

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 July 2022 and an ensemble of forecasts issued the last week of July 2022. 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 report uses results from WSIM Version 2. Visit <https://wsim.isciences.com> for details.

All maps have half-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 judgement on the legal status of any territory, or any endorsement or acceptance of disputed boundaries on the part of ISciences or our data providers.

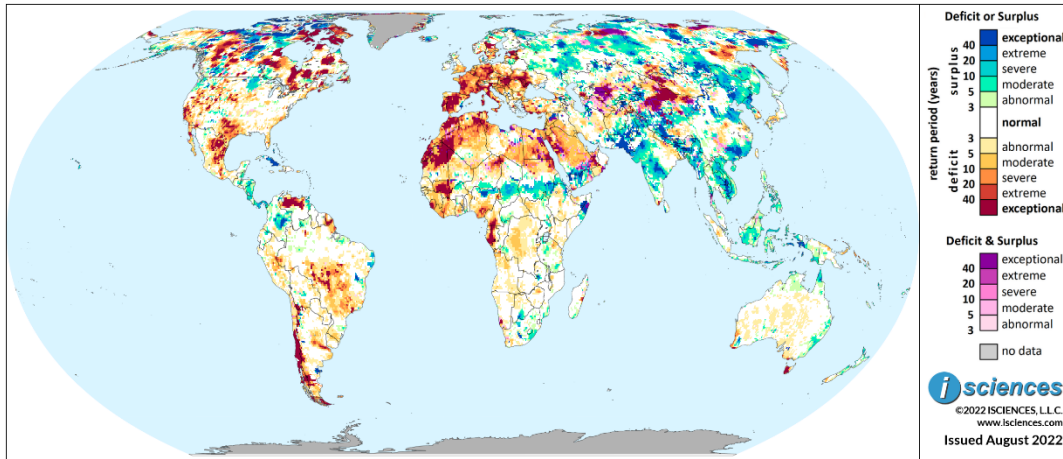
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Worldwide Water Watch List

This map presents a selection of regions likely to encounter significant water anomalies during the one-year period beginning in May 2022 and running through April 2023 using 3 months of observed temperature and precipitation data and 9 months of forecast data.

ISciences Water Anomalies Forecast: May 2022 - April 2023



Based on observed data through July 2022 and forecasts through April 2023

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: The forecast through October indicates a number of regions with water deficits but limited intense anomalies. Areas of deficit include California, Montana, Iowa, eastern Texas, pockets in the Great Lakes States, and many regions on the East Coast. Surpluses are forecast in the Dakotas.

Canada: The forecast through October indicates many areas of intense water deficit including southern Newfoundland, eastern New Brunswick, and large pockets of Nord-du-Québec, eastern Ontario, and northern Manitoba. Surpluses are forecast in British Columbia’s Thompson and Quesnel Watersheds.

Mexico, Central America, and the Caribbean: The forecast through October indicates that water deficits in Mexico will shrink and downgrade, but will be intense in Puebla, Querétaro, San Luis Potosí, and Chihuahua. Surpluses are forecast in northeastern Sonora and many regions of Central America.

South America: The forecast through October indicates widespread water surpluses in Colombia and the northwestern Amazon Basin in Brazil. Deficits are forecast in many areas of Brazil, but the extent of intense deficit will be limited. Other areas of deficit include Chile and the eastern Pampas.

Europe: The forecast through October indicates widespread water deficits though exceptional deficits will shrink considerably. Deficits will be severe from France through Germany, and many pockets in England, Eastern Europe, and the Balkans, and of even greater intensity on many major rivers.

Africa: The forecast through October indicates water deficits in Africa's northwest and in coastal nations from Sierra Leone around the Gulf of Guinea. Surpluses are expected in the Sahel, Uganda, and from Tanzania through its southern neighbors and eastern South Africa.

Middle East: The forecast through October indicates widespread intense water deficits in Saudi Arabia and in Iraq between the Tigris and Euphrates Rivers and through Kuwait. Moderate deficits are forecast in central Iran. Areas of surplus include Tehran, Yemen, and Turkey northeast of Lake Tuz.

Central Asia and Russia: The forecast through October indicates water deficits from the Gulf of Ob in Russia past the city of Norilsk, in Khakassia, and west of the Sea of Okhotsk. Areas of surplus include the Western Siberian Plain and Transbaikal. Surpluses will persist in Kyrgyzstan.

South Asia: The forecast through October indicates widespread water surpluses in India and Pakistan, exceptional in many regions of Pakistan and in central Rajasthan. Surpluses are forecast in eastern Afghanistan and some deficits in the west and north.

Southeast Asia and the Pacific: The forecast through October indicates widespread water surpluses in eastern Thailand, Cambodia, Laos, Vietnam, Philippines, Borneo, Java, Sulawesi, and Papua, Indonesia. Areas of deficits include central Sumatra and coastal Papua New Guinea.

East Asia: The forecast through October indicates water surpluses of varying intensity in Northeast China, Shandong into Shaanxi, southeast China, and Korea. Deficits will emerge in western Sichuan and from the Yangtze Gorges southwest in pockets to the Vietnamese border.

Australia & New Zealand: The forecast through October indicates that water surpluses in eastern Australia will increase, particularly in New South Wales. Surpluses are forecast from Wide Bay-Burnett in Queensland to Canberra. Intense deficits are forecast in coastal Victoria and Tasmania.

Watch List: Regional Details

United States

The 12-month forecast ending April 2023 indicates water deficits of varying intensity in the U.S. West, Rockies, parts of the Central Plains, and Texas. Deficits are also expected in New England, the South Atlantic States, and Florida. Surpluses are forecast in the Northern Plains and parts of the Pacific Northwest.

In the West, exceptional anomalies will be widespread in California from San Francisco to Santa Barbara, and severe to exceptional deficits are forecast in the Central Valley. Other areas with a forecast of exceptional deficit include southwestern Arizona, the Utah Rockies, and the Salmon River Mountains in Idaho. Though deficits are forecast in many pockets of Idaho, Montana, and Wyoming, some pockets of surplus are also forecast.

In the Pacific Northwest, surpluses are expected from western Washington into Oregon and spanning their shared border region in the east. Deficits will dominate central and southeastern Oregon.

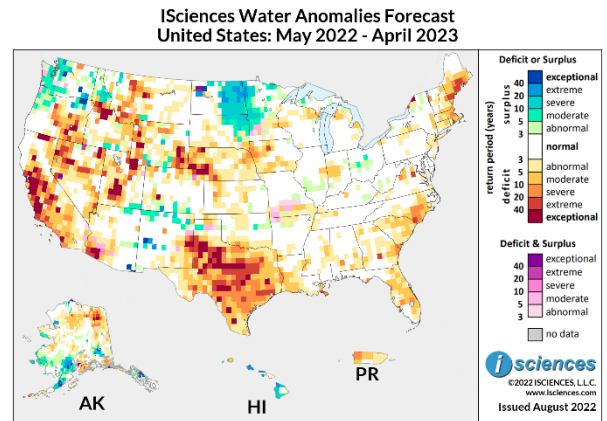
In the center of the nation, deficits are forecast in Nebraska and Iowa, intense in western Nebraska, and moderate pockets are predicted in Kansas and southern Missouri. The Northern Plains, however, can expect widespread severe to extreme surpluses from North Dakota's eastern half into Minnesota and South Dakota. Surpluses are also expected near western Lake Sakakawea in South Dakota.

The forecast for Texas indicates widespread deficits, extreme in the heart of the state, becoming exceptional in the southern Panhandle. In the U.S. Southwest, moderate surpluses will follow the San Juan and Upper Canadian Rivers. In Louisiana, deficits are forecast in the southwest and at the mouth of the Mississippi.

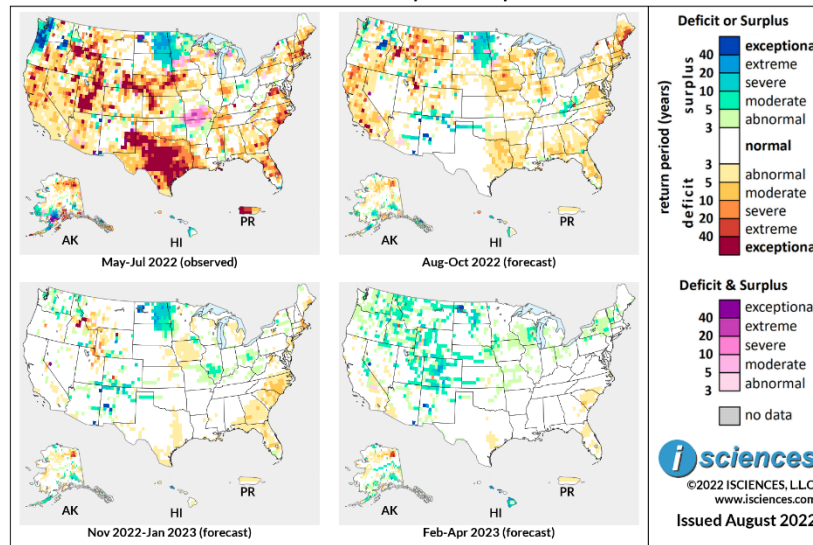
On the East Coast, New England will see deficits, extreme in coastal Maine. Primarily moderate deficits are expected in pockets of northern Virginia, from eastern North Carolina through Peninsular Florida, and small pockets in the Deep South. Anomalies will be severe in the Cape Fear River Basin of North Carolina. In the Midwest, a few pockets of moderate deficit are forecast in central Indiana, northern Michigan, and northern Wisconsin.

Outside the contiguous U.S., Alaska can expect deficits through the Brooks Range in the north and near Anchorage. Surpluses are expected near Juneau, Nome, west of Bethel, the central region of the Alaska Peninsula, north of Iliamna Lake, and at the eastern end of the Alaska Range. Surpluses are forecast in several of the Hawaiian Islands and deficits in Puerto Rico.

