

П'ЯТЬ РОКІВ БОЙОВИХ ДІЙ

НА СХОДІ УКРАЇНИ

Екологічні проблеми
у інфографіці

FIVE YEARS OF FIGHTING

IN EASTERN UKRAINE

Environmental issues
depicted in infographics



Київ

2019

Kyiv

Матеріали підготовлено Д. Аверінім за участі Н. Денісова (Екологічна мережа «Зой»)

При підготовці інфографіки використано дані інформаційної системи довкілля Донбасу deis.menr.gov.ua з доповненнями, а також тематичні звіти, підготовлені для Координатора проектів ОБСЄ в Україні експертами В. Єрмаковим та О. Улицьким: Навчально-науковий інститут екологічної безпеки та управління Державної екологічної академії післядипломної освіти та управління Міністерства енергетики та захисту довкілля (розділи «Порушення роботи промислових підприємств», «Затоплення шахт Донбасу» та «Військові дії в промисловому регіоні – джерело високого ризику»), О. Василюком: ГО «Українська природоохоронна група» (розділ «Пошкодження природоохоронних територій»), С. Зібцевим: Регіональний східноєвропейський центр моніторингу пожеж, Національний університет біоресурсів і природокористування України (розділ «Пожежі у природних і сільськогосподарських ландшафтах»), С. Янчевським та групою експертів Національного центру управління та випробувань космічних засобів (розділ «Затоплення шахт Донбасу»).

Консультації при підготовці матеріалів надано спеціалістами Сіверсько-Донецького басейнового управління водних ресурсів, Департаменту екології та природних ресурсів Донецької обласної державної адміністрації, а також Програми з питань води, санітарії та гігієни Дитячого фонду ЮНІСЕФ.

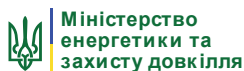
Оригінал-макет та дизайн: Юлія Мадінова

Координація проєкту: Алла Юшук, Ірина Лоїк та Ярослав Юрцаба

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Організація з безпеки та співробітництва в Європі
Координатор проєктів в Україні

These materials were compiled by D. Averin and N. Denisov (Zoï Environment Network)

These infographics are based on data from the Donbas Environmental Information System (DEIS, deis.menr.gov.ua) complemented by additional resources and solicited reports prepared for the OSCE Project Co-ordinator in Ukraine from the following sector experts: V. Yermakov and O. Ulytskyi of the Educational-scientific Institute of Ecological Safety and Management of the State Ecological Academy of Postgraduate Education and Management operating under the Ministry of Energy and Environmental Protection of Ukraine (Disruptions at industrial operations, Flooding of Donbas coal mines and Combat in industrial areas poses high risk); Mr. O. Vasyliuk of the Ukrainian Nature Conservation Group, NGO (Damage at protected natural areas); Mr. S. Zibtsev of the Regional Eastern European Fire Monitoring Centre and the National University of Life and Environmental Sciences of Ukraine (Fire damage at natural and agricultural landscapes); Mr. S. Yanchevskyi and the expert group from the National Space Facilities Control and Test Centre (Flooding of Donbas coal mines).

Also consulted during the preparation of these infographics were experts from the Siverskyi-Donets Basin Administration of Water Resources, the Department of Ecology and Natural Resources of the Donetsk Oblast State Administration, and the UNICEF "Water, Sanitation and Hygiene" Programme.

Layout and design: Yulia Madinova

Editing: Joel Rakos

Project co-ordination: Alla Yushchuk, Iryna Loik and Yaroslav Yurtsaba

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The views, thoughts, conclusions and other data presented in these materials belong solely to their authors and do not necessarily reflect the official position of the Organization for Security and Co-operation in Europe (OSCE).

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ЗМІСТ / CONTENT:

Військові дії в промисловому регіоні - джерело високого ризику

Понад **80%** пошкоджених в ході бойових дій підприємств та об'єктів життєзабезпечення відносяться до небезпечних та дуже небезпечних



Combat in industrial areas poses high risk

More than **80%** of the enterprises and critical public infrastructure damaged during combat operations belong to "dangerous" or "very dangerous" environmental-risk categories

Затоплення шахт Донбасу

Затоплення шахт - одне із головних наслідків бойових дій: **39** шахт регіону повністю затоплені та не підлягають експлуатації



Flooding of Donbas coal mines

The flooding of coal mines is one of the most severe consequences of combat: **39** mines in the region are completely flooded and inoperable

Порушення роботи промислових підприємств

500 випадків порушення роботи промислових підприємств через бойові дії, з них **1/4** пов'язана із пошкодженням їхньої інфраструктури



Disruptions at industrial operations

500 cases of combat-related disruption of industrial operations **1/4** of the cases involved damage to industry infrastructure

Водопровід - артерія життя

Понад **300** аварійних та нештатних випадків зафіксовано на 60 об'єктах системи водозабезпечення Донбасу



Water pipelines - the artery of life

More than **300** emergencies and other disruptions were recorded at 60 water supply facilities in Donbas

Пожежі у природних і сільськогосподарських ландшафтах

Бойові дії у 2014 році призвели до різкого збільшення кількості пожеж на сході України. В умовах конфлікту пожежна небезпека не лише зберігається, але й посилюється із підвищенням сухості клімату



Fire damage at natural and agricultural landscapes

Combat operations in 2014 provoked the spread of uncontrolled fires in eastern Ukraine. In conflict conditions fire hazards persist, aggravated by an increasingly dry climate

Пошкодження природоохоронних територій

Понад **78** природоохоронних об'єктів постраждали в результаті бойових дій **80%** природоохоронних об'єктів регіону опинилися за лінією розмежування



Damage at protected natural areas

More than **78** conservation sites have experienced damage due to combat operations **80%** of all Donbas conservation areas are now located behind the contact line

Моніторинг довкілля: воєнні втрати і модернізація

З початком бойових дій за лінією розмежування залишилося більше половини постів спостереження за якістю повітря та води. На підконтрольній території відбувається масштабна модернізація системи екологічного моніторингу.



