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Global Water Monitor & Forecast Watch List

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Introduction

The ISciences Water Security Indicator Model (WSIM) monitors and forecasts water anomalies on a global basis. Each month we produce data and a report that document current conditions and provide forecasts with lead times from 1 to 9 months. WSIM has been run continuously since April 2011 and has been validated against subsequently observed data. ISciences also provides assessments of the impacts of water anomalies on people, agriculture, and electricity generation. Detailed data and reports are available for purchase. Additional information and pricing are available upon request.

We have recently completed the latest Water Security Indicator Model (WSIM) analysis of global water anomalies using observed temperature and precipitation through October 2023 and an ensemble of forecasts issued the last week of October 2023. This edition of Global Water Monitor & Forecast Watch List presents a selection of regions likely to encounter significant water anomalies in the next few months.

This edition uses results from a new version of WSIM that uses temperature and precipitation data from the ECMWF Reanalysis v5 (ERA5) instead of gridded station data published by NOAA's Climate Prediction Center. Spatial resolution of the maps has sharpened from half-degree to quarter-degree and we expect higher fidelity in sparsely instrumented regions of the world. We have also changed the baseline period for computing statistical distributions from 1950-2009 (60 years) to 1981-2020 (40 years) to rely more exclusively on data from the satellite era. We have published more details and some side-by-side comparisons of the two versions of WSIM, which can be viewed in our recent blogpost.

In addition to the implementation of a new version of WSIM, we have also compiled a list of user questions to help us improve the Global Water Monitor & Forecast Watch List. Please take a moment to complete our user survey. We thank you in advance for your responses and any supplemental information you are able to provide.

All maps have quarter-degree resolution and depict our composite water anomaly index, which is based on WSIM estimates of soil moisture, evapotranspiration deficit, runoff, and total blue water anomalies. Shades of red indicate deficits and shades of blue indicate surpluses. Since different variables are used to estimate deficits and surpluses, it is possible for a single half-degree cell to register both a deficit and a surplus. These cases are depicted on the maps in shades of purple, with the more extreme value (deficit or surplus) used to determine the shade.

Deficits and surpluses are stated in terms of return period – a measure that characterizes the rarity of an event. For example, a return period of 10 years indicates an event that would occur, on average, once every ten years. Higher return periods indicate more extreme and, therefore, more disruptive anomalies. Return period is computed by comparison to cell-specific distributions of data from 1950 through 2009. Anomaly levels correspond to return periods: abnormal=3-5 years, moderate=5-10 years, severe=10-20 years, extreme=20-40 years, and exceptional=greater than 40 years.

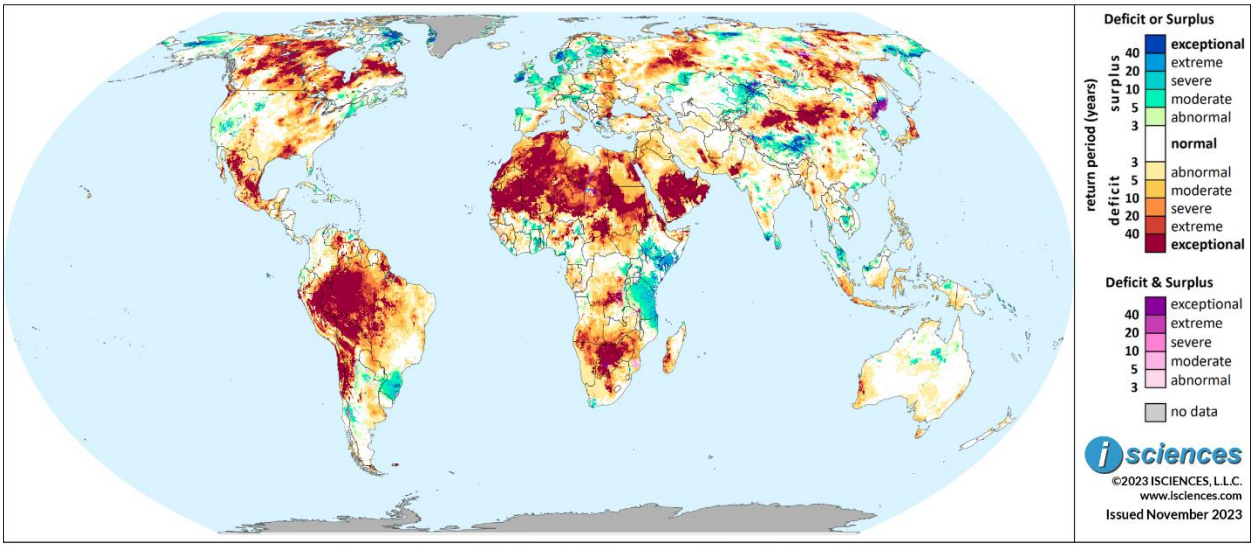
Please note that the WSIM model makes use of seasonal temperature and precipitation forecasts produced by the U.S. National Oceanic and Atmospheric Administration (NOAA) Climate Forecast System Version 2 (CFSv2). These forecasts predict broad temperature and precipitation patterns, but do not effectively predict singular events such as tropical storms. Detailed outlooks and analyses of tropical storms are available from the NOAA National Hurricane Center.

There are numerous regions around the world where country borders are contested. ISciences depicts country boundaries on these maps solely to provide some geographic context. The boundaries are nominal, not legal, descriptions of each entity. The use of these boundaries does not imply any judgment on the legal status of any territory, or any endorsement or acceptance of disputed boundaries on the part of ISciences or our data providers.

Worldwide Water Watch List

This map presents a selection of regions likely to encounter significant water anomalies during the one-year period beginning in August 2023 and running through July 2024 using 3 months of observed temperature and precipitation data and 9 months of forecast data.

ISciences Water Anomalies Forecast: August 2023 - July 2024



Based on observed data through October 2023 and forecasts through July 2024

Watch List: Regional Synopsis

This synopsis provides highlights of regional water forecasts. More detailed analysis is available in "Watch List: Regional Details" immediately following the synopsis.

United States: Severe to extreme surpluses are expected to linger until January 2024 or longer.

Canada: Widespread exceptional deficits are expected to linger in most Canadian provinces until April 2024 or longer.

Mexico, Central America, and the Caribbean: Widespread deficits are expected to linger throughout Mexico until April 2024 or longer.

South America: Much of South America is expected to endure exceptional deficits, though these anomalies are expected to dissipate after January 2024, becoming mostly near-normal conditions.

Europe: The majority of Continental Europe is expected to observe prolonged surpluses, ranging from moderate to extreme intensity until April 2024.

Africa: Widespread deficits in northern African countries are expected to resolve, with near-normal conditions expected across much of the continent throughout April 2024.

Middle East: Exceptional deficits are expected to continue in southern regions of Yemen and Oman throughout April 2024.

Central Asia and Russia: Intense deficits are expected to persist in western and eastern Russia until April 2024, as are intense surpluses in eastern Kazakhstan.

South Asia: Exceptional deficits are expected to persist in areas of Pakistan and western India until January 2024.

Southeast Asia and the Pacific: Widespread intense deficits are expected to occur in most Indonesian regions in Maritime Southeast Asia, which are expected to resolve after January 2024.

East Asia: Intense deficits are expected to persist across northern China until January 2024.

Australia & New Zealand: Much of Australia is expected to experience near-normal conditions through July 2024, though western Tasmania is expected to observe severe to extreme deficits through January 2024.

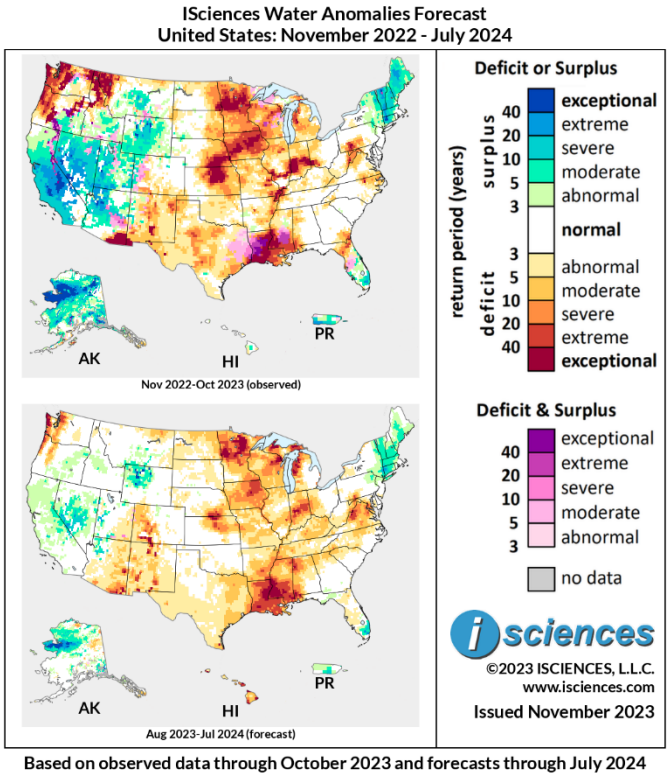
Watch List: Regional Details

United States

The 12-month forecast ending in July 2024 anticipates intense deficits to linger in Louisiana and New Mexico, as well as in the Upper Midwest and western regions of the Pacific Northwest. Existing surpluses in western states are expected to mostly resolve, but will continue in northwestern states and some regions of the Midwest.

Severe to exceptional deficits are expected in the following regions:

- **Louisiana**, with the highest concentrations appearing near Concordia Parish and continuing into Wilkinson County in southwestern **Mississippi**.
- Northern **Minnesota**, near the Red Lake and Leech Lake Reservations.
- Northeastern **Iowa**, appearing throughout Allamakee County. Nearby, areas of south-central **Kansas** and northern **Nebraska**
- Central **Indiana**, throughout regions near Indianapolis.
- Western coastal regions of the **Pacific Northwest**.



