GROCERY RETAIL · FRESH FISH

Improving quality, reducing waste, and enhancing efficiency

End-to-end cold chain management for fresh fish — how a leading seafood retailer gained continuous, case-level visibility from supplier to store.

KEY BENEFITS

REDUCTION IN SHRINKAGE DUE TO MIS-SHIPMENTS

95%

4–8% Potential sales increase from better inventory visibility

8% Pallets identified outside of the cooler for more than 30 minutes



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TABLE OF CONTENTS

You can’t fix what you can’t see

01	Executive summary	03
02	Introduction	04
03	Challenge	04
04	The solution	06
05	Key areas of focus	07
06	Results and findings	08
07	Conclusion	10

RESULTS AT A GLANCE

95%
LESS SHRINKAGE FROM MIS-SHIPMENTS

4–8%
POTENTIAL SALES INCREASE

8%
PALLETS OUT OF THE COOLER 30+ MIN

4%
PALLETS FLAGGED FOR CORRECTIVE ACTION

+28%
PROJECTED ROI, END TO END

+6%
INCREASE IN COSTS, END TO END

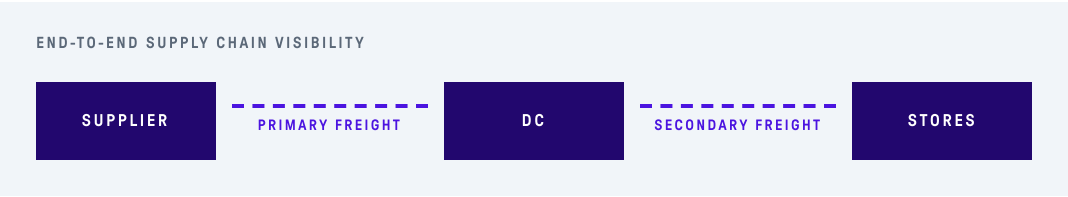
01

Executive summary

A leading retailer faced significant challenges managing cold chain integrity for their seafood, with a particular focus on fresh fish — spoilage and quality issues that were often discovered only after the damage was done. Their goals were to reduce waste, protect product quality, and improve operational efficiency across the supply chain. Wiliot's battery-free IoT Pixels were deployed to deliver continuous, case-level temperature and condition sensing — replacing the periodic checks and manual processes that had left blind spots between checkpoints.

What set this project apart was the end-to-end visibility the Wiliot Physical AI Platform provided, surfacing critical issues from the supplier, through transportation, to the distribution center (DC) and the store — not just at fixed checkpoints, but continuously across the entire journey. This visibility gave the retailer the data to act at each stage, driving a noticeable improvement in product quality, a substantial reduction in waste, and new opportunities to sharpen supply chain and store operations. With labor shortages affecting unloading and cooling processes in stores, the platform's real-time insights also helped the retailer deploy staff where they were needed most.

> "You can't fix what you can't see."
>
> MANAGER
> Leading seafood retailer



02

Introduction

The retailer, known for its commitment to offering high-quality seafood, was dedicated to further optimizing its cold chain management practices to best serve its customers. Despite already surpassing industry average — with over 90% of their fresh fish inventory reaching customers — the retailer aimed to further reduce stock loss. To achieve this, they sought a solution that would enable continuous, item-level temperature monitoring throughout their entire supply chain, from the supplier through to the store.

By deploying Wiliot's battery-free IoT Pixels across the Wiliot Physical AI Platform, the retailer gained end-to-end visibility into each stage of the supply chain — uncovering key inefficiencies at the supplier, during transportation, and within the DC. Because IoT Pixels sense and report continuously rather than at fixed checkpoints, optimal conditions could be confirmed in real time, letting the retailer catch and address issues before they escalated. The platform also helped the retailer better manage labor shortages, particularly in stores, ensuring products were unloaded and stored in a timely manner. This improved inventory management accuracy, protected shelf life, and enhanced overall operational efficiency — eliminating manual logging and scanning without adding any labor.

03

Challenge

Managing the cold chain for seafood presents significant challenges due to the product's sensitivity to temperature fluctuations. Fresh fish specifically has a typical shelf life of just 11 days. Even minor temperature excursions can drastically reduce this shelf life, shortening it to as little as three days. While temperature mishandling can reduce shelf life, leading to markdowns or wastage, this is only a fraction of the broader issue of overall inventory shrinkage.

Inventory shrinkage stems from a variety of factors, many of which directly impact the shelf-life and salability of products. However, some shrinkage occurs because inventory becomes unreachable or unaccounted for within the supply chain due to missing/stolen inventory. These issues, rather than being isolated to a single point, compound across multiple nodes of a typical supply chain.