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



**ISciences Water Anomalies Forecast
United States: May 2022 - April 2023**



Based on observed data through July 2022 and forecasts through April 2023

The forecast through October indicates that while many regions will see deficits, intense anomalies will be limited. Deficits will be moderate overall in California’s southern half but exceptional in pockets near Los Angeles. Deficits in the state’s far north will be severe. The Pacific Northwest will see mixed conditions including intense deficits in the Salmon River Mountains and intense surpluses in the Blue Mountains. Deficits are forecast in much of Montana, trailing south through the Rockies. Surpluses will follow the San Juan and Canadian Rivers through New Mexico and the Texas Panhandle into Oklahoma. Moderate deficits are forecast on the Middle Brazos River in Texas and from eastern Texas into Louisiana. In the Northern Plains, surpluses will be widespread and severe in eastern North Dakota, poking into Minnesota and moderating in South Dakota. Moderate deficits are expected in Iowa and pockets in the Great Lakes States. In Appalachian Kentucky, moderate to severe surpluses are predicted, reaching into nearby states. Deficits are forecast on the East Coast from the Northeast through Florida and into pockets of the Deep South. Anomalies will be moderate overall but extreme in coastal Maine.

From November 2022 through January 2023, normal water conditions will return to much of the nation, though severe deficits will persist in eastern Massachusetts, moderate deficits in the Carolinas, and isolated pockets of deficit in the Rockies. Widespread severe surpluses will persist in North Dakota, moderating to the east and south, and extreme surpluses near Lake Sakakawea. Surpluses will also persist on the San Juan and Canadian Rivers and pockets of the Southwest and Pacific Northwest, and will emerge in southern Illinois, central Ohio, and the border region of northeastern Iowa.

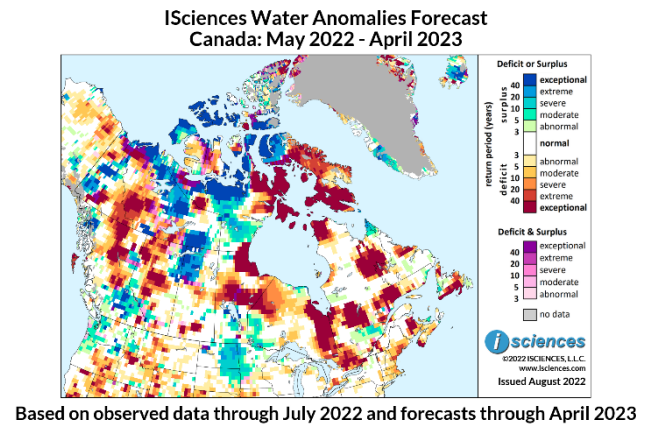
The forecast for the final months – February through April 2023 – indicates surpluses, primarily moderate, throughout many pockets in the Rockies and along major rivers in the region. Surpluses will shrink in the Dakotas, and emerge in eastern Wisconsin, pockets of the Northeast, and the southern Sierra Nevadas.

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

Canada

The 12-month outlook for Canada through April 2023 indicates vast areas of exceptional water deficit in the eastern half of the nation and in the northwest.

In the east, deficits will be exceptional in many regions including southern Newfoundland, the Miramichi and Saint John River watersheds in New Brunswick, and the following regions in Quebec: from the Caniapiscou River to the George River, the Manicouagan Reservoir into Minganie Region, west of Lake Mistassini, and the Ungava Peninsula. Surpluses are forecast in Quebec between the Saint Maurice River and Lac Saint Jean.



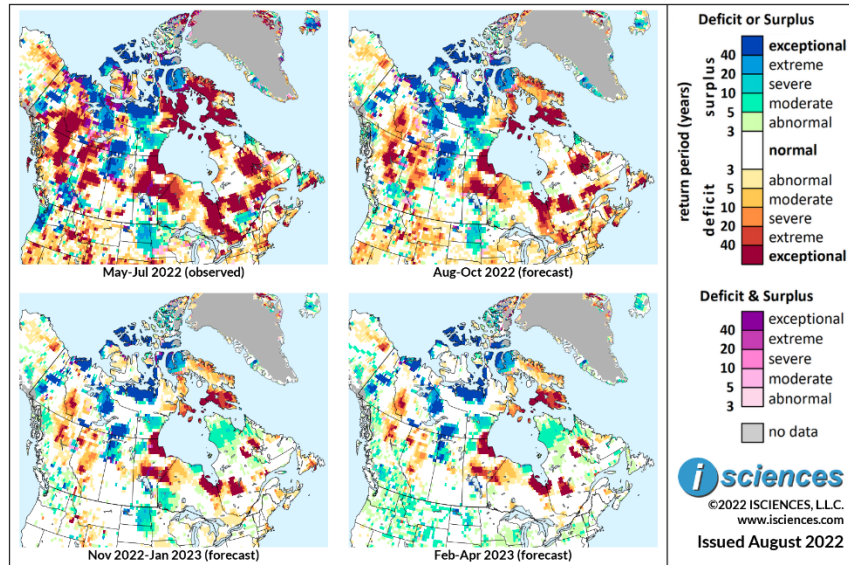
Intense deficits are expected in a broad column along Ontario's eastern border leading into Southern Ontario east of Georgian Bay, and a pocket north of Lake Erie. Deficits will be widespread in northern Kenora District though surpluses are forecast for southern Kenora.

Widespread intense deficits are forecast in a belt across central Manitoba and in the province's northeast reaching Hudson Bay. Surpluses are forecast south of Lake Winnipeg and near the U.S. border. Elsewhere in the Prairie Provinces, deficits will be intense in a path across south-central Saskatchewan leading to Regina and a pocket in the center of the province, but widespread surpluses are forecast in the northwest leading west past Fort McMurray, Alberta. In Alberta, deficits are expected in the central south, the Middle Athabasca River region, and the northwest, and surpluses near Calgary.

Surpluses are forecast in the Thompson River Watershed of southern British Columbia leading east into the Columbia Watershed, but exceptional deficits are expected in East Kootenay in the province's southeast corner. Exceptional deficits are also forecast in the Upper Fraser and Nechako River Watersheds. In British Columbia's central far north, intense deficits will lead from Williston Lake well into Yukon and Northwest Territories.

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

ISciences Water Anomalies Forecast
Canada: May 2022 - April 2023



Based on observed data through July 2022 and forecasts through April 2023

The forecast through October indicates many areas of deficit in the east, frequently intense, including areas of Newfoundland, New Brunswick, Nova Scotia, and in Quebec between the Caniapiscau and Upper George Rivers, and in the Côte-Nord and Lake Mistassini regions. In Ontario deficits will be severe to exceptional along the eastern border and east of Georgian Bay, and severe north of Lake Erie. Much of northern Kenora will also see deficits though surpluses will increase in Polar Bear Provincial Park on Hudson Bay and will linger in southern Kenora. Surpluses are forecast in Manitoba south of Lake Winnipeg, along the U.S. border, and in the far northwest, but widespread, exceptional deficits will persist in a broad belt north of Lake Winnipeg and near Hudson Bay. Widespread, intense surpluses will persist from northwestern Saskatchewan into Alberta. Deficits will linger in pockets near the U.S. border in Saskatchewan and Alberta, and severe to extreme deficits near Lac La Ronge in central Saskatchewan. Moderate surpluses will trace parts of the North Saskatchewan River. Deficits will be widespread and intense in Alberta from the Middle Reaches of the Athabasca River through the northwest. In British Columbia, surpluses are expected in the Thompson and Quesnel Watersheds, and intense deficits in the Upper Fraser and Nechako Watersheds and from Williston Lake into Yukon and Northwest Territories.

From November 2022 through January 2023, deficits will shrink and downgrade overall, but large pockets will persist in Quebec, Ontario, and Manitoba. Widespread moderate surpluses will emerge in the Ungava Peninsula and will increase in southern Kenora. Near-normal conditions are forecast in the Prairie Provinces' southern extent. In British Columbia, surpluses in the Thompson and Quesnel Watersheds will shrink and pockets of surplus will emerge in the Coast Mountains.

The forecast for the final months – February through April 2023 – indicates a pattern of anomalies like the prior three-months though surpluses will retreat from southern Kenora and increase in British Columbia. Please note that WSIM forecast skill declines with longer lead times.

Mexico, Central America, and the Caribbean

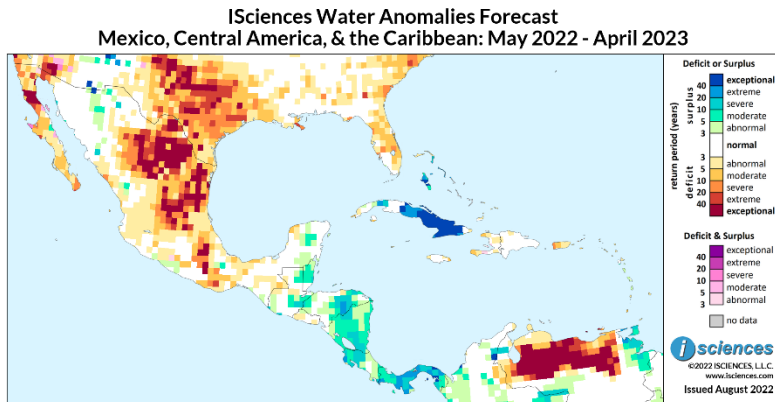
The 12-month forecast ending April 2023 indicates widespread, intense water deficits from Mexico’s north-central and northeastern states into land-locked regions in the center of the country. Deficits are also expected in the Baja Peninsula and several southern states.

Exceptional deficits will blanket much of Coahuila. Severe to

exceptional anomalies are forecast in northern Baja, eastern Chihuahua, northern Durango, Nuevo León, Tamaulipas, San Luis Potosí, Guanajuato, Querétaro, Hidalgo, Tlaxcala, Puebla, and Oaxaca. A pocket of moderate surplus is expected in the north-central Yucatán.

