

REACH Ukraine Emergency Brief

Novokakhovka Dam breach on 06 June 2023

Context

Around 03:00 on June 6th, the Kakhovka Hydroelectric Power Plant (about 70km upstream of Kherson) was severely damaged by explosions, causing water from the reservoir to flow uncontrollably downstream, [inundating at least 80 settlements](#) on both sides of the river bank. The Head of the Kherson Regional Military Administration reported that an estimated 16,000 persons in 17 settlements on the right bank of the Dniper River are located in areas within the flooding zone. At the time of this report, evacuations are ongoing from Kherson primarily to Mykolaiv, Kryvyi Rih, Odesa and Kropyvnytskyi. However, key informant interviews and observations seem to indicate a limited overall number of evacuees, with the majority of people, including those displaced, expected to remain in Kherson city.

Information shared in this brief was collected from a variety of sources including open-source media, and key informant interviews with evacuees and representatives from local authorities, as well as direct observation by field teams. The situation remains volatile and subject to change. Under the circumstances, REACH is not able to triangulate all information and findings should be interpreted with caution.



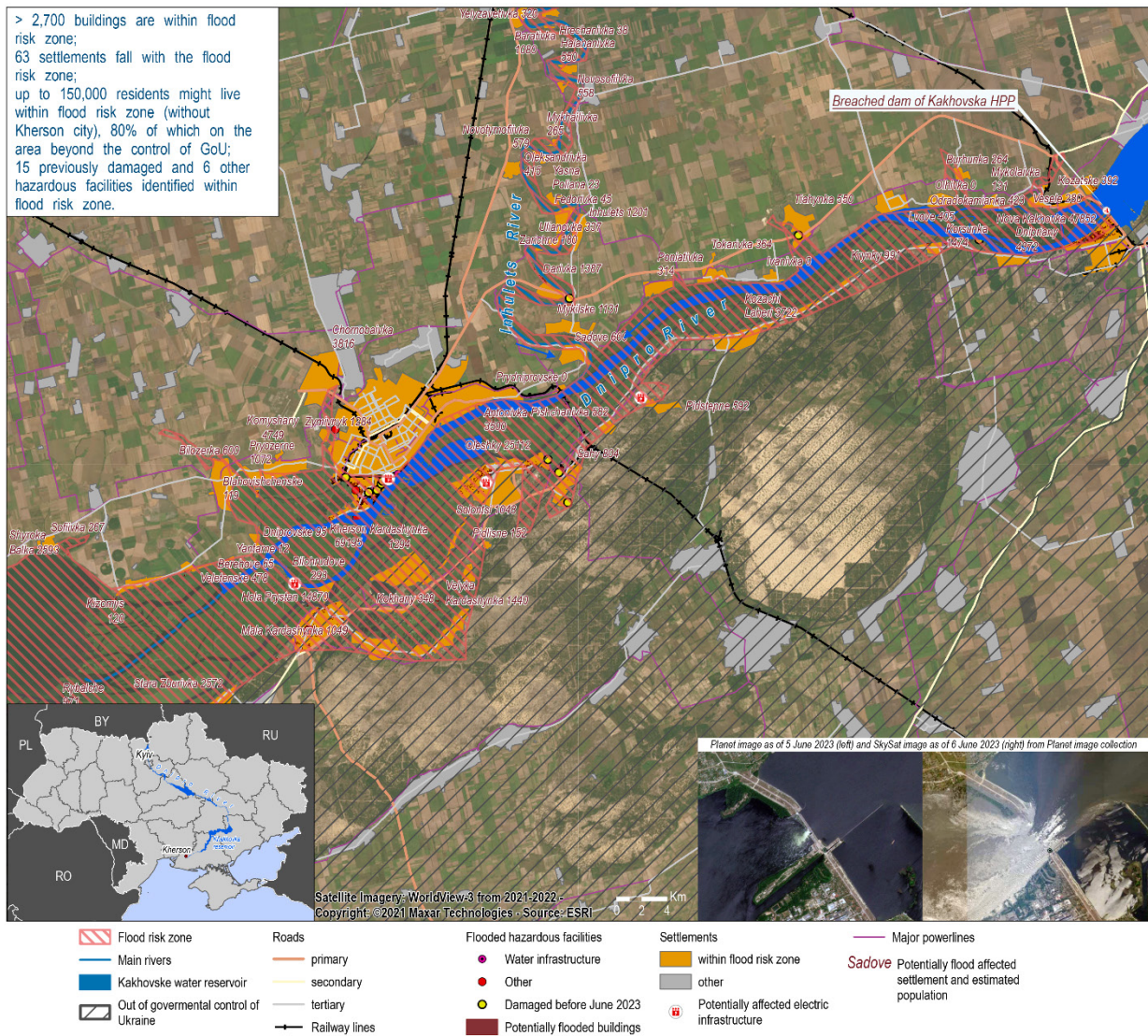
Planet satellite data showing the Novokakhovka dam before and after the breach.

