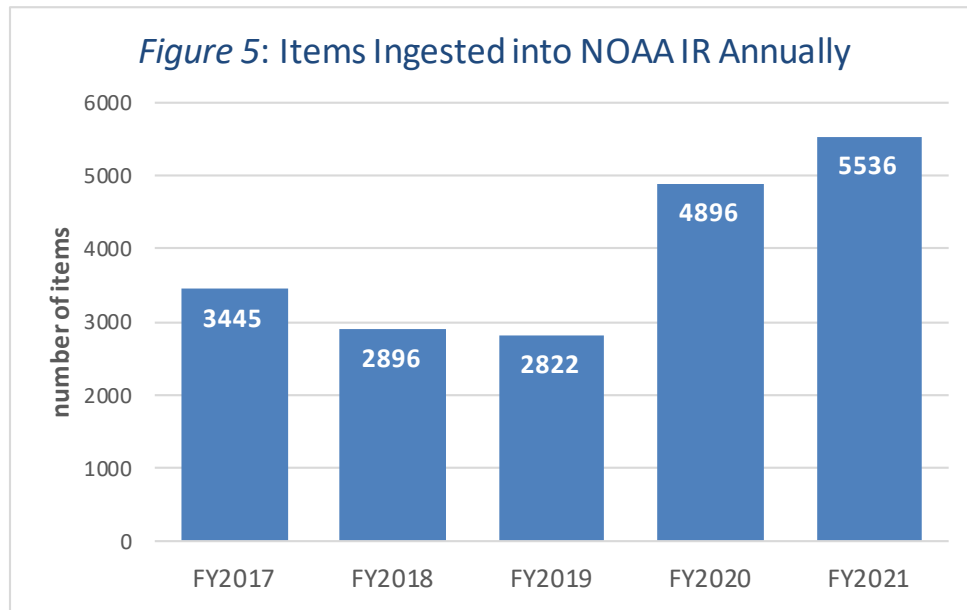
### Ingests

Ingest is the process by which publications are added to the NOAA IR, but the term is also often used to refer to the number of items that have been added to the repository within a given time period.

Ingesting publications is a multi-step process that includes:

1. Assigning metadata including author, office, and keyword elements;
2. Uploading the metadata and corresponding document to the CDC's Stacks system;
3. A quality check of each item to ensure metadata has been transferred correctly and that all documents (including any supporting documents or links to datasets) are accessible via the staging environment;

4. A full system index or data migration as the system refers to it, is performed to update all instances of the repository (there are 3 sets of servers on a bi-coastal system that maintain backups of the NOAA IR and its contents).

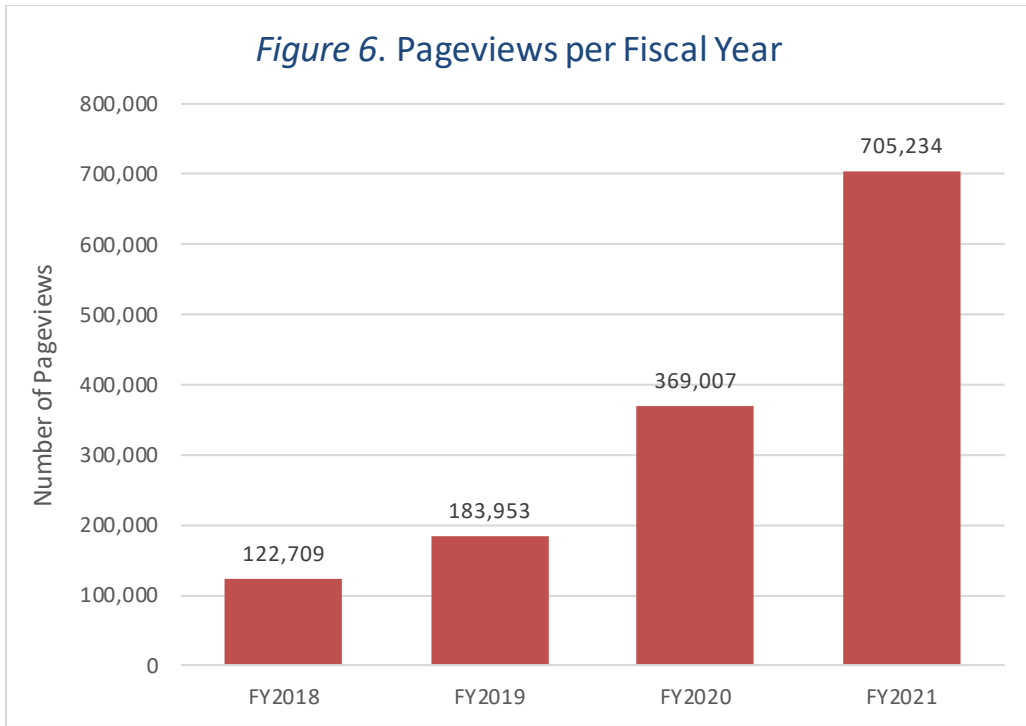


*Figure 5. Non-cumulative comparison of the number of total items, regardless of document type, ingested into the NOAA IR per fiscal year.*

As shown in Figure 5, after a dip in ingested items, FY2020 showed a large jump in items added to the NOAA IR with a further increase shown in FY2021. This was due to a number of factors including: 1) the NOAA Central Library has continued working to digitize historical NOAA Technical Reports and Memorandum from its physical collection, with final scans being added to the NOAA IR; 2) in accordance with our newly established agreement with NIH’s PubMed Central, the IR team began to harvest open access NOAA publications from PMC; and 3) a large jump in submissions of journal articles from offices and, most notably all Cooperative Institutes and Cooperative Science Centers.

