CREATING CIRCULAR ECONOMIES IN NORTHWEST ARKANSAS

REPORT SUMMARY

2020

NORTHWEST ARKANSAS COUNCIL

THE SUSTAINABILITY CONSORTIUM™

EXECUTIVE SUMMARY

Adding sustainability to economic development plans opens new opportunities for cities and regions to create jobs and other economic value while increasing the well-being of their citizens. This type of development might be creating new greenspaces for citizens as part of a downtown revitalization project or finding more efficient ways to manage waste that conserves resources and is more convenient for residents. Based on the Greater Northwest Arkansas Development Strategy published in 2018 by the Northwest Arkansas Council, The Sustainability Consortium (TSC) proposed a study to investigate how to improve on the existing recycling management system within the context of the circular economy. TSC's proposal became part of this work.

The purpose of this work was to understand the pathways available to the Northwest Arkansas region to become a circular region. The recommendations developed for this work serve as a map, identifying actions and opportunities for sustainable development in Northwest Arkansas based on the circular movement of recycled and recovered materials.

This work focused on the existing municipal systems and material streams coming from residential sources. It excluded industrial and commercial streams not included in municipal recycling systems and opportunities related to reuse and refurbishment, food waste, yard waste, and composting. Other commercial or industrial streams that would not be encountered in a typical municipal system or would require separate, specialized treatment such as construction and demolition debris are also not included.

NORTHWEST ARKANSAS REGION

For purposes of this project, the Northwest Arkansas region includes Benton, Madison, and Washington counties. It includes all areas served by the Benton County Solid Waste District (SWD) and the Boston Mountain Solid Waste District. The SWDs are responsible for carrying out state regulations regarding waste and recycling management and work closely with cities and existing recycling facilities to provide convenient options to residents.