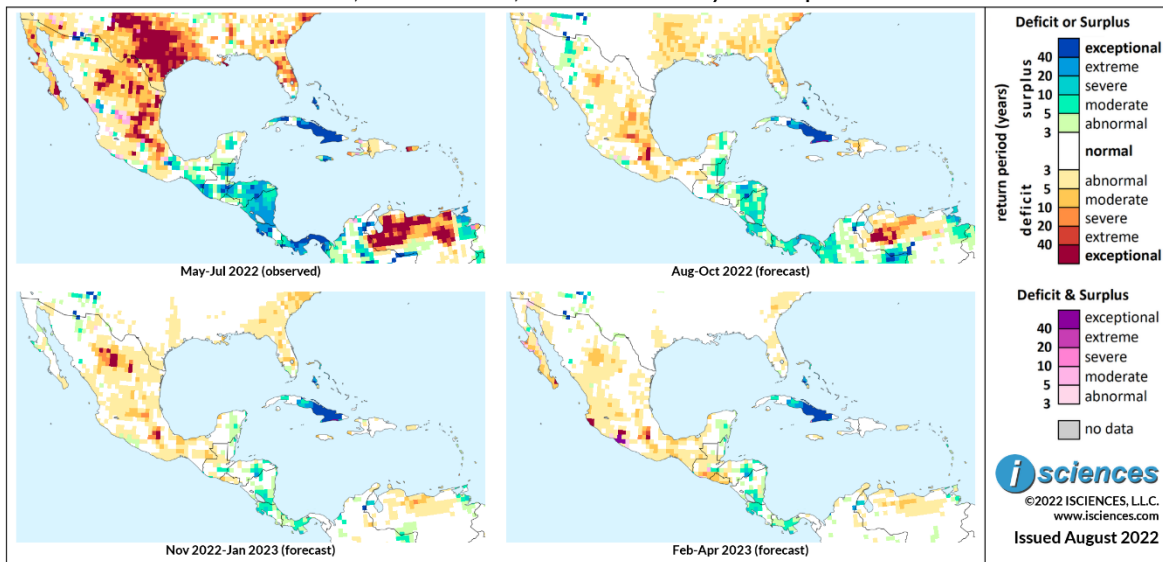
In Central America, surpluses are forecast from Belize into Guatemala and in the Motagua River Watershed of Guatemala; from eastern Honduras through Nicaragua into northern Costa Rica; and throughout Panama. Surpluses will be severe to extreme in Panama. Surpluses are also forecast for Cuba and the Bahamas, and moderate deficits in peninsular points of Haiti.

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



Based on observed data through July 2022 and forecasts through April 2023

ISciences Water Anomalies Forecast
Mexico, Central America, & the Caribbean: May 2022 - April 2023



Based on observed data through July 2022 and forecasts through April 2023

The forecast through October indicates that deficits in Mexico will shrink and downgrade overall though moderate deficits will increase somewhat in the south. Deficits are forecast from southern Nuevo León

through land-locked states into Oaxaca, and in pockets along the Gulf of Mexico. Anomalies will be exceptional in Puebla, extreme in Querétaro, and severe in San Luis Potosí. In the north, moderate to severe deficits will persist in southern Chihuahua. Moderate surpluses will continue in the north-central Yucatán and surpluses will emerge in the Yaqui River Basin in northeastern Sonora.

Surpluses, generally moderate to severe, are expected in Belize, the Motagua River Watershed of Guatemala near Honduras, and in eastern Honduras, Nicaragua, northern Costa Rica, and Panama. Surpluses are also forecast for Cuba and the Bahamas, but moderate deficits are forecast from eastern Haiti into Dominican Republic and on peninsular points in Haiti.

From November 2022 through January 2023, anomalies in Mexico will shrink overall. However, deficits will increase and intensify from southeastern Chihuahua into Coahuila and Durango and will include exceptional anomalies. Severe to exceptional deficits will persist in Puebla and moderate to severe deficits from Guanajuato through Querétaro into Hidalgo. Some pockets of moderate deficit are forecast in the south. Surpluses in Central America will shrink and downgrade leaving moderate pockets. Surpluses will continue in the Bahamas and Cuba, and deficits will nearly disappear in Hispaniola.

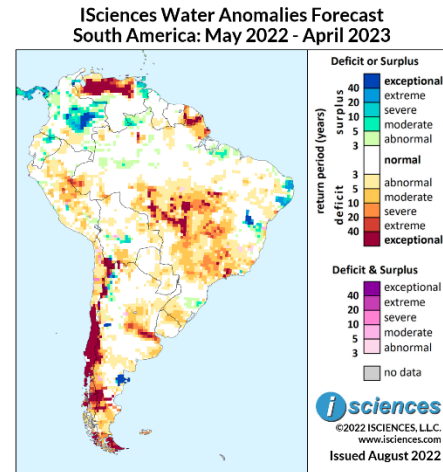
The forecast for the final three months – February through April 2023 – indicates small pockets of exceptional deficit in coastal Jalisco and southeastern Michoacán; severe to exceptional deficits in Puebla; and moderate deficits in southern Chihuahua, southern Baja, and pockets of southern Mexico. Moderate deficits are also forecast for southern Guatemala and El Salvador. Surpluses will persist in pockets of Central America and in Cuba and the Bahamas.

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

South America

The 12-month forecast through April 2023 indicates widespread water deficits in Brazil’s Central West region through the Southeast. Anomalies will be moderate to severe overall but with many areas of greater intensity including exceptional anomalies in pockets of Mato Grosso, Tocantins, and São Paulo.

In the north, deficits are expected throughout the state of Amapá and exceptional anomalies in neighboring French Guiana’s southern half and on the Maroni River. Some pockets of extreme surplus are forecast in the small states of far eastern Brazil and exceptional surpluses in the Chapada Diamantina region of Bahia.



Based on observed data through July 2022 and forecasts through April 2023

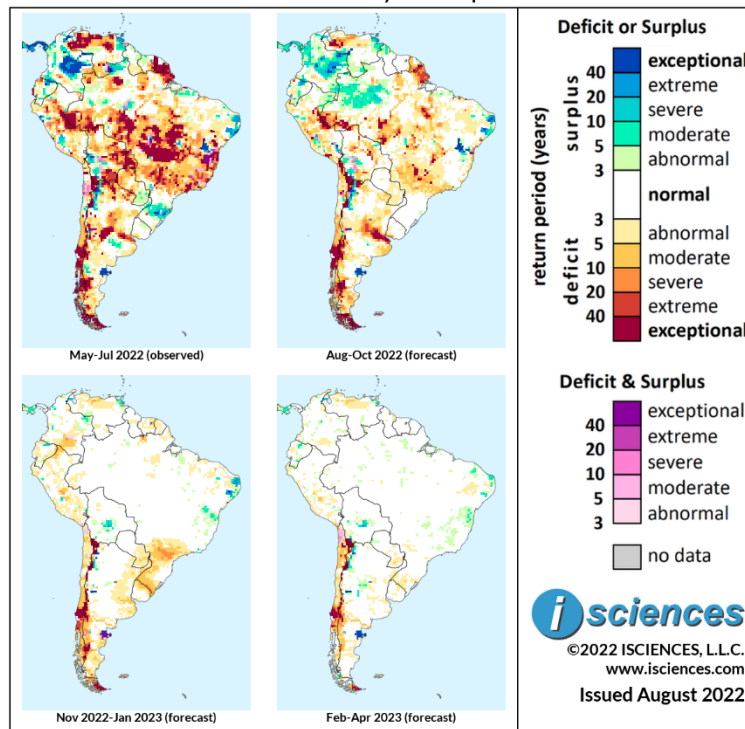
Across the northern arc of the continent, exceptional deficits are forecast from Merida, Venezuela through much of the Orinoco River’s northern watershed. The Orinoco Delta, however, will experience surpluses. Surpluses are also forecast in much of central Colombia - exceptional in the Middle Guaviare River Watershed - and in a pocket northeast of Quito, Ecuador.

In Peru, deficits will be widespread from southern Loreto Region through Ucayali and Pasco Regions, reaching into far western Brazil. Central Bolivia will see severe surpluses in the Upper Yapacani River region while deficits are expected in the nation’s east and south, exceptional in the southern Altiplano.

Widespread exceptional deficits are forecast in Chile from La Serena through Valparaiso and Santiago to the Gulf of Corcovado. In Argentina, widespread deficits are forecast in the eastern Pampas, moderate near Laguna Mar Chiquita in Córdoba Province and near Mar del Plata on the Atlantic, but severe to exceptional in a broad path approaching Buenos Aires. Exceptional surpluses are forecast in coastal Chubut Province near the Valdes Peninsula and deficits in Patagonia, exceptional on the Chico River and in Tierra del Fuego.

The 3-month maps (below) for the same 12-month period show the evolving conditions in greater detail.

ISciences Water Anomalies Forecast
South America: May 2022 - April 2023



Based on observed data through July 2022 and forecasts through April 2023

The forecast through October indicates that although deficits are forecast in many areas of Brazil, the extent of intense deficit will be limited. Deficits are expected in large pockets in the southern Amazon Basin, in the nation's southeast, far west, and far northeast. Anomalies will be widespread and intense in Amapá and Acre, and deficits will reach exceptional intensity in pockets of Mato Grosso, Pará, Goiás, and Mato Grosso do Sul, among others. Moderate to severe surpluses are forecast in the northwestern Amazon Basin in Brazil, extreme to exceptional surpluses in Brazil's eastern tip, and exceptional surpluses in the Chapada Diamantina region of Bahia and the Contas River nearby.

Across northern South America, surpluses of varying intensity are forecast in a pocket northeast of Quito, Ecuador, throughout much of Colombia, and from the Orinoco Delta into northern Guyana. Deficits are expected in northwestern Venezuela, exceptional surrounding Merida and downgrading but severe as they reach Caracas. Deficits are forecast in central Peru, moderate overall but more intense near the Brazilian border, and a pocket of exceptional deficit is expected near Arequipa in southern Peru. Moderate surpluses are forecast in Peru's far northeast and a few pockets in the Andes. Mixed conditions are predicted in Bolivia, and deficits in Chile, moderate near Santiago but exceptional farther south. In Argentina, widespread severe to exceptional deficits are forecast in the eastern Pampas from Córdoba Province to the city of Buenos Aires, and moderate deficits in eastern Buenos Aires Province. A pocket of exceptional surplus is expected in coastal Chubut near the Valdes Peninsula. Patagonia will see deficits of varying intensity, exceptional in Tierra del Fuego.

