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

April 26, 2022

Contents

Executive Summary 1
Roadmap 1
Recommendations 2
Background 2
Members 3
Evaluation Strategy 3
Goals for Program Evaluation 3
Types of program evaluation 4
Framework for program evaluation 6
Phases of program implementation 6
Direct versus indirect program impacts 7
Projected versus observed program impacts 9
Other evaluation framework considerations 9
Geographies 9
Equity in program delivery 11
Environmental impacts and climate resilience 11
Measuring and Monitoring Program Operations 12
Data 13
Leveraging Existing Data 13
U.S. Census Bureau's Data Linkage Infrastructure 13
Models 14
Indices measuring underserved populations 15
Program data collection and record linkage 15
Address linkages 16
Organization linkages 16
Person linkages 17
Data Management Principles and Best Practices 17
Bibliography 19
Tables 22
Table 1. Program Lifecycle Summary 22
Table 2. Framework for program evaluation by phase and type of impact metric 24
Table 3. Prototype library of indirect program impact metrics 25

Table 4. Required fields to enable record linkage of program data collected 28
Table 5. Example of Address components 28
Appendix 1. IIJA and ARP programs established/leveraged at Department of Commerce implementing bureaus 29
EDA 29
NIST 30
NOAA 31
NTIA 36
Appendix 2. Agency-specific program evaluation metrics 38
EDA 38
NIST 39
NOAA 40
NTIA 41
Appendix 3. Agency-specific data for program evaluation 45
EDA 45
NIST 45
NOAA 46
NTIA 46
Appendix 4. Agency-specific grants management 47
EDA 47
NIST 51
NOAA 51
NTIA 55
Appendix 5. Common Program Impact Measures and Data Sources 56
Appendix 6. Data Governance Working Group members and advisors 58

Executive Summary

The American Rescue Plan Act (P.L. 117-20) (ARP) and the Infrastructure Investment and Jobs Act (P.L. 117-58) (IIJA) provide the Department of Commerce (DOC) with critical resources to strengthen the American economy, respond to the COVID-19 public health crisis, and make once-in-a-generation investments in our nation's infrastructure. The DOC is committed to delivering ARP relief and IIJA funding in a manner that is expedient, equitable, and accountable and maximizes return-on-investment. To that end, the DOC directed the formation of a Data Governance Working Group (DGWG) under the purview of the Commerce Data Governance Board (CDGB). The DGWG seeks to identify an approach for agencies to measure program performance in a way that minimizes the burden to aid awardees while maximizing the ability to report achievement of program goals and objectives, demonstrate lessons learned, improve program outcomes, and foster adoption of promising practices.

The ability to quickly and accurately aggregate data on program performance across DOC bureaus is critical to monitoring the performance of the infrastructure programs, providing effective oversight, and working to resolve issues expediently. However, while this opportunity is driven by these large, above-base initiatives, the benefits of leveraging data as a strategic asset are not just limited to the ARP and IIJA programs. The lessons learned from the DGWG's effort translate into a broader approach for the DOC's use of data and strategic program evaluation. Defining success, understanding how to measure it, collecting the necessary up front and monitoring change will provide important evidence on what factors and approaches support greater impact, in-process corrective actions, and program design going forward. Additionally, by standardizing key data elements and measurement methodologies, the DOC will be able to aggregate the impact of its investment programs regardless of the policy area or program design. In order to do this, the structure of data elements must be considered and designed up front, ensuring that financial and performance information can be reported consistently and timely regardless of the agency implementing the program.

The following report is the culmination of work completed by the DGWG to develop a standard approach for agencies to plan evaluation of programs funded by the federal government, including IIJA and ARP. The report recommends that agencies leverage Census Bureau's Data Linkage Infrastructure (described in this report) to reduce respondent burden and enable evaluation otherwise not possible.

Roadmap

The following offers a roadmap for designing and executing a framework for using data to support implementation throughout the program's lifecycle. First the report discusses several types of program evaluation methodologies and details the strengths and weaknesses of each approach in terms of a method's credibility, feasibility, data requirements, and expense. Second, the report recommends a framework for program evaluation, which considers three dimensions: the phases of program implementation, direct versus indirect program impacts, and projected versus observed program impacts. Next the report discusses other important considerations essential to program evaluation design, including identification of geographies, equity in program delivery, and environmental impacts and/or climate resilience. The report then describes the data and tools that can be leveraged to enable program evaluation, including the Census Bureau's Data Linkage Infrastructure, model-based tools, local-level (census tract, county, etc.) indices which do not require the use of microdata, approaches to linking program data with statistical and administrative data, and best practices for managing data.

Recommendations

The DGWG makes many recommendations throughout this report. The recommendations are presented in a way that allows agencies to make decisions about the appropriate implementation strategy depending on the program.

- Agencies should implement a measurement and evaluation design that emphasizes credible results within resource, cost, and schedule constraints.
- Agencies should consider implementing large-scale observational studies that link program administrative data to previously collected data from censuses, surveys, administrative records, commercial vendors, and aggregated indices. The Census Bureau's Data Linkage Infrastructure may be particularly useful (see Table 3 for a list of potential data sources and metrics).
- Agencies should collect high-quality unique identifiers from aid awardees, including both primary and secondary awardees to enable linkage to other data sources.
- Agencies should evaluate programs based on the phase of program implementation, direct versus indirect program impacts, and projected versus observed program impacts (see Table 2).
- Agencies should follow all applicable standards issued by the Office of Management and Budget (OMB) for grant awardees to report on geographic location of primary and secondary awardees, as well as the point of service delivery. The DGWG supports using census tracts as a standard reporting element.
- Agencies should continue to measure and monitor program operations (e.g., timeliness, compliance with regulations) following or exceeding guidance from OMB and their respective agencies.
- Agencies should leverage existing impact projection models from industry, academia, or government where possible.
- Agencies should use metrics and available indices of economic and geographic vulnerability to determine the equity or bias in program delivery.
- Agencies should consider incorporating program impacts on the environment and climate resilience into their evaluation plans.
- Agencies should establish or participate in a working group to identify existing standards and best practices for managing program operations and evaluation data and develop guidance for use by data practitioners.
- Agencies should create a community of practice to share lessons learned from program implementation and foster collaboration.

Background

The American Rescue Plan Act (P.L. 117-20) (ARP) and the Infrastructure Investment and Jobs Act (P.L. 117-58) (IIJA) provide the Department of Commerce (DOC) with critical resources to strengthen the American economy, respond to the COVID-19 public health crisis, and make once-in-a-generation investments in our nation's infrastructure. The DOC has four program-implementing bureaus which received a total of $54 billion in funds from IIJA and ARP: the Economic Development Administration (EDA), the National Oceanic and Atmospheric Administration (NOAA), the National Telecommunications

and Information Administration (NTIA), and the National Institute of Standards and Technology (NIST).[1] The DOC is committed to delivering ARP and IIJA funding in a manner that is expedient, equitable, and accountable. Most important, the DOC is committed to maximizing the positive impact of ARP and IIJA programs on individuals, businesses, and communities. Toward those ends, DOC leadership directed the formation of the DGWG to identify ways to collect program performance information while minimizing the burden to aid awardees and, maximizing DOC's ability to report achievement of program objectives, demonstrate lessons learned, improve program outcomes, and foster adoption of promising practices.

The DGWG was tasked with providing data governance standards[2] for ARP and IIJA programs to the Deputy Secretary and the Commerce Implementation Coordination Office. While the DGWG's work focuses primarily on providing guidance for the ARP and IIJA programs, the resulting recommendations provide value for many other programs within the DOC and across the federal government.

Members

The following agencies participated in the development of this report and formed the DGWG: DOC Implementation Coordination Office, U.S. Census Bureau, EDA, NOAA, NTIA, NIST, Bureau of Economic Analysis (BEA), the DOC Office of the Chief Evaluation Officer, and the DOC Office of the Chief Data Officer.

The group has also been advised by the Office of Management and Budget (OMB), the Department of Transportation, and staff from the DGWG member agencies regarding best practices and considerations under advisement for the use of data across government.

The DGWG is chaired by the U.S. Census Bureau's Deputy Director to provide statistical agency and evaluation methods expertise. The Evaluation Officer supports alignment with OMB direction on program evaluation and current best practices in the Federal performance and evaluation communities. The DOC Office of the Chief Data Officer represents the DOC's data governance and compliance board, and the utilization of data to drive business outcomes. As ARP and/or IIJA-implementing bureaus, NTIA, NOAA, NIST, and EDA each have representation on the DGWG to provide programmatic subject matter expertise. For a list of DGWG members and advisors, please see Appendix 6.

Evaluation Strategy

Goals for Program Evaluation

The OMB defines program evaluation as the "systematic analysis of a program, policy, organization, or component of these to assess effectiveness and efficiency" (OMB M-19-23).[3] Some basic questions that

[1] Specific programs funded by IIJA and ARP within bureaus of the DOC are described in more detail in the Appendix.

[2] Development and implementation of comprehensive data governance standards requires significant resources. Preliminary standards to support the immediate need will be included in this report, i.e., information required to evaluate impacts, geospatial reporting standards and more. Comprehensive data governance standards will be developed in coordination with the CDGB.

[3] OMB M-20-12 and OMB (2021) Part 6 provide guidance on measuring program performance and program evaluation. They define four types of evaluation: Formative Evaluation (assesses what data is needed/available to conduct one of the other three types of evaluations); Process Evaluation (assesses if the service delivery process is

agencies should ask when evaluating their programs are (OMB M-21-27): To what degree is our implemented approach causing the desired outcomes/impact? How much effect? For whom? Under what conditions?

Title 1 of the Foundations for Evidence-Based Policymaking Act of 2018 (Evidence Act 2018) and OMB's guidance on implementation (see OMB M-19-23, OMB M-20-12, OMB 2021: Section 290, OMB M-21-27) require systematic rigorous program evaluation.[4] In addition to formal program evaluation, agencies must also monitor the performance of program implementation throughout the program lifecycle (see section "Measuring and Monitoring Program Operations"). However, apart from compliance with laws and regulations, public servants have an obligation to maximize the return on tax dollars. Rigorous evaluation that informs policy is essential to meeting that obligation. Without information on best practices, investments in strategies that seem appropriate but have minimal public benefit can be repeated decade after decade. Similar problems come up cyclically, and each iteration of interventions should be better informed than the last.

In accordance with the Evidence Act, the DGWG aims to advance data sharing and collaboration opportunities across DOC bureaus and build an exemplary body of evidence on the effectiveness of different project designs and interventions. Title 2 of the Evidence Act promotes agency use of administrative and statistical data to build that exemplary body of evidence. The DOC is positioned to lead the way. Census and BEA advances have increased the utility of statistical information for evaluation. Their data and statistics are becoming more granular (e.g., local, subgroups) and timely. This creates new opportunities for using data to increase impact and target underserved communities and populations. Granular data, at the census tract level, provide consistent, high-resolution geographic reporting needed to assess the longer-term benefits of programming for different locations and demographic groups. Additionally, data collected and produced by programs track the inputs and outputs throughout the program implementation lifecycle. These administrative data, combined with statistical data on local economies, provide the information needed to assess the relative cost effectiveness of programs and projects. Those assessments are the raw material of evidence-based decision making.

Types of program evaluation

An important consideration when developing a program evaluation is the inferences and conclusions that the study design permits. There are many ways to evaluate a program, each with varying degrees of credibility, feasibility, data requirements, and expense (see, for example, Hannan 2008). Thus, an important consideration is matching the study design to the evaluation needs of the program. Data availability will also limit design options. Program monitoring and activity tracking require near real time

working well and/or as planned); Outcome Evaluation (assesses if the planned outcomes occurred); Impact Evaluation (assesses if the outcomes occurred and if the program caused the outcomes). This report focuses on Outcome and Impact Evaluations.

[4] OMB sets standards for program evaluation for the federal government. Because those standards continue to evolve, the **DGWG recommends** that all agencies engaging in program evaluation review and follow or exceed the latest guidance from OMB. Additionally, agencies should follow any standards set forth by their own departments and agencies.

metrics but do not require an elaborate study design with control groups. Credible and defensible program evaluation are more data and resource intensive and require careful design.

In conceptualizing study designs along a credibility continuum, the top tier produces results from *multiple randomized controlled trials (RCTs)*, which are often synthesized through a systematic review or a meta-analysis. RCTs are the gold standard of scientific research because they allow for causal inference, i.e., the size of the impact the program has on the desired outcome. However, RCTs are often difficult to implement outside of the natural or physical sciences and medical research setting. For example, in a laboratory setting, it is easier to account for the confounding factors that can impact the study outcome; accounting for such confounding factors is more difficult when assessing social benefit programs. For instance, a national economic upturn may influence the level of a desired impact of government economic development investments. Although RCTs yield highly credible results, it is worth noting that they require a pre-specified and detailed study design, can be hard to successfully implement in a non-controlled setting, often rely upon multiple rounds of data collection, can be burdensome to the public, are typically expensive to conduct and often involve considerable time lags. Another potential drawback is that randomly selecting the beneficiaries of a program may not be ethical (e.g., when support is needed for disaster relief). Further, the implementation of multiple RCTs, to allow for a systematic review or meta-analysis, requires a significant monetary and time investment, which may not be practical in the context of a specific program evaluation.

The second tier in a strength of evidence continuum includes *single RCTs and unrandomized (observational) studies*. Within this tier, single RCTs provide credible evidence related to a causal effect, though effect size estimates may not be as precise as estimates based upon a meta-analysis. Observational studies, such as case-control or cohort studies, involve a comparison group. Administrative and survey data are used to measure the outcomes in areas or populations that received the benefit and those that did not. This approach balances the need for rigorous program evaluation and the practical constraints when the randomization of program recipients is not possible. Quasi-experimental designs, such as difference-in-difference models, compare changes in the outcome over time between groups that received and did not receive a benefit. Another example are regression discontinuity models, which compare entities with scores just above a numerical qualification criterion for a benefit to entities with scores just below on an outcome measure. These types of research methods enable social science researchers to account for some aspects of non-randomization and approximate conditions of RCTs. Leveraging administrative or survey data that have been previously collected for first or second tier research reduces respondent burden and costs to the public. To use data sets created for statistical purposes for program evaluation, the statistical survey data needs to be linked to administrative program data. To enable the linking, agencies must collect sufficient identifying information from federal aid awardees at the address, organization, or person-level. For more information, see section “Program data collection and record linkage.”

The final tier includes study designs that yield results with the lowest level of confidence and, potentially, increased levels of bias. The study designs included in this tier include *smaller case studies or reports, dashboards, and expert opinions*. The study designs in this tier very often require less effort and cost to design and actuate, given the lack of methodological rigor. Thus, inferences to a broader population are limited as are comparisons between groups; ascertaining key findings is further complicated by the fact that collections of case studies often cannot be harmonized or readily compared. Although the designs in this tier are feasible, have minimal data requirements, and lower

costs, the resulting evidence is often not sufficiently credible. This point is succinctly made by Zolas and colleagues: "Consequently, the extent to which this type of information provides rigorous, systematic, aggregate insights into economic value is far from clear" (Zolas et. al. 2015, p. 1367). The findings from this final tier of study designs are often considered less conclusive regarding the effect of a given program, but they can aid in informing hypothesis development for larger scale and more rigorous studies. Researchers are encouraged to review topical studies from this tier as well as pertinent qualitative studies, such as in-depth and structured interviews and focus groups as they gather information and develop the statistical analysis plan for their program evaluation.

The DGWG recommends that agencies consider implementing a study design that allows for the most credible, or strongest, results, given the associated feasibility, data requirements and cost constraints. Given the constraints that many agencies will encounter, this report emphasizes the value of large-scale observational studies that link program administrative data to previously collected data from censuses, surveys, administrative records, commercial vendors, and aggregated indices. If systematically and rigorously actuated across a portfolio of program evaluations, the federal government will generate large quantities of highly credible evidence to support decision making.

Framework for program evaluation

The DGWG recommends that agencies consider using a framework for conceptualizing program evaluation which includes three dimensions: the phase of program implementation, direct versus indirect program impacts, and projected versus observed program impacts (see Table 2).

Phases of program implementation

The first dimension is phase of program implementation. Agencies should evaluate project potential and programs at multiple points throughout the program lifecycle. The phases of the program implementation relevant to program evaluation are: 1) program design/standup; 2) pre-award program implementation; 3) post-award program implementation; 4) closeout (see Table 1).[5]

The program design/standup phase begins with defining program objectives and ends with the release of the solicitation and Notice of Funding Opportunity (NOFO). During this phase, agencies should determine the metrics included in the NOFOs, including the definition, measurement, cadence of data collection (if necessary) and alternative source data availability for the metrics. Further, at this point in the program implementation lifecycle, agencies should begin to develop and document an analysis plan. The analysis plan should address the central components of a rigorous program evaluation, including the research question(s), data sources, definitions of key populations, outcome measures (specifying, as appropriate, direct, and indirect measures), statistical methodology, and quality control mechanisms. Agencies, to the extent possible, should prospectively publish their program evaluation analysis plans.

