

Positive Impacts of Dyvert Vue Lid System Installation on Xanterra's Recycling Program in Yellowstone National Park

"It couldn't be any clearer!"

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Figure 1 – Dyvert Vue Lids after assembly and before installation

Abstract

Recycling in Yellowstone National Park presents unique challenges. All recyclables must be source-separated, with metal, plastic, mixed paper, and glass collected in dedicated bins. This system improves material quality but also increases the risk of sorting errors. For Yellowstone National Park Lodges (operated by Xanterra Travel Collection), the park's primary concessionaire, these errors are compounded by a diverse and transient guest and employee population. The main behavioral hurdles include language barriers, challenges with engagement and awareness, and barriers to ease of use. Because employees represent a smaller, more controlled population that reflects the diversity of park visitors, Yellowstone National Park Lodge's sustainability team began by piloting Dyvert Vue lids in employee dormitories. These display case-style lids feature physical examples of acceptable materials for each waste stream, making sorting more intuitive and accessible.

A 20-day study compared contamination levels before and after installation of the Vue lids and improved signage, along with employee surveys post-deployment. Contamination dropped an average of 11.6% across all streams, with a statistically significant 17.6% improvement in plastic sorting. Survey responses showed higher recycling participation, greater confidence in proper sorting, and increased satisfaction with recycling stations. The results demonstrate that simple, visually clear tools can meaningfully improve recycling performance in complex settings, offering scalable strategies to reduce landfill waste and strengthen environmental stewardship in one of the nation's most iconic public lands.

Introduction

Yellowstone National Park Lodge's (YNPL) mission is to provide *Legendary Hospitality with a Softer Footprint*®. As Yellowstone National Park's primary concessionaire and largest employer, we bear a dual responsibility: to deliver outstanding guest experiences while safeguarding the environmental integrity of the Greater Yellowstone Ecosystem (GYE), one of the last intact temperate ecosystems on Earth.

Recycling plays a critical role in YNPL's stewardship efforts; however, recycling in Yellowstone is far from straightforward. Every recyclable item must be source-separated, meaning metal, plastic, mixed paper, and glass are each collected in dedicated bins. This method can significantly improve the quality and value of recycled materials by reducing contamination and producing cleaner, more consistent waste streams — benefits recognized by the U.S. Environmental Protection Agency as essential for supporting circular markets and more efficient processing of recovered materials. However, source-separated systems also require greater user participation and awareness, making them more vulnerable to sorting errors, especially in transient or diverse populations ([“Contracting Best Practices: Source Separation Requirement or Preference | US EPA”](#)). Considering that

Yellowstone's population is highly diverse and almost entirely transient, it is understandable that sorting errors are common.

Sorting errors result in the primary challenge for YNPL's recycling program: contamination. Simply put, contamination refers to the presence of materials in the wrong waste stream. For example, a candy wrapper in the bin designated for plastic recycling, or a metal can in the glass recycling bin. While removing contamination from recycling bins is possible, it becomes increasingly difficult as the percentage of contamination increases. Once contamination reaches approximately 25 percent of the volume of the recycling bin, the materials will no longer be processed by the regional recycling center and must be sent to the landfill. Here lies the true challenge of contamination: stopping it before it happens by eliminating sorting errors.

Research suggests that sorting errors are often the result of practical and behavioral hurdles, such as unclear or inconsistent signage, time constraints, or physical distance between bins ([Rosenthal and Linder](#); [Cakanlar et al.](#)). It is fair to add that, given the diverse population in Yellowstone, language barriers and varying levels of prior recycling experience may also contribute to sorting errors. These challenges can be broken into three main areas: language barriers, engagement/awareness, and ease of use.