From November 2022 through January 2023, anomalies will shrink considerably, leaving near-normal conditions in many regions. However, moderate to severe deficits are forecast from south-central Colombia into Peru and Pasco Region in central Peru, and Paraná and Rio Grande do Sul in Brazil. In Chile, moderate deficits will persist in central regions and extreme to exceptional deficits in Bío Bío and nearby areas. In Argentina, moderate deficits are forecast north of the Salado River as it approaches Buenos Aires and along rivers in Patagonia, but exceptional deficits will persist in Tierra del Fuego and in Patagonia near the Chilean border. Extreme pockets of surplus will continue in Brazil's eastern tip, but surpluses in Bahia will shrink and moderate. In Bolivia, surpluses will remain severe in the Yapacani Watershed.

In the final quarter – February through April 2023 – deficits are expected in Chile, Bolivia's southern tip, Tierra del Fuego, and near Caracas. Surpluses are forecast in pockets of eastern Brazil, near Quito, and in central Bolivia.

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

Europe

The 12-month forecast through April 2023 indicates water deficits throughout much of Europe including intense deficits in many areas. Anomalies will be widespread from Portugal through Germany, in Italy, from Slovakia and Hungary through Ukraine’s western half and Moldova, and in parts of the Baltic region and Sweden.

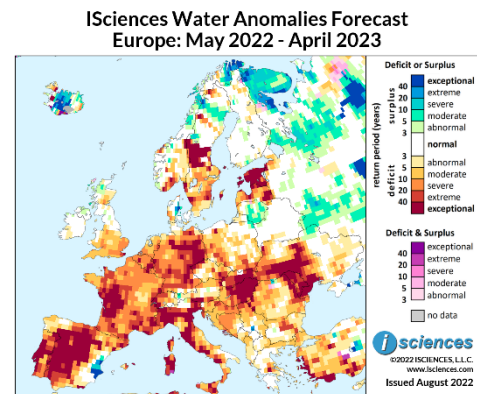
On the Iberian Peninsula, deficits will be exceptional in a vast area encompassing central and western Spain and in western Portugal. On Spain’s Mediterranean Coast, however, intense surpluses are expected in Valencia Province. In France, widespread exceptional deficits are forecast in the west in the Vienne River Watershed and reaching the city of Bordeaux.

Northern Italy’s Po River Basin will experience exceptional deficits, conditions that will extend through Veneto Region in the northeast. Deficits will also be exceptional from Tuscany to Vatican City and Rome and other pockets on the Tyrrhenian Coast. Other regions of Europe with a forecast of exceptional deficit include much of the Elbe River Watershed in eastern Germany, eastern Slovakia and most of Hungary, the Dniester River Watershed in Ukraine reaching northeast to Kyiv and south through Moldova to Odessa, and central Sweden’s Dalälven River Watershed. Moderate to severe deficits are forecast in many areas in the Balkan region, normalizing in the south, but deficits will be extreme in the central Balkan Mountains of Bulgaria.

In the U.K., moderate deficits are expected in much of England and southern Wales, but anomalies will become more intense on the Thames approaching London and in the East of England. A pocket of deficit is forecast west of Edinburgh.

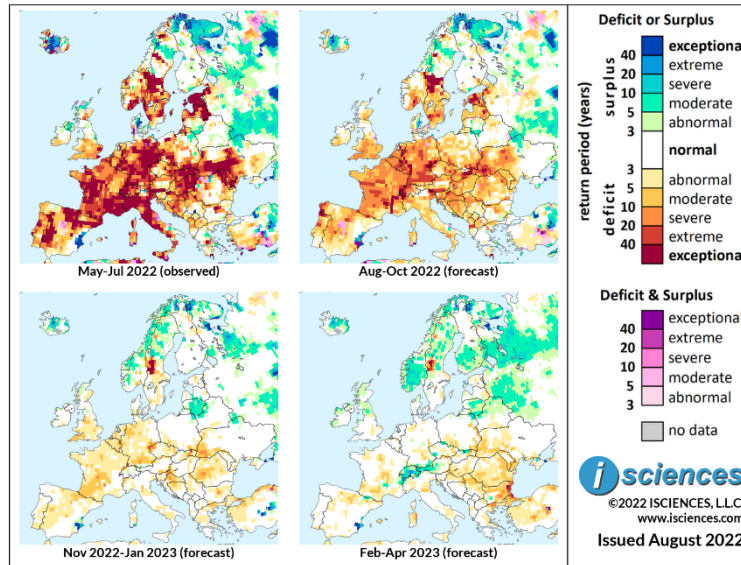
In Northern Europe, deficits are forecast from southern Norway into Sweden and in the northern Baltic nations. Areas with a forecast of surplus include central Iceland, Lithuania, Arctic Norway, Murmansk, from Lake Ladoga in northwestern Russia through the Vychegda Lowland, and the Desna and Volga River Watersheds.

The 3-month composites (below) for the same 12-month period show the evolving conditions.



Based on observed data through July 2022 and forecasts through April 2023

**ISciences Water Anomalies Forecast
Europe: May 2022 - April 2023**



Based on observed data through July 2022 and forecasts through April 2023

The forecast through October indicates widespread water deficits though the extent of exceptional deficit will shrink considerably. Deficits will be severe in France, Belgium, Netherlands, and Germany, with exceptional anomalies on the Rhône and Rhine Rivers and extreme anomalies on the Loire, Allier, Vienne, Danube, and Doubs Rivers. On the Iberian Peninsula, deficits are forecast in the west, intense in the coastal northwest. Surpluses in Valencia will begin to downgrade, and deficits will emerge to the south in Murcia. Italy can expect deficits to moderate.

In Eastern Europe, deficits will be moderate to severe through western Ukraine and many areas in the Balkans, but intense pockets are forecast from Slovakia into Ukraine and surrounding Tirana, Albania. England and Wales will see moderate to severe deficits, and moderate deficits are forecast from Edinburgh into the Highlands and in Cork County, Ireland. Deficits are expected in southern Sweden, southeastern Norway, Estonia, Latvia, and in St. Petersburg, Yaroslavl, on the Mezen River, and in the northern Urals of Russia. Areas of surplus include Iceland, Arctic Norway, Murmansk, the Vychegda Lowland, Desna and Don River Watersheds, and Middle, Lower, and Transvolga regions of the Volga.

From November 2022 through January 2023, deficits will shrink considerably and moderate, lingering primarily in southwestern France, southern Germany, eastern Croatia, eastern Slovakia, western Ukraine, western Romania, and central Sweden. Surpluses, generally moderate, are forecast in Iceland, Norway, northern Sweden, Murmansk, Lithuania, from Lake Onega to the Svernya Dvina River, and Middle Volga and Transvolga regions.

The forecast for February through April 2023 indicates deficits from western Ukraine through Bulgaria, and pockets in France. Surpluses are forecast from Switzerland into Austria, and in Iceland, northern Europe, and western Russia.

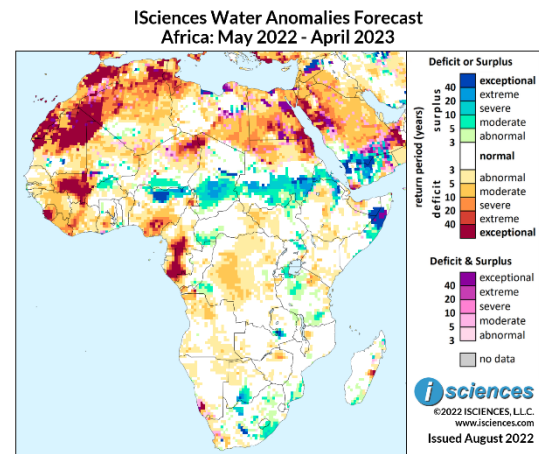
Please note that WSIM forecast skill declines with longer lead times.

Africa

The 12-month forecast through April 2023 indicates water deficits of varying intensity in many regions across North Africa. Areas with a forecast of exceptional anomalies include Morocco, northern Mauritania into Algeria, and northeastern Niger.

In West Africa, exceptional deficits are forecast for Sierra Leone and southern Mali, and deficits of lesser intensity in Guinea, Liberia, Côte d'Ivoire, central Ghana, and northeastern Benin. Deficits will be intense in southeastern Nigeria and exceptional from southern Cameroon through central and southern Gabon.

Northern Nigeria can expect surpluses, exceptional surrounding Kano State, and surpluses will be widespread across the Sahel.



In the Horn of Africa, surpluses are forecast in Ethiopia's Afar region and in central Somalia; a few pockets of deficit are forecast in the Highlands and around Berber in Somaliland.

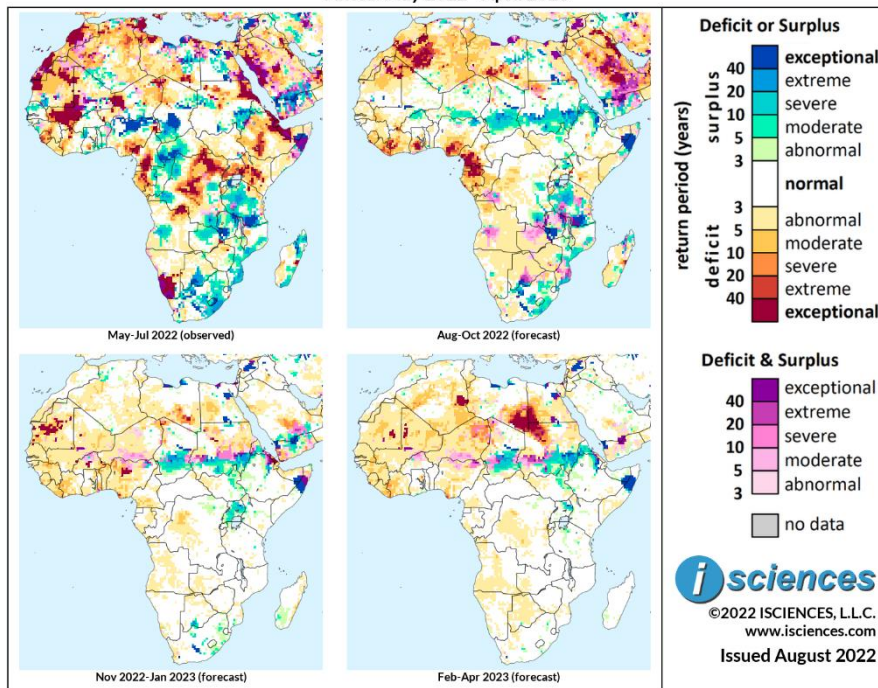
In the heart of the continent, surpluses are forecast in southwestern Central African Republic and moderate deficits in western South Sudan. Moderate deficits are also forecast in the Kasai and Ruki Sub-Basins of the Congo River in Democratic Republic of the Congo (DRC) and approaching the river's mouth, with some surpluses between. Moderate deficits are forecast in northwestern Angola. In East Africa, surpluses are predicted for northeastern Uganda and several pockets in Tanzania, though moderate deficits are expected in the north-central region of the nation as well as pockets in Kenya and Burundi.

