Ocean Conservancy®

From the Ocean to the Great Plains

Why NOAA Is Essential Infrastructure for Kansas

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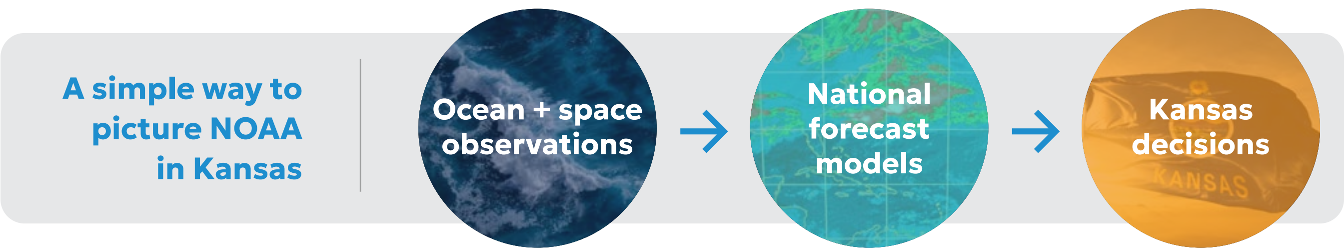
The research and drafting of this document were assisted by artificial intelligence. All content was reviewed, verified, and edited by Ocean Conservancy experts for quality and accuracy. Ocean Conservancy assumes full responsibility for the content and conclusions presented in the report.

Executive Summary: A Kansas Snapshot

Kansas is landlocked, but Kansas weather—and its risks—begins over the ocean. Warm water in the Gulf fuels the moisture supply for many Great Plains thunderstorms and flood events.[1] Ocean temperature patterns across the Pacific help shape drought and seasonal outlooks.[2] The National Oceanic and Atmospheric Administration (NOAA) collects real-time data on both the ocean and the atmosphere, converting global-scale information into life-saving forecasts that Kansans rely on.

Kansas has unusually high exposure to weather risk, which is why NOAA's science and services function as core infrastructure in the state. Kansas averages **81 tornadoes per year** (1994–2023).[3] From 1980–2024, Kansas was affected by **102 "billion-dollar" weather and climate disaster events**, including **20 droughts** and **71 severe storms**.[4] Drought can also produce major, sometimes "quiet," damage: according to the Kansas Geological Survey, losses from the **2011 drought exceeded $1.7 billion in Kansas alone**.[6]

At the same time, Kansas' economy depends on weather-sensitive sectors that require accurate forecasts. The Kansas Department of Commerce highlights aerospace as a major export industry—about $2.25B annually, nearly 20% of state exports—and cites a $7 billion annual contribution to Kansas' gross domestic product (GDP).[8] Kansas' electricity system is also increasingly weather-driven; federal energy analysis notes that renewables supplied more than half of Kansas' net generation in 2024, almost all of it from wind.[9]



- **Ocean sensors** including Argo floats and Pacific buoys detect ocean heat and patterns such as El Niño and La Niña, improving seasonal and subseasonal outlooks and the background information used to assess drought and severe storm risk.[10]
- **Satellites** observe storms evolving over land and ocean; modern geostationary satellites can monitor targeted severe weather areas every 30–60 seconds.[11]
- **Models** such as NOAA's High-Resolution Rapid Refresh (HRRR)—which began as a NOAA research project—assimilate radar data every 15 minutes and update hourly.[12] HRRR output is part of NOAA's operational model suite and is used by National Weather Service meteorologists to create official forecasts, warnings and decision-support products.
- **Local offices and dissemination** systems translate that science into warnings, river forecasts, drought predictions, and decision support—and transmit warnings 24/7.[13]

What's at stake if NOAA is cut

NOAA's services in Kansas are the visible tip of an integrated national system. Cuts to satellites, ocean observations, data infrastructure, or the pipeline that moves new science into daily forecasting would not simply "trim the edges". They would weaken the core forecast and warning capabilities Kansans depend on for safety and economic productivity.[14]

The Global Machinery Behind Kansas Forecasts

NOAA is most visible in Kansas through its weather forecasts, but a forecast-only view of NOAA misses the full story. What Kansans experience—tornado warnings, river forecasts, drought maps, aviation weather, heat risk tools—depends on a national production chain with three essential components that must work together:

- **Observations** (ocean, space, land, and air)
- **Models and research-to-operations** (the "information engine" that turns observations into predictions)
- **Delivery and decision support** (warnings, briefings, and tools that people and businesses can act on)[15]