The pre-award program implementation phase includes receiving and reviewing applications, merit-based selections, grant processing, and defining and designing post-award reporting requirements (as defined in the NOFO), among other activities. During this phase of assessment, bureaus should focus on measuring operational outcomes against planned milestones, with a particular focus on the early indicators that would signal to program managers the need for operational pivots. For example, tracking the demographics of applicants for technical assistance requests in underserved areas could help

[5] The DOC Program Lifecycle Summary begins with another phase: planning (pre-funding). This phase is a precursor to an agency appropriating funding through legislation and is outside the scope of this report.

programs understand whether their outreach and engagement strategy with these communities is sufficient, or if it should be adjusted.

The post-award implementation phase includes grant monitoring, recipient reporting, funds tracking, audits and compliance monitoring, and program evaluation. Evaluation activities during active program implementation should focus on tracking real time metrics for agencies to analyze short-term impacts. Evaluators should answer critical questions including: is the program implementation successful in providing timely assistance to target populations? Is there equity in program delivery? Ideally, evaluations performed at this early stage allow agencies to pivot implementation strategies if necessary.

The closeout phase occurs after the program implementation has been completed, and includes program evaluation, financial audit, and funds recovery. This is the ideal program phase for agencies to evaluate long-range program impact trends, assess intended versus actual delivery of funds, and to understand if program delivery milestones were missed and if so, why. Ultimately this type of ex-post facto review should be documented and used to inform future effective program design.

Agencies should discuss the appropriate intervals for evaluation. **The DGWG recommends** at least one report during each of the pre-award, post-award, and closeout phases. However, the frequency and the type of evaluation should vary with the types of projects funded. For large-scale, high profile, or high-risk programs (such as those where funding is issued expediently due to a pressing external need, like disaster response), an ongoing approach to program monitoring may be more appropriate. Some programs have shorter timelines and therefore earlier predicted impacts; others have longer timelines and later predicted impacts. The timeline for evaluation should be appropriate given the timeline of the program.

For projects that involve long time lags between initiation and the realization of expected benefits (e.g., those involving construction or lengthy research activities), early evaluation work will focus on project management and activity tracking (e.g., direct expenditures and jobs created) with outcome assessments only feasible once the project is completed.

Direct versus indirect program impacts

The second dimension of the program evaluation framework captures direct versus indirect program impacts. Program impact is measured by the difference between the baseline (current conditions without the investment) and the new (post investment) condition. Depending on the project, program impacts can be experienced by different types of communities: individuals, organizations and businesses, geographic areas, etc. The proper unit of analysis in an evaluation study must reflect this variation.

As part of the program evaluation, agencies should examine both the direct and indirect impacts of their programs on communities, businesses, and people. However, direct program impacts are more essential to ensure that agencies fulfill their fiduciary obligation to maximize the return on investment in tax dollars as defined by the policy that established a given program.

Measures of direct program impact quantify achievement of a program's stated objectives as defined in legislation.[6] Direct impacts are program (even sub-program) specific and should flow from the benefits intended from legislation or other relevant policy statements. Due to diversity in programs, there is heterogeneity in the intended outcomes of programs which will drive which direct impact measures agencies need to examine. For some programs, it will be easier to measure these direct outcomes (e.g., job training programs implemented; broadband infrastructure built) and in other cases more difficult (e.g., climate resilience; research and development).

Agencies should identify direct program impact metrics that can be measured at multiple points in time with a consistent approach. While direct program impact data has usually been developed from administrative data reported by awardees to an implementing agency, **the DGWG recommends** that agencies consider using existing data sources, including data from censuses, surveys, administrative records, commercial vendors, and aggregated indices.

Indirect program impacts may result from program implementation and cover everything significant that is not in the legislation defining a program.[7] Similar to direct program impact metrics, indirect program impact metrics will vary based on the type of program being implemented. However, agencies should consider examining a standard set of metrics to enable cross-program comparison.

Toward that end, the DGWG developed a prototype library of indirect program impact metrics for agencies to consider using in their program evaluations (Table 3). The DGWG based these metrics on a review of DOC's large assistance programs and identified broad categories of indirect program impacts including demographic and socioeconomic, economic indicators and jobs, environment and climate, and underserved communities.

More work is needed to identify, categorize, and evaluate potential metrics used by agencies. **The DGWG recommends** developing a living library of metrics that can be updated as agencies develop new metrics and refine existing ones. To make this effort as successful as possible, it is essential that the living library of metrics include robust metadata, or data that describe the attributes of the program impact metrics, including definitions, formulas used in calculating metrics, data sources, geographic and temporal aspects, and potentially code agencies develop while using these metrics.

Note that depending on legislative intent, an indirect impact for one program could be identified as a direct impact of another. For instance, construction jobs would be the direct impact of a program designed to increase work for people in the trades. For a program intended to upskill technology workers, the construction jobs needed to build a training facility would be an indirect impact. A best

[6] For example, NTIA's Broadband Equity, Access, and Deployment (BEAD) program appropriates $42.45 billion for states, territories, the District of Columbia (D.C.), and Puerto Rico (P.R.) to utilize for broadband deployment, mapping, and adoption projects. Direct program outcomes include change in a community's broadband infrastructure, the number of people who can access broadband, and the number of people who have connected their homes/businesses to broadband.

[7] Indirect impacts that may result from expanded broadband access include new e-businesses in the community, use of on-line educational and health care tools, and an increase in population of telecommuters to the area. Broadband access could have the indirect but profound effect of reducing local unemployment and increasing educational attainment.

practice is using a Logic Model to provide clarity on intended direct and indirect outcomes of a program.[8]

Projected versus observed program impacts

The third dimension of the program evaluation framework considers the distinction between projected versus observed impacts. Projected impacts are based on statistical modeling of future potential impacts and could be reported by aid awardees. With the proliferation of data sources and the advent of new data science techniques and technologies, programs now have the opportunity to leverage modelled data in a way that has not previously been available. In doing so, agencies can make informed decisions prior to or concurrent with observed outcomes. This presents a powerful opportunity to assess performance and make course corrections during the implementation phase rather than wait for an after the fact evaluation. This is particularly important for large, one-time programs (such as those in the ARP or IIJA legislation) or unprecedented circumstances, as happened with the COVID-19 pandemic. **The DGWG recommends** that agencies leverage existing projection models from industry or government where possible. Note that the scope of this report excludes consideration of multiplier effects (i.e., increased economic activity that occurs in service to the employment, investment, facilities that are the direct and indirect outcomes of programming)

Observed impacts are based on statistical estimates from current or past data, or reports on what occurred (e.g., payroll information). Ideally, these metrics are produced in ways which minimize burden to program awardees. Agencies are encouraged to look for ways to collect and leverage outcomes in a timely manner that aligns with the program phase and implementation timeline. In many instances this may require relying on proxy or related data collected through existing government surveys or inherent in readily available data sources, rather than relying on recipient or program generated data.

Other evaluation framework considerations

Geographies

Awardees of federal aid must report to the federal agency that provides their funding at many points in the program lifecycle. In these administrative records, awardees may report on the geography of the aid awardee, including primary and secondary awardees, the location(s) of point of service delivery, and the location(s) of the beneficiaries or where the program is predicted to have an impact. OMB is developing standards to ensure geographies are measured consistently when aid awardees report geographic information to federal agencies. OMB is anticipated to issue guidance that census tracts should be the unit of measure, and **the DGWG recommends** that agencies follow this standard or whatever guidance is issued.

Census tracts are a well-established way to delineate small geographic areas on land and are often used as proxies for neighborhoods in social science research. Because Census Bureau data are often published at the tract level, it is easy to link socio economic or demographic data to contextualize outcomes. Tracts are more stable and easier to work with than other geographies such as ZIP codes.[9]

[8] See: https://www.ies.ncsu.edu/blog/what-are-logic-models-and-when-should-you-use-them/ and https://www2.ed.gov/programs/hep/hep-camp/logic-models-and-program-evaluation.pdf for examples
[9] See: https://www.census.gov/geographies/reference-files/time-series/geo/relationship-files.html

Tracts change only once every ten years, are well documented, and are part of a nested hierarchy that makes it easy to aggregate them to larger geographic areas such as counties or metro areas.

OMB is exploring how to require awardees to report geographies in a way that reduces respondent burden while achieving the goal of a census tract-level measure. Census tracts may reflect the location of an awardee, point of service delivery, and beneficiaries/impacted communities. This guidance will require agencies to capture the census tract(s) of proposed projects in applications for funding and determine how awardees of federal funds will report on these geographies via the post-award reporting process

In order to identify census tracts for reporting purposes, agencies must identify what type of geography is appropriate to measure based on their programs. Geographies of interest may be a point, line, or polygon. A point is a specific point on a map where a program was implemented, such as an address. A line is a series of points that connect, such as a road. A polygon is a series of points that outline an area and include the area encompassed within that shape.

In leveraging these geographies, the working group recognizes the need for program-specific flexibility in determining what communities are impacted. In some cases, there is a mismatch between the point of service delivery and the area impacted by a given program or project. For example, remediation of lead pipes in a neighborhood has the potential to impact the community which receives water through those pipes. Repairing a bridge or road has the potential to impact many communities beyond those immediately adjacent to that bridge or road. Environmental impacts can be both local and across regions (e.g., reopening rivers for migratory fish can impact fish stock across the habitats) and so other geographic measures might need to be used to determine scope of a program's impact.[10]

Ideally, all federal agencies will capture geographic information about the point of service delivery. If this is done in a consistent way, evaluators will know what other public investments were made in an area to assess project impact and the combinations of investments that are most effective. In other words, consistent measurement of geographies will enable the government to better isolate the effects of one program versus another, assess what combinations of program interventions are most effective, and mitigate any double counting.

The Census Bureau provides several publicly available geographic tools to assist users who need to geocode points, lines, and polygons. All these tools use the Master Address File/Topologically Integrated Geographic Encoding and Referencing (MAF/TIGER) database as the underlying source of data. All tools will reference the same addresses and display the same results.

[10] There are various methods to georeference environmental and marine activities according to the target audiences, the type of activities and desired project outcomes. For example, to identify the accurate location of a marine activity or object (e.g., a buoy or an offshore wind turbine), latitude and longitude in different digits of coordinates are generally used. For a moving object or an activity that takes place across an area, location identification can expand to a path (e.g., for a container ship), grid and polygon (e.g., for a habitat of coral reefs), and something to three-dimensions to include the information of its depths in water (e.g., for seabed mapping). One of the best practices to describe environmental and marine activities/objects/projects is to provide two locations: one is where the project takes place physically, the other one is where the potential impact area will be.

The Census geocoder permits users to geocode a single address or batch of addresses to Census geographic data.[11] Geocoding is the process of identifying a geographic area and/or latitude and longitude coordinates based on an address. The Census geocoder returns latitude and longitude coordinates as well as legal and statistical geographies associated with a given address. Legal geographies include legislative districts and state, etc.; statistical geographies include combined statistical areas, census tracts, etc. The Census geocoder allows users to output a csv file with the return queries in the API or within the batch-processing.

The Census Bureau's TIGERweb is a user-friendly web application that allows users to easily view a variety of geographic entities.[12] Users can view and query legal and statistical geographies, as well as roads, railroads, and hydrography features.

The Census Bureau also maintains shapefiles for more advanced data users.[13] Shapefiles are Geographic Information System (GIS) mapping files that contain geographical information (spatial data). Thirty-four different data layers are available in Shapefile format including county boundaries, roads, and census blocks. The 2020 tabulation blocks are updated to include the 2020 Census population and housing unit counts.

Equity in program delivery

Agencies should define metrics to determine equity or bias in program delivery. For example, agencies may track whether historically underserved populations and communities are appropriately targeted during the Pre-Award Program Implementation phase including applications, as well as track total approved funding to these communities. Throughout the program lifecycle, this type of data should be monitored on an ongoing basis to help programs understand how to address inequities in delivery. Post-close out evaluations should assess which communities benefited from programs and to what degree. Agencies can examine whether there was bias associated with program uptake, measured by comparing eligible populations to enrolled populations for a program. Measuring the level of program benefits delivered to vulnerable populations and by socioeconomic characteristics can be particularly effective.[14] Data to evaluate equity in program delivery are listed in Table 3, which includes restricted microdata from the Census Bureau's Data Linkage Infrastructure and publicly available indices measuring underserved communities (see section "Indices measuring underserved populations"). **The DGWG recommends** that these indices be used with census tract information to measure benefits directed to underserved communities and the impact of the benefits on underserved communities.

Environmental impacts and climate resilience

Agencies' program evaluation plans should consider, to the extent possible, impacts on the environment and climate resilience. Climate resilience refers to a community's ability to be resilient against climate-related risks.[15] This information can illuminate where projects have higher risk of climate hazard

[11] See: https://geocoding.geo.census.gov/geocoder
[12] See: https://tigerweb.geo.census.gov/tigerwebmain/TIGERweb_main.html
[13] See: https://www.census.gov/geographies/mapping-files.html
[14] An example of this approach is shown in an analysis of uptake of the Supplemental Nutrition Assistance Program (SNAP) by state and time period: https://www.census.gov/library/visualizations/interactive/snap-eligibility-access.html
[15] See: https://toolkit.climate.gov/about/faq

impacts, the location and type of adaptation projects needed, and where additional resources may be required.

There are many tools available across the government to assist in these efforts. The Climate and Economic Justice Screening Tool[16] of the Council on Environmental Quality, the FEMA Resilience Analysis and Planning Tool (RAPT)[17]and the NOAA Social Vulnerability Index[18] are currently available. NOAA has a variety of tools to assist in assessing and building climate resilience such as the Climate Resilience Toolkit,[19] Sea Level Rise Viewer,[20] or Drought Monitor.[21] In addition, NOAA programs like the Regional Integrated Sciences and Assessments Program (RISA)22 and Regional Climate Service Directors (RCSDs)[23] possess expertise in helping local communities adapt in the face of climate and environmental change. The Census Bureau's Community Resilience Estimates[24] program produces neighborhood-level estimates of community resilience to disasters, and work is underway to develop Community Resilience Estimates focused specifically on the impacts of climate change.

In the instances that a tool is not available, geospatial climate data combined with demographic information from the U.S. Census Bureau can provide information on where projects have higher risk of climate hazards impacts, the location and type of climate resilience projects that are mostly needed, and where additional requirements are needed for safety. These tools and data sources should be used by both applicants and program staff in assessing and designing projects.

Measuring and Monitoring Program Operations

In addition to program evaluation, **the DGWG recommends** agencies continue to measure and monitor program operations following guidance from OMB and their respective agencies. Operational performance metrics track compliance with the program plan for selecting and funding projects, targets for types of projects and categories of beneficiaries, and targets for the projected impact levels. Performance metrics are required by the Government Performance and Results Modernization Act (GPRAMA) of 2010 and with some impact results are reported in the agency Annual Performance Plan and Report (APPR).[25]

Performance metrics track project and program operations and projected impact during implementation. The metrics that track projected impact should mirror metrics that are used to measure actual impact when program evaluations are conducted (OMB 2021, section 240). This permits evaluators and analysts to compart projected to actual impact.

---

[16] See: https://screeningtool.geoplatform.gov/en/
[17] See: https://www.fema.gov/emergency-managers/practitioners/resilience-analysis-and-planning-tool
[18] See: https://screeningtool.geoplatform.gov/en/
[19] See: https://toolkit.climate.gov/#tools
[20] See: https://coast.noaa.gov/slr/#/layer/slr
[21] See: https://www.drought.gov/data-maps-tools/us-drought-monitor
[22] See: https://cpo.noaa.gov/Divisions-Programs/Climate-and-Societal-Interactions/RISA/About-RISA
[23] See: https://www.ncei.noaa.gov/introducing-nceis-regional-climate-services-directors
[24] See: https://www.census.gov/programs-surveys/community-resilience-estimates.html
[25] Data on these measures are reviewed before the report is published each February, during the required Annual Strategic Review due to OMB in June, and during the process of developing the draft APPR due to OMB in September with the agency proposed budget.

Additionally, agencies should focus on outreach and technical assistance throughout the program implementation process. Feedback from aid awardees and end users should be systematically requested at phases of the award process and is valuable for identifying process and communications problems that can adversely affect results.

Data

Leveraging Existing Data

The **DGWG recommends** that agencies leverage existing survey and administrative data whenever possible when developing and executing program evaluation. These data are particularly useful for large scale observational studies (see "Types of program evaluation"). This approach enables consistent program evaluation across agencies and facilitates comparisons across a variety of programs. It also reduces the burden of aid awardees when reporting on the work they did with the federal funds. Importantly, harnessing the existing data allows agencies to answer questions otherwise not possible to answer.