Surpluses will be intense in a pocket of central Zambia. A few pockets of deficit are forecast north of Harare in Zimbabwe and east of Lake Malawi in Mozambique.

In southern Africa, surpluses are forecast for south-central Botswana; the Kalahari and Upper Karoo regions of Northern Cape in South Africa; Eastern Cape's northern half through southern KwaZulu-Natal; the Orange River region in Lesotho; and some pockets in South Africa's Free State, north of Pretoria, and in southern Mozambique. Deficits will be intense in a pocket near Namibia's southern coast and moderate in Western Cape, South Africa. In Madagascar, a pocket of intense deficit is forecast on the central east coast.

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

ISciences Water Anomalies Forecast
Africa: May 2022 - April 2023



Based on observed data through July 2022 and forecasts through April 2023

The forecast through October indicates deficits of varying intensity in North Africa from Morocco and northern Mauritania into western and southern Libya. Exceptional deficits will be widespread in western Algeria. Deficits are also forecast in southeastern Egypt and northwestern Sudan. A pocket of exceptional surplus is forecast in Egypt west of Lake Nassar's southern extent. Surpluses are forecast across much of the Sahel and will be particularly widespread in southern Chad and Sudan. On the Atlantic, deficits will be pervasive in coastal nations from Sierra Leone around the Gulf of Guinea, reaching exceptional intensity in several regions including the Lower Niger River and western Cameroon into Gabon. In the Horn, surpluses are forecast in Ethiopia's Afar Region and central Somalia. Some pockets of generally moderate deficit are expected in central Kenya, the western Congo Basin, and northwestern Angola.

Surpluses are forecast for the Upper Congo Basin, northern Uganda, many regions of Tanzania and Mozambique, and in central Zambia. Anomalies will be exceptional in the Luwego River Watershed in Tanzania and in Zambia. Surpluses will be widespread in South Africa in Eastern Cape, KwaZulu-Natal, Free State, Gauteng, Mupumalanga, and the Upper Karoo and Kalahari regions of Northern Cape, reaching into Botswana. In Madagascar, intense deficits are forecast in a pocket on the central east coast, and surpluses in some pockets elsewhere.

From November 2022 through January 2023, anomalies will shrink considerably. Deficits in North and West Africa will be mild to moderate overall, though intense pockets are expected in Mauritania, southern Libya, near Burkina Faso's capital, Ouagadougou, and surrounding the city of Kaduna in northern Nigeria. Surpluses will persist in southern regions of Chad and Sudan, the Sudd in South Sudan,

the southern half of Afar Region in Ethiopia, and northern Eritrea. Exceptional deficits will emerge in southern Eritrea. Surpluses are expected to increase in Uganda. Moderate deficits will linger in southern Cameroon and the Ruki Sub-Basin of the Congo in DRC. In southern Africa, surpluses linger in south-central Botswana and pockets in Northern Cape and eastern South Africa.

In the final quarter – February through April 2023 – exceptional deficits are forecast at the intersection of Libya, Egypt, and Sudan, and severe deficits in northeastern Niger. Deficits elsewhere in West Africa and the northwest will be mild to moderate overall. Surpluses will persist in the eastern Sahel and in northeastern Uganda.

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

Middle East

The forecast for the 12-month period ending April 2023 indicates widespread water deficits in Saudi Arabia, the Levant, and western Turkey.

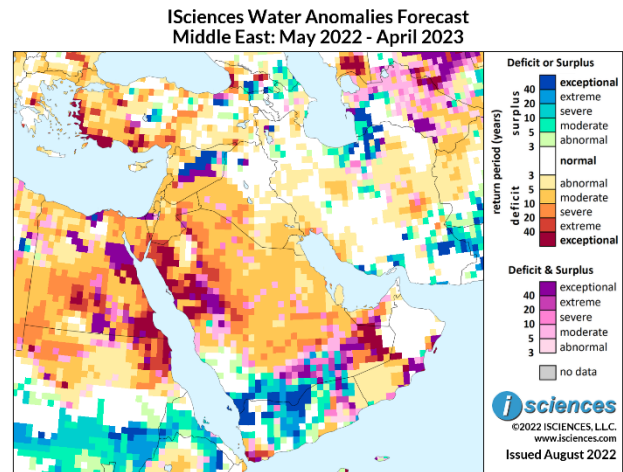
Deficits are expected to be moderate overall in the Levant. Surpluses are forecast in the Bishri Mountains of northern Syria. In Iraq, moderate deficits are forecast west of the Euphrates River.

On the Arabian Peninsula, severe to exceptional deficits are forecast in Saudi provinces bordering the northern coast of the Red Sea, and also in the nation's southeast corner; moderate deficits in a vast extent of Saudi Arabia; and surpluses along the border with Yemen and well into Yemen. Deficits are forecast in Yemen's southwest corner near the Bab al-Mandab Strait, and in central Oman and United Arab Emirates.

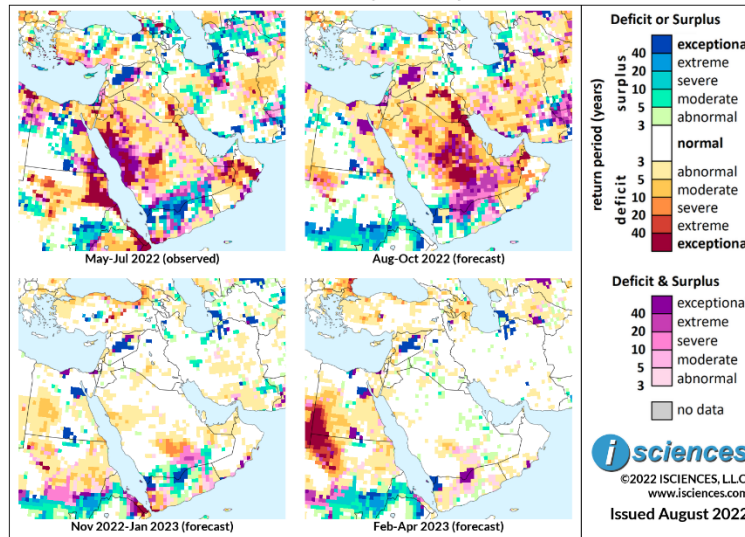
In Turkey, deficits of varying intensity are predicted in the west; along the Mediterranean coast and parts of the Black Sea Coast; the Ceyhan River Watershed; and near Lake Van. Surpluses are forecast from Lake Tuz into the Middle Kizilirmak River Watershed. Mixed conditions are forecast in Georgia and Azerbaijan.

Iran can expect moderate to severe deficits in Bushehr Province on the Persian Gulf, and in central Isfahan Province and the Lut Desert. Surpluses are forecast on the central Caspian Sea Coast and into the nation's northeast, near the Strait of Hormuz, and in Sistan and Baluchistan.

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



ISciences Water Anomalies Forecast
Middle East: May 2022 - April 2023



Based on observed data through July 2022 and forecasts through April 2023

The forecast through October indicates widespread deficits in Saudi Arabia with exceptional deficits in Riyadh Province. Near-normal water conditions will return to Saudi provinces bordering the Red Sea; transitional conditions (pink/purple) are expected in the central-south; and surpluses in the nation's southeast corner. Yemen can expect transitional conditions and pockets of surplus. Deficits are forecast in central Oman and spanning its border with United Arab Emirates. In the Levant, generally mild deficits and transitions are predicted. Iraq can expect intense deficits between the Tigris and Euphrates Rivers from Lake Tharthar and Baghdad in the north past Lake Hammar in the south and through Kuwait. In Iran, surpluses are forecast from Tehran to the coast, near Lake Urmia, and in central Sistan and Baluchistan Province. Generally moderate deficits are expected in large pockets across the breadth of the nation, particularly in Fars and Kerman Provinces. In Turkey, surpluses are expected from Lake Tuz into the Kizilirmak River Watershed, and a few other pockets. Moderate to severe deficits are expected in the Upper Ceyhan River region. Deficits are forecast in western Georgia and surpluses from the Kura River region into northern Armenia.

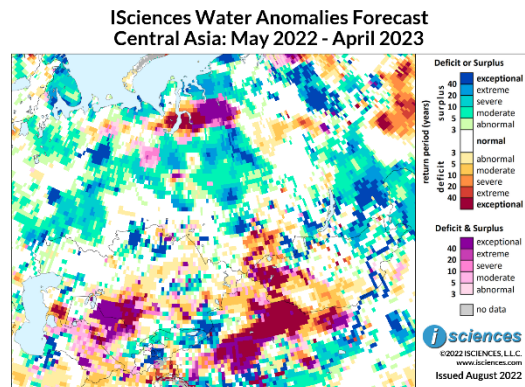
From November 2022 through January 2023, deficits will shrink and downgrade considerably, persisting primarily in southern Riyadh Province, western Georgia, and Central Anatolia in Turkey. Deficits will emerge along Turkey's Black Sea Coast and in southwestern Yemen. Surpluses are forecast along the border of Saudi Arabia and Yemen; central Syria; near Lake Tuz, Turkey, and in a pocket north of Konya; and in Iran near Lake Urmia, east of Tehran, west of the city of Isfahan, and in Sistan and Baluchistan.