Building NOAA's forecasts is like running a factory that makes a valuable public product. Observations are the raw materials, models and forecasting science are the machinery that turn those inputs into predictions; and forecast offices and decision tools are the finished products delivered in usable form to the public. If we defund the satellites or ocean observing systems that feed the models, we degrade Kansas forecasts. If we defund the research that modernizes warnings and short-range models, we freeze capability at yesterday's level. If we defund data and climate infrastructure, we erode the information that underpins everything from drought triggers to bridge design rainfall tables. [21] [44]

Kansas is a high-consequence state for forecasting because of its risk profile: tornadoes, hail, extreme winds and derechos, floods, winter storms and recurring drought. NOAA's own disaster accounting shows Kansas has been affected by more than 100 "billion-dollar" events since 1980, with drought and severe storms dominating the count and the costs.[17]

NOAA's value in Kansas is not abstract; it is real, tangible, and operational:

- **Public safety:** The difference between a tornado warning with lead time and one with no lead time is measured in lives and injuries. In the 2007 Greensburg tornado, NOAA documents that the tornado warning was issued 26 minutes before impact—time that enabled people to take shelter and became part of the community's recovery narrative.[18]
- **Economic productivity:** Nationally, weather forecasts generate more than $30 billion annually in economic benefits because nearly every sector uses them for routing, staffing and risk management.[20]
- **Farming decision triggers:** U.S. Department of Agriculture (USDA) drought assistance and emergency conservation flexibilities are explicitly tied to the U.S. Drought Monitor (USDM), which is supported by NOAA data and analysis; counties designated D2 (Severe Drought) or higher can trigger emergency haying and grazing policies on certain acres.[21]
- **Aerospace and electricity:** Kansas' aerospace sector and weather-driven wind power generation depend on accurate short-range and aviation forecasts; Kansas' own economic development materials emphasize aerospace exports and GDP contribution. [22]

NOAA operates as an integrated system, so selectively cutting some programs while funding others creates ripple effects across the agency. You can't sustainably fund the National Weather Service while underfunding the rest of NOAA and still expect the same level of service, because today's forecasts depend on satellites and global observations, including ocean measurements, that are funded and managed across NOAA.

For example, low Earth orbit satellites supply more than 80% of the data incorporated into numerical weather prediction models.[19] Modern weather models rely on those global inputs to set accurate initial conditions—combining satellite observations with buoy, radar, aircraft and balloon data—so cuts to any part of NOAA's observing or modeling systems can degrade the forecasts that farmers, businesses and first responders rely on across Kansas.[23]

Fully funding NOAA is a common-sense investment in Kansas' safety, economy and resilience. It also aligns with an ocean-connected reality: the ocean is part of Kansas' weather, water and risk infrastructure, even if Kansas is nowhere near a coastline. [24]


Photo credit: Adobe Stock

NOAA in Everyday Kansas Life

A few “ordinary” Kansas days illustrate NOAA’s importance to Kansans’ safety and economy.

On a spring day with severe weather potential, NOAA’s ocean-to-sky chain is already in motion. Research on tornado variability finds that April tornado activity in the Southern Great Plains can be linked to global sea surface temperature patterns and the northward flow of Gulf moisture—an ocean-to-tornado connection that is scientifically measurable.[25] When storms begin to form, geostationary satellites can observe targeted severe areas every **30–60 seconds,** enabling near-real-time monitoring of rapidly developing conditions.[11] NOAA’s HRRR model, updated hourly at 3-km resolution, assimilates radar data every 15 minutes, sharpening storm-scale guidance for the next 1–12 hours.[12] Those upstream inputs become tangible locally through warnings and communications about tornadoes and other severe weather. NOAA Weather Radio is designed as a continuous, direct broadcast channel for official warnings and watches 24/7.[26] When storms and tornadoes loom and minutes matter, time is safety.