Potential flood range and affected communities

According to the Head of Kherson Regional Military Administration, as of 07:30 on June 6th, the following settlements on the right bank of the river were already partially or completely flooded: Tiahynka, Lvove, Odradokamianka in Beryslav district, Ivanivka, Mykilske, Tokarivka, Poniativka, Bilozerka, and the Ostrov neighborhood of Kherson in Kherson district.

As of noon, the Head of the Kherson Regional Military Administration reported that the water levels in Kherson had risen by two meters and could rise another meter. The water levels are expected to reach critical levels in the next 24 hours. The deputy mayor of Mykolaiv expects the levels to go back down after 3-5 days.

Map 1: Flood range downstream from Novokakhovka dam breach, modelled by GIS Analyst Center under a scenario of 1,000 cubic meters per second discharge.



Immediate concerns

Water scarcity and contamination

Contamination of the water supply is a major concern throughout the region. According to the Deputy Mayor of Mykolaiv, the only pumping station providing potable water to the city of Mykolaiv was flooded, leaving water from other sources contaminated by metals and silt. Decreasing water levels in the reservoir will also have major impacts on water supplies upstream, in Kryvyi Rih, Nikopol, and other urban centers that were not directly affected by the flooding. The Ministry of Social Protection of Ukraine reported that contaminated water, as well as other sources such as rabies-carrying wildlife displaced by the flood, are top concerns for public health in interviews with REACH.