U.S. Census Bureau's Data Linkage Infrastructure

The U.S. Census Bureau maintains a Data Linkage Infrastructure[26] of census, survey, administrative, and third-party data that supports high-quality research and evaluation, advancing the Census Bureau's mission of providing timely and unbiased data to support evidence-based decision making. These activities align with the intent of the Foundations for Evidence-Based Policymaking Act of 2018,[27] which will improve how data are used to generate evidence about policies and programs in the federal government.

The Census Bureau's Data Linkage Infrastructure includes data on households and businesses which come from census and survey collections as well as administrative records. Many of the key metrics that the working group recommends for program evaluation draw upon the Data Linkage Infrastructure data assets; the metrics are described in Table 3.

Household data include decennial censuses and household surveys such as the American Community Survey, the Current Population Survey, the Survey of Income and Program Participation, and the American Housing Survey. These data, which all provide unique analytic advantages, can be used to study sociodemographic characteristics of the population; income, poverty, health insurance; labor force, occupation, and industries; data linked over time; individuals, families, households; and geographic information down to Census blocks.

Business data include Economic Censuses, firm surveys, establishment surveys, transaction, and trade data. The Census Bureau's business data include precise geolocations for all U.S. businesses, as well as payroll, tax records, and foreign investments for large samples of businesses. The Longitudinal Employer-Household Dynamics (LEHD) program can link business data over time and link employee and employer data.

---

[26] Information about the census and survey data in the Census Bureau's Data Linkage Infrastructure is available at: https://www.census.gov/surveyexplorer. Information about the administrative data held in the Census Bureau's Data Linkage Infrastructure is available at: https://www.census.gov/datalinkage.

[27] See: https://www.congress.gov/bill/115th-congress/house-bill/4174/text

Administrative records at the federal level include data from the Internal Revenue Service, Social Security Administration, Department of Health and Human Services, among many others. At the state level, administrative data cover programs including the Supplemental Nutrition Assistance Program, Temporary Assistance for Needy Families, and Unemployment Insurance. At the local level, data are available covering topics like homelessness and involvement with the criminal justice system. Third-party data include mortgage information and property and tax foreclosure.

All data, whether census, survey, or administrative records, are assigned unique identifiers at the individual, geographic, or business level either probabilistically or deterministically, depending on the information available. For example, household-level data are linked at the individual level using unique anonymized identifiers called Protected Identification Keys (PIKs).[28][29][30] Note that if any restricted data in the Census Bureau's Data Linkage Infrastructure are used, the data are subject to disclosure and privacy protections pursuant to United States Code Titles 13 and 26.

Models

Model-based statistics may assist agencies in identifying multiplicative economic impacts of various federal programs. While the DGWG does not include the multiplier effect in the presented program evaluation framework, several potential models may be useful to agencies and other decision makers.

The Bureau of Economic Analysis (BEA) provisions the Regional Input-Output Modeling System (RIMS II), a tool used by investors, planners, and elected officials to objectively assess the potential multiplicative economic impacts of various projects.[31] This model produces multipliers that are used in economic impact studies to estimate the total impact of a project on a region beyond either the direct or indirect impacts discussed above. RIMS II multipliers provide a measure of the effects of local demand shocks on total gross output, value added, earnings, and employment.[32] The RIMS II is built on the assumption that an initial change in economic activity results in additional rounds of spending—for example, building a new road will lead to increased production of asphalt and concrete. The increased production of asphalt and concrete will lead to more mining. Workers hired due to the increase in economic activity will spend more in the region. There are other commercially available models such as IMPLAN[33] and REMI[34] (Regional Economic Models Inc) that are widely used by government agencies in the development of economic impact studies. Some state and local governments have developed models that estimate the economic impact of proposed business and infrastructure locations.

---

[28] See Wagner and Layne (2014) for a detailed description of the process used to assign PIKs.

[29] Since not all survey respondents or individuals within the administrative records can be assigned a PIK, researchers often use inverse probability weighting to reweight the estimates and make the linked sample representative of the target population. The inverse probability weights are created by dividing the survey sample weight by the predicted probability of the individual having a PIK.

[30] Restricted microdata are available through the Federal Statistical Research Data Center system: https://www.census.gov/about/adrm/fsrdc.html

[31] See: RIMS II User Guide at: https://apps.bea.gov/regional/pdf/rims/rimsii_user_guide.pdf

[32] RIMS II multipliers are not designed to estimate the impact of supply shocks to the economy. RIMS II makes several assumptions about how businesses and households operate. These assumptions work well when fundamental relationships and structures remain stable in the economy. However, during periods of economic instability these assumptions may no longer be applicable.

[33] See: https://implan.com/

[34] See: https://www.remi.com/models/

Indices measuring underserved populations

The DGWG has identified a variety of indices summarizing information about underserved communities at varying geographic levels. These indices assess different elements of a geography's vulnerability based on socioeconomic factors, climate resilience, population health, infrastructure conditions, etc. (see Table 3).[35]

For instance, the Census Bureau Opportunity Atlas reports an area's track record for upward mobility, focusing on outcomes (e.g., earnings) in adulthood for a cohort of children born between 1978 and 1983 (including those born in the U.S. and authorized childhood immigrants). The National Economic Resilience Data Estimator (Argonne National Laboratory in collaboration with EDA)[36] considers economic distress criteria, the impact of COVID-19, and the existence and emergence of industry clusters. Other examples of indices that the working group considers useful include the Community Resilience Estimates (Census Bureau), Small Area Income and Poverty Estimates (Census Bureau), Social Vulnerability Index (NOAA), and the Environmental Justice Screening and Mapping Tool (Environmental Protection Agency). For more information, please see Table 3.

Indices like these should be leveraged by federal agencies to identify vulnerable and underserved populations and when developing program evaluation plans. Unlike microdata in the Census Bureau's Data Linkage Infrastructure, indices are publicly available from many federal, academic, and non-profit sources and can be readily linked at the appropriate level of geography. Agencies should consider the reference period, lag, and geographic availability of the data used to produce these indices. In many cases, multiple years of data are combined to produce aggregated indices at lower levels of geography (e.g., census tract), and indices may refer to older data.

Program data collection and record linkage

Throughout the program lifecycle, agencies collect data to administer their programs. Some of these data, called administrative data, may be stored in operational databases covering, for example, grant applications and post-award reporting. Agencies may also leverage existing surveys or establish new surveys to measure the impact of the programs they support through federal funds.

For these administrative and survey data to be used for large-scale observational studies, it is imperative that agencies collect high-quality unique identifiers from aid awardees, including both primary and secondary awardees. Identifiers allow agencies to harness previously collected data, such as those datasets contained in the Census Bureau's Data Linkage Infrastructure. Unique identifiers allow linkage at the address, organization, or person level to other administrative or survey data. These linkages enable evaluations otherwise not possible.

There are three broad classes of linkages performed at the U.S. Census Bureau. These include address linkages, organization linkages, and person linkages. Each type of linkage requires different information to be collected from aid awardees throughout the implementation of a given program. These linkages are performed via secure servers at the Census Bureau by employees on approved projects. Table 4 summarizes the information agencies should collect to enable record linkage.

---

[35] Users can also find helpful comparisons of many of these indices here: https://experience.arcgis.com/experience/376770c1113943b6b5f6b58ff1c2fb5c/page/Overview-Compare/

[36] See: https://www.anl.gov/national-economic-resilience-data-explorer-nerde

Address linkages

Agencies may collect address-based information from aid awardees for many reasons, including addresses of an organization receiving federal funds, or locations of point of service delivery. Address linkages are performed via the Master Address File Match (MAFMatch) process.[37] This process begins by cleaning, standardizing, and parsing addresses provided in a survey or administrative record form. A full address is broken down into its many components (see Table 4). Next, a probabilistic matching algorithm compares the parsed address information from the survey or administrative record form to address information in the Master Address File (MAF). The MAF is a frame of all addresses in the United States that is maintained by the Census Bureau. Next, the MAFMatch process assigns unique MAF-IDs to the addresses in the source data. This unique MAFID permits the survey or administrative record form to be linked to any other dataset which includes a MAFID. The match rate for the MAFMatch process varies but is quite high (over 90 percent) for federal administrative record forms.

Organization linkages

Aid awardees can belong to many organizations, including businesses, non-profit entities, and governments. For the purposes of data linkage, businesses and non-profits are combined in the discussion because they have comparable data requirements.

Business-level linkages, including non-profits, are complex due to the hierarchical and complicated structure of businesses in the United States. For example, a small business may only operate at a single location (establishment) and be incorporated at that location, while a larger business may operate many establishments and have a separate corporate mailing address. Depending on the goals of the program, an agency may require aid awardees to provide information about businesses at any given level in that hierarchy.

The Census Bureau's Business Register (BR) is the universe of non-farm businesses in the United States. The information is derived from Internal Revenue Service (IRS) forms as well as other administrative records and Census Bureau economic censuses and surveys. The BR's data model captures the hierarchical nature of corporate structures and can house information at the appropriate level of a given company's hierarchy. Aid granting agencies should collaborate with Census Bureau subject matter experts to determine the appropriate level in a corporate hierarchy required for business linkage (e.g., establishment and/or corporate).

One approach used for business-level linkages is the Multiple Algorithm Matching for Better Analytics (MAMBA) system.[38] MAMBA is a probabilistic record linkage framework that enables data users to compare Business Identifiable Information (BII) to an appropriate extract of the BR. Match rates for business data are typically in the 60-80% range for data with business name and address but can be higher when Employer Identification Number (EIN), a 10-digit identifier provided to a business by IRS at time of incorporation, is also available. Other approaches for business record linkage are currently being evaluated.

Key identifiers greatly aid in the business matching process and enable the highest quality matches. It is useful to have these identifiers both at the establishment level and firm level, where possible and applicable. Identifiers ideally include EIN, business name, mailing address, physical location address,

[37] For more information about this process, see Brummet (2015)

[38] See Cuffe and Goldschlag 2018

NAICS, and company web address. In some cases, SSN of the owner of a sole proprietorship may also be useful. Additional fields like the Unique Entity Identifier (UEI), which replaces the Data Universal Number System (DUNS) number for the federal government in April 2022, are also useful.[39] The more information provided, the more likely a match can be made at the establishment and firm level.

The Census Bureau maintains an official record of the nation's state and local governments through its Census of Governments.[40] The Government Master Address File (GMAF) contains information on over 90,000 governments and their dependent agencies including address and contact information, government type (state, county, municipality, special district, school district, or dependent agency), government dependency (if applicable), geographic codes, and more. To enable high quality record linkage of governments, agencies should aim to collect the following information: government name and address, web address, and UEI.

Person linkages

Person-level linkages are achieved through two processes at the U.S. Census Bureau. First, the Census Bureau's Person Identification Validation System (PVS) assigns unique and anonymous identifiers to individual-level data to enable linkage to other census, survey, administrative, and commercial data within the Census Bureau's Data Linkage Infrastructure.[41] The PVS algorithm compares the personally identifiable information (PII) in a data source to a reference file derived from the Social Security Administration's Numident file as well as other federal administrative records and assigns a Protected Identification Key (PIK).

A second process to assign person-level matches is the deterministic Quick PIK system (QPIK). The QPIK process takes source records with a nine-digit number, such as an SSN or Individual Taxpayer Identification Number (ITIN) and employs a look up table to replace the source 9-digit number with a 9-digit PIK.

The quality of matches depends on the quality of the PII provided on a given file. The highest quality matches are usually found on federal administrative record forms, with PIK rates over 90% depending on the form. The higher PIK rates often correspond to data files which contain Social Security Number (SSN). The PIK rate for survey data, which do not contain SSNs, typically ranges from 85-95%, and the PIK rate for commercial data is in the 75-85% range.

For the highest quality matches, person records should contain the following types of PII: full name (first, middle, last, suffix), complete date of birth (age is acceptable but less optimal), full address, and sex. For administrative records forms from agencies with authority to collect this information, the addition of SSN or ITIN on a record improves the match quality.

Data Management Principles and Best Practices

To fully ascribe the impact of funding programs and maximize the benefits of those programs for the American public, data management principles need to be utilized in collecting, using, analyzing, and storing the information needed to determine the impact throughout the lifecycle of the funded programs. In this context data management is defined as the practice of collecting, storing, and using

[39] See: https://sam.gov/content/duns-uei
[40] See: https://www.census.gov/topics/public-sector/government-organization.html
[41] See: Wagner and Layne 2014

data securely, efficiently, and cost-effectively with the goal of optimizing the use and re-use of data within the bounds of policy and regulation for decision making thereby maximizing the benefit to the organization.

The DGWG will work with appropriate CDGB working groups to identify existing standards and best practices for managing program management and evaluation data and develop guidance for use by the data practitioners. Practitioners include those who collect, use, store, and curate data. FAIR Data Principles (**F**indable, **A**ccessible, **I**nteroperable, and **R**eusable),[42] CARE Principles for Indigenous Data Governance (**C**ollective benefit, **A**uthority to control, **R**esponsibility and **E**thics)[43] and appropriate metadata standards such as the Data Documentation Initiative[44] will be utilized to inform the guidance. Coordination with the Federal Geographic Data Committee (FGDC) and the Federal Chief Data Officers Council is also recommended. Implementation of the standards will maximize the use and re-use of the data and information collected and prioritizes leveraging data as a strategic asset. Agencies should also consider the Paperwork Reduction Act, Privacy Act, and Freedom of Information Act as they develop data management plans.

At a minimum the data guidance will address the following:

- Strategies for maximizing usage through data and metadata being as open as possible by default and harvestable by other organizations as appropriate.
- Strategies to create a data management plan for funded program evaluation activities.
- Strategies for describing the quality of data collected and produced, and the quality of the program outcomes and impacts.
- Strategies for linking funding programs to the data collected; products, services and applications created to outcomes and impacts.
- Common metadata standard, ensuring the data are adequately documented, with appropriate linkage, data quality, privacy constraints, and usage restrictions.
- Common data structure to facilitate data analysis, reduce reformatting complications and maximize interoperability.
    - A methodology for describing geographic regions not covered in Census tracts that will adequately describe the impact area.

[42] See: Wilkinson et. al. 2016
[43] See Research Data Alliance International Indigenous Data Sovereignty Interest Group (2019)
[44] https://ddialliance.org

Bibliography

Brummet, Quentin. 2015. "Matching Addresses between Household Surveys and Commercial Data." U.S. Census Bureau Working Paper Number CARRA-WP-2015-04. Available at: https://www.census.gov/library/working-papers/2015/adrm/carra-wp-2015-04.html

Bureau of Economic Analysis. "RIMS II User Guide." Available at: https://apps.bea.gov/regional/pdf/rims/rimsii_user_guide.pdf

Council on Environmental Quality. "Climate and Economic Justice Screening Tool." Accessed: March 31, 2022. Available at: https://screeningtool.geoplatform.gov/en/

Cuffe, John; Goldschlag, Nathan. 2018. "Squeezing More Out of Your Data: Business Record Linkage with Python." U.S. Census Bureau Working Paper Number CES-18-46. Available at: https://www.census.gov/library/working-papers/2018/adrm/ces-wp-18-46.html

DDI Alliance. "Document, Discover and Interoperate." Accessed: April 20, 2022. Available at: https://ddialliance.org

Department of Education. "Logic Models and Program Evaluation." Accessed: April 20, 2022. Available at: https://www2.ed.gov/programs/hep/hep-camp/logic-models-and-program-evaluation.pdf

Federal Emergency Management Agency. "Resilience Analysis and Planning Tool (RAPT)." Accessed: April 1, 2022. Available at: https://www.fema.gov/emergency-managers/practitioners/resilience-analysis-and-planning-tool

Foundations for Evidence-Based Policymaking Act of 2018. (2019, January 14). https://www.congress.gov/bill/115th-congress/house-bill/4174/text

General Services Administration. Accessed: March 31, 2022. "DUNS to Unique Entity ID (SAM) Transition." Available at: https://sam.gov/content/duns-uei

Hannan, Edward L. 2008. "Randomized Clinical Trials and Observational Studies: Guidelines for Assessing Respective Strengths and Limitations." JACC: Cardiovascular Interventions: 1(3): 211-217. Available at https://doi.org/10.1016/j.jcin.2008.01.008

IMPLAN. "Technology for Unlocking Economic Opportunity." Accessed: April 1, 2022. Available at: https://implan.com/

NAPSG Foundation. "Social Indices Overview Chart." Accessed: March 31, 2022. Available at: https://experience.arcgis.com/experience/376770c1113943b6b5f6b58ff1c2fb5c/page/Overview-Compare/