On a drought week in summer, NOAA is again crucial. The Kansas Geological Survey emphasizes that drought is among the most costly hazards and notes Kansas’ 2011 losses exceeded $1.7 billion.[6] Across Kansas and the Great Plains, ranchers use weekly U.S. Drought Monitor maps to make “timely, critical” decisions about grazing, forage, water, herd management, and financial risk, while agencies use the same designations to declare disasters and deliver assistance.[27] USDA uses the U.S. Drought Monitor to determine eligibility for specific programs, including the Livestock Forage Disaster Program and emergency haying and grazing on certain acres.[28] NOAA’s drought science is not “extra.” It is operational infrastructure for farmers and ranchers that also helps unlock aid.[29]

On an ordinary weekday in Kansas’ aviation economy, weather affects far more than whether a passenger flight to or from a Kansas airport is delayed. It affects aircraft manufacturing and delivery around Wichita, business aviation, cargo movement, and the safe routing of flights through the national airspace system.[30] According to the Kansas Department of Commerce, aerospace exports are an important driver of Kansas’ statewide economy.[8] The data, forecasts and warnings that help pilots and aviation planners avoid turbulence, storms, and other hazards come from NOAA’s Aviation Weather Center, powered by NOAA satellites and models.[32] And the guidance that flags turbulence and thunderstorm timing rests on the same NOAA satellite and model backbone that begins over the ocean.[33]

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NOAA Services that Kansas Depends On

Kansas experiences NOAA directly through local forecast offices, warning systems, climate services, and the many “embedded” NOAA products used by farmers, ranchers, businesses, state agencies and municipalities.

At the local level, NOAA’s Weather Forecast Office in Topeka offers a detailed example of what one NOAA Kansas office does: it issues forecasts, warnings, and advisories; provides forecasts for airports; produces fire weather forecasts; and issues river flood warnings and river-stage forecasts developed with the Missouri Basin River Forecast Center. The office describes its core equipment as including a Weather Surveillance Radar-1988 Doppler (WSR-88D) radar, multiple NOAA Weather Radio transmitters, river gauges and automated observing sites.[35] This is not “just weather.” It is a layered safety and operations service for transportation, agriculture, utilities and emergency management.

In northwest Kansas, NOAA’s office in Goodland illustrates another underappreciated feature: NOAA’s service areas cross state lines because weather does not respect borders. That office describes a 19-county warning area spanning parts of Colorado, Nebraska, and Kansas, along with aviation forecasts and fire weather programs.[37] That cross-border structure is a reminder that Kansas benefits from, and contributes to, national infrastructure designed around on-the-ground realities.

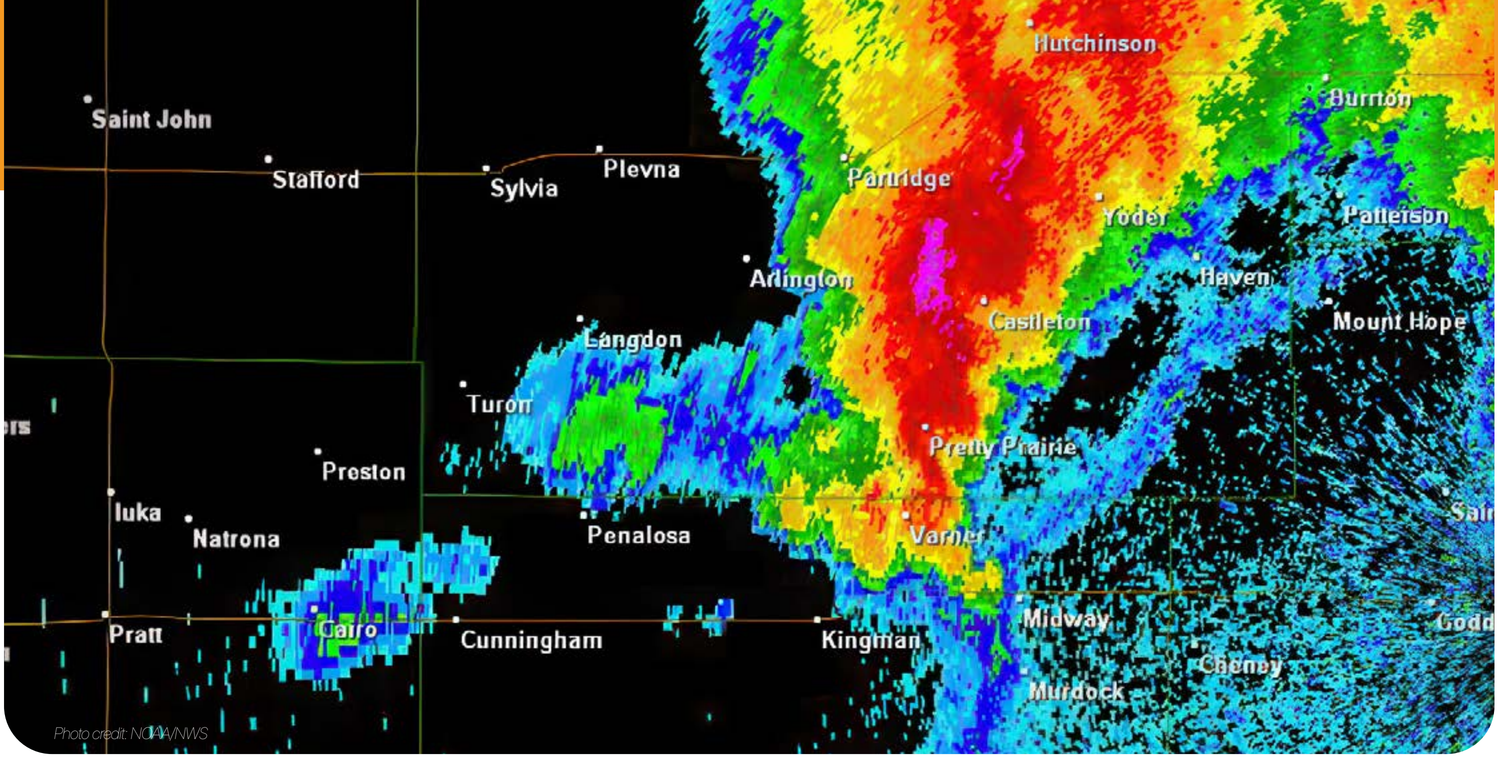
Warning dissemination is also concrete and local. NOAA Weather Radio remains a critical redundancy when other communication channels fail. It provides continuous broadcasts of official warnings and watches every day. The Wichita office states that it operates multiple NOAA Weather Radio transmitters that broadcast warnings and other information 24/7, and lists transmitter locations and county coverage across central and southeastern Kansas.[38] NOAA Weather Radio is an “All Hazards” radio network, making it a single source for comprehensive weather and emergency information for all types of hazards, including natural hazards, environmental hazards, and public safety.[39]