Environmental monitoring: losses and gains

With the onset of combat operations, the government of Ukraine lost control of air and water quality monitoring stations now located beyond the contact line—more than a half of all regional installations. In the government-controlled areas monitoring has undergone significant modernization in recent years.

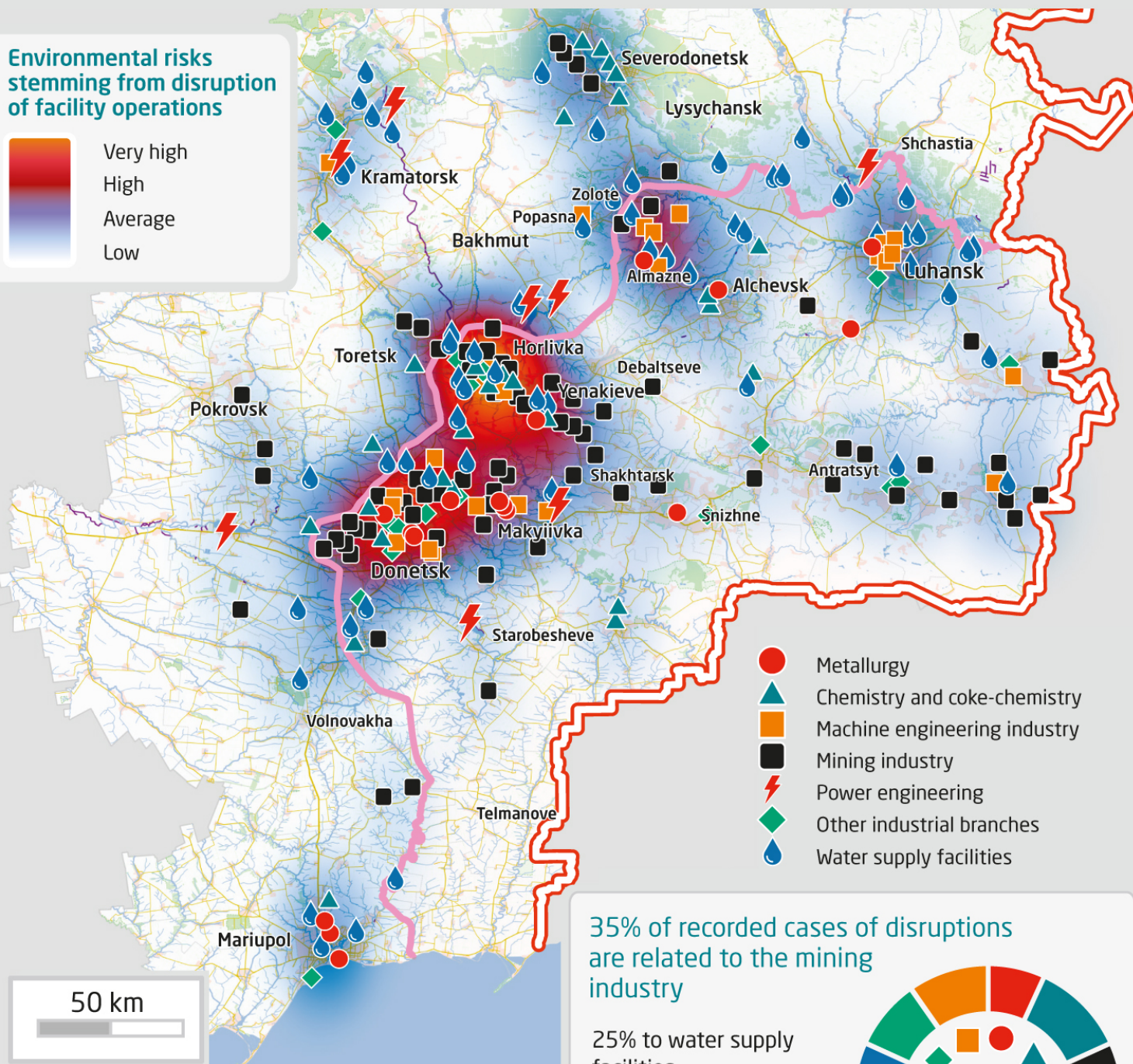
COMBAT IN INDUSTRIAL AREAS POSES HIGH RISK

Military activities in any industrial area create considerable environmental hazard. Deliberate and unintentional damage to industrial hardware, infrastructure, fuel storage facilities, raw materials or industrial waste pose significant risk for environmental disaster. Among the 247 enterprises at which operational activities were compromised by military activities, those which pose the greatest potential danger include: the Yasynivskiy, Avdiivskiy and Yenakiivskiy coke plants; the Yenakiivskiy, Alchevskiy and Donetskyyi metallurgical plants; the Toretskyi ferroalloy plant; the chemical company "Concern Stirol"; the Luhanska, Vuhlehirska and Myronivska TPPs.

Environmental risks stemming from disruption of facility operations



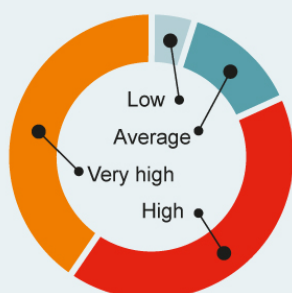
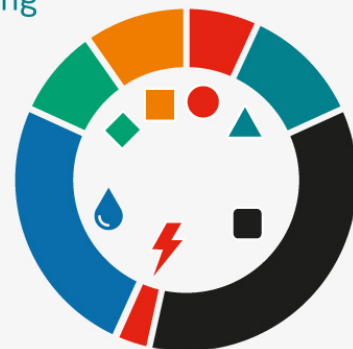
Very high
High
Average
Low



- Metallurgy
- ▲ Chemistry and coke-chemistry
- Machine engineering industry
- Mining industry
- ⚡ Power engineering
- ◆ Other industrial branches
- 💧 Water supply facilities

