

CESER QUALITY ASSURANCE PROJECT PLAN

Office of Research and Development
Center for Environmental Solutions & Emergency Response (CESER)
Land Remediation & Technology Division (LRTD)
Environmental Decision Analytics Branch (EDAB)

Strategies for Characterization of Food Waste: Existing Data Software Tracking Tool

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*Existing Data,
Decision Support Tool,
Software Development
QA Category B*

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Approval Page

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Contractor Approvals	
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Distribution

This Quality Assurance Project Plan (QAPP) will be distributed to the staff of the U.S. Environmental Protection Agency (EPA) and contract staff. A copy of the approved signed document will be provided to all staff involved in the project, including those who join the project after the initial distribution of the QAPP. All staff will be directed and encouraged to use the most current approved and signed version of this QAPP, downloadable via ORD QA TRACK @ the Project tracking webpage <http://qatrack.epa.gov/projects/>.

<i>Approval Page.....</i>	<i>2</i>
<i>EPA CESER Project Approvals</i>	<i>2</i>
<i>Contractor Approvals.....</i>	<i>2</i>
<i>Distribution</i>	<i>3</i>
1. PROJECT DESCRIPTION AND OBJECTIVES	6
1.1 Background.....	6
1.2 Project Description.....	6
1.3 Project Objectives	6
2. ORGANIZATION AND RESPONSIBILITIES	7
2.1 Project Personnel and Responsibilities.....	7
2.2 Project Schedule & Key Milestones	8
3 SCIENTIFIC APPROACH	9
3.1 General.....	9
3.2 Secondary Data Requirements.....	9
3.3 Secondary Data Sources	9
4. Software Development	10
4.1 Food Waste Software Tracking Existing Data Tool	10
4.2 Deployment	11
5. QUALITY METRICS.....	12
5.1 Data Quality Requirements	12
5.2 Procedures to determine the quality of secondary data	12
5.3 Disclaimer	12
6. DATA ANALYSIS, INTERPRETATION, AND MANAGEMENT	13
6.1 Approaches for Calculating Metrics.....	13
6.2 Approaches for Determining the Uncertainty in Calculated Metrics	13
6.3 Data Requirements	13
6.4 Data Storage Requirements	13
7. REPORTING	14
7.1 Deliverables	14
7.2 Expected Final Products.....	14
8. REFERENCES	15

1. PROJECT DESCRIPTION AND OBJECTIVES

1.1 Background

A secondary data research project involves the gathering and/or use of existing environmental data for purposes other than those for which they were originally collected. These secondary data may be obtained from many sources, including literature, industry surveys, compilations from computerized databases and information systems, and computerized or mathematical models of environmental processes. Initially, the project will focus on the following:

- 1) What is the occurrences of plastics in treating food waste, and
- 2) What food waste depackaging technologies are currently available on the market.

1.2 Project Description

The U.S. is committed to reducing food waste by 50% by 2030. To divert food waste from landfills, OLEM promotes anaerobic digestion and composting of food waste; however, contamination of food waste with packaging (including film plastics) may complicate composting and anaerobic digestion operations and decrease the market desirability and safety of land application of the compost and digestate made from food waste.

1.3 Project Objectives

De-packaging technologies (beyond screens and filters) are increasingly being used by large food waste generators and treatment facilities as primary means of removing plastics. This project will test the performance of de-packaging equipment available on the market in real-world settings. Research will characterize the plastics, including quantity and particle size, in food waste streams before and after the use of de-packaging technologies. The results from this study will be useful to OLEM, restaurant and commercial kitchen operators, food retailers, composters, and wastewater treatment facility staff across the U.S. as they seek to exclude plastics (including microplastics) from the food waste stream.

2. ORGANIZATION AND RESPONSIBILITIES

2.1 Project Personnel and Responsibilities

The project organization is depicted in Figure 1 for staff with program management and technical responsibilities and those with quality assurance/quality control (QA/QC) roles. It shows the relationships including lines of authority (and reporting) and lines of communication among all project participants, including those from EPA.