NC State. "What are logic models, and when should you use them?" Accessed: April 20, 2022. Available at: https://www.ies.ncsu.edu/blog/what-are-logic-models-and-when-should-you-use-them/

NOAA. "Introducing NCEI's Regional Climate Services Directors." Accessed: April 19, 2022. Available at: https://www.ncei.noaa.gov/introducing-nceis-regional-climate-services-directors

NOAA. “Regional Integrated Sciences and Assessments Program (RISA).” Accessed: April 1, 2022. Available at: https://cpo.noaa.gov/Divisions-Programs/Climate-and-Societal-Interactions/RISA/About-RISA

NOAA. “Sea Level Rise Viewer.” Accessed: April 1, 2022. Available at: https://coast.noaa.gov/slr/#/layer/slr

NOAA. “Social Vulnerability Index 2010 (Census Tracts). Accessed: March 31, 2022. Available at: https://coast.noaa.gov/digitalcoast/data/sovi.html

NOAA. “U.S. Climate Resilience Toolkit.” Accessed: April 1, 2022. Available at: https://toolkit.climate.gov/#tools

NOAA. “U.S. Drought Monitor (USDM).” Accessed: April 1, 2022. Available at: https://www.drought.gov/data-maps-tools/us-drought-monitor

OMB M-19-23. “Phase 1 Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Learning Agendas, Personnel, and Planning Guidance.” July 10, 2019. Memorandum for Heads and Executive Departments and Agencies. Available at: https://www.whitehouse.gov/wp-content/uploads/2019/07/M-19-23.pdf

OMB M-20-12. March 10, 2020. “Phase 4 Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Program Evaluation Standards and Practices.” Memorandum for Heads and Executive Departments and Agencies. Available at: https://www.whitehouse.gov/wp-content/uploads/2020/03/M-20-12.pdf

OMB M-21-27. June 30, 2021. “Evidence-Based Policymaking: Learning Agendas and Annual Evaluation Plans.” Memorandum for Heads and Executive Departments and Agencies. Available at: https://www.whitehouse.gov/wp-content/uploads/2021/06/M-21-27.pdf

OMB 2021. August 6, 2021. “Preparation, Submission, and Execution of the Budget.” OMB Circular No. A-11 Revised. Available at: https://www.whitehouse.gov/wp-content/uploads/2018/06/a11.pdf

REMI. “Models.” Accessed: April 1, 2022. Available at: https://www.remi.com/models/

Research Data Alliance International Indigenous Data Sovereignty Interest Group. 2019. “CARE Principles for Indigenous Data Governance.” The Global Data Alliance. Available at: https://static1.squarespace.com/static/5d3799de845604000199cd24/t/5da9f4479ecab221ce848fb2/1571419335217/CARE+Principles_One+Pagers+FINAL_Oct_17_2019.pdf

U.S. Census Bureau. “Census Survey Explorer.” Accessed: March 31, 2022. Available at: https://www.census.gov/data/data-tools/survey-explorer/

U.S. Census Bureau. “Community Resilience Estimates.” Accessed: April 1, 2022. Available at: https://www.census.gov/programs-surveys/community-resilience-estimates.html

U.S. Census Bureau. “Data Linkage Infrastructure.” Accessed: March 31, 2022. Available at: https://www.census.gov/about/adrm/linkage.html

U.S. Census Bureau. “Federal Statistical Research Data Centers.” Accessed: March 31, 2022. Available at: https://www.census.gov/about/adrm/fsrdc.html

U.S. Census Bureau. “Geocoder.” Accessed: March 31, 2022. Available at: https://geocoding.geo.census.gov/geocoder

U.S. Census Bureau. “Government Organization & Structure.” Accessed: March 31, 2022. Available at: https://www.census.gov/topics/public-sector/government-organization.html

U.S. Census Bureau. “Mapping Files.” Accessed: March 31, 2022. Available at: https://www.census.gov/geographies/mapping-files.html

U.S. Census Bureau. “Opportunity Atlas.” Accessed: March 31, 2022. Available at: https://www.census.gov/programs-surveys/ces/data/analysis-visualization-tools/opportunity-atlas.html

U.S. Census Bureau. “Relationship Files.” Accessed: March 31, 2022. Available at: https://www.census.gov/geographies/reference-files/time-series/geo/relationship-files.html

U.S. Census Bureau. “Supplemental Nutrition Assistance Program (SNAP) Eligibility and Access.” Accessed: March 31, 2022. Available at: https://www.census.gov/library/visualizations/interactive/snap-eligibility-access.html

U.S. Census Bureau. “TIGERWeb.” Accessed: March 31, 2022. Available at: https://tigerweb.geo.census.gov/tigerwebmain/TIGERweb_main.html

Wagner, Deborah; Layne, Mary. 2014. “The Person Identification Validation System (PVS): Applying the Center for Administrative Records Research and Applications’ (CARRA) Record Linkage Software.” U.S. Census Bureau Working Paper Number CARRA WP 2014-01. Available at: https://www.census.gov/library/working-papers/2014/adrm/carra-wp-2014-01.html

Wilkinson, M., Dumontier, M., Aalbersberg, I. et al. 2016. “The FAIR Guiding Principles for scientific data management and stewardship”. Sci Data 3, 160018. https://doi.org/10.1038/sdata.2016.18

Zolas, Nikolas; Goldschlag, Nathan; Jarmin, Ron; Stephan, Paula; Owen-Smith, Jason; Rosen, Rebecca F.; Allen, Barbara McFadden; Weinberg, Bruce A.; Lane, Julia I. 2015. “Wrapping it up in a person: Examining employment and earnings outcomes for Ph.D. recipients.” Science: 350(6266): 1367-1371. Available at https://doi.org/10.1126/science.aac5949

Tables

Table 1. Program Lifecycle Summary

	Objectives	Products/Documents	Measures/KPIs	Data Sources	Exit Criteria
Planning (pre-funding)	· Review legislation · Review regulations · Identify potential implementation issues · Scope out resource requirements · Draft milestone schedule for legislation implementation	· Required legislative changes · Regulatory updates · Resource and schedule outline (ROM for staff and funding needs, based on program parameters)	· Legislative progress · Issue list and resolution status · Completion of resource outline (Y/N)	· Legislation	· Legislation providing authority (if applicable) · Appropriated funding
Program Design/ Stand up	· Define program objectives · Develop integrated project schedule – Define critical path activities · Develop program management structure · Outline resourcing strategy (incl. contracting) · Define program risks · Define policy objectives and seek resolution on policy questions · Draft and release solicitation/NOFO or other funding implementation document	· Project Management (PM) artifacts, including: – Project schedule/timeline – Project workstreams – critical path activities – Staffing plan, org chart – Assignment of key roles – Risk management plan – Communication plan · Measurement strategies (how to measure success)	· Project timeline drafted (Y/N) · Program objectives defined (Y/N) · Workstreams and critical path activities identified (Y/N) · Staffing plan developed (Y/N) · Hiring actions completed (# compared to plan) · Org chart developed with key roles assigned (Y/N) · Risk register developed (Y/N) · Measurement strategies and KPIs developed, and data sources identified (Y/N)	· PM artifacts · Hiring reports from ES or other staffing reports	· All PM artifacts complete (draft) · Initial staffing footprint met · Program objectives defined and aligned with resource requirements, org structure, and measurement strategy · NOFO or other funding implementation document released

(continued on next page)

	Objectives	Products/Documents	Measures/KPIs	Data Sources	Exit Criteria
Pre-Award Program Implementation	· Update regulations (if required) · Stakeholder engagement · Provide technical assistance to applicants and stakeholders · Receive and review applications · Merit based selections · Grant processing · Assess progress against timeline and workstreams · Review risks · Define/design post-award reporting requirements	· Technical assistance, outreach, and stakeholder engagement plan · Reports on application status · Grant application tracking · Grant processing status · Updated risk register (if needed)	· Assessment of progress against project schedule · Changes in risk register scores · # Stakeholder engagements · # Applications · # Applications through each stage · Funds awarded · Matching funds secured	· PMO provides assessment of project schedule · Risk register updates · Bureau CRM system · Acquisitions contract support · Grant Management front end · GMIS/GrantsOnline/ eRa · CBS/BAS · Post-award reporting template	· Applications received and processed · Funding awards in progress · Post-award reporting requirements established
Post-Award Program Implementation	· Grant monitoring · Recipient reporting · Program evaluation · Funds tracking · Audits and compliance monitoring	· Financial status reports · Performance measure reports · Recipient summary reports	· Program specific performance measures (leading and lagging) · Funds obligated · Funds outlayed · Grant mods required	· Census data to measure performance results · CBS/BAS reporting · GMIS/GrantsOnline/ eRa · Bureau CRM system	· End of project lifespan · Funding expired · Grant funds expended · Performance results data collected
Closeout	· Program evaluation · Financial audit · Funds recovery	· Program results evaluations/evidenced based reporting · Financial reporting · Recovery rate	· Improper payment rate · Recovered funds · Funds executed reporting · Program performance measures · Evidence based evaluations	· Program evaluations GMIS/GrantsOnline/ eRa · CBS/BAS · Bureau CFO financial reporting	· Funds recovery · Completed audit · Program evaluation · Grant closed out

Source: Department of Commerce Implementation Coordination Office
Note: The DOC Program Lifecycle Summary includes the planning (pre-funding) phase, which is a precursor to an agency appropriating funding through legislation and is outside the scope of this report.

Table 2. Framework for program evaluation by phase and type of impact metric

	Direct program impacts (*D*)		Indirect program impacts (*I*)	
Phase	Projected*	Observed	Projected	Observed
Program design/stand up	Identify direct impacts (*D*) and determine how to capture in NOFOs		Identify indirect impacts (*I*) and determine administrative/survey data to measure	
Pre-award program implementation	What is potential benefit of *D*?	What is current (baseline) rate of *D*? (before grant implementation)	What is potential benefit of *I*?	Baseline: What is current rate of *I*?
Post-award program implementation	Compare to initial projection of *D*; update projection of *D* based on observed	Compare to baseline levels of *D*	Compare to initial projection of *I*; update projection of *I* based on observed	Compare to baseline levels of *I*
Closeout	Compare to projected levels of *D* (from each phase)	Compare to baseline levels of *D* and implementation levels of *D*	Compare to projected levels of *I* (from each phase)	Compare to baseline levels of *I* and implementation levels of *I*

*Impacts calculated based on data or trends (imply knowledge of the current conditions), or provided by Congress

Table 3. Prototype library of indirect program impact metrics

Category	Measurement	Data source type (survey, administrative data, etc.)	Data source name(s)
Customer experience	CRM Records	Administrative data	NOAA Internal Salesforce Database
Customer experience	Earth Observations User Engagement	Administrative data	NOAA Internal Data on User Needs
Customer experience	NWS Customer Satisfaction Survey	Survey, Administrative data	NWS Customer Satisfaction Survey
Demographic	Total population	Survey	American Community Survey
Demographic	Population projections	Survey, Administrative data	Population Estimates
Demographic	Race and ethnicity	Survey	American Community Survey
Demographic	Business and Owner Characteristics	Survey, Administrative data	Annual Business Survey; Nonemployer Statistics by Demographics
Demographic	Life expectancy	Administrative data	CDC
Economic Indicators	New business starts	Administrative data	Business Formation Statistics and Business Dynamics Statistics
Economic Indicators	Manufacturing	Survey	Manufacturers' Shipments, Inventories, and Orders (M3)
Economic Indicators	Construction spending	Survey	Construction Progress Reporting Survey
Economic Indicators	New residential sales	Survey	Value of Construction Put in Place Survey (VIP)
Economic Indicators	New residential construction	Survey	Survey of Construction; Building Permits Survey
Economic Indicators	Housing vacancies and ownership	Survey	Current Population Survey, Housing Vacancy Survey; ACS; American Housing Survey
Economic Indicators	Selected Services Revenue	Survey	Quarterly Services Survey
Economic Indicators	Rental vacancy rate	Survey	Current Population Survey, Housing Vacancy Survey
Economic Indicators	Quarterly Profits - Manufacturers and Retailers	Administrative data	Quarterly Financial Report (QFR)
Economic Indicators	County GDP	Statistical estimate	GDP by County; BEA / Regional Program
Economic Indicators	County Personal Income	Statistical estimate	Personal Income by County; BEA / Regional Program
Economic Indicators	GDP for U.S. Territories	Statistical estimate	GDP for U.S. Territories; BEA / Regional Program
Economic Indicators	County Employment	Statistical estimate	Employment by County; BEA / Regional Program
Environment/Climate	Sea Level	Physical	Sea Level Trends
Environment/Climate	Air Quality Data	Physical	EPA Air Quality Data Collected at Outdoor Monitors Across US
Environment/Climate	US GHG Emissions	Physical	Inventory of U.S. Greenhouse Gas Emissions and Sinks

Environment/Climate	Global GHG Emissions	Physical	GHG total without LULUCF, in kt CO_2 equivalent
Environment/Climate	Energy Consumption	Socioeconomic	EIA Monthly Energy Review
Environment/Climate	Water Usage	Socioeconomic	USGS Water Use Data for the Nation
Environment/Climate	Social Vulnerability	Metaanalysis	FEMA National Risk Index
Environment/Climate	NAIC Actuaries Climate Index	Metaanalysis	NAIC Actuaries Climate Index
Environment/Climate	State and Local Government Finances	Socioeconomic	State and Local Government Finances
Environment/Climate	Distribution of weather and climate disasters	Administrative data	NOAA, NCEI
Environment/Climate	Exposure to weather hazards	Administrative data	OpenFEMA
Environment/Climate	Climate exposure supplement to CRE	Survey, Administrative data	NOAA administrative data, CENSUS CRE
Environment/Climate	**Climate-related mobility and migration patterns**	**Survey, Administrative data**	**GIS-based and statistical data**
Environment/Climate	Coastal communities and businesses	Survey, Administrative data	American Community Survey; Annual Business Survey; Business Register
Environment/Climate	Habitat Restored and/or Acquired	Physical (Annual Acres)	National Land Cover Database
Environment/Climate	Jobs created to support habitat restoration and conservation	Socioeconomic	Census, BLS, surveys
Environment/Climate	Number of public access sites created through acquisition/easement	Physical, Administrative	NOAA
Geography	Point of Delivery	Administrative data	Various
Geography	Location of grant recipient (and downstream recipients)	Administrative data	Various
Jobs	Commuting patterns	Survey	American Community Survey
Jobs	Employees by industry/sector	Survey	Current Population Survey and Current Employment Statistics
Jobs	Real earnings	Survey	Current Employment Statistics
Jobs	Full-time employment	Survey	Current Population Survey, American Community Survey
Jobs	Unemployment rate	Survey	Current Population Survey, American Community Survey
Jobs	Labor force participation rate	Survey	Current Population Survey, American Community Survey
Jobs	Employed part time	Survey	Current Population Survey, American Community Survey
Jobs	Quarterly Workforce Indicators (QWI)	Administrative data	LEHD
Other economic	Business revenues	Survey	Business Register
Other economic	Tax revenues	Survey	Census of Governments
Other economic	Travel: revenues and admissions	Survey	Quarterly Services Survey

Other economic	County Business Patterns (CBP)	Administrative data	Business Register
Socioeconomic	Income	Survey	CPS ASEC, ACS, administrative data
Socioeconomic	Poverty Rate	Survey	CPS ASEC, ACS, administrative data
Socioeconomic	Housing costs	Survey	American Community Survey; American Housing Survey
Socioeconomic	Educational attainment	Survey	American Community Survey
Socioeconomic	Internet Access	Survey	American Community Survey
Socioeconomic	Uninsured rate	Survey	American Community Survey
Underserved communities index	Census tracts by number of individuals with risk factors	Survey, Administrative data	Community Resilience Estimates
Underserved communities index	Census counties by poverty/income estimates	Survey, Administrative data	Small Area Income and Poverty Estimates (SAIPE)
Underserved communities index	Census tracts/counties with high poverty	Survey	ACS 5-year estimates
Underserved communities index	Counties by health status	Many	County Health Rankings and Roadmap
Underserved communities index	Counties by resilience index	Many	National Economic Resilience Data Explorer (NERDE)
Underserved communities index	Census tracts by disadvantaged community status	Many	Climate and Economic Justice Screening Tool
Underserved communities index	Census tract by social vulnerability of coastal counties	Survey	Social Vulnerability Index (uses ACS 5-year estimates)
Underserved communities index	Census tract/county by social vulnerability	Survey	CDC/ATSDR Social Vulnerability Index (uses ACS 5-year estimates)
Underserved communities index	Census tract/county by environmental justice, pollution and sources, and social indicators	Many	Environmental Justice Screening and Mapping Tool
Underserved communities index	Census tract by health insurance status	Survey, Administrative data	Small Area Health Insurance Estimates (SAHIE)

Table 4. Required fields to enable record linkage of program data collected

Linkage type	Linkage fields to collect
Address linkage	Full address; coordinates for point of service delivery
Organization linkage	Businesses/non-profits: For both establishment and firm collect: EIN, business name, mailing address, physical location address, NAICS, company web address, UEI, SSN (owner of sole proprietorship) Governments: name, address, UEI, web address
Person linkage	Full name (first, middle, last, suffix), complete date of birth (age is acceptable but less optimal), full address, sex, SSN/ITIN (for administrative records with authority to collect)

Table 5. Example of Address components

Example address: 123 ½ E MAIN ST NW APARTMENT 1, ANYTOWN XX 12345

Address component name	Address component value
House number	123
House number suffix	½
Street directional prefix	E
Street name	MAIN
Street type suffix	ST
Street directional suffix	NW
Apartment number	1
City	ANYTOWN
State	XX
Zip code	12345

Adapted from Brummet 2015

Appendix 1. IIJA and ARP programs established/leveraged at Department of Commerce implementing bureaus

EDA

Background/Programs. EDA was allocated $3 billion in supplemental funding under the American Rescue Plan to assist communities nationwide in their efforts to build back better by accelerating the economic recovery from the pandemic and building local economies that will be resilient to future economic shocks. The investments EDA makes under the American Rescue Plan will place strong emphasis on Equity and will directly benefit underserved communities impacted by the pandemic. EDA is making this funding available through a series of six innovative programs, namely:

Build Back Better Regional Challenge (BBBRC). This challenge provides transformational investments to develop and strengthen regional industry clusters across the country, while embracing equitable economic growth, creating good-paying jobs, and enhancing U.S. global competitiveness. EDA has allocated $1billion in the BBBRC to provide regions the opportunity to grow new regional industry clusters or scale existing ones through planning, infrastructure, innovation and entrepreneurship, workforce development, access to capital, and more.