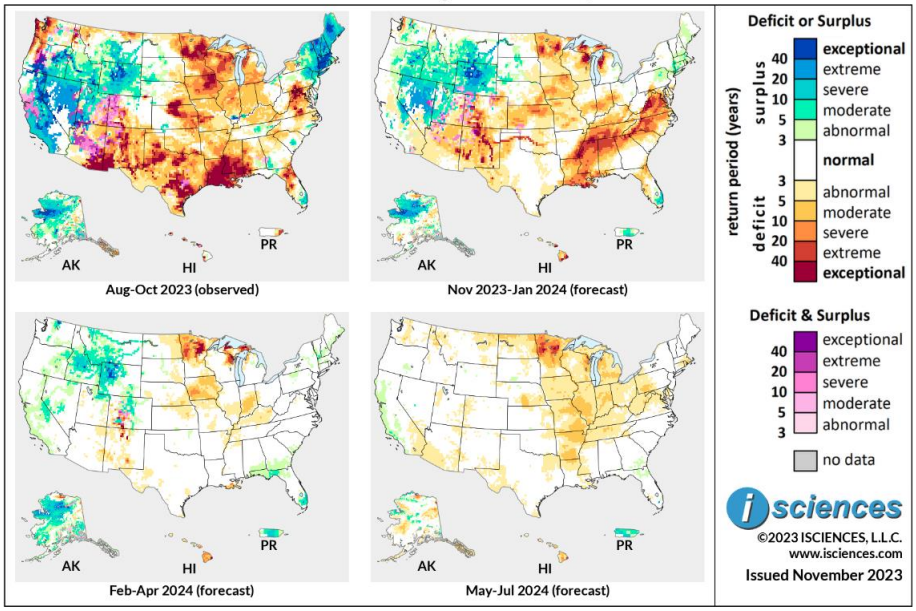
The map on top depicts long-term deficit and surplus anomalies as of October 2023, while the map on the bottom depicts a forecast of long-term deficit and surpluses as of July 2024.

Moderate to severe surpluses are expected in:

- **Nevada**, widespread throughout most of the state.
- Northwestern **Wyoming**, in areas throughout and nearby the Yellowstone National Park.
- **Vermont**, widespread throughout the state. These surpluses continue throughout the majority of **New Hampshire**, **Massachusetts**, **Connecticut** and **Rhode Island**.
- **Alaska**, throughout the Seward Peninsula.

The 3-month maps (below) show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
United States: August 2023 - July 2024



Based on observed data through October 2023 and forecasts through July 2024

The forecast through January 2024 anticipates extreme to exceptional surpluses in southern California to diminish, but continue in eastern regions of the state, as well as into Nevada, eastern Oregon, northwestern Wyoming, and western regions of Utah. Exceptional deficits are expected to linger in pockets of north-central and southern New Mexico, with similarly intense deficits appearing throughout Louisiana, northern Mississippi, and northern Alabama. These deficits also persist in northern South Carolina, throughout Tennessee, North Carolina, and Virginia. Further north, exceptional deficits will decrease in size, but persist in northern Minnesota and northeastern regions of Michigan. Outside of the Continental U.S., northern Alaska, particularly throughout the Seward Peninsula, can anticipate extreme to exceptional surplus throughout the region.

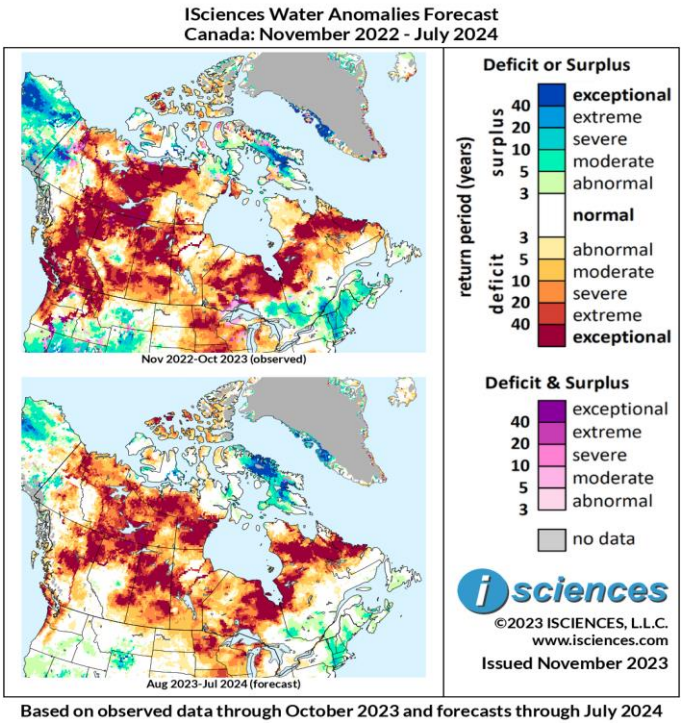
From February through April 2024, existing anomalies within contiguous states are expected to mostly dissipate. However, severe to extreme surpluses are expected to continue in Idaho, northwestern Wyoming, and in pockets throughout Montana. Extreme to exceptional deficits are expected to linger in northern Minnesota and in Michigan's Upper Peninsula, while moderate to severe deficits are anticipated throughout Iowa and central to southern Indiana.

The forecast for the final months – May 2024 through July 2024 – anticipates near-normal conditions throughout most of the country, with exceptional deficits continuing in northern Minnesota. Exceptional deficits in northeastern coastal regions of Michigan are expected to dissipate.

Please note that WSIM forecast skill declines with longer lead times.

Canada

The 12-month forecast ending in July 2024 anticipates widespread exceptional deficits to remain throughout most of the country, with some intense surplus emerging in the northern islands of Nunavut.



The map on top depicts long-term deficit and surplus anomalies as of October 2023, while the map on the bottom depicts a forecast of long-term deficit and surpluses as of July 2024.

Extreme to exceptional deficits are expected in:

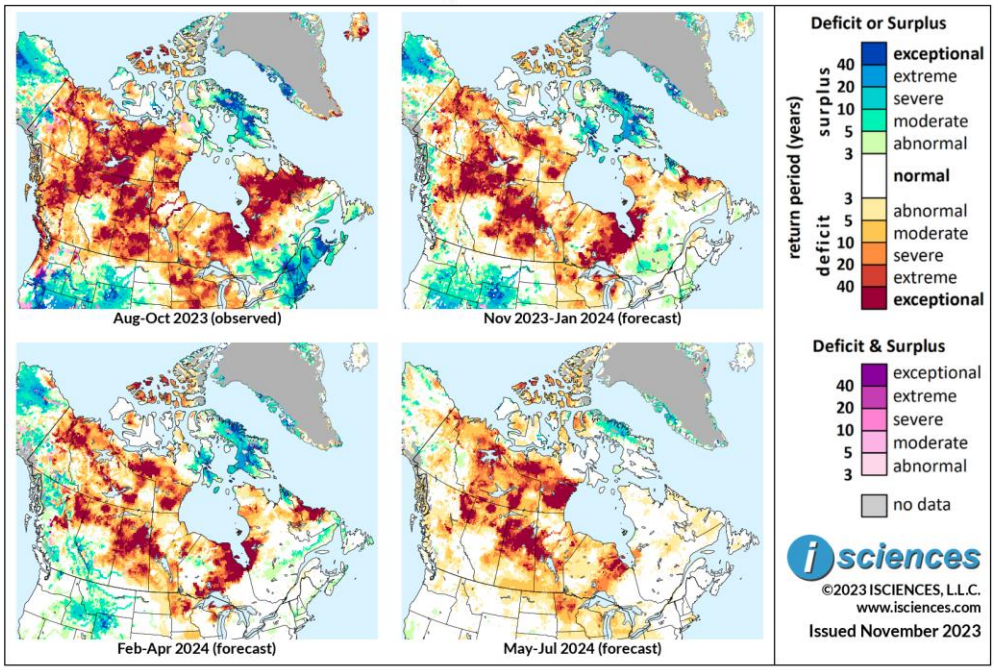
- Central and northeastern **British Columbia**, appearing in regions west of Williston Lake, as well as throughout the Canadian Northern Rockies area.
- Northern and southeastern **Alberta**, in regions near the Wood Buffalo National Park of Canada, as well as regions east of Calgary.
- **Saskatchewan**, widespread throughout most of the province's northern and central regions, continuing east into western Manitoba, northwest of Lake Winnipeg.
- Southern to northeastern **Ontario**, beginning in regions bordering Lake Superior and into coastal regions along the Hudson Bay. These deficits travel along the coast into western and northern **Quebec**, as well as into northern Newfoundland.
- Northern **Yukon**, in areas near Ivvavik National Park, continuing east throughout Northwestern Territories and into the Kivalliq and Kitikmeot regions of **Nunavut.**

Extreme to exceptional surpluses are expected to occur in:

- The Qikiqtaaluk Region of **Nunavut**, covering much of Baffin Island.

The 3-month maps (below) show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
Canada: August 2023 - July 2024



Based on observed data through October 2023 and forecasts through July 2024

The forecast through January 2024 anticipates exceptional deficits in most provinces to persist, appearing in central to northeastern British Columbia, northern and southeastern Alberta, the majority of Saskatchewan, central Manitoba, and across Ontario into coastal regions of Quebec. Northern Yukon and southern and northwestern regions of Northwestern Territory will observe continued exceptional deficits, as well as western and southern regions of Nunavut. Further north, southeastern regions of the Qikiqtaaluk Region and Baffin Island can expect continued extreme to exceptional surplus.

