NOAA Research and Development Database

2021 NRDD

Annual Operating Report

Cascade head near Lincoln City. Photo Credit: Commander Bruce Hillard, NOAA Corps.

FY2021 NRDD Annual Operating Report

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Executive Summary

The [NOAA Research and Development Database (NRDD)](#) is a web-based tool that serves as a single repository for research and development (R&D) project data conducted by NOAA and NOAA-funded external partners. The Fiscal Year 2021 (FY2021) NRDD Annual Operating Report provides details of system developments and enhancements made to the NRDD database, describes interactions of user and stakeholder engagement, as well as provides a brief summary of the data calls and queries conducted during FY2021.

Key System Enhancements to the NRDD in FY21:

1. Expanded Project Search: for all users

The NRDD's search tool within the 'Project Search' and 'Edit Project' tabs was expanded in an effort to communicate the true scope of each NOAA Organization's contributions to NOAA's R&D.

2. My Dashboard: for data enterers and approvers

A custom user dashboard was created to display projects for which the user is listed as the creator, data enterer, and/or approver.

3. Import Template: for Data Enterers

The Import template was created to enable bulk imports of multiple projects into the NRDD.

4. Error Checking: for all users

Error checking procedures were built into the NRDD production site and the import template in an effort to improve the completeness, consistency, and accuracy of the entered and imported R&D data.

5. NRDD Field Guide: for all users

The NRDD Field Guide provides a comprehensive overview of definitions and guidance to ensure that project entries are consistent across NOAA.

6. Single Sign-On Identity, Credential, and Access Management (ICAM): for all users

Per the request of the NOAA Research and Development Enterprise Committee (RDEC), the NRDD Development Team added the capability for NRDD users to sign in to the NRDD production site using their NOAA Common Access Card (CAC).

The NRDD has had a productive and successful year, incorporating feature enhancements that are guaranteed to optimize the user experience and improve the quality of the inputted data. This work was completed with the collaborative efforts and input of the entire NRDD community: the data enterers, the program and project managers, the NRDD Information Technology (IT) team, the RDEC and many more. This report aims to share these accomplishments and milestones delivered by the NRDD community.

Where are our users?

United States
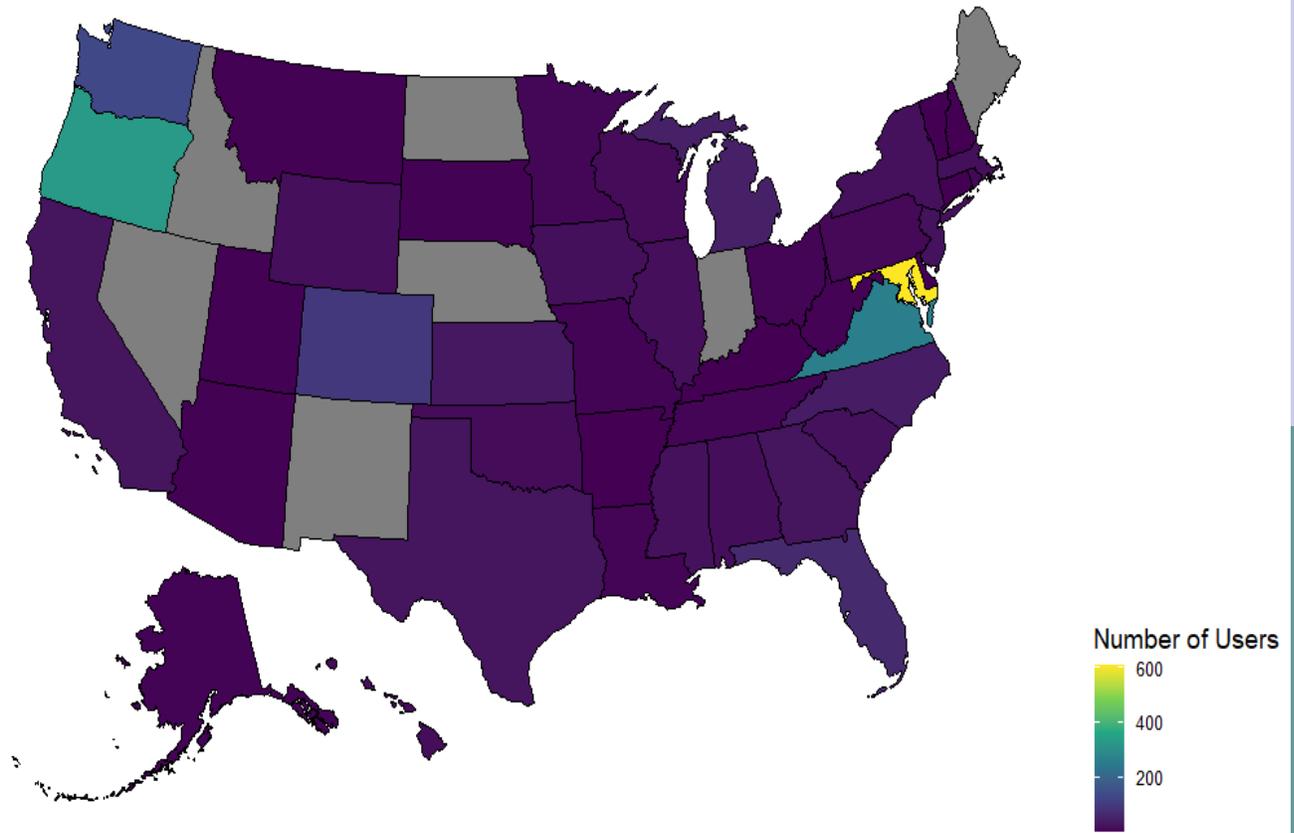
* Gray indicates no data.