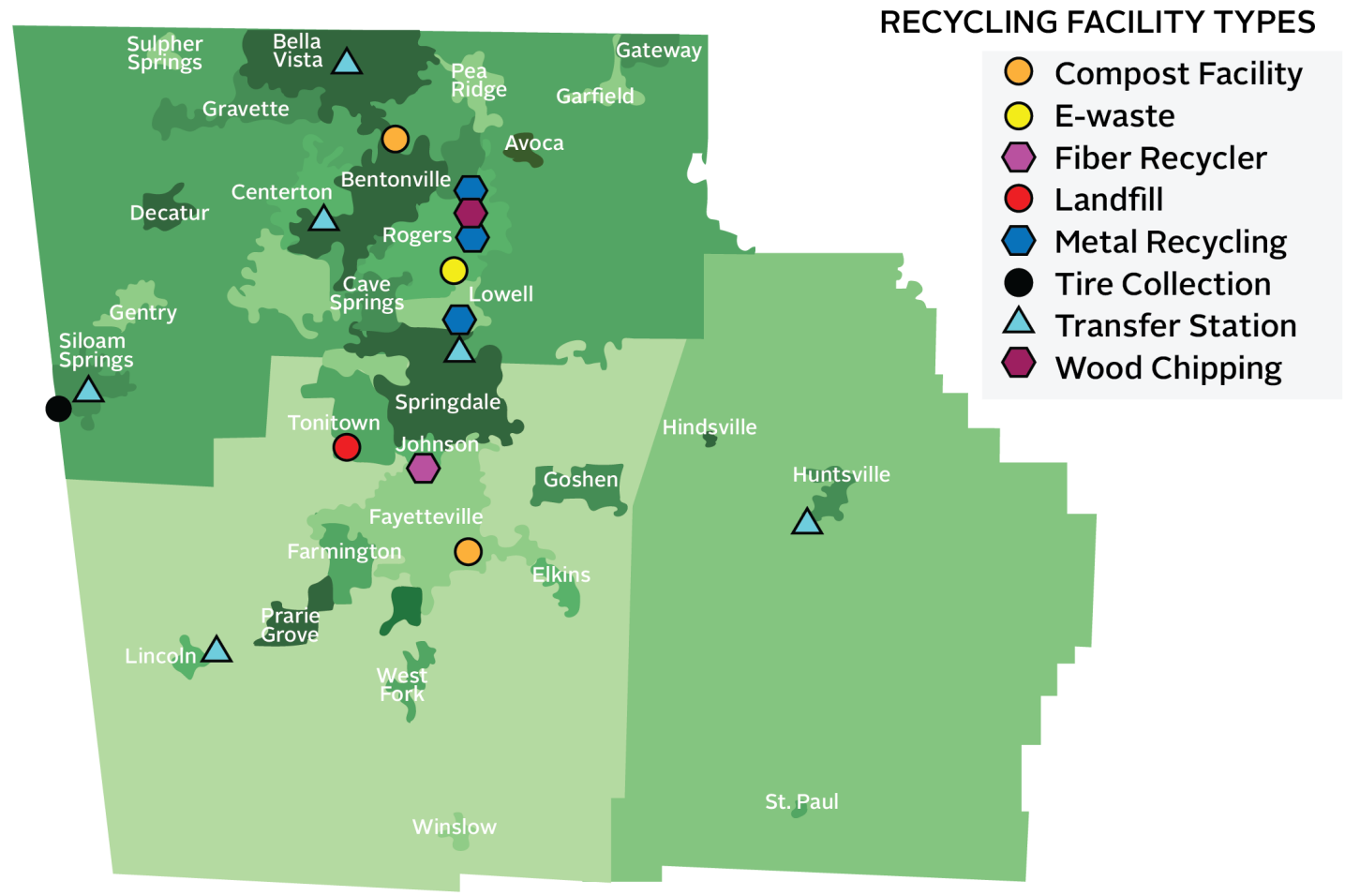

FIGURE 1: NORTHWEST ARKANSAS RECYCLING
Recycling centers are included under the transfer station category (blue triangle) as this is how they are defined by the state. The Benton County facility in Centerton and Boston Mountain facility in Prairie Grove serve as hubs for their respective solid waste districts that collect a wider range of materials, including household hazardous waste, tires, and batteries, than other identified facilities.

The region has established recycling infrastructure, as required by Arkansas Regulation 28. The list of materials accepted curbside and at drop-off facilities across the region is shown in Table 1. Figure 2 shows which materials are flowing through the region. The recycling volumes were taken from the annual surveys submitted by public collection programs to the state of Arkansas. Additional data from Marck Recycling, which manages the material collected in the single-stream curbside collection programs in Springdale, Bentonville, Rogers, and Lowell, was provided for this project. Unfortunately, this is not a complete picture of what is collected in the region, as volumes collected by other private haulers managing single-stream collection programs opted not to share this information. Please see the full report of this work for further details on the challenges of data collection in the region. Even with incomplete data, the Northwest Arkansas region has a solid base from which to build a circular region.