#### Pageviews and Downloads

Currently, the NOAA Central Library reports usage metrics obtained through Google Analytics. The numbers provided reflect annual pageviews for the NOAA IR since FY2018. At the end of FY2021, CDC implemented event tracking through Google Tag Manager, which will allow for the capture of more accurate download data as well as more granular information on how and what people are searching for in the NOAA IR.



*Figure 6. Total pageviews for NOAA IR from FY2018 through FY2020*

At this time, download data is obtained through server end reporting offered to the NOAA Central Library via monthly reports from the CDC. This reporting capability is new and we are working to assess its accuracy and clarify data gathering practices before making that data available to stakeholders.

**Line Offices**

**NESDIS**

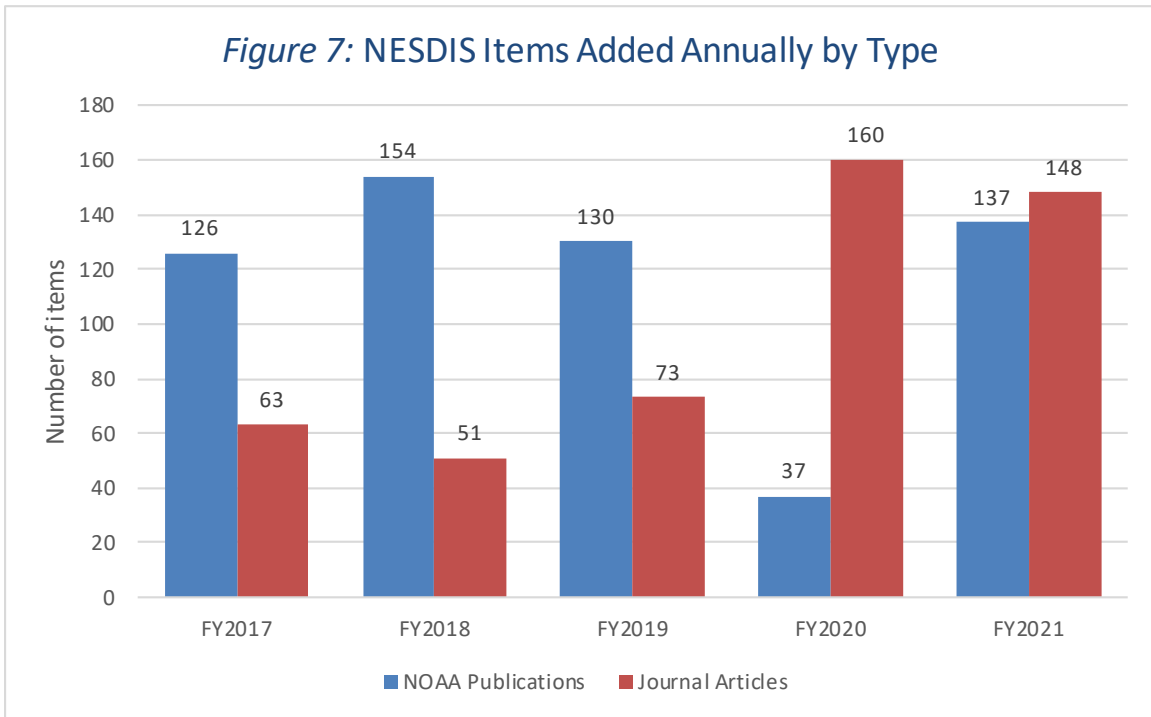


Figure 7. Non-cumulative comparison of NOAA publications and journal articles produced by NESDIS employees, contractors, and grantees that were added to the NOAA IR in each fiscal year with a total of: 189 items added in FY2017; 205 in FY2018; 203 in FY2019; 197 in FY2020; and 285 in FY2021.

NESDIS Collection	Count
<b>NOAA Publications</b>	1,051
<b>NOAA Assigned Digital Object Identifiers (DOIs)</b>	120
<b>Journal Articles</b>	498

Table 1. Breakdown of the number of Technical NOAA publications within the NESDIS collection as well as the number of digital object identifiers assigned to NESDIS publications by the NOAA Central Library. It should be noted that DOIs are not assigned to publications produced prior to 2015.