Addressing behavioral hurdles across Yellowstone's nearly 5 million annual visitors is a long-term goal for YNPL; however, implementing consistent recycling behavior across 2.2 million acres and 840 buildings presents a challenge of its own. As a starting point, YNPL's sustainability team focused on improving the recycling program for YNPL's Yellowstone employees. With nearly 3,000 seasonal staff from all 50 states and 28 countries, the employee population reflects the cultural, linguistic, and educational diversity of the park's visitors, making it an ideal pilot group for testing behavior-based recycling solutions. Working within a more controlled environment allowed the team to refine best practices that could be scaled into a long-term, guest-facing strategy.

The majority of employee recycling happens in the dormitories. Each dormitory has a recycling station with a bin for each waste stream (metal, glass, plastic, mixed paper, and landfill), with corresponding signs mounted on the walls above the bin's aperture and/or on the bin itself. Historically, these stations did little to engage or educate employees on Yellowstone's source-separated recycling program, resulting in sorting errors and contamination. Specifically, these were the issues the team sought to address: 1) Language barrier: the recycling signs did not display items that could go into each bin, instead describing the items that can be recycled in English. 2) Engagement: the bins themselves were uniform in appearance and difficult to label, and while some bins had lids with material-specific apertures (like narrow, rectangular slots for paper, or small circles for metal cans), these created new obstacles since recyclables come in a wide variety of



Figure 2 – Dyvert Vue Lid Example

shapes and sizes. 3) Ease of use: English-only signage, inconsistent recycling bins, and limited information on what can and cannot be recycled. Identifying a solution to address all three challenges was the first step.

The team landed on a display case-style lid system designed by the company Dyvert. By displaying actual examples of common recyclables, the Vue lid is a unique and elegant solution that has the potential to make source-separated recycling easy and engaging for YNPL's employees.



Figure 3 – Assembly process of Dyvert Vue Lids

hypothesis, Vue lids were piloted in six dormitories in 2023. The almost universally positive feedback and improved employee engagement prompted the sustainability team to expand the initiative parkwide. In May 2025, Vue lids were installed in 18 dormitories across four additional Yellowstone locations: Old Faithful Village, Grant Village, Lake Area, and Canyon Village. This case study examines changes in the sorting behavior by measuring the quality and quantity of recyclables following implementation.

Methods



Figure 4 – Old recycling area



Figure 5 – New Recycling Area

Bin Measurements

Canyon Village was selected as the primary data collection site due to the proximity and number of its four dormitory buildings, as well as the timing of seasonal staff arrivals. These four dorms housed approximately 260 employees during the study period. Pre- and post-installation measurements

were used to track changes in recycling volume and contamination levels, while employee surveys across all four villages captured user feedback.

Waste data was collected over a 20-day period, 10 days before and 10 days after Dyvert Vue Lid installation. Recycling bins were measured daily at approximately 8:00 AM. Each bag was weighed using a tared hanging scale, and contamination was visually assessed.

To account for potential human error, the same individual conducted all observations using a consistent method. Contamination was recorded in three steps: (1) a visual estimate while the bag remained in the bin ("Top Contamination"), (2) observations from one side of the removed bag ("Side 1"), and (3) the other side ("Side 2").

The average of these three values represented the daily contamination percentage for each bin. To generate overall contamination graphs by waste stream, daily bin averages were combined to calculate a single average contamination percentage for each stream.