NOAA's Doppler radar network gives Kansas something most people never see but rely on constantly: a real-time, statewide "x-ray" of the atmosphere that tracks thunderstorms as they form, intensify, and move. That picture helps forecasters pinpoint where the worst winds, hail, tornado potential, and flash-flood rainfall are developing. In Kansas, a state that averages **81 tornadoes per year** plus frequent severe hail and high-wind events, that coverage is not a nice-to-have. It is everyday public safety and economic infrastructure.[3]

That "radar picture" is built on a tangible footprint of physical assets. Kansas is served by four NEXRAD (WSR-88D) Doppler radar sites located in the state—Dodge City (KDDC), Goodland (KGLD), Topeka (KTWX), and Wichita (KICT)—with overlapping coverage from nearby radars just outside Kansas that help fill gaps and provide resilience when one site is down. During a major upgrade to the Topeka radar, for example, the National Weather Service noted that adjacent radars—including KICT, KUEX, KEAX, KOAX, and KSGF—helped provide temporary coverage during downtime, underscoring that Kansas relies on both in-state and regional radar infrastructure. In tangible terms, radar data helps the National Weather Service issue more precise warnings, supports safer aviation routing, and gives communities, schools, hospitals, utilities, and businesses clearer lead time to protect people and property. Keeping that radar "picture" reliable requires sustained funding for upgrades and lifecycle upkeep, including ensuring sites can operate through power outages during hazardous weather and extending the service life of aging systems through national refurbishment and life-extension efforts across the NEXRAD network.[41][42][43]

Kansas also benefits from NOAA work that doesn't look like a "forecast" at all. It looks like the engineering numbers that determine how roads are built and floodwater is managed. One practical example is the Kansas Department of Transportation's (KDOT) county rainfall tables: reference charts engineers use to answer questions such as, "How much rain should a roadside ditch, culvert, bridge opening, or storm drain be designed to handle during a 10-year storm? A 50-year storm? A 100-year storm?" KDOT updates these county tables using NOAA Atlas 14, which provides rainfall depth and intensity estimates across storm durations (from 5 minutes up to 24 hours) and recurrence intervals from 1 to 500 years.[45] Atlas 14 is a set of precipitation-frequency estimates derived from NOAA's underlying climate data archives—meaning the same federal record-keeping and science used for weather and climate also supplies the baseline numbers Kansas engineers rely on to design roads, bridges, and stormwater systems.[46] In practice, that's "quiet infrastructure": NOAA's data helps determine whether highways stay passable, whether culverts can handle sudden downpours, and whether public investments are built to withstand the flood risks Kansas faces.