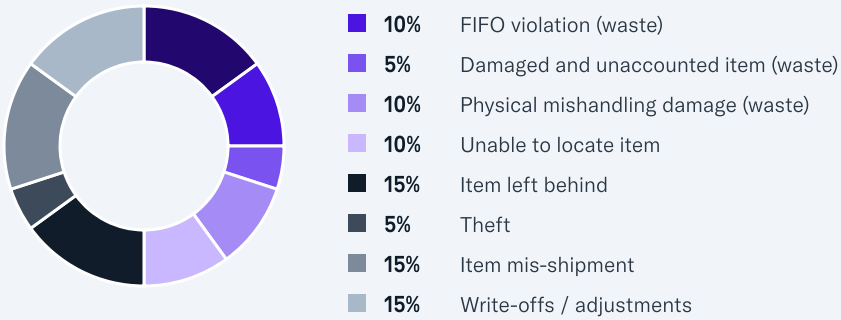


Figure 1: Common reasons for inventory shrinkage across the supply chain. Source: consensus figures based on consultation with industry experts.

At the supplier level, compliance with temperature protocols during loading and throughout the primary freight journey is critical. Within the DC, issues such as FEFO (First-Expiry, First-Out) violations and pick errors further contribute to shrinkage. In transit, dwell times and routing inefficiencies were flagged as areas that could impact product quality by the time it reached the store. On average, 20% of store-level issues are a result of upstream mishandling, which often goes unnoticed until it's too late. While around 80% of problems occur downstream due to the larger number of stores compared to distribution centers and suppliers, the remaining 20% happens upstream.

Most importantly, these issues often involve continuous or slowly aggregating excursions that begin all the way from the source, compounding as they move through the supply chain. This is why upstream visibility is critical for retailers to protect their bottom line. The retailer experienced a stock loss for several SKUs of fish that, while better than the national average for seafood, still posed significant room for improvement, in terms of cost and impact to customer satisfaction. Customer complaints, or in the worst case, a food safety outbreak, underscored the need for improved quality control and handling procedures.

04

The solution

To address these challenges, the retailer deployed Wiliot's battery-free IoT Pixels across the Wiliot Physical AI Platform, giving them end-to-end visibility and control over their seafood supply chain. Because each IoT Pixel senses temperature, location, and motion simultaneously, the retailer got real-time, case-level data — not the zone-level snapshots typical of legacy monitoring — tracking seafood from the supplier, through transit, to the distribution center (DC), and finally to the store.

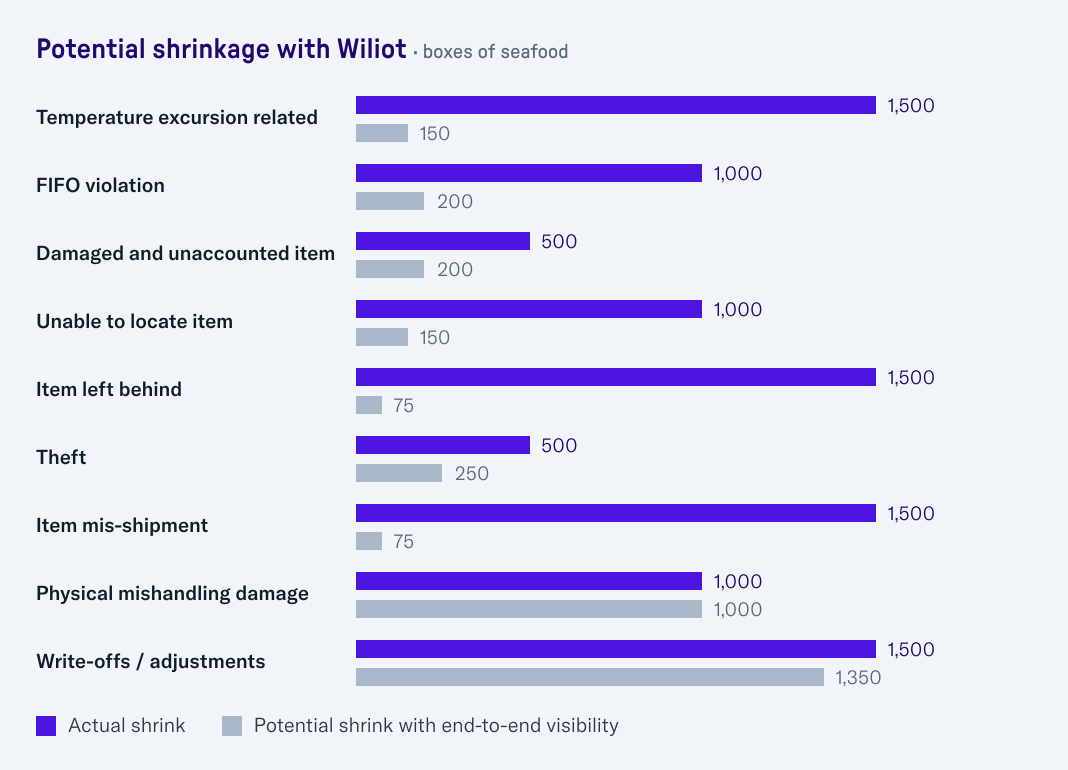


Figure 2: The level to which the Wiliot solution can bring down each category of shrink in Figure 1, considering a shrink of 10,000 units

