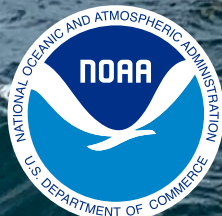


# 2023 ANNUAL OPERATING REPORT

NOAA RESEARCH AND DEVELOPMENT DATABASE



U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

# 2023 NOAA RESEARCH AND DEVELOPMENT DATABASE ANNUAL OPERATING REPORT

NOAA Technical Memorandum OAR OSS-004

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Office of Science Support  
NRDD Management and Development Team

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## ACKNOWLEDGEMENTS

This work was completed with the collaborative efforts and input of the entire NRDD community: data enterers, program and project managers, the NRDD Information Technology (IT) team, the Research and Development Enterprise Committee (RDEC) and many more. This report aims to share the accomplishments and milestones delivered by the NRDD community.

## COVER PHOTO

NOAA Great Lakes Environmental Research Laboratory's (GLERL) Real-time Coastal Observation Network (ReCON) buoy off the coast of Muskegon, MI. The use of ReCON buoys, included among 6,000+ R&D projects in the NRDD, support continuous collection of meteorological data and a variety of sub-surface measurements. Credit: [NOAA GLERL](#)



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<sup>1</sup> NRDD team members who contributed to NRDD management and development efforts in 2023, but were no longer involved with the NRDD at the time of this report.

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# EXECUTIVE SUMMARY

The National Oceanic and Atmospheric Administration (NOAA) Administrative Order (NAO) 216-115B provides guidance by which research and development throughout NOAA can be continually planned, reviewed, evaluated, and rebalanced according to evolving mission needs. This NAO mandates that for NOAA to maintain accountability for its research and development (R&D) portfolio, planned and actual investments for NOAA R&D will be enumerated and monitored in a database. NOAA monitors its research and development portfolio through the [NOAA Research and Development Database \(NRDD\)](#), an online repository serving as a single access point for data on R&D projects conducted by NOAA and NOAA-funded external partners.

The 2023 NRDD Annual Operating Report provides an overview of NRDD data inputs, usage, stakeholder engagement, and improvements made during 2023, to inform the Research and Development Enterprise Committee (RDEC) and the NRDD user community how NRDD funding is used.

In 2023, users submitted data for 1,213 new project entries and made updates on over 470 projects. As of May 2024, there were 5,477 approved project entries in the NRDD system, 784 of which were active, ongoing projects.

The NRDD management team continued its efforts in user and stakeholder engagement through quarterly user forum meetings, monthly email announcements, and Application Programming Interface (API) literacy efforts.

The NRDD development team launched five key improvements in 2023:

- 1. Implementation of the NRDD Application Programming Interface (API)** for export of NRDD data. The API facilitates automated data transfer from the NRDD into other applications (e.g. RStudio) for data use and analysis. The implementation of an API into the data pipeline expands the usability of NRDD data by streamlining data extraction processes and simplifying data analysis workflows.
- 2. NRDD Live Data Dashboard**, which offers a dynamic high-level view of NRDD data and provides a snapshot of NOAA's R&D portfolio.
- 3. Collaborative Project fields**, which make it possible to attribute NRDD projects to multiple NOAA offices, which streamlines data entry and provides recognition to cross-organizational collaborations.
- 4. Reduction in Mandatory Fields**, in which the number of required data fields for NRDD project entries was reduced from 46 to 20, easing the burden on data providers and enterers, while improving the quality of required data fields that support NOAA enterprise needs.
- 5. Bulk Error Checking** for bulk data ingestion templates, which allow users to check and correct data validation errors themselves, increasing transparency of NRDD data requirements and streamlining bulk data import processes.

In 2024, the NRDD website will undergo a migration to a new cloud-based platform, enabling opportunities for cloud-based integrations and other enhanced development capabilities in the future.

# SECTION I. BACKGROUND

## ABOUT THE NRDD

NOAA monitors its research and development (R&D) portfolio through the [NRDD](#), an online repository that serves as a single access point for data on R&D projects conducted by NOAA and NOAA-funded external partners. The NRDD supports the implementation of [NAO 216-115B](#) by helping to capture consistent and comprehensive information on NOAA's R&D investments.

The NRDD is populated with information from all NOAA line offices that conduct R&D activities and captures the following R&D project management data:<sup>2</sup>

Category	Mandatory data fields	Optional data fields
<b>Owners</b>	Project title, accountable office, point of contact, principal investigator	Executing office (for collaborative projects), project team
<b>Project Goals</b>	Project status, project dates	Deliverables, milestones, LO performance measures
<b>Description</b>	Description, benefits	Outcomes, project documents, URLs, keywords, linkages to special projects
<b>Transitions</b>	Current readiness level, transition plan status	Planned readiness levels, transition adopters, transition types, transition dates
<b>Partners</b>	NOAA partners, external partners	Project stakeholders
<b>Strategic Plans</b>	None	Linkages to goals in Department of Commerce Strategic Plan, NOAA Strategic Plan, and NOAA R&D Plans
<b>Resources<sup>3</sup></b>	None	Funding lines, grant numbers, planned and actual project cost, and leveraged resources

The NRDD standardizes these project metadata to enable discovery and access to R&D information across NOAA and between NOAA line offices. To date, the NRDD houses information on over 5,000 R&D projects, and information can be accessed by all NOAA federal and contract staff who request an NRDD account.

As per NAO 216-115B, the NOAA Science Council coordinates all matters of R&D within NOAA and is the sole executive sponsor for the NRDD. The Procedural Handbook for NAO 216-115B establishes

<sup>2</sup> Not all NRDD data fields/types are mandatory. See the [NRDD Fields List](#) for information on which data fields are currently required and historical changes in mandatory field requirements.

<sup>3</sup> Resource information data fields are optional and are only visible for certain NRDD users.

that 1) the RDEC, a working committee under the NOAA Science Council, provides oversight for the NRDD and 2) the NRDD management team is responsible for managing the overall design and functional integrity of the NRDD from a technical perspective.

## NRDD PURPOSE AND SCOPE

The NRDD aims to support NOAA's R&D enterprise and project management by improving the transparency and coordination of R&D activities, facilitating research transitions, and assisting with strategic planning efforts. The NRDD provides a unique benefit to NOAA in that it contains R&D project information from *across* NOAA, allowing access to information on R&D efforts of multiple NOAA Line Offices in a single, consistent location.

