



The Opportunity Project

2020 Earth Sprints



Natural Environment Cohort

June – September, 2020

Census Open Innovation Labs

U.S. Census Bureau



Natural Environment Problem Statements

Developing Effective and Efficient Markets for Recycled Materials

U.S. Environmental Protection Agency

Pages 3-4

Reducing Plastic Pollution in Oceans

U.S. Department of State & The Wilson Center

Pages 5-6

Helping the Public Understand Effects of Emissions on Local Air Quality

U.S. Environmental Protection Agency

Page 7

Enabling Aerial and Geospatial Data to Aid Agricultural Decision-Making

U.S. Department of Agriculture

Page 8

Sprint Timeline

Page 9



Developing Effective and Efficient Markets for Recycled Materials

U.S. Environmental Protection Agency

Challenge: Develop innovative digital solutions that connect domestic recycling facilities with manufacturers to enhance recycling markets and increase the use of recycled materials in new products.

Executive champion: Kathleen Salyer, Acting Director, Office of Resource Conservation and Recovery, U.S. Environmental Protection Agency

Background: Recycling facilities, ranging from those operated by large waste management corporations to smaller, family-owned facilities, process the nearly 70M tons of material that Americans throw into their recycling bins each year. While international markets were historically significant purchasers of materials from these U.S. recycling facilities, recent years have seen tightening of international markets, due largely to contamination of traditional recycling streams by newer products (e.g., plastic bags, flexible pouches, and lithium batteries), which our outdated recycling infrastructure is ill-equipped to manage. Many recycling facilities are unable to fill the gap left by international markets, as they are not connected to domestic manufacturers (e.g., paper mills, bottling plants) that have demand for using these recycled materials in new products. These dynamics have contributed to recycling programs across the country shrinking or even shutting down.

Why this problem matters: While surveys indicate that the vast majority of Americans support recycling, the U.S. recycling rate has stagnated, with consumers recycling only 34–35% of household waste, in part due to facilities reducing the breadth of materials they accept or closing their doors altogether. Despite these challenges, recycling can help American industry to compete on the world stage while also reducing manufacturing's impact on ecosystems and creating jobs. Recycling provides households and businesses with an accessible destination for their waste materials, reducing environmental impacts, and generating economic benefits for communities. Recycling is key to maintaining domestic materials supply chains without increasing environmentally impactful activities like mining and refining. During the 20th century, global raw materials use rose at twice the rate of population growth, with raw material usage currently accounting for 42% of all U.S. greenhouse gas emissions. Recycling is also a vital source of jobs – more than 750,000 Americans work in the recycling industry, and millions more work in manufacturing industries supported by recycled feedstocks. Connecting recycling facilities to domestic manufacturers would not only reinvigorate the existing system but also illustrate to recycling facilities that there are proven use cases for some of the materials that our system cannot currently accommodate, which could spur investment into the recycling infrastructure and limit contamination, thereby improving our supply of recycled materials.

Vision for sprint outcomes: By enhancing connections between those processing recycled materials and those interested in purchasing these materials, there will be more demand for recyclables, leading to a stronger and more resilient recycling system in the U.S.

Target end users: U.S. recycling facilities and manufacturers looking to produce, sell, and buy quality recycled materials; rural or tribal communities; organizations and state and local governments striving to improve their recycling facilities and infrastructure.



Related open data sets:

- **EPA annual report Advancing Sustainable Materials Management** ([link](#))
- **EPA's Recycling Economic Information report** including the recycling industry workforce ([link](#)) and ([link](#))
- **U.S. Geological Survey's annual mineral commodity summaries** - manufacturing industry data on the use of virgin (primary) and recycled (secondary) materials in the U.S. for several dozen minerals ([link](#))
- **Southeast Recycling Development Council's** map of recycling opportunities in the Southeast ([link](#))
- **The Recycling Partnership's** map of recycling opportunities nationwide ([link](#))
- **Institute of Scrap Recycling Industries** - monthly, quarterly, and annual data on overall and materials-specific recycling industry economics ([link](#))
- **Materials-specific industry trade association data** on recycling and production rates, as well as access to recycling opportunities

Lead POCs:

- Mya Sjogren, Management and Program Analyst, EPA
- Nicole Villamizar, Chief, Materials Management Branch, EPA
- Ron Vance, Chief, Resource Conservation Branch, EPA



Reducing Plastic Pollution in Oceans

U.S. Department of State & The Wilson Center

Challenge: Create open data sets and engaging digital tools that complement existing citizen science plastics data, to help the public understand the amount of plastic on local beaches and in the ocean, where such plastic comes from, and actions that can be taken to alleviate the problem.