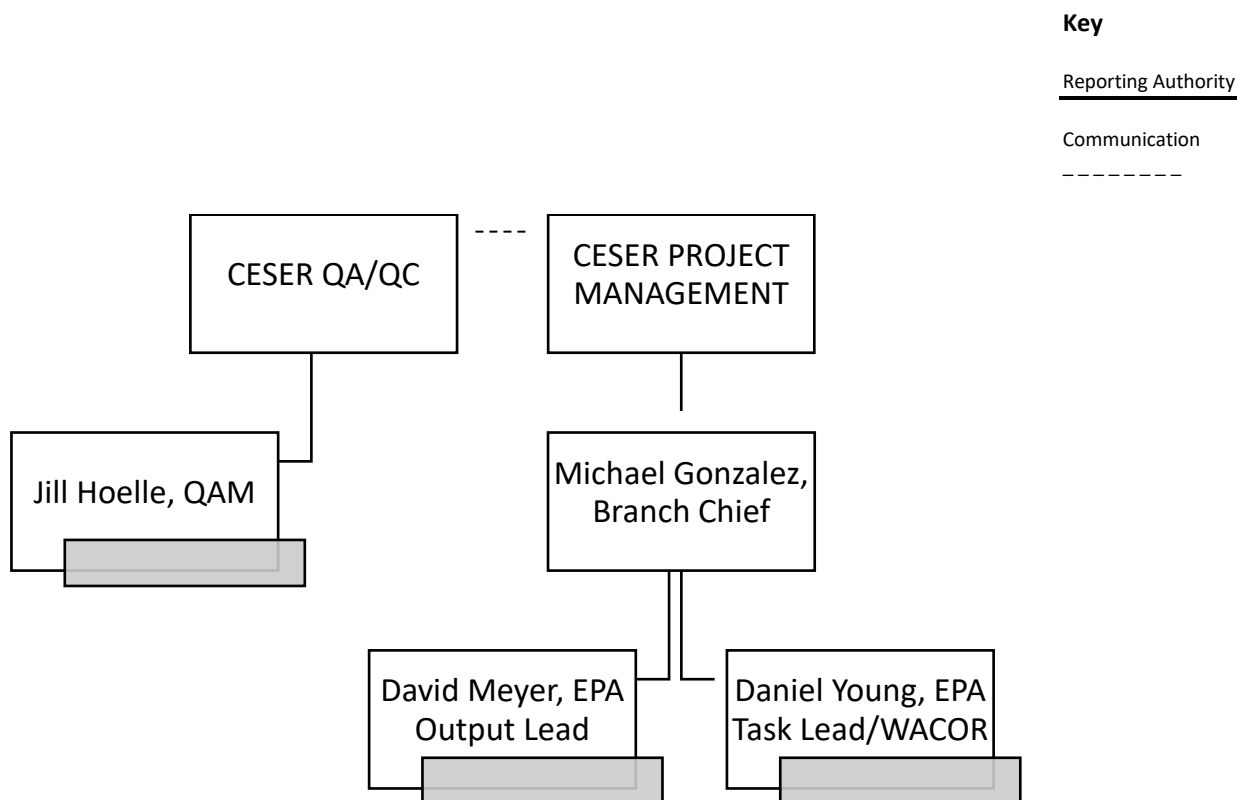


Figure 1: Project Organization

2.1.1 Product Manager, Michael Gonzalez, CESER

Dr. Michael Gonzalez, Supervisor (EPA) will have oversight of this QMP. He will provide ideas and guidelines to cover the scope of this research proposal, participating actively in the review of all reports and in the implementation of QAPPs and SOPs. In addition, he will participate in the technical meetings with the other principal investigators to ensure the work progresses in accordance with this described research, develop new models and their validation, and prepare technical reports and peer review articles.

2.1.2 Output Lead, David Meyer, CESER

Dr. David Meyer will direct overall project and coordinate with SHC lead.

2.1.3 Product Lead, Daniel L. Young, CESER

Dr. Daniel Young, Principal Investigator (EPA) will have oversight of Django/PostgreSQL tool for alpha and beta independent verification and validation of standalone/deployed tool. He will provide ideas and guidelines to cover the scope of this research proposal. In addition, he will advise through meetings and discussions to complete all tasks so that all achievements are in accordance with this described research. He will serve as the Work Assignment Contracting Officer's Representative (WACOR). As a WACOR, he is a key player in protecting the Government's interests and carrying out the Government's obligations under the contract. To do so effectively, it is imperative that he is familiar with the contract terms and conditions as well as his responsibilities and limitations as a WACOR.

2.1.4 Quality Assurance Manager (QAM), Jill Hoelle, CESER

Jill Hoelle will provide independent QA oversight to ensure that planning and plan implementation are in accordance with the approved Quality Assurance Project Plan (QAPP). She will provide technical direction from a QA/QC perspective to EPA PIs on an as needed basis. She will enter QAPP and related products into ORD QA Track database.

