Innovation in Evidence-Building:

Evolving Program Data Management Practices within the Department of Commerce

Report of the Metrics Working Group of the Commerce Data Governance Board

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Overview

This report summarizes the work of the Department of Commerce (DOC) Data Governance Board (CDGB)'s Metrics Working Group (MWG). The MWG was formed in August 2022 and charged with facilitating the application of recommendations within the CDGB's Data Governance Working Group (DGWG)'s June 2022 report, "[Best Practices for Monitoring and Evaluating the ARP, IIJA (now named BIL), and Other Programs: Report of the Department of Commerce Data Governance Working Group](#)."[1]

This report will be delivered to the DOC Chief Data Officer for further distribution to the intended audiences, including DOC Bureau-Level Evaluation Officers, Chief Data Officers, Program Officers, and related agency staff (statisticians, economists, and other social scientists) who support program design, implementation, and evaluation.

The main recommendations of the MWG are:

1. **Look to the NTIA and EDA Program Models:** Program administrators should study and leverage the innovative approaches to data linkage and evaluation that were adopted by NTIA and EDA for ARP and BIL programs.

2. **Collect Specific Types of Program Data:** Bureaus should collect specific information about participants, grantees, and place-of-service to facilitate data linkages and evaluations, using the Census Bureau's Data Linkage Infrastructure, as detailed in this report.

3. **Find Ways to Securely Share Data Across the DOC:** The DOC should provide a capability for securely sharing data, consistent with the law, across the department to enable large-scale observational studies and ease reporting constraints.

4. **Use Newly Available Resources:** Bureaus should utilize resources provided by the DOC to support evidence-building and evaluation.

5. **Dedicate More Resources to Continue Advancement:** Bureaus should dedicate resources to further the advancement of program data management and evaluation practices.

There are four sections in this report, summarizing the MWG (1) charge and membership, (2) activities, (3) insights and opportunities, and (4) recommendations.

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[1] [Best Practices for Monitoring and Evaluating the ARP, IIJA and Other Programs: Report of the Department of Commerce Data Governance Working Group (census.gov)](#)

1. Goals and Membership

The MWG was charged with facilitating the application of the DGWG recommendations across DOC bureaus administering the following above-base programs: American Rescue Plan (ARP), Inflation Reduction Act (IRA), and Bipartisan Infrastructure Law (BIL, Infrastructure Investment and Jobs Act (IIJA)) and the Coronavirus Aid, Relief, and Economic Securities Act (CARES).

The DGWG report includes specific recommendations for improving program evaluation, as well as recommendations for facilitating large-scale observational studies for evaluating multiple program impacts.

Conducting large-scale observational studies enables the DOC to comprehensively understand the impact of several above-base programs on communities, the environment, and the economy. The results of these studies will further provide information that the government can use as it determines the efficacy of its expenditures. Specifically, the report recommends the following evolution in the DOC's approach to program monitoring and evaluation:

DGWG Report Recommendations:
Evolve How DOC Programs Project, Monitor, and Evaluate Outcomes

From	To
From a program-specific model	To large-scale observational studies that enable consistent program evaluation across agencies; facilitates comparisons across a variety of programs; reduces burden of aid awardees, and allows for the harnessing of data to answer questions not otherwise possible
From little to no statistical data linkage	To linkage with data from the Census Bureau, Internal Revenue Service, Social Security Administration, Health and Human Services, etc.; state level data (ex. Unemployment Insurance); local data; or third-party data
From little multiplicative effect analyses	To model-based statistics to identify multiplicative economic impacts of federal programs (RIMS II)
From county-level place-of-performance	To Census tract or most granular level of place-of-performance

Figure 1: Source: Best Practices for Monitoring and Evaluating the ARP, IIJA, and Other Programs: Report of the Department of Commerce Data Governance Working Group

To explore pathways for adopting these recommendations, the CDGB authorized the MWG in August 2022. Nancy Ritchey (Archive Branch Chief, NOAA) and Barbara Downs (Evaluation Officer, Census Bureau) co-chaired the MWG, with significant research expertise and analytic support from Shannon Arvizu (Senior Advisor to Chief Data Officer).

Four DOC bureaus, representing programs that received above-base funding, convened to share preliminary approaches to program design and evaluation. MWG participating bureaus and associated programs include:

- Economic Development Administration (EDA)
  - Build Back Better Regional Challenge
  - Good Jobs Challenge
- Minority Business Development Agency (MBDA)
  - Coronavirus Response and Relief Center
  - State Small Business Credit Initiative Technical Assistance.
- National Oceanic and Atmospheric Administration (NOAA)
  - Climate Ready Coasts (includes 5 IRA-funded initiatives and 6 BIL-funded initiatives)
- National Telecommunications and Information Administration (NTIA)
  - Enabling Middle Mile Broadband Infrastructure Program
  - Broadband Equity, Access, and Deployment Program
  - Digital Equity Act Programs
  - Tribal Broadband Connectivity Program

In addition, representatives from other DOC bureaus and departments that support monitoring and evaluation efforts were also invited to participate. MWG member names and affiliations are provided as an attachment to this document.