More specifically, the NRDD supports **enterprise management** by providing:

- A data collection tool for monitoring NOAA's R&D portfolio in specific topical areas and responding to special R&D taskers (assigned tasks or activities to be completed within a designated time frame) and Congressional Inquiries.
- Support for NOAA's ability to transition research to operations, applications, commercialization, and other uses by tracking readiness level progression, completed transitions, and providing a repository for all signed transition plans.
- A means of collecting information on accomplishments, internal and external collaborations, and integration across NOAA.

In terms of **project management**, the NRDD:

- Enables individual labs, programs, and science centers to keep track of their respective project milestones and metrics;
- Provides cross-NOAA visibility to individual labs, programs, and their R&D progress;
- Enables recognition and attribution of lab and program scientists and their contributions to NOAA's R&D portfolio; and
- Facilitates opportunities for conversations between principal investigators (PIs), NRDD data enters, and project managers on NOAA priorities and strategic goals.

The NRDD houses information on R&D projects from across NOAA line offices. While it is a growing database, NRDD currently does not represent the organization's full portfolio, as participation and engagement, including amounts of R&D project entries and updates, varies by NOAA line office.

In this report, we highlight how the NRDD was used in 2023, including project data updates, uses of the website and NRDD application, and requests for NRDD data. We also discuss ongoing activities with user and stakeholder engagement and improvements made to the NRDD application during 2023. Finally, we preview ongoing and upcoming NRDD improvements in the next year.

# SECTION II. NRDD USAGE & ANALYTICS

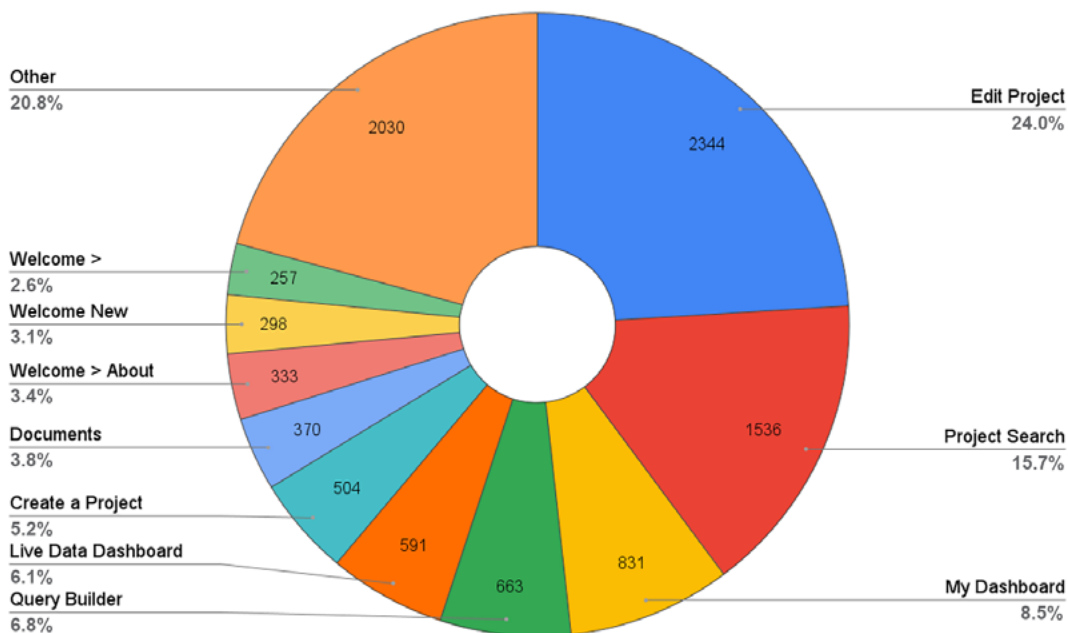
## NRDD WEBSITE & USER ANALYTICS

The NRDD website hosts the NRDD application, which includes the create/edit project interface, project search, project summaries, user dashboards, and QueryBuilder, a user-friendly Standard Query Language (SQL) tool that allows users to search and export project data. In addition to the application itself, users access the website for general NRDD information, announcements, [training materials](#), technical reports, and to register for an NRDD account.

There are 755<sup>4</sup> registered NRDD users, each with a designated NRDD user role (data viewers, data enterers, approvers, etc.). In 2023, the NRDD team created 82 new NRDD user accounts.

With Google Analytics, we can track user engagement to assess user behavior on the website and the NRDD application. The NRDD web team migrated to the NRDD’s Google Analytics account from Universal Analytics to Google Analytics 4 (GA4)<sup>5</sup> in early 2023, as Universal Analytics would stop operating in July 2023. As a result of this transition, there is a gap in analytics data between January 2023 and March 2023 and some variability between the metrics in this report compared to previous annual operating reports.

Figure 1 displays the top 10 most popular web pages of the NRDD website in 2023, based on number of pageviews.<sup>6</sup> The figure does not include pageviews of the NRDD homepage or login page.



**Figure 1:** Percent and total pageviews for the top 10 pages of <https://researchprojects.noaa.gov/>, not including the Home or Login page.

<sup>4</sup> As of April 2024. In April 2024, the NRDD management team conducted a bulk cleanup of NRDD user accounts of individuals who are no longer at NOAA. As a result, the total number of users may be lower than user counts reported in previous years.

