

About the cover map: GWSC GIS Program Manager Nick Roberge displayed this map of conflict zones around the Lake Chad Basin at the 2025 ESRI User Conference.

CHAD

LAKE CHAD
BASIN

Global Water Security Center

Highlights from 2025

PART
OF THE



**University of
Alabama System.**



About the map: GWSC Cartographer Zach Goodwin created this map to accompany GWSC's Gabon product in 2025.

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A Word from the Director

As we approach five years at the Global Water Security Center (GWSC), we have grown beyond what anyone could have imagined. We have come from a concept-driven organization developed into a functional resource that converts scientific data into insights to support water security decisions.



Our mission has been to help leaders understand that water isn't just an environmental issue it's a global stability issue. We study how water shortages, floods, and contamination can lead to conflict, migration, and economic disruption. By translating complex science into clear, actionable insights, we aim to help decision-makers anticipate risks and prevent crises before they start. This is the second annual report for GWSC, and we are so excited to share our growth with you.

To support this effort, we expanded our analyst team to strengthen GWSC's ability to deliver high quality situational overviews in both short and medium formats. Our team now includes fifteen staff members representing a wide range of expertise, including data science, human environmental science, cartography, and communications/project management. Each role is essential to our work, and our success depends on the contributions of every team member.

In the year ahead, I look forward to identifying new ways to apply our foundational Pathways to Impact research in support of national security agencies. We will continue producing our environmental intelligence briefs while expanding their reach to a broader audience. As our brand and reputation grow, we will also pursue additional opportunities to translate science into policy and deliver measurable benefits to society.

As we continue to grow, we aim to expand our content and strengthen partnerships that improve understanding of global water security challenges and inform decisions across the water, food, health, and energy nexus.

Mike Gremillion
GWSC Director



Scan the QR code to read GWSC's Pathways to Impact paper



About the map: GWSC Cartographer Emma Dyson created this map to accompany GWSC's Kazakhstan product in 2025.

GWSC's environmental insight briefs support decision making around water security. This map highlights several of our 2025 products, with pins representing all the other areas we studied in 2025.

Mexico – 3 Mar 2025

Farmer Displacement: The irrigation systems that are essential to wheat and corn production are being strained by the anticipated drought in Sonora and Sinaloa. This is putting more financial instability on their rural communities. At the same time, cartels associated with Chinese mining interests are controlling limited water resources through violence. Together, declining crop yields and rising violence raise the risk of farmer displacement and abandonment of agricultural towns.

Tehran – 27 Aug 2025

Day Zero Water Availability: Low reservoirs, rising water demand, and power blackouts with water shutoffs amid extreme heat are driving widespread water stress and public outrage. Population growth, high agricultural water demand, high per capita water use, and a dated water-intensive energy sector have created a mismatch between water supply and available resources.

Russia – 21 Feb 2025

Food Security: Despite overall wheat production being within recent norms, Russia's low export quota set in early 2025 could disrupt global wheat supply. Trade disruptions may push vulnerable, import-dependent countries towards more expensive options, driving up food costs. Decreased food access and affordability may increase the possibility of unrest in areas that are already unstable.

Guatemala & Honduras – 14 Nov 2025

Illicit Agriculture: Agricultural stress threatens rural livelihoods, particularly in coffee-producing areas, offering opportunities for criminal organizations. Recurrent droughts, hurricanes, and rising temperatures make coffee production less profitable, while coca cultivation which is more resilient to heat, drought, and flooding offers a viable alternative source of income. By exploiting rural vulnerabilities and the region's proximity to Mexican and US markets, organized crime is growing the region's small but strategically significant coca output to bolster illicit economies.

Grand Ethiopian Renaissance Dam – 21 Aug 2025

Transboundary Water and Dams: Despite political hostility, Ethiopia's GERD has had little measurable impact on Egypt's water security to date. The majority of Egypt's water comes from Lake Nasser, which has stayed constant despite Ethiopia filling the dam during historically dry years. Forecasts for long-term Nile rainfall further lessen the immediate risk of GERD. Egypt's greater future vulnerability may come from Sudan, where a return to stability could enable expanded irrigation that diverts water before it reaches Egypt, a risk Ethiopia's hydropower focused dam does not pose.