NMFS

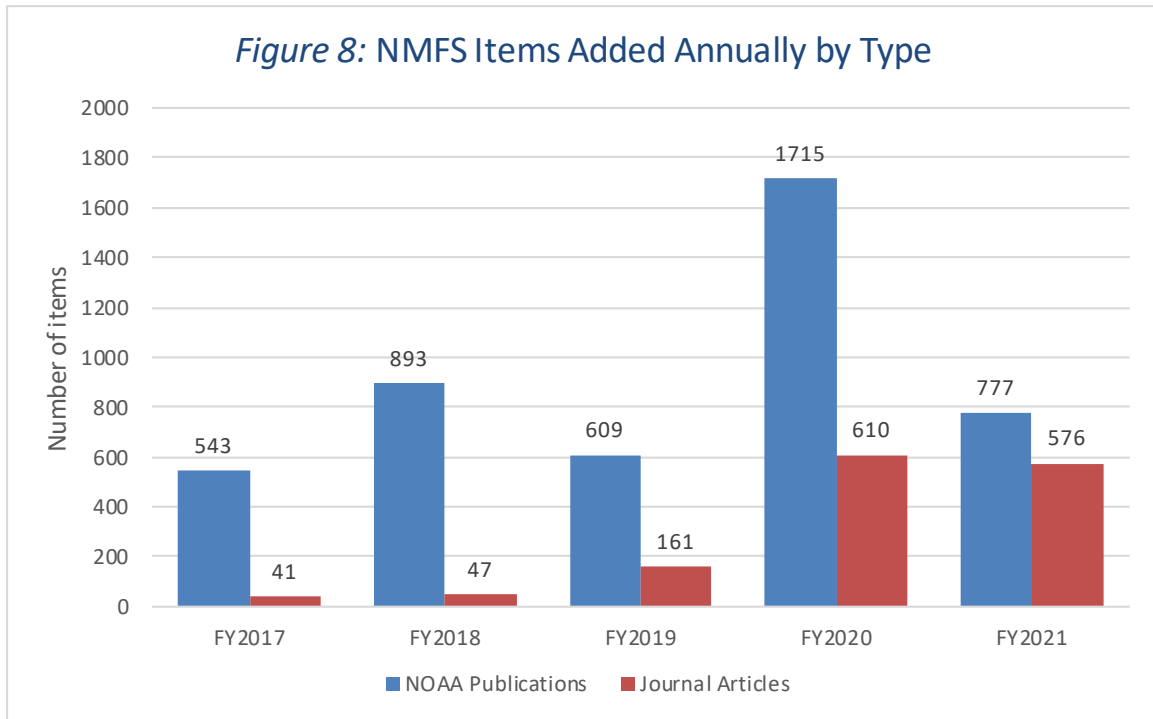


Figure 8. Non-cumulative comparison of NOAA publications and journal articles produced by NMFS employees, contractors, and grantees that were added to the NOAA IR in each fiscal year with a total of: 584 items added in FY2017; 940 in FY2018; 770 in FY2019; 2,325 in FY2020; and 1,353 in FY2021.

NMFS Collection	Count
<b>NOAA Publications</b>	8,259
<b>NOAA Assigned Digital Object Identifiers (DOIs)</b>	2,021
<b>Journal Articles</b>	1,490

Table 2. Breakdown of the total number of Technical NOAA publications within the NMFS collection as well as the number of digital object identifiers assigned to NMFS publications by the NOAA Central Library. It should be noted that DOIs are not assigned to publications produced prior to 2015.

NOS

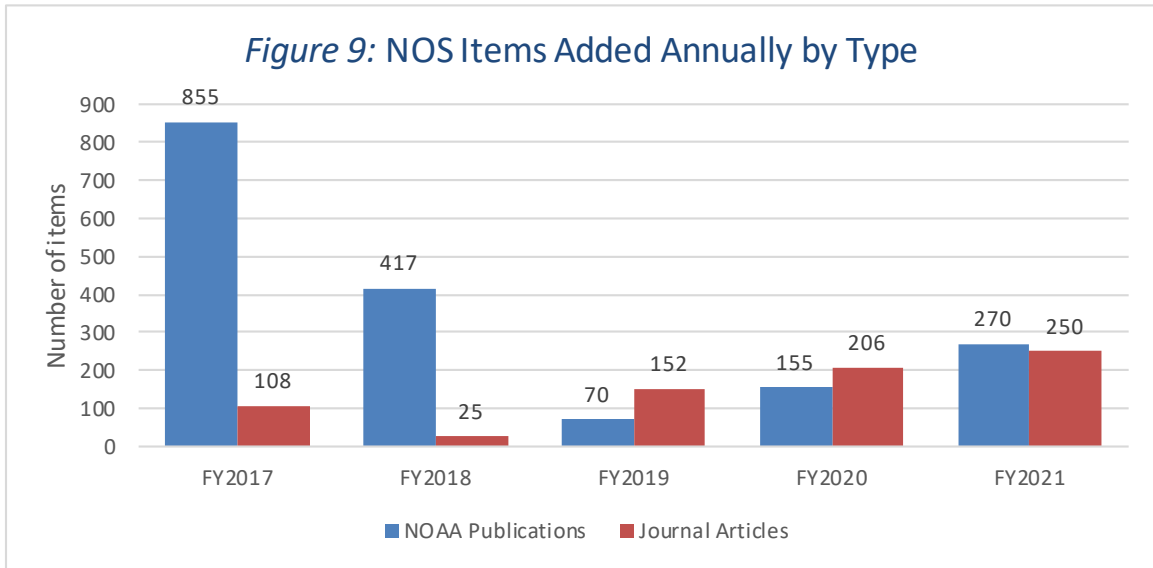


Figure 9. Non-cumulative comparison of NOAA publications and journal articles produced by NOS employees, contractors, and grantees that were added to the NOAA IR in each fiscal year with a total of: 961 items added in FY2017; 443 in FY2018; 222 in FY2019; 361 in FY2020; and 520 in FY2021

NOS Collection	Count
<b>NOAA Publications</b>	4,220
<b>NOAA Assigned Digital Object Identifiers (DOIs)</b>	212
<b>Journal Articles</b>	747

Table 3. Breakdown of the number of Technical NOAA publications within the NOS collection as well as the number of digital object identifiers assigned to NOS publications by the NOAA Central Library. It should be noted that DOIs are not assigned to publications produced prior to 2015.