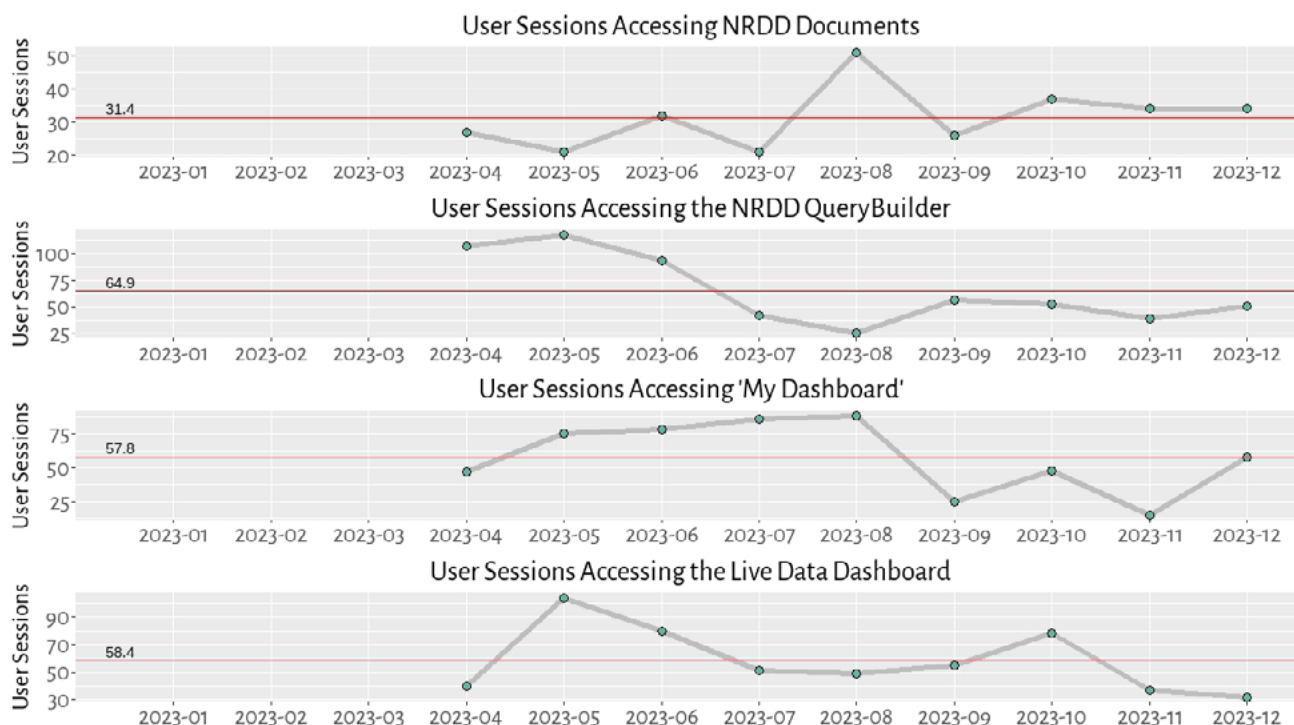
<sup>5</sup> <https://support.google.com/analytics/answer/10089681?hl=en>

<sup>6</sup> In GA4 Analytics, a pageview is the total number of app screens and/or web pages the user viewed. Repeated views of a single screen or page are counted. GA4 Analytics does not collect unique pageview counts as it previously did with Universal Analytics.

The Edit Project page (used for editing and submitting projects) received the most traffic, which was consistent with trends from previous years. The second and third most visited pages were Project Search and My Dashboard. These trends are unsurprising, given that users' primary use of the NRDD site is to update and submit projects to the database.

We can also track trends in visitation and usage of specific pages on the NRDD site over the course of the year (Figure 2). For instance:

- Visits to the **NRDD Documents** page were relatively consistent at an average of 31 sessions<sup>7</sup> per month, with an increase in August, following the release of the 2022 Annual Operating Report.
- **My Dashboard**, a custom user dashboard for data enterers and approvers averaged 58 sessions per month and usage also peaked in August.
- **NRDD QueryBuilder** averaged 65 sessions per month and the **Live Data Dashboard** had 58 sessions per month on average. They went through similar cyclical waves with sessions peaking in May, dropping in August, and increasing slightly in the Fall.



**Figure 2:** Monthly count of user sessions for four different NRDD webpages: NRDD Documents page, NRDD QueryBuilder, NRDD 'My Dashboard', and Live Data Dashboard in 2023. (Due to the transition from Universal Analytics to GA4, there is a gap in data between January 2023 and March 2023.) The red line indicates the mean number of user sessions per month for each page.

## PROJECT DATA - IMPORTS AND UPDATES

Each year, the NOAA RDEC establishes timelines for two NRDD data calls:

1. **Project Plans Data Call** in which users are asked to enter new projects that are still in the planning phase or ongoing/older projects that have not yet been entered into the database. The FY23 Project Plans Data Call took place from May 1st, 2023 to July 31st, 2023.

<sup>7</sup> Sessions are defined by GA4 Analytics as a period of time during which a user interacts with the website or app.