35% of recorded cases of disruptions are related to the mining industry

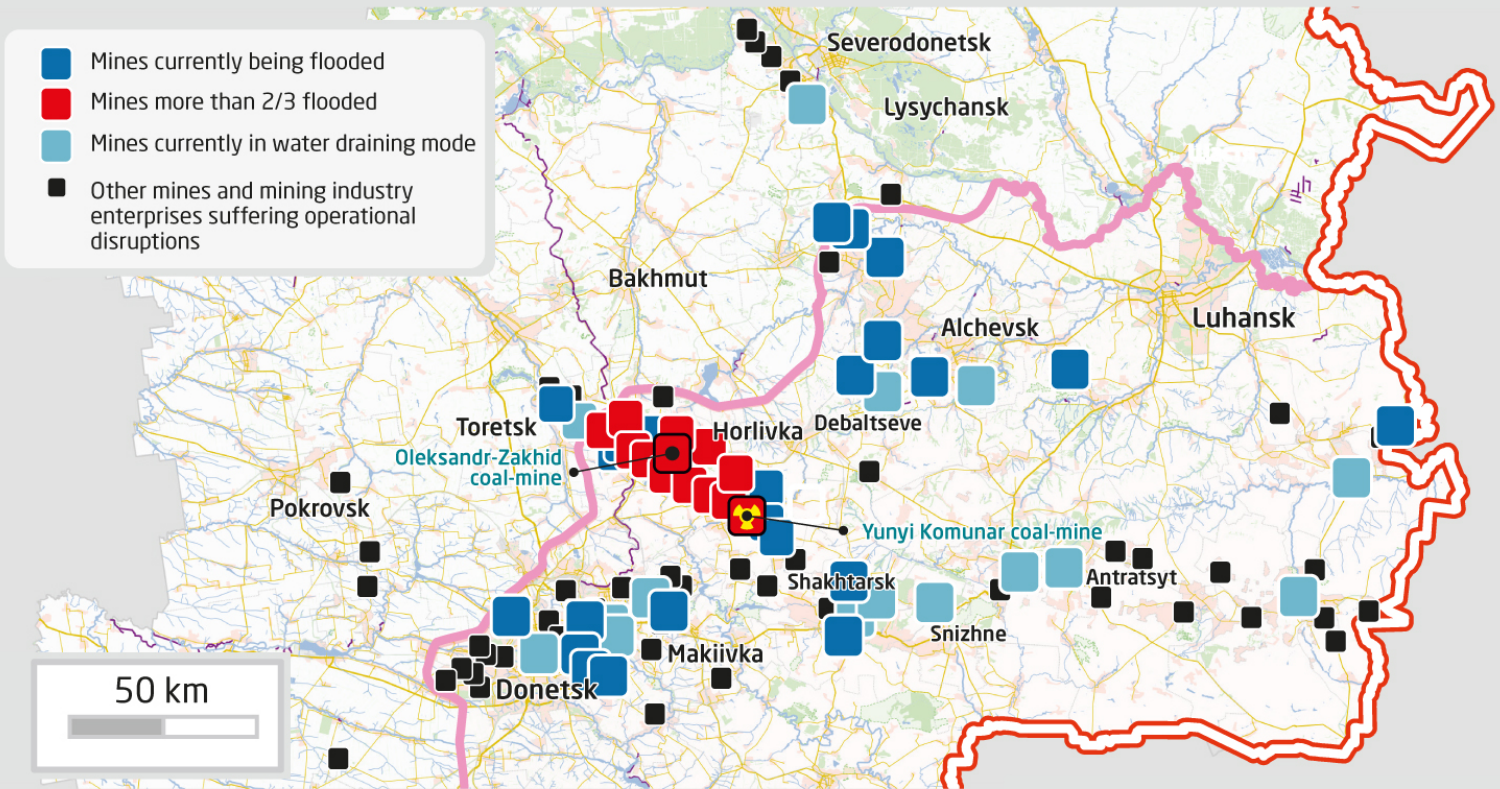
25% to water supply facilities,
11% to chemical and coke-chemical industry,
10% to machine engineering industry.



More than 80% of the facilities damaged during hostilities have high or very high environmental risk levels. The highest environmental risk zones are seen at the population agglomerations of Donetsk - Makiivka, Toretsk - Horlivka - Yenakieve, and in the city of Mariupol in the Donetsk oblast. In the Luhansk oblast, sites of highest risk include: Luhansk, Alchevsk and the population agglomeration of Almazne - Irmino - Zolote.

FLOODING OF DONBAS COAL MINES

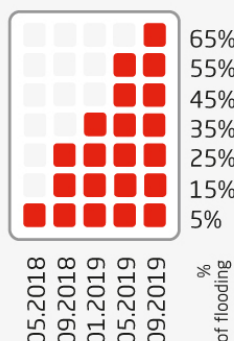
A major consequence of military activities in Eastern Ukraine is flooding at Donbas coal mines. Due to discontinued power supply, destroyed infrastructure, disabled pumping equipment and other causes, 39 of the region's mines are being flooded or have already been flooded completely, terminating any further potential for mining operations. Some of these locations have significant stores of hazardous materials. From 2014 - 2018, operational disruptions were recorded at 80 Ukrainian mining industry enterprises.