Finally, NOAA's climate services reach Kansas through the Regional Climate Center network, especially the High Plains Regional Climate Center (HPRCC), which serves Kansas and five neighboring states.[48] Even though the center is physically located in Nebraska, it provides highly practical, Kansas-specific services: easy public access to quality-controlled historical climate records and near–real-time station data; ready-to-use climate maps, including temperature and precipitation through the Applied Climate Information System (ACIS); station tools that let users graph precipitation and snowfall totals and extremes; and agricultural and water-resource products used for drought monitoring and day-to-day planning.[62] Regional Climate Centers exist to deliver sector-specific, value-added climate products that make climate information easy to use, supporting decisions by farmers, utilities, municipal planners, and emergency managers. And because many Great Plains droughts and seasonal swings are shaped by ocean-driven patterns such as El Niño and La Niña, HPRCC also produces briefings that translate Pacific conditions into what they can mean for the High Plains—turning ocean signals into actionable information for Kansas.[49] [67]



How NOAA's Global Observations Show Up in Kansas

NOAA's "hidden" value in Kansas becomes clear when you look upstream: most of what makes accurate Kansas weather forecasting possible is not located in Kansas.

Modern forecasts are not built primarily from local observations. NOAA's polar-orbiting satellites are the "backbone" of forecasting and supply **more than 80% of the data incorporated** in weather prediction models.[19] The implication for Kansas is straightforward: funding that maintains satellites is also fundamentally funding Kansas forecast accuracy.

At the same time, geostationary satellites provide the rapid refresh that forecasters use during the most dangerous moments. NOAA's Geostationary Operational Environmental Satellites (GOES) can **observe targeted severe areas every 30–60 seconds**, enabling forecasters to see storm formation and evolution in near real time—a capability explicitly tied to more advanced warnings and effective evacuations.[11] Those satellites watch the ocean and land alike; their value is not bound by borders or coastlines.

Ocean observing is not "coastal-only science." It's part of the national forecasting machinery that helps predict the weather patterns Kansas experiences.

Start with NOAA's Argo program. Think of Argo as a **global fleet of robotic ocean thermometers**—thousands of small floats spread across the world's oceans. Each float drifts with currents, then periodically dives and resurfaces to measure the ocean's temperature and salinity, or how salty the water is, and transmits those readings by satellite. NOAA uses these measurements to give forecast models an accurate picture of the ocean's current state—essentially setting the starting line for ocean and ocean-atmosphere models. One of Argo's stated goals is to improve weather and climate forecasts by feeding or "assimilating" these observations into forecast systems.[51]

Now picture NOAA's Tropical Atmospheric Ocean (TAO) array in the Pacific Ocean. Instead of free-floating robots, TAO is a line of anchored buoys strung across the tropical Pacific—like a set of **"weather stations" on the ocean**, constantly measuring conditions at the ocean surface and just below it. TAO exists because the tropical Pacific is the engine room for El Niño and La Niña, which can shift jet streams and storm tracks and disrupt "normal patterns of weather variability." These swings in ocean conditions have real downstream impacts on sectors such as agriculture and energy—the same kinds of impacts Kansas feels through altered drought risk, heat patterns and seasonal precipitation.[52]

For Kansas specifically, the atmosphere's moisture supply shows why ocean observations matter. One scientific study of the Great Plains low-level jet—a fast-moving stream of air roughly a mile or so above the ground that often forms overnight and funnels warm, humid air from the Gulf of Mexico northward—found that the Gulf is the jet's main moisture source and that during these events it accounts for roughly **70–80% of the moisture transport** into the southern Great Plains.[53] Research also links April tornado activity in the Southern Great Plains to broader sea-surface temperature patterns, describing how ocean-driven shifts in atmospheric circulation can strengthen or weaken the northward flow of Gulf moisture—changing how much warm, humid air piles up over the region.[25] In other words, **the ocean is not a "side story" for Kansas tornadoes and heavy rain. It is a core driver.**

All this information is pulled together through NOAA's national data-assimilation and modeling systems—where observations from around the world become tomorrow's forecast in places like Topeka. NOAA's Global Data Assimilation System (GDAS) explicitly lists buoy and satellite observations among the data streams it ingests to initialize weather forecasts.[23] That's the connective tissue between a buoy in the tropical Pacific, a drifting sensor in the open ocean, a satellite orbiting overhead, and the forecast a Kansas emergency manager relies on to decide whether to staff an operations center tonight.