2. Activities

The MWG worked iteratively in a series of short-term goal-based efforts (sprints) to identify and take advantage of opportunities for the application of the DGWG recommendations.

The first sprint focused on facilitating the application of DGWG recommendations related to the improvement of program monitoring and evaluation measurement practices and data collection. Monitoring and evaluation plans study both program outputs (e.g., populations served) and outcomes (e.g., changes in population characteristics).

In particular, the first sprint focused on the following three DGWG recommendations:

1. **Improve Evaluation Rigor:** Agencies should evaluate programs based on the program implementation stage, direct versus indirect program impacts, and projected versus observed program impacts.
2. **Improve Geo-Location Data Collection:** Agencies should measure location of primary and secondary awardees, as well as the places of service/performance/implementation, using standard geographic reporting elements (e.g., census tracts, counties, FIPS codes, etc.).
3. **Improve Assessment of Equitable Delivery**: Agencies should use measures and available indices to assess equitable distribution and outcomes in program delivery, as defined by specific legislative intents and requirements.

MWG bureau members presented and discussed information on proposed program plans across four stages: pre-award, implementation, closeout, and evaluation. Bureaus shared in-progress evaluation plans developed in accordance with the requirements of the Foundations for Evidence-Based Policymaking Act of 2018. Information presented included:

- Research questions
- Measures used to answer research questions
- Data sources for measures
- Ways that measures will be used and acted on

Early in the MWG development, there was a proposal to focus efforts on identifying a common set of program measures that would be applicable to all DOC programs. However, the MWG uncovered that the effort would not be possible for two reasons, including (1) the MWG sample included only nine programs and it would be erroneous to assume that measures for those nine programs could encompass the efforts of all 85 DOC program listings[2] and (2) amongst the nine programs in the MWG sample, programs had legislative requirements that necessitated an individualized approach to measurement (e.g. legislative requirements for defining underserved communities for NTIA's broadband programs are different than those that govern EDA's economic development programs).[3]

Instead, in this first sprint, the MWG focused on supporting the advancement of program data and measurement practices. The MWG also sought to identify commonalities in direct and indirect impacts across the nine programs. Those commonalities include impacts on:

- local job growth
- business revenue
- business formation
- employment trends
- educational attainment
- ecosystem habitat restoration

The second sprint focused on ways to facilitate the application of DGWG recommendations related to large-scale observational studies that enable cross-program evaluation.

Specific activities included interviews and deep dive conversations with various stakeholders within the MWG and throughout the DOC, including program evaluation leads, program analysts, program data managers, grants acquisition experts, GIS specialists, equity indicator experts, and economic projection experts. These stakeholders hailed from the aforementioned DOC grant-making bureaus, as well as those from the Bureau of Economic Analysis (BEA), the Performance Excellence Office, the Office of Acquisition Management, the Office of the Chief Information Officer (OCIO), the Commerce Implementation Coordination Office (CIC), and representatives of several Census Bureau staffs and divisions.

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[2] A table with a list of the 85 DOC programs is at the end of this document.
[3] Future work on common metric development might focus on the totality of DOC programs that share a specific desired impact (ex. programs that target local job growth or programs that target business formation activities)

Interviews and conversations focused on surfacing information related to:

- data fields needed to facilitate linking administrative data about program participants or grantees to statistical data sets
- opportunities and challenges to collecting more granular data from grantees
- opportunities and challenges to sharing program data, both internally in bureaus and externally with other DOC bureaus, for enabling large-scale observational studies

The collaborative and collegial nature of the MWG interviews and discussions facilitated sharing of lessons learned and identified common needs and potential improvements. One improvement identified was related to how programs benchmark and track impacts in communities. This effort will be addressed by the newly formed Census Center of Excellence (COE), which is charged with providing statistical measures to DOC grant-making agencies to support evaluations of program outcomes. More detail about how the COE can address those needs is provided later in this report.

Another need identified was to better understand program outcomes in specific geographies, which will be addressed by the newly formed Regional Economic Research Initiative (RERI) in the Office of the Undersecretary of Economic Affairs (OUSEA). The Regional Economic Research Initiative is charged with conducting research, developing data products, and providing data services to support place-based program efforts. RERI defines place-based policies as those that either address a place's distress (i.e., targeting unmet local needs like high unemployment or infrastructure gaps) or build upon a place's capacity (i.e., strength in an industry sector, skills of local workforce).

Lastly, a common challenge in sharing program data led to sourcing a solution to ease reporting and evaluation efforts at all stages of program administration. The Office of the Chief Data Officer (OCDO) is leading activities to develop an approach to sharing program data across the department in a secure, automated, and self-service fashion. This approach enables bureaus to maintain control and storage within their respective data environments, while allowing other department stakeholders, such as those that report to the Secretary, evaluation officers, and statistical leads, access to specific data fields for business intelligence and cross-program analyses.

Finally, the collaborative and collegial activities of the MWG directly supported the final DGWG Report recommendation, which was to create a community of practice to share lessons learned, foster cross-bureau collaboration, and inspire the next evolution in evidence-building practices across the DOC.