In the final quarter – February through April 2023 – near-normal conditions are forecast overall with small pockets of deficit in Turkey, Georgia, Azerbaijan, and Riyadh, and surpluses in central Syria, northeastern Iran, and northwestern Yemen.

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

Central Asia and Russia

The 12-month forecast through April 2023 indicates exceptional water deficits in western Kazakhstan’s Mangystau Region and in the middle reaches of the Syr Darya River in the nation’s south. Deficits of lesser intensity are forecast northeast of Lake Balkhash and along the Lower Ile River as it discharges into Balkhash. Exceptional surpluses are expected in Akmola and Kostanay Regions in far northern Kazakhstan, and extreme to exceptional surpluses in the Kapchagay Reservoir region on the middle reaches of the Ile River. Other areas of surplus include the Alatau Mountains and eastern Kazakh Uplands.



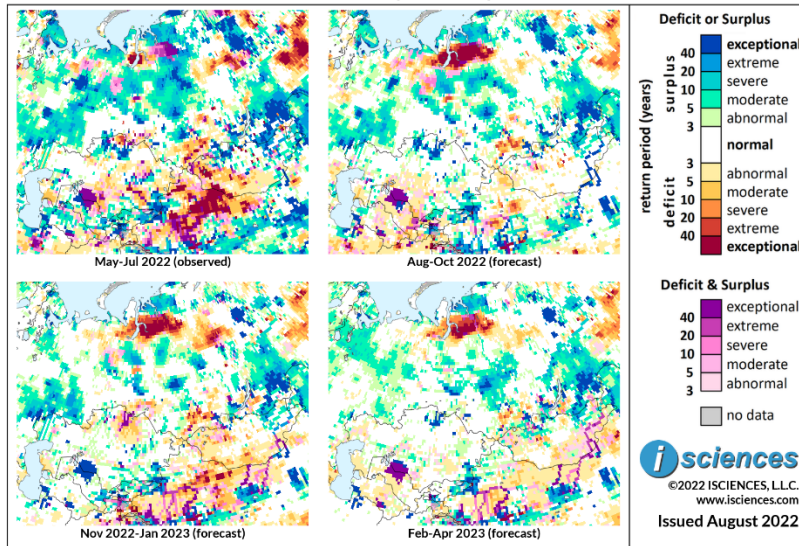
Based on observed data through July 2022 and forecasts through April 2023

Moderate deficits are forecast in eastern Turkmenistan, and surpluses in its Caspian corner. In Uzbekistan, deficits and transitions (pink/purple) are expected in the center of the nation and surpluses in the east near Lake Aydar. Surpluses are also forecast throughout much of Kyrgyzstan, extreme near Lake Issyk-Kul and exceptional in the south leading into central Tajikistan. Eastern Tajikistan can expect deficits.

In Asian Russia, intense deficits will span the Gulf of Ob, but widespread surpluses are forecast from the central Ural Mountains through the Western Siberian Plain past the Yenisei River. In Sakha Republic, severe to extreme deficits are forecast north of the Vilyuy Reservoir; exceptional surpluses are expected in the Tyung River Watershed of northern Sakha. Siberia’s far south can expect deficits ranging from moderate to exceptional. Zabaykalsky Krai in Transbaikalia will experience exceptional surpluses. Intense deficits are forecast in the Lena River Delta (not shown) and severe to exceptional deficits west of the Sea of Okhotsk.

The 3-month composites (below) for the same 12-month period show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
Central Asia: May 2022 - April 2023



Based on observed data through July 2022 and forecasts through April 2023

The forecast through October indicates that exceptional deficits spanning the Gulf of Ob in Russia will increase, reaching east past the city of Norilsk. Surpluses from the Western Siberian Plain past the Yenisei River will shrink somewhat. Deficits north of the Vilyuy Reservoir will shrink and downgrade. In southern Siberian, surpluses are forecast in Tomsk and Kemerovo Oblasts, and deficits in the Republic of Khakassia and the Western Sayan Mountains. Surpluses are forecast near Lake Baikal and in Transbaikal. Intense surpluses will persist in the Tyung River area of northern Sakha Republic. Deficits in the Lena Delta and west of the Sea of Okhotsk will downgrade, moderating in the Delta but still severe near the Sea of Okhotsk. In Central Asia, some moderate deficits will linger in Mangystau, Kazakhstan, and emerge in the nation’s far south, transitioning from surplus. Surpluses are forecast in the far north and southeast. Most of Turkmenistan and Uzbekistan will transition from surplus to mild deficit. Surpluses will downgrade somewhat in Kyrgyzstan; mixed conditions are forecast in Tajikistan.

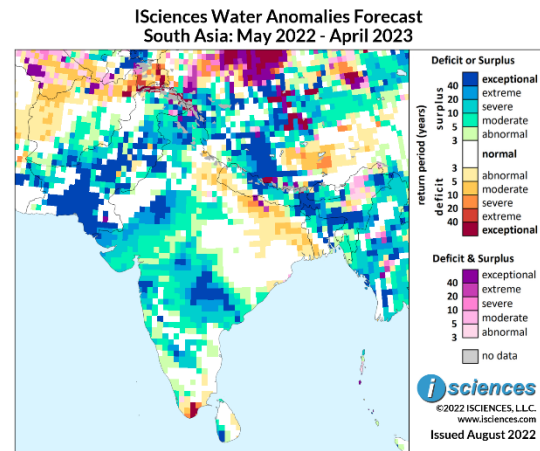
From November 2022 through January 2023, deficits will persist from the Gulf of Ob past Norilsk, in Khakassia and the Western Sayan Mountains, and in the Lena Delta and near the Sea of Okhotsk. Deficits will re-emerge in the Central Siberian Plateau. Surpluses will shrink somewhat in the Western Siberian Plain and persist in the Tyung River region, near Baikal and in Transbaikal. Moderate deficits will emerge in northern Kazakhstan as surpluses retreat. Deficits will nearly disappear elsewhere in Central Asia, persisting in pockets of eastern Tajikistan. Surpluses will linger in Kyrgyzstan and re-emerge in pockets of Turkmenistan, Uzbekistan, and western Tajikistan.

The forecast for the final months – February through April 2023 – indicates near-normal conditions in Central Asia with some persistent surpluses. The pattern of anomalies in Russia will be similar to that of the prior forecast though deficits in the Central Siberian Plateau will moderate and surpluses will emerge on the Middle Yenisei River.

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

South Asia

The 12-month forecast through April 2023 indicates widespread water surpluses in India through the Deccan Plateau, much of the west, the far north, and parts of the Far Northeast. Surpluses will span the heart of the nation from Maharashtra reaching south through Karnataka with exceptional anomalies in the Middle Reaches of the Godavari River. Western India can expect surpluses from Gujarat through eastern Rajasthan and western Madhya Pradesh with exceptional surpluses in central Rajasthan. In the north, surpluses are predicted from Haryana through Jammu and Kashmir, intense in the far north. India's Far Northeast can expect surpluses and mixed conditions.



Based on observed data through July 2022 and forecasts through April 2023

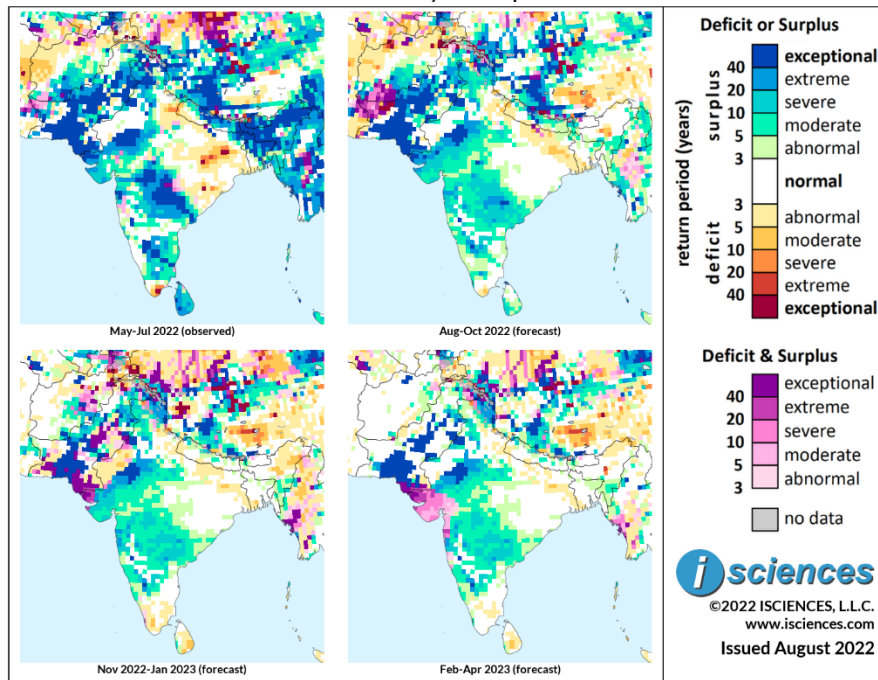
Generally moderate deficits are predicted in the Ganges Plain. Deficits will be exceptional in India's southernmost tip in Tamil Nadu. Nearby in Sri Lanka, however, surpluses are forecast in the southwest.

Surpluses will be widespread in Pakistan and exceptional in many areas, particularly the south. In Afghanistan, moderate surpluses are forecast east of the Helmand River, becoming more intense in the southeast. Moderate deficits are forecast in pockets of the nation's west, leading north where anomalies will be more intense in the Hindu Kush.

In Nepal, surpluses of varying intensity are forecast throughout the Himalayas; some moderate deficits will skirt the Indian border. Bhutan will also see surpluses as will much of Bangladesh's northern half, and surpluses will trace the path of the Padma River as it joins the Meghna to the Bay of Bengal. Moderate deficits are expected in the Ganges Delta.

The 3-month composites (below) show the evolving conditions in greater detail.