Figure 6 – Mixed Paper bin before Dyvert Vue Installation



Figure 7 – Mixed Paper bin after Dyvert Vue Installation

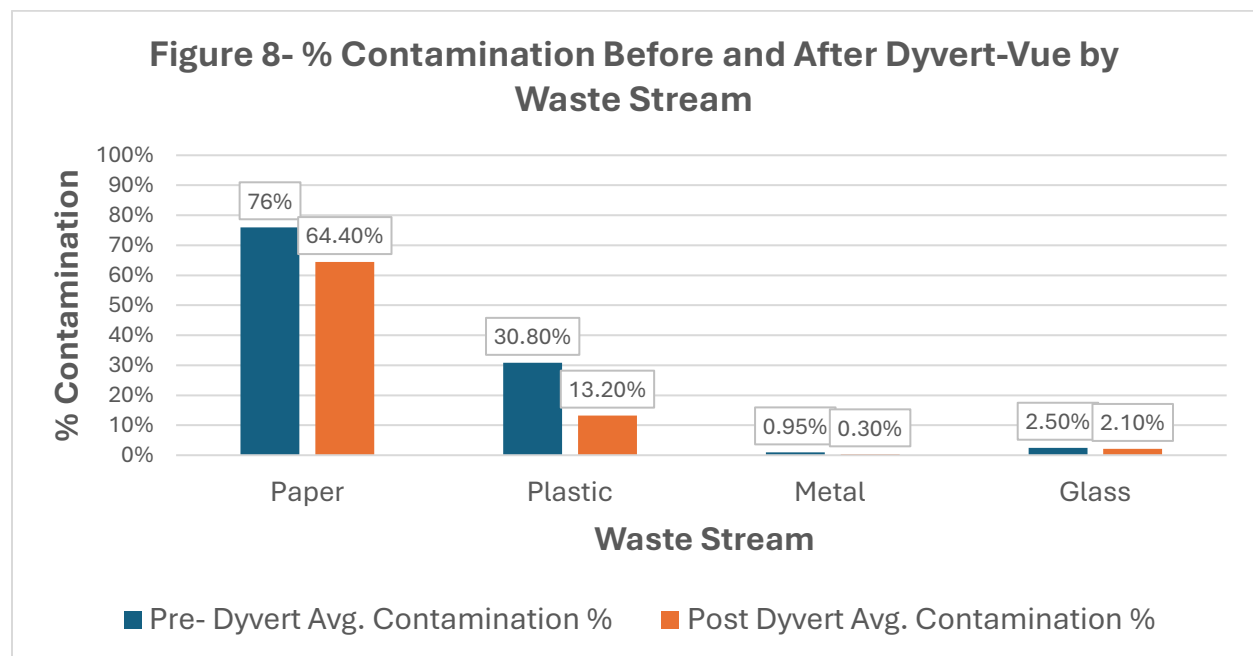
Employee Survey

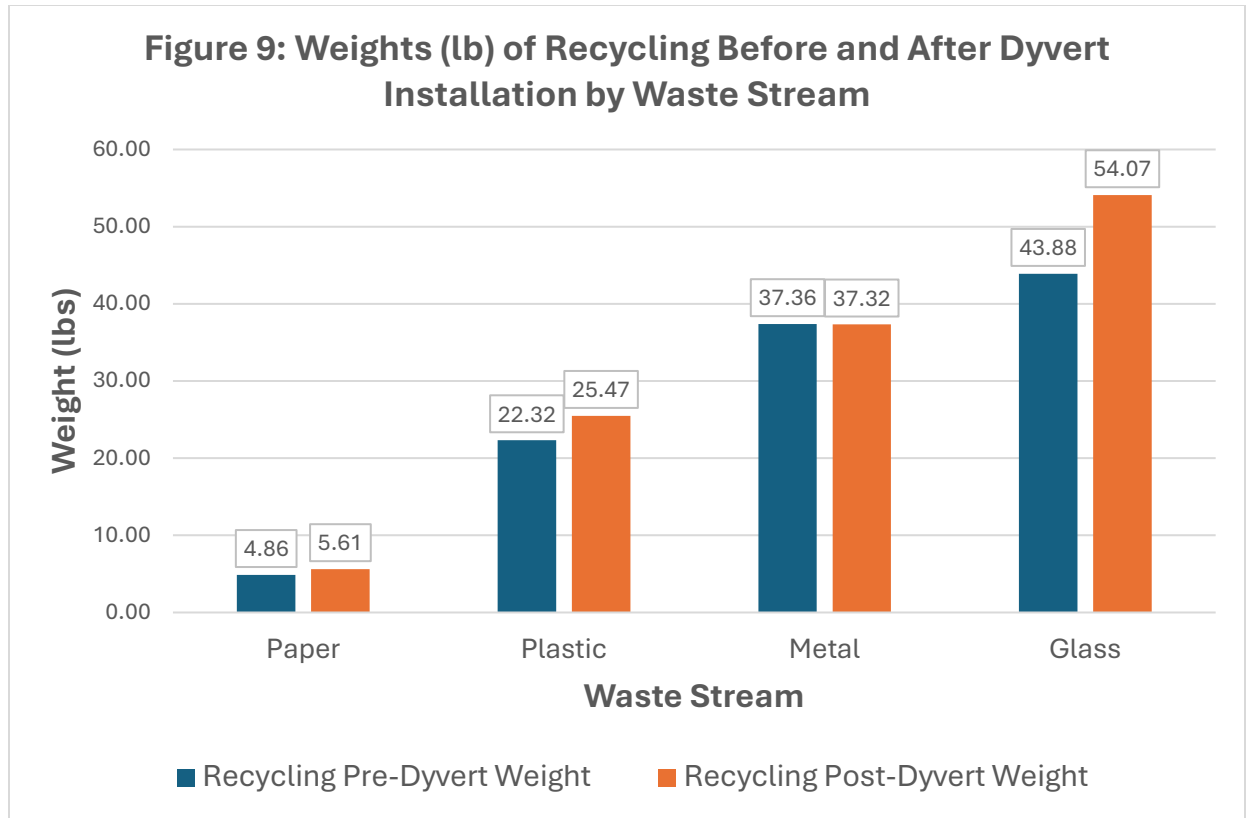
In Grant Village, a total of 16 Grayling dorm residents were randomly surveyed, with 8 people surveyed before and another group of 8 after the Dyvert lid installation. Participants were asked “How often do you use recycling bins in Grayling Dorm?” and “What would you rate your satisfaction with the recycling bins in the dorm?”. Answers were given on a scale of “Never”, “Sometimes”, “Most of the time”, and “All of the time.” Additional anecdotes were informally collected through conversations with dozens of employees throughout each village about the new recycling bins.