The challenge is divided into two phases. In Phase 1, 50-60 regional coalitions of partnering entities will be awarded approximately $500,000 in technical assistance funds to develop and support three to eight projects to grow a regional growth cluster. In Phase 2, EDA will award 20-30 regional coalitions between $25 million and $75 million, and up to $100 million, to implement those regional cluster growth projects. As part of EDA's $300 million Coal Communities Commitment, EDA will allocate at least $100 million of the Build Back Better Regional Challenge funding to support coal communities.

Good Jobs Challenge. The Good Jobs Challenge aims to get Americans back to work by building and strengthening systems and partnerships that bring together employers who have hiring needs with other key entities to train workers with in-demand skills that lead to good-paying jobs. These systems and partnerships will create and implement industry-led training programs, designed to provide skills for and connect unemployed or underemployed workers to existing and emerging job opportunities and ultimately secure high-quality jobs (good pay, benefits, growth opportunities). EDA has allocated $500 million for this challenge to support collaborative skills training systems and programs.

Indigenous Communities. This program is designed specifically for Indigenous communities, which were disproportionately impacted by the pandemic. EDA has allocated $100M to support the needs of Tribal Governments and Indigenous communities through a wide range of technical, planning, workforce development, entrepreneurship, and infrastructure projects.

Travel, Tourism & Outdoor Recreation. EDA is focused on accelerating the recovery of communities that rely on the travel, tourism, and outdoor recreation sectors. In this effort, EDA has allocated $750 million of our ARP funds to support the recovery of this sector through competitive and non-competitive grants to help states and communities invest in infrastructure, workforce, or other projects to support the recovery of the industry and economic resilience of the community in the future. EDA has allocated $510 million of the $750 million in non-competitive state tourism grants to help states quickly invest in marketing, infrastructure, workforce, and other projects to rejuvenate safe leisure, business, and

international travel. The remaining $240 million is allocated in competitive grants to help communities that have been hardest hit by challenges facing the travel, tourism, and outdoor recreation sectors recover.

Statewide Planning, Research & Networks. Through the Statewide Planning, Research & Networks program, EDA is supporting states in planning efforts by allocating $59 million for Statewide Planning Grants. In addition, the program has allocated $31 million for Research and Networks Grants to invest in research that assesses the effectiveness of EDA's programs and provides timely recommendations and to fund communities of practice to support stakeholder communities around key EDA initiatives.

Economic Adjustment Assistance. EDA's American Rescue Plan Economic Adjustment Assistance program makes $500 million in Economic Adjustment Assistance grants available to American communities. The Economic Adjustment Assistance program is EDA's most flexible program, and grants made under this program will help hundreds of communities across the nation plan, build, innovate, and put people back to work through construction or non-construction projects designed to meet local needs. A wide range of technical, planning, workforce development, entrepreneurship, and infrastructure projects are eligible for funding under this program. As part of EDA's $300 million Coal Communities Commitment, EDA will allocate at least $200 million of the Economic Adjustment Assistance funding to support coal communities.

NIST

Background/Programs. Manufacturing USA is a national network of public-private partnerships united to secure U.S. global leadership in advanced manufacturing through large scale collaboration on technology, supply chain, and workforce development. The network includes the U.S. Departments of Commerce, Defense, and Energy, their 16 sponsored manufacturing institutes, and six other federal partner agencies – the National Aeronautics and Space Administration, National Science Foundation, Health and Human Services, and the Departments of Agriculture, Education, and Labor.

The National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL) is the single Manufacturing USA institute sponsored by the Department of Commerce. NIIMBL's partners include more than 200 members spanning major biopharmaceutical manufacturers, small biotechnology companies and equipment suppliers, major research universities, community colleges, and non-profit entities such as the Bill & Melinda Gates Foundation for Global Health.

Manufacturing USA Pandemic Response Awards. With enactment of the American Rescue Plan in March 2021, NIST was appropriated $150 million in funds to make financial assistance awards to Manufacturing USA institutes for 'Research, development and testbeds to prevent, prepare for, and respond to coronavirus.' The authorizing statute for the Manufacturing USA program requires that NIST offers financial assistance to the Manufacturing USA institutes different mechanisms: competitive awards to the non-Commerce sponsored institutes and separately to the single Commerce-sponsored institute, NIIMBL. The separate funding mechanisms produced the awards described below.

NIIMBL Pandemic Response Award ($83 million). In July 2021, NIST awarded NIIMBL $83 million in funding for 32 projects with a period of performance not to exceed three years.

The 32 NIIMBL projects include both Research and Development projects conducted by sub-recipients, as well as projects led by NIIMBL to create testbeds and build agile and robust coronavirus response capabilities that extend to the community of biopharmaceutical manufacturing researchers.

The NIIMBL funded projects will accelerate and improve novel vaccines, innovate testing formats, and increase manufacturing agility. NIIMBL project teams will also use ARP-funding to increase trust in vaccine safety in 'vaccine hesitant' communities and replicate successful biopharmaceutical manufacturing training programs to minority serving institutions to expand the skilled pipeline for the biomanufacturing workforce and achieve more equitable access to high-paying biopharmaceutical manufacturing jobs.

Rapid Assistance for Coronavirus Emergency Response (RACER) Awards ($54 million). Using the Public Service Grants authority granted to NIST in the authorizing legislation for Manufacturing USA, NIST issued a Notice of Funding Opportunity to the fifteen Manufacturing USA institutes sponsored by the Departments of Commerce and Energy. This competitive funding opportunity resulted in $54 million in awards to eight institutes for thirteen Research and Development projects. The projects funded convene partners within each institute to address pandemic response needs through a diversity of approaches including novel manufacturing methods and materials for personal protective equipment, point-of-care photonics sensors for diagnostic testing, and development of virtual training curriculum for pharmaceutical manufacturing technicians.

NOAA

Background/Programs. The Infrastructure Investment and Jobs Act (IIJA) provides a total of $2.96B to NOAA over the next five fiscal years. The investments for NOAA laid out in this legislation will improve and significantly expand equitable access to our weather and climate prediction capabilities and services; enhance coastal resilience and habitat restoration efforts, including Pacific salmon recovery; and improve our modeling capacity through investments in supercomputing infrastructure. The IIJA includes the following provisions directing specific activities to be carried out by NOAA as described below:

Provision1: National Oceans and Coastal Security Fund Grants ($492 million). The IIJA will provide supplemental funds to the National Coastal Resilience Fund (NCRF), established in 2018, and administered by the National Fish and Wildlife Foundation (NFWF) in coordination with NOAA's Office for Coastal Management (OCM). The IIJA will significantly increase annual investments in the NCRF to support natural and nature-based infrastructure projects in coastal areas and will enable enhanced engagement and technical assistance to support applicants and grantees, including partnerships with organizations that address issues related to equity and justice and partnerships with the private sector where there exists mutual interest in building community resilience. Geographically, the IIJA NCRF supplemental funds will focus on coastal areas of U.S. coastal states, including the Great Lakes states, and U.S. territories and coastal tribal lands.

Provision 2: Habitat Restoration ($491 million). The supplemental IIJA funds will enable NOAA's Office of Habitat Conservation's Restoration Center (OHC) to fund through a competitive grant process the restoration of marine, estuarine, coastal, and Great Lakes ecosystem habitats, as well as construct and protect ecological features that protect coastal communities from flooding or coastal storms. This program will allow NOAA to make significant progress on Administration priorities for more effective

inclusive conservation by emphasizing the essential role of communities in strengthening coastal resilience and increasing carbon sequestration through the restoration of coastal ecosystems (EO 14008). It also will help NOAA meet the goals set in the America the Beautiful initiative by pursuing locally led and collaborative conservation and economic vitality, while fostering the development of the New Blue Economy. These investments will complement and leverage the outcomes of other IIJA provisions for habitat restoration. OHC will explore ways in which environmental justice and equity priorities (EO 13985/EO 14035) can be applied to this funding and place particular emphasis on building capacity in underserved communities. OHC's technical assistance will help partners build capacity across all project phases including laying the groundwork for future projects in these communities.

Provision 3: Flood and Inundation Mapping and Forecasting, Water Modeling, and Precipitation Studies ($492 million). The IIJA funds will enable NOAA to transform water prediction by delivering the first-ever, coupled, continental-scale, operational coastal and inland flood forecasting and inundation mapping services. These include critically needed, user-friendly, actionable decision support services, including flood and inundation information equitably delivered to communities nationwide. As a result of this investment, disadvantaged, underserved, or socially vulnerable communities, including urban and rural areas, will have equitable access to information that enables them to improve their preparedness, responsiveness and resilience to water availability and flood risks and decision makers and the public will have access to actionable information to optimally design, build, and operate critical national infrastructure.

Provision 4: Water Resources Development Act (WRDA) data acquisition ($25 million). Section 511(b)(1) and (2) of the Water Resources Development Act (WRDA) of 2020 (division AA of Public Law 116–260) requires NOAA to establish a pilot program within the National Mesonet Program (NMP) for the acquisition and use of data generated by a U.S. Army Corps of Engineers (USACE)-led initiative. USACE is augmenting existing mesonet sites in 5 networks in the Upper Missouri River Basin (UMRB) with new soil moisture and snowpack instrumentation and installing new sites to reach a total of 540 sites outfitted with the new instrumentation by the end of FY 2026. With the IIJA funds NOAA will establish the Soil Moisture and Snowpack Monitoring Pilot Program (SMPP), which will acquire data that is generated by the network being installed in the UMRB from 2023 through 2025. The NWS NMP supports a public-private partnership of nearly four-dozen mesonet networks operated by the states and the private sector providing hydrometeorological observational data at more than 30,000 sites nationwide.

Provisions 5 and 15: Wildfire ($50 million for modeling and $50 million for instruments). The IIJA will enable NOAA to bring together scientific expertise in observations, weather modeling, decision support, and social, behavior, and economic science from across the Bureau to aggressively tackle these issues. Working with partners, NOAA will deploy observation systems to improve understanding of the atmospheric boundary layer and improve weather, smoke, and fire behavior forecasts. These advances will support tactical firefighting decisions in treacherous mountain locations on the ground and in the air, improved risk management and resource planning, and improved understanding of the impacts of fires on air quality and health that will support policymakers, planners, insurance providers, and the healthcare industry in responding to these impacts.

In addition, NOAA proposes an end-to-end, comprehensive plan that will strengthen our Nation's foundational intelligence infrastructure for fighting, and recovering from, wildfires. The plan includes

upgrades and advances in key ground and satellite observations and dissemination systems. It also implements secure, cloud-based software and decision support tools that will significantly expand the capabilities of Incident Meteorologists (IMETs) and firefighters on the ground and in the air for a seamless customer experience. These actions will improve detection, and forecasting, advance information dissemination related to wildfire events, and support critical on-site impact-based decision support services while increasing cybersecurity and reducing risk of infrastructure issues.

Provision 6: WRDA Soil Moisture and Snowpack Pilot Study ($1 million). The IIJA funds will support the report required in Sec. 511(b)(3), NOAA's National Integrated Drought Information System (NIDIS) to coordinate an inter-agency team to study both a) the value of the data generated by the UMRB Soil Moisture and Snowpack Pilot Program (SMPP) and b) the viability of the pilot program's data acquisition structure. This study will be delivered to Congress by FY 2026. For the study, NIDIS will utilize existing collaboration channels established under the National Coordinated Soil Moisture Monitoring Network, as well as engagement across NOAA line offices.

Provisions 7 and 8: Marine Debris ($200 million). Marine debris is one of the most pervasive global threats to the health of the ocean and our waterways and is an issue of growing local, regional, national, and international concern. The NOAA Marine Debris Program (MDP), a division of the Office of Response and Restoration within the National Ocean Service, is the U.S. Federal lead for addressing marine debris. The IIJA funded two provisions enabling marine debris assessment, prevention, mitigation, and removal - $150 million through MDP , and $50 million through the National Sea Grant Program, within the Office of Oceanic and Atmospheric Research (OAR). The two programs will coordinate to optimize the unique opportunity to ensure a significant and measurable impact. The goals and execution strategy align closely with the Administration priority of coastal resilience given the direction to better understand the problem, remove legacy debris, and prevent future debris to reduce stress on ecosystem services.

Provision 9: Coastal Zone Management ($207 million). The Coastal Zone Management Act (CZMA) established a national system of state and territorial Coastal Zone Management Programs and stated that there is a national interest in the effective management, beneficial use, protection, and development of the coastal zone. The IIJA funds will enable approved coastal programs to protect and restore these ecologically significant habitats, including conserving lands that play a critical role in helping communities become more resilient to natural hazards including storms, flooding, inundation, erosion, tsunamis, sea level rise and lake level changes. Projects funded through Coastal Zone Management grants will result in an increase in the number of acres of coastal ecosystems protected and restored including wetlands, corals, and natural shorelines, through direct investment by coastal states and territories in ecologically significant habitats. The funding will also enable coastal management programs to deliver increased support for communities most vulnerable to climate impacts, including those which have historically been underserved and often lack access to resources, and advance the principles of diversity and inclusion.

Provision 10: National Estuarine Research Reserve System ($77 million). The National Estuarine Research Reserve System (NERRS) consists of estuarine areas of the United States and its territories designated and managed for research and educational purposes, called Reserves. Each Reserve within the NERRS is chosen to represent a different biogeographic region and to include a variety of ecosystem types in accordance with the classification scheme of the national program as specified in 15 CFR 921. The IIJA investments will enhance long-term protection of Reserves for research, education, and habitat

protection and strengthen the protection of key land and water areas and will complement and leverage the outcomes of other IIJA provisions for habitat restoration. The funding will also enable Reserves to deliver increased support for communities most vulnerable to climate impacts, including those which have historically been underserved and often lack access to resources, and advance the principles of diversity and inclusion.

Provision 11: Coastal, ocean, and Great Lakes observing systems ($100 million). NOAA will support the fortification of critical ocean observing assets to ensure the long-term sustainability of the U.S. ocean observing enterprise. Together, these IIJA investments capitalize on an opportunity to transform the ocean observing community into a true sustainable oceanography enterprise that will fuel the development of the New Blue Economy. The New Blue Economy is the knowledge-based ocean economy that uses data and information to support coastal resilience, climate change adaptation, and inform stewardship and resource management. Investing in the observing systems will address the need to minimize risk and gaps in service. The IIJA funding will stabilize, modernize, and enhance the national network of coastal, ocean, and Great Lakes observing systems to deliver data and information necessary to support coastal communities as they respond to changing coastal conditions, including flooding, increased harmful algal blooms, extreme storms, and other risks for society. This funding will also modernize and improve parts of the global ocean observing system, in support of predictions of subseasonal to seasonal weather, climate, and extremes.