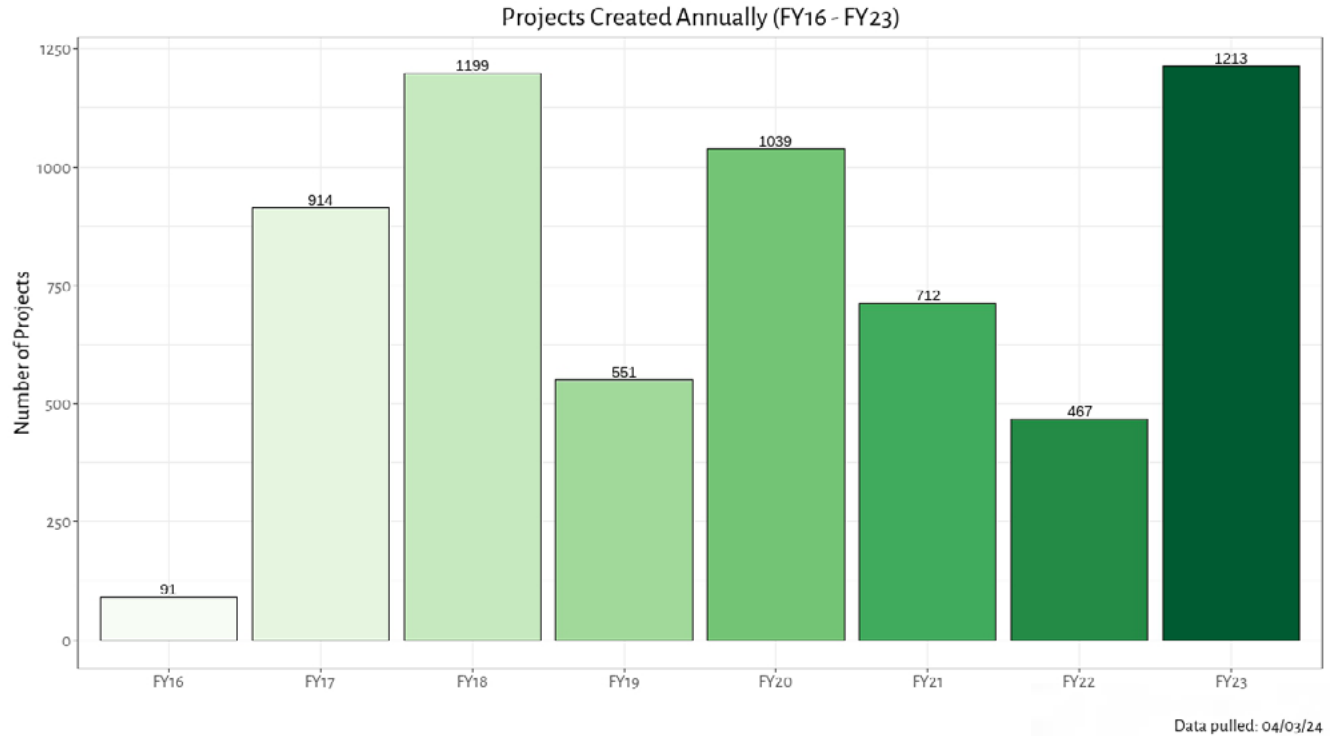


**2. Project Actuals Data Call** in which users are asked to update existing project entries in the database with actuals information, including changes to project status, readiness levels, or project dates. The FY23 Project Actuals Data Call took place from November 1st, 2023 to March 31st, 2024. The RDEC granted users an optional extension to the FY23 Project Actuals Data Call to balance competing priorities of users.

The NRDD management team monitors line office imports and updates to the database to ensure that entries are in line with line office benchmarks and to help mitigate issues related to data entry.

## NEW PROJECT ENTRIES

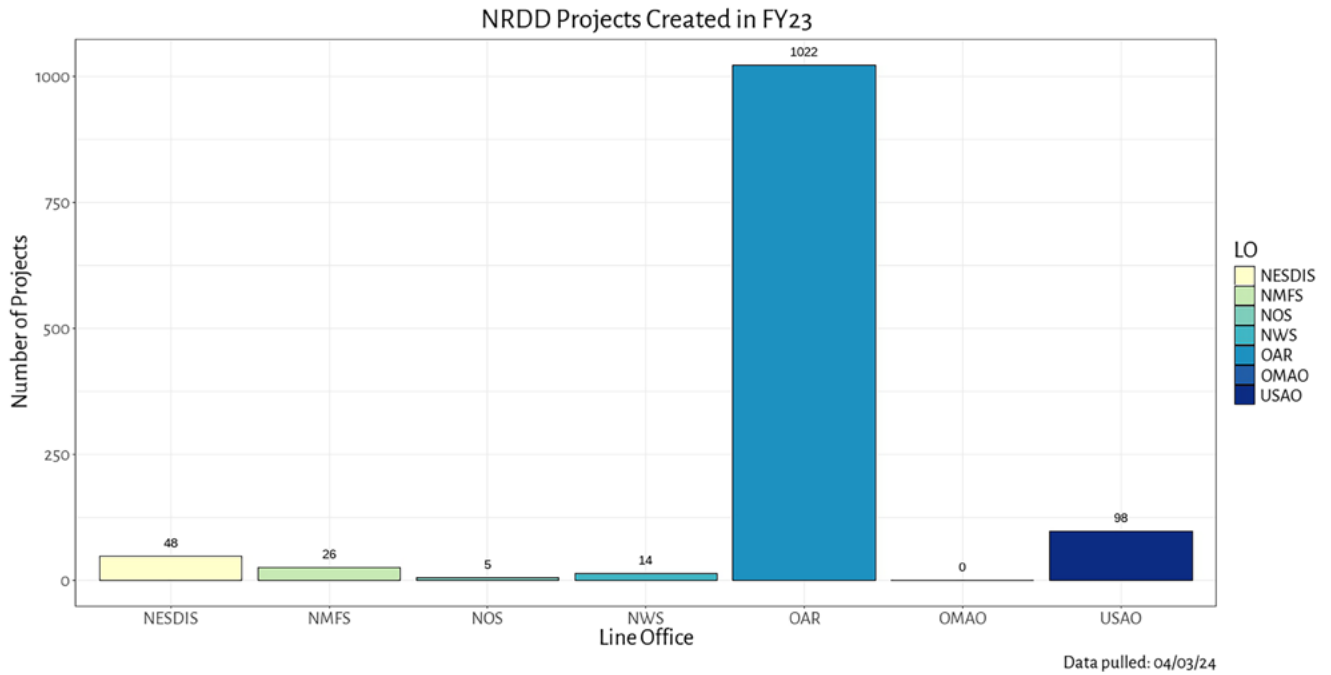
Users added 1,213 new R&D project entries to the NRDD during FY23. The amount of data ingested into NRDD fluctuates from year to year and sometimes spikes, which can be due to an office's ingestion of several years' worth of data at once. This is visible in Figure 3 which displays the yearly distribution of all new NOAA project uploads. Additionally, not all labs, programs, or offices participate in every data call. Therefore, their participation in data entry, or lack thereof, for a particular year will influence the annual numbers.



**Figure 3:** New project entries added to the NRDD for the respective fiscal year. This information was determined from the project 'Creation Date.'

The total number of new projects provided by each line office in FY23 is depicted in Figure 4. Due to OAR's larger R&D budget,<sup>8</sup> it is expected that OAR has higher numbers of projects in the NRDD compared to other line offices.

<sup>8</sup> 2022 NOAA Science Report



**Figure 4:** Number of project entries created in the NRDD in FY23 (October 1, 2022, to September 30, 2023) by each line office.

## PROJECT UPDATES

Users made updates to 473 existing projects during the FY23 Project Actuals Data Call (conducted from November 1st, 2023 to March 31st, 2024). Table 1 lists the number of projects updated by each line office and how much they contribute to the line office’s total portfolio. These numbers do not include new project entries made during this period.

Not all projects are expected to have changes during the Project Actuals Data Call, as each project experiences a unique process and timeline.

**Table 1:** Column 2 reflects the total number of projects updated by each line office during the FY23 Project Actuals Data Call. Column 3 lists the total number of line office projects in the NRDD. Column 4 reflects the percentage of the line office’s portfolio updated during the data call.