Results

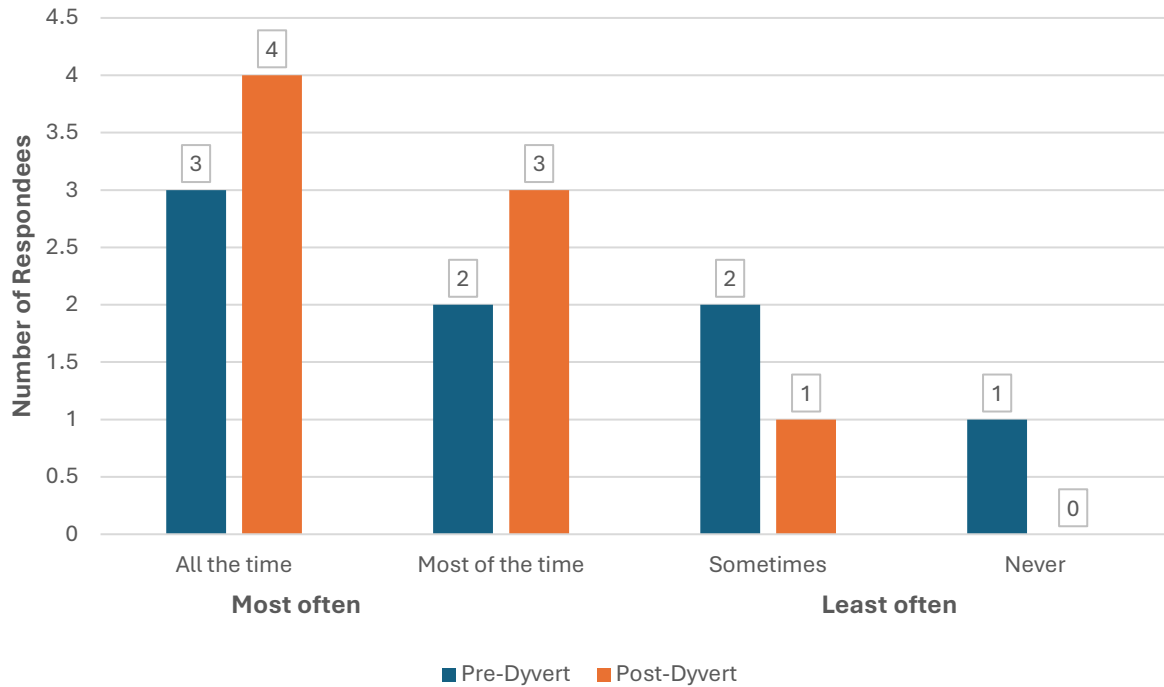
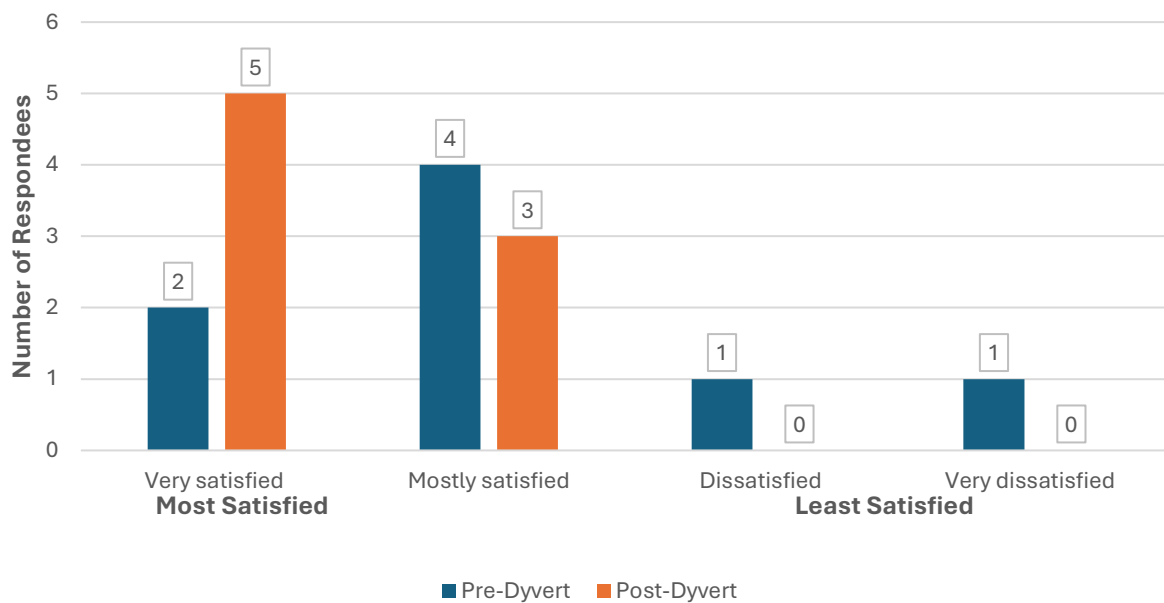
The graphs below show both qualitative (survey) and quantitative (contamination measurement) data. Figure 8 demonstrates a decrease in contamination across all waste streams, with a statistically significant drop in Plastic ($p = 0.0087$). Figure 9 shows that after the Vue lids were installed, the average amount of waste in each bin increased across all waste streams. This could be the result of a more accessible and easier-to-understand sorting system, which may have improved people’s confidence in their recycling abilities and encouraged them to recycle more. This trend is also reflected in the survey results shown in Figures 10 and 11, where the number of people reporting that they recycle 'all the time' or 'most of the time' increased by 25%. Additionally, no participating employees expressed dissatisfaction with the new lids; only positive feedback was recorded.

Bin Measurements





Employee Survey

Figure 10: How often do you use recycling bins in Grayling Dorms?**Figure 11: What would you rate your satisfaction with the recycling bins in the dorm?**

Discussion/Conclusion

The results support the claim that installing Dyvert Vue lids in employee dormitories made YNPL's recycling program more intuitive and accessible. The system effectively addressed the three behavioral hurdles that contribute to contaminated recycling streams: language barriers, engagement and awareness, and ease of use.

