Glass Recycling in Nebraska

By Allison Majerus, Program Director

July 2024

NEBRASKA RECYCLING COUNCIL

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Intended Audience for this report

- Communities interested in glass recycling
- Glass recyclers
- NET board members and staff

Purpose of report

The purpose of this report is to develop a state-wide plan for glass recycling including a toolkit for getting started.

THANK YOU for your contribution to this report

- Franklin Rosario, Matt O'Connell, Steve Hart, Joe Worthing, Nadine Saylor, Kim Slezak, Matt Lottman, Mick Barry, Joseph Chapman, Spud Rowley, Shauna Petzold, Sara Nichols, Nathan Lund, Kym Beck, Sandy Brown
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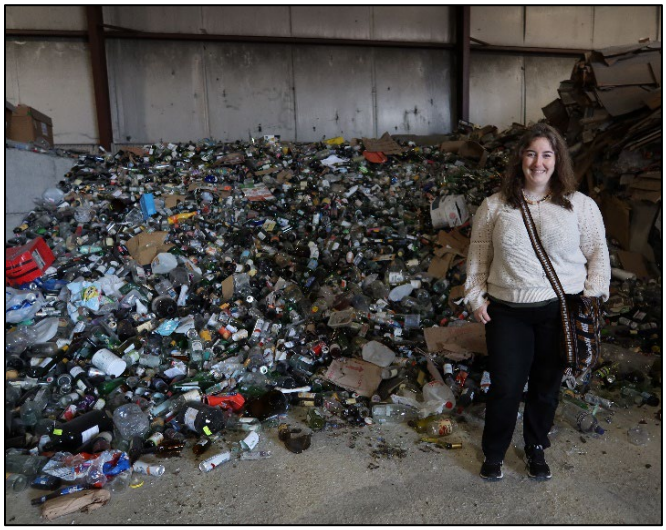

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Introduction to Glass Recycling

One of the first materials to be recycled, glass is highly versatile, 100% recyclable, and can be recycled endlessly (Figure 1). When a glass bottle or jar is recycled, it can be a new bottle or jar on a store shelf in as little as 30 days.

Figure 1: Glass Recycling Drop-off, Lincoln NE

Nationally, glass waste management has developed over time (Figure 2).

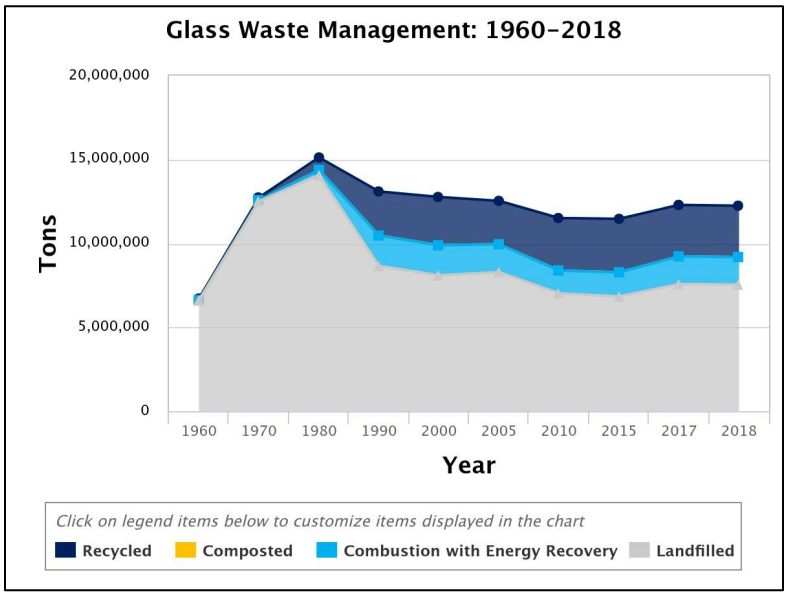


Figure 2: Glass Waste Management

Note: This is an EPA graph utilizing data from the Glass Packaging Institute and state environmental agency websites.

From an economics standpoint, as of July 12, 2024, the market value of glass flint in the Midwest is $57.50/ton delivered (recyclingmarkets.net).

With the landfill disposal fee of $1.25 per ton for all waste disposed in municipal solid waste landfills in Nebraska (NDEE website) and the weight of glass, it makes sense for glass to be diverted from the landfill and recycled as much as possible.