From February through April 2024, deficits will continue to be widespread throughout most provinces, but will slightly decrease in size. Regions that continue to be affected include central and northeastern British Columbia, northern Alberta, much of Saskatchewan, western Manitoba, and along Ontario and Quebec's coasts along the Hudson Bay. Deficits are also expected to continue in southern Ontario and northern Newfoundland. Further north, deficits in northern Yukon and Northwest Territories are expected to persist, as well as in western and southern Nunavut. In Baffin Island, extreme to exceptional surpluses will continue across most of the area, as well as southwestern regions of the Qikiqtaaluk Region.

The forecast for the final months – May 2024 through July 2024 – anticipates widespread deficits to continue throughout northeastern British Columbia, as well as north-central Saskatchewan. Deficits will continue in central Manitoba, northwest of Lake Winnipeg, but will subside in Quebec and Newfoundland.

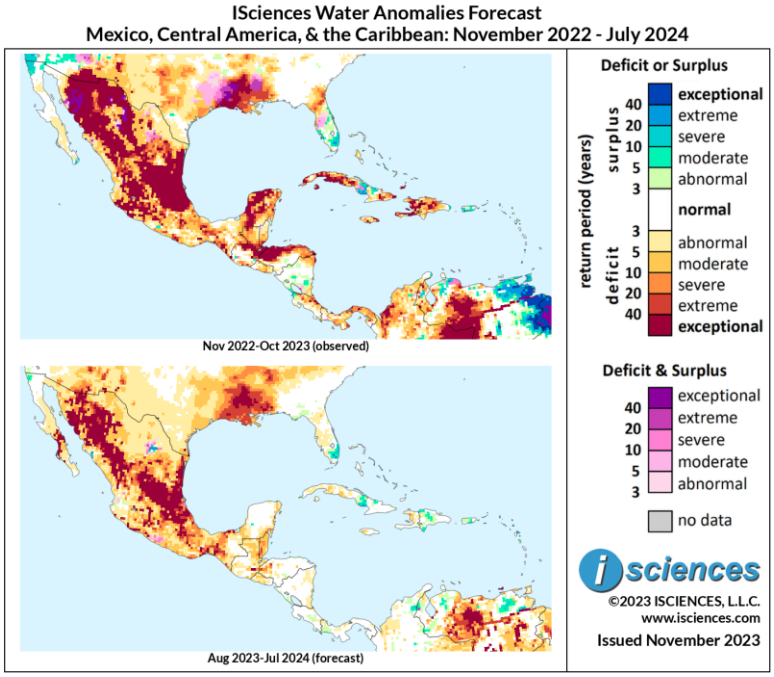
Please note that WSIM forecast skill declines with longer lead times.

Mexico, Central America, and the Caribbean

The 12-month forecast ending in July 2024 anticipates widespread exceptional deficits throughout much of Mexico, while Central America can anticipate lingering deficits to disappear, becoming near-normal conditions.

Deficits of varying intensity are expected in:

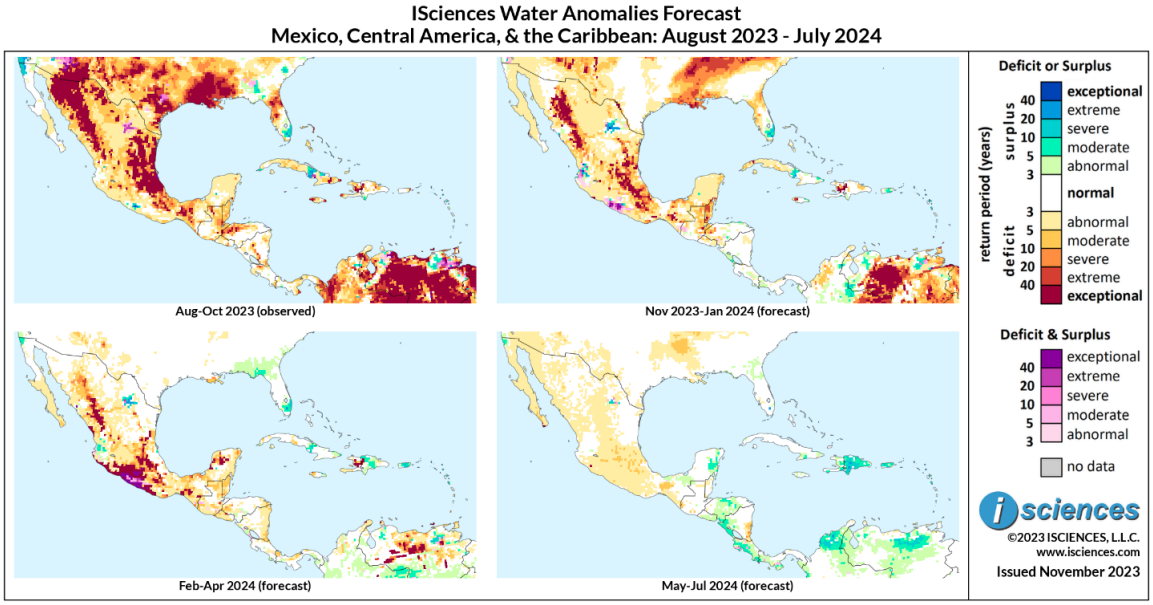
- **Mexico**, widespread throughout the country, spreading from the state of Sonora into Durango, Zacatecas, San Luis Potosi, and Tamaulipas.
- Southwestern **Guatemala**, with severe to extreme deficits appearing in the Jutiapa Department and continuing east into western **Honduras**.
- **Belize**, with moderate to severe deficits appearing throughout the country.



Based on observed data through October 2023 and forecasts through July 2024

The map on top depicts long-term deficit and surplus anomalies as of October 2023, while the map on the bottom depicts a forecast of long-term deficit and surpluses as of July 2024.

The 3-month maps (below) show the evolving conditions in more detail.



Based on observed data through October 2023 and forecasts through July 2024

The forecast through January 2024 indicates that exceptional deficits will persist in Sonora, Durango, San Luis Potosi, and regions nearby Mexico City, but somewhat decrease in size. Moderate to severe deficits will persist in Belize, while deficits in western Honduras will decrease in size and severity. Additionally, some transitional conditions in coastal regions of Guerrero are expected to appear.

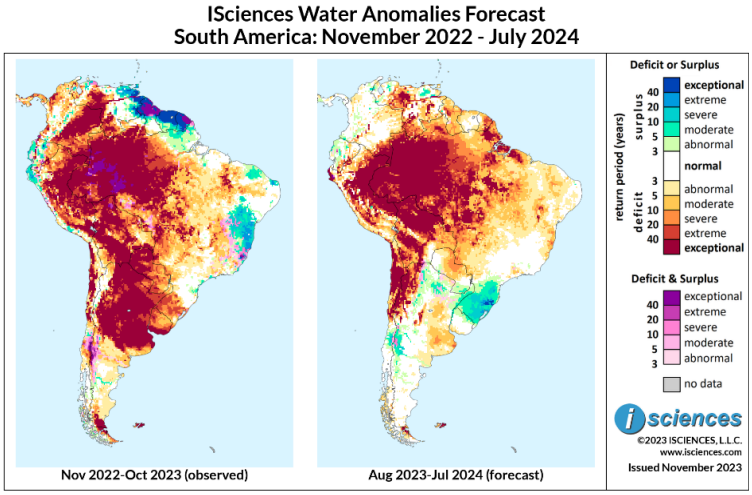
From February through April 2024, exceptional deficits in Mexico are expected to linger, particularly in Durango, regions north of Mexico City, and the Yucatan Peninsula, with some transitional conditions appearing in the states of Oaxaca and Guerrero.

The forecast for the final months – May 2024 through July 2024 – anticipates near normal conditions throughout the region, though Nicauragua, Costa Rica, and the Dominican Republic are expected to observe moderate surpluses.

Please note that WSIM forecast skill declines with longer lead times.

South America

The 12-month forecast ending in July 2024 anticipates widespread exceptional deficits to continue throughout much of Brazil and the Bolivarian Nations, as well as in some areas of the Guianas. Isolated surpluses are expected to occur in southern Brazil.



The map on the left depicts long-term deficit and surplus anomalies as of October 2023, while the map on the bottom depicts a forecast of long-term deficit and surpluses as of July 2024.

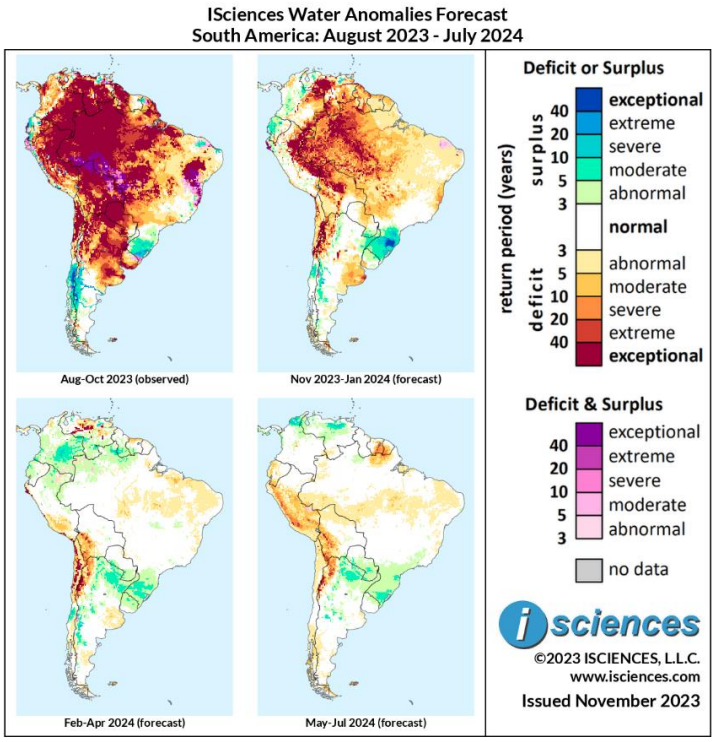
Extreme to exceptional deficits are expected in:

- Western and central **Brazil,** throughout the majority of the state of Amazonas, and into regions of Rondonia, Para, and Mato Grosso.
- Eastern **Peru**, in regions near the Mashco Piro and Made De Dios Reserves.
- **Bolivia**, throughout the Beni Department and in regions northeast of the Silvestre Amazónica Manuripi National Reserve.
- Northern **Chile**, throughout the Antofagasta Region.
- West-central **Venezuela**, in areas near the Aguaro-Guariquito National Park.