Reduction of Contamination

After the installation of Dyvert Vue lids, all waste streams saw a decrease in contamination. Average contamination levels dropped from 27.56% to 16.00% – an overall improvement of 11.56%. Plastic and mixed paper, two streams with historically high contamination rates, experienced the largest reductions. Contamination in plastic decreased by a statistically significant 17.60%, while mixed paper improved by 11.6%. On average, these reductions equate to 6 pounds less contamination per week in plastic bins and 5.2 pounds less in mixed paper bins.

The Vue lids not only reduced contamination: they also increased the amount of material actually being recycled. The total weight of the recycling bins remained consistent before and after the Vue lids were installed; however, the drop in contamination means that the overall weight of recyclable materials collected in each bin increased. Based on the reduction in contamination, it is estimated that during Yellowstone's 30-week summer operating season, the four Canyon Village dormitories alone are projected to collect an additional 45.87 lbs. of plastic, 11.78 lbs. of mixed paper, and 152.94 lbs. of glass.

Employee Engagement with Recycling Programs

Survey results from Grant Village's Grayling Dormitory revealed that the installation of Dyvert Vue lids led to more frequent recycling. It was found that 25% more residents reported recycling "all the time" or "most of the time" after installation of the new recycling bins compared to when the old-style bins were used. Many confirmed that the Dyvert Vue lids empowered them to recycle more by providing accessible information about what goes in each bin, increasing their confidence and motivation. One F&B employee shared that the bins "help me determine what goes where" and "make sorting recycling fun," which helped him, as a first-time recycler who had never recycled before working in Yellowstone, feel "excited to recycle".

Residents also reported that their satisfaction with the recycling area more than doubled after Dyvert-Vue lids were installed. Residents appreciated the effort to make the bins user-friendly, noting that it strengthened the recycling culture in Grayling Dorm. Residents' comments included: "nice and easy to use," "the best recycling bins I have ever seen," and "I am a visual learner, so it's really helpful to see what I can recycle." Notably, positive impacts were observed even before employees received additional training, showing the Dyvert Vue bins' effectiveness on their own. This shows that the visual clarification provided by the lids reduces the need for additional employee training, a key benefit given the short orientation time for a large number of seasonal staff.

“Coming from New York, there was just one big landfill bin on every sidewalk,” explained another employee. “Coming here, that (the Dyvert Vue Lids) stood out to me a lot because I noticed people actually take this seriously and there’s a procedure for this.” Another employee reported a positive perception of the company, stemming from its commitment to improving recycling programs: “I’ve been recycling since I was 15 years old, and that’s the one thing that I love most about the company: that we recycle.” These employee testimonials support survey findings and show that a clear, consistent recycling program can boost overall morale, from long-time managers to first-season hourly staff.

Overall, survey data and employee feedback suggest the lids improved recycling accessibility, enhanced perceptions of YNPL’s recycling program, and increased proper sorting among a diverse workforce.

Looking ahead

The Dyvert Vue lids combined with improved recycling signage proved to be a practical, high-impact upgrade to YNPL’s recycling program, delivering measurable improvements in both recycling quality and employee engagement. By addressing the core behavioral hurdles of language barriers, engagement, and ease of use, the lids reduced overall contamination rates by 11.6%, with plastic recycling improving by a statistically significant 17.6%. This translates into hundreds of additional pounds of material being successfully recycled each season, with minimal need for extra staff training. Just as importantly, survey responses showed that employees found the bins easier to use, more satisfying, and even motivating, helping to strengthen a shared culture of environmental responsibility within the dorms.

These results will inform scalable solutions for YNPL’s broader goal of reducing landfill waste by 5% annually. While the Dyvert Vue pilot focused on employee residences, the gains in sorting accuracy, diversion rates, and user satisfaction suggest that it is possible to make source-separated recycling effective in a setting as dynamic and challenging as Yellowstone.

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