Photo credit: Lieutenant Elizabeth Crapo / NOAA

Photo credit: Rachel McBee / NOAA

Interdependence in Action

For Kansans, the practical question isn't which NOAA office or program sounds most familiar. It's what must stay connected for Kansans to keep getting the dependable forecasts, warnings and data services they count on every day. In practice, that means paying attention to the whole chain—from observations to models to local delivery—because NOAA's capabilities are built as a linked system, and weakening one part can reduce performance in another.

Consider drought warnings as a chain of data flowing from the ocean to Kansas ranch decisions. Measurements of rainfall, heat, soil moisture, streamflow, and other conditions help experts understand how dry the landscape already is. That evidence informs the U.S. Drought Monitor, which provides the country's baseline picture of current drought. NOAA's Climate Prediction Center uses that baseline to produce outlooks showing whether drought is likely to expand, ease, or persist, informed by global information such as distant ocean conditions. Those outlooks then flow into NOAA's Southern Plains Drought Early Warning System, helping turn national climate science into practical information for people on the ground, including Kansas ranchers.[54] [55] If any link in that chain weakens—whether it's the observations that set the broader climate context, the forecasting capacity that helps guide on-the-ground decisions, or the data and analysis that keep the Drought Monitor reliable—Kansas farmers, ranchers, and agencies lose lead time, confidence and clarity when decisions are most costly and time-sensitive.

Now consider how tornado warning improvements move from research to real-world forecasts. NOAA's National Severe Storms Laboratory (NSSL) develops and tests new tools that can be handed off to the National Weather Service once they're proven to work—much like how new safety technology is tested before it becomes standard equipment. One major example is the Warn-on-Forecast project, which aims to increase lead time for tornadoes, severe thunderstorms, and flash-flood warnings by combining high-resolution weather models, high-performance computing, and rapidly updated observations (especially radar and satellite data) so forecasters can see hazardous storms developing sooner and with greater confidence.[57] In 2025, NOAA transitioned the Warn-on-Forecast System to the National Weather Service in a demonstration capacity, and it has already shown that it could provide up to two hours of lead time in some situations.[58] This matters for Kansas because Kansas is a high-tornado state, and warning lead time is where federal science becomes concrete: more minutes to get kids into a safe room, move patients in a hospital, or pause operations at a job site.[59] Cutting NOAA's research would slow the pipeline that modernizes the warnings and decision tools Kansas relies on to save lives.

Taken together, these examples show what "interdependence" means on the ground: Kansas outcomes depend on a NOAA system that starts with global observations, including ocean measurements; runs through national modeling and climate services; and ends with local forecasts, warnings, and decision tools. When that chain is strong and connected, Kansans get earlier tornado warnings, clearer drought signals, and more actionable information for agriculture, water, and emergency management. When pieces of the chain are weakened, the effects don't stay neatly contained within one program. They surface as less reliable guidance at the exact moments Kansas families, businesses, and communities need it most.

What's at Risk if NOAA is Cut, and What Kansas Leaders Can Do

What's at stake for Kansas if NOAA faces major budget and staffing cuts? Put simply, it's the risk of a slow breakdown in essential services Kansans depend on—often without noticing until something goes terribly wrong. Likely outcomes include:

Forecasts become less accurate due to satellite and observation gaps.
NOAA's polar-orbiting satellites supply more than 80% of the data that weather models ingest before they run.[19] Those models don't rely on one data stream; they're built from a blended picture that includes satellite and ocean-buoy observations alongside radar, aircraft reports and weather balloons.[63] If those inputs are reduced, the model starts with a fuzzier picture—and that can show up in Kansas as less reliable guidance on storm timing and track, where heavy rain will fall, how dangerous a heat event will be, and what wind and aviation conditions will look like.