Moderate to severe surpluses are expected in the following regions:

- Southeastern **Brazil**, throughout the state of Rio Grande do Sul.
- Western **Argentina**, in western regions of the San Juan Province.

The 3-month maps (below) show the evolving conditions in more detail.



Based on observed data through October 2023 and forecasts through July 2024

The forecast through January 2024 indicates that deficits throughout the continent will significantly decrease in severity and magnitude, though will continue in northeastern Colombia, eastern Peru, northwestern Venezuela, western Brazil, and northwestern Bolivia. Northern Chile can expect similarly intense deficits to continue. In the Brazilian state of Rio Grande do Sul, severe to exceptional surpluses are expected to continue.

From February through April 2024, deficits in Brazil, Peru, and Colombia are expected to vanish, becoming mostly normal conditions. Deficits are expected to linger in southwestern Bolivia and northern Chile, but with lesser intensity. Moderate surplus is expected to expand in northern Argentina, southern Brazil, and eastern Colombia.

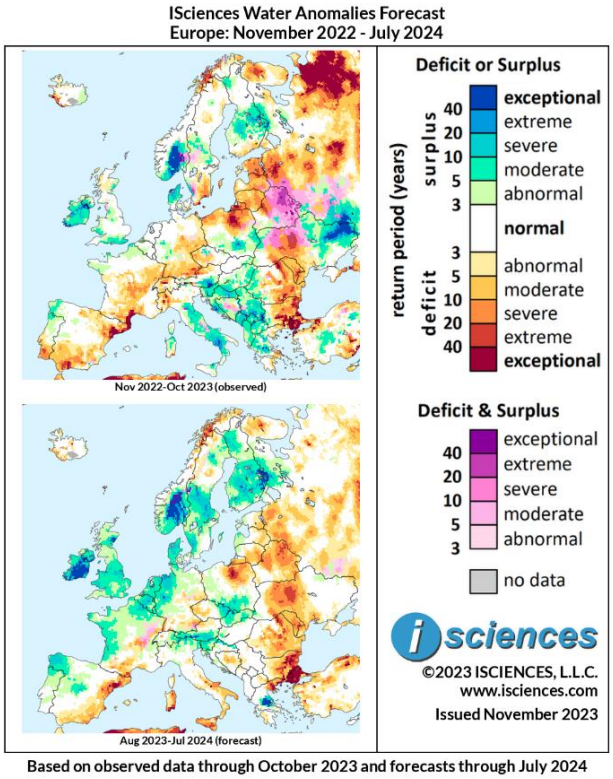
The forecast for the final months – May 2024 through July 2024 – anticipates mostly normal conditions to continue throughout the continent, with some deficits intensifying in western coastal regions of Peru into southwestern Bolivia and northeastern Argentina. Moderate surpluses in northern Argentina and the Brazilian state of Rio Grande do Sul will linger but somewhat decrease in size. Further north, similar surpluses are expected in northernmost regions of Colombia and east-central regions of Venezuela. Moderate to severe deficits are expected to emerge in Suriname.

Please note that WSIM forecast skill declines with longer lead times.

Europe

The 12-month forecast ending in July 2024 anticipates widespread surpluses throughout much of the United Kingdom and Ireland as well as Continental Europe. Deficits are expected in Eastern Europe and the Balkans.

The map on top depicts long-term deficit and surplus anomalies as of October 2023, while the map on the bottom depicts a forecast of long-term deficit and surpluses as of July 2024.



The map on top depicts long-term deficit and surplus anomalies as of October 2023, while the map on the bottom depicts a forecast of long-term deficit and surpluses as of July 2024.

Severe to exceptional surpluses are expected in:

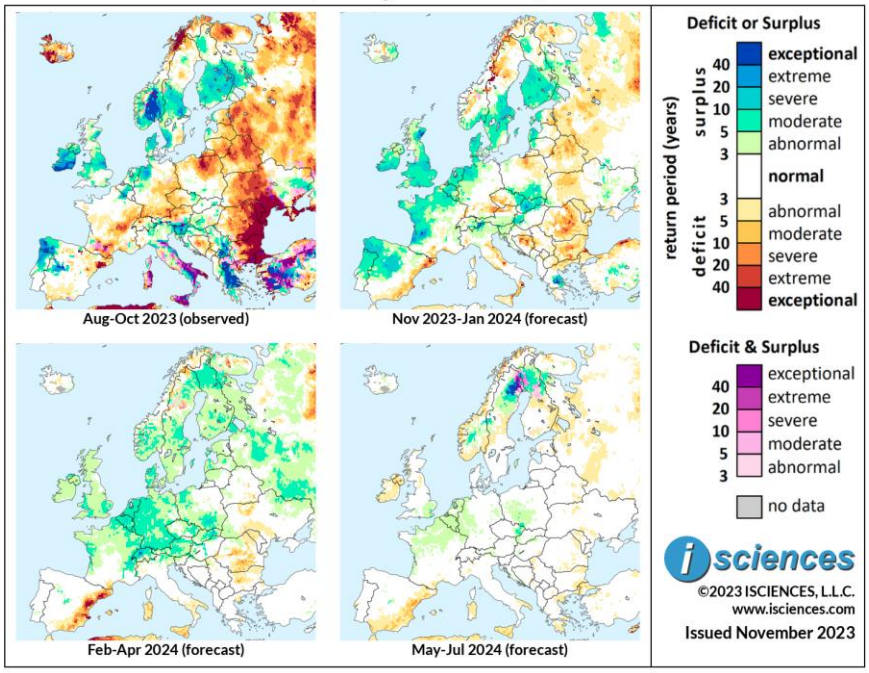
- Much of central to eastern **Norway**, which spread further east into southern **Sweden** and throughout most of **Finland.**
- **Netherlands** and **Belgium,** widespread throughout both countries, spreading further into western **Germany.**
- Regions along the southern border of **Austria**, as well as southern **Poland** and western areas of the Czech Republic.
- Northwestern **Spain**, throughout the community of Galicia.
- Throughout most of the **United Kingdom** and **Ireland**.

Severe to exceptional deficits are expected in the following regions:

- Western **Ukraine**, in areas west of the city of Kyiv.
- Eastern regions of the **Balkans**, particularly eastern **Bulgaria**, **Moldova**, and throughout most of **Romania**.
- North-central **Poland**, throughout the Warmian-Masurian Voivodeship.
- Northeastern **Belarus**, in areas near the city of Viciebsk.
- Northwestern **Spain**, in coastal areas of the Catalonia region.

The 3-month maps (below) show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
Europe: August 2023 - July 2024



Based on observed data through October 2023 and forecasts through July 2024

The forecast through January 2024 indicates that moderate to severe surplus is expected throughout western Spain, western France, Belgium, the Netherlands, and Slovakia. Similar surpluses are expected to be widespread throughout Ireland, the United Kingdom, southern Sweden, and southern Finland. Deficits in the Balkans are expected to linger but decrease significantly in intensity and magnitude, with mainly moderate to severe deficits persisting in central Romania and central Bulgaria. The Catalonia region of Spain can expect similarly intense deficits.

From February through April 2024, widespread moderate surplus is expected throughout most of Continental Europe, spanning much of Belgium, Netherlands, Germany, Switzerland, Poland, and Slovakia. Similarly intense pockets of surplus are expected in southern Norway, central Sweden, and northern Finland. In eastern coastal regions of Spain, extreme to exceptional deficits are expected to occur, near the cities of Denia, Tarragona, and Barcelona.

The forecast for the final months – May 2024 through July 2024 – anticipates mostly near normal conditions, though extreme to exceptional surpluses are anticipated to emerge in northern regions of Sweden and Finland.

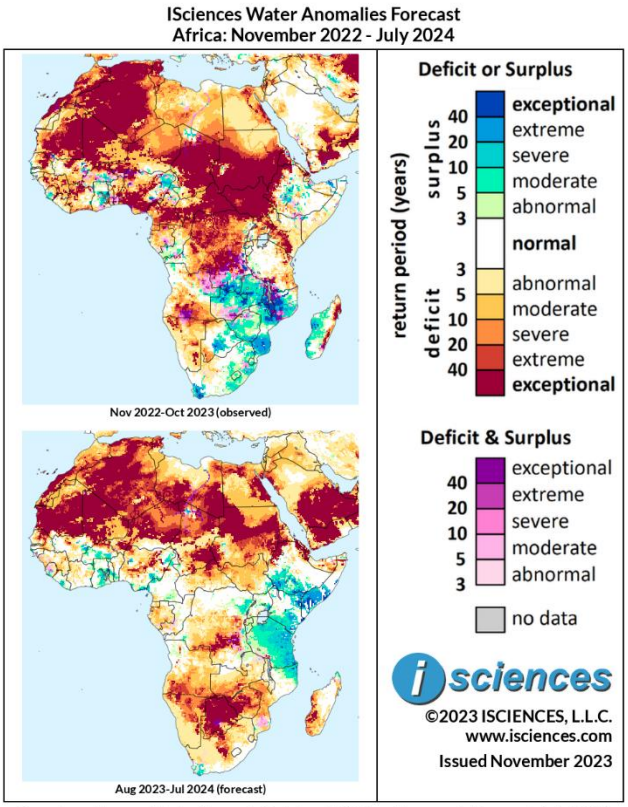
Please note that WSIM forecast skill declines with longer lead times.