3. Insights and Opportunities

The work of the MWG yielded insights and opportunities across several dimensions, including program outcome goals, data collection needs, data sharing capabilities, and requirements for data linkage. We list those insights and opportunities below.

Insight #1: DOC Programs with Above-Base Funding Share a Common Program Goal – Improve place-based outcomes

In our sample of nine programs, there is a shared common goal: improve direct and indirect outcomes for communities. These outcomes focus on improving jobs, earnings, capacity building (as defined by the program), business growth, and ecosystem conditions. Depending on the program focus, desired outcomes vary by geography or by industry.

Opportunity: DOC programs could benefit from a systematic and thematic approach to program data requirements to facilitate cross-agency and cross-program analyses.

As DOC programs focus more on place-based outcomes and industry-specific growth, there is an opportunity to take a thematic approach to improving program data collection and analyses. An approach could look first at the universe of all DOC programs that intend to have place-based outcomes or industry-specific outcomes. Then identify specific common research questions across programs, as well as potential common measures and related data sets. These efforts could lead to the development of a shared program data structure that facilitates cross-program analyses at the geographic level.

Insight #2 - To facilitate cross-program analyses, DOC programs need to collect specific types of detailed granular data from grantees, sub-grantees, and/or recipients to support linkages to other statistical or programmatic data.

To facilitate large-scale observational studies, two types of data must be collected:

1. geographic data to identify the location of service provision, and
2. detailed data to assess the impacted businesses, individuals, and communities.

Together these data provide a snapshot of the community where services are provided, the directly served individuals or businesses, and the resulting community and individual-level outcomes. These data can also be used to identify repeat recipients for informing future federal funding and services decisions.

Five opportunities to facilitate these data collections are described below. The first three focus on geographic data, the fourth on detailed individual, business, and community-level data, and the fifth on general data collection.

Opportunity: Use TigerWeb (and other related Census Bureau geographic tools), NSF's region of service map builder guide, Federal Information Processing System (FIPS) codes, and census tract information to designate place of service, and enable geographic linkage of statistical data for benchmarking and tracking geographic outcomes.

Place-of-service reporting is important for identifying how the receipt of services changed local economic characteristics. Correlational analyses could be done by linking program data to community measures, using place-of-service as a common "key" to combine the data sources and produce repeated cross-sectional measures of local characteristics before, during, and after the program intervention.

Using place-of-service as the geographic identifier is more precise for understanding local impacts than using other geographic measures, such as grantee or sub-grantee address, as the grantees may not be co-located with the service delivery. However, it can be logistically challenging for grantees and sub-awardees to consistently report place-of-service addresses, particularly if a sub-awardee delivers services at multiple locations. In this case, grantee or sub-awardee location is often used as a proxy for place of service. The many challenges of capturing place-of-service highlight the need for additional research into the ways in which this information has been, and could be, captured.

Opportunity: Utilize the Census Bureau's COE to produce evidence-building estimates to evaluate program outcomes.

The Census Bureau's COE is positioned to provide detailed statistical measures to DOC program administering agencies in support of program outcome evaluations. These measures include detailed socio-demographic characteristics and industry-specific measures that can be used to benchmark pre-program status and assess changes in local characteristics as the program is administered and closed out. These measures will be produced at the lowest level of geography for which confidentiality safeguards prevent identification of any individual or business.[4] Overlaying place-of-service, or its proxy, on a map of detailed characteristics may produce key evidence for evaluating program administration and, with repeated annual measures of characteristics, studying program outcomes.

One example of this approach is NTIA's ACCESS BROADBAND Dashboard, a new data tool designed and developed in collaboration with the Census Bureau. The Dashboard maps indicators of broadband availability and adoption with economic indicators that research suggests broadband expansion could influence. Created in response to the ACCESS BROADBAND Act's mandate to report an estimate of the economic impact of broadband deployment on local economies, the first release of the Dashboard provides granular baseline data of local economic conditions. Economic indicators are provided either at the county- or census tract-level where possible. Over time, NTIA plans to provide annual updates to the broadband availability, adoption, and economic indicators to help the federal government, researchers, and broadband stakeholders to assess the long-run economic impacts of broadband expansion.

The Census Bureau's COE can also collaborate with program administering bureaus to develop customized tools linking program data to the evidence-building measures described above.

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[4] DS025: Organization of the Disclosure Review Board (census.gov)

Finally, the Census Bureau is investigating opportunities to allow users to create custom geographies, further assisting in the planning and evaluation of program administration.

Opportunity: Utilize OUSEA's Regional Economic Research Initiative to assist in the evidence-based design, implementation, and evaluation of programs that intentionally target specific places, close geographic gaps, and/or have the potential to transform a specific geography.

The Regional Economic Research Initiative (RERI) can help analyze data to support multiple phases of an agency's place-based programs. Specifically, RERI can assist with developing pre-funding opportunity announcements, support the application review process, identify post-grant opportunities for technical assistance, and collaborate on post-program evaluation metrics on local economic conditions.