Line Office	FY23 Updates to Actuals	Total Projects per Line Office	Percent of Line Office Portfolio Updated
NESDIS	127	376	33.8%
NMFS	51	457	11.2%
NOS	13	713	1.8%
NWS	4	369	1.1%
OAR	258	4092	6.3%
OMAO	20	22	90.9%
USAO	0	117	0.0%

## 2023 NRDD DATA USE

In 2023, the NRDD management team received eight formal query requests to extract NRDD data. It should be noted that as users become more comfortable using QueryBuilder, formal query requests come less frequently<sup>9</sup> to the NRDD management team and, thus, we cannot report a complete account of all NRDD queries and use cases.

Most, but not all, formal NRDD query requests aimed to respond to inquiries from the United States Congress and NOAA leadership. Examples included:

- The Senate Commerce Committee asked if NOAA had any information or relevant work related to the costs or impacts of severe cold events and risk factors. An NRDD query showcased 14 potentially relevant NOAA R&D projects being conducted in partnership with different Cooperative Institutes.
- The Office of Legislative and Intergovernmental Affairs requested that OAR provide a summary of recent or upcoming Texas-based funding opportunities, or Texas-based projects to help the Gulf Coast Regional Team prepare for a NOAA 101 for the Texas Congressional delegation. An NRDD query showcased 122 R&D projects and 16 Texas-based partners.
- A cross-line office tasker requested information on ongoing coastal resilience efforts within NOAA to prepare a 3-Things Memo (3TM) for NOAA Administrator Dr. Spinrad. The request aimed to provide information for an upcoming meeting with Hill officials on the feasibility of establishing a new Cooperative Institute focused on coastal resilience research. A search of the NRDD yielded information on 93 ongoing NOAA R&D projects related to coastal resilience, along with many other completed projects on this topic.

## EXAMPLES OF NRDD APPLICATIONS IN 2023

We asked some of our data users to share their experience using the NRDD and its R&D project data in 2023.

### OAR POLICY TEAM

The OAR Policy Team regularly uses information from the NRDD to respond to requests from NOAA or OAR leadership. OAR Policy Team members Maureen Brooks and Tiffany Atkinson shared their experience using the NRDD to find and compile information during FY23.

The information the OAR Policy Team gathers from NRDD is often included directly in talking points and 3TMs for leadership or provided as background information for leadership requests, in case of longer lists and exports. The team uses NRDD data on external partners most frequently but also searches for information by subject matter, keyword, or project description.

Maureen and Tiffany said they typically use NRDD's QueryBuilder to gather the information they need. It can take some training to understand how to use the QueryBuilder tool, but after the initial learning curve, they have found it easy to use.

"Having access to the NRDD has definitely saved [the OAR Policy Team] from having to task things out further," Maureen explained. In FY23, the team queried the NRDD for 92 taskers, about a quarter

<sup>9</sup> By comparison, the NRDD team received 11 formal query requests in 2022 and 20 in 2021.

of the 359 taskers they received that year. If the NRDD did not exist, the team would likely have to look for information on public websites and send out taskers for subject matter experts to find what they need.

**“ It really does help a lot for getting their work in front of leadership. ”**

For requests that do need to be tasked out further, the OAR Policy Team uses NRDD data to pre-populate information before sending requests. In some cases, the NRDD helps them narrow down who they should reach out to if they need more information.

Maureen and Tiffany also commented on some of the challenges and downsides of using the NRDD. They know that the data in the NRDD is not complete and that many NOAA R&D projects are not yet in the database.

They also think there is a great opportunity for increasing awareness about R&D projects at NOAA through the NRDD. “It really does help a lot for getting their work in front of leadership,” said Tiffany.

## **SECTION III. USER AND STAKEHOLDER ENGAGEMENT**

The NRDD management team maintains ongoing communications with its users to provide key updates, troubleshoot issues, offer support, and gather feedback. Communication activities include quarterly user forums, monthly announcements, group or individual training sessions, one-on-one meetings, and email communications with users and other stakeholders. The NRDD management team strives to facilitate open lines of communication with users to gather feedback to inform improvements in the function and use of the NRDD for all users.

During 2023, major user and stakeholder engagement activities included API literacy efforts and quarterly user forums.

### **APPLICATION PROGRAMMING INTERFACE (API) LITERACY**

Per the NOAA RDEC approved change request that was requested by NESDIS’ National Centers for Environmental Information and OAR’s Pacific Marine Environmental Laboratory, the NRDD team completed the development of an API for exporting data from the database in 2023. For more information about what an API is and how the NRDD API works, see [Section IV](#).

As APIs may be a new or complicated topic for many users, the NRDD team began an API literacy process, developing tools and documents to help mitigate barriers to accessing the API. To demonstrate how to connect to the API, the NRDD team developed a standard code in R programming language. Using ‘httr’ and ‘jsonlite’ packages, the R script connects to the NRDD API, pulls data in a JSON (JavaScript Object Notation) format, and then converts it to R data frames. This script breakdown helps to communicate the different components of REpresentational State

Transfer (REST), such as URL endpoints, HTTP request methods, authentication and authorization, and cookie storage.

The NRDD team shared this work at an NRDD Users Forum meeting and with NOAA Central Library staff.

## NRDD USER FORUM

The NRDD User Forum is an email distribution group available to all NRDD users, although only around 34% (259) of the NRDD's 755 users have opted into joining the group.

Those who join the NRDD User Forum group are invited to quarterly user forum meetings and receive monthly announcement emails that contain updates, reminders, and other information about the NRDD.

During 2023, the NRDD management team held four user forum meetings to update users on system changes, solicit feedback, provide an open forum for concerns, and address topics of interest to users. In addition to ongoing updates and reminders, special topics covered during the 2023 user forum meetings included:

- Results of the 2022 NRDD Data Use Survey
- Readiness Level Training Task Force
- Discussion on how NRDD data is used
- Updates on mandatory field requirements

Attendance at NRDD User Forum meetings generally ranged between 10 and 20 attendees.

# SECTION IV. NRDD SYSTEM DEVELOPMENTS AND ENHANCEMENTS

In 2023, the NRDD management and development teams implemented several new features and enhancements, which were driven by feedback from NRDD users and NOAA leadership. Improvements included a new live data dashboard, data fields for collaborative projects, a reduction in the number of mandatory fields, and bulk error-checking changes.<sup>10</sup>

For information on NRDD developments and improvements prior to 2022, see [Appendix C: NRRD Evolution & Improvements 2016-2022](#).