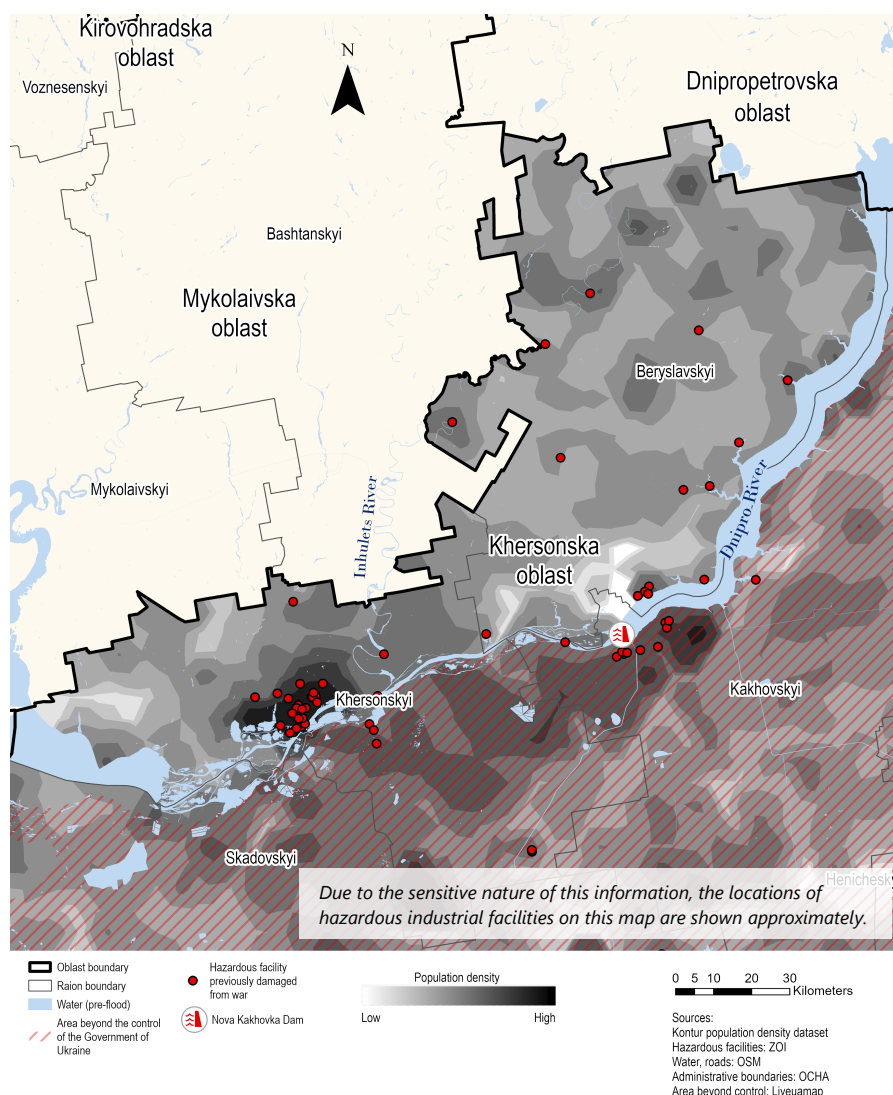
Mine contamination

Ukraine's Ministry of Internal Affairs [raised concerns and urged for caution regarding landmines](#) previously placed on both banks of the Dniper river that may have become dislodged by the flood. Indeed, there are unverified [footage and reports](#) of landmines adrift or washed ashore downstream, raising protection issues and complicating a response in the area.

Reverberating effects

Damages to facilities with health and environmental risks

Map 2: Hazardous industrial facilities potentially affected by flooding



Rapid analysis based on REACH's Hazardous Events Monitoring Initiative data allowed to identify 64 hazardous industrial facilities in rayons potentially affected by flooding resulting from damage to the Nova Kakhovka dam. Out of these, 20 are in area of heightened flood risks. These facilities are a significant concern due to their previous exposure to conflict (including direct damage) and their storage of substances that are harmful to human health and/or the environment. The potential flooding is expected to increase the risks of both immediate and long-term impacts.

Out of these 20 identified hazardous facilities, 15 are situated in areas under the control of the Government of Ukraine (as of June 6, 2023), while the remaining 5 are located beyond its control. These facilities of concern contain a variety of hazardous substances, each with its own environmental and health risk profiles. They include ammonia, antibiotics, biodiesel, chlorine, isopropyl alcohol, kerosene, oils and solvents, and various petroleum products. As of 6 June, 150 tons of machine oil are reported to have been leaked into the Dniper river due to damage to the Kakhovka Hydroelectric Power Plant.

A cluster of hazardous facilities is found within and in close proximity to Kherson city, where the high population density exacerbates threats to human health. Further analysis will be required to assess the potential health and environmental impacts.

Similarly, Ukrainian authorities [reported](#) that as a consequence of the damages at least 150 tons of engine oil got into the Dniper river, and there is a risk of further leakage of more than 300 tons.

Water supply to Zaporizhzhia Power Plant (ZPP)

Concerns emerged around the situation at ZPP, which relies on water on the Kakhovka reservoir to cool its reactors. [According to the International Atomic Energy Agency \(IAEA\)](#), if the water levels drop below 12.7m then it can no longer be pumped (at 0800 on June 6th, they estimated it to be around 16.4m). However, the IAEA [assessed](#) that as of June 6th, the situation was not critical since current water levels should be able to supply water to ZPP through the main pumping channels for a few days, and a back-up pond separated from the Kakhovka reservoir can supply the reactors with water for a few months.

Evacuations

As of 15:00 on June 6th, the Ministry of Internal Affairs of Ukraine [reported](#) that 1300 persons have been evacuated from Kherson oblast. Overall however, large-scale evacuation is not expected.

The Deputy Mayor of Mykolaiv reported the city is getting ready to support about one thousand evacuees. However, he expects most evacuees will choose to remain in Kherson with the hope of coming back to their homes as soon as the water level drops. According to him, the fear of looting of private properties is reportedly one factor behind people's intentions to stay. Three representatives of the Kherson territorial community, as well as representatives of the Mykolaiv and Odesa territorial communities also confirmed this displacement pattern. Odesa's regional social security office reported that they do not expect the arrival of more than 300 people.