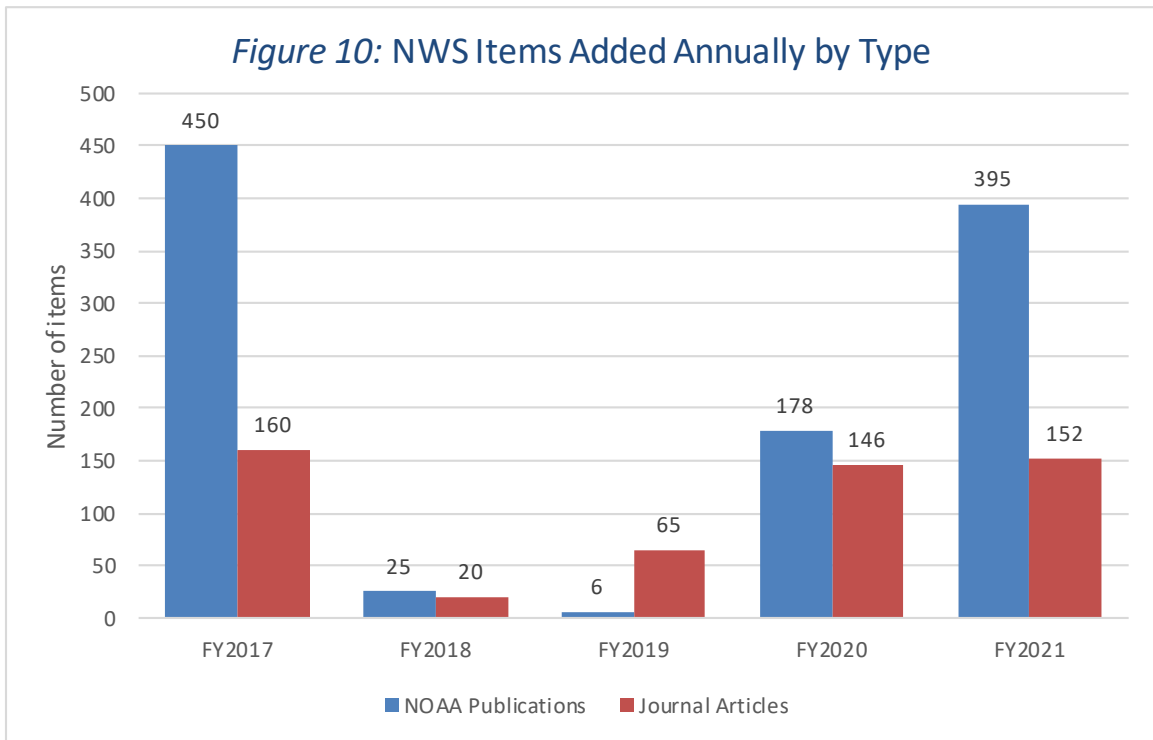


Figure 10. Non-cumulative comparison of NOAA publications and journal articles produced by NWS employees, contractors, and grantees that were added to the NOAA IR in each fiscal year with a total of: 610 items added in FY2017; 45 in FY2018; 71 in FY219; 324 in FY2020; and 547 in FY2021.

NWS Collection	Count
<b>NOAA Publications</b>	2,233
<b>NOAA Assigned Digital Object Identifiers (DOIs)</b>	69
<b>Journal Articles</b>	594

Table 4. Breakdown of the number of Technical NOAA publications within the NWS collection as well as the number of digital object identifiers assigned to NWS publications by the NOAA Central Library. It should be noted that DOIs are not assigned to publications produced prior to 2015.

OAR

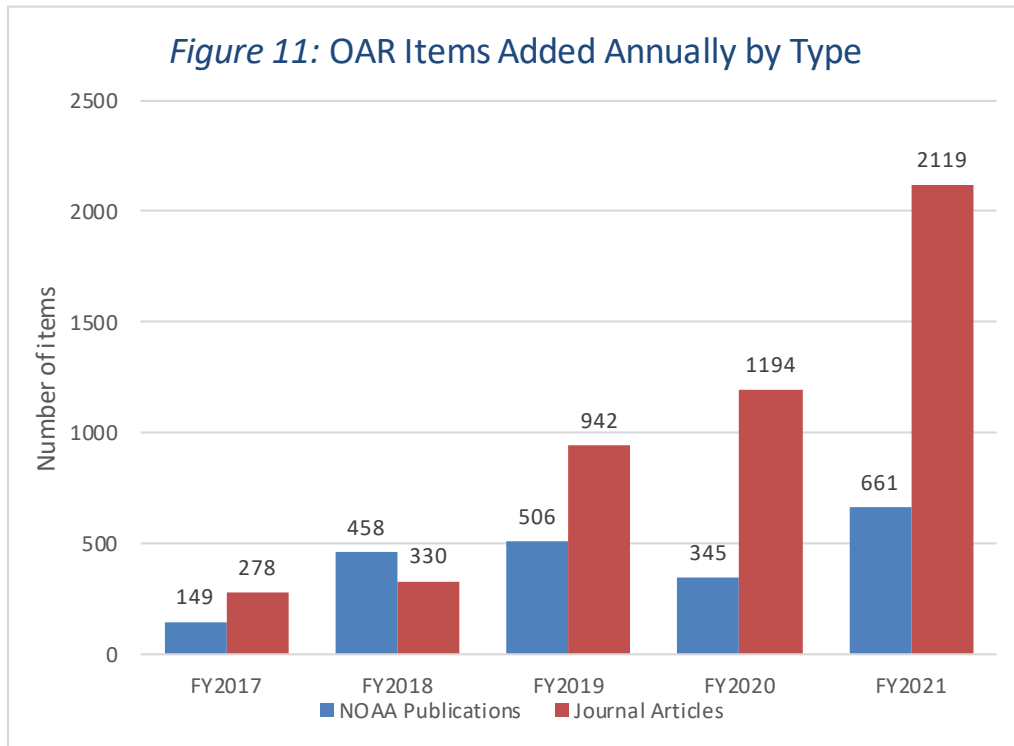


Figure 11. Non-cumulative comparison of NOAA publications and journal articles produced by OAR employees, contractors, and grantees that were added to the NOAA IR in each fiscal year with a total of: 427 items added in FY2017; 788 in FY2018; 1,448 in FY2019; 1,539 in FY2020; and 2,780 in FY2021.