Hazardous material storage in coal mines currently being flooded

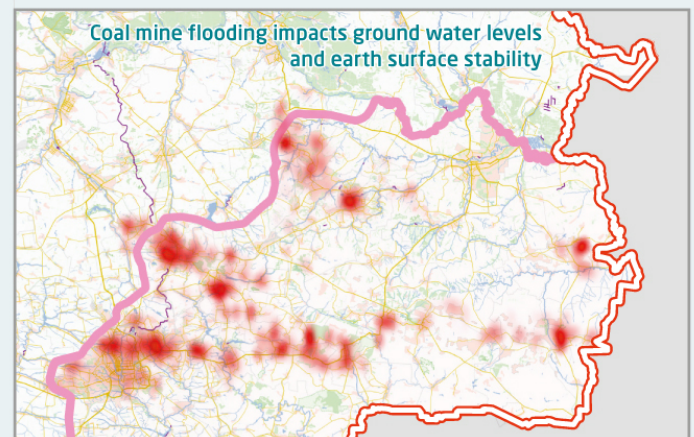
When water drainage in mines is disturbed, the contaminated mine water impacts ground and surface water quality on both sides of the contact line. Coal mines that had been used to store hazardous waste, for example, the Oleksandr-Zakhid coal mine, already more than 2/3 flooded, present a specific environmental threat.

In an attempt to decrease tension in the surrounding rock massif, in 1979 a 0.3 kiloton capacity subsurface nuclear explosion was conducted at the Yuni Komunar coal mine. Since May 2018 the coal mine has been flooded which may facilitate the introduction of radioactive substances into regional and neighbouring ground and surface waters.