This real-time, case-level visibility was instrumental in addressing and reducing the various causes of shrinkage. By establishing visibility from the source — covering every stage from the supplier, in transit, to the DC, to the store — the retailer could monitor temperature compliance during loading and transportation, ensure accurate inventory counts upon receipt at the DC, and track the movement of stock to the store. This end-to-end visibility uncovered key areas for improvement: transportation delays, FEFO practices in the DC, product misplacement in-store, and labor-related inefficiencies like unloading delays from staffing shortages. This comprehensive, case-level tracking gave the retailer daily, actionable insight into reducing shrinkage and improving product quality and operational efficiency.

05

Key areas of focus

Continuous temperature monitoring

Wiliot's battery-free IoT Pixels delivered real-time temperature monitoring throughout the supply chain, identifying excursions and triggering alerts for immediate corrective action. This proactive approach significantly reduced the risk of spoilage, keeping product quality intact throughout its journey. For example, the platform detected that 4% of pallets weren't moved to refrigerated storage for over 60 minutes — a delay that risked compromising shelf life and the visual appeal of the fresh fish. The retailer acted immediately, optimizing pallet-picking order to keep fish at the top of pallets and in the best possible condition. Temperature protocol issues during primary and secondary freight journeys were also flagged, allowing the retailer to work directly with transportation vendors to resolve them — along with broader workflow adjustments that reflect this customer's relentless drive toward better product handling.

KEY OPPORTUNITIES FOR ENHANCING TEMPERATURE CONTROL

Immediate alerts
The system triggered alerts before the pallet had been out of refrigeration for 60 minutes, allowing the team to take swift corrective action.

Process adjustments
Adjustments included ensuring sufficient staff were available to move shipments into coolers immediately upon arrival and restructuring pallets for immediate restocking, placing fish at the top to avoid prolonged exposure on the sales floor.

Inventory visibility & accuracy

IoT Pixels also gave the retailer real-time visibility of merchandise from source to destination — pivotal in reducing disputes and commercial claims between the retailer and its suppliers, since both sides could see the same timestamped record instead of relying on conflicting paper trails. Visibility at the supplier level let the retailer track the quantity of cartons dispatched, accounting for inventory from the very start of the supply chain. The platform also enabled tracking of lot IDs by case — critical for traceability and compliance. In the DC, it helped automate carton receipt, reducing disputes tied to missing or miscounted inventory and improving FEFO accuracy.

KEY OPPORTUNITIES FOR ENHANCING INVENTORY VISIBILITY & ACCURACY

Inventory accuracy
Utilize real-time data as an audit point against expected inventory counts, with options to update records or correct the process in real-time.

Location and expiry monitoring
Reduce waste and increase the likelihood stock is placed in the correct location while adhering to the FEFO (First-Expiry, First-Out) method, ensuring older goods are prioritized for stocking first, thereby reducing waste caused by expiry.

Operational efficiency

Wiliot's platform automated several manual processes that were previously time-consuming and error-prone, including temperature collection and inventory checks upon receipt into the retailer's Warehouse Management System (WMS) — cutting errors, omissions, and labor inefficiencies. Eliminating a 10-second scanning task per case translated into significant labor hour savings, with further potential savings from automating manual inventory tasks and the search for missing or misplaced items. The platform's ability to flag labor shortages also improved efficiency by ensuring products moved promptly to coolers, avoiding unnecessary delays, and by surfacing non-compliant processes — including stocking delays and incorrect stock placements — so the retailer could address them proactively.

KEY OPPORTUNITIES FOR IMPROVING OPERATIONAL EFFICIENCY

Alerts for picking errors
Implement immediate alerts for picking errors at the distribution center (DC), with options to update records or correct the process in real-time.

Process adjustments
Utilize insights to identify and address the root causes of delivery times that fall outside the expected window, improving transport efficiency and in-store workforce management.