OAR Collection	Count
<b>NOAA Publications</b>	3,019
<b>NOAA Assigned Digital Object Identifiers (DOIs)</b>	481
<b>Journal Articles</b>	4,880

Table 5. Breakdown of the number of Technical NOAA publications within the OAR collection as well as the number of digital object identifiers assigned to OAR publications by the NOAA Central Library. It should be noted that DOIs are not assigned to publications produced prior to 2015.

Cooperative Institutes

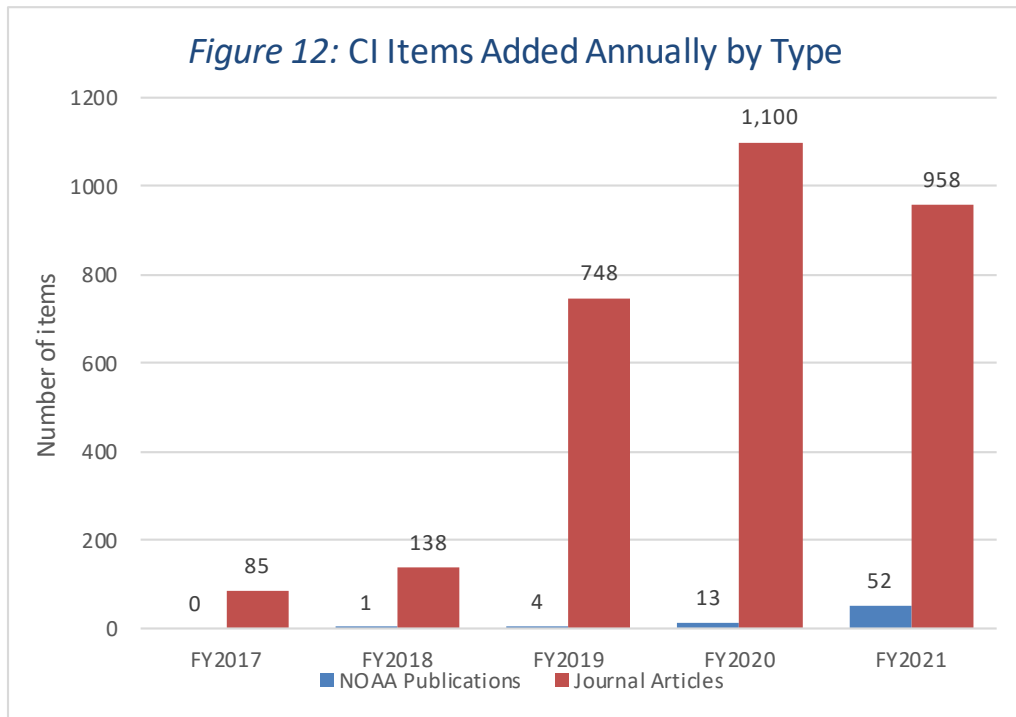


Figure 12. . Non-cumulative comparison of NOAA publications and journal articles produced by CI employees, contractors, and grantees that were added to the NOAA IR in each fiscal year with a total of: 85 items added in FY2017; 139 in FY2018; 752 in FY219; 1,113 in FY2020; and 1,010.

Cooperative Institute Collection	Count
NOAA Publications	76
NOAA Assigned Digital Object Identifiers (DOIs)	64
Journal Articles	3,462

Table 6. Breakdown of the number of Technical NOAA publications within the Cooperative Institute collection as well as the number of digital object identifiers assigned to CI publications by the NOAA Central Library. It should be noted that DOIs are not assigned to publications produced prior to 2015.

**Section V. Next Steps**

**NLAC Strategic Goals**

Since the NOAA Institutional Repository is a product of the NOAA Libraries, future developments and initiatives should be tied to and support the NOAA Library Network’s short and long-term goals. Looking at the proposed NOAA Libraries Advisory Committee Strategic Goals for the NOAA Library Network (FY22-FY25) the NOAA IR team has identified the following NLAC priorities:

*Goal 1: Ensuring awareness of library services so NOAA staff are served fully*

In accordance with RDEC recommendations, the NOAA IR will continue to develop and disseminate training and informational materials related to PARR Compliance, copyright, open access, and Section 508 compliance. The NCL hopes to work with the Commerce Learning Center to develop a standardized publications training course that can be accessed by FTE and contract staff through the platform. The training will focus on NOAA policies related to scholarly publishing and PARR requirements. Supplemental training on manuscript processing and versioning have also been discussed as future projects with CLC and NCL Outreach staff.

*Goal 2: Building digital collections and processes to preserve the past and inform the future*

This goal states that the NOAA Libraries plan to “facilitate text mining for machine learning and AI applications, as well as to improve their discoverability” and accessibility. Text mining (or text as data) is a growing field and there has been much interest in using the NOAA IR as a dataset for these purposes, however, until recently the API only served up the metadata (including abstract) to users. A first step in working toward a completely harvestable collection is the addition of machine-readable versions to the NOAA IR. When available, IR catalogers harvest machine-readable formats of journal articles in addition to the publisher PDF and add these as supporting files for the corresponding item in the NOAA IR. It is a priority for the NCL to investigate methods for converting NOAA publications (existing and new submissions) to a machine-readable format. NCL staff have been investigating the preferred/best format (HTML vs. XML vs. JSON, etc.) for text mining purposes. Currently there are over 24,000 NOAA publications housed in the NOAA IR, all of which would require conversion. Discussions with CDC as to how these alternative versions of the publications will be accessed en masse via the NOAA IR API (as opposed to individually from document details pages) are ongoing.

*Goal 4: Creating a trusted infrastructure for NOAA authors in support of Open Science*

The NOAA IR serves as a critical role in supporting and advancing NOAA’s Open Science efforts. The NOAA Libraries are considered a trusted source for publishing and scholarly communication information, and are advocates/educators on publications policies such as the NOAA PARR Plan and the Fundamental Research Communications Policy (FRC) as well as providing information and resources on personal identifiers and open access issues.