Section I. Background

A. The NOAA Research and Development Database (NRDD)

The NOAA Research & Development Database (NRDD) is a secure, web-based enterprise tool that houses project management data for all R&D conducted by NOAA and its partners. The NRDD provides a consistent and comprehensive method of tracking R&D information across the agency, improving transparency and coordination, facilitating research transitions, evaluating R&D investments, and assisting with strategic planning.

The NRDD is populated with data from all NOAA Line Offices conducting research and development, either through manual uploads to the NRDD website or through bulk imports using the NRDD Import Template. The NRDD captures information such as the following: **Owners** (project title, accountable office, points of contact, project team); **Project Goals** (timeline, deliverables, milestones, and performance measures); **Description** (benefits, outcomes, and keywords); **Partners** (NOAA and external to NOAA); **Strategic Plan Linkages (**NOAA R&D Plans, Next Generation Strategic Plan, DOC Strategic Plans); **Transitions** (readiness levels and transition plans); and **Resources** (funding lines, grant numbers, planned and actual annual project cost, leveraged resources).

B. NRDD Purpose and Scope

The NOAA Science Council (NSC) is the sole executive sponsor for the NRDD. The NOAA Research and Development Enterprise Committee (RDEC), a working committee under the NOAA Science Council, provides oversight for the NRDD. Although the NRDD is a growing database, it currently does not represent the organization's full portfolio. It does however provide a high-level overview of NOAA's R&D portfolio, as well as a transparent means to tracking NOAA's R&D investments.

For the NOAA Science Council, the NRDD serves as:

- A data collection tool for the NOAA Science Reports, special R&D taskers (e.g. tracking COVID-19 related projects), and Congressional Inquiries
- An analysis tool for NOAA's R&D Enterprise Portfolio

For NOAA Line and Staff Offices, the NRDD serves as:

- A repository for NOAA's Line and Staff Office R&D portfolio
- An ancillary analysis tool for NOAA's Line and Staff Office R&D portfolio
- A means of collecting accomplishments, forms of collaborations and integration across NOAA

Section II. 2021 NRDD System Developments and Enhancements

Since the inception of the NRDD, the database has continually evolved to better meet user needs based on feedback gathered from data enterers, managers, leadership, and data analysts. Previous records of website improvements can be found in the 2020 NRDD Systems Improvement Report. In FY21 the following enhancements were made to the NRDD system:

A. *Expanded Project Search*
The NRDD Search tool, located within the Project Search and Edit Project tabs, expanded its search functions. Users are now able to search from drop lists by Line Office, Office and/or Division. Additional search filters such as Accountable Organization, NOAA Principal Investigator/Team Member Affiliations, and NOAA Partners/Adopters have been added with the option to Select All or individual checkboxes.

B. My Dashboard

This is a new custom dashboard that is available to all Data Enterers and Approvers. It lists projects for which the user is registered as the Creator, Data Enterer and/or Approver. The user is able to select projects and perform tasks like Submit, Delete and/or Edit to the desired project. The search feature enables users to search for projects by their NRDD ID, Title, Status, and Organization.

Welcome	Project Search	Create Project	Edit Project	Query Builder	Admin Dashboard	My Dashboard

Good afternoon, ishrat.jabin@noaa.gov!

You have 0 project(s) awaiting your approval.

User Dashboard Search Filters

NRDD Project ID:

NRDD Project Title:

NRDD Project Status:
-- Please select a Status --

NRDD Organization:
-- Please select an Organization--

Clear Search   Search User Projects

Select all projects (✓): ☐	NRDD Project ID ▾	Title ▾	Organization ▾	Record Owner ▾	Status ▾
☐	21476	Test Dummy - OSS	OAR - OAR HQ - OFFICE OF SCIENCE SUPPORT	Your project	Open for Data Entry
☐	20897	Demo Project -OSS	OAR - OAR HQ - OFFICE OF SCIENCE SUPPORT	Your project	Open for Data Entry
☐	19860	Demo_Test_Project	OAR - OAR HQ - OFFICE OF SCIENCE SUPPORT	Your project	Open for Data Entry

C. NRDD Import Template

The FY2021 Import Template is a coded Google spreadsheet provided to the NRDD user by the NRDD Admin team that allows for the entry of multiple projects at a time. The user will inform the NRDD Admin team when entries are completed. Subsequently, the NRDD Admin team will review and process the data file to the NRDD Development Site and then to the NRDD Production Site.

D. Error Checking

Error checking procedures were introduced into the Import Template and NRDD website for the purpose of improving its data quality attributes, such as its completeness, correctness, and consistency, to allow for more accurate R&D analyses. The error checks evaluate the project dates based on the project's current status. For example, a project that is currently "in progress" will receive an error if it has entered a Actual End Date. More details on error checking can be found in the NRDD Field Guide.