Provision 12: Regional Ocean Partnerships ($56 million). Regional Ocean Partnerships (ROPs) are regional organizations voluntarily convened by governors working in collaboration with other governments (including tribal, Federal, and local) and stakeholders to address ocean and coastal issues of common concern in that region. The IIJA funds to ROPs will support priorities, such as offshore energy, aquaculture, coastal resilience, education and engagement, data access, and tribal participation, and enable partnership to conduct projects that support Administration priorities on tackling the climate crisis (EO 14008) and the goals of the America the Beautiful initiative, as well as directing resources to underserved communities (EO 13985). The work conducted as a result of these funds will enhance regional capacity for sharing and integration of Federal and non-federal data, including the development of information portals to facilitate user access to data and products to support regional coastal, ocean, and Great Lakes management priorities. As a result, the Nation will benefit from increased access to and usefulness of Federal and non-federal data, strengthened and expanded partnerships across NOAA and the regions, and the ability to apply higher quality data directly to stated management challenges. These improvements will be critical to address increasing ocean uses (such as doubling of offshore wind), supporting sustainability, and tracking climate impacts on shifting ecosystems, and making data accessible to all, including the underserved.

Provision 13: Consultations and Permitting ($20 million). NOAA Fisheries (NMFS) conducts consultations with Federal action agencies under both the Endangered Species Act (ESA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and authorizes take under the Marine Mammal Protection Act (MMPA). Completion of these consultations will enable the Administration to advance priorities to improve the Nation's infrastructure while ensuring the conservation of our most vulnerable species and important habitats. NMFS will address consultation and permitting requests for infrastructure projects such as large-scale construction, dredging, hydro-electric, oil and gas, and offshore wind energy development. The IIJA funding will enable NMFS to meet the demand of the new consultations as a result of the IIJA funded infrastructure projects planned by other

Federal agencies across the country. Completing these consultations and authorizations depends on labor, so funding to carry out this activity will be used for term employees or labor contracts.

Provision 14: Fish Passage ($400 million). The Office of Habitat Conservation's Restoration Center (OHC) will implement the fish passage provision of the IIJA by providing technical assistance and funding through a competitive grant process to restore fish passage under the Community-based Restoration Program. This program includes emphasizing the essential role of communities in strengthening climate resilience against the impact of climate change by restoring connectivity in rivers and streams (EO 14008). It also will help NOAA meet the goals set in the America the Beautiful initiative by pursuing locally led and collaborative conservation and economic vitality. OHC will provide technical assistance to our partners on projects to eliminate in-stream barriers to restore fish passage. OHC will explore ways in which environmental justice and equity priorities (EO 13985/EO 14035) can be applied to this funding and place particular emphasis on building capacity in underserved communities. Additionally, OHC will direct funds to Indian Tribes through a focused grant competition to address tribal priority restoration needs, including building capacity for planning and implementation.

Provision 16: Research Supercomputing ($80 million). The IIJA funds will enable NOAA to expand compute and archive resources capacity and extend data center space to be used for weather and climate model development to improve drought, flood, and wildfire prediction, detection, and forecasting. This enhancement will also provide modernization of software infrastructure to improve model development and scalability, improved efficiency, compatibility, and portability of experimentation, and user experience improvement across all R&D systems. Contracting vehicles exist for all enhancements for rapid obligation. These activities support EO 14008 and the building of infrastructure to combat climate change while creating job opportunities through contracting of computing and facility improvements.

Provision 17: Ocean and coastal observing systems ($50 million). The IIJA funds will support the fortification of critical ocean observing assets to ensure the long-term sustainability of the U.S. ocean observing enterprise and to support the New Blue Economy. NOAA is the authoritative provider of weather, ocean, and climate information, services, and predictions to the nation. With this funding, NOAA will modernize two ocean observations systems, the Tropical Atmosphere Ocean (TAO) array in the equatorial Pacific, and the Deep-ocean Assessment and Reporting of Tsunami (DART) network, to address obsolescence of the aging equipment impacting NOAA's ability to sustain the systems and the observations data. Investing in these observing systems now will address this need to minimize risk and gaps in service.

Provision 18: Pacific Coastal Salmon Recovery Fund ($172 million). The PCSRF program objective is to supplement existing state and tribal programs for salmon and steelhead restoration and conservation by allocating Federal funding using a scientific and merit-based competitive grant process to activities that provide demonstrable and measurable benefits to Pacific salmon and steelhead and their habitat. Eligible projects include activities that contribute to (1) recovering Pacific salmon and steelhead listed under the Endangered Species Act (ESA) or that are identified by a State as at-risk to be so listed, (2) supporting Pacific salmon and steelhead species important to tribal treaty and trust fishing rights and native subsistence fishing, and (3) conserving Pacific salmon and steelhead habitat. The IIJA funds will allow NOAA to make significant progress on Administration priorities emphasizing the essential role of communities in strengthening coastal resilience through the restoration of coastal ecosystems (EO

14008). It also will help NOAA meet the goals set in the America the Beautiful and the Blue Economy initiatives by pursuing locally led and collaborative conservation.

Eligible applicants are the states of Washington, Oregon, Idaho, Nevada, California, and Alaska, and federally recognized Tribes of the Columbia River and Pacific Coast (including Alaska). Grants are issued based on guidelines developed by the Secretary of Commerce. To maximize the impact of the Federal funds, the guidelines follow scientific conservation principles that prioritize projects that directly increase the productivity of at-risk populations or populations where the Federal government has tribal treaty or trust obligations. This ensures the majority of funds go toward projects that will actively benefit those populations at the greatest risk and improve the conditions on the ground for their successful recovery. IIJA funds for the PCSRF program are instrumental in supporting tribal participation in several local, state, and Federal processes including recovery plan implementation, project development and design, and project prioritization. In addition to contributing to numerous activities that have led to project implementation, the West Coast Tribes are active practitioners of on-the-ground habitat protection and restoration projects.

NTIA

Background/Programs. The Infrastructure Investment and Jobs Act (IIJA) created multiple new broadband deployment and digital equity and inclusion programs, to help ensure that every American has access to affordable, reliable, high-speed internet. Of the approximately $65 billion in broadband funding in the IIJA, NTIA will administer over $48 billion across six programs: the Broadband Equity, Access and Deployment (BEAD) program, the Enabling Middle Mile Broadband Infrastructure program, the Tribal Broadband Connectivity program, and the Digital Equity Act programs (which includes three grant programs.)

Broadband Equity, Access, and Deployment (BEAD) Program ($42.45 billion). The BEAD program is a formula-based grant program which appropriates $42.45 billion for states, territories, the District of Columbia (D.C.), and Puerto Rico (P.R.) to utilize for broadband deployment, mapping, and adoption projects – focused on sustainable broadband access. Each state, D.C., and P.R. will receive an initial allocation of $100 million -- and $100 million will be divided equally among the United States Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands -- to support planning efforts including building capacity in state broadband offices and outreach and coordination with local communities. States, territories, D.C., and P.R., leveraging initial planning funds that will be made available through the program, will submit a 5-year action plan, which shall be informed by collaboration with local and regional entities. The remaining funding will be distributed based on a formula that considers the number of unserved and high-cost locations in the state, based on the maps to be published by the FCC in 2022. The first priority for funding is for providing broadband to unserved areas (those below 25/3 Mbps), followed by underserved areas (those below 100/20 Mbps), and then serving community anchor institutions (1/1 Gbps).

BEAD funding can also be used for broadband data collection and mapping; to promote broadband adoption, including through the provision of affordable internet-connected devices; to provide Wi-Fi or reduced-cost internet access to multi-family housing units; and for other uses that NTIA determines are necessary to facilitate the goals of the program. States will distribute funds through a competitive grant program. Funding recipients have an obligation to offer a low-cost plan as a condition of receiving

funding for broadband deployment, and future-proof deployments are prioritized. This is by far the largest of the programs NTIA will administer.

Enabling Middle Mile Broadband Infrastructure Program ($1 billion). The Enabling Middle Mile Broadband Infrastructure program provides $1 billion for the construction, improvement, or acquisition of middle mile infrastructure. The purpose of the grant program is to expand and extend middle mile infrastructure to reduce the cost of connecting unserved and underserved areas to the internet backbone. Eligible applicants include States, political subdivisions of a State, tribal governments, technology companies, electric utilities, utility cooperatives, public utility districts, telecommunications companies, telecommunications cooperatives, nonprofit foundations, nonprofit corporations, nonprofit institutions, nonprofit associations, regional planning councils, Native entities, or economic development authorities.

Tribal Broadband Connectivity Program (TBCP) ($2 billion). The IIJA provides an additional $2 billion to TBCP, a NTIA program previously implemented under the Consolidated Appropriations Act, 2021. The TBCP directs funding to tribal governments to be used for broadband deployment on tribal lands, as well as for telehealth, distance learning, broadband affordability, and digital inclusion.

Digital Equity Act Programs ($2.75 billion). The Digital Equity Planning, Digital Equity Capacity, and Digital Equity Competitive Grants are three NTIA-administered grant programs (two formula-based and one competitive) to plan for and then promote digital inclusion and equity for communities that lack the skills, technologies and support needed to take advantage of broadband connections. Grants can be used to accelerate the adoption of broadband through digital literacy training, workforce development, devices access programs, and other digital inclusion measures. The goal of these programs is to promote the meaningful adoption and use of broadband services across the targeted populations in the Act, including low-income households, aging populations, incarcerated individuals, veterans, individuals with disabilities, individuals with a language barrier, racial and ethnic minorities, and rural inhabitants.

The Digital Equity Planning Grant Program is a $60 million formula grant program for states and territories to develop digital equity plans. The Digital Equity Capacity Grant Program is a $1.44 billion formula grant program for states and territories distributed via annual grant programs over 5 years to implement digital equity projects and support the implementation of digital equity plans. Lastly, the Digital Equity Competitive Grant Program is a $1.25 billion discretionary grant program distributed via annual grant programs over 5 years to implement digital equity projects. Eligible applicants include specific types of political subdivision, agency, or instrumentality of a state; tribal governments; nonprofit entities; community anchor institutions; local educational agencies; and entities that carry out workforce development programs.

Appendix 2. Agency-specific program evaluation metrics

EDA

Timeline. While EDA is primarily focused on long-term economic development,EDA is also interested in the short-term, intermediate, outcomes of our investments.

Geography. EDA is working with Census to develop modeled, tract-level demographic data to identify underserved geographies at the county and sub-county levels, and to accurately assess the impact of EDA's investments.

Direct impact of program on intended outcome. Due to the nature of EDA's investments, EDA's performance is divided into two primary goals. The first performance goal (Goal 1) is to promote private enterprise and job creation in economically distressed communities and regions through critical infrastructure and revolving loan fund investments. The metrics for this performance goal are Jobs created or retained and private investment leveraged at 3-, 6-, and 9-year intervals after investment. The second performance goal (Goal 2) is to create the conditions for long term economic development through non-infrastructure investments that build community capacity to achieve and sustain regional competitiveness and economic growth. For ARP programs, EDA is anticipating ride-along research, and communities of practice, to provide timely support to communities and other regional stakeholders as they implement their awards and develop metrics for long-term evaluations to assess the impact of these programs. In addition, EDA will be using the applicable KPIs from the Department of Commerce's Strategic Plan such as:

- Number of new technologies licensed or brought to market as a result of EDA-sponsored activities
- Estimated jobs created and retained for underserved populations and geographies
- Private investment funds leveraged for underserved populations and geographies
- Total number of workers placed through the Good Jobs Challenge
- Number of workers from underrepresented populations placed through the Good Jobs Challenge
- Number of workers trained through EDA initiatives
- Number of workers from underrepresented populations of workers trained through EDA initiatives
- Estimated private investment funds leveraged as a result of EDA investments in workforce projects
- Total sum of funding secured by entrepreneurs as a result of activities sponsored by EDA investments
- Percent of EDA awards that support entrepreneurship in underserved communities and regions
- Investments supporting environmentally sustainable development

Indirect impacts of program. EDA will engage with third party researchers to identify appropriate indirect measures and collect baseline data on these measures.

Equity in program delivery. EDA's implementation and subsequent evaluation of ARP programs focuses heavily on equity. Addressing economic disparities in historically underserviced populations and geographies is critical to EDA's mission. To better understand the impact of EDA's investments in underserved communities and populations, EDA acknowledges the need to investigate the long-term

Equity in Program Delivery. Only existing Manufacturing USA institutes were statutorily eligible to receive funding through this program. NIST encouraged all applicants to consider institutional and geographic diversity in forming project teams in the Selection Factors for awards. Federal Program Managers work directly with teams to encourage maximum access to project outcomes among underrepresented communities.

Within the NIIMBL ARP projects and the RACER projects funded, several projects are anticipated to have indirect, long-term impacts on underrepresented communities through increased energy security in Native American communities, greater trust in the safety of vaccines, simpler and more cost-effective diagnostic clinical testing capabilities for low-resource communities, and increased access to industrially relevant training programs and high-paying jobs in the underserved Appalachian region.

Given the diversity of the funded projects and deliverables from these projects, NIST must coordinate with project teams to determine the best way to track the indirect impacts for each project

Environmental Impacts and Climate. The statutory directive for the NIST ARP-funded projects was for R&D and testbeds to prevent, prepare for, and respond to coronavirus. A few funded projects will have potential longer-term impacts on environment and climate, however. One funded project team will develop materials for more ecofriendly personal protective equipment; one project will demonstrate a biomanufactured alternative to harvesting a key vaccine ingredient from trees; and one project will deliver clean-energy-powered services in low-resource environments.

Given the diversity of the funded projects and deliverables from these projects, NIST must coordinate with project teams to determine the best way to track the indirect impacts for each project.

NOAA

Timeline. NOAA is focused on actionable outcomes that achieve immediate results while also acknowledging that distribution of IIJA funding for investments, especially in capital projects and research, will require structured implementation. Performance metrics that capture the immediate, interim, and long-term impacts of IIJA will be captured.

Geography. NOAA currently provides gridded information that can be overlaid with geographic information and continues to refine its information to understand climate, weather, and ocean phenomena at the sub-Census tract level. NOAA's tribal affairs offices also maintain detailed information of tribal communities and many NOAA products and services, such as the Sea Level Rise Viewer, already include measures of social vulnerability to geolocate its information with underserved and disadvantaged communities. NOAA is also conducting a review and coordinating with FEMA and Census on existing social vulnerability indicators to ensure NOAA is using the best available information to meet these considerations.

Direct Program Impacts. NOAA is immediately supporting 18 projects through IIJA funding. The included Summary Infrastructure and Guidance table provides detailed information for each project, but generally these 18 projects will collect information on the following:

- Performance and Regulatory Metrics
- Jobs created and sustained
- Habitats, waterways restored (acreage/mileage)
- Coastal debris cleaned

- Research projects and output created
- Students enrolled in educational programs
- Number of public access sites created
- Cross-jurisdictional priority actions completed
- Number of underserved communities, tribes, states, and federal partners engaged
- Number of datasets and products made accessible
- Nautical miles surveyed
- Increased access to information by underserved and disadvantaged communities
- Provision of new precipitation estimate approaches and information
- Enhanced environmental modeling capabilities
- Observing system maintenance and acquisitions
- Computational infrastructure and IT improvements
- Improved data product generation and cloud accessibility

Indirect Program Impacts. NOAA will coordinate with stakeholders to understand which indirect metrics are most appropriate for each project.

Equity in Program Delivery. NOAA's focus through the investment of IIJA funding is on disadvantaged, underserved, or socially vulnerable communities in both urban and rural areas. The agency expects that by focusing on these communities, the American public and international stakeholders will also greatly benefit.

Environmental Impacts and Climate. NOAA is the primary federal agency responsible for providing climate information and services. Investment in all 18 of these programs will have direct and substantive impacts on observing and understanding changes to climate and have positive impacts on the environment.

NTIA

Timeline. NTIA's IIJA grant programs are focused on actionable outcomes that include deliberate planning stages and efforts, in particular for the Broadband Equity Access and Deployment (BEAD) program and the State Digital Equity programs. Much of NTIA's IIJA funding (approximately $45 billion) is focused on capital infrastructure projects which have a longer implementation timeframe, including a longer timeline in which to observe direct outcomes, as well as indirect outcomes and impacts. NTIA intends to collect performance metrics that capture interim and direct outcomes of funded projects and leverage these performance metrics to evaluate long-term impacts of IIJA funded broadband projects against key broadband, equity, and other socio-economic indicators prior to project implementation and post project implementation.

Geography. NTIA leverages its National Broadband Availability Map (NBAM), which includes multiple data sets on broadband availability and adoption, socio-economic factors, minority populations (including Tribal), and other Federal agency broadband project investments. local broadband landscape by aggregating and analyzing existing sources of data, compiled from more than 50 sources. Key data sources include:

- The Federal Communications Commission (FCC). The FCC, as an independent regulatory agency, collects important information on the types and levels of broadband services available through

telecommunications providers. The Broadband DATA Act, enacted in 2020, set out new requirements for the FCC to collect granular service availability data from wired, fixed wireless, and satellite broadband providers and standardized coverage data from mobile service providers, as well as to change the way broadband data is collected, verified, and reported.