2.1.5 Product Contributors

Shannon Kenny, ORD/IOAA; Tim Torma, ORD/IOAA

2.1.6 Partners

Cheryl Coleman, OLEM/ORCR; Lana Suarez, OLEM/ORCR

2.2 Project Schedule & Key Milestones

There will be some overlap between data collection, sampling, and analysis. Nevertheless, we anticipate adhering to the following general timeline:

Start Date: 10/2019

- Milestone 1: Testing protocols completed, identification of technologies and locations of sites to be tested finalized (Q4/2021)
- Milestone 2: (Subject to successful identification of test locations/ tech in milestone 1) On-site sampling and testing completed, results documented. (Q4/2022)
- Milestone 3: EPA report or peer reviewed article published. (Q2/2022)

Delivery Date: 04/2022.

3 SCIENTIFIC APPROACH

3.1 General

The general approach starts with an overview of the whole system and moving down into the detail behavior of the community system in order to infer the strategies and policies that are most likely to lead towards sustainability.

3.2 Secondary Data Requirements

This project primarily relies on secondary / existing data to meet its objectives. The availability of a broad range of high-quality data in the area of de-packaging and food waste are critical to the successful completion of this research. Searches will be completed and stored on the decision support tool identified in Section 4 of this QAPP.

3.3 Secondary Data Sources

We consider U.S. government publications and web sites to be the most reliable sources of information on the economy and the environment because of quality control measures that, in general, accompany these data. For this reason, information from these sites is preferred when it is available. After U.S. government sources, we will look first to government agencies in the States, and we finally look to sources in the private sector including academic institutions and industry when no other data is available. All levels of government often contract academic institutions to produce statistical abstracts, thus we do not intend to imply the research of academic institutions is less reliable, only the government is more likely to have specific quality requirements for such data and provide a centralized data repository. Academic institutions producing government reports will have conformed to these quality standards. Published articles in the peer-reviewed literature are another source of reliable information. The non-peer-reviewed literature from government and academic institutions may be used when the needed information is not available from other sources.

4. Software Development

4.1 Food Waste Software Tracking Existing Data Tool

4.1.1 Requirements

Develop a Django high-level Python Web framework with integrated PostgreSQL database that encourages rapid development and clean, pragmatic design. The application will be used to track existing data from secondary sources for this project.

- ✓ Requirement #1: Create log-in module.
- ✓ Requirement #2: Create Home page.
- ✓ Requirement #3: Create Contact page.
- ✓ Requirement #4: Create Secondary/Existing Data Tracking page.
 - Include following Fields:
 - ‘User Work Office/Lab,’
 - ‘Email Address,’
 - ‘Phone Number,’
 - ‘Search for Secondary / Existing Data,’
 - Option #1: **Enter Search Term** (general Google Scholar Search engine, <https://scholar.google.com/>)
 - Option #2: **Enter Search Term** (general DuckDuckGo Search engine, <https://duckduckgo.com/>)
 - Option #3: **Enter URL** (to cut & paste URL, e.g., link internal intranet sources such as: ‘Food Waste Reduction in Military Kitchens: A Tracking Technology Demonstration at Fort Jackson,’ <https://qatrack.epa.gov/projects/qlog/show/25893/>)
 - ‘Add Comments.’
 - ‘Add Citations (APA style).’
 - ‘Add EPA Disclaimer (if appropriate, see 5.3 of this QAPP).’
 - **Export Function to Excel**
 - **Export Function to PDF**
- ✓ Requirement #5: Create Help page.
- ✓ Requirement #6: Create User page.
- ✓ Requirement #7: Create Team. Add function to create team for searching existing data. Will permit EPA intramural team (e.g., EDAB Team) to search and store existing data for use in Phase II (Environmental Measurement / Sampling & Analysis) of the project. In addition, other EPA contributors and partners can create their own teams if needed.

4.1.2 Design

- ✓ Design #1: Create (request OSIM) GitHub repository for source code.
- ✓ Design #2: Using PostgreSQL 10 and PgAdmin 4, create a password protected database, named ‘FoodWaste.’
- ✓ Design #3: Create a new ‘Django Web Project’ using Visual Studio Professional 2019.
 - Design #3.1: Create 64-bit Python 3.7 environment for Project using Visual Studio Professional 2019.