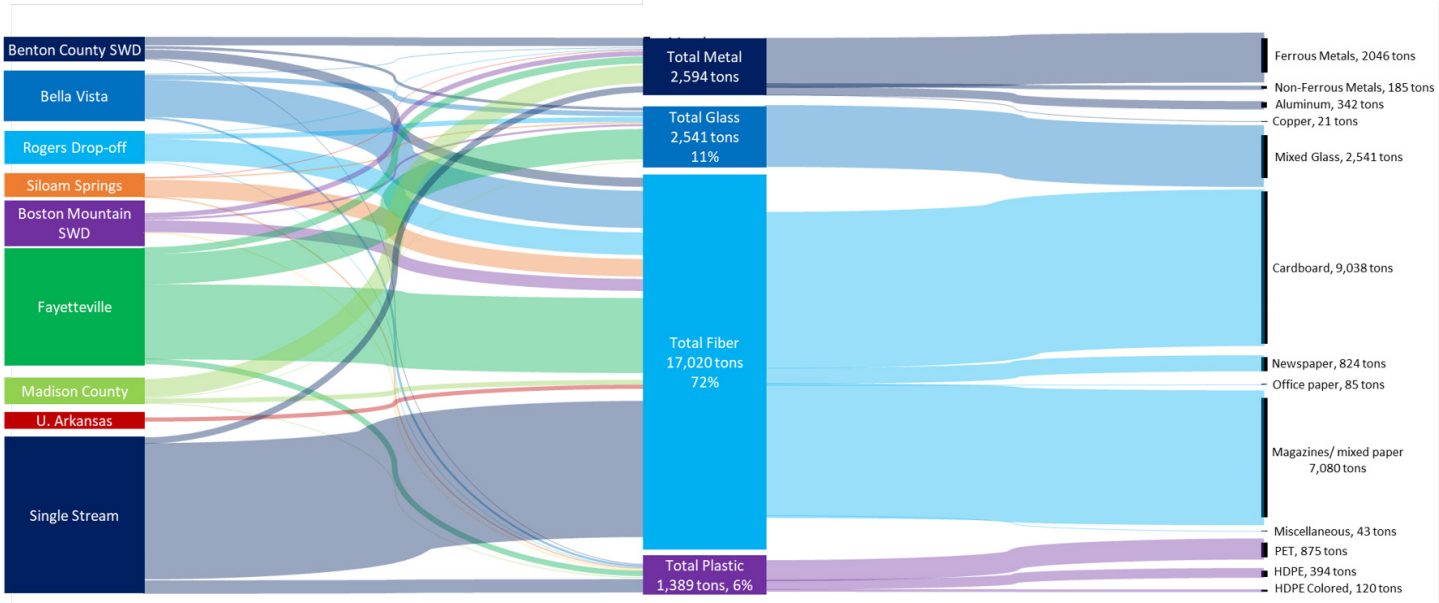

FIGURE 2: SANKEY FLOW DIAGRAM, NORTHWEST ARKANSAS 2018-2019
The left-hand column shows the programs required to report under Reg 28. The right-hand side shows which commodities are collected and how much for the same reporting timeframe. The diagram only shows the major commodity streams rather than all materials collected by a given program. The "Single Stream" indication in the left column represents the materials collected from single-stream curbside collection programs in Bentonville, Rogers, Lowell, and Springdale and processed by Marck Recycling.

ACCEPTED CURBSIDE & DROP-OFF LOCATIONS:
Aluminum
Ferrous (steel, iron, stainless, tin cans)
Cardboard
Office paper
Mixed paper (junk mail, phone books chipboard boxes, magazines)
Newspaper
Plastic bottles
ACCEPTED DROP-OFF LOCATIONS ONLY:
Mixed glass*
Electronics
Cardboard
Large appliances
Batteries (lead-acid, lithium ion, alkaline, nickel cadmium)
LIMITED RECYCLING AVAILABILITY:
Light Bulbs
Textiles
Tiles

TABLE 1: MATERIALS ACCEPTED IN NORTHWEST ARKANSAS
*Fayetteville accepts glass curbside
Accepted materials in both drop-off sites and curbside collection can vary by program. The website for each facility specifies what is accepted and can also be found on the recycling pages for the state of Arkansas

WHAT IS A CIRCULAR REGION?

Most circular economy work with municipal systems has focused on circular cities – what actions and processes would be available to a large city (e.g., Austin, New York City) that wanted to establish or improve circular material flow (EMF, 2019). Outside of large urban areas, the concept of a circular region is more applicable. A circular region would exemplify the same circular economy principles as a circular city: 1) design out waste and pollution; 2) keep products and materials in use, and 3) regenerate natural systems (EMF, 2019). The difference is that a circular region would implement these principles in a coordinated fashion across the different cities and rural areas in a region.

A circular region embraces the challenges and opportunities faced by low density suburban and rural communities by leveraging decentralized recycling and circular economy infrastructure and coordination across a range of municipal and commercial entities to implement circularity in a way that makes sense for a region. A circular region is more complex than a circular city since it would include independent recycling programs and related infrastructure, as well as a much broader set of stakeholders drawn from cities and communities across the entire region. The complexity can be an advantage – more different types of systems mean more ways to make material flow have been tried in the region, and more people involved means more ideas and experiences that can guide and contribute to the development of a circular region.