Coal mine flooding impacts ground water levels and earth surface stability

Coal mine flooding leads to soil subsidence and may entail disruption of infrastructure and industrial operations including malfunctions in vital elements of the regional water supply. Subsided soil zones have been found in the population agglomerations of Donetsk-Makiivka-Khartsyzk, Toretz-Horlivka-Yenakieve, Shakhtarsk-Snizhne-Khrustalniy, Dovzhansk, Sorokine and Zolote-Kadyivka-Alchevsk.

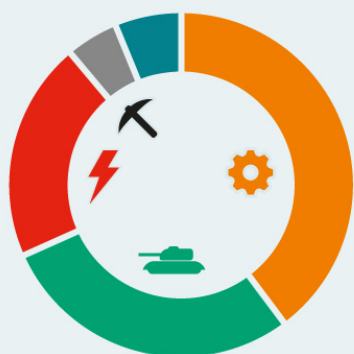
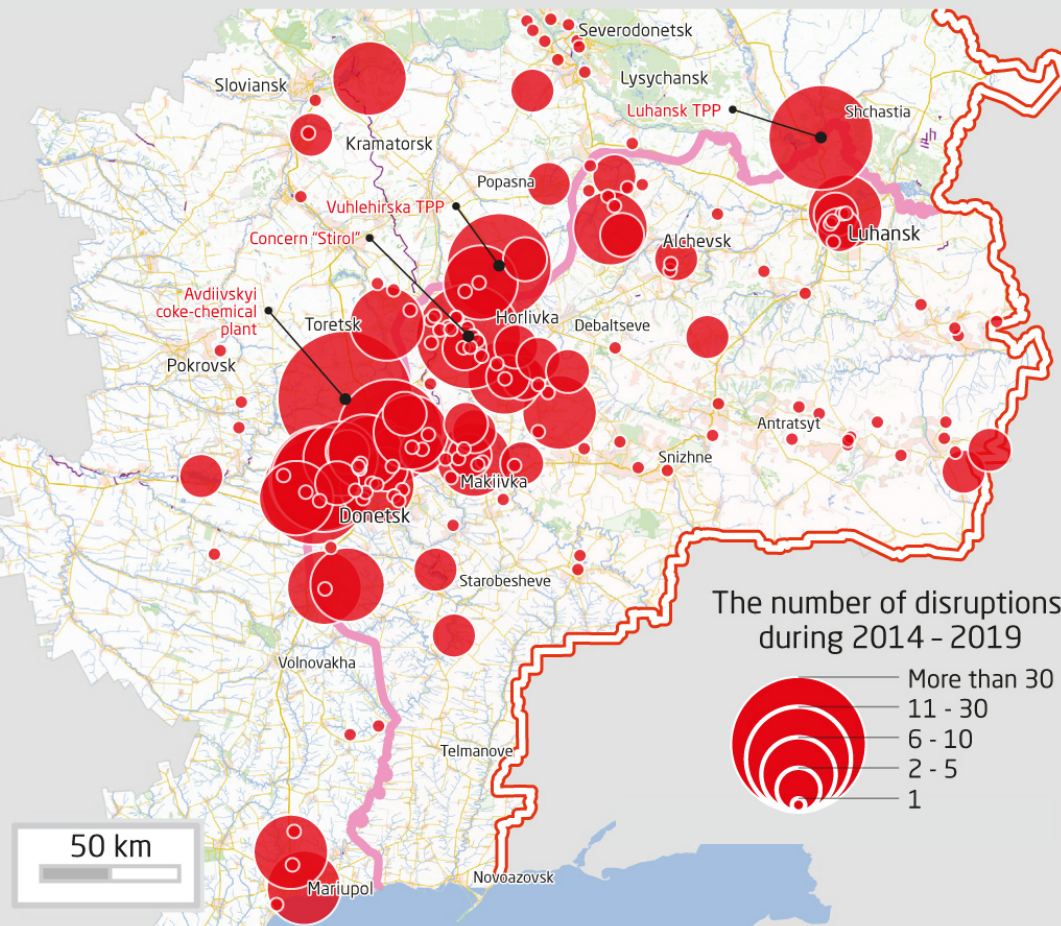
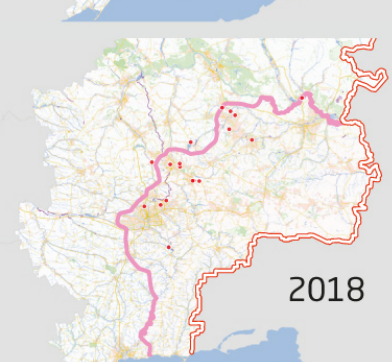
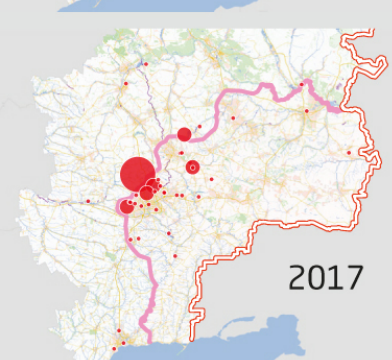
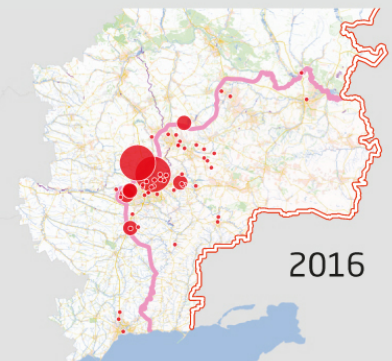
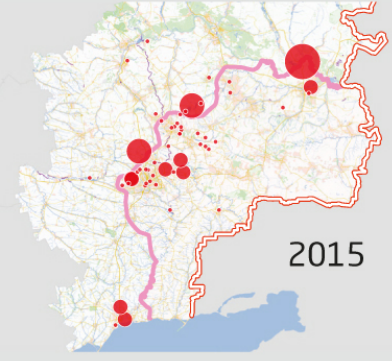
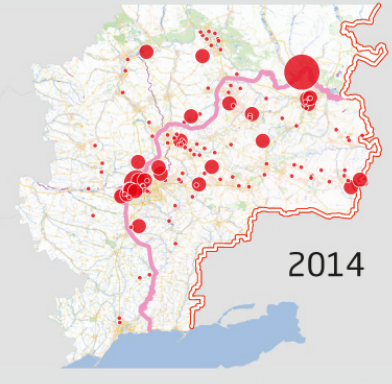
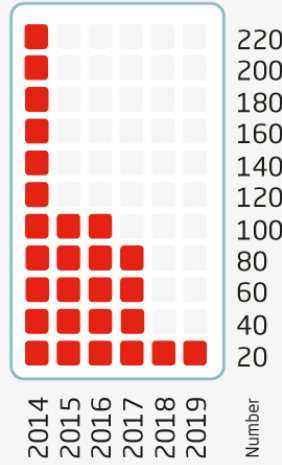