In terms of transportation costs, the City of Kearney is 327 miles from Ripple Glass in Kansas City. Therefore, if the truck hauling the glass gets 7 miles per gallon, they would need to purchase 46 gallons of gas to transport the glass to Ripple Glass. As of July 27, 2024, gas averages $3.27/gallon, so that trip would cost $150.42 in fuel.

Glass content in landfills from 2009 Nebraska waste characterization study:

-6.33% glass in Pheasant Point Landfill for consolidated residential weight data, 5.34% at Bluff Road Landfill

-3% glass in Pheasant Point Landfill for consolidated commercial weight data, 3.31% at Bluff Road Landfill

In 2025 the Nebraska Department of Environment and Energy plans to complete an updated waste characterization study. This data will be vital in measuring changes to the material streams, and in helping our municipalities assess the need for and cost effectiveness of recycling programs.

Things to consider:

- weight of glass
- type of glass (borosilicate vs. non-borosilicate)
- cleanliness
- Viability of end-markets
- color of glass (flint, brown, green)
- cost of freight/distance to end market
- Cost of equipment
- Impact to the environment
- Safety concerns

Some types of glass are not recyclable, such as ceramic/Pyrex glasses, light bulbs and mirrors. This list is not exhaustive but it's good to do your research if you want to start a glass recycling program in your community.

Nebraskan Consumers and Businesses who use Glass

Glass is preferred in certain applications, such as food, dairy products and wine. Glass is odorless and flavorless and preserves the taste of the food and beverage it holds (Source: O-I Glass).

Mark Davis, the Fiscal Compliance Analyst at the Nebraska Liquor Control Commission, reported that an "estimated 34.8 million glass bottles of wine/liquor were sold in Nebraska in 2023."

Todd's Foods, based in Des Moines, Iowa, with a location in Madison, Nebraska, uses glass jars and bottles for multiple products, including salsa, pasta sauce, dressings, bloody Mary mixes and barbeque sauce. They source their glass from multiple out-of-state companies such as AR Glass Company, Berlin, Gamer, and Ardaugh.

Burbach's Countryside Dairy in Hartington, Nebraska, produces and processes milk on their farm, which gives the best quality product possible in the best container possible: glass. They believe their milk tastes better, is kept colder and stops environmental waste because they seal the freshness into the glass bottles.

Nebraska produced 75,000 gallons of wine in 2023 and used approximately 380,000 bottles. Most bottles used come from Mexico. The Nebraska Winery and Grape Growers Association has a listing of 24 wineries across the state: https://www.nebraskawines.org/map.

Glass Recycling in Nebraska

Glass recycling doesn't happen in each community but there is a network of communities who do recycle glass regularly. See Figure 3 for map designating communities with satellite drop-off locations around the state.