Imagine how this could work in Northwest Arkansas' future:

Consumers buy and use a wide range of goods and end up with used packaging and products. When finished with these packaging and products, the consumers are able to and choose to recycle just about all of it. The materials are collected, sorted, and fed into a regional network of material processors. Collection is consistently high throughout the region. Single-stream recycling systems are still available in most cities, but a new on-demand collection scheme has been instituted in others and in rural areas. Through an expanded drop-off program, sites take not only what is collected curbside, but a variety of plastics and plastic forms that are used by local companies. Glass continues to move to a recycler in an adjoining state, but a local company is exploring whether there is an opportunity to sustainably produce cullet locally to support the Northwest Arkansas construction industry. Metal and fiber-based materials continue to be processed locally and turned into construction and building materials as well as into new packaging.

Plastics are a regional bright spot – investment in innovation hubs allow local entrepreneurs and university students to start businesses producing products made from locally-sourced materials. For example, one university student's startup uses mixed 3-7 plastics to create flooring tiles made from recycled materials. Another uses polystyrene recycled from expanded polystyrene (EPS) in regional facilities (recently expanded due to demand) to make household decorations and other products sold at local retailers. Meanwhile, a public-private partnership brought in a new chemical recycling system that turns plastic film and other hard-to-recycle plastics into fine intermediate chemicals that are sold in multiple states, creating a new revenue stream and local jobs. The solid waste districts implemented small demonstration platforms where citizens can come and recycle their own plastic products and make 3D printer filaments or molded household products chosen from a library of patterns. Materials enter, then are used and recirculated without ever leaving the region to the benefit of citizens and businesses.

REGIONAL BEST PRACTICES

Across the region, there are examples of how individual municipalities are contributing to a circular economy by providing opportunities for citizens to conserve resources through recycling and other activities. Highlights from the region include:

- **NORTHWEST RAGS INC:** Working in collaboration with Boston Mountain Solid Waste District, this Springdale company collects and processes used textiles through reuse or producing rags and wipes for a variety of industries. This sets up a local, value-add end market for products that otherwise would end up in a landfill.
- **EXPANDED POLYSTYRENE (EPS) RECYCLING:** Commonly known as styrofoam, this material can be difficult to collect and process due to its very light weight and low density. The city of Rogers has installed an EPS recycling system that allows citizens to drop off their EPS material and have it condensed to polystyrene that can then be sold into markets for use in new products.
- **MULTI-STREAM CURBSIDE COLLECTION:** In the cities of Fayetteville, Siloam Springs, and Prairie Grove, curbside recycling is sorted into material streams rather than having those materials comingled. This allows for much cleaner and more desirable recycled material that can be used locally or sold into the global commodity markets.
- **NON-PROFIT INVESTMENT:** The city of Bella Vista has the Bella Vista Recycling Foundation, a volunteer organization that provides recycling opportunities to citizens through its drop-off site. Material collected here, as well as through contracts for cardboard collection with local companies, are sold into the market and the proceeds are invested back into the community through grants to local organizations.
- **CONTRACTS:** Much of how municipal recycling works is determined through contracts with private haulers. The city of Gravette worked with the Benton County Solid Waste District to write their 2016 contract with Republic Services. It is customized and specific to the needs of the city, resulting in lower costs to the city. The contract also accounts for changes in both the situation (e.g., emergency events, new residents) and the contract terms as the city grows. Another best practice comes from the city of Johnson, which requires specific reporting on how much of what material is collected and where it goes from the private hauler servicing the city.
- **MADISON COUNTY RECYCLING:** The Madison County Solid Waste and Recycling Center was founded by community members to address solid waste issues in this rural county. The central facility has provided solid waste and recycling services to its community for over 30 years and has expanded to include three satellite collection sites in the county. The secondhand shop at the primary facility in Huntsville allows clothing, books, and other household goods that would otherwise go to a landfill to find second uses throughout the community.
- **FAYETTEVILLE TRANSPARENCY RESOLUTION:** In 2011, the Fayetteville City Council passed Resolution 19-11 that commits the city to publishing quarterly reports regarding its recycling efforts. The volume and types of material collected and where it goes to be recycled can be found on the city's website. This commitment to transparency is an example of leadership in the region and helps build resident confidence that their efforts to recycle are reflected in the actions of the city.
- **STATE SUPPORT:** The state of Arkansas provides support through data collection and a series of grant programs to organizations that recycle. Under Arkansas State Regulation 28, Arkansas Division of Environmental Quality (ADEQ) issues a data request for all solid waste districts to quantify recycling, al though there are currently some challenges with making the best use of this information. Another key service provided by the state is access to a materials marketplace. The Arkansas Marketing Board for Recyclables was established in 1991 to coordinate recycling and markets for recycled materials across the state, to provide information to communities and private organizations on how to utilize these resources, and to coordinate volunteers to assist with market identification. The board manages the state's engagement with the Resource Exchange Network for Eliminating Waste (RENEW), which is operated by the Texas Commission on Environmental Quality. The purpose is to match those who have excess or unwanted materials with buyers who can use the materials.