India & Pakistan – 23 May 2025

Withholding Water Threats: In line with the Indus Waters Treaty, India lacks the infrastructure necessary to legitimately cut off water to Pakistan. Treaty rules limit India to run of river projects in Kashmir and require releases to protect its own dams and cities, making sustained withholding unrealistic. Pakistan's current water stress is driven more by the overuse and slowly aging irrigation systems than Indian actions, with farm output remaining high and strong. Only the construction of large, highly visible storage dams over decades would give India real leverage over downstream flows.

Taiwan – 5 May 2025

Seasonal Weather Impacts to Instability: El Niño and La Niña-related extreme weather expose weaknesses in power and water systems that China could potentially take advantage of. Heat strains the likelihood of a blackout and puts pressure on the semiconductor industry in Taiwan's near-max energy grid and limited LNG stocks. Drought intensifies water shortages, forcing the government to prioritize semiconductors over agriculture, which feeds farmer resentment that China could amplify to threaten political stability and public stability.

Argentina – 28 Oct 2025

Critical Minerals: Lithium, copper, and uranium resources could strengthen Western Hemisphere supply chains while providing a critical economic boost beyond its vulnerable agriculture sector, where constrained growing conditions often slow the farm-driven economy. Yet mining expansion raises concerns over intensive water use. At the same time, Argentina's energy sector is hobbled by drought-driven hydropower losses, while grid constraints may prevent planned nuclear expansion from offsetting those losses.

This graphic highlights eight of the 31 products GWSC produced in 2025.

Map Credits

Argentina, India-Pakistan, Mexico, Taiwan: Zach Goodwin
Ethiopia, Honduras/Guatemala, Russia, Tehran: Nick Roberge
World map (background): Adobe Stock Images

31 Total products completed in 2025 by the Global Water Security Center's Analysis Team, including 16 one-page Quicklooks and 15 multi-page Environmental Insight Briefs.



Scan the QR code to visit our publicly available repository of GWSC products.

GWSC Goes Global

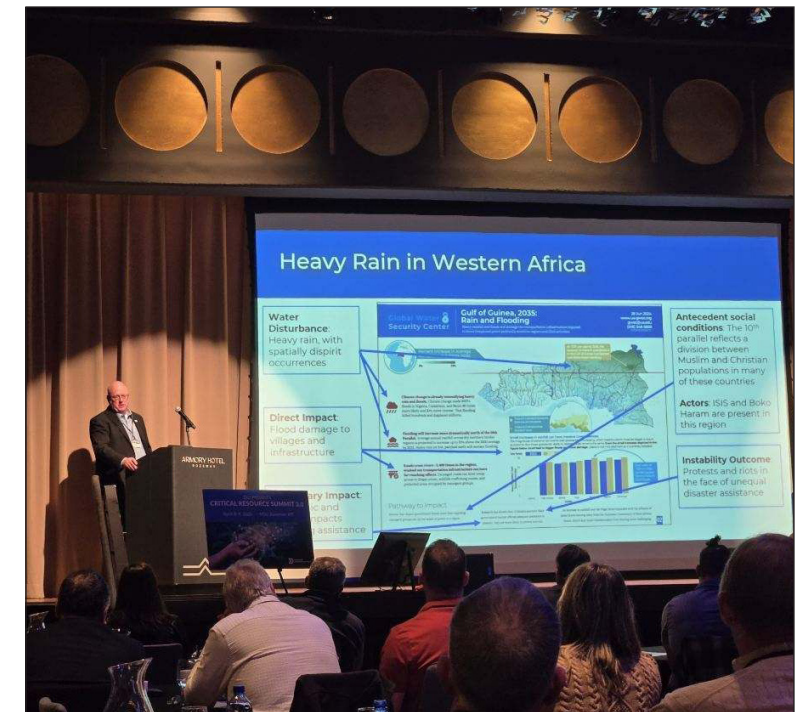
Members of the GWSC staff represented the organization at events around the world, bringing our products to new audiences and increasing awareness of global water security concerns.

