Freight railroads operate 24/7 over more than 140,000 miles of track stretching from the great plains to low-lying coastlines, which makes their infrastructure and equipment vulnerable to extreme weather and natural disasters such as flooding.

According to the U.S. Department of Transportation (DOT), high waters from hurricanes, tropical storms, flash floods and persistent heavy rains are one of the most prominent weather-related concerns railroads face. Water can weaken rail bridges, wash away the ballast that stabilizes tracks and damage sophisticated railroad signaling systems and electronic trackside equipment — all of which threaten rail service.

**Year-round Planning**

Although flash floods can happen within a matter of minutes, railroads proactively monitor and prepare their networks for potential water-related risks every day.

- **24/7 Monitoring**: Railroads monitor weather in real-time at their traffic control centers, where they receive information from in-house meteorologists, the National Weather Service and train operators.

- **Ongoing Maintenance**: Railroads perform maintenance throughout the year to ensure they clear all debris from ditches and culverts along rail corridors to help them drain properly during heavy water flow.

- **Detection Technology**: In some flooding-prone parts of the network, high-water detectors send notifications about track conditions to approaching trains, helping them determine whether to slow the train or perform an inspection before passing.

- **Set Procedures**: Each railroad maintains company-specific operating instructions on how to prepare for and respond to natural disasters, including flooding.
Preparation & Response

Railroads take all precautions necessary to protect their employees, infrastructure and customer shipments as a storm and potential flooding approach. Working closely with multiple partners — including the Federal Emergency Management Agency, the DOT and the Federal Railroad Administration — railroads monitor potential impacts and begin preparations. Shared information such as emergency declarations, regulatory waivers and response plans are aggregated into digital, real-time "Storm Information Dashboards."

- **Employees:** Railroads communicate critical information with their employees during every step of preparation and response. They will relocate employees to ensure they are safe and that they can effectively support with preparations, such as helping to stage additional resources or clearing ditches.

- **Customer Shipments:** To reduce the impact on customers' business, railroads will move shipments onto unaffected lines or leverage pre-determined re-routing agreements to move traffic onto another company’s line. Railroads keep customers updated on any service changes throughout the duration of the weather event.

- **Locomotives & Electronic Equipment:** In advance of a flood, railroads will relocate locomotives — which use sophisticated electric motors in their wheels — away from low-lying areas. They will also remove sensitive electronic trackside equipment such as sensors, signals and switches, store them in a dry area and re-install them after a flood. These precautions help railroads restore service quickly because they do not have to wait for replacement equipment to be shipped to the affected area.

- **Bridges:** Forceful water can move a bridge from its support beams or destabilize it by unearthing the supporting soil. Railroads may park rail cars full of heavy materials — like rocks and ballast — on a bridge before a flood to weigh it down and make it less prone to moving.

- **Track:** Railroads may raise track infrastructure in flood-prone areas to mitigate potential damage. To prepare for Missouri flooding in early 2017, UP crews worked up and down the Missouri River for six weeks straight, raising the level of eight bridges and 63 miles of track, dumping more than 400,000 tons of rock (enough to fill 4,100 rail cars), and raising or removing track signals in danger of being damaged.
Restoring Services & Supporting Communities

Teams of skilled railroad employees — including civil engineers, dispatchers and maintenance personnel — work around the clock with local, state and federal officials to resume train operations. Railroads inspect and assess infrastructure and equipment so they can prioritize clean-up and repair, which may include removing debris off tracks, repairing or laying down new track and roadbeds, and rebuilding bridges, engines or railcars. Technologies such as drones keep rail employees safe during inspections of flooded rail yards or bridges while ground-penetrating radar helps them assess conditions under the track, where water may have eroded the ballast.

Because freight railroads are privately owned, they can allocate resources to critical maintenance projects and restore service in sometimes just a few hours, much faster than publicly-funded infrastructure recovery projects. After Hurricane Katrina struck Louisiana in 2005, it only took Norfolk Southern an astounding 16 days to complete repairs to its Lake Pontchartrain Bridge. Using nine cranes on barges, the railroad lifted nearly five miles of track out of the water and put it safely back onto the bridge so service could continue.

It is not just their own infrastructure that railroads rebuild; they care deeply for the communities their trains travel through and will often bolster local relief efforts by delivering food and water, removing debris, transporting evacuees or donating to relief efforts.