RECOMMENDATIONS

While there is a solid foundation on which to build a circular region in Northwest Arkansas, there are additional steps that can be taken. A traditional hub-and-spoke model of recycling supports many of the single-stream systems in larger cities and metropolitan areas. This model consists of one central facility that collects material from a series of spoke facilities distributed across a given area where the material volume is large enough to make the facility economically viable. The economic analysis accompanying this report shows that a standard Material Recovery Facility coming into the region would not only need to take in all material already collected in the region but also collect from a much wider area to be economically viable. Additionally, a traditional hub-and-spoke system would require all existing material to flow into a central facility, circumventing the existing municipal programs. This would require the solid waste districts and cities to agree to a single system and support a single facility. Based on the politics of the region, this would be a major challenge.

Rather than moving directly to these types of technologies, our recommendations focus on creating a coordinated, distributed system of material handling that maximizes the existing flows and can expand to include new ones – a distributed network rather than a traditional hub-and-spoke model. See the full length report for additional information about these different recycling models and the scope of the recommendations outlined below.

- **NORTHWEST ARKANSAS COUNCIL SHOULD HIRE A PROGRAM MANAGER TO COORDINATE EFFORTS ACROSS THE REGION:** The Northwest Arkansas Council has a strong history of coordinating work with regional stakeholders and already has established a good working relationship with the regional solid waste districts. The districts must be key collaborators for this effort. The program manager would be a single point of contact for stakeholders and provide project support to execute on the recommendations below. Ideally the program manager would be someone with existing connections and relationships with those working in the materials management industry across the region.
- **THE NORTHWEST ARKANSAS COUNCIL SHOULD CONTINUE VISION DEVELOPMENT WITH THE ESTABLISHED STAKEHOLDER GROUP:** During the project, three workshops were hosted that engaged 122 regional stakeholders, 72 of which were unique individuals, representing 50 different organizations. There was strong interest from participants to continue these interactions to ensure improved connection and coordination between stakeholders in the region. Decisions around what technologies or processes should be brought to the region and developing implementation plans will require continued dialogues between stakeholders. Working with a group such as the Resource Innovation and Solutions Network (RISN) at Arizona State University could help create a truly circular region (sustainability.asu.edu/resourceinnovation). The RISN staff is experienced in assisting municipalities with stakeholder engagement and planning and executing circular economy projects as well as engaging the university community to be a key part of the solution.
- **WORK COLLECTIVELY TO SET UP NORTHWEST ARKANSAS MATERIALS EXCHANGE:** A way to centrally coordinate and aggregate material from across the region currently does not exist. Some aggregation is done by brokers in the area, such as ORE Recovered Materials, but aggregation is challenging unless the broker is aware of what material is available. A stakeholder group led by the Northwest Arkansas Council should collaborate with the Arkansas Marketing Board for Recyclables and the Arkansas Recycling Coalition to drive this effort. A page on a website or similar forum where listings of available material could be submitted would allow people with material to notify others that the material is available. Municipal programs could do the same, preferably in the same place, so that it would be possible to easily identify when an opportunity to combine collected materials exists. This does not have to be publicly available but could be established just among programs that have materials and those working with the programs to move material. Setting up a place where programs in the region can post what materials they have collected would enable more systematic aggregation that could bring better prices on the commodity market. The RENEW exchange is a good example of how this is done across states; the objective would be to connect people within the Northwest Arkansas region for materials exchange rather than multiple states across the southeast United States.