As an example of the kinds of assistance that the Regional Initiative team provides, this team recently supported EDA's Tech Hubs program by developing a data visualization tool that uses relevant publicly available data to assist in EDA's application review process. As part of that work, the Regional Initiative provided a literature review of indices and data utilized to identify potential metros for Tech Hub funding, conducted expert interviews with key stakeholders to identify additional indices of value, aggregated agreed-upon datasets into a single file (joined by Metropolitan and Micropolitan Statistical Areas (MSA) designations), facilitated alignment sessions with EDA staff on target "types" of tech hubs, synthesized and recommend top indicators for use in Tech Hubs selection processes, and conducted analyses on the aggregated datasets and indicators.

Opportunity: Use granular individual or business-level information to facilitate record-level data linkages between program data and survey or administrative data.

In addition to place-of-service, detailed characteristics of the businesses or individual program recipients are necessary to facilitate future linkage to other data sources that may support the longitudinal evaluation of direct program impact. For instance, to know the long-term trajectory of businesses or individuals participating in a program, researchers must be able to link that business or individual to existing administrative data about earnings, business revenue, employment, services, and transactions. Clearly identifying recipients allows bureaus to compare the "counterfactual" or the impact of programs on individual businesses/persons compared to similar entities who did not participate in the program. The Census Bureau's Data Linkage Infrastructure maintains considerable administrative and survey data resources to support these types of analyses.

For example, the EDA Good Jobs Challenge, in partnership with the Census Bureau, collects detailed information about grantees and their sectoral partnerships but only limited personally identifiable information (PII) for the participants. The PII allow data linkages between Good Jobs Challenge participants and longitudinal employment and earnings data to study the short-, medium-, and long-term impact of jobs trainings on jobs, wages, as well as detailed demographic characteristics primarily from the Decennial Census.

To facilitate data linkage, PII and Business Identifiable Information (BII) such as name, address, date of birth (for individuals), and Employer Identification Number (EIN) for businesses should, as permitted by relevant legal authorities, be collected by the program (see figure 2, for details). Once individuals are linked to administrative or survey data, PII is removed for privacy protection, and long-term large-scale evaluations can proceed. The chart below lists the identifying information necessary for data linkage to Census Bureau administrative or survey data.

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Census Bureau Data Linkage Infrastructure Requirements

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Linkage Type	Linkage Method	Data Fields to Collect
Address Linkage	Master Address File Match	Full address; coordinates for point-of-service delivery
Organizational Linkage	TF-IDF (term frequency inverse document frequency)	Businesses/nonprofits: EIN, business name, mailing address, physical location address, NAICS, web address, UEI, SSN (for sole proprietorships) Governments: name, address, UEI, web address
Person Linkage	Person Identification Validation System (PVS)	Full name (first, middle, last, suffix), complete date of birth, full address, sex, SSN/ITIN (for administrative records with authority to collect)

Figure 2. Data linkage quality dependencies, Source: U.S. Census Bureau

Opportunity: Design Notices of Funding Opportunity (NOFO) announcements to facilitate more granular data collection that will support program monitoring and evaluation.

Program NOFO announcements are an ideal avenue for informing prospective awardees of reporting requirements that will support data collection goals. Programs should consider the legal and administrative burdens to capturing these essential data.

Potential barriers include privacy concerns, maintaining compliance with federal reporting regulations applicable to programs or institutions receiving federal funding, the complexities of ensuring awardees and sub-awardees accurately report where services were delivered, and challenges in receiving consistently reported participant data. Solutions to these barriers include consulting with bureau program counsel prior to issuing NOFOs and providing clear guidance and standardized reporting fields and/or tools for each required data element.

There could also be opportunities to explore the allowability of collecting standardized data fields such as participant characteristics and place-of-service in all program data collections as part of the Paperwork Reduction Act requirements.

RERI has provided sample NOFO language to facilitate collecting geographic information at the initial application stage (see Appendix).

As an example, EDA's Good Jobs Challenge utilized the NOFO process to communicate data reporting requirements to applicants and followed up with webinars to clarify the requirements. The end result was that applicants were aware of requirements and able to address any challenges they may have faced prior to submitting formal requirements, including requesting funding to support the collection and submission of required data elements. The resulting agreements between EDA and grantees codified the expected data collections. EDA and the Census Bureau partnered early in the program application process to develop a secure system for collecting, storing, and analyzing detailed participant and program-level data.

Insight #3 - DOC programs are not yet commonly projecting program outcomes with the use of statistical data sets or modeling.

The DGWG recommends that agencies leverage existing projection models from industry or government where possible. This means considering multiplier effects (i.e. increased economic activity that occurs as a result of investments in capacity building and facilities) that are the direct and/or indirect outcomes of programs.

Opportunity: DOC Programs could benefit from use of the BEA Regional Input-Output Modeling System (RIMS II) Tool

The BEA RIMS II tool facilitates economic projection modelling at the regional level. The tool uses multipliers in response to agency-provided inputs to estimate changes in output (sales), value added or contribution to gross domestic product (GDP), earnings, and employment (full and part-time jobs) at the specified geography. The tool is useful for projecting program outcomes and impacts and is thus valuable for program administration planning purposes and comparison of projected to actual outcomes.