Africa

The 12-month forecast ending in July 2024 anticipates widespread deficits in northern regions of the continent, with similarly intense deficits occurring in Botswana. Eastern countries and southern regions of the Horn of Africa are expected to observe intense surplus.

Extreme to exceptional deficits are expected in:

- The majority of **Mauritania,** northern to central **Mali, Algeria,** southern **Libya, and** most of **Niger**.
- Most northern and southeastern regions of **Chad**, which continue into northwestern to eastern **Sudan** and along the northern border of **Ethiopia**.
- **Democratic Republic of Congo** (DRC), in areas near the city of Kabongo.
- **Angola,** throughout the Cunene Province, continuing into northwestern **Namibia**, and throughout **Botswana.**
- Southwestern **Madagascar**, throughout areas nearby the region of Soahazo.



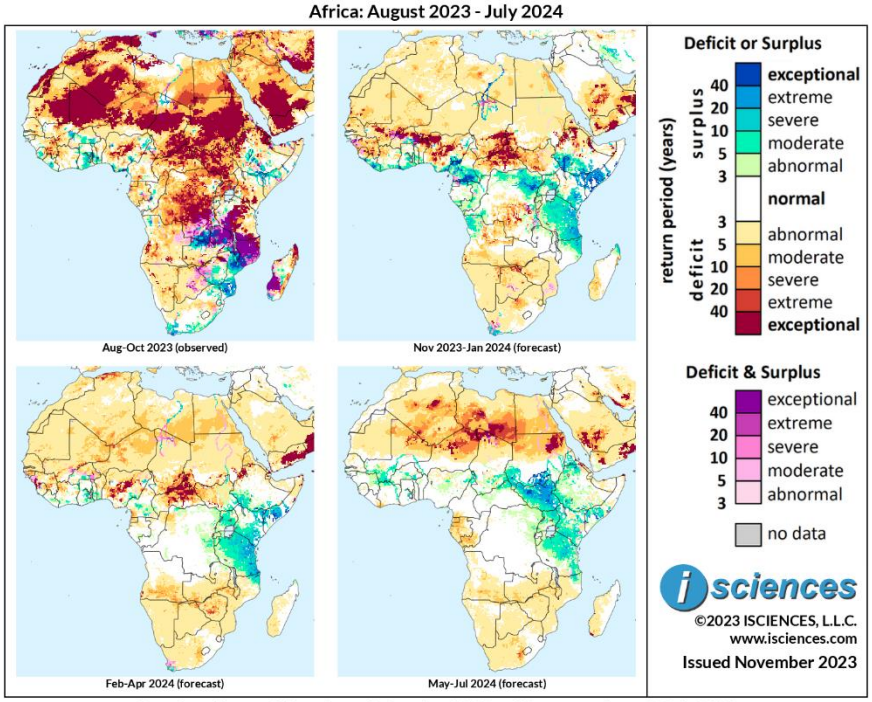
The map on top depicts long-term deficit and surplus anomalies as of October 2023, while the map on the bottom depicts a forecast of long-term deficit and surpluses as of July 2024.

Severe to extreme surpluses are expected to occur in:

- **Tanzania**, throughout the country.
- **Somalia**, near the city of Baidoa in the country's South West State.
- Southwest **Ethiopia**, west of the city in Arba Minch.

The 3-month maps (below) show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
Africa: August 2023 - July 2024



Based on observed data through October 2023 and forecasts through July 2024

The forecast through January 2024 anticipates most deficits in northern African countries to dissipate, but still linger in southern Mali, northern Benin, and northwestern to central Nigeria. Similar deficits will continue in southeastern Chad, northern Central African Republic, and northern Ethiopia. Moderate to extreme surpluses are expected to arise in many areas of western and eastern Africa, including coastal regions of Liberia and Ivory Coast, along the coast into southern Cameroon, northern DRC, Uganda, southern Kenya, southern Somalia, and Tanzania.

From February through April 2024, deficits in central African countries are expected to dissipate further, mainly affecting central Niger and the Central African Republic. Surpluses are expected to continue throughout Tanzania, Kenya, Uganda, and southern Somalia.

The forecast for the final months – May 2024 through July 2024 – anticipates deficits to re-emerge in southern Libya, central Algeria, northeastern Sudan, and northeastern Niger. Intense surpluses are expected to emerge in South Sudan, while similarly intense surpluses will continue in Tanzania, Kenya, and Uganda.

Please note that WSIM forecast skill declines with longer lead times.

Middle East

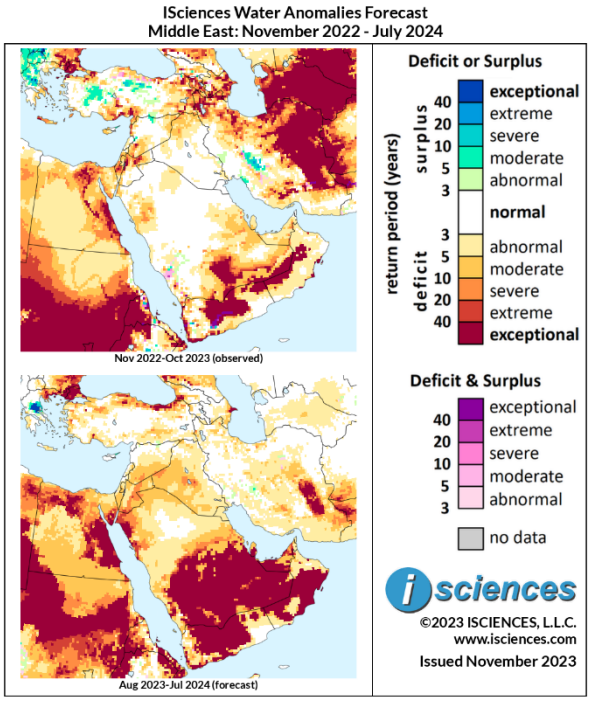
The 12-month forecast ending in July 2024 anticipates exceptional deficits to expand significantly across southern Saudi Arabia, covering much of Yemen, Oman, and the United Arab Emirates. Exceptional deficits are also expected to retreat in eastern Iran.

Extreme to exceptional deficits are expected in the following areas:

- **Saudi Arabia**, in most regions south of Riyadh.
- **Yemen** and **Oman**, widespread throughout both countries.
- Eastern **Iran**, in areas within the Kerman Province.
- Northern coastal regions of **Turkey** along the Black Sea.

Moderate to severe deficits are expected in the following regions:

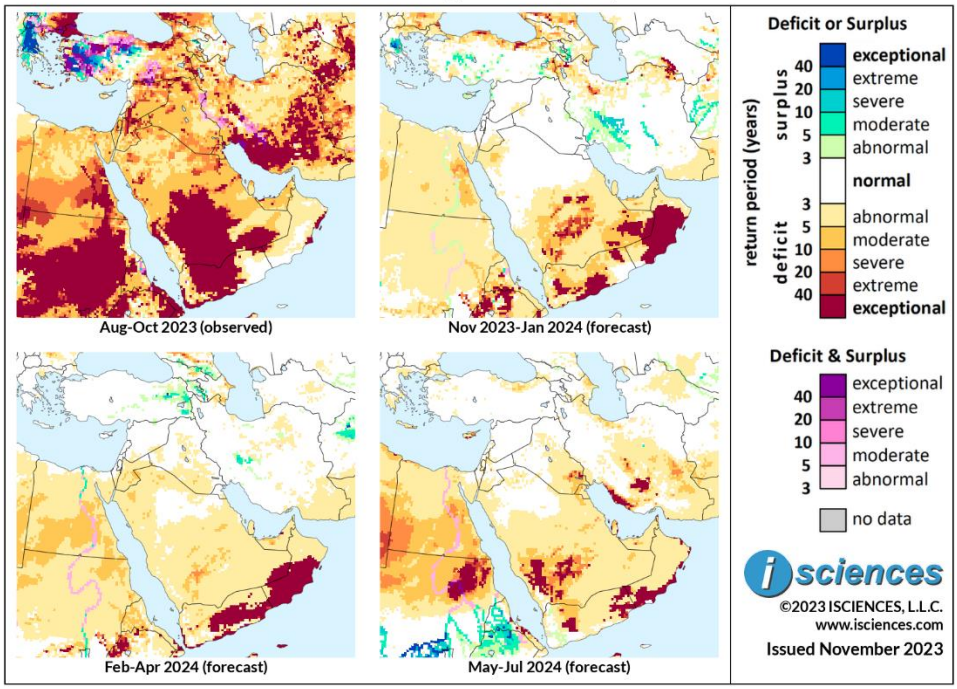
- **Jordan**, in most southern areas of the country.
- Western to central **Iraq,** specifically in areas near Razzaza Lake.
- **Syria**, in areas of the Homs and al-Hasakah Governorates.



The map on top depicts long-term deficit and surplus anomalies as of October 2023, while the map on the bottom depicts a forecast of long-term deficit and surpluses as of July 2024.

The 3-month maps (below) show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
Middle East: August 2023 - July 2024



Based on observed data through October 2023 and forecasts through July 2024

The forecast through January 2024 indicates that exceptional deficits will decrease in size, but continue throughout Saudi Arabia's Riyadh Province, as well as much of Oman. South-central and western Yemen can expect isolated deficits of similar intensity. Further north, exceptional deficits along Turkey's northern coast are expected to linger. In Iran, southwestern regions can expect moderate to severe surpluses, while northwestern regions of Iran, near the city of Mashbad, can expect exceptional deficits.