## NRDD APPLICATION PROGRAMMING INTERFACE (API) IMPLEMENTATION

In 2023, the NRDD team successfully completed the development of an NRDD API. APIs facilitate data transfer between databases (e.g. line office data sources and the NRDD) and can streamline and automate data-sharing processes for users.

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<sup>10</sup> In addition to the implemented changes, two change requests were considered by the RDEC, but not approved for implementation: 1) adding a data field to capture the Open Researcher and Contributor ID (ORCID iD) and 2) changing the source of the keyword structure, using the Global Change Master Directory (GCMD).

The current version of the NRDD API conforms to REST architecture and is designed to pull data out of the database in JSON format. This gives users the capability to pull NRDD data directly from the Command Prompt of their operating system, an integrated development environment (IDE), or even from tools like Google Sheets.

Data is pulled in a manner similar to NRDD’s QueryBuilder, with different data tables, each associated with a set of data fields. For example, the External Partners data table provides information for data fields such as external partner name, external partner state, etc. Users can specify projects, table(s) to pull the data from, data fields to include, and more using the API.

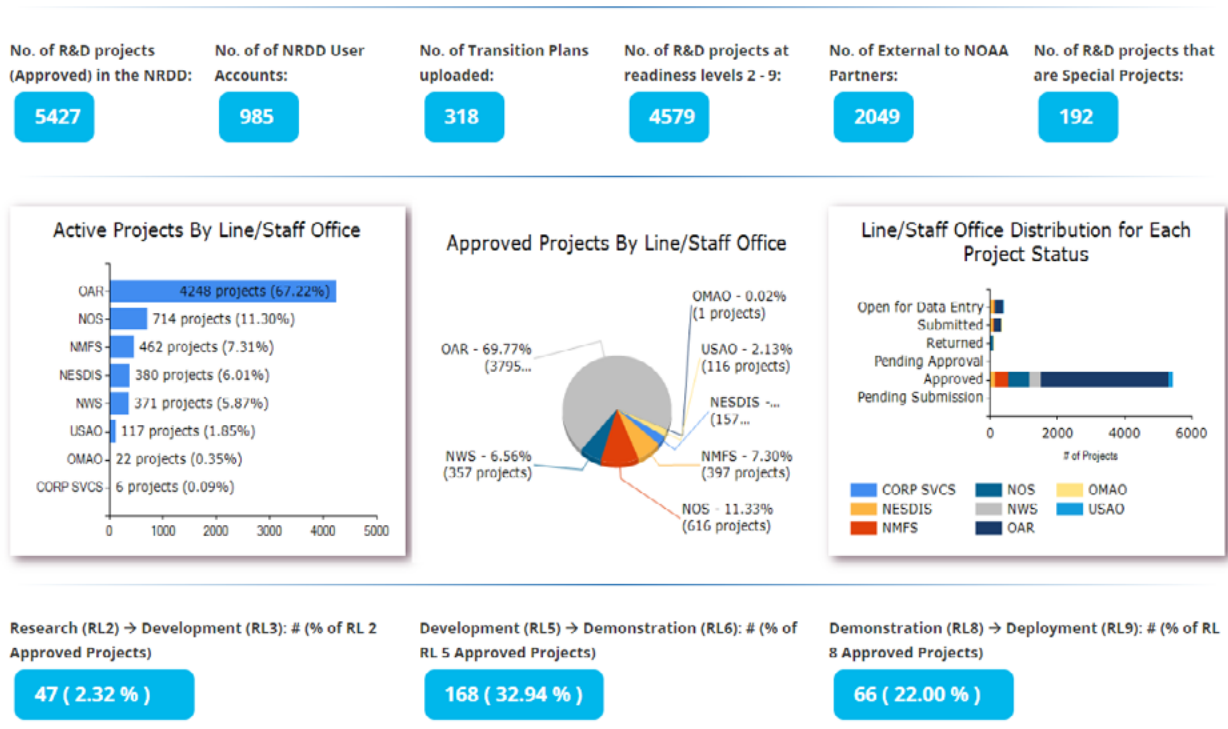
The NRDD team has documented the query process and developed materials to support users in using the API (See Section III). API-based data access eliminates the need for users to access the NRDD website and manually query data from QueryBuilder, saving them time and effort.

While the NRDD API is currently only set up to “pull” data from the NRDD, the potential long-term goal would be to develop additional API procedures that allow for data ingestion into the NRDD as well.

## NRDD LIVE DATA DASHBOARD

In June 2023, the NRDD management and development teams launched a new [data dashboard](#) populated with live data from the NRDD. This dashboard improved on the earlier [Live Charts](#) feature by offering a more dynamic view and easier user exploration of NRDD information in several areas.

The Live Data Dashboard was further improved upon and refined to address specific user questions and requests, such as featuring the number of R&D projects funded through special project initiatives (e.g. Inflation Reduction Act, Disaster Supplementals).



**Figure 5:** Snapshot of the NRDD Live Data Dashboard as of March 2024. The dashboard includes key statistics and charts about NOAA R&D projects in the NRDD.

## COLLABORATIVE PROJECTS

An option for users to create ‘collaborative projects’ was introduced to the NRDD system in 2023. This change makes it possible to attribute individual NRDD projects to multiple NOAA offices, thereby avoiding duplication and providing better recognition of inter-office collaborations.

This change involved:

- Adding a checkbox in the project editor to indicate when an initiative is a Collaborative Project
- Renaming the *Accountable Organization* field to *Primary Funding Office (Accountable Organization)*
- Adding a new *Executing Office(s)* data field that allows multiple offices to be listed

With the implemented changes, projects can be attributed to multiple offices. Offices can then work together on a single entry to maintain, update, manage, and track projects, eliminating duplicate entries.

## MANDATORY DATA FIELD REDUCTION

Following a suggestion by NWS to the RDEC to assess the utility of the NRDD and adapt the NRDD functionality based on the assessment, the NRDD conducted a data use survey of its users in 2022. Based on the survey result and a decision tree framework that considered user input, data quality impact, and usage by NOAA for enterprise management needs, the RDEC agreed to reduce the number of mandatory NRDD data fields from 46 to 20.

Reducing the number of mandatory NRDD data fields eases the burden on data enterers, managers, and scientists while improving the data quality of required fields that support NOAA enterprise needs.