ISciences Water Anomalies Forecast
South Asia: May 2022 - April 2023



Based on observed data through July 2022 and forecasts through April 2023

The forecast through October indicates widespread surpluses in central and parts of southern India, a vast extent of the nation’s west, and the far north. Anomalies will be intense in the west, exceptional in central Rajasthan. In Maharashtra and Telangana, surpluses will be severe, becoming extreme in the Middle Godavari River region. Surpluses of similar intensity are forecast in central Karnataka. Moderate deficits are forecast in Jharkhand. Central Assam in the Far Northeast will also see deficits though moderate surpluses are expected in neighboring states and nearby regions of Bangladesh. Surpluses are forecast in Nepal, but intense anomalies will be limited to the Gandaki River. Severe surpluses will persist in southwestern Sri Lanka. In Pakistan, widespread surpluses are expected in much of the nation, exceptional in many regions west of the Indus River. Moderate to extreme surpluses will reach into Afghanistan to the Helmand River, encompassing the area from Kandahar to Kabul. Transitional conditions (pink/purple) are expected in the south, and deficits in pockets of the west and north.

From November 2022 through January 2023, surpluses will remain widespread in India, generally moderate to severe in the center of the nation but extreme to exceptional in central Rajasthan. Some moderate deficits are forecast in Assam and moderate surpluses will linger in Indian regions east of Bangladesh and in Nepal. Surpluses will retreat in Sri Lanka and moderate deficits will emerge in the southeast. In Pakistan, exceptional surpluses will continue in the south, but surpluses elsewhere will shrink as transitions begin. Surpluses and transitional conditions are expected in eastern Afghanistan.

The forecast for the final months – February through April 2023 – indicates persistent, widespread surpluses in India and Pakistan.

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

Southeast Asia and the Pacific

The 12-month forecast through April 2023 indicates widespread surpluses of varying intensity in many regions of Southeast Asia. Surpluses are also expected in the Philippines and central and eastern Indonesia.

In Myanmar, surpluses of varying intensity are forecast throughout much of the nation with a few pockets of transitional conditions (pink/purple).

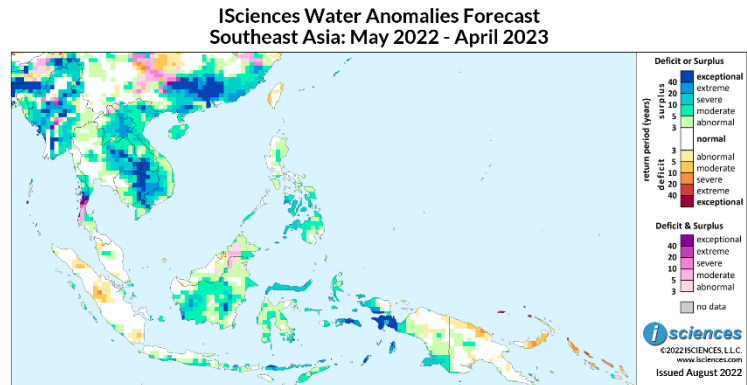
Though most of western Thailand will see near-normal conditions, surpluses will dominate much of the nation's eastern half and will include severe to exceptional surpluses in the Chi River Basin. Cambodia, too, can expect widespread surpluses east of Tonlé Sap with exceptional anomalies following the Mekong River. Surpluses are forecast in Laos and Vietnam, severe to extreme in northern Laos.

In the Philippines, surpluses will be severe in the central islands, moderate to severe in northern Mindanao, and moderate in isolated pockets of Luzon.

Moderate deficits are forecast in a few pockets of Sumatra including near the city of Medan in the north and in the central provinces of Riau and West Sumatra. Surpluses will be widespread in Indonesian Borneo, moderate overall but more intense in the west (south of the Kapuas River) and in the Mahakam River region in the east. Surpluses are forecast in Sulawesi, southern Java, the Lesser Sunda Islands, the Maluku Islands, and in the Bird's Head Peninsula (Doberai Peninsula), nearby Fakfak Peninsula, and southern extreme of Papua, Indonesia. Anomalies will be especially intense in the Fakfak Peninsula, nearby small islands, and Flores Island.

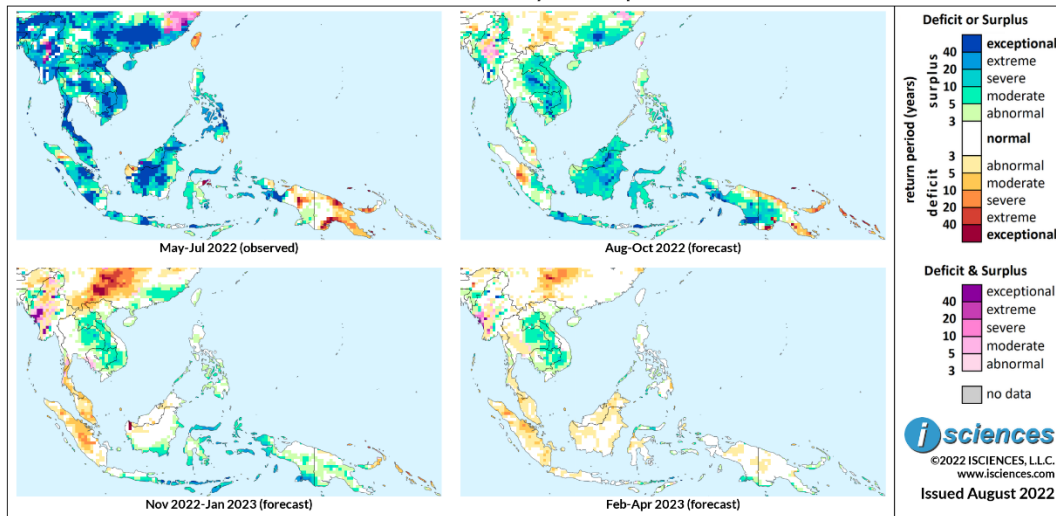
Deficits are forecast on Papua New Guinea's central north coast, and in New Britain and the Solomon Islands.

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



Based on observed data through July 2022 and forecasts through April 2023

ISciences Water Anomalies Forecast
Southeast Asia: May 2022 - April 2023



Based on observed data through July 2022 and forecasts through April 2023

The forecast through October indicates widespread surpluses in Southeast Asia from eastern Thailand through Cambodia, Laos, and most of Vietnam. Surpluses will be intense in Thailand’s Chi River Basin and in the Mekong River region through Cambodia and the Delta. Mixed conditions are forecast in Myanmar: transitions and deficits in the center of the nation surrounded by pockets of surplus. In the Philippines, surpluses will be severe in the central islands and extreme in eastern Mindanao. Deficits are forecast in central Sumatra, surpluses in the southeast and Singapore. Surpluses will be widespread in Borneo, Java, Sulawesi, Flores Island, the Maluku Islands, most of Indonesian Papua and well into central Papua New Guinea. Deficits are forecast for much of New Guinea’s north coast, the Bird’s Tail Peninsula (Papuan Peninsula), and pockets on the Gulf of Papua, as well as in New Britain and the Solomon Islands.

From November 2022 through January 2023, surpluses will shrink and downgrade considerably. Moderate surpluses are forecast in eastern Thailand, Laos, eastern Cambodia, and Vietnam’s Central Highlands. Surpluses will nearly disappear from Myanmar and moderate deficits are forecast north of Mandalay. A few pockets of moderate surplus will linger in the Philippines. Moderate deficits will emerge in the Malay Peninsula and deficits will increase in Sumatra including severe anomalies in central Sumatra. Surpluses are forecast in the Lesser Sunda Islands, the Maluku Islands, Sulawesi’s peninsulas, and coastal pockets of Indonesian Borneo. In New Guinea, surpluses will persist in the Bird’s Head and Fakfak Peninsulas, southern Papua, and pockets in the Highlands. Deficits will retreat from the Papuan Peninsula and around the Gulf of Papua as some surpluses emerge. Moderate surpluses will emerge in western New Britain while deficits persist in the east and in the Solomons, though anomalies will shrink and downgrade.

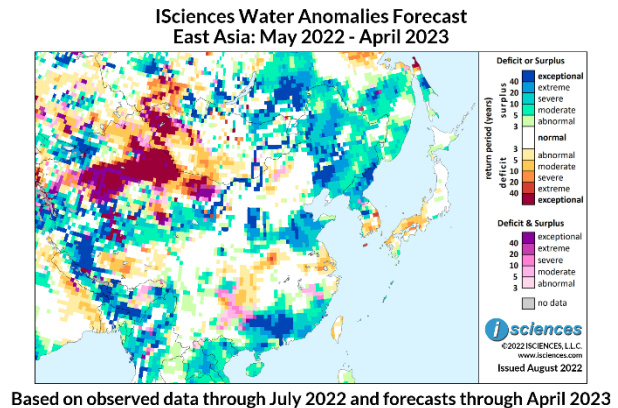
The forecast for the final months – February through April 2023 – indicates moderate surpluses in eastern Thailand, Laos, eastern Cambodia, and the Central Highlands of Vietnam. Some deficits are forecast in Sumatra.

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

East Asia

The 12-month forecast for East Asia through April 2023 indicates widespread, intense water surpluses in southern China throughout the Pearl River Basin (Zhujiang River) with exceptional anomalies in Guangxi and Guangdong. Anomalies of lesser intensity will reach through Fujian on the southeast coast and through Hainan in the south.

Moderate to severe deficits are forecast around the metropolis of Nanyang in Henan Province, trailing southwest into Guizhou. Deficits are also expected in the Lower Yangtze River region.



Surpluses will be widespread and intense from Shandong into northern Shaanxi. Northeast China, too, can expect surpluses in a vast area from Liaoning to the Chinese border. Anomalies will be extreme to exceptional in the Manchurian Plain.