DISRUPTIONS AT INDUSTRIAL OPERATIONS

Industrial enterprises within the region continue to pose environmental threat. Open source materials indicate 564 cases of operational disruption and/or accidents resulting from armed hostilities between 2014 and 2019.

Decrease in the number of operational disruptions at industrial enterprises

The number of annual disruptions has decreased from 224 in 2014 to 12 in 2019. The facilities at which the largest number of incidents were recorded include: the Avdiivskiy coke-chemical plant (37 cases); the Luhansk TPP (30); the Butivska coal mine (24); the Cheliuskintsiv coal mine (15); the Skochynskiy coal mine (14); the Vuhlehirska TPP (12); the Abakumov coal mine (12); chemical company "Concern Stirol" (12).



28% of the disruptions occurred due to infrastructure damage

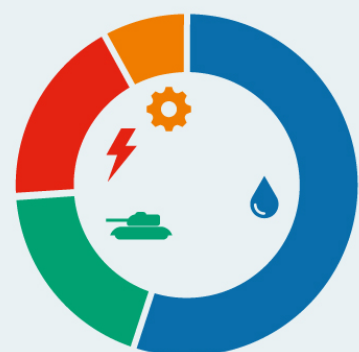
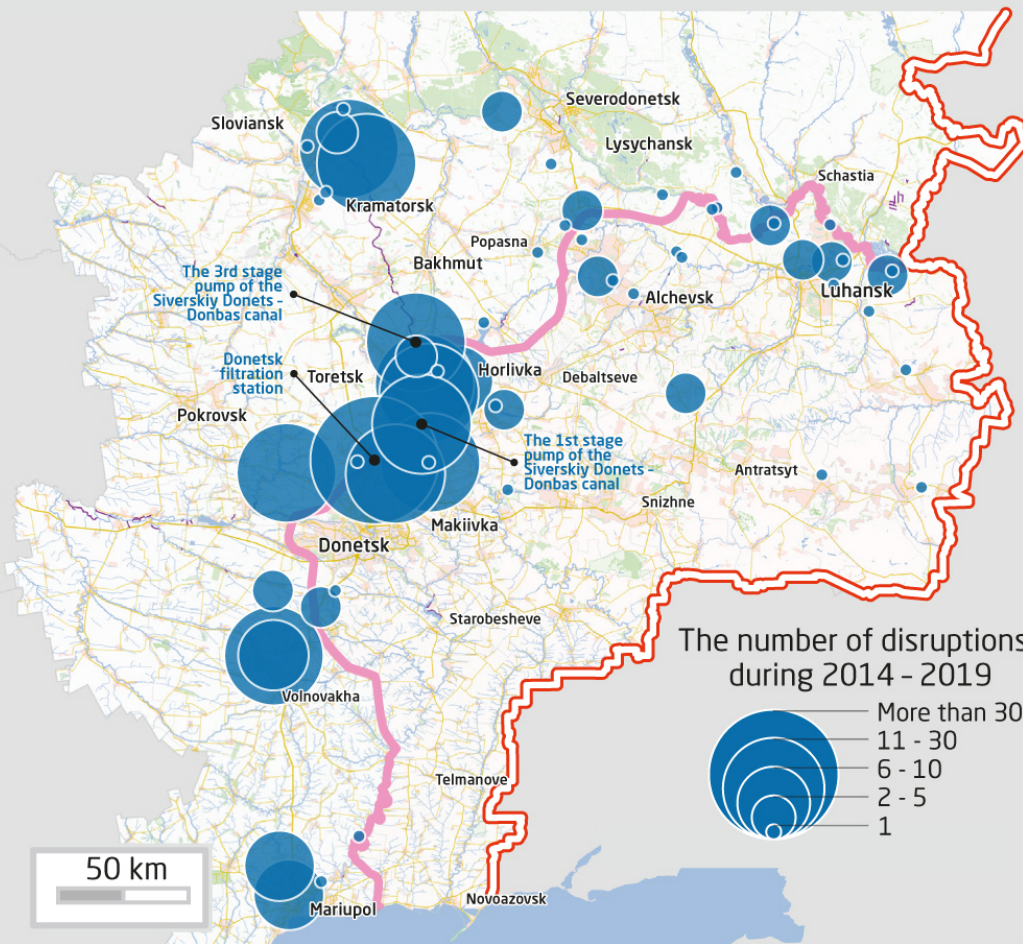
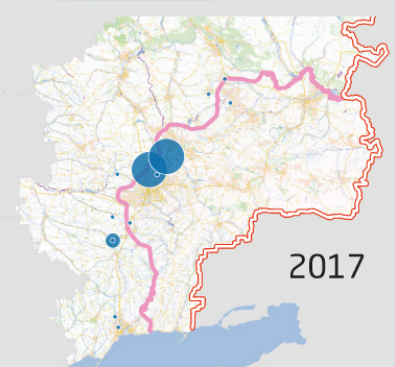
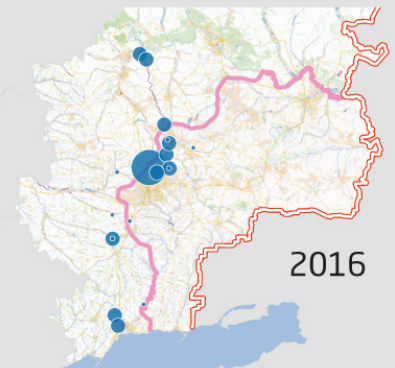
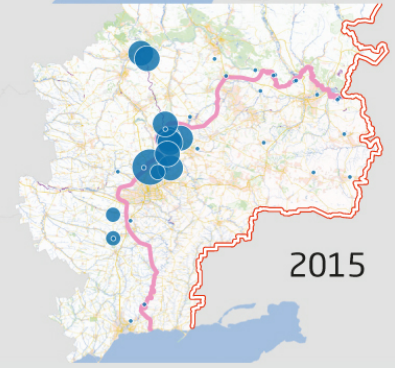
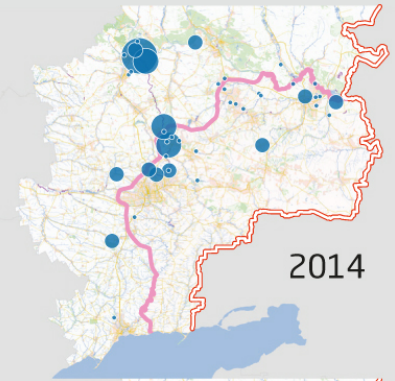
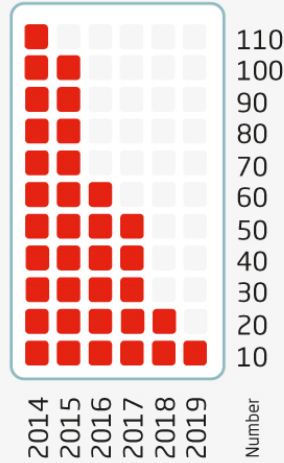
- Disturbance of management or production processes (40%)
- Damage to infrastructure (28%)
- Interruption of power supply (21%)
- Dismounting of equipment (5%)
- Other damages (6%)

WATER PIPELINES - THE ARTERY OF LIFE

Between 2014 and 2019, there have been 366 registered cases of routine operational disruptions and major emergencies due to ongoing hostilities in the combat zone. In some cases, these disruptions have had an adverse effect on the environment with the release of hazardous substance contaminants.

Decrease in the total of water supply facility disruptions

The aggregate count of operational disruptions decreased from a high of 111 in 2014 to 8 in 2019. The greatest frequency of operational disruptions were recorded at the following facilities: the Donetsk Filtration Plant (69 cases); the first stage pump of the Southern Donbas water pipeline (33); the third stage pump of the Siverskiy Donets - Donbas Canal (21); and the first stage pump of the Siverskiy Donets - Donbas Canal (20).