***ORCID Consortium***

To address identifier questions, and in response to Presidential Memorandum on United States Government-Supported Research and Development National Security Policy (NSM-33)<sup>2</sup>, issued in January 2021, the NCL has started the process of joining the federal [ORCID](#) consortium. An IAA is currently in progress, and the IR team is working with CDC (who is also a consortium member) staff to determine how ORCID profiles will be included in IR metadata. Some questions remain about how to collect and record this information on the backend, as well as how to ensure all NOAA authors have, and maintain, their ORCID profiles; something that could aid in ensuring further PARR compliance through harvesting capabilities using ORCID API tools. A NOAA-wide policy regarding personal/persistent identifiers would need to be drafted and implemented to ensure the agency utilizes the membership to its full potential.

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<sup>2</sup> Issued on January 14, 2021, the [Presidential Memorandum on United States Government-Supported Research and Development National Security Policy](#) states that all “funding agencies shall establish policies regarding requirements for individual researchers supported by or working on any Federal research grant to be registered with a service that provides a digital persistent identifier for that individual.”

### ***Transformative Agreements & APC Costs***

Open Access is a key component of open science (despite some using the terms interchangeably, OA is just one aspect of the Open Science landscape). The level of OA impacts what version of the document we can include in the NOAA IR--with OA allowing us to use the definitive publisher's version (VOR). In recent years the publishing landscape has shifted from traditional publishing models (subscription based) to paid open access models (through article processing charges (APCs)). This shift has placed the burden of paying for publication on authors and funders. Since these fees can range from \$1000 to upwards of \$12,000 per article, the NCL plans to devise marketing materials that highlight the cost savings offered by using the NOAA IR for Green open access (i.e., archiving the accepted manuscript) as an alternative to spending research funds on publishing costs. This builds off of the RDEC recommendations and solutions for PARR Compliance that calls for promotion of the cost savings of using the NOAA IR to self-archive manuscripts.

Additionally, using the NOAA IR as a dataset, the NCL hopes to identify journal titles and publishers that offer transformative agreements, which transfer the cost of journal access from subscription payments to payment of these article processing charges, while still providing access to paywalled and historical content through the journal's website. The intent is to ensure that NOAA is not paying twice for content; first when it is published, and again through our subscriptions. Using the NOAA IR contents, NCL hopes to identify frequently published-in titles, and work directly with publishers to lower these APC and subscription costs. It should be noted that in order for these agreements to work effectively, a centralized process for paying/authorizing APCs would need to be implemented. Currently, publishing costs are handled at a lab/office/division level and are regularly paid through purchase card funds.

### ***Integrated Submission & Cataloging System***

As mentioned above, the NOAA IR team has developed a list of system requirements for a combined submission processing and cataloging system. At this point, the NCL plans to continue working with OAR IT to refine and finalize these requirements while exploring in-house and commercial options for the system. Preliminary discussions with OAR IT have allowed us to rule out some out of the box solutions (such as SmartSheets). Based on the specific needs that the NCL has identified, a custom developed solution is most likely what is needed; whether that is developed in-house or through a contract will need to be determined in future discussions with IT. Most likely, the system development will need to be iterative, with elements added over time to accommodate funding and staffing considerations.

### ***National Sea Grant Library Transition***

In early 2021, the National Sea Grant Advisory Board approved committee recommendations, which call on Sea Grant to integrate, to the extent possible, the Sea Grant collection and future submissions with the NOAA Library while preserving the unique records in Sea Grant's collection. This decision was the result of a two year process by the National Sea Grant Advisory Board to assess Sea Grant's information services needs which included consultations with Sea Grant's own Librarians, URI leadership, and NOAA Librarians and acknowledgement of Sea Grant's PARR responsibilities that had been previously lacking. After formalizing the recommendations, Sea Grant program staff and NCL staff began the work of creating a new submission format for Sea Grant programs, as well as a transition plan for the existing 55,000+ items in the National Sea Grant Library.

Using a limited amount of metadata pulled from the existing National Sea Grant Library's (NSGL) data management system, NCL staff worked with SG program managers to identify what items the NCL is

able to accept into the NOAA IR and the NOAA Library Catalog based on scope documents for each collection. It was determined that over 35,000 of Sea Grant's records were metadata only, and thus ineligible for inclusion into either part of NCL.

NCL staff worked to develop a method for new Sea Grant submissions, based on current NOAA IR submissions; utilizing the same single and batch form submission method. After testing and stakeholder feedback, the new submission forms for Sea Grant journal and non-peer reviewed materials will be made live January 1, 2022. Currently, the process is structured so that NCL staff will handle all journal submissions directly, while Sea Grant staff will provide processing and filtering for all other Sea Grant publications, ensuring that documents meet inclusion criteria. Over the course of the next year, the NCL and National Sea Grant program plan to work on refining the submission process for state Sea Grant programs, while working to incorporate the existing NSGL documents into the NOAA Libraries collections.



## Appendix A.

### PARR Compliance Challenges and Solutions Document.

Developed by NOAA IR Staff and RDEC.