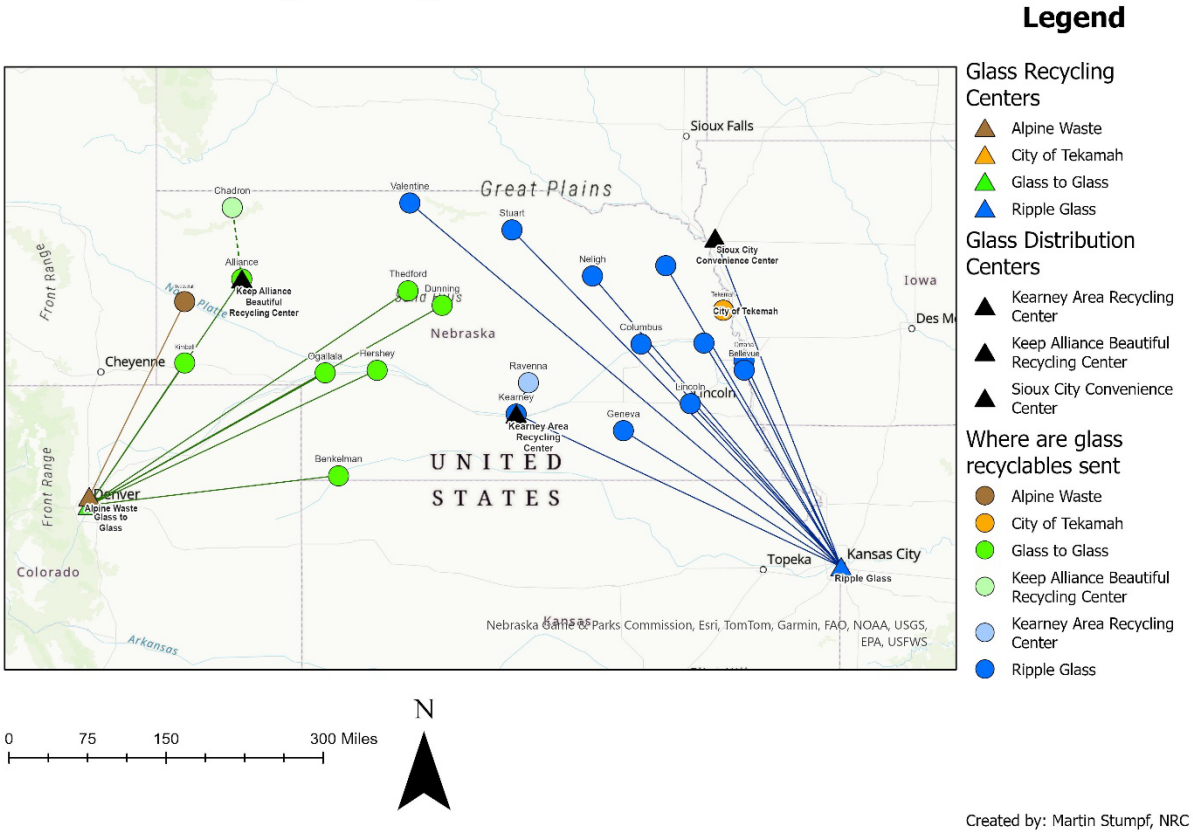


Figure 3: Glass Recycling in Nebraska

Ripple Glass (Kansas City):

- Bellevue
- Columbus
- Fremont
- Geneva
- Kearney
- Lincoln
- Omaha
- Neligh
- Ravenna-to Kearney
- Stuart
- Valentine
- Wayne
- Sioux City, Iowa

Rowley Enterprises (Glass to Glass in Denver):

- Alliance
- Benkelman
- Chadron-to Alliance
- Dunning
- Hershey
- Kimball
- Ogallala
- Thedford

Alpine Waste (Denver):

- Scottsbluff

Example Community Glass Recycling Programs

Keep Alliance Beautiful currently accepts glass from area businesses, drop-offs at their recycling center and trailers in Alliance and Hemingford (Figure 4). Their recycling center accepts most glass, except for windows, tempered glass, and lightbulbs. By volume, Alliance has shipped 84,207 pounds in 2023, and 70,066 pounds in 2022. Spud Rowley with Rowley Enterprises hauls their glass to Glass to Glass in Denver, CO. Keep Alliance also receives glass materials from the community of Chadron regularly.

Figure 4 : Glass from Keep Alliance Beautiful

City of Wayne currently accepts glass for recycling at their transfer station/recycling center. Their glass recycling program started in June 2016 and has seen an overall growth in glass recycling rate (Table 1). They have a skid loader, three metal bins (Figure 5) and a glass bunker made from concrete blocks and a concrete pad. They use a skid loader to move the three full metal bins to the glass bunker and then load the Ripple Glass truck when they come to pick up. They aim for 22-25 tons of glass per load.

Wayne, NE Glass Recycling Totals		
Load	**Yearly Total in tons**	**Inc/Dec YOY**
2017	37.63	
2018	19.75	-48%
2019	39.35	99%
2020	19.78	-50%
2022	49.93	152%
2023	72.44	45%
Total	**238.88**	

Table1: Wayne, Nebraska Glass Recycling Totals

Figure 5: Metal bins in Wayne for glass collection

City of Tekamah collects glass in their city recycling drop-off and then grinds for different local uses, available for free. Glass goes into the hopper (Figure 6), up the conveyor belt into the pre-breaker unit. Then the glass drops to the trommel where glass falls through to the sizing unit and paper comes out the end of the trommel into a waste container. Once glass is small enough to fit through the sizing unit screen, if falls to another conveyor belt that deposits the crushed glass outside (Figure 7). An exhaust fan is used to help keep dust outside near the outdoor opening.

Figure 6: City of Tekamah glass grinder, showing hopper to pre-breaker

Figure 7: City of Tekamah, 1200 pounds of crushed glass

Glass Haulers

Alpine Waste hauls glass from Scottsbluff, Nebraska to their facility in Denver, Colorado.