The majority of incidents involved water supply disruption

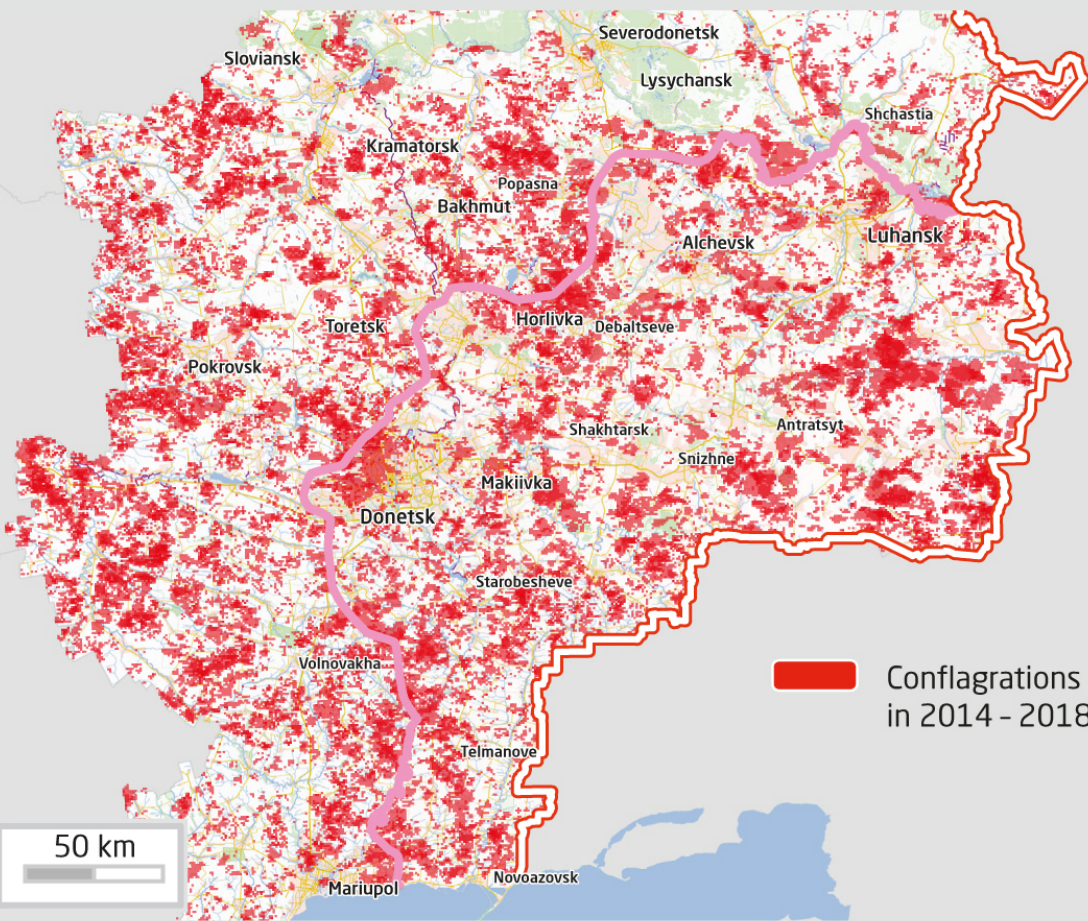
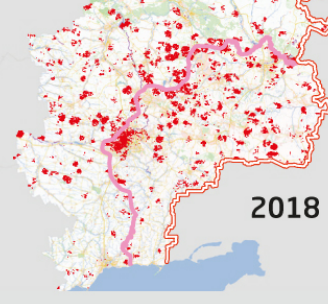
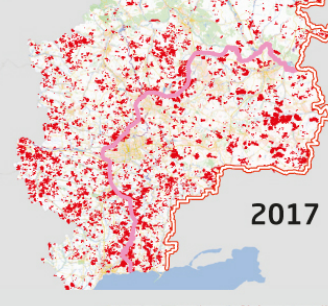
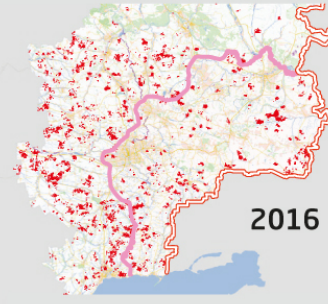
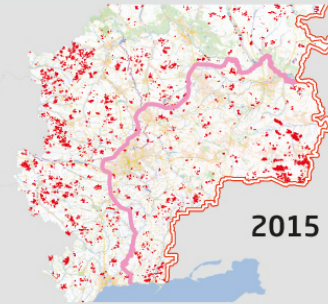
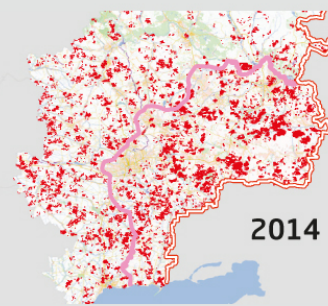
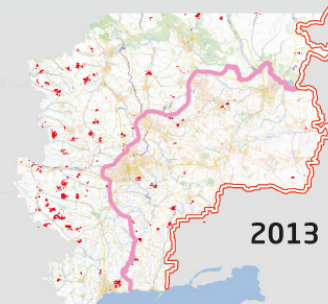
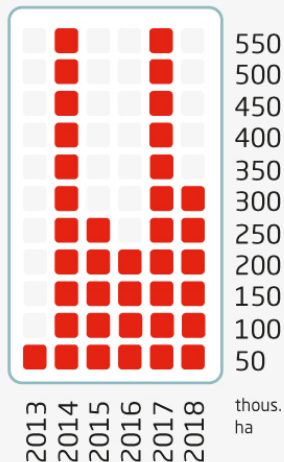
- Water supply disruption (55%)
- Infrastructure destruction (19%)
- Power supply interruption (18%)
- Disturbance of process conditions or facility management (8%)

FIRE DAMAGE AT NATURAL AND AGRICULTURAL LANDSCAPES

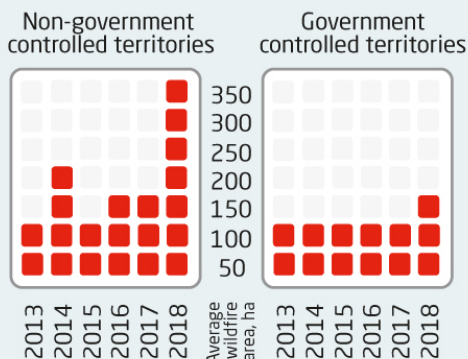
The onset of combat operations in Eastern Ukraine in 2014 has resulted in a significant increase in wildfires which have leveled forests, grasslands and agricultural fields in the region. As the ongoing conflict makes fire management particularly difficult, fire hazard in the region has not only remained acute, but has - with the effects of climate change - escalated measurably.

The largest burned areas registered during 2014 military operations

Active combat operations commencing in August 2014 corresponded with an increase of the number of wildfires by a factor of 2-4. Ongoing military operations and the presence of troops and military equipment further aggravate fire hazards. According to remote sensing data, from 2014 to 2018, the territories of the Donetsk and Luhansk oblasts registered more than 14,000 wildfires, covering 1.9 million hectares. In 2017, characterized by an unusually high temperature, neighbouring oblasts under Ukrainian control also measured record peaks in incidences of wildfire.