From February through April 2024, exceptional deficits in most of Saudi Arabia are expected to vanish, though will still remain widespread throughout most of Oman and central to eastern Yemen. Otherwise, most of the region can anticipate near-normal to moderate deficit conditions.

The forecast for the final months – May 2024 through July 2024 – anticipates near-normal to moderate deficit conditions to continue in most of the Middle East, though some pockets of exceptional deficits are expected to re-emerge in southwestern regions of Saudi Arabia, western Yemen, and southern coastal regions of Oman. Similar deficits are expected to arise in southwestern Iran.

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Central Asia and Russia

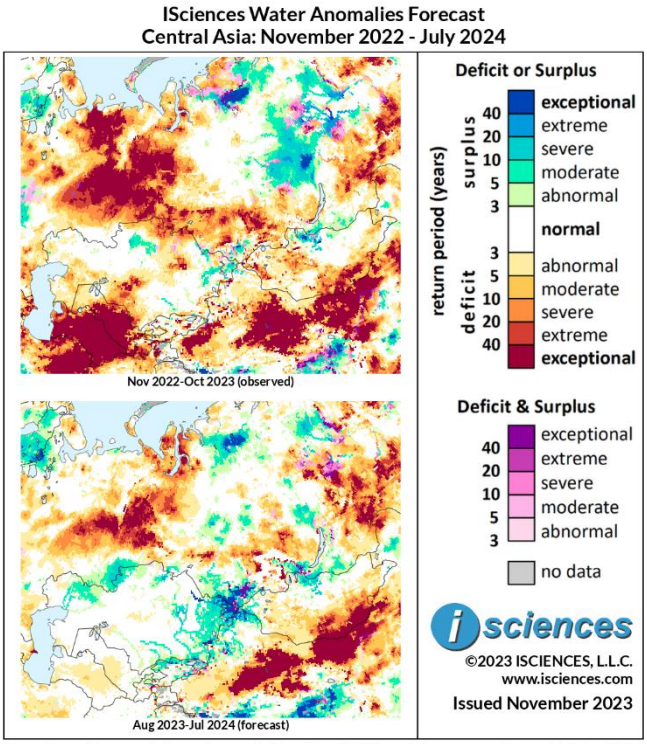
The 12-month forecast ending in July 2024 indicates that intense deficits in central Russia will mostly retreat, and that deficits in southwestern and eastern Russia will persist, but decrease in area.

Extreme to exceptional deficits are expected in the following areas:

- Southwestern **Russia**, in areas throughout the Sverdlovsk Oblast, Perm Krai, and the Republic of Tatarstan.
- Northern **Russia**, throughout northern coastal regions of the Yamalo-Nenets Autonomous Okrug.
- Southeastern **Russia**, throughout much of the Zabaykalsky Krai region.

Severe to exceptional surpluses are anticipated in:

- Northern **Russia**, in central regions of the Taymyrsky Dolgano-Nenetsky District.
- Northeastern **Russia**, in the northernmost areas of the Irkutsk Oblast.
- Eastern portions of **Kazakhstan**, spreading further into the southern Siberian region of **Russia**.



Based on observed data through October 2023 and forecasts through July 2024

The map on top depicts long-term deficit and surplus anomalies as of October 2023, while the map on the bottom depicts a forecast of long-term deficits and surpluses as of July 2024.

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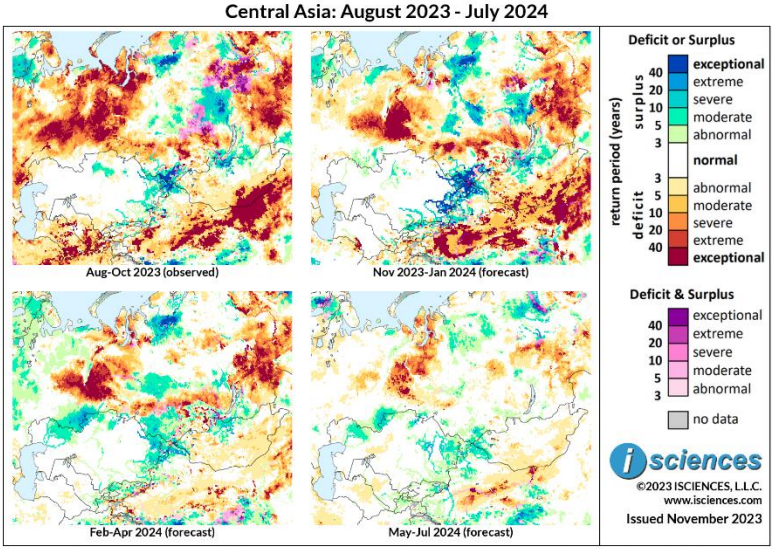
ISciences Water Anomalies Forecast
Central Asia: August 2023 - July 2024



Based on observed data through October 2023 and forecasts through July 2024

The forecast through January 2024 indicates that exceptional deficits will continue throughout the Sverdlovsk Oblast, southern Siberia, and throughout much of the Irkutsk Oblast. Exceptional surplus will continue in western to central regions of the Yamalo-Nenets Autonomous Okrug, as well as in areas near the city of Krasnoyarsk and the Kirensky District. Exceptional surplus is expected to be widespread throughout eastern Kazakhstan, which spreads further east into southernmost regions of Siberia, as well as further south into northern Kyrgyzstan.

From February through April 2024, widespread deficits are expected to continue throughout the Sverdlovsk Oblast, northern coastal regions of Yamalo-Nenets Autonomous Okrug, across southern Siberia, and throughout eastern regions of the Irkutsk Oblast. Surpluses ranging from severe to exceptional intensity are expected to linger in western to central areas of the Taymyrsky Dolgano-Nenetsky District, and in the Altai Krai. Surpluses in eastern Kazakhstan are expected to lessen in intensity but persist, instead transitioning to severe anomalies.

The forecast for the final months – May through July 2024 – anticipates mostly normal conditions, with some severe to exceptional deficits dissipating, though persisting in coastal regions of northernmost Yamalo-Nenets Autonomous Okrug, northern regions of the Beloyarsky District, and northern areas of Tyumen Oblast.

Please note that WSIM forecast skill declines with longer lead times.

South Asia

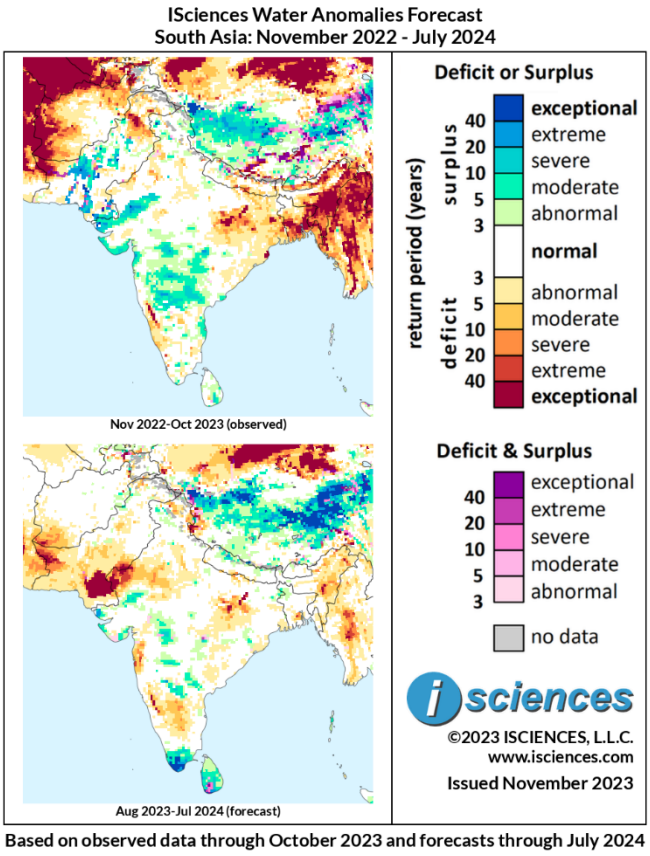
The 12-month forecast ending in July 2024 anticipates mostly near normal conditions throughout much of the region, with some exceptional deficits occurring in Pakistan and east-central India. Surpluses in central India are expected to dissipate, but will reappear in southernmost regions of the country.

Severe to exceptional deficits are expected in the following regions:

- Southern **Pakistan**, in the Tharparkar District of the Sindh Province. Western regions of the country, specifically in the province of Balochistan, can anticipate similarly intense deficits.
- East-central **India**, in southeastern regions of the state of Uttar Pradesh.
- Western **India**, in the coastal city of Mumbai.