Rowley Enterprises regularly hauls glass from western Nebraska to Glass to Glass located in Denver, Colorado.

Ripple Glass collects from sites across eastern Nebraska and is hauled to Kansas City, Missouri.

Glassman Recycling and Repurposing provides glass recycling services in Omaha, Plattsmouth, Nebraska City and nearby areas.

Spud Rowley, owner/operator of Rowley Enterprises

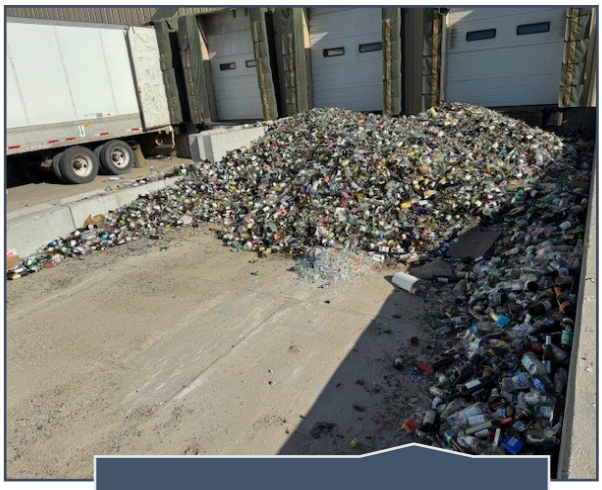
Glassman Recycling and Repurposing

Ripple Glass

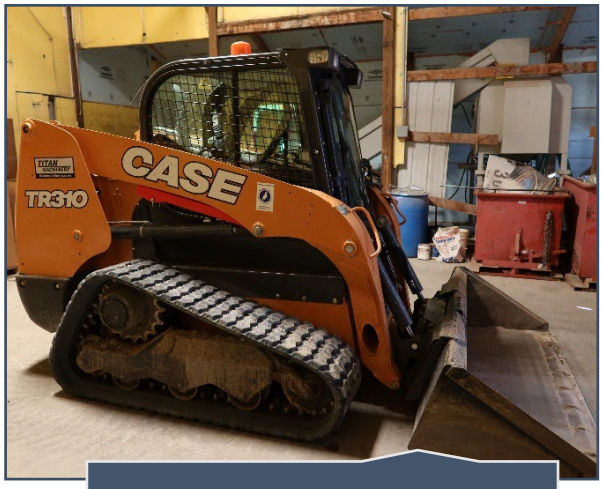
Equipment Needed to Start Glass Recycling Programs

Rolloff Containers

ICB Totes



Concrete bunker and pad



Skidsteer

If you'd like to keep your glass in-house, you could purchase a glass grinder. Companies such as Glass Aggregate and Georgia manufacture glass grinders.

If you have an existing glass recycling program and would like to become a hub for your region, you may consider investing in equipment such as:

- magnets to remove metals prior to grinding-dust control
- hammer/trommel system to remove the paper/labels
- drier before grinding glass into cullet

- sorter/separation machine if you are taking in co-mingled streams of glass. This can be done manually or optical sorting machines that can sort brown from clear.

Recycling Equipment Grant Awardees for Glass Recycling Work

Funded by Nebraska Environmental Trust

Figure 8: City of Omaha glass roll-off containers

City of Omaha (population 475,862) purchased two 22-foot glass recycling roll-off containers (Figure 8) for expanded recycling glass program in the Omaha Metro with $9,958.80 in NET/NRC in March 2021. The city of Omaha's glass gets hauled to Kansas City, MO by Ripple Glass.

Figure 9: City of Geneva glass bunker

City of Geneva (population 2,154) purchased cement blocks and a concrete pad to build a glass bunker (Figure 9) with $3,957.00 in NET/NRC recycling funds in May 2020. Their glass gets hauled to Kansas City, MO by Ripple Glass.

NK Waste (Valentine and Cherry County residents' population 5713) purchased 40 concrete blocks and a concrete pad to build a concrete bunker for glass recycling (Figure 10) with $3,582.50 in NET/NRC recycling funds in September 2018. They were motivated to provide glass recycling to their area and divert it from the landfill.

Figure 10: NK Waste concrete bunker for glass recycling

The **Village of Stuart** (population 490) purchased concrete blocks, concrete and rebar to build a concrete pad and bunker for glass recycling (Figure 11) with $3798.00 in NET/NRC recycling funds in November 2019. They also received $20,000 in grant funding for a skid loader in October 2022 to assist with moving, sorting, and stacking recyclable materials.