Slower modernization of tornado, flood, and flash-drought services.
NOAA's Warn-on-Forecast program is explicitly designed to increase warning lead time by using high-resolution models plus radar-and-satellite data assimilation, and it is a prime example of how NOAA research yields improved operational forecasts. [64] In a state averaging 81 tornadoes a year, slowing or reversing warning modernization is not a neutral choice; it is accepting preventable risk.[65]

Erosion of drought decision triggers and agricultural risk management.
NOAA's U.S. Drought Monitor (USDM) is used by ranchers for critical decisions and by agencies for drought disasters and assistance; USDA explicitly uses the USDM to determine eligibility for certain programs.[66] If NOAA's drought monitoring, climate analysis, or outlook capacity is reduced, Kansas producers face delayed signals, reduced confidence, and a harder time getting assistance—exactly when speed and clarity matter most.

More uncertainty—and higher costs—for infrastructure and water management.
Kansas engineers don't guess how much rain a culvert, bridge, or storm drain should handle; they use standardized rainfall "design" numbers that help size and site public works safely. The numbers used by the Kansas Department of Transportation are based on NOAA precipitation-frequency estimates.[44] [45] NOAA's estimates are built from NOAA's underlying climate data infrastructure.[46] Water operations across Kansas depend on NOAA in a similar way: the U.S. Army Corps of Engineers Missouri River Water Management Division prepares forecasts in collaboration with other agencies, and the official river and weather forecasts used for release-calculation purposes are issued by the National Weather Service.[69] In a state where both floods and drought can strain water systems, less reliable inputs and forecasts can mean less confidence in critical decisions, higher operational costs, and greater risk to public safety.

Photo Credit: Adobe Stock

Infrastructure reliability failures occur

Critical observing systems, such as Doppler radar, become less reliable due to delayed maintenance or a lack of modernization. NOAA's forecasting and warning enterprise depends on a physical network—radars, weather balloons, river gauges, ocean buoys, and the communications and computing systems that move and process those data in real time. When any of those components are down, degraded, or slow to recover, the impact shows up quickly as less timely and less precise forecasts and warnings. Doppler radar is a clear example: outages or degraded performance can leave forecasters with a weaker picture of what's happening right now. That's why NOAA has invested in a multi-year, $150 million effort to extend the life and reliability of the national NEXRAD radar network with upgrades like new generators and major mechanical refurbishments designed to keep the system available beyond 2035.[60] When maintenance and modernization of NOAA's key observing assets are budget-constrained, the predictable result is more downtime, slower and more expensive repairs, and a gradual decline in the reliability Kansans depend on when weather turns dangerous.

What Kansas leaders can do

Kansas depends on NOAA's national and global ocean-to-heartland information infrastructure, and all the agency's functions need to be funded accordingly. Kansas leaders can advocate and act to:

- **Fully fund NOAA as an integrated system, not as a set of disconnected programs.** Kansas' day-to-day forecast reliability depends on global ocean observations, satellite data, and modeling systems, not just local offices. [71]
- **Protect the observing backbone and satellite continuity** that feed forecasts, including the satellite systems that provide most assimilated data, and the geostationary satellites that provide rapid severe-storm monitoring.[19] [11]
- **Sustain research-to-operations pipelines that improve lead time and reduce risk,** such as Warn-on-Forecast and other innovative model development. Cutting-edge research projects are central to increasing warning lead time and improving forecasts.[73]
- **Maintain drought monitoring and decision-support capacity** so that drought designations remain credible and timely, and so farmers and ranchers can keep using a trusted map tied to assistance programs.[74]
- **Support NOAA data infrastructure and applied climate services** that Kansas uses in tangible, practical ways that are critical but often "behind the scenes," including regional climate services and precipitation frequency standards that flow into engineering and planning.[75]
- **Treat NOAA operations and maintenance as public safety spending, not overhead.** The radar network example shows how lifecycle investment keeps critical systems available during the worst conditions.[76]

NOAA's job is to turn global signals into local decisions.

Those signals begin far from Kansas—in the Pacific and the Gulf, and on satellites that watch the whole Earth. NOAA translates them into the forecasts and outlooks Kansans rely on. When that pipeline is strong, communities get earlier warnings and clearer confidence. When it's weakened, the results are predictable: more uncertainty, worse timing, and less dependable guidance when Kansas can't afford to guess. The practical takeaway is simple. Keep the whole system working—NOAA's ocean sensors and satellites, the agency's world-class models and research labs, all the way to the local warnings people depend on.