### *NRDD Mandatory Data Fields as of October 2023*

- |   |                             |
|---|-----------------------------|
| 1. Project Title                            | 11. Project Benefits        |
| 2. NOAA Accountable Line Office (LO)        | 12. NOAA Partner            |
| 3. Office/Financial Management Center (FMC) | 13. External Partner        |
| 4. Division                                 | 14. Current Readiness Level |
| 5. NOAA Point of Contact Name               | 15. Transition Plan (y/n)   |
| 6. NOAA Point of Contact Email              | 16. Current Project Status  |
| 7. PI First and Last Name                   | 17. Planned Start Date      |
| 8. PI Email                                 | 18. Planned Completion Date |
| 9. PI Affiliation                           | 19. Actual Start Date       |
| 10. Project Description                     | 20. Actual End Date         |

Changes to the mandatory field requirements in the NRDD application were implemented in October 2023. Following this change, all NRDD data fields remain available for data entry, but only the 20 listed above are mandated for each project.

## **BULK ERROR CHECKING CHANGES**

The NRDD development team introduced a new data validation script for bulk import/export templates, enabling users to validate data, check for errors, and make corrections themselves before submitting bulk templates for import into the NRDD. This process allows users to get immediate feedback about data validation errors, saving users, the NRDD management team, and the NRDD development team significant time in the data import process.

# **SECTION V. FUTURE IMPROVEMENTS**

The NRDD team continues working to implement improvements to the NRDD system, to streamline processes for data entry and increase the functionality of the NRDD for end users.

## **.NET (CLOUD) MIGRATION**

As a precursor to additional new end-user improvements, in 2024, the NRDD will undergo a migration from its current content management system (DNN) to the .NET development platform. This migration makes it possible to move the NRDD to a cloud-based environment, in alignment with OAR IT's cloud migration strategy, improves site security, and opens the door to future enhanced development capabilities and cloud-based integrations.

Migrating the site content from DNN to .NET is necessary for this process, as DNN requires an on-site server (not cloud-compatible). In addition, removing the NRDD's dependence on a third-party service provider (DNN) will reduce costs, with DNN's license cost increasing significantly year-over-year over the last several years with minimal added benefits.

## **INTERACTIVE DATA DASHBOARD**

The NRDD team is developing a new interactive project data dashboard in Looker Studio. With this dashboard, users will be able to explore and drill down into specific aspects of NRDD data (e.g. by line office, deliverable type, readiness level, etc.).

## **API-INTEGRATED GOOGLE SHEET OF NRDD DATA**

The NRDD team is developing an API-integrated Google Sheet, allowing easier access to NRDD project data to a wide range of users. The Google Sheet will provide users with access to NRDD project data without requiring them to log into the NRDD system or use QueryBuilder.

# **CONCLUSION**

The 2023 Annual Operating Report illustrates the ongoing efforts of many individuals who contribute to the NRDD by gathering and inputting R&D project data, reviewing and updating records, discovering new ways to explore and use NRDD data, and suggesting or implementing improvements to the NRDD system. The NRDD team will continue to engage with its user community to gather feedback and implement improvements in the coming year. We continue to welcome data inputs, user comments, and new ideas into 2024 and beyond.



# APPENDIX A: GLOSSARY OF TERMS

<b>3TM</b>	“3- Things Memo,” a high-level document summarizing key points about a topic or issue, prepared for NOAA leadership.
<b>Active project</b>	Approved NRDD project entries whose project start and end dates encompass the period of time under analysis and have an “In Progress” or “Planned” project status.
<b>API</b>	Application Programming Interface, which is a set of code that facilitates the transfer of data between one database or software application and another.
<b>Collaborative projects</b>	R&D projects collaboratively implemented by two or more NOAA offices.
<b>Data call</b>	Identified period for entry or updates to new and existing R&D project entries. NRDD data calls are issued by the NOAA RDEC twice a year, one for new project entries (“Planned”) and the other for updates to the existing project records (“Project Actuals”).
<b>Data validation</b>	Process where information entered into the NRDD is validated to ensure required fields are complete and data is correctly formatted prior to being imported into the NRDD.
<b>DNN</b>	Web content management system and web application framework based on .NET framework, currently used for managing NRDD website content.
<b>Export template</b>	Google sheet template containing data extracted from the NRDD, which users can use to update existing project records in the NRDD in bulk.
<b>GA4</b>	Google Analytics 4, the newest version of Google Analytics tracking service, allows for measuring and tracking website traffic and use. The NRDD site was required to GA4 transition from the older Google “Universal Analytics” service, which was discontinued in 2023.
<b>Import template</b>	Google sheet template that allows users to submit data for new NRDD projects for bulk import into the NRDD.
<b>JSON</b>	JavaScript Object Notation, a commonly used data format that uses human-readable text to store and transmit data objects consisting of attribute-value pairs and arrays.
<b>.NET</b>	Free open-source computer management framework that can be used for building applications, websites, and cloud-based systems. The post-migration NRDD website will be based on the .NET system.

<b>NRDD development team</b>	Team of OAR contracting developers that support the NRDD management team and execute the technical requirements, enhancements, and modifications necessary to maintain the database and website.
<b>NRDD management team</b>	Provides user support and manages the overall design and functionality of the NRDD from a technical perspective.
<b>RDEC</b>	NOAA's <a href="#">Research and Development Enterprise Committee</a> , a committee that is a NOAA Science Council standing committee, which serves as the governing body for the NRDD. The NOAA RDEC has representatives from each NOAA line office who collectively make decisions about NRDD requirements, enhancements, improvements, and overall strategy.
<b>REST</b>	REpresentational State Transfer, a software architectural style that establishes standards between web-based computer systems, facilitating communication.
<b>Query</b>	Request for NRDD project data according to specified search parameters.
<b>QueryBuilder</b>	Query interface, which allows users to do a customized search of NRDD records and data and export data into comma-separated value (CSV) files or other formats for further exploration and use.

# APPENDIX B: DEFINITION OF “PROJECT” IN THE NRDD

A project is defined as: *a sequence of tasks that must be completed to attain a certain finite output.*

In the purview of NOAA research and development, a project is further defined as: *a planned effort that develops novel knowledge, or improves upon technology or otherwise aims to describe, predict, or explain some specified phenomena and includes hypothesis-driven research.*

A project is temporary and has a definite beginning and end. It can be managed by one or more people, depending on the complexity.