The following error checking procedures were built into the NRDD Production site and Import Template:

Current Project Status must match Actual Project Dates:

- **Unfunded:** No actual start or end date
- **Planned**: No actual start or end date
- **In Progress**: Mandatory actual start date, No actual end date
- **Completed**: Mandatory actual start date, Mandatory actual end date
- **Transitioned**: Mandatory actual start date, Mandatory actual end date
- **Pending Transition(s)**: Mandatory actual start date, Mandatory actual end date
- **Pending Deliverable(s)**: Mandatory actual start date, Mandatory actual end date
- **Pending Transition(s) & Deliverable(s)**: Mandatory actual start date, Mandatory actual end date
- **Delayed**: Optional actual start date, No actual end date
- **On Hold**: Optional actual start date, No actual end date

E.   NRDD Field Guide

The NRDD Field Guide provides a comprehensive overview of definitions and guidance to ensure that project entries are consistent across NOAA. The Field Guide explains what types of data are collected and how such data may be interpreted. This document was developed in FY21 and is replacing the former NRDD User Manual.

F.   Single Sign On / Identity, Credential, and Access Management (ICAM)

To better protect NOAA users and privileged credentials, all users must use enterprise identity and credentialing management (ICAM) solutions for authentication into NOAA systems. The OAR HQ web team migrated from local database authentication to the enterprise single sign-on service provided by the NOAA ICAM team for privileged users (content contributors and system admins). Now users are able to access the NRDD using their NOAA Common Access Card (CAC) rather than their username and password.
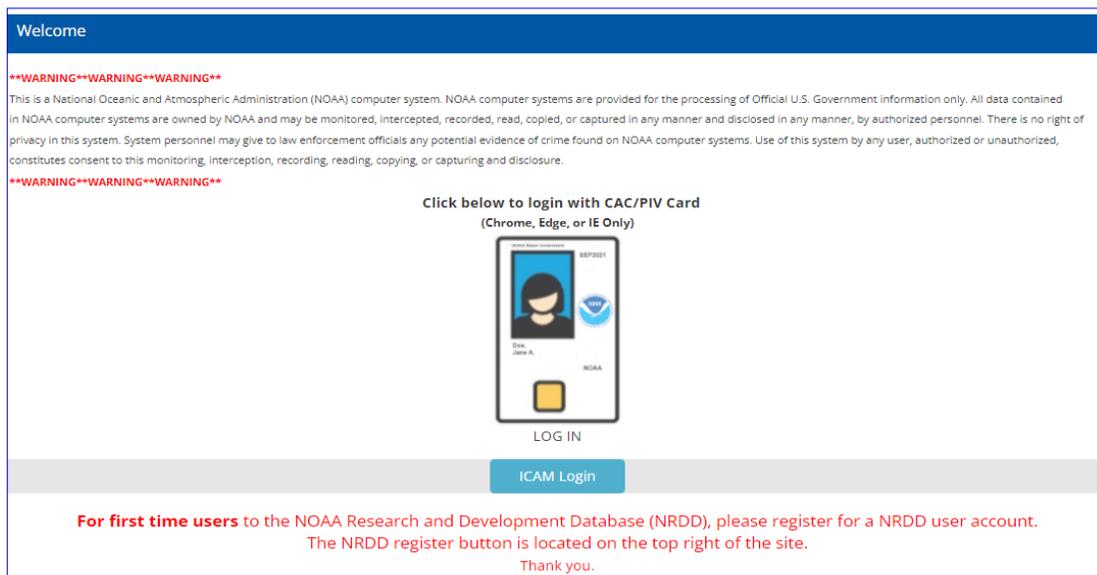
Section III. User and Stakeholder Engagement

User and stakeholder engagement is essential to ensuring that communications are streamlined directly to those impacted by system changes. The NRDD team maintains consistent and continuous interactions with the NRDD community through the Monthly Users Forum, one-on-one meetings, and email communications. The NRDD team engages with RDEC, data enterers, and data users to gather feedback on the database and to ensure that the data collected are meeting information requests from across the agency.

A. *NRDD Website Analytics*

The NRDD Web-based repository also functions as a source location for major announcements, training materials, NRDD related documents, in addition to QueryBuilder, a user-friendly Standard Query Language (SQL) query tool that is used to connect to the database and filter and find matching projects. The NRDD website uses Google Analytics to track user engagement on its individual webpages.