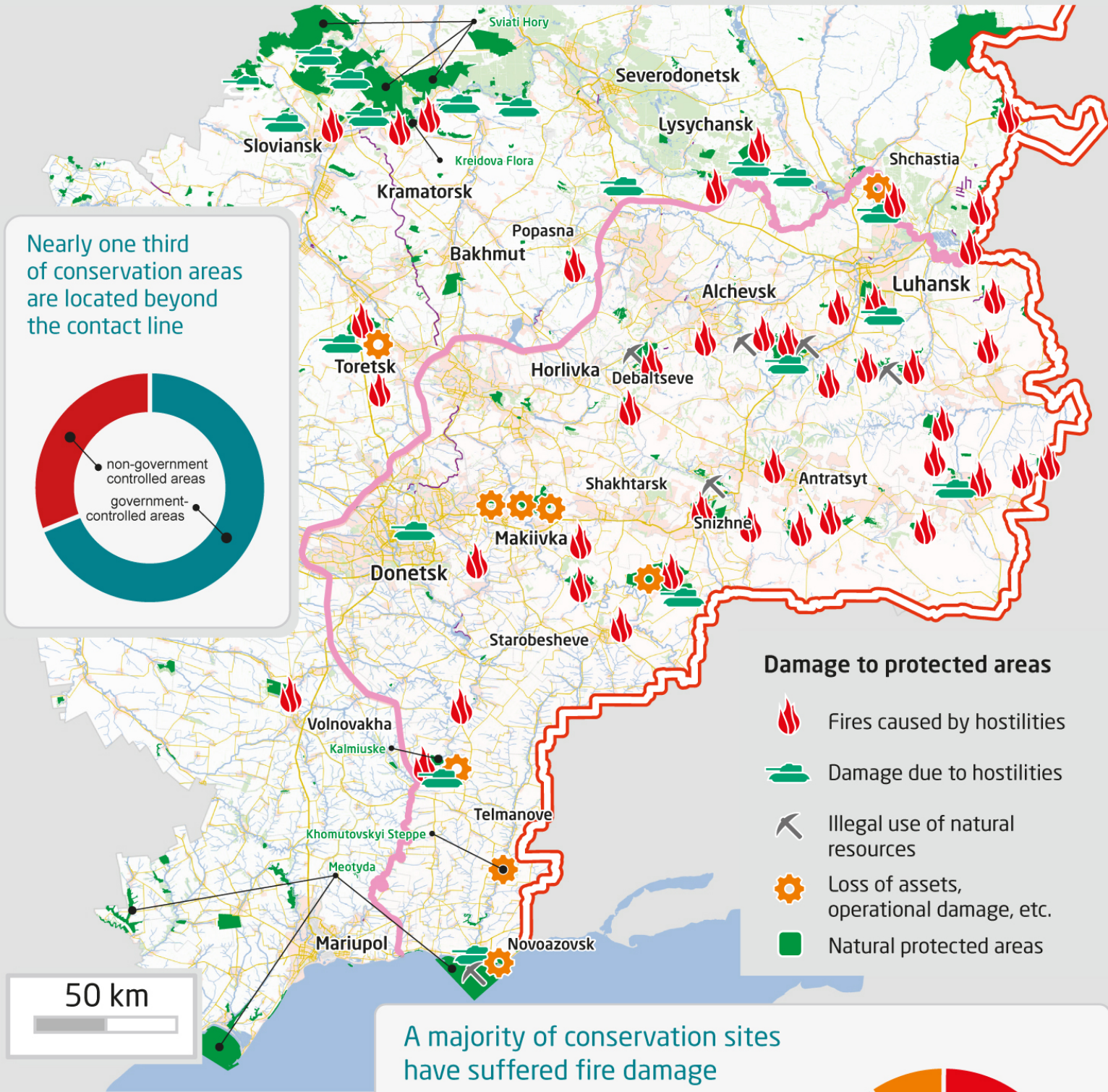


Insufficient financial support; a general lack of attention toward the ensuring of fire protection for forested and agricultural lands; and altered land use in practices and structure in non-government controlled areas compound the problem. This has resulted in the gradual increase in the average wildfire coverage area from 111 ha in 2013 to 349 ha in 2018. A similar trend has not been observed in government-controlled areas.

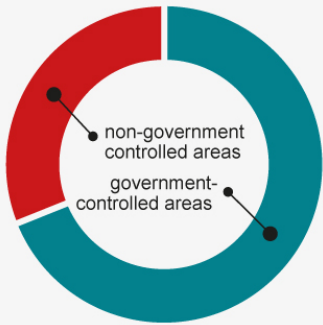


DAMAGE AT PROTECTED NATURAL AREAS

78 nature reserves, wildlife sanctuaries, and landscape parks in the Donetsk and Luhansk oblasts have suffered fire damage due to military operations, fortification construction, the detonation of ammunition, combat vehicle maneuvers, the illegal extraction of natural resources, etc.



Nearly one third of conservation areas are located beyond the contact line

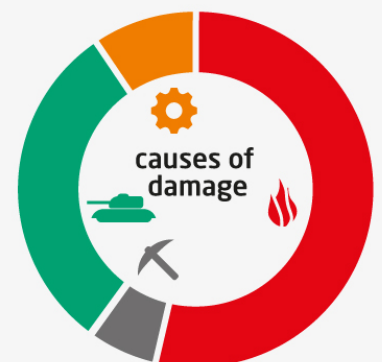


Damage to protected areas

- Fires caused by hostilities
- Damage due to hostilities
- Illegal use of natural resources
- Loss of assets, operational damage, etc.
- Natural protected areas

A majority of conservation sites have suffered fire damage

50 protected natural sites have experienced fires due to armed hostilities. 29 sites were directly affected by hostilities and fortification construction. Six protected natural sites suffered damage from the illegal extraction of natural resources.

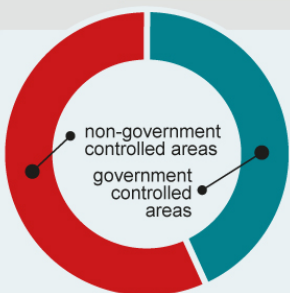