WORK COLLECTIVELY TO IMPROVE STATE DATA COLLECTION AND CLARIFY REPORTING REQUIREMENTS: Current state level data collection and reporting requirements presented numerous challenges for this work. For a detailed description of the issues and how they relate to the development of a circular region, please see the "Challenges" section of the full length report. Increased visibility into the volume of materials present in the region will be essential for building regional circularity and opening doors for end-market development. To help facilitate this, the project team has worked with local stakeholders and ADEQ to create a standardized reporting template. The final form has been designed and the state is interested in a pilot test. The new form is in line with those used by states such as Tennessee and Louisiana and a marked improvement over the existing forms. The Northwest Arkansas Council intends to work with the state to pilot this form to improve data collection and use. Clarifying whether private haulers are required to report under Regulation 28 would ensure that private companies handling recycling in the region report information to the state in the same manner as their public counterparts.

EACH ENTITY SHOULD COMMIT TO IMPROVING CONTRACT QUALITY: The current municipal recycling contracts have many gaps that hinder their effectiveness in developing circularity in the region. First, the quality of existing contracts can be improved to better define and clarify the roles of those entities entering the contract. As mentioned previously, Gravette's 2016 agreement with Republic Services should become a model for what a good contract should discuss, cover, and contain. Second, including a mechanism for collection volumes, recycling stream composition and material destination would be useful to provide the information necessary to assess the success of the collection program and help describe material flow through the region. The city of Johnson contract shows how this can be done. In the long term, municipalities should consider maintaining ownership of the materials so that they can be more active in determining the fate of recycled materials collected in their communities.

WORK WITH UNIVERSITY PARTNERS TO QUANTIFY FULL MATERIALS FLOW FOR THE REGION: Work with the University of Arkansas or NorthWest Arkansas Community College to have a group of students characterize what types of materials are generated by commercial, institutional, and industrial and in what quantities. This would provide a better estimate for interested end-market companies to work with when deciding whether their technology is a good fit for the region. These analyses should be conducted on a regular basis to continue to monitor volumes and enable reporting to potential end-market companies.

Two promising technologies to pursue:

Recyclops provides a platform to enable on-demand pick-up of recycling from customers in rural regions and is a graduate of the RISN Incubator program, a joint effort between Arizona State University and the city of Phoenix. The technology could help improve collection rates in rural areas and be adapted to coordinate material aggregation in the region. The company would be a valuable resource to help with the broader aggregation and coordination conversation. Working with local organizations that already understand how the region operates, its technology could streamline the process and complement the centralized listing or exchange as discussed above. Recyclops has multiple programs underway in the western United States and it has considered Arkansas as a potential new market, so it is likely to be responsive to inquiries regarding partnerships.

Founded in the city of Eindhoven in the Netherlands, Precious Plastic provides open-source modular recycling system designs that can handle almost all plastic types. The organization's mission is to reduce plastic waste wherever and however it can by building networks of individuals and organizations to effectively collect, process, and find end-market value in plastics. The core components of these networks are workspaces where a community can come together to recycle plastic and reuse it in new products. The different components of a workspace can be found on its website, and it includes freely available designs for a range of plastics-processing equipment. Before investing in building equipment locally, machines can be purchased through the Precious Plastic's network. In the United States, Precious Plastic USA builds equipment for plastics re-processing and product production.