Figures 1 to 3, shown below, display the top 10 most popular webpages of the NRDD website with respect to unique page views and average time spent during each unique user session. Besides the main landing page, the page that received the most traffic is the '/Edit-Project' page which is used for editing and uploading projects. Over 40% of time spent on the NRDD website was used for editing projects, indicating that NRDD's most engaged users are its data enterers.
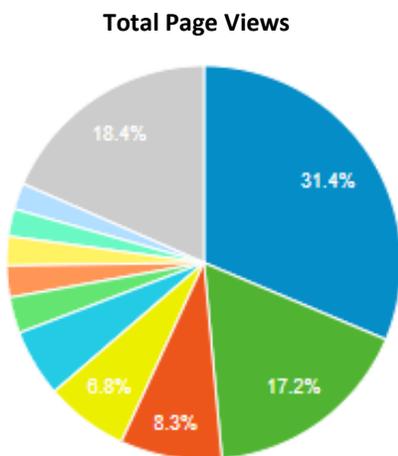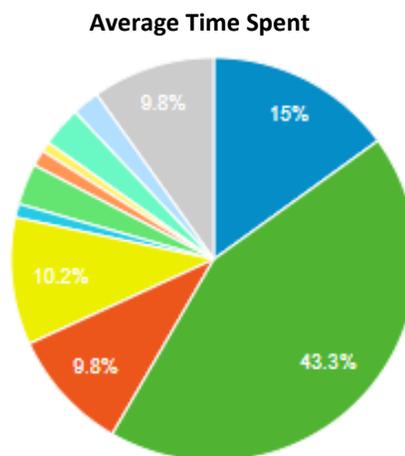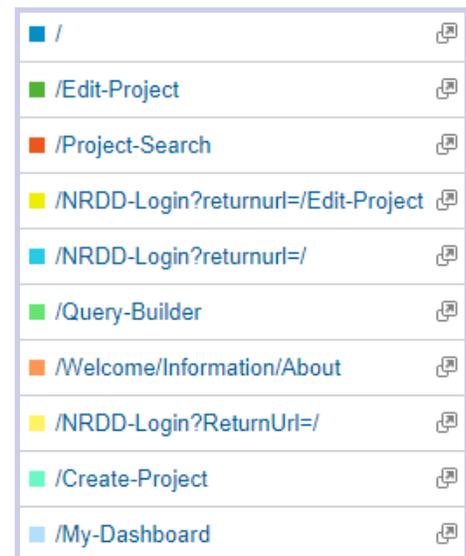
| Figure 1 | Figure 2 | Figure 3 |

Figure 1 (left) shows the percentage of total page views for the top 10 popular pages of https://researchprojects.noaa.gov/. Blue indicates the main landing page; **Figure 2** (center) shows the total percentage of time spent on the respective pages; **Figure 3** (right) shows the legend colors for Figures 1 and 2. Grey indicates other.

The NRDD currently has 790 registered users, of which are delegated roles as data viewers, data enterers, project managers, program managers, etc. Permissions can vary depending on the user's relation to the NOAA enterprise. Over the past fiscal year, there have been a monthly average of 234 unique users accessing the NRDD website (**Figure 4**). It can be observed that there is a rise and fall of users that occurs from November to April and then again from April to July. This can be attributed to the Planned and Actual Data calls that occur during these time periods and require increased engagement from data enterers. Monthly user count can be seen as high as 340 during Quarters 1 and 4 and as low as 164 during the end of Quarter 2 and beginning of Quarter 3.
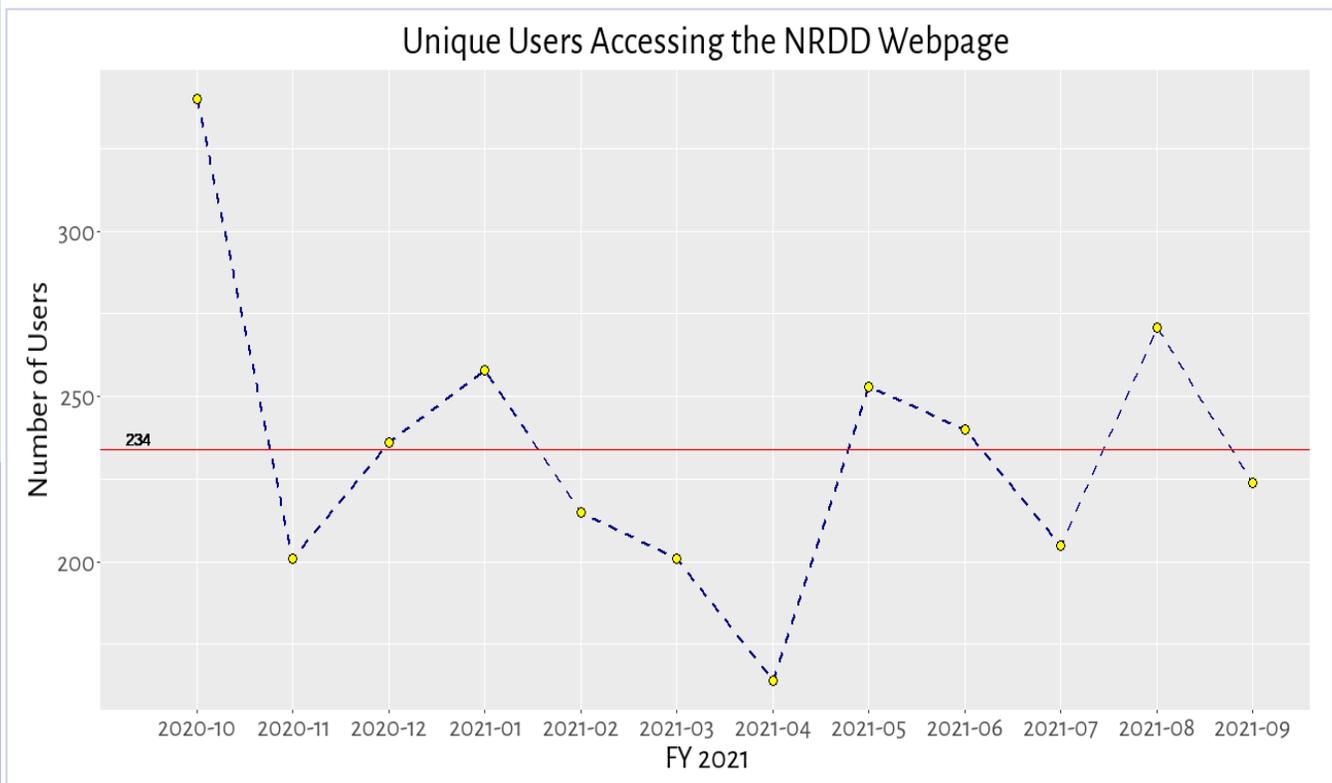
Figure 4 : Monthly count of unique users accessing the NRDD website during FY21. Red line indicates mean value.