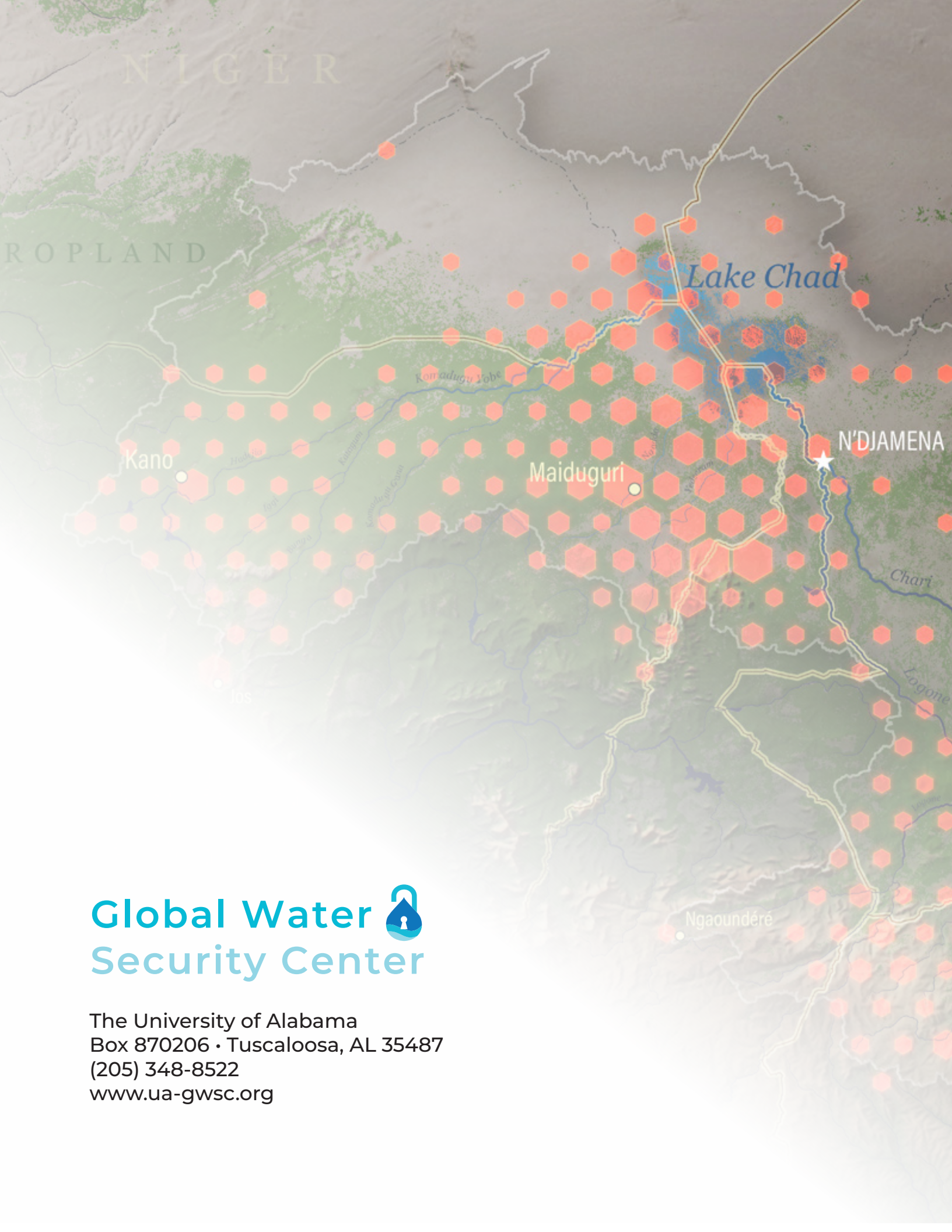


Clockwise from top left: Human Environmental Scientist Caily Schwartz presented at the 2025 International Security Studies conference; Cartographer Emma Dyson displayed a map at the NACIS conference; Director Mike Gremillion and Data Scientist Erin Menzies-Pluer attended the Critical Resource Summit in Montana; Human Environmental Analyst Penelope Mitchell spoke at the 2025 American Association of Geographers conference.



Clockwise from top left: Assistant Director for Technology Hobson Bryan spoke at the 2025 Databricks Data + AI Conference; Deputy Director Kate Brauman represented GWSC in Germany; Human Environmental Scientist Penny Beames participated in a panel discussion at an international summit in Montreal; Director Mike Gremillion was part of a gathering of water security leaders hosted by the Ditchley Foundation in England.





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Global Water Security Center



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