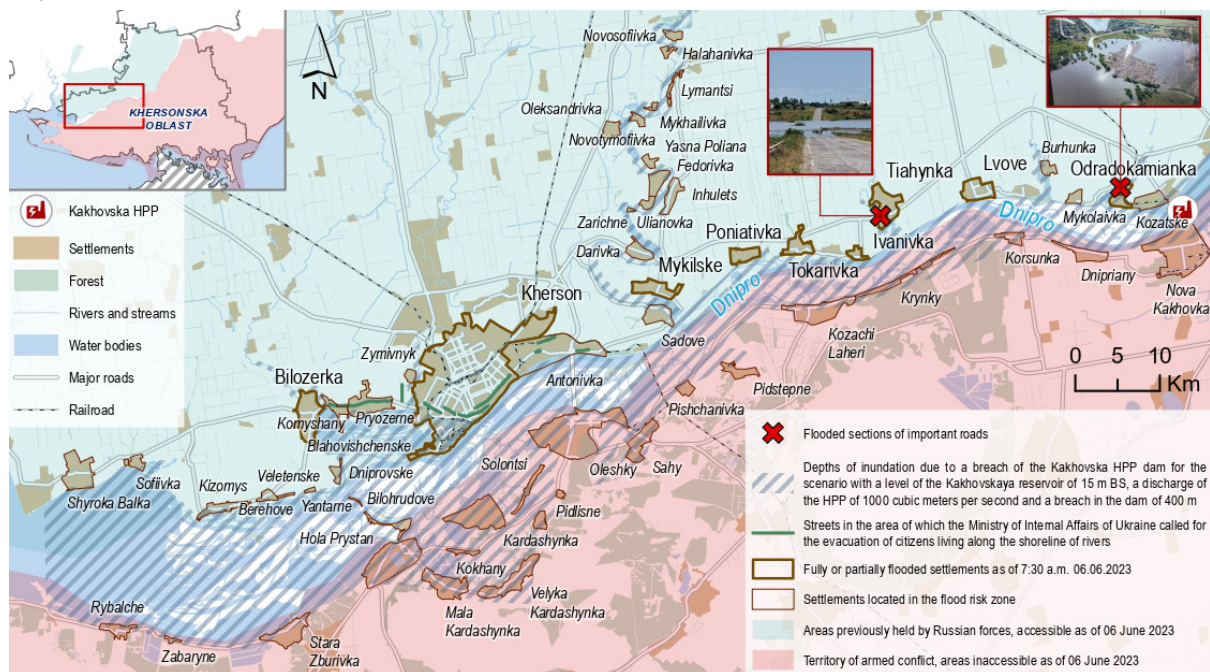
Early insights from key informant interviews at a train station in Mykolaiv seem to also confirm the trend that evacuees have prepared only for short-term displacement (3 to 5 days). Assessing from pictures [shared](#) by Ukraine's Ministry of Internal Affairs, people appear to evacuate with only their grab bag. Very few evacuees having taken a train from Kherson. One evacuation train [left Kherson for Mykolaiv](#) on June 6th, with REACH field team observing less than 50 persons in it. A second train was scheduled later in the day but was cancelled due to a lack of evacuees. Most evacuees arriving in Mykolaiv were middle-aged persons, including some children. There were not many older persons amongst them.

Social protection authorities confirmed people with limited mobility have been evacuated to Kherson city hospitals – which appears to be their final destination. They also reported cases of older persons refusing evacuation. People who refuse to leave Kherson are being accommodated in public places such as kindergartens and schools.

The main evacuation routes identified by State authorities appears to be from affected settlements to Kherson, and then from Kherson to Mykolaiv, Odesa, Kryvyi Rih and Kropyvnytskyi. The mayor of Kyiv [announced](#) that around 100 children are expected to be evacuated to the capital. Coordination and communication about evacuation was reported to remain at the regional level.

As some roads on the right bank are reported to be flooded, such as the main road to the Tyahinka settlement, people evacuating from affected settlements by their own means might be difficult. The Ministry of Internal Affairs of Ukraine [announced](#) that off-road vehicles and boats have been dispatched from Kyiv to support evacuations.

Map 3: Main roads from affected communities towards Kherson



Reported needs

Watercraft, life jackets, and children’s life jackets are very much needed to continue evacuating people from areas no longer accessible by land, according to Ukraine’s State Emergency Service in Kherson. Additionally, they report dry food rations, regular food packages, personal hygiene products, summer blankets, power banks, and flashlights as top needs among displaced and non-displaced persons remaining in Kherson. With [some areas in Kherson city losing electricity](#), an increase in humanitarian needs and continued evacuations are likely. According to the Ministry of Social Protection, an additional 800 persons may need to be evacuated due to the loss of electricity. In the next days, the Ukrainian Red Cross expects water and water purification stations as urgent needs. Key informants in Kherson city shared a preference for in-kind assistance in the short-term.

In arrival and transit sites such as Mykolaiv and Odesa train stations, REACH field teams report a significant local response. Both governmental and civil society partners were present to support evacuees in the first 24 hours. Counselling services from the State Emergency Service of Ukraine were reportedly present in Mykolaiv, sharing information on available services with evacuees. A large majority of interviewed evacuees reported having accommodation options on arrival, staying with family or friends, with a small minority staying in collective sites. Cash assistance appears a feasible modality for assistance covering basic needs in arrival and transit locations not affected by flooding.