Google Analytics also collects how many times a user accesses a webpage by aggregating page views that are generated by the same user during the same session. The NRDD Documents webpage hosts NRDD's Annual Reports, the NRDD field guide, and the 2020 NRDD Systems Improvements Report. Though this page has existed prior to FY21, the webpage received 0 views until March, after which views continued to increase to some degree (**Figure 5**). This is opposed to the NRDD Dashboard, one of the system developments introduced in the latter half of FY21, and has averaged 70.6 page views over the course of five months. Alternatively, the NRDD QueryBuilder goes through cycles of high and low page view count.
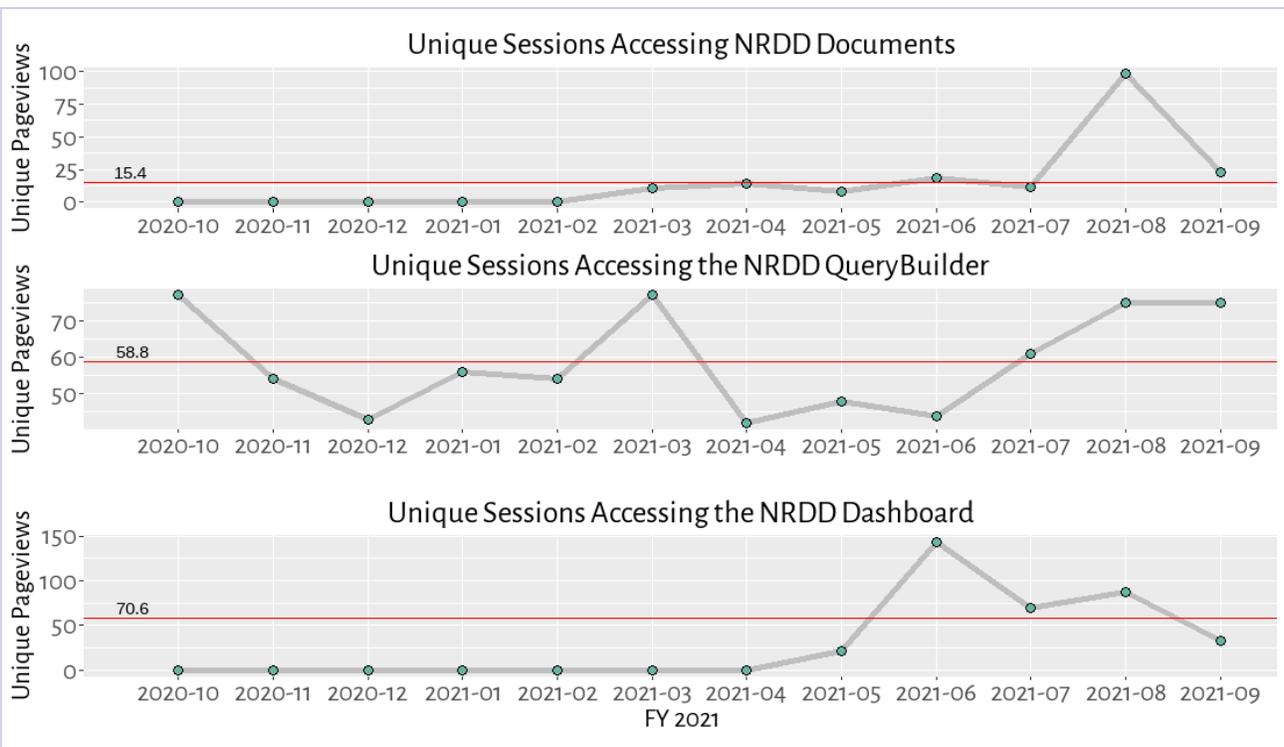
Figure 5 : Monthly count of unique user sessions for individual NRDD webpages. Red line indicates mean value for active months only. The NRDD Dashboard was implemented in May of 2021 and is therefore showing zero values for previous months.

B. Monthly Users Forum

The Monthly Users Forum is an optional monthly meeting open to all NRDD users. The NRDD management team shares announcements, updates, or website enhancements and the meeting is then opened for questions, concerns, feedback and discussion. The forum is also used as a place to exchange information between the various types of users, all coming from unique positions within their Line Offices or Committees. Forum discussion topics include FY2021 Planned and Actuals Data calls, updates to the Import Template, as well as change requests that will be presented at the RDEC meeting. Users may present difficulties that have occurred while entering data into the NRDD or offer ideas to simplify data entering procedures. Some of these ideas that have been presented to the RDEC are integrating Application Programming Interface (API) capabilities within the NRDD, project linking, and adding checkboxes that identify which projects fall under congressional bills.