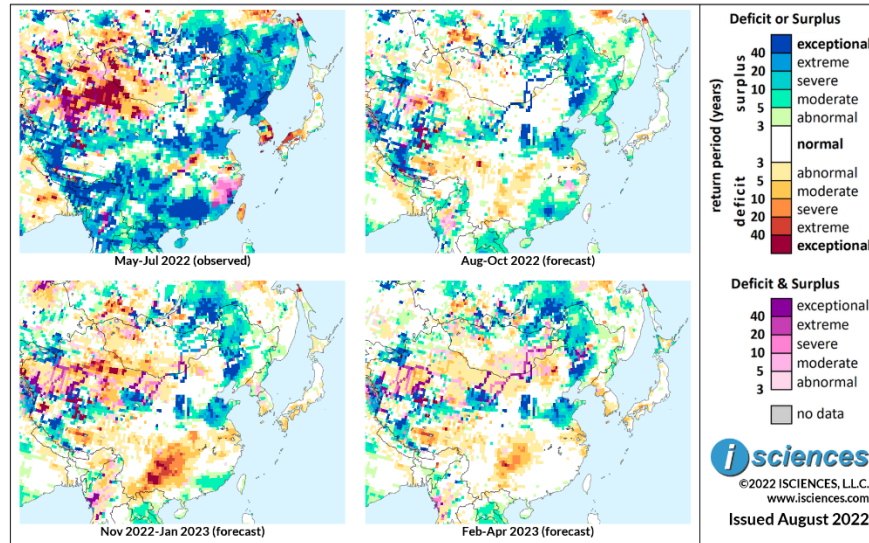
Widespread, exceptional deficits will reach across a vast belt in Xinjiang Uygur through the city of Hami and the Taklimakan Desert with pockets of transitional conditions (pink/purple) as well. In Tibet (Xizang), intense surpluses will dominate many areas in the western half of the region including the Yarlung (Brahmaputra) River. Eastern Tibet, however, can expect deficits, severe around Tibet's capital, Lhasa.

Intense surpluses will dominate North Korea. In South Korea, exceptional surpluses are expected in a band from Incheon on the Yellow Sea to the Lower Namhan River region, but deficits are forecast in many other regions of the nation. Japan can expect moderate to severe deficits in southern Honshu and in pockets of Kyushu and Shikoku.

In Mongolia, moderate deficits are forecast in the western Gobi Desert leading northwest, intensifying in the western region of the Hangayn Mountains and becoming exceptional in the lakes region of the nation's far northwest. Surpluses are forecast in far northern Mongolia from the Ider River region to Lake Khovsgol, and in the nation's east, including the Herlen River and Hentiyn Mountains in the northeast.

The 3-month time series maps below show the evolving conditions in more detail.

ISciences Water Anomalies Forecast
East Asia: May 2022 - April 2023



Based on observed data through July 2022 and forecasts through April 2023

The forecast through October indicates persistent surpluses of varying intensity in many areas of Northeast China. From Shandong into northern Shaanxi, severe to exceptional surpluses will continue. In southeast China surpluses will be exceptional in Guangdong, moderating as they reach well into neighboring provinces. Moderate deficits will emerge in the Yangtze Gorges, trailing southwest in pockets to the Vietnamese border. Intense deficits are expected in a pocket of western Sichuan and in central Tibet surrounding Lhasa, while intense surpluses are expected farther west in Tibet. In the nation's northwest, surpluses are forecast in the Qilian Mountains and Hexi Corridor, and mixed conditions in the vast expanse of Xinjiang Uygur. In Korea, moderate surpluses are forecast in the north, reaching into the south and intensifying near Seoul. Near-normal conditions are expected in Japan with some deficits west of Osaka and surpluses in Kyushu's far south. In Mongolia, surpluses are forecast in parts of the east and isolated pockets of deficit south and west of Ulaanbaatar.

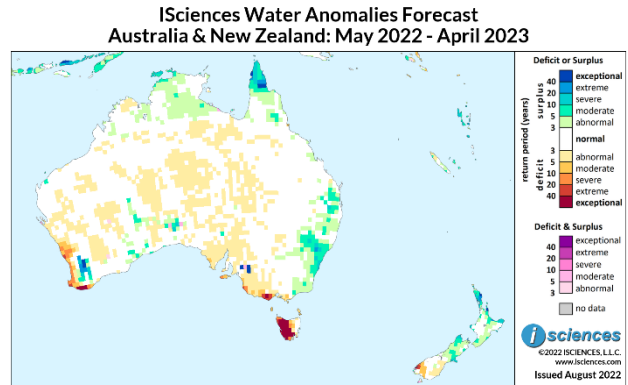
From November 2022 to January 2023, surpluses will shrink but remain widespread in Northeast China, downgrade slightly in Shandong, and persist with intensity in northern Shaanxi. Moderate surpluses will linger in the southeast in Guangdong and Fujian. Widespread deficits are forecast from southern Henan through Yunnan, severe to exceptional in Guizhou and eastern Yunnan. Moderate deficits near Shanghai will increase. Surpluses will intensify in the Qilian Mountains of Qinghai, and widespread deficits will emerge from far western Inner Mongolia into Xinjiang Uygur and Mongolia. Moderate surpluses will linger near Seoul and in Korea's coastal northwest. Moderate deficits will emerge in pockets of northwestern and southern Korea and increase in southern Japan as surpluses retreat.

The forecast for the final three months – February through April 2023 – indicates persistent surpluses in Northeast China, Shandong through Shaanxi, Qinghai, and western Tibet. Deficits will shrink in south-central China and Xinjiang, increase in western Korea, and emerge north of Beijing and in Zhejiang.

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

Australia & New Zealand

The 12-month forecast through April 2023 indicates moderate water surpluses in the Wide Bay-Burnett and South East (Brisbane) regions of Queensland. Surpluses are also forecast in eastern New South Wales in the Hunter Central Coast, Greater Sydney, and Central West regions, moderate overall but more intense in some pockets including the coast south of Sydney. In Queensland’s Far North, surpluses of varying intensity are expected north of the Holroyd River in Cape York Peninsula.



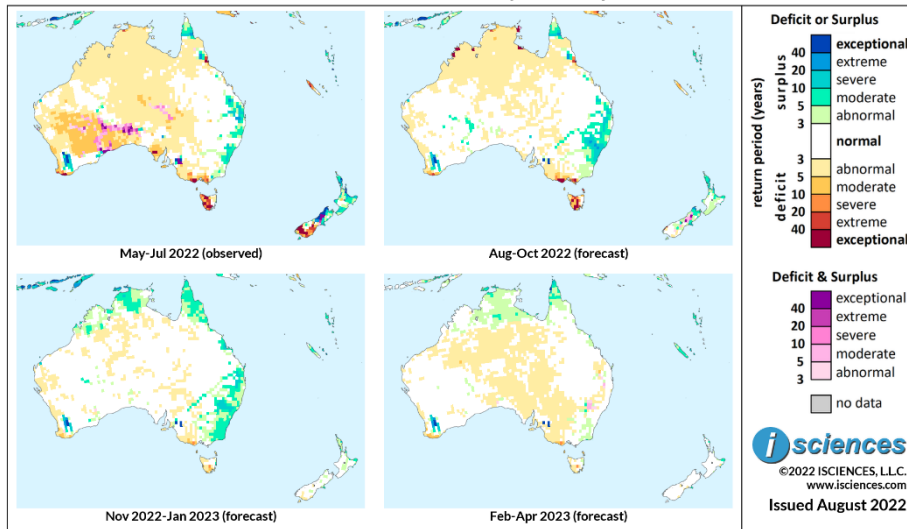
Elsewhere in Australia, surpluses are forecast in the Upper Avon River catchment of Western Australia, pockets of the Great Victoria Desert and Nullarbor Plain, the Tiwi Islands near Darwin in Northern Territory, and the Lower Murray River region of South Australia.

Deficits will skirt Victoria’s southern coast, extending west to Kangaroo Island. Exceptional deficits will dominate Tasmania’s western half, the Derwent Estuary, and Hobart. In Western Australia, moderate to severe deficits are expected on the southwest coast from Geraldton past Perth, becoming more intense as they reach Albany in the south.

In New Zealand, intense deficits are expected in South Island’s Fiordland, and surpluses in Christchurch and the northwest. In North Island, surpluses are forecast around the Bay of Plenty and in Northland where anomalies will be intense. Near-normal conditions are expected in New Caledonia.

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

**iSciences Water Anomalies Forecast
Australia & New Zealand: May 2022 - April 2023**



Based on observed data through July 2022 and forecasts through April 2023

The forecast through October indicates that widespread surpluses in eastern Australia will increase. Surpluses are forecast from Wide Bay-Burnett in Queensland (QLD) through eastern New South Wales (NSW) to Canberra. Anomalies will be moderate to severe and will reach inland to Dubbo and the confluence of the Macquarie and Barwon Rivers. Moderate surpluses are forecast on the Darling River. In northern QLD, a pocket of deficit is expected between Cairns and Townsville, but surpluses are forecast in the Atherton Tableland nearby. Surpluses will be widespread in Far North QLD north of the Holroyd River in Cape York Peninsula. A few intense pockets of deficit are forecast in coastal Top End, Northern Territory (NT) and the Kimberley in Western Australia (WA). Deficits will linger on WA's southwest coast from the Lower Blackwood River to Albany while surpluses persist in the Avon River region and re-emerge in pockets of the Great Victoria Desert. Along Victoria's coast, intense deficits will persist from Cape Otway past Melbourne. Widespread deficits will persist in Tasmania, intense in many areas including Hobart. Surpluses will linger in northern South Island, New Zealand and in Northland and on the Bay of Plenty in North Island. Severe deficits are expected in northern New Caledonia.

From November 2022 through January 2023, widespread surpluses will persist in eastern Australia, increasing past Canberra into East Gippsland, Victoria. Anomalies will be moderate overall but severe near Dubbo in NSW. Surpluses will increase in Far North QLD, and emerge in coastal Mackay (QLD), Top End, and the Fitzroy River region of the Kimberley. Deficits will shrink and downgrade considerably in coastal Victoria and Tasmania. Near-normal conditions are forecast in New Zealand. Moderate surpluses will emerge in central New Caledonia.

The forecast for the final months – February through April 2023 – indicates that surpluses will retreat from eastern Australia, but linger in pockets of the far north and in the Avon River region in the southwest. Surpluses in New Caledonia will increase.

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