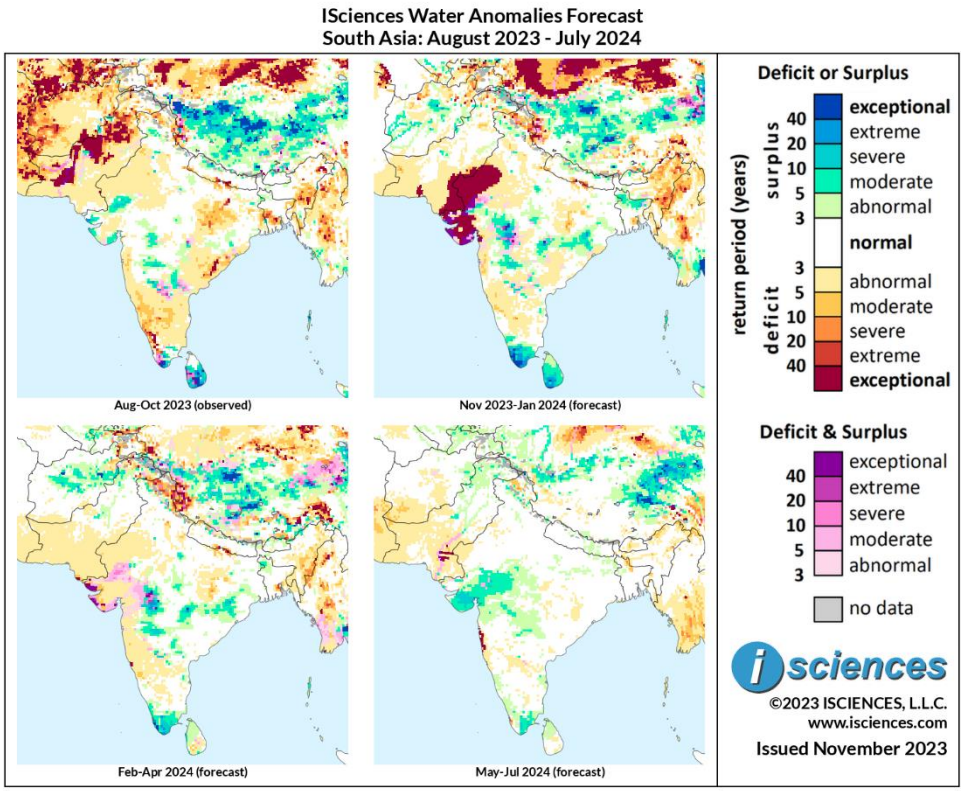
Moderate to exceptional surpluses are expected in:

- Southern **India**, in southernmost regions of the state of Tamil Nadu.
- Western **India**, in western coastal regions of the state of Gujarat.
- **Sri Lanka**, throughout much of the country.



The map on top depicts long-term deficit and surplus anomalies as of October 2023, while the map on the bottom depicts a forecast of long-term deficit and surpluses as of July 2024.

The 3-month maps (below) show the evolving conditions in more detail.



Based on observed data through October 2023 and forecasts through July 2024

The forecast through January 2024, isolated pockets of severe to extreme surplus are expected to manifest in central India, while extreme to exceptional surplus is expected to continue in southern regions of the state of Tamil Nadu and Sri Lanka. Exceptional deficits in southeastern Pakistan are expected to persist, continuing to spread into nearby western Indian states. Further east, much of Bangladesh is expected to experience moderate to severe deficits.

From February through April 2024, intense deficits in Pakistan and India are expected to disappear, though moderate to extreme surpluses are expected to linger in west-central and southern India. Additionally, northernmost Indian states can expect an emergence of severe to extreme deficits.

The forecast for the final months – May 2024 through July 2024 – the region can anticipate continued near-normal conditions, though moderate to severe surpluses are expected to occur in Gujarat and southern Rajasthan.

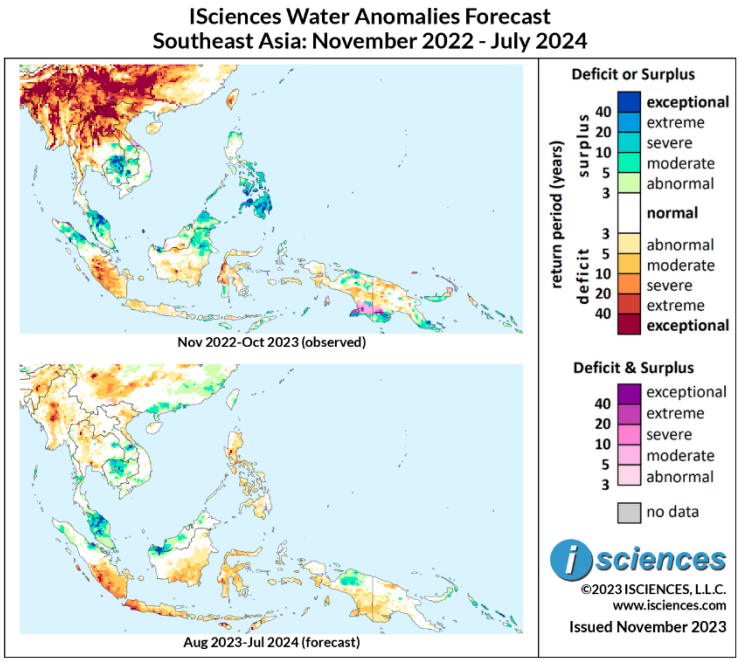
Please note that WSIM forecast skill declines with longer lead times.

Southeast Asia and the Pacific

The 12-month forecast ending in July 2024 anticipates some instances of intense surplus in Mainland Southeast Asia, while several Indonesian regions of Maritime Southeast Asia are expected to observe prolonged deficits.

Moderate to severe surpluses are expected in:

- **Malaysia**, appearing in northeastern regions of Peninsular Malaysia, as well as near the city of Kuching.
- **Indonesia**, in the northern coastal regions of the Riau Province.
- **Cambodia**, in regions near Tonlé Sap.



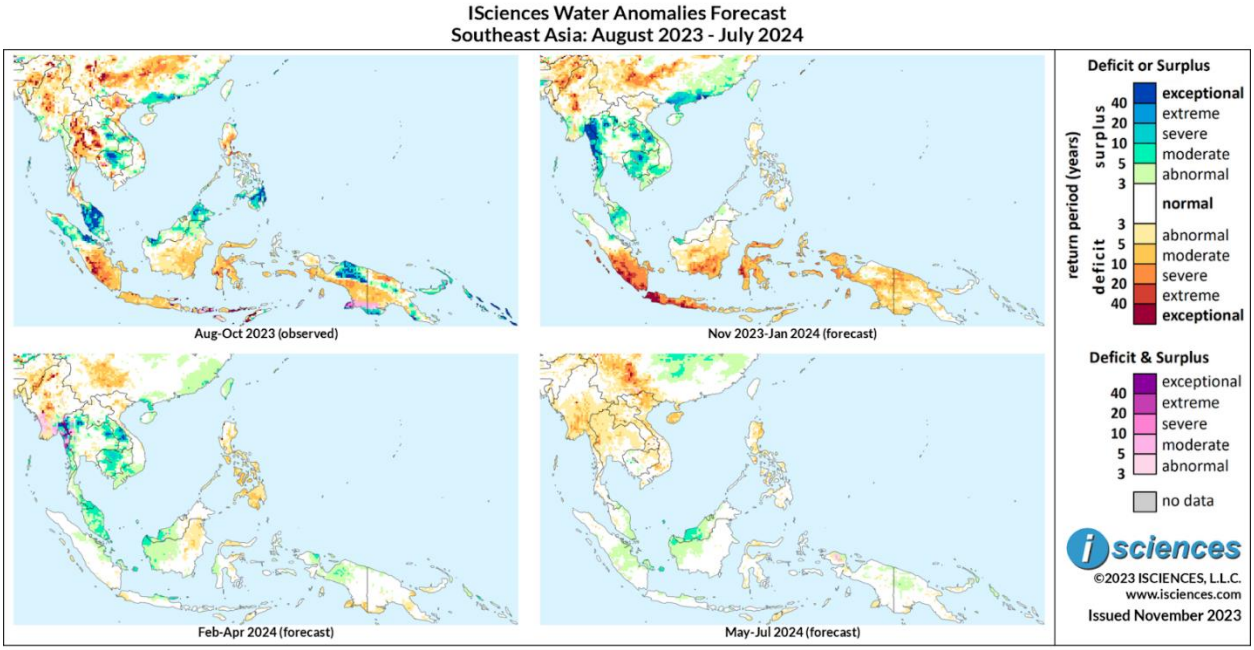
Based on observed data through October 2023 and forecasts through July 2024

The map on top depicts long-term deficit and surplus anomalies as of October 2023, while the map on the bottom depicts a forecast of long-term deficit and surpluses as of July 2024.

Severe to exceptional deficits are expected in the following regions:

- **Indonesia**, with deficits appearing in Sumatra, western Java, and the Greater Sunda Islands. Some deficits continue in southwestern regions of Kalimantan and Sulawesi.
- **Myanmar**, near the city of Monywa in the Sagaing Region.

The 3-month maps (below) show the evolving conditions in more detail.



Based on observed data through October 2023 and forecasts through July 2024

The forecast through January 2024 anticipates deficits in Maritime Southeast Asia to increase in size and severity, becoming severe to exceptional in much of Indonesia. In Mainland Southeast Asia, severe to exceptional surplus are expected to occur in northern Malaysia, western and eastern Thailand, and Cambodia. Deficits in central Myanmar are expected to continue.

From February through April 2024, surpluses in western and eastern Thailand, Cambodia, and Peninsular Malaysia are expected to continue, while intense deficits in Indonesia are expected to dissipate. Surplus in regions near the Malaysian city of Kuching are also expected to continue.

The forecast for the final months – May 2024 through July 2024 – much of the region is expected to observe near normal conditions. However, moderate surpluses are expected to expand near Kuching, affecting nearby areas of central Sarawak.

Please note that WSIM forecast skill declines with longer lead times.

East Asia

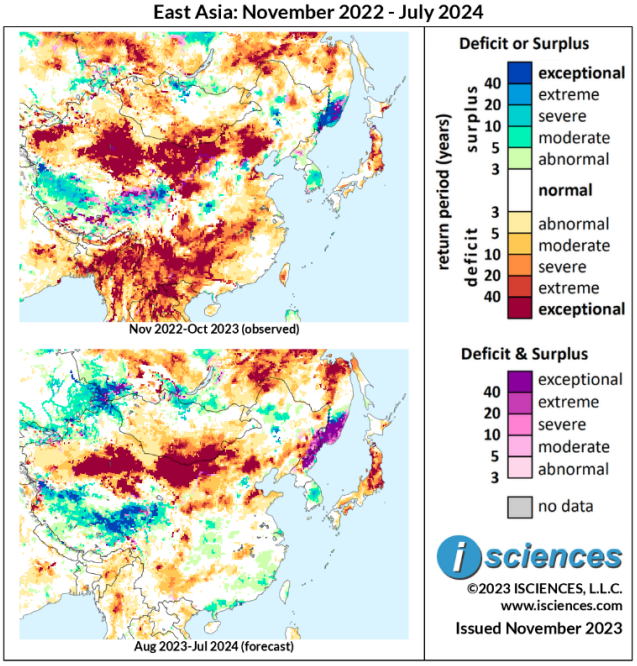
The 12-month forecast ending in July 2024 anticipates widespread deficits in southern regions of East Asia to dissipate, though will continue in northern portions of the area. Intense surplus is expected to occur throughout much of Tibet.