To use the RIMS II multipliers, programs need to collect the following data fields:

- Estimated final-demand change in output (sales), jobs, or earnings
- Industry of final-demand change – North American Industry Classification System (NAICS)
- Affected region – county or aggregation of counties
- The time frame of the final-demand changes, taking into account multi-stage projects and non-permanent demand changes - particularly important for employment impacts

Estimates of final-demand changes in outputs or jobs are typically sourced through grantees, each of which may use different assumptions in creating an estimate. The NOFO process is an opportunity to provide guidance or parameters to grantees to use when estimating the potential final-demand changes or impacts the program may have on outputs or jobs.

RIMS II multipliers provide a way to estimate the total impact that an initial change in economic activity has on the economy of a region (county or set of counties), based on the idea that an initial change in economic activity results in diminishing rounds of new spending. Spending diminishes because of "leakages" from the economy in the form of savings, taxes, and imports to the region. Two important things to consider to effectively use the multipliers:

- **The size of the initial change must be relatively large enough** compared to the whole economy of the region to have a tangible impact on the economy. Too small of an initial change and the multipliers will be less effective in accurately measuring the total impact and conversely the multipliers are not designed for extreme changes that alter the structure of the regional economy, such as a catastrophic event or the departure of a major industry. The initial change in economic activity should be permanent or at least persistent enough to fully work through the economy.

- **Careful consideration should be given to defining the county or group of counties** that will comprise the region used to calculate the RIMS II multipliers. The region should be large enough to capture regional supply changes, including labor, but small enough that the results are still economically significant—for example, a new manufacturing plant may have a large effect on economic activity in a county but a negligible effect on economic activity in the state.

For additional information visit the [BEA RIMS II website](#) and the [RIMS II User Guide](#).

There are also other widely used alternative private section economic impact analysis models, such as IMPLAN (IMPact Analysis for PLANing) and REMI (Regional Economic Models, Inc.), which typically use Census Bureau and BEA data as the foundation for their models. While both analysis tools use similar data as RIMS II, the models have underlying differences and features that go beyond the scope of this paper.

Insight #4 - To facilitate cross-program analyses of outcomes, DOC programs need a secure and standardized way to automatically share program data.

Currently, there are no established data pathways for researchers to conduct cross-program analyses of outcomes within the DOC's grant-making bureaus. To provide perspective on the universe of DOC programs, the DOC currently has 85 financial assistance listings under which it awards grants. Many of these listings house several programs themselves (e.g., all four of EDA's ARPA programs are listed in one financial listing).

Of the thirteen bureaus within the DOC, six are grant-making (NOAA, NTIA, EDA, ITA, NIST, and MDBA). Of these six bureaus, NOAA has the most financial listings (51), followed by NIST (13), and EDA (8). The balance of the financial listings is held by MBDA (4), ITA (1), and NTIA (7).

For the 85 financial listings, there are at least four grants management systems currently in operation according to the MWG discovery efforts. Those systems include:

- Government Management Information Sciences (GMIS)
- Operations Planning and Control System (OPCS) (EDA's legacy system)
- Grants Online (managed by NOAA)
- Salesforce

These systems are managed by various entities amongst the DOC. The following illustration provides additional detail (note: EDA also uses Grants Online).
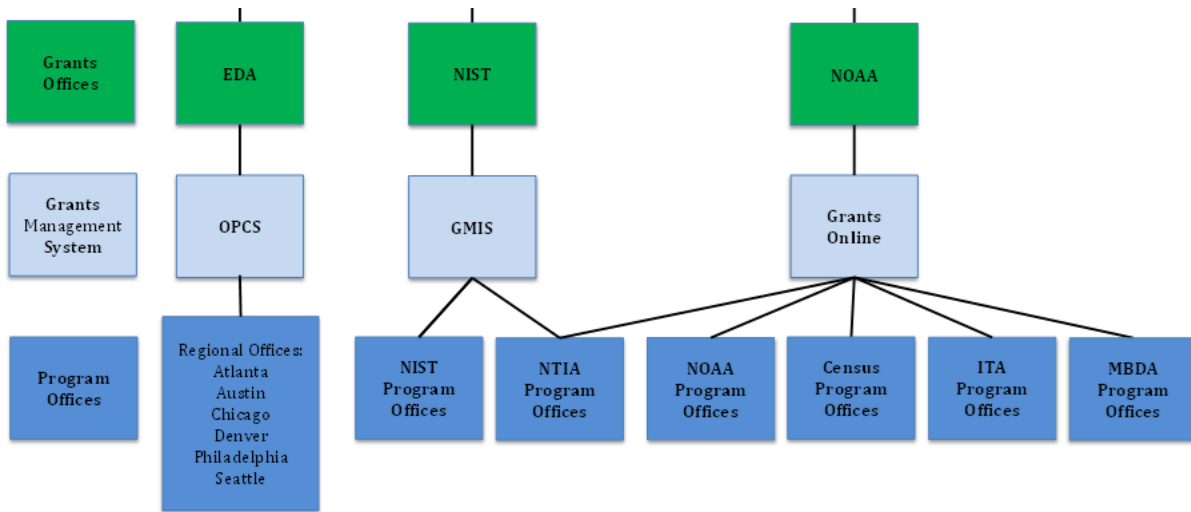
Source: DOC Office of Acquisition Management.