For Northwest Arkansas, the two regional solid waste districts are an obvious choice for this type of model. A recycling workspace, as described by Precious Plastic, could be established at the centralized solid waste districts' transfer facilities, as these sites already serve as collection and community engagement points. As noted earlier, drop-off locations already collect and source-separate material, and those locations could add new material streams as interest or demand dictates. If plastics reprocessing or production equipment were installed, it could be visible to the public and not only recycle plastics but educate the community on how this is done. This could also be an opportunity to engage with an entrepreneur from the community or university students to start a new business using recycled material. If the first project is successful, it could serve as a template for a regional incubator for new technologies or businesses with similar technologies.

- **DESIGN COMPETITION:** In collaboration with student groups at the University of Arkansas or Northwest Arkansas Community College, generate ideas for products that could be made with recycled materials and sold locally. The design criteria for the competition need to include how something would be recovered and recycled at end-of-life. For example, if the product being designed are floor tiles, the group would need to address questions about how the tiles would be recovered and recycled when they wear out or are removed.
- **STARTUPS:** Support a company that starts 3D printing consumer goods – there is huge range of interesting and useful products that can be printed, as can be seen at the website Thingiverse. Recruit entrepreneurs from University of Arkansas or from the community and provide grants and/or other support to launch a new idea. Alternatively, if there is someone in the community with a product idea that could use recycled plastic, draw on students to create or implement a process to support product production locally. Publicize widely.

Regional stakeholders collaborate on refining the vision for the future of Northwest Arkansas circular economy development, Cave Springs, AR

Northwest Arkansas has a dedicated set of stakeholders, strong community engagement, and a robust recycling system in place. The region also has the advantage of being home to Fortune 500 companies with strong sustainability commitments. These are excellent base conditions for creating a circular r egion. Further discussion of the successes and challenges for Northwest Arkansas as it becomes more circular can be found in the full report on this project and the accompanying economic analysis.

As shown throughout this summary, the region has good recycling infrastructure that can be leveraged to collect and keep more material in the region to support end-market development. This existing strength comes from each program finding and continually improving on what works for its specific context and environment. Having local programs see themselves as part of a larger regional system lays the foundation for creating a circular region. Maintaining these hyper-local city programs and their successes is vital to the success of any regional effort. To move forward, focus should be placed on better understanding and coordinating the interactions of the current systems (including people, data and infrastructure) and designing a future that meets the needs of the region and its citizens.

REFERENCES

1. Ellen MacArthur Foundation. (EMF, 2019). Circular economy in cities. Retrieved from: https://www.ellenmacarthurfoundation.org/our-work/activities/circular-economy-in-cities (Date accessed: August 8, 2020)

2. Regulation No. 28 – Regulation of the State of Arkansas for County Recycling Programs; Docket No. 04-004-R. Arkansas Pollution Control & Ecology Commission (2004). Retrieved from: https://www.adeq.state.ar.us/regs/ (Date accessed: August 8, 2020)

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ABOUT THE NORTHWEST ARKANSAS COUNCIL

Established in 1990 by Sam Walton, Don Tyson, J.B. Hunt and other business leaders, the Northwest Arkansas Council is a private, nonprofit organization working to advance job opportunities, talent recruitment, physical infrastructure and quality of life in the region. Most of the Council's more than 100 members are companies, including Walmart, Tyson Foods, J.B. Hunt Transport Services, Inc., Simmons Foods and George's, Inc.

Learn more at
nwacouncil.org

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ABOUT THE SUSTAINABILITY CONSORTIUM

The Sustainability Consortium (TSC) is a global non-profit organization transforming the consumer goods industry to deliver more sustainable consumer products. We work to enable a world where people can lead fulfilled lives in a way that decouples their impacts on people and the planet. Formed in 2009, TSC is jointly administered by Arizona State University and the University of Arkansas and has a European office at Wageningen University and Research in the Netherlands.

For more information visit
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Funder: Walmart Foundation
Research in this report was made possible through funding by the Walmart Foundation. The findings, conclusions, and recommendations in this report are those of The Sustainability Consortium, and they do not necessarily reflect the opinions of Walmart or the Walmart Foundation.

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