C. FY2021 Actuals Data Call and Data Queries

During FY21, the NRDD was utilized by NOAA leadership and Financial Management Centers (FMCs) to achieve several different objectives. There were 20 formal query requests for information using the NRDD. One example is a request for information on OAR 'omics projects to be used for an FMC-based portfolio analysis (**Figure 6**). This information provided a general overview on the types of 'omics projects being funded in OAR and potential work that can seek future funding. NOAA leadership has primarily used this tool to minimize taskers and optimize work time. The NRDD database has also been utilized for overviews of NOAA's

internal and external partners, engagements with Federally Funded Research and Development Centers (FFRDCs), and NOAA's contributions towards the public and private sector.

Request Date	Requested R&D Project Query	NOAA Office	Purpose	Purpose Category	Search Terms and/or Filters
1/21/2021	OAR projects with 'omics	OAR	General inquire to know what's being funded and what work is going on across OAR as a start to seek more funding	FMC-Based Portfolio Analysis	LO = OAR Title, Description, Benefits contain "omic" OR "genom" OR "dna" OR "qPCR" OR "genotype" OR "molecular" not "economic" OR not "taxonomic" OR not "atomic" OR not "astronomic" only if previous omic search terms are not present
2/1/2021	OAR hydrology and water projects	OAR	Query OAR projects that deals with Hydrology and water	NOAA Leadership	LO = OAR Description contain "lake" OR "drought" OR "rainfall" OR "flood" OR "freshwater" OR "soil moisture" OR "hydrolo", "SEBN", "atmospheric river", "precipitation", "water vapor", "river" not "ocean" OR "marine" OR "salmon" OR "sportfish" OR "fish"

Figure 6: Snapshot of some queries run for OAR leadership in response to NOAA taskers.

On November 15, 2021, the NRDD Admin Team announced the FY2021 Actuals Data Call. This data call asked for updates to existing projects within the NRDD. These updates could be changes to Project Status, Readiness Levels (RLs), or Project Dates. It is also possible that a project may not have any updates. The Data Call officially closed on January 31, 2022, although many updates continued to be made afterwards. Line Office response to the FY21 Actuals Data Call can be seen in **Figure 7**.
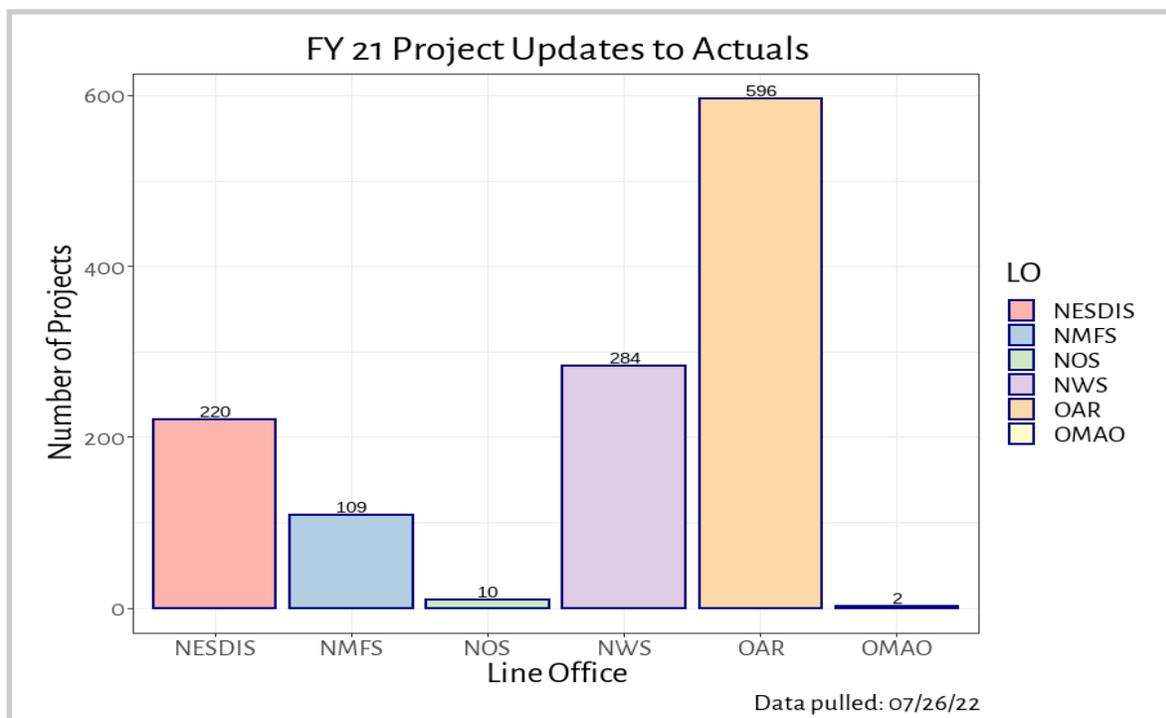

Figure 7: Line Office participation during the FY21 Actuals Data Call. This information was determined using the 'Last Record Update' field and only included updates made between November 15, 2021 and July 26, 2022. These numbers do not reflect the project updates made to new FY22 project entries.