Programs differ from projects in that programs contain multiple projects, though the definition of program and project will continue to be refined as enhancements are made to the NRDD on how projects can be clustered for oversight and information.

To be included in the NRDD, a project must meet all of the following criteria:

1. Defined objective(s), final deliverable(s), and output(s)
2. Defined timeline/endpoint (generally up to 4 years, but can be longer for some projects)
3. Defined budget, personnel working on the project, and/or other leveraged resources (e.g., ship or aircraft time)
4. Single designated Readiness Level at the beginning of the project and expected Readiness Levels at the end of the project. (See NAO 216-105B for the definition of Readiness Levels).

Operational systems (e.g., observing systems that are operational) are not considered R&D projects, even if effort 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 effort to improve upon the operational system technology would be entered as an NRDD project.

# APPENDIX C: NRRD EVOLUTION & IMPROVEMENTS 2016-2022

2016



**Development of the NRDD begins**, following a unanimous vote by the NOAA Research Council to implement the database (then called Project Database Management System). A Memorandum was sent out by Chief Scientist Rick Spinrad requiring NOAA-wide participation.

2017



**OAR provides NRDD's operational funding**; OAR invested \$1.09 million between 2017 and 2023 in the creation and maintenance of the NRDD, providing this service to all NOAA line offices.



**NRDD site launched**, intended to be populated with input from all of NOAA's R&D units, directly and/or through data imports from other systems. At its launch, only a small subset of NRDD data fields were mandatory.



**NRDD team begins outreach efforts** to socialize the new system and encourage data inputs. Efforts included briefings, coordination/discussion with labs and programs to discuss data imports, and creation of communication materials.



**NRDD team hosts its first 'users brief'** to report results of the first NRDD data call and next steps to NRDD users.

2018



**NRDD team continues user outreach and engagement** to socialize the NRDD, request data for ongoing data calls, and gather user feedback.

2019



**NRDD site redesign** in which the site interface, database architecture, and data fields were redesigned to improve user experience and data completeness, and better meet the needs of NOAA leadership. The redesigned site was launched in August 2019.



**Number of mandatory data fields increased**, making most NRDD data fields required, where only a subset of the fields had been required before.



**Development of Bulk Import Templates** allowing for collaborative data collection in a spreadsheet and simultaneous upload and approval of multiple projects into the NRDD. The NRDD team makes updates and improvements to the templates each year.

2020



**NRDD releases a promotional video** featuring Deputy NOAA Administrator Tim Gallaudet, which emphasizes the value of NRDD to NOAA.



**NRDD team begins publishing annual reports** to highlight use cases and applications of NRDD data from the prior year, beginning with the 2019 NRDD Annual Report.



**NRDD team begins hosting a monthly NRDD user forum**, an optional session open to all NRDD users, featuring NRDD updates and open discussion to address user questions and comments.



**Addition of new data fields** including project status, reasons for no transition plan (if applicable), reasons for external partnerships, expansion to final deliverable options, and strategic plan linkages for new R&D Vision Areas.



**Standardization of affiliation and external partner organization data fields** from open text fields to standardized dropdown menus.



**Query Builder module launched**, which allows users to search the NRDD's database and generate a custom export of NRDD data, which can be downloaded and manipulated/used for analysis.

2021



**Project Search tool expanded** within the 'Project Search' and 'Edit Project' tabs to communicate the true scope of each NOAA Organization's contributions to NOAA's R&D.



**Creation of My Dashboard module**, a custom user dashboard that displays projects for which the user is listed as the creator, data enterer, and/or approver.



**Error-checking procedures built into NRDD Application and bulk import templates** to improve the completeness, consistency, and accuracy of entered and imported R&D data.



**1st NRDD Field Guide produced**, providing a comprehensive overview of data fields and guidance to ensure that project entries are consistent across NOAA.

## 2022



### Single Sign-On Identity, Credential, and Access Management (ICAM)

capability added by RDEC request, enabling users to sign in to the NRDD using their NOAA Common Access Card (CAC).



**Annual reports replaced with annual operating reports**, starting with the 2021 Annual Operating Report. The new approach focuses on activities, analytics, and improvements to the NRDD.



**User Forum meetings reduced from monthly to quarterly**, supplemented with monthly email announcements to provide NRDD users with timely updates.



**Updates to Strategic Plan data fields** to reflect the goals in the 2022-2026 Department of Commerce Strategic Plan and NOAA 2022 - 2026 Strategic Plan, Building a Climate Ready Nation.



**Additions to special projects tracking fields**, allowing users to identify projects funded through 2021 and 2022 supplemental appropriations bills.



**Bulk update process developed**, allowing users to update multiple projects at once using Bulk Export/Update Templates. This benefits offices that need to update actuals for a large number of existing projects in the NRDD.



**Process for backend error checking of templates updated** to process and validate errors in bulk, rather than incrementally, saving data processing time for users, admins, and developers.



**Application Programming Interface (API) prototype created** for the NRDD Query Builder, enabling client applications to extract NRDD data into their systems.



**Development of a Transition Plan module**, enabling NRDD administrators to download transition plan files directly from the NRDD, avoiding longer waiting periods and saving developer hours.



**Data use surveys and analysis**, in which the RDEC surveyed the NRDD user community to understand current NRDD data field use and ongoing challenges to data entry.



Overall site development



NRDD application improvements



Changes to data fields



Bulk import templates



User engagement activities



Communications activities



Data summary & use features



NRDD Funding

# APPENDIX D: NRRD FUNDING MODEL

From the launch of the NRDD in 2017 to 2023, OAR provided the NRDD's operational funding, investing \$1.09 million in the creation and maintenance of the NRDD as a service to all NOAA line offices over that period.

In June 2023, OAR made changes to the NRDD funding model, after informing the NOAA RDEC that it was unable to continue its current level of customer support with the existing funding model. Starting in October 2023, with the [new NRDD funding model](#), only paying line offices receive access to certain services including access to import and export templates for bulk entry and updating of project data. All line offices, whether paying or not, continue to have access to the NRDD website/application for project entry and updates.

As a result of this change in customer support, the access to bulk import and export templates varied for the FY23 data calls:

- 1. Project Plans Data Call** (May 1st, 2023 to July 31st, 2023): all line offices
- 2. Project Actuals Data Call** (November 1st, 2023 to March 31st, 2024): OAR only, as the only paying line office at the time