In conversations with the Grants Council, the MWG learned that there are efforts underway by the Office of Management and Budget (OMB) and the DOC Office of Acquisition Management to eventually transition to the Grants Enterprise Management Solution (GEMS) that is supported by U.S. Health and Human Services (HHS). That transition is scheduled for completion within the DOC by 2025.

In the meantime, program data is locked in a patchwork of multiple grants management systems that are not interoperable. Extracting data from these systems into a digestible format for reporting and analytical purposes is a time-consuming and cumbersome task for bureaus. For example, with Grants Online, program information is provided in pdf format and is not consistently formatted, making it challenging for bureaus to use and analyze the information.

In addition, when program data is reported outside of the program administration teams, it is typically produced in two formats:

- Financial listing data format required by OMB for reporting to USA Spending used to produce data and visualization on the USA Spending site

- Summarized program data at the bureau level, as required by OMB for reporting to the Performance Excellence Office and used to produce the DOC Strategic Plan Key Performance Indicator dashboard

While these are both valuable outputs from program data, the data that is publicly available for publishing to USA Spending or the DOC Strategic Plan dashboards is insufficient to enable large-scale observational studies.

Opportunity: Reduce friction, manual effort, and duplication in program reporting and evaluation by demonstrating a data sharing system that enables large-scale observational studies and eases reporting burden.

To facilitate agency reporting efforts and large-scale observational studies of multiple programs, the DOC would benefit from a data sharing system. Easily sharing data in a secure and automated environment would:

- introduce efficiencies to bureaus' regular reporting requirements to the Department,
- enable bureaus to combine their data with publicly available measures from external sources,
- and facilitate the efficient transfer of files to bureaus, such as the Census Bureau, that are required to conduct linkage activities within their own firewall (note: standard security protocols to protect PII/BII are a basic requirement for such a data sharing system).

The MWG, with the CIC, CDO, and the Census Bureau, identified a pathway to achieve greater sharing and reporting capabilities. Since the Spring of 2023, these groups have been exploring the possibilities for a Commerce Data Mesh, consisting of a system that enables data sharing and a compute environment with a collective data governance structure. Once acquired, this system will evolve over time, in congruence with the data needs of various stakeholders, including the COE, CIC, RERI, DOC Evaluation Office, the DOC Office of Acquisition Management, and others. One thing that is unique to a data mesh is that bureaus retain full ownership and management of their data, while enabling access on a user-by-user basis to specific files or data fields. This is a key requirement as bureaus must comply with statutes and/or federal regulations around access to data. For instance, under Title 13, U.S. Code, the Census Bureau is permitted to grant access to its restricted data only to individuals with Special Sworn Status for approved research projects with a statistical purpose under Title 13, and only via certain approved environments.

A demonstration to carefully define potential uses is under consideration, with EDA as the bureau early adopter. In conversations with various stakeholders interested in EDA program data, the data mesh exploration efforts have identified several research questions that can be more efficiently answered using a data mesh than by repeated static data calls. Each of the questions listed below requires the combination of data sources from EDA and at least one other federal agency, often the Census Bureau. A data mesh will provide the Census Bureau a single location to deposit publicly cleared information that EDA can use to evaluate these and other questions. A data mesh also provides an environment where staff from multiple bureaus can

collaborate with controlled access on research combining data from more than one bureau or program, provided that all legal requirements are met.

Research questions that could be readily addressed via a data mesh storage and sharing system include:

- How much funding is going to counties with high rates of young businesses, defined by the Census County Business Patterns data?
- Where is EDA funding energy-related investments? How might this data be used by the Department of Energy, for example, to inform decisions on related energy investments?
- For areas with business assistance programs, were there local economic changes such as growth in businesses, change in business characteristics, or population-level changes in earnings, educational attainment, or labor force participation/composition?
- Are there recipients or locations that receive multiple federal programs or services?

4. Recommendations

Moving forward, the Metrics Working Group recommends the following next steps. The following is an elaboration of the brief recommendations listed at the start of the report.

Future program administrators should study and leverage the innovative approaches to data linkage and evaluation that were adopted by NTIA and EDA for ARP and BIL programs:

- Combine administrative data sources with survey data to map program places of service and characteristics of communities likely to receive services, using common geographic identifiers. Use the Census Bureau's Data Linkage Infrastructure to evaluate the impact of program participation on participants' long-term employment, wages, education, or household characteristics.