Executive champions:

- Landon Van Dyke, Acting Deputy Director of the Center for Analytics & Senior Advisor for Energy, Environment and Sustainability, U.S Department of State
- Anne Bowser, Director of Innovation, The Wilson Center

Problem: Plastic Pollution is a pervasive and global issue. 8.3 billion tonnes of plastics are estimated to have been produced since the 1950s. While the production of plastic products has grown exponentially, today only 9% is recycled. Inefficient recycling systems and chemical compositions that limit decomposition create new problems for our planet and our health — we see plastics on our beaches, in our oceans, and in the stomachs of animals and people (UN Environment). While many agencies and citizen scientists collect data through activities including beach clean-ups, there is a need for coordination between different data sources to understand plastic pollution at local, national and global scales. Further, different stakeholders, including the general public and federal agencies, need to more easily understand how pollution quantity and type varies by location and where different types of pollution might come from. On the citizen level, such accessible information is important for education and behavior change. On the government level, information is needed to manage resources, set policies, and contribute to our international agreements, like reporting America's progress against the Sustainable Development Goals (SDGs).

Why this problem matters: Ocean plastics directly impact more than 800 species world-wide. Further, because plastics never completely degrade, microplastics in the environment threaten human as well as environmental health. Participation in citizen science shows that the public clearly cares. Citizen scientists do not always stay engaged and keep sharing data over time. In addition, citizen science volunteers do not always have access to contextual information on why plastic might be there and what they can do. The lack of data on plastics pollution and related information prevents citizen scientists and the public policy community from fully understanding the extent of the problem and making informed choices to reduce the growing threat of plastic pollution to human and environmental health.

Vision for sprint outcomes: Engaging digital tools and open data enable members of the public, as well as governments to understand both the extent of plastic pollution locally and globally, and how they can help create solutions to make a difference.

Target end users: Engaged citizens passionate about reducing plastic pollution, rural or tribal communities, as well as policymakers, advocates, and researchers



Related open data sets:

- **Earth Challenge 2020** Data through the Citizen Science Cloud ([link](#))
- **NOAA** Marine Debris Monitoring and Assessment Project information ([link](#)) and Citizen Science Data ([link](#))
- Ocean Conservancy **TIDES** Coastal Cleanup Data ([link](#)) and Citizen Science Data ([link](#))
- **Commonwealth Scientific and Industrial Research Organization's** Marine Debris List ([link](#)) and Database ([link](#))
- **OGC SensorThings API** ([link](#))
- **Marine Litter Watch**, European Environment Agency ([link](#))
 - Citizen Science Data ([link](#))
- **Additional Citizen Science Plastics Program datasets**

The below datasets can be combined with NOAA, EEA, TIDES, and Earth Challenge 2020 data to provide additional information/analysis.

- Litterati, captures photos of plastics pollution ([link](#))
- Project Aware – Divers Against Debris, captures data about plastics on the seafloor ([link](#))
- Global Alert – Floating Trash ([link](#))

Lead POCs:

- Stephanie Christel, Eco-Management Analyst, U.S Department of State
- Metis Meloche, Product Manager, Science Technology Innovation Program, Wilson Center
- Elizabeth Newbury, Director of the Serious Games Initiative, Science Technology Innovation Program, Wilson Center



Helping the Public Understand Effects of Emissions on Local Air Quality

U.S. Environmental Protection Agency

Challenge: Create tools to help communities understand how emissions from motor vehicles and equipment transportation influence local air quality and health, as well as the actions available to lessen these impacts.

Executive champion: Karl Simon, Director of the Transportation and Climate Division, Office of Transportation and Air Quality, U.S. Environmental Protection Agency

Problem: Often individuals do not have access to information that helps them easily understand how their choices impact emissions and local air quality, nor what actions can decrease their contributions to transportation-related pollution. There is a need for digital tools that can help the public understand how transportation contributes to local air pollution, as well as the health and environmental impacts of this pollution. Once community members have access to this important information, the natural next step is for them to have access to tools, resources, and methods for reducing air pollution.

Why this problem matters: Transportation emissions make up almost one-third of the nation's greenhouse gas emissions and contribute to air pollution. This has significant health ramifications – every year, 7 million individuals worldwide die from air pollution. Furthermore, 80 percent of people living in urban areas that monitor air pollution breathe in air that exceeds WHO guideline limits. Communities' choices about the transportation of their residents and everyday goods play a significant role in air pollution, but it is difficult to convey this type of information easily to the public, as well as to point to actions that individuals can take to help. It is hard to take action even when one wants to.

Vision for sprint outcomes: Through practical user-friendly digital tools, more Americans will have an improved understanding of transportation's role in local air pollution, its causes, and its negative effects. They will also be equipped with ideas for how to take action to reduce pollution in the transportation sector.