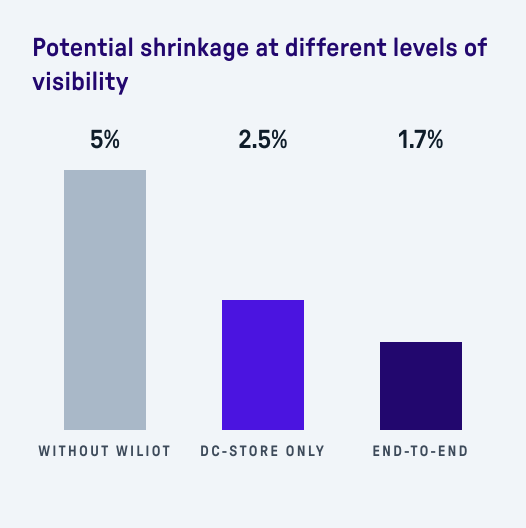
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Results and findings

The implementation of Wiliot's Physical AI Platform led to several key outcomes:

- **Quality improvement.** The project revealed opportunities to reduce seafood customer complaints and returns by maintaining more consistent product quality and addressing temperature-related issues.

- **Waste reduction.** Continuous monitoring from source to store, paired with timely alerts, helped reduce stock loss — including flagging 4% of pallets for corrective action — reducing overall shrinkage.
- **Operational efficiency increase.** The retailer saw improved inventory accuracy, reduced error-prone manual labor, and automation of key processes, leading to fewer delays and more efficient supply chain operations, with the opportunity to reduce stocking labor effort.
- **Industry context — sales impact of inventory visibility.** Industry research shows that improved inventory record accuracy can lift annual sales 4–8% (https://www.ecrloss.com/research/grow-sales-by-improving-inventory-records).
- **Projected ROI through end-to-end tracking.** End-to-end tracking through the Wiliot Physical AI Platform unlocked new insights for root-cause analysis, enabling issues to be addressed before they grew into bigger problems. Based on this analysis, the retailer projects a 28% increase in ROI against just a 6% increase in costs.
- **Visibility and control.** As one manager put it, “You can’t fix what you can’t see.” Continuous, real-time tracking gave the retailer clear visibility into the complexities of the fish supply chain — and the confidence to identify and address issues as they arose.



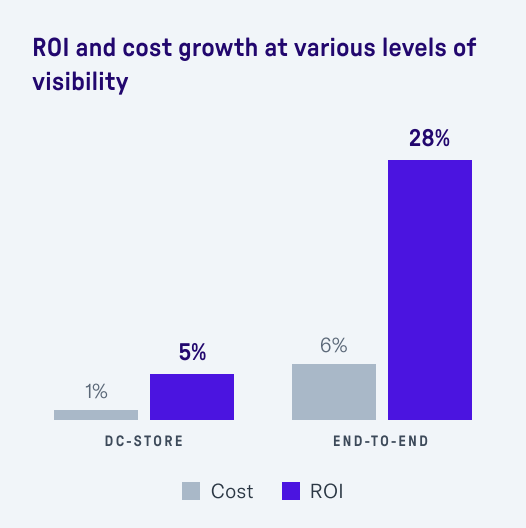


Figure 3: Potential reduction of shrinkage at varying levels of visibility. Figure 4: Implementing Wiliot from supplier to store instead of DC storage only raises cost by 6% while potential ROI grows 28%.

07

Conclusion

Wiliot's Physical AI Platform drove real value for the retailer, delivering significant improvements across their seafood supply chain. By enabling continuous temperature monitoring, real-time inventory visibility, and automation of key processes, the platform helped the retailer significantly reduce stock loss, enhance seafood quality, and improve operational efficiency — while surfacing new opportunities for optimization along the way.

Looking ahead, the more data the platform processes, the sharper its insights become — allowing the retailer to move from reacting to issues to anticipating them, and to keep building on the improvements already achieved. This positions their supply chain to remain resilient, efficient, and capable of consistently delivering the highest-quality products to customers.

Strategically, these advancements align closely with the retailer's broader objectives around sustainability, customer satisfaction, and operational excellence — positioning them as a leader in quality food management, equipped to meet the demands of an increasingly competitive market while maintaining customer trust and loyalty.

WHY WILIOT

ABOUT WILIOT

Wiliot is a Physical AI company that gives organizations continuous, scan-free visibility into the location and condition of every item in their supply chain. Battery-free Bluetooth sensors, called IoT Pixels, capture the data, and the Wiliot Physical AI platform refines it into actionable insights — predicting problems like shrink, mis-ships, and spoilage, and recommending the next move. Trusted by many of the world's largest retailers, carriers, and consumer brands, Wiliot has tagged more than 1 billion assets worldwide.

Visit www.wiliot.com to learn more.