- U.S. Census Bureau. The U.S. Census Bureau serves as the nation's leading provider of quality data about its people and economy. In addition to collaborating on data collection efforts through the NTIA Internet Use Survey, the Census Bureau provides key demographic and economic datasets for NTIA's broadband analytical tools.
- Third Party and Crowd-Sourced Data. Third party and crowd-sourced datasets – including those produced by Ookla, Measurement Lab, and BroadbandNow– compile upload and download speeds, latency rates, and retransmission rates in a network.
- Independent Research Organizations. Non-profit organizations regularly conduct and publish research on broadband; for example, the Pew Research Center has tracked Americans' Internet use since 2000.
    - NTIA is also working with Census on a prototype to develop a tool that provides location-based (e.g., household, business) granularity of information in which to provide a baseline of current broadband and socio-economic factors for a longitudinal study on impact 5-7 years after grant funds are awarded. This tool is also being developed to provide States and Territories (as well as local governments) a tool in which to identify potential focal points (geographical or community) for digital equity projects and investments. Indicators to support this analysis includes (but is not limited to) rates of broadband adoption, rurality, minority, ethnic, economic, education, literacy, broadband infrastructure, and availability.

Direct Program Impacts. NTIA will be launching the first of its IIJA programs in 3QFY22 and is in the process of identifying critical performance metrics for each of the IIJA funded programs. NTIA will leverage past and existing grant programs with similar project goals and outcomes to build a comprehensive data set of performance metrics. Key metrics that will be tracked include, but are not limited to:

All IIJA Grant Programs:

- Funds obligated, funds expended
- Geographic location of awarded projects (granularity dependent on type of program, e.g., location for last mile broadband projects, census block/tract for middle mile broadband, state/local/tribal government boundaries for broadband planning projects, state/local/tribal government boundaries for digital equity programs.
- Number of households/individuals to be served/impacted by projects by various socio-economic indicators: Rurality, low-income, minority (including tribal).

IIJA Broadband Infrastructure Programs:

- Number of unserved (less than 25 Mbps/3 Mbps) locations (households, community anchor institutions, and businesses) passed/served with broadband
- Number of underserved (less than 100 Mbps/20 Mbps) locations (households, community anchor institutions, and businesses) passed/served with broadband

- Number of locations (households, community anchor institutions, and businesses) subscribing to grant funded broadband infrastructure
- Number of fiber miles deployed/wireless towers erected/other technical infrastructure deployment indicators
- Number of households eligible and subscribing to low-cost broadband plans
- Number of interconnection or splice points-- Middle Mile only
- Number of last mile agreements/commitments for unserved and underserved communities (and prospective number of last mile locations (households, community anchor institutions, and businesses) included in that last mile provider's footprint) - Middle Mile only

IIJA Broadband Digital Equity and Inclusion Programs:

- Number of digital equity/inclusion/literacy programs funded, (e.g., literacy classes/training, workforce development programs, subsidized broadband service and/or device and equipment programs)
- Number of participants (by covered/vulnerable population) in digital equity/inclusion/literacy programs funded, (e.g., literacy classes/training, workforce development programs, subsidized broadband service and/or device and equipment programs)
- Number of broadband/end-user devices procured/distributed
- Number of public computing centers (built or ungraded) with funds from these programs, (including the number of hours per annum centers are open, the number of users and number of training programs provided and participants.

Indirect Program Impacts. NTIA IIJA broadband program indirect impacts include, but are not limited to: Increased broadband adoption (especially measured among rural, low income, minority or other vulnerable populations), lower broadband costs, economic indicators, e.g., change in local GDP, change in local unemployment rate, change in # and % of jobs, by location, change in # and % of small businesses, by location, change in average household income, by location, average life expectancy, by location, high school and college graduation rates, by location.

Equity in Program Delivery. NTIA's IIJA broadband programs are deeply rooted in the promotion of equity and are specifically focused on closing the digital divide in areas and for populations that have largely been left behind in broadband deployment, adoption, and meaningful use. The IIJA broadband programs are focused on investing improving broadband access, adoption, and use in the following communities and populations: Unserved (less than 25 Mbps/3 Mbps broadband speeds available) communities, underserved (less than 100 Mbps/20 Mbps broadband speeds available) communities, rural, minority, low income, Tribal, veteran, non-English speaking, low literacy, aging incarcerated populations, well as individuals with disabilities or with a language barrier

Environmental Impacts and Climate. NTIA requires all IIJA broadband infrastructure projects to consider climate change considerations for that geography, including potential weather changes over time in the selection and proposal of infrastructure technologies and deployment mechanisms, e.g., buried vs. aerial fiber. Further, NTIA will be responsible for ensuring that recipients of IIJA funding to deploy broadband infrastructure comply with all applicable environmental laws, including the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA). NTIA will include in the NOFOs for BEAD and Middle Mile Programs a provision directing applicants proposing projects with

construction and/or ground disturbing activities to describe how they will comply with applicable environmental and national historic preservation requirements and how they will obtain the necessary federal, state, and local governmental permits and approvals needed to allow the project to proceed.

Appendix 3. Agency-specific data for program evaluation

EDA

Universe of all EDA awards made under the American Rescue Plan, including project types and geographic project location details (complete data set expected by the end of FY 2022). EDA has more than 150 fields of administrative data available.

EDA has existing survey instruments that, where feasible, EDA will use as part of the data collection for ARP programs. EDA is also in the process of developing metrics centered around the Good Jobs Challenge. For the rest of the programs, EDA is anticipating ride along research, that may include surveys, to assess the performance of the awards.

NIST

Goal of funded projects. NIST was directed to use the American Rescue Plan funds for 'research and development and testbeds to prevent, prepare for, and respond to coronavirus.'

Eligible Applicants. Eligible applicants for this program are the existing Manufacturing USA institutes. Due to statutory requirements, NIST issued a (non-competitive) Request for Application to the single Commerce-sponsored institute, NIIMBL, and a competitive 'Notice of Funding Opportunity' call for proposals to the fifteen Manufacturing USA institutes sponsored by the Departments of Defense and Energy.

The determination to make 60% of the $150 million appropriated through ARP available to NIIMBL was justified by the direct relevance of NIIMBL technical scope on biopharmaceutical manufacturing innovation as well as the performance of the NIIMBL teams on projects previously funded through the CARES Act. The NIIMBL award was issued in July 2021. The remaining 40% of the appropriation was awarded to eight other Manufacturing USA institutes through the RACER competition based on merit of the proposals and potential impact on the nation's coronavirus response. Individual project teams have periods of performance from a minimum of six months to a maximum of three years. Awards were announced in February 2022.

Grants Management Approach. NIST manages the ARP awards through a team-based approach with Grants officers and Grants specialists working with Federal Program Teams and subject-matter experts from the NIST Laboratory Programs. Progress of project teams against technical milestones are monitored by project managers within each funded Manufacturing USA institute. Project team meetings (generally monthly) are attended by NIST program managers and subject matter experts.

NIST reports progress and impacts quarterly to DOC. These reports include spend rates and project highlights. During the period of award, short-term program level impact metrics for the R&D projects funded within the NIIMBL and RACER awards are based on the breadth of the research partnerships catalyzed, publications and other forms of dissemination of the research, and success rate for progress against milestones. Individual project impact highlights are narratively summarized in quarterly reporting to DOC as those impacts are noted from monthly project team meetings reports.

Formal reporting for the funded awards is semi-annual and includes qualitative and quantitative data for each award and project team. Administrative data collected by NIST from each recipient includes Federal Financial Report (SF-425) and a Research Performance Progress Report (RPPR) on a semi-annual

basis. Semi-annual RPPR submissions contain standard cover page data elements, mandatory reporting category of Accomplishments, and optional categories of Products, Participants and Other Collaborating Organizations, Impact, and Changes/Problems. NIST also ensure compliance with Human Subjects Protection regulations as necessary.

Given the diversity of the project outcomes from these R&D projects, NIST must coordinate with project teams to determine the best way to measure and monitor impacts for each project. It is anticipated that most project impacts will be narrative summaries or data collected through project team reporting during and at close of the projects. NIST will coordinate with recipients to determine the most appropriate measures and mechanisms for monitoring impact of the awards beyond the period of performance.

NIST tracks administrative grants management and reporting data using its internal grants management system.

NOAA

The IIJA funds will cover diverse geographic locations across the US. Many of these funds will cover coastal areas of U.S. coastal states, including the Great Lakes states, and U.S. territories and coastal tribal lands. These grants will fund improvements to habitat restoration, coastal security, marine debris, and ocean observations. Other funds will go toward improving soil moisture monitoring to improve flooding and drought forecast. The IIJA funds will also go toward enhancing water modeling, precipitation studies, and fire weather prediction capabilities. Funds will also be invested in improving the supercomputing capacity needed for cutting edge modeling and research.

NOAA collects several performance indicators that will be influenced by the activities funded by IIJA. These indicators measure the number of communities using tools such as digital coast, climate smart communities, and flood inundation mapping services. Other indicators measure the volume of data acquired to support maritime commerce. Finally, NOAA collects information about engagement activities with local partners working to mitigate the dangers of hazardous weather.

NTIA

NTIA will collect broadband and digital equity specific performance indicators and outcomes through its semi-annual grant awardee performance progress reports. NTIA will also leverage other, key broadband data sets to support program evaluation, including, but not limited to: Federal Communications Commission FABRIC Location Maps (identifying broadband service availability by location), Census American Communities Survey, and NTIA Internet Use Survey (to measure broadband adoption and use), and will also leverage broadband cost data, including broadband cost analyses from the FCC and commercial data sets, e.g., BroadbandNow.

Appendix 4. Agency-specific grants management

EDA

EDA's ARP is broken into six programs, as described above. EDA also has two separate grants management systems where the administrative data for each project is captured.

How to measure. For each of the following ARP programs, EDA will use a mix of quantitative and qualitative analyses using EDA award data, modeled tract-level demographic data (developed in coordination with Census), and grantee questionnaire responses. EDA uses a competitive grant process to fund its evaluation work. An appropriate, competitive application must be received, reviewed, and awarded. EDA will work with external researchers to collect baseline data on economic conditions both pre-award and during project deployment. EDA is currently reviewing research applications and expects to award related grants within the coming months.

Build Back Better Regional Challenge

- **Who Grants Go To.** Eligible applicants under this program include a(n):
    - (i) District Organization of an EDA-designated Economic Development District (EDD);
    - (ii) Indian Tribe or a consortium of Indian Tribes;
    - (iii) State, county, city, or other political subdivision of a State, including a special purpose unit of a State or local government engaged in economic or infrastructure development activities, or a consortium of political subdivisions;
    - (iv) institution of higher education or a consortium of institutions of higher education; or
    - (v) public or private non-profit organization or association acting in cooperation with officials of a general-purpose political subdivision of a State.
    - Under this program, EDA is not authorized to provide grants or cooperative agreements to individuals or to for-profit entities.
- **Goals.** This program is designed to (1) help regions develop transformational economic development strategies and (2) fund the implementation of those strategies that will create and grow regional growth clusters. Such efforts will help regional economies recover from the pandemic and build economic diversity and resiliency to mitigate impacts of future economic disasters as well as benefit regional workforces and residents through creation of high-quality jobs, increased wages, and revitalized communities.
- **System(s).** GrantsOnline (Phase 1); OPCS (Phase 2)
- **Primary Fields Available.** More than 150 fields of administrative data available.

Economic Adjustment Assistance

- **Who Grants Go To.** Eligible applicants under this program include a(n):
    - (i) District Organization of an EDA-designated Economic Development District (EDD);
    - (ii) Indian Tribe or a consortium of Indian Tribes;
    - (iii) State, county, city, or other political subdivision of a State, including a special purpose unit of a State or local government engaged in economic or infrastructure development activities, or a consortium of political subdivisions;
    - (iv) institution of higher education or a consortium of institutions of higher education; or

    - (v) public or private non-profit organization or association, including labor unions, acting in cooperation with officials of a general-purpose political subdivision of a State.
    - Under this NOFO, EDA is not authorized to provide grants or cooperative agreements to individuals or to for-profit entities.
- **Goals.** The EAA Challenge is designed to provide a wide range of financial assistance to communities and regions as they respond to, and recover from, the economic impacts of the coronavirus pandemic, including long-term recovery and resilience to future economic disasters. Under this program, EDA solicits applications under the authority of the Economic Adjustment Assistance (EAA) program, which is flexible and responsive to the economic development needs and priorities of local and regional stakeholders. This is the broadest program EDA has under ARPA and any eligible applicant from any EDA Region may apply. EDA also expects to fund a number of projects under this program that support communities negatively impacted by the downturn in the coal economy, supporting transitioning away from coal.
- **System(s).** OPCS
- **Primary Fields Available.** More than 150 fields of administrative data available.

Good Jobs Challenge

- **Who Grants Go To.** Eligible applicants under this program include a(n):
    - (i) District Organization of an EDA-designated Economic Development District (EDD);
    - (ii) Indian Tribe or a consortium of Indian Tribes;
    - (iii) State, county, city, or other political subdivision of a State, including a special purpose unit of a State or local government engaged in economic or infrastructure development activities, or a consortium of political subdivisions;
    - (iv) institution of higher education or a consortium of institutions of higher education; or
    - (v) public or private non-profit organization or association, including labor unions, acting in cooperation with officials of a general-purpose political subdivision of a State.
    - Under this program, EDA is not authorized to provide grants or cooperative agreements to individuals or to for-profit entities, including for-profit institutions of higher education.
- **Goals.** The Good Jobs Challenge is designed to help get Americans back to work by investing in (1) developing and strengthening regional workforce training systems that support sectoral partnerships, (2) designing sectoral partnerships, and (3) implementing sectoral partnerships that will lead to high-quality jobs. The goal of regional workforce training systems is to create and support effective training programs that will connect the in-demand and emerging skills needs of employers with qualified workers and help workers find and keep quality jobs and advance along their chosen career path.
- **System(s).** GrantsOnline
- **Primary Fields Available.** More than 150 fields of administrative data available.

Indigenous Communities

- **Who Grants Go To.**
    - An Indian Tribe or a consortium of Indian Tribes, as defined in section 3(4) of PWEDA (42 U.S.C. § 3122(4)(A)) and 13 C.F.R. § 300.3.1 The regulation at 13 C.F.R. § 300.3 defines "Indian Tribe" as:

        - [A]n entity on the list of recognized tribes published pursuant to the Federally Recognized Indian Tribe List Act of 1994, as amended (Pub. L. 103-454) (25 U.S.C. 479a et seq.), and any Alaska Native Village or Regional Corporation (as defined in or established under the Alaska Native Claims Settlement Act (43 U.S.C. 1601 et seq.).2 This term includes the governing body of an Indian Tribe, Indian corporation (restricted to Indians), Indian authority, or other non-profit Indian tribal organization or entity; provided that the Indian tribal organization, corporation, or entity is wholly owned by, and established for the benefit of, the Indian Tribe or Alaska Native Village."
    - A public or private non-profit organization or association serving Native Hawaiians.
    - A public or private non-profit organization or association serving Native Pacific Islanders of Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, the Republic of the Marshall Islands, the Federated States of Micronesia, or the Republic of Palau.
- **Goals.** The Indigenous Communities program is designed to support indigenous communities as they respond to, and recover from, the economic impacts of the coronavirus pandemic, including long-term recovery and resilience to future economic disasters. Under this program, EDA solicits applications under the authority of its Economic Adjustment Assistance (EAA) program, which is intended to be flexible and responsive to the economic development needs and priorities of indigenous communities.
    - Through this program, EDA provides investments that support a wide range of non-construction and construction activities in regions experiencing severe economic distress due to the coronavirus pandemic. Through this program, EDA can support both the development of pandemic recovery strategies and the implementation of recovery projects identified with those strategies, including infrastructure improvements and capitalization of revolving loan funds (RLFs).
- **System(s).** OPCS
- **Primary Fields Available.** More than 150 fields of administrative data available.

Statewide Planning, Research and Networks

- **Who Grants Go To.** Eligible applicants under this program include a(n):
    - (i) District Organization of an EDA-designated Economic Development District (EDD);
    - (ii) Indian Tribe or a consortium of Indian Tribes;
    - (iii) State, county, city, or other political subdivision of a State, including a special purpose unit of a State or local government engaged in economic or infrastructure development activities, or a consortium of political subdivisions;
    - (iv) institution of higher education or a consortium of institutions of higher education; or
    - (v) public or private non-profit organization or association, including labor unions, acting in cooperation with officials of a general-purpose political subdivision of a State.
    - Under this program, EDA is not authorized to provide grants or cooperative agreements to individuals or to for-profit entities, including for-profit institutions of higher education.
    - For Statewide Planning grants, eligible applicants are limited to the Governor's Office, or equivalent, of a State, who may designate an eligible applicant type described above to

apply for and administer the award. Under section 3(10) of PWEDA the term "State" includes the fifty States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, the Republic of the Marshall Islands, the Federated States of Micronesia, and the Republic of Palau.