Target end users: Engaged citizens and the general public, especially those at higher risk for respiratory illnesses (e.g., individuals over 65, children, those with respiratory ailments), urban populations and communities (e.g., high transportation traffic areas), rural or tribal communities, and motorized vehicles users.

Related open data sets:

- **Nonattainment counties for all criteria pollutants**, EPA ([link](#))
- **Air Quality Index**, AirNow ([link](#))
- **Emissions from motorized vehicles**, EPA ([link](#))
- **Fuel Economy** ([link](#))
- **Green vehicle resources**, EPA ([link](#))
- **Population data**, Census Bureau ([link](#))
- **Health data**, CDC ([link](#))

Lead POCs:

- Diana Galperin, Economist, EPA
- Britney McCoy, Environmental Engineer, EPA



Enabling Aerial and Geospatial Data to Aid Agricultural Decision-Making *U.S. Department of Agriculture*

Challenge: Create digital tools that provide farmers, ranchers, and researchers with timely access to National Agriculture Imagery Program (NAIP) data to help them make important agricultural and planning decisions.

Executive champion: Denny Skiles, Director, Aerial Photography Field Office, Farm Production and Conservation Business Center, U.S. Department of Agriculture

Problem: Farmers and ranchers are part of a vital infrastructure but are often at the mercy of environmental and economic conditions that are out of their control. Aerial imagery is used as the base to create and update many geospatial datasets and products (e.g., Geospatial Information Systems [GIS]) that are used to support and assist the farming community, citizens, and researchers. NAIP imagery has increased in spatial and spectral resolution over the years. As NAIP increases in quality, the complexity and challenges in usability during the US agricultural growing seasons by farmers and citizens increases due in part to the massive size of the dataset. Thus, such aerial imagery requires robust processing. It can be challenging for those who need timely access to NAIP data to use it to manage farms, farm programs, conservation, and disaster mitigation.

Why this problem matters: Food is a necessity for survival, and our American agriculture system provides food to both the American people and the world. The ability to visualize and develop solutions to catastrophic events such as flooding, tornados, and plant disease, as well as planning considerations such as diminishing agricultural lands, natural resource distribution, disease mapping, and land conservation are key to ensuring the strength and resilience of food supply.

Vision for sprint outcomes: With user-friendly tools, citizens will have timely and reliable access to NAIP imagery for solving geospatial challenges facing farming, conservation, natural resources, and disaster preparedness.

Target end users: Farmers, ranchers, engaged citizens, rural or tribal communities, emergency managers, state and local government, federal agencies, university researchers.

Related open data sets:

- NAIP public image service ([link](#))
- NAIP public image dates ([link](#))
- USGS National Map ([link](#))

Lead POCs:

- Joan Biediger, Cartographer, USDA
- Zachary Adkins, Geospatial Services Branch Chief, USDA
- John Mootz, Imagery Program Manager, USD



Sprint Timeline: June – September *(Dates Subject to Change)*

Week	Milestone	Activity
June 15 – 19	Kick Off Call (6/18)	TOP team launches sprint with all participants Slack channel launches
June 22 – 26	User Engagement Workshop (6/25)	Participants join a virtual workshop to connect with each other for real time user research and ideation
June 29 – July 3		Teams connect with user advocates to conduct user research and better understand the challenge they are working on
July 6 – 10	User Research Milestone (7/9)	Teams share learning from user research that will inform design of their product, and connect with user advocates for more feedback
July 13 – 17		Teams continue user research and begin data exploration
July 20 – 24	Data Q&A (7/23)	Data dive Q&A with data stewards to answer questions on federal data sets
July 27 – 31		Teams continue exploring data and developing products
Aug 3 – 7	Concept Pitch (8/6)	Participants come together for a virtual demo of the tools in progress. Teams share concepts, wireframes, and works in progress, with wide variation in product maturity. Sprint participants provide feedback on the tools in development
Aug 10 – 14		Teams continue building products and conduct user testing
Aug 17 – 21	Beta Demos (8/20)	Teams come together to showcase and share feedback on more mature versions of their products. Typically, tools have reached at least wireframes and have some functioning features by this stage
Aug 24 – 28	Product Sustainability Milestone (8/27)	Tech teams, product advisors, and past tech teams join a session to share best practices and strategies for making TOP tools lasting and effective
Aug 31 – Sept 4		Teams continue building prototypes/products
Sept 7 – 11	MVP Demos (Dates TBD)	Teams share MVP with TOP team prior to collective rollout
December	TOP Demo Day	Teams present their sprint products to government, industry, media, and other stakeholders at open press Demo Day event