Bureaus should collect specific information about participants, grantees, and place of service to facilitate data linkages and evaluations:

- The NOFO process is the ideal time to define all data reporting requirements. As bureaus complete administration of the ARP, BIL, CHIPS, and other programs, the MWG recommends creating a repository of NOFOs, along with any recommended modifications to those NOFOs, that can be used by future program administrators.
- Grantees and sub-awardees should be provided standard criteria for reporting data that enables linkage. Bureaus should document reporting criteria to facilitate program evaluation comparisons and inform future data collections and analysis.
- Privacy, data confidentiality, and other legal concerns related to sharing any data collections should be resolved as early in the NOFO process as possible.
- Leverage current and future OMB requirements for post-award grantee reports to collect evaluation-relevant information.

- Collect detailed place-of-service geography (e.g., county FIPS or census tract codes) whenever possible, to facilitate studies of program outcomes and impact at the community or other level.
- Collect detailed participant information, to the extent permitted by the relevant laws, to facilitate data linkages using the Census Bureau's Data Linkage Infrastructure. For individuals: full name, address, date of birth, sex, SSN/ITIN (if authorized to collect), and for businesses: firm name, address (mailing and physical location), company web address, UEI, EIN, NAICS, SSN (for owner of sole proprietorship) and latitude/longitude.

The Department of Commerce should provide a capability for securely enabling access to data across the DOC to enable large-scale observational studies and ease reporting capabilities in a way that is consistent with the law and contractual obligations:

- Proceed with piloting a data sharing solution to facilitate program administrative data sharing and linkage to other data sources.
- Bureaus should leverage data resources throughout the DOC (such as RERI or the Census Bureau's COE) to minimize reporting burden and maximize the information available to conduct evaluation activities.
- Utilize a data sharing solution to develop an understanding of DOC resource allocation across all programs, geographies, industries, or population groups.

Bureaus should utilize existing resources provided by the Department of Commerce to support evidence-building and evaluation:

- The Census Bureau's COE leverages DOC-wide resources and expertise to support program administrative design, monitoring, and evaluation. The COE partners with CIC to assist DOC bureaus in determining evidence-building data requirements and identifying appropriate data resources to meet those requirements. The COE further leverages the Census Bureau's technical expertise to assist in the production of relevant evidence-building metrics to support program evaluation. The services provided by COE can be enhanced with additional reimbursable data collection, analysis, and production activities. To support decision-making, the COE will create an annually updated summary of products prepared or created through its partnership with CIC.
- Bureaus can utilize OUSEA's Regional Economic Research Initiative for technical assistance on program design, NOFO applications, application reviews, and other evidence-building activities geared toward place-based research.

Bureaus should dedicate resources to future the advancement of program data management and evaluation practices for themselves and for grantees:

- Bureaus should dedicate resources to breaking siloed approaches to evaluation, instead utilizing cross-Department/cross-bureau capabilities to support effective program administration, monitoring, and evaluation.

- Each program should define terminologies such as capacity building, places of service/performance/implementation, and other program-specific concepts.
- Bureaus should encourage program applicants to budget for detailed data collection and delivery necessary for program monitoring evaluation.

Appendices

Appendix 1. Department of Commerce Assistance Listings

Bureau	CFDA Number	Assistance Listing Title
Census	11.016	Statistical, Research, and Methodology Assistance
EDA	11.023	Science, Technology, Engineering, and Mathematics (STEM) Talent Challenge Program
EDA	11.024	BUILD TO SCALE
EDA	11.300	Investments for Public Works and Economic Development Facilities
EDA	11.302	Economic Development Support for Planning Organizations
EDA	11.303	Economic Development Technical Assistance
EDA	11.307	Economic Adjustment Assistance
EDA	11.312	Research and Evaluation Program
EDA	11.313	Trade Adjustment Assistance for Firms
ITA	11.112	Market Development Cooperator Program
MBDA	11.034	2023 MBDA Capital Readiness Program
MBDA	11.802	Minority Business Resource Development
MBDA	11.804	MBDA Business Center - American Indian and Alaska Native
MBDA	11.805	MBDA Business Center
NIST	11.013	Education Quality Award Ambassadorship
NIST	11.037	CHIPS Incentives Program
NIST	11.601	Calibration Program
NIST	11.603	National Standard Reference Data System
NIST	11.604	Standard Reference Materials
NIST	11.606	Weights and Measures Service
NIST	11.609	Measurement and Engineering Research and Standards
NIST	11.610	Standards Information Center
NIST	11.611	Manufacturing Extension Partnership
NIST	11.616	Technology Innovation Program (TIP)
NIST	11.617	Congressionally-Identified Projects
NIST	11.619	Arrangements for Interdisciplinary Research Infrastructure
NIST	11.620	Science, Technology, Business and/or Education Outreach
NOAA	11.008	NOAA Mission-Related Education Awards
NOAA	11.011	Ocean Exploration
NOAA	11.012	Integrated Ocean Observing System (IOOS)
NOAA	11.015	Broad Agency Announcement
NOAA	11.017	Ocean Acidification Program (OAP)
NOAA	11.021	NOAA Small Business Innovation Research (SBIR) Program
NOAA	11.022	Bipartisan Budget Act of 2018
NOAA	11.400	Geodetic Surveys and Services (Geodesy & Applications of the Nat'l Geodetic Ref. System)
NOAA	11.405	Cooperative Institute (Inter-Agency Funded Activities)
NOAA	11.407	Interjurisdictional Fisheries Act of 1986
NOAA	11.408	Fishermen's Contingency Fund