4.2 Deployment

The software tool developed for tracking existing data will be deployed on the EPA RTP RHEL server assigned below:

- ✓ Server Name: v2626umcth937.rtd.epa.gov IP address: 134.67.216.106
- ✓ SW app/dBase: FoodWaste
- ✓ GitHub: https://github.com/USEPA/Food_Waste_Reduction_Identification_Prevention
- ✓ URL: <https://FoodWaste.epa.gov/>
 - Fed Owner: Daniel L. Young
 - Responsible Admin: Daniel L. Young

5. QUALITY METRICS

5.1 Data Quality Requirements

Data from organizations within the federal government are preferred because most are taken under a QA/QC plan. Below that level in quality are data from the peer-reviewed published literature and state and local government. The federal government is one of the few institutions that have the resources to collect comparable data regularly for a state or the nation as a whole. Fortunately, government departments and agencies usually have a Data Quality Management Plan and individual data Quality Assurance Project Plans to check and insure the quality of the data they distribute. For these reasons, we have chosen U.S., State, and territorial governments as the preferred source of data that we use in these analyses.

Some data may not be available from government agencies but are available from other sources such as the peer-reviewed literature, private industries, and grey literature. Data from peer-reviewed literature have been checked and subjected to review of two or three independent scientists and are likely reliable. Information from industry must be used with more discrimination, but for numbers where self-interest is not involved, we consider this source generally reliable, e.g., reports from industry groups like the American Iron and Steel Institute. Non-peer-reviewed literature from known or well-documented sources can be reliable, however, most scientists would consider such numbers less reliable, and thus they should be used only as a last resort. All sources of data used in the analysis of geographic regions will be identified and referenced in any project deliverable.

5.2 Procedures to determine the quality of secondary data

The six metrics of sustainability are calculated from a large number of variables and each metric has its own time series data set. Therefore, error in data for any a single variable, of one particular time series, is unlikely to yield wholly erroneous results, and provides some flexibility in accepting data of varying quality.

When estimates of measurement error are available for data on the variables under study, these error estimates will be used in estimating uncertainty in the calculated metrics of sustainability. Unfortunately, data of the type needed for the project do not often come with error estimates. Often, data errors can be inferred from the level of noise where there are no known trends in the data, and this will be done in cases where trendless data are available for the variables under study.

5.3 Disclaimer

If a data source does not provide documentation about the quality of the data, we will use the following disclaimer on the project deliverables:

“The information and data presented in this product were obtained from sources that are believed to be reliable. However, in many cases the quality of the information or data was not documented by those sources; therefore, no claim is made regarding their quality.”

6. DATA ANALYSIS, INTERPRETATION, AND MANAGEMENT

6.1 Approaches for Calculating Metrics

All existing data will be stored on the EPA RTP RHEL server listed in section 4 of this QAPP.

6.2 Approaches for Determining the Uncertainty in Calculated Metrics

Data validation procedures will not be addressed in this QAPP. Phase II, Environment Measurement QAPP will discuss uncertainty in the sampling and analysis section.

6.3 Data Requirements

Describe how the data will be summarized or analyzed (e.g., qualitative analysis, descriptive or inferential statistics) to meet the project objective(s).

6.3.1 Data Validation Procedures for Ensuring the Accurate Calculation of Metrics

Phase I of this research project is focused on collecting as much existing data on food waste and food waste de-packaging as possible to better inform the EPA team on the current stat of the industry. The existing data will be used to assist the team in developing the Phase II QAPP and work assignment for the contract staff performing the actual sampling and analysis. It is not expected that any Quality Affecting data will be collected from Secondary / Existing data sources, however, all searches will be verified and tracked on the EPA server and if used in Phase II will be validated and verified prior to use.

6.3.2 Storage

Data used in this study, along with their source, will be entered directly into the decision support tool developed. All data will be available in the PostgreSQL database on the RTP RHEL server. In addition, data will be available for export via Excel and PDF.

6.4 Data Storage Requirements

In addition to storage stated in section 6.3.2 above, a US EPA GitHub repository has been assigned by OSIM and will store all source code and applicable documentation. The repository is available @ <https://github.com/USEPA/FoodWaste>.

7. REPORTING

7.1 Deliverables

EPA report or peer-reviewed publication.

7.2 Expected Final Products

EPA report or peer-reviewed publication.

8. REFERENCES

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