Photo credit: Rachel McBee / NOAA

Resources

[1] https://esd.copernicus.org/articles/10/107/2019/
[2] https://www.weather.gov/ict/enso
[3] https://www.weather.gov/ict/KSTornadoClimo
[4] https://www.ncei.noaa.gov/access/billions/state-summary/KS
[6] https://kgs.ku.edu/kansas-droughts-climatic-trends-over-1000-years
[8] https://www.kansascommerce.gov/?p=20785&post_type=industry
[9] https://www.eia.gov/states/KS/analysis
[10] https://www.aoml.noaa.gov/argo/
[11] https://www.goes-r.gov/resources/faqs.html
[12] https://rapidrefresh.noaa.gov/hrrr/
[13] https://www.weather.gov/top/office
[14] https://www.nesdis.noaa.gov/news/revolutionizing-weather-forecasting-how-leo-satellites-have-changed-the-game
[15] https://www.weather.gov/about/forecastsandservice
[17] https://www.ncei.noaa.gov/access/billions/state-summary/KS
[18] https://www.weather.gov/media/ddc/Greensburg_1year_later.pdf
[19] https://www.nesdis.noaa.gov/news/revolutionizing-weather-forecasting-how-leo-satellites-have-changed-the-game
[20] https://gsl.noaa.gov/pages/industry-and-the-economy
[21] https://www.ncei.noaa.gov/news/value-of-data-USDM
[22] https://www.kansascommerce.gov/?p=20785&post_type=industry
[23] https://www.ncei.noaa.gov/access/metadata/landing-page/bin/iso?id=gov.noaa.ncdc%3AC00379
[24] https://pmc.ncbi.nlm.nih.gov/articles/PMC6703861/
[25] https://pmc.ncbi.nlm.nih.gov/articles/PMC6703861/
[26] https://www.weather.gov/nwr
[27] https://www.ncei.noaa.gov/news/value-of-data-USDM
[28] https://www.climatehubs.usda.gov/hubs/tools/us-drought-monitor
[29] https://www.ncei.noaa.gov/news/value-of-data-USDM
[30] https://www.kansascommerce.gov/?p=20785&post_type=industry
[32] https://aviationweather.gov/
[33] https://www.nesdis.noaa.gov/news/revolutionizing-weather-forecasting-how-leo-satellites-have-changed-the-game
[35] https://www.weather.gov/top/office
[37] https://www.weather.gov/gld/ouroffice-stationdigest
[38] https://www.weather.gov/ict/nwr
[39] https://www.weather.gov/nwr
[41] https://www.weather.gov/ddc/DodgeCityRadarGeneratorReplacement
[42] https://www.weather.gov/ddc/DodgeCityPedestalSLEP
[43] https://www.weather.gov/news/241908-weather-radars
[44] https://hdsc.nws.noaa.gov/pfds/
[45] https://ntlrepository.blob.core.windows.net/lib/54000/54400/54437/KS-14-13_FinalReport.pdf
[46] https://hdsc.nws.noaa.gov/pfds/pfds_map_cont.html?bkmrk=ks
[48] https://www.ncei.noaa.gov/regional/regional-climate-centers
[49] https://www.climate.gov/enso
[51] https://www.aoml.noaa.gov/argo/
[52] https://www.pmel.noaa.gov/gtmba/pmel-theme/pacific-ocean-tao
[53] https://esd.copernicus.org/articles/10/107/2019/
[54] https://www.drought.gov/dews/southern-plains
[55] https://www.cpc.ncep.noaa.gov/products/Drought/
[57] https://www.nssl.noaa.gov/projects/wof/
[58] https://inside.nssl.noaa.gov/nsslnews/2026/01/2025-in-a-flash-nssl-annual-accomplishments-report/
[59] https://www.weather.gov/ict/KSTornadoClimo
[60] https://www.weather.gov/news/241908-weather-radars
[62] https://hprcc.unl.edu/
[63] https://www.ncei.noaa.gov/access/metadata/landing-page/bin/iso?id=gov.noaa.ncdc%3AC00379
[64] https://www.nssl.noaa.gov/projects/wof/
[65] https://www.weather.gov/ict/KSTornadoClimo
[66] https://www.ncei.noaa.gov/news/value-of-data-USDM
[67] https://hprcc.unl.edu/enso_reports.php
[69] https://www.nwd.usace.army.mil/mrwm/forecast/
[71] https://www.ncei.noaa.gov/products/weather-climate-models/numerical-weather-prediction
[73] https://www.nssl.noaa.gov/projects/wof/
[74] https://www.ncei.noaa.gov/news/value-of-data-USDM
[75] https://www.ncei.noaa.gov/regional/regional-climate-centers
[76] https://www.weather.gov/news/241908-weather-radars