Figure 11: Village of Stuart glass recycling concrete bunker

Stuart built this concrete pad and bunker to "divert tons of recyclable material from our landfills and convert it to useable products and save the community money for disposal." Stuart's glass goes to Ripple Glass in Kansas City, MO.

The **City of Tekamah** (population 1,722) purchased a skid loader (Figure 12) with $20,000 in NET/NRC recycling funds in October 2021. They use this skid loader to move and load trucks with glass collected for recycling. Once collected, they grind the glass, using an NDEE grant-funded glass grinder from Glass Aggregate (Faribault, MN), and offer the ground glass to the public free of charge. The public uses for multiple purposes, including decorative uses in concrete for patios, fill-in city/county roads, electrical utility company markers in the ground, contractor uses, and other purposes.

Figure 5: City of Tekamah skid loader

Funding Resources for Glass Recycling Equipment

NET/NRC Recycling Equipment Grant Program: https://nrcne.org/recycling-equipment-grants/ for up to $25,000 in grant funding with a required cash match, within a 2-year grant period. For more information, email grants@nrcne.org.

Glass Recycling Foundation grants: https://www.glassrecyclingfoundation.org/ . Up to $20,000 in grant funding request. Cash match preferred. Reimbursement grant program only. The grant cycle each year depends on timing based on grant funding coming in, with one grant cycle per year. And timing

Note: City of Omaha is a recent awardee of this grant program.

Conclusion

The Nebraska Recycling Council is committed to improving access to glass recycling in the state, with particular interest in the central and southwest regions. As a rural state, collaboration between communities is key to success, and we strongly recommend the use of the hub and spoke model. For communities interested in starting or improving glass recycling systems, NRC is happy to serve as a resource.

Considerations recommended by the Nebraska Department of Environment and Energy staff include: 1) acquiring the necessary permits (waste processing, air, and construction permits) for a new glass processing facility, if that becomes a reality, and 2) researching transportation options for glass recycling, including rail versus trucks, as the weight of glass is a significant factor.

During this research, we also consulted our neighbors in Colorado and Iowa. We visited the Schupan glass material recovery facility in Des Moines, Iowa, which has a bottle redemption program, glass can be collected for recycling and goes back to the original distribution company. If Nebraska adopted a bottle redemption program, logistics to redeem, move and sort the glass would need to be established. We will

also want to keep communication lines open with our neighbors on all sides, as we can work together to move glass in the most efficient way to end market.

Glass recycling in Nebraska faces a significant challenge, with the majority of materials currently transported out of state, to Kansas City and Denver. Moving forward, to establish a local end market for glass, more effort is required to ensure success. According to Sara Nichols of the Glass Recycling Foundation, generating glass data and infrastructure mapping within the state is crucial. The Glass Recycling Coalition offers an interactive glass map where entries can be submitted as glass recycling progresses in Nebraska.

Future Actions

1. **Support existing infrastructure and programming**: The Nebraska Recycling Council will support existing glass recycling infrastructure and programs across the state, through grant funding, education, consultation and technical assistance. We encourage other recycling industry professionals to do the same.
2. **Transportation considerations**: We could research cost and logistics of truck versus rail versus keeping it in the community and grinding it. From Valentine, Nebraska to Ripple Glass in Kansas City, MO it's roughly 500 miles by truck. Would another mode of transportation be better?
3. **Continued market viability research:** We need to continue researching how to acquire the necessary data to stimulate the market and attract end market companies to come to Nebraska.
4. **Future Legislative actions**: We question whether Nebraska will want to pursue enacting a bottle bill in the future. We would be interested in speaking with legislators who are interested in engaging with the future of glass recycling in Nebraska.
5. **Public Education**: The Nebraska Recycling Council will continue educating the public on what is accepted and not accepted in communities for glass recycling.

Additional Resources

Glass Packaging Institute: https://www.gpi.org/

Glass Recycling Coalition: https://www.glassrecycles.org/

Glass Recycling Foundation: https://www.glassrecyclingfoundation.org/

2023 Glass Recycling Survey (Glass Recycling Coalition-January 2024): https://mcusercontent.com/a0d1fb7a48b87b383c8845c53/files/faf51949-76c2-1717-6b74-8009b1372b79/2023_GRC_Survey_Results_Final.01.pdf