#### **Background**

In 2013 the White House [Office of Science and Technology Policy \(OSTP\) issued a memo](#) to all federal agencies conducting research requiring them to create a plan to make all the results of this research publicly available; resulting in the development and implementation of [NOAA's Plan for Increasing Public Access to Research Results](#) (NOAA PARR Plan) in 2015. In FY2019, the U.S. Government Accountability Office (GAO) released a report detailing federal agencies' progress with implementing the OSTP memo and subsequent Public Access plans. In November 2019, [GAO released a report](#) examining the extent of agencies' progress in implementing these plans for public access with two recommendations for NOAA:

- To “fully develop and implement a mechanism to ensure researcher compliance with the public access plan and associated requirements”, and;
- To “take steps to fully implement leading practices that enhance and sustain collaboration”

While the library has taken steps to address the second recommendation by signing agreements with both CHORUS (Clearinghouse for the Open Research of the United States) and PubMed Central, NOAA's response to the first item is still lagging. For FY2020 NOAA's compliance rate— the number of items that have been submitted by authors to the NOAA Institutional Repository (IR) compared to the agency's total output— was 23.72%. The following is a list of issues identified by the NOAA IR Team as challenges to PARR Compliance that have been expressed by authors, publications staff, program managers, and funded partners, with tables illustrating suggested solutions as proposed by the NOAA Central Library and NOAA Research and Development Enterprise Committee. These suggestions have been derived from the soon-to-be released [Compliance Toolkit](#), created by the OSTP National Science and Technology Council, Subcommittee on Open Science Publications Working Group. The toolkit (co-edited by NOAA) provides best practices, methods, and tools that agencies are using to fulfill their public access policies for published intramural and extramural scientific articles and grey literature. The Toolkit is currently being reviewed by the full OSTP NSTC Subcommittee on Open Science.

#### **Barriers to PARR Compliance**

*Challenge #1. Unfamiliarity with the NOAA PARR Plan, its requirements, and the NOAA IR.* Many authors say that they are unaware of the NOAA PARR Plan, what it requires, what the NOAA IR is, or its purpose. In FY20, the NOAA IR team conducted an [IR User Survey](#) and found that 62% of our 750+ respondents were unfamiliar with the NOAA IR. The FY21 NOAA Libraries Advisory Committee all-NOAA Library Survey found that unfamiliarity with NOAA IR had dropped to approximately 53% for 1,327 respondents.

Proposed solution	Mechanism	Responsible party/parties	Science Council action needed?
Email communications from leadership highlighting PARR requirements/priority level	Regular/periodic messaging from leadership	NOAA Chief Scientist for initial email(s); Lab directors, LO AAs for follow up emails	Yes
Update language within policies to explicitly state responsibilities of authors, program managers, etc. in relation to PARR requirements (i.e., submission to NOAA IR; RPTS input; etc.)	NAOs: R&D Enterprise NAO; Scientific Integrity Policies: FRC; PARR Plan	NOAA RDEC, NOAA SI Committee, NOAA Central Library	Yes (Task relevant committees)
Training	Possible complementary module to the SI training	NOAA Central Library, SI Committee	Advocacy and communication
Continued Library Outreach (e.g., NOAA IR Week, Publishing@NOAA webinars)	Seminars/webinars, website, <a href="#">Publishing Guide</a> , promotional materials ( <a href="#">see attachment</a> )	NOAA Central Library	Advocacy and communication

**Challenge #2. “My boss has not told me to do this, so I am not submitting.”**

Related to Challenge #1, people will acknowledge PARR, but will reiterate that it has not been made a priority by their Line Office leadership and cite time constraints.

Proposed solution	Mechanism	Responsible party/parties	Science Council action needed?
Additional Performance Plan language based on metrics of how many publications have been submitted/approved/submitted to IR down to the division/program level	Per Section 8.2 of PARR: “Performance plans of relevant Program Managers, or their designees, shall be revised as necessary to explicitly assign responsibility and to enable enforcement as part of annual performance reviews”	Supervisors	Advocacy and communication
Email communications from leadership highlighting PARR requirements/priority level	Regular/periodic messaging from leadership	NOAA Chief Scientist for initial email, Lab directors, LO AAs for follow up emails	Yes
Message the cost-savings of the IR	Library outreach, periodic messaging from leadership	NOAA Central Library,	Advocacy and communication

		NOAA leadership	
Training	Possible integration into the SI training	NOAA Central Library, SI Committee	Advocacy and communication
Regular reminders from RPTS to submit manuscript to the IR	RPTS	RPTS team	No

**Challenge #3. Confusion about who is responsible for submitting.**

There is confusion about who is responsible for submitting publications to the NOAA IR; especially when the publication is a collaboration between Line Offices, or whether it is the author or their office/program that should be sending it for inclusion.

Proposed solution	Mechanism	Responsible party/parties	Science Council action needed?
Update language within policies to explicitly state responsibilities of authors, program managers, etc. in relation to PARR requirements (i.e., submission to NOAA IR; RPTS input; etc.)	NAOs: R&D Enterprise NAO; Scientific Integrity Policies: FRC; PARR Plan	NOAA RDEC, NOAA SI Committee	Yes (Task relevant committees)
Continued Library Outreach (e.g., IR specific topics in the Publishing@NOAA series)	Seminars/webinars, website, <a href="#">Publishing Guide</a> , promotional materials ( <a href="#">see attachment</a> )	NOAA Central Library	Advocacy and communication

**Challenge #4. Unsure of WHAT to submit.**

Within recent months this particular issue has been increasing as more people submit to the NOAA IR. Most of the confusion centers around journal articles; specifically, people are unsure what version can be included in the IR.