- **Goals.** Awards will help develop coordinated state-wide plans for economic development and data, tools, and institutional capacity to evaluate and scale evidence-based economic development efforts, including through communities of practice and provision of technical assistance among existing and new EDA grantees.
- **System(s).** GrantsOnline
- **Primary Fields Available.** More than 150 fields of administrative data available.

Travel, Tourism, and Outdoor Recreation

- **Who Grants Go To.**
    - State Tourism: Eligible applicants for EDA's Statewide Planning Grants include Governors, the Mayor of DC, and other applicable Territory leaders or their designees. EDA will send these applicants a formal invitation to apply.
    - Competitive Tourism - Eligible applicants under this program include a(n):
        - (i) District Organization of an EDA-designated Economic Development District (EDD);
        - (ii) Indian Tribe or a consortium of Indian Tribes;
        - (iii) State, county, city, or other political subdivision of a State, including a special purpose unit of a State or local government engaged in economic or infrastructure development activities, or a consortium of political subdivisions;
        - (iv) institution of higher education or a consortium of institutions of higher education; or
        - (v) public or private non-profit organization or association, including labor unions, acting in cooperation with officials of a general-purpose political subdivision of a State.
    - Under this program, EDA is not authorized to provide grants or cooperative agreements to individuals or to for-profit entities, including for-profit institutions of higher education.
- **Goals.** Through this ARPA Tourism program, EDA aims to assist communities and regions in recovery from the coronavirus pandemic's significant negative impact on the travel, tourism, and outdoor recreation sectors. EDA's ARPA Tourism program is designed to provide a wide range of financial assistance to communities and regions to rebuild and strengthen their travel, tourism, and outdoor recreation industry through various infrastructure and non-infrastructure projects. Under this NOFO, EDA solicits applications under the authority of the Economic Adjustment Assistance (EAA) program, which is flexible and responsive to the economic development needs and priorities of local and regional stakeholders.
- **System(s).** OPCS
- **Primary Fields Available.** More than 150 fields of administrative data available.

NIST

Short-term program level impact metrics for the R&D projects funded are based on the breadth of the research partnerships catalyzed, publications and other forms of dissemination of the research, and success rate for progress against milestones. Individual project impact highlights are narratively summarized in quarterly reporting to DOC as those impacts are noted from monthly project team meetings within the funded Manufacturing USA institutes. Longer term impacts (beyond the period of performance) will be desired impacts on industry practices and adoption of the tools developed within the projects funded.

NOAA

NOAA is a critical climate agency that directly serves American lives, livelihoods, and the economy. With the allocation of IIJA funds, NOAA will be better able to meet its core missions and ensure equitable service delivery to underserved and marginalized communities.

How to Measure. NOAA will fund some IIJA projects through a competitive grant process. An appropriate, competitive application must be received, reviewed, and awarded. NOAA will work with external researchers to collect baseline data related to IIJA investments starting with the initial awareness and to continue through the entirety of the project. NOAA will document the grant process through the Grants Online federal portal.

Provision 1: National Oceans and Coastal Security Fund Grants

- **Who Grants Go To.** Non-profit 501(c) organizations; state and territorial government agencies, local governments, municipal governments; Tribal governments and organizations; educational institutions; or commercial (for-profit) organizations.
- **Goals.** This program is designed to restore, increase, and strengthen natural infrastructure to protect communities while also enhancing habitats for fish and wildlife.
- ***System(s).*** NFWF's Grants System
- ***Primary Fields Available.*** NFWF Performance Metric System (metrics common to Provisions 2, 9, and 10 will be integrated into NOAA Office of Coastal Management measurement system; all others will be reported through Grants Online)

Provision 2: Habitat Restoration

- ***Who Grants Go To.*** Eligible applicants are institutions of higher education, non-profits, commercial (for profit) organizations, U.S. territories, and state, local, and Native American tribal governments. Applications from federal agencies or employees of federal agencies will not be considered. Federal agencies are strongly encouraged to work with states, tribes, non-governmental organizations, municipal and county governments, conservation corps organizations, and others that are eligible to apply.
- ***Goals.*** The goal is to support habitat restoration actions that rebuild productive and sustainable fisheries, contribute to the recovery and conservation of threatened and endangered species, use natural infrastructure to reduce damage from flooding and storms, promote resilient ecosystems and communities, and yield socioeconomic benefits.
- ***System(s).*** GrantsOnline
- ***Primary Fields Available.*** The Restoration and Conservation Database (RCDB)

Provision 3: Flood and Inundation Mapping and Forecasting, Water Modeling, and Precipitation Studies

- ***Who Grants Go To.*** Institution of higher education or a consortium of institutions of higher education (Northeastern Regional Association Coastal Ocean Observing Systems (NERACOOS) and Virginia Institute of Marine Science (VIMS); Rutgers University)
- ***Goals.*** Create a new Cooperative Institute for water resources will focus solely on helping NOAA address the Nation's growing water-related challenges. The new Cooperative Institute for water resources will adhere to the standard reporting requirements for all NOAA cooperative institutes. The Cooperative Institute will develop capabilities to couple the NextGen National Water Model to coastal models and deliver regional/national coastal models (including Great Lakes) to inform coupled system development.
- ***System(s).*** GrantsOnline and project specific data on readiness levels advanced for producing regional predictions of mean and extreme water levels at monthly to annual time frames
- ***Primary Fields Available:*** *TBD*

Provision 4: Water Resources Development Act data acquisition

- ***Who Grants Go To.*** *NOS: Northeastern Regional Association Coastal Ocean Observing Systems (NERACOOS) and Virginia Institute of Marine Science (VIMS); Rutgers University*
- ***Goals.*** To support the provision of soil moisture and snowpack observations to the stakeholder community for data as the 540 sites in the Upper Missouri River Basin (UMRB) Pilot Project are installed by USACE during Fiscal Years 2023-2025. These observations will be reviewed for impacts to weather and water models and how they could support critical economic activities in the UMRB in agriculture and water resources.
- ***System(s).*** *Grants Online and possibly existing Cooperative Institute Agreements*
- ***Primary Fields Available:*** *TBD*

Provision 5: Wildfire

- ***Who Grants Go To.*** TBD
- ***Goals.*** The goals are to
    - provide firefighters and first responders detection capabilities to keep communities safe,
    - advance innovations in fire weather science through research, modeling, and testing,
    - improve community preparation for and resilience to fire, and
    - measure fire weather forecast accuracy and user response to ensure highly accurate weather forecasts, products, and messaging are delivered to end users, stakeholders, and forecasters when and how they need the information.
- ***System(s).*** Grants Online, need guidance for sending funding to FFRDC
- ***Primary Fields Available.*** *TBD*

Provision 7: Marine Debris

- ***Who Grants Go To.*** Eligible applicants for projects taking place in the coastal United States, Great Lakes, territories, and Freely Associated States (or their adjacent waterways), are state, local, tribal, and territory governments whose activities affect research or regulation of marine debris. Equally eligible are any institution of higher education, nonprofit organization, or commercial (for-profit) organization with expertise in a field related to marine debris. Applications from federal agencies or employees of federal agencies will not be considered. Interested federal agencies may collaborate with eligible applicants but may not receive funds through this competition. Foreign public entities (see 2 CFR 200.1) from outside of the Freely Associated States are not eligible to apply.
- ***Goals.***
  - In FY22, NOAA seeks to support partnerships that will support timely and cost-effective implementation of abandoned and derelict vessel removal, disposal, prevention, tracking, and post-removal monitoring efforts throughout the coastal United States, Great Lakes, territories, and Freely Associated States.
  - The National Sea Grant College Program will execute this task utilizing the existing strengths of Sea Grant's network of 34 institutional programs: (1) stakeholder-designed research-to-application initiatives, and (2) educating and connecting stakeholders within academia, government, the NGO community, industry, and the public. This work will complement broader NOAA efforts, particularly, the National Ocean Service's Marine Debris Program, focused on active removal, cleanup, mitigation, and prevention of marine debris. Each Sea Grant program will determine and prioritize local needs and research-driven solutions that best serve historically underserved communities as defined by Executive Order 13985 (Section 2(b)).
- ***System(s).*** Grants Online
- ***Primary Fields Available.*** Sea Grant PIER database

Provision 9: Coastal Zone Management (CZM)

- ***Who Grants Go To.*** Designated state government agencies with approved Coastal Management Programs
- ***Goals.*** To enable approved coastal programs to protect and restore ecologically significant habitats, including conserving lands that play a critical role in helping communities become more resilient to natural hazards including storms, flooding, inundation, erosion, tsunamis, sea level rise and lake level changes.
- ***System(s).*** Grants Online
- ***Primary Fields Available.*** Adding a new module to the CZM Performance Measurement System

Provision 10: National Estuarine Research Reserve System (NERRS)

- ***Who Grants Go To.*** Designated state government agencies and universities with designated National Estuarine Research Reserves
- ***Goals.*** To enhance long-term protection of Reserves for research, education, and habitat protection and strengthen the protection of key land and water areas.
- ***System(s).*** Grants Online
- ***Primary Fields Available.*** Adding a new module to the CZM Performance Measurement System

Provision 11: Ocean and coastal observing systems (ORF)

- ***Who Grants Go To.*** *IOOS Regional Associations (RAs)*
- ***Goals.*** Refurbishments and technology upgrades of critical observing infrastructure in the U.S. Integrated Ocean Observing System (IOOS) Regional Associations (RAs)
- ***System(s).*** *Grants Online*
- ***Primary Fields Available.*** *TBD*

Provision 12: Regional Ocean Partnerships

- ***Who Grants Go To.*** State established Regional Ocean Partnerships (ROPs): the Gulf of Mexico Alliance; the West Coast Ocean Alliance; the Northeast Regional Ocean Council; and the Mid Atlantic Regional Council on the Ocean; and tribal governments (for a portion of funding).
- ***Goals.*** To enhance and sustain the efforts of established Regional Ocean Partnerships (ROPs) to coordinate interstate and intertribal management of ocean and coastal management issues. The scope of work should focus on enhancing and supporting ROP activities and priorities.
- ***System(s).*** Grants Online
- ***Primary Fields Available.*** Grants Online

Provision 14: Fish Passage

- ***Who Grants Go To.*** Eligible applicants are institutions of higher education, non-profits, commercial (for profit) organizations, U.S. territories, and state, local, and Native American tribal governments. Applications from federal agencies or employees of federal agencies will not be considered. Federal agencies are strongly encouraged to work with states, tribes, non-governmental organizations, municipal and county governments, conservation corps organizations, and others that are eligible to apply.
    - This provision also directs up to 15 percent of funds to Indian Tribes and/or partnerships of Indian tribes. OHC will execute these funds through a separate focused Notice of Funding Opportunity to address tribal priority.
- ***Goals.*** The goal is to fund projects that eliminate in-stream barriers to restore fish passage while applying a watershed approach that addresses fish passage barriers throughout a waterway/ecosystem and increases resilience to climate change by removing or improving outdated infrastructure.
- ***System(s).*** Grants Online
- ***Primary Fields Available.*** The Restoration and Conservation Database (RCDB)

Provision 18: Pacific Coastal Salmon Recovery Fund

- ***Who Grants Go To.*** States of AK, WA, OR, ID, NV, & CA and Federally recognized tribes of the Columbia River and Pacific Coast (including Alaska), or their representative tribal commission and consortia
- ***Goals.*** To reverse the declines of Pacific salmon and steelhead, supporting conservation efforts in California, Oregon, Washington, Idaho, and Alaska.
- ***System(s).*** Grants Online
- ***Primary Fields Available.*** PCSRF Project Database

NTIA

NTIA is developing a grants portal leveraging a commercial-off-the-shelf platform (Salesforce) to develop an integrated customer relationship management, application intake, application review, and post award monitoring platform, the latter will collect semi-annual grant awardee project performance metrics (including outcomes). NTIA will also leverage the Grants Office systems of its Grants Office partners, NIST's GMIS for BEAD, Middle Mile, and Digital Equity programs, and NOAA's GOL for TBCP.

Appendix 5. Common Program Impact Measures and Data Sources

A limited set of standard impact measures, with standard definitions, and verification requirements should be used by programs with similar objectives. The standards for ARP and IIJA programs fall into the following categories: jobs/employment; investment levels by the private sector; economic and natural disaster vulnerability/resilience; environmental indicators (such as habitat restored); access to safe/healthy infrastructure and services; economic indicators; and sociodemographic characteristics of the community and program beneficiaries. Standard measures (with standard definitions and data sources) in these categories would facilitate analysis of the relative cost effectiveness of different interventions under different circumstances and permit aggregation of impact data across programs. Most important there would be a uniform understanding of impact data reported.

The following table lists potential standard impact measures by category or the data sources that would be used to generate the standard impact measures. Programs would not use all the standard measures. They would use the measures most relevant to specific program objectives. An impact could be claimed if the Federal investment was necessary for the impact but not necessarily sufficient, i.e., other public and private actions and investments were needed. The listed data sources serve as a recommendation for the types of data that can be used to identify or create the specific impact measures. For example, in instances where 'Administrative/ Statistical Data' statistical data is listed, researchers should review the metrics listed in Table 3, which is a living library of metrics, for topical metrics that can be used to measure program impact.

Table B. Standard impact measures by category

Category	Direct Projected	Direct Actual	Indirect Projected	Indirect Actual
Jobs/Employment Construction	Projected number of employees using industry standards	Actual jobs/employment in construction using administrative/ statistical data	Indirect projected employees jobs/employment construction using input/output model	Actual jobs/employment in construction using administrative/ statistical data
Jobs/Employment Long-term	Number of additional employees anticipated by organizations directly benefiting*	Actual jobs/employment long term using administrative/ statistical data	Number of additional employees in the community anticipated as result of public investment	Administrative/ Statistical Data
Job Placements from Industry Driven Training	Number of placements based on program design and capacity	Actual job placements via report from Awardee	Projected increase in life-time earnings per placement	Economic Modeling
Private Investment Amount	Projected private investment anticipated by grantee	Actual private investment reported by grantee	Projected additional community and private investment from	Observed additional community and private investment from

			improved infrastructure	improved infrastructure
Vulnerability/ Resilience	Projected size of population with reduced risk	Administrative/ Statistical Data	Projected cost avoidance from reduced risk	Economic modeling
Safe/healthy services and infrastructure	Projected size of population with improved services or infrastructure	Administrative/ Statistical Data	Projected cost avoidance from improvements	Economic Modeling
Economic Outcomes			- Local economic activity - Percent in poverty	Administrative/ Statistical Data
Demographics of Beneficiaries	Population benefiting in Census Tract(s) that are classified as economically vulnerable**	Administrative/ Statistical Data	Change in vulnerability classification or rating**	Administrative/ Statistical Data
Customer Experience Rating for Program		Rating by applicants and award recipients of program delivery system		
Environmental Indicators	Acres of Habitat Restored or Acquired Stream Miles made accessible	Administrative/ Statistical Data and Surveys	Benefits from Improved ecosystem conditions (such as fish stocks, etc.)	Administrative/ Statistical Data/ Modelling/Survey Research

*Organizations directly benefiting include project endorsement in the application and estimated increases in their workforce

**Indexes include listed in Table 3

Appendix 6. Data Governance Working Group members and advisors

Members

U.S. Census Bureau: Ron Jarmin, Carla Medalia, Consolee Mulindahabi, Nikolas Pharris-Ciurej

Department of Commerce (DOC) Implementation Coordination Office: Benjamin Page, Whitney Duffey-Jones

DOC Office of the Chief Evaluation Officer: Christine Heflin

DOC Office of the Chief Data Officer: Nancy Ritchey

Bureau of Economic Analysis (BEA): Mauricio Ortiz

Economic Development Administration (EDA): Bryan Borlik, Ryan Smith

National Institute of Standards and Technology (NIST): Alex Folk, Jannet Cancino, Anita Vanek

National Oceanic and Atmospheric Administration (NOAA): Monica Grasso

National Telecommunications and Information Administration (NTIA): Nicholas Alexander, Susannah Spellman

Advisors

DOC: Don Graves, Nicole Parent, Corinn Wendel, Jacob Wright

Office of Management and Budget: Rea Hubbard

Department of Transportation: Daniel Morgan

U.S. Census Bureau: Deirdre Bishop, John Cuffe, Kelsey Drotning, Nathan Goldschlag, Keith Finlay Patrick Jurgens, Christian Moscardi, Cecile Murray, Emily Schondelmyer, Damon Smith, Brian Timko

NOAA: Mark Seiler, Arlene Simpson Porter

NIST: Michael Molnar, Kelley Rogers

BEA: Sharon Panek