Figure 7 represents updates made between November 15, 2021 and July 26, 2022. This does not include the new project entries made during the FY22 Project Plans Data Call, nor does it include updates to those FY22 Project entries. Because each Line Office can have varying degrees of input to the NRDD, the number of updates can also vary significantly. To put this into perspective, **Figure 8** displays the total percent of projects that were updated by each Line Office. NESDIS, for example, has updated 70% of their Line Office project entries.
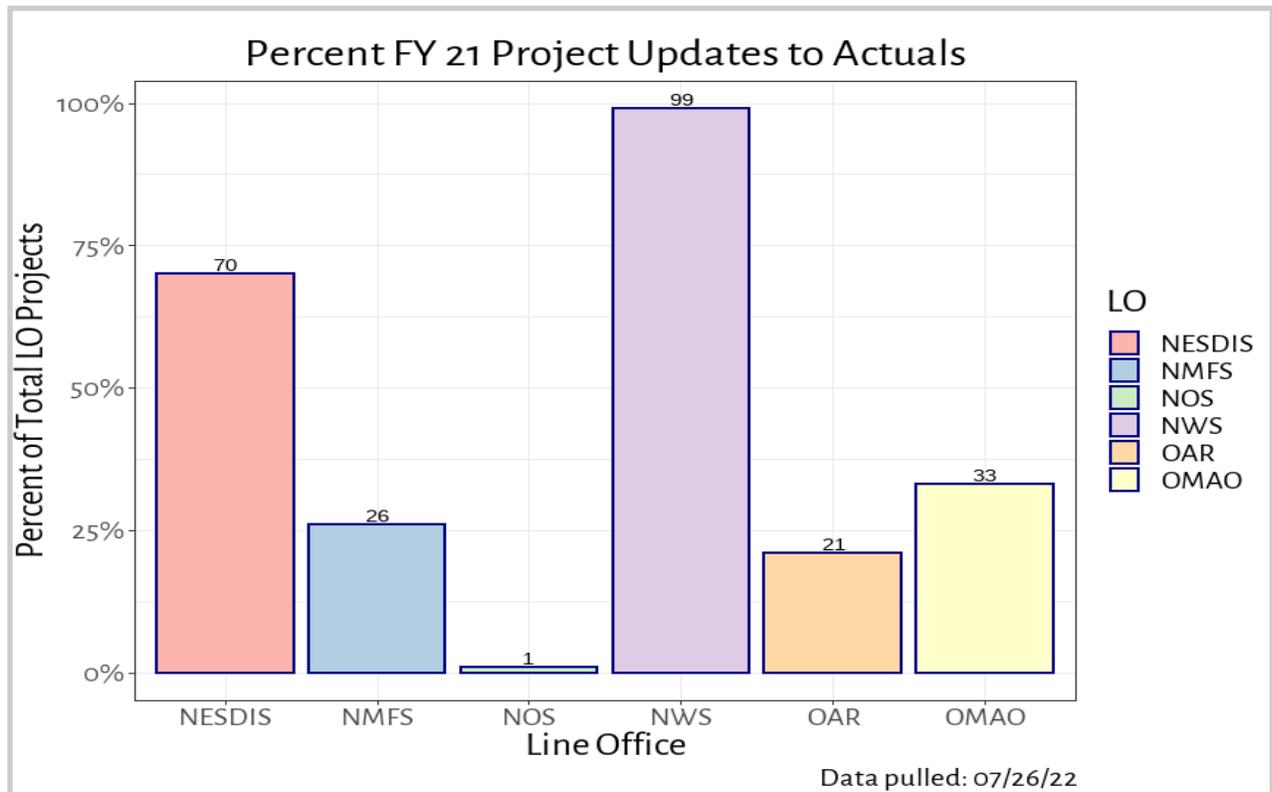

Figure 8: Percent of projects updated by each Line Office. This information was determined by taking the number of updates made during the FY21 Actuals Data Call over the total number of projects the respective Line Office has in the NRDD. These numbers do not reflect the project updates made to new FY22 project entries.