Extreme to exceptional deficits are expected in the following areas:

- Northern **China**, in central and western Inner Mongolia, into western Gansu and eastern Xinjiang.
- **Japan**, in most central to northern areas of the island of Honshu.

Severe to exceptional surpluses are anticipated in:

- Southwestern **China**, throughout most eastern regions of Tibet.
- Northwestern **China**, in the northernmost regions of Xinjiang.

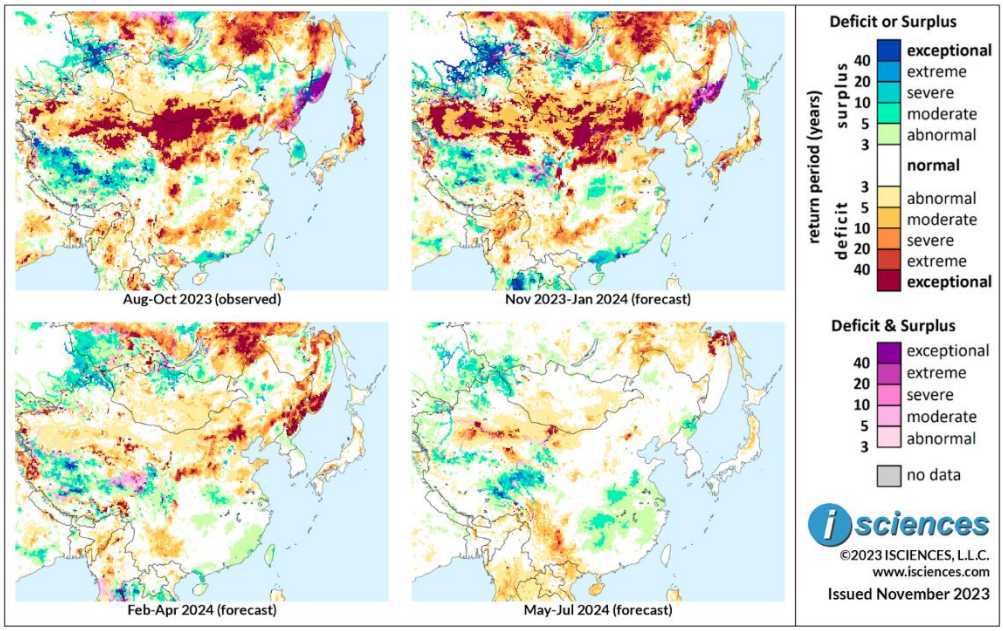


Based on observed data through October 2023 and forecasts through July 2024

The map on top depicts long-term deficit and surplus anomalies as of October 2023, while the map on the bottom depicts a forecast of long-term deficit and surpluses as of July 2024.

The 3-month maps (below) show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
East Asia: August 2023 - July 2024



Based on observed data through October 2023 and forecasts through July 2024

The forecast through January 2024 indicates that pockets of exceptional deficits will continue to expand over northern China, throughout the Inner Mongolia region, western Gansu, and eastern Xinjiang. Surpluses ranging from severe to extreme intensity are expected to continue throughout Tibet, as well as in southern coastal regions of Guangxi and Guangdong. Further north, moderate to severe deficits are expected to occur in regions of Sichuan, Guizhou, and northern Jiangxi. Southern and eastern coastal regions of Japan are expected to experience severe to exceptional deficits.

From February through April 2024, deficits in northern China are expected to mostly disappear, though will continue in some areas of central Inner Mongolia. Pockets of severe to exceptional surpluses are expected to continue throughout Tibet. Much of the rest of the region can anticipate mostly normal conditions.

The forecast for the final months – May through July 2024 – expects near-normal conditions to continue in most parts of the region, with some severe to extreme surpluses continuing in eastern Tibet, southwestern Qinghai, and appearing in pockets across Hunan. Some pockets of severe to exceptional deficits are expected to emerge in central Xinjiang.

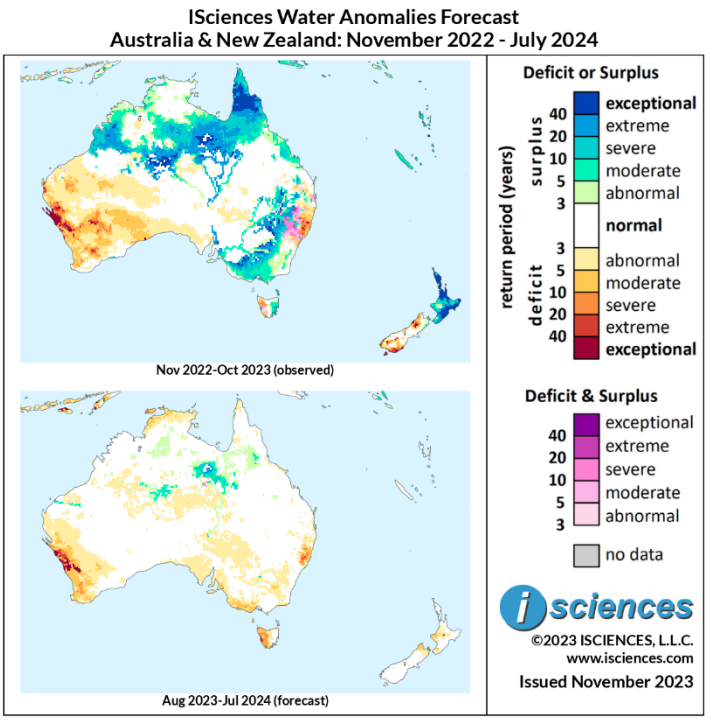
Please note that WSIM forecast skill declines with longer lead times.

Australia and New Zealand

The 12-month forecast ending in July 2024 anticipates extreme to exceptional surpluses across Australia to disappear, with most regions expected to observe near normal conditions. Some western coastal regions of Western Australia, eastern coastal regions of New South Wales, and western Tasmania, are expected to experience varying levels of drought. Western Queensland and eastern Northern Territory can expect some lingering surplus.

Severe to exceptional deficits are expected in the following regions:

- Western coastal areas of **Western Australia**, in the Mid West region near the city of Geraldton.
- Eastern coastal regions of **New South Wales**, in areas near the Hastings River.
- Western **Tasmania**, throughout the Arthur-Pieman Conservation Area, which continues south across the country into the Southwest National Park.



Based on observed data through October 2023 and forecasts through July 2024

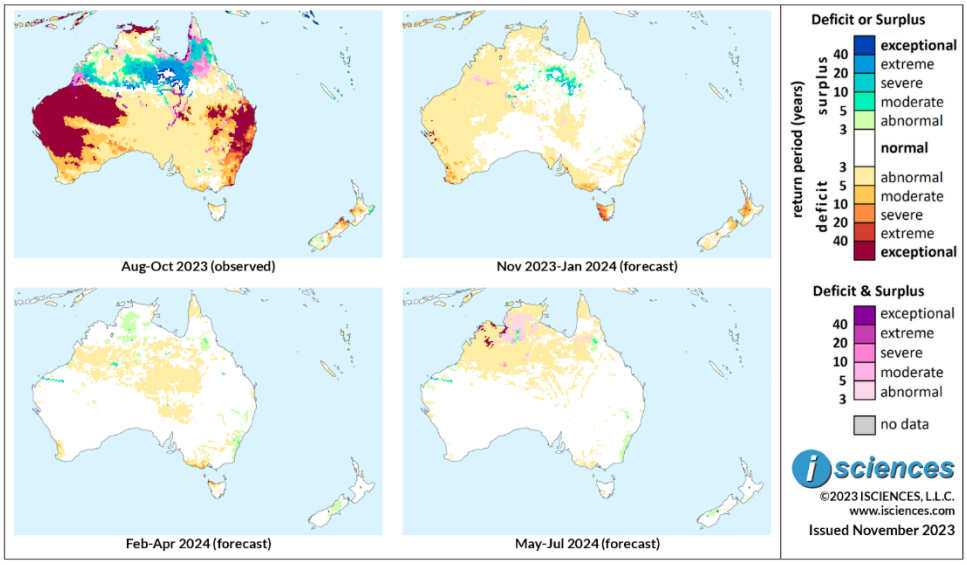
The map on top depicts long-term deficit and surplus anomalies as of October 2023, while the map on the bottom depicts a forecast of long-term deficit and surpluses as of July 2024.

Moderate to severe surpluses are expected in:

- Western **Queensland**, near the locality of Lawn Hill.
- Eastern **Northern Territory**, in the Nicholson region.

The 3-month maps (below) show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
Australia & New Zealand: August 2023 - July 2024



Based on observed data through October 2023 and forecasts through July 2024

The forecast through January 2024 expected most anomalies across Australia to continue to lessen in intensity and magnitude, though severe to extreme deficits are expected to continue in western Tanzania. Severe deficits are expected to expand in northern New Zealand,

From February through April 2024, near normal conditions are expected to further cover the majority of Australia, with intense anomalies similarly disappearing in Tasmania and New Zealand.

The forecast for the final months – May 2024 through July 2024 – expects near normal conditions to persist across Australia, with pockets of exceptional surplus appearing across the Shire of Wyndham-East Kimberley.

Please note that WSIM forecast skill declines with longer lead times.