Proposed solution	Mechanism	Responsible party	Science Council action needed?
Regular reminders from RPTS to submit manuscript to the IR	RPTS	RPTS team	No
Quarterly list of approved FRCs that have not been submitted to the IR	Citation submission via Excel Template <a href="#">Journal Article template</a> <a href="#">NOAA publication template</a>	NOAA Central Library, RPTS Team	No
Continued Library Outreach (e.g., draft information materials, Publishing@NOAA series, Submission information page)	Seminars/webinars, website, <a href="#">Publishing Guide</a> , promotional materials ( <a href="#">see attachment</a> )	NOAA Central Library	Advocacy and communication

**Challenge #5. Unfamiliar with HOW to submit.**

Many authors have told the library that they are unclear how to send their publications to the NOAA IR, regardless of the type (either journal article or NOAA publication). Usually these questions come to the IR through general library inquiries, or through colleagues “in the know.” The FY20 IR User Survey revealed that of the 94 respondents who knew how to submit to the NOAA IR via its submittal form -- over 50% found it an easy, or very easy process.

Proposed solution	Mechanism	Responsible party/parties	Science Council action needed?
Regular reminders from RPTS to submit manuscript to the IR	RPTS	RPTS Team	No
Continued Library Outreach (e.g., Publishing@NOAA series, IR and NCL websites) - including a combined IR/RPTS outreach seminar	Seminars/webinars, website, <a href="#">Publishing Guide</a> , promotional materials ( <a href="#">see attachment</a> )	NOAA Central Library	Advocacy and communication

## Appendix B.

### Text from NOAA-wide email from Craig McLean

Subject: "Improvement in NOAA's PARR Compliance Needed"

May 25, 2021

Dear Colleagues:

The research that NOAA produces is of the highest quality and utmost importance in furthering our collective understanding of the planet. Since publications are how we communicate our research, access to them is vital to navigate a changing climate and its challenges. We pride ourselves as a leader in research, but we should also serve as a leader in scholarship; therefore, it is our responsibility to ensure that the products of our research are open, and freely accessible to the scientific research community and general public.

In 2013, a White House [Office of Science and Technology Policy memo](#) and subsequent [Executive Order](#) instructed all federal agencies conducting research to create a plan for making all research results publicly available. In response, [NOAA's Plan for Increasing Public Access to Research Results](#) (NOAA PARR Plan) was implemented in 2015 and requires all NOAA authored and funded publications to be submitted to the [NOAA Institutional Repository](#) (NOAA IR). In November 2019, the Government Accountability Office (GAO) examined agency compliance with the public access mandate, leading to a report that directed NOAA to implement stronger compliance mechanisms.

Compliance with the OSTP mandate is reported annually by all federal agencies; as of FY2020 NOAA's PARR Compliance Rate was **23%**. The NOAA PARR Plan and the NOAA IR have been enacted and operational since 2015, and it is past time to ensure that NOAA's research results are publicly available to improve our impact and accountability of this important federal science investment. The NOAA Science Council has committed to improving this rate to bring NOAA more in line with other federal science agencies' compliance rates, such as the Department of Energy (74%), U.S. Geological Survey (80%), and National Institute of Health (90%).

In accordance with PARR, each NOAA author that publishes science and Program Manager responsible for funded research is responsible for ensuring compliance. The NOAA Central Library has created a number of resources about PARR compliance and requirements including FAQ pages, infographics, and a monthly webinar series focusing on publishing issues and the NOAA Institutional Repository. I encourage everyone to utilize these resources, including the [upcoming seminar on May 26th](#) that will focus on what and how to submit to the NOAA Institutional Repository, to ensure we are making all of NOAA's research accessible and available.

Sincerely,

Craig McLean  
NOAA Acting Chief Scientist and Science Council Chair

## Glossary of Terms

### Compliance

For the purposes of this report compliance is defined as the ratio of: (1) the number of peer-reviewed scholarly articles subject to the agency's public access policy that have been submitted to the agency's designated repository/system (including those still under embargo) divided by (2) the number of total number of peer-reviewed scholarly articles that are subject to the agency's public access policy, and will be expressed as a percentage. This method of calculation stems from the reporting requirements that have come from the Office of Science and Technology Policy (OSTP) and we have opted to carry over that method to this report.

### Items added

This refers to the publications and their associated metadata that have been ingested into the NOAA Institutional Repository. This number does not necessarily mirror the submissions numbers for a given year due to previous fiscal year carry over and work done by the NOAA Central Library to identify and add publications that have not been submitted by offices/authors. An example of these efforts would be the digitization projects NOAA Central Library staff have conducted scanning and ingesting older NOAA technical memorandum and report series from all line offices.

### Submission

A submission is a publication that has been sent to the NOAA IR via one of the following methods:

- 1) NOAA IR Submission Form via Google Drive
- 2) Email sent to [noaa.repository@noaa.gov](mailto:noaa.repository@noaa.gov)
- 3) Through the RPTS system
- 4) Via NMFS's ECO tracking system for Biological Opinions

### Ingest

Ingest is the process by which publications are added to the NOAA IR and include a series of steps including:

- 1) Metadata creation
- 2) Metadata and file upload to the cloud
- 3) Quality checks and item approvals by data manager(s)
- 4) System indexing or data migration to push all metadata and associated files "live" making them available via the NOAA Institutional Repository page.

### NOAA publications

NOAA publications are publications as defined in [NAO 201-32G](#) and can include the following areas:

- 1) *NOAA Authored Publications* refer to those publications that have been written by NOAA employees or NOAA contractors, and were written as part of their official duties.
- 2) *NOAA peer-reviewed scholarly publications* are defined as research results that are published in peer-reviewed or refereed journals; meaning the process includes a review of the research by independent scholars, experts, etc. in the field who agree that the article in question represents properly conducted research and/or writing. Within this report these will also be labeled as journal articles. For the purposes of this report and our calculations, journal articles figures will exclude those still under embargo, but include those that are not subject to the NOAA PARR Plan.
- 3) *NOAA Funded Publications* can refer to two different kinds of publications: those produced through grant funding, most often, but not exclusively by universities via the NOAA Cooperative Institute Program; and those publications produced by companies contracted by NOAA.