NOAA	11.413	Fishery Products Inspection and Certification
NOAA	11.415	Fisheries Finance Program
NOAA	11.417	Sea Grant Support
NOAA	11.419	Coastal Zone Management Administration Awards
NOAA	11.420	Coastal Zone Management Estuarine Research Reserves
NOAA	11.426	Financial Assistance for National Centers for Coastal Ocean Science
NOAA	11.427	Fisheries Development & Utilization Research & Devel. Grants & Coop. Agreements Pgm
NOAA	11.429	Marine Sanctuary Program
NOAA	11.431	Climate and Atmospheric Research
NOAA	11.432	National Oceanic and Atmospheric Administration (NOAA) Cooperative Institutes
NOAA	11.433	Marine Fisheries Initiative
NOAA	11.434	Cooperative Fishery Statistics
NOAA	11.435	Southeast Area Monitoring and Assessment Program
NOAA	11.436	Columbia River Fisheries Development Program
NOAA	11.437	Pacific Fisheries Data Program
NOAA	11.438	Pacific Coast Salmon Recovery Pacific Salmon Treaty Program
NOAA	11.439	Marine Mammal Data Program
NOAA	11.440	Environmental Sciences, Applications, Data, and Education
NOAA	11.441	Regional Fishery Management Councils
NOAA	11.451	Gulf Coast Ecosystem Restoration Science, Observation, Monitoring, and Technology
NOAA	11.452	Unallied Industry Projects
NOAA	11.454	Unallied Management Projects
NOAA	11.455	Cooperative Science and Education Program
NOAA	11.457	Chesapeake Bay Studies
NOAA	11.459	Weather and Air Quality Research
NOAA	11.460	Special Oceanic and Atmospheric Projects
NOAA	11.462	Hydrologic Research
NOAA	11.463	Habitat Conservation
NOAA	11.467	Meteorologic and Hydrologic Modernization Development
NOAA	11.468	Applied Meteorological Research
NOAA	11.469	Congressionally Identified Awards and Projects
NOAA	11.472	Unallied Science Program
NOAA	11.473	Office for Coastal Management
NOAA	11.474	Atlantic Coastal Fisheries Cooperative Management Act
NOAA	11.477	Fisheries Disaster Relief
NOAA	11.478	Center for Sponsored Coastal Ocean Research Coastal Ocean Program
NOAA	11.481	Educational Partnership Program
NOAA	11.482	Coral Reef Conservation Program
NOAA	11.483	NOAA Programs for Disaster Relief Appropriations Act - Non-construction & Construction
NOAA	11.999	Marine Debris Program
NTIA	11.028	Connecting Minority Communities Pilot Program
NTIA	11.029	Tribal Broadband Connectivity Program
NTIA	11.031	Broadband Infrastructure Program

NTIA	11.032	State Digital Equity Planning Grants
NTIA	11.033	Middle Mile (Broadband) Grant Program
NTIA	11.035	Broadband Equity, Access, and Deployment Program
NTIA	11.553	Special Projects

Appendix 2. RERI sample NOFO language

Place-based policy and geographic data collection guidance and sample NOFO language:

Place-based Policies: Bureaus are strongly encouraged to identify programs with a place-based focus as a "place-based policy" initiative in the body of the NOFO. Explicitly describing programs as place-based can help potential grantees more effectively delineate the impacts a grant would have for their community.

For programs that are identified as place-based, the following language would be appropriate for a *Definitions* section in a NOFO:

> **Definition. Place-based policy.** A place-based policy intentionally targets investment to specific places, is designed to close geographic gaps, and/or has the potential to have transformative impact in a specific geography. Place-based policies either address a place's distress (i.e., targeting unmet local needs like high unemployment or infrastructure gaps) or build upon a place's capacity (i.e., strength in an industry sector, skills of local workforce).

Data Collection: Understanding the area of impact is especially crucial for selecting and evaluating applicants for place-based programs; high-quality geographic data can facilitate analyses of applicants that contribute to more equitable allocation of resources over time. Note that a region of impact is the geographic area that is expected to positively benefit from the investment, which can be broader than the location of the investment itself. Bureaus are strongly encouraged to collect structured data for place-based programs. For programs with state or county-level impacts, Federal Information Processing System (FIPS) Codes are an effective structure for collecting geographic information. For programs with impacts at a more granular level of geography (i.e., town, neighborhood), census tracts are an effective structure for collecting geographic information.

The following language is appropriate for a *Project Narrative* or similar section of a NOFO:

> ***Geography of Impact.*** Provide a description of the area or region of impact of the project. Using the Census Map Building Tool, provide a link to a map illustrating your project's area or region of impact. A step-by-step guide for creating a map illustrating your project's area or region of impact is available at this link. Maps or lists of FIPS codes will not count toward the Project Narrative page limit.

Appendix 3. Membership List

The following persons were members of the Metrics Working Group at any time between August 2022 and September 2023.

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