The second data call that takes place during the Fiscal Year is the Project Plans Data Call. During the Project Plans Data Call, only new projects are imported or uploaded to the NRDD. Data enterers, however, still have the option to submit new project entries throughout the year. A yearly distribution of new project uploads can be found in **Figure 9**.
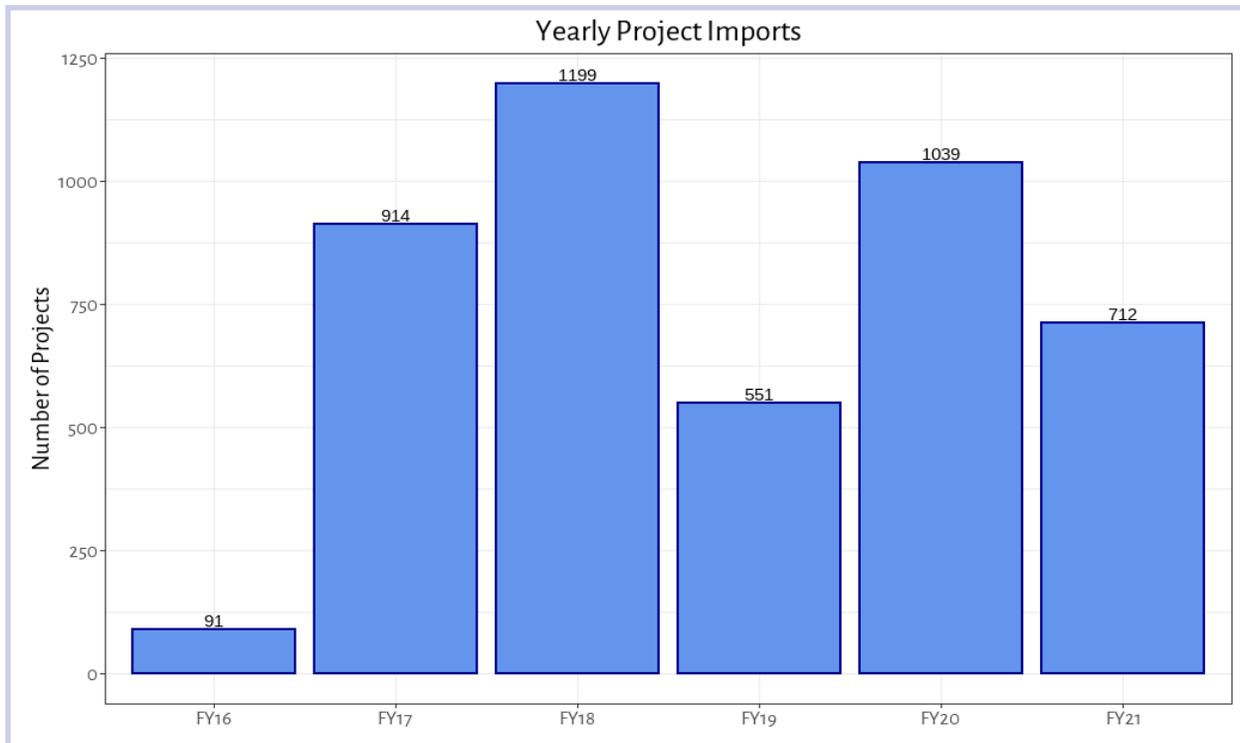
Figure 9: Yearly Project Imports are new project imports into the NRDD. This information was determined from project 'Creation Date'.

Conclusion

The FY21 NRDD Annual Operating Report is a testament to the work being done by the NRDD Community. The feature enhancements of 'Project Search', 'My Dashboard', 'ICAM single sign on', and 'Error Checking' have been designed to improve the user experience, to optimize user time, and to ensure that NOAA's investment of its repository is beneficial. These improvements were implemented through direct feedback and contribution from the NRDD users. The website analytics will be used to inform future developments so that progress is made in areas where users find most utility. The NRDD community continues to welcome more data, more feedback, and looks forward to implementing new and improved features in 2022.

Future Improvements

The NRDD aims to become a one stop repository for all of NOAA R&D. Over the last few years, the NRDD has witnessed greater compliance, quality, and consistency in the data and will continue to see such improvements. It has also seen greater engagement from new users coming from different areas of NOAA. The NRDD team is working hard to ensure that all users, be it data enterers or NOAA leadership, are receiving the full benefits from the investment that they have put their time and resources into.

In the coming years, there will be more conversations surrounding Application Programming Interface (API) integration into the NRDD. API capabilities can change how users import and export data, potentially saving time in the long run. The NRDD IT team is also exploring the possibility of moving the NRDD to the 'Cloud' and addressing risks to IT infrastructure. Other priorities include ensuring that NRDD data quality stays at satisfactory levels for portfolio analysis and high level taskers.

It has been a productive and dynamic year for the NRDD community, and we look forward to sharing many more accomplishments in 2022!

Glossary of Terms

1. Import Template

Import is the process by which data is submitted by the user, using the NRDD Import Template. The import template is coded to include error checking to facilitate the data entry process.

2. Change Request Form

A Change Request Form is to be completed with any proposed improvements and enhancements to the NRDD system. The form requires review and approval by the RDEC.

3. Data Call

A data call is an identified period of time to allow entry or updates to R&D project entries.

4. Application Programming Interface (API)

API is a set of programming code that enables data transmission between one software product and another. API integration into NRDD would enable quicker transfer of information from one database to the NRDD, without a 3rd party involvement.

5. Project Definition

The NRDD defines an R&D project as an effort that either develops or improves upon a technology, or is hypothesis-driven research. A project must have ALL of the following 4 criteria:

1. Defined objective(s), and final deliverable
2. Defined endpoint/timeline (generally up to 4 years, but can be longer for some projects)
3. Defined resources (one or more of the following):
   a) Budget
   b) Personnel working on the project (FTE time or dollars)
   c) Other leveraged resources (e.g., ship or aircraft time)
4. Designated single Readiness Level (see NAO 216-115A)

Please note: Observing/monitoring systems that are operational are NOT considered R&D projects, even if effort and/or funds are spent to maintain these systems, and even if they are generating scientific data. However, each hypothesis-driven endeavor that uses the resulting data to answer a specific scientific question WOULD be entered into the NRDD as its own project. Similarly, any efforts to improve upon the observing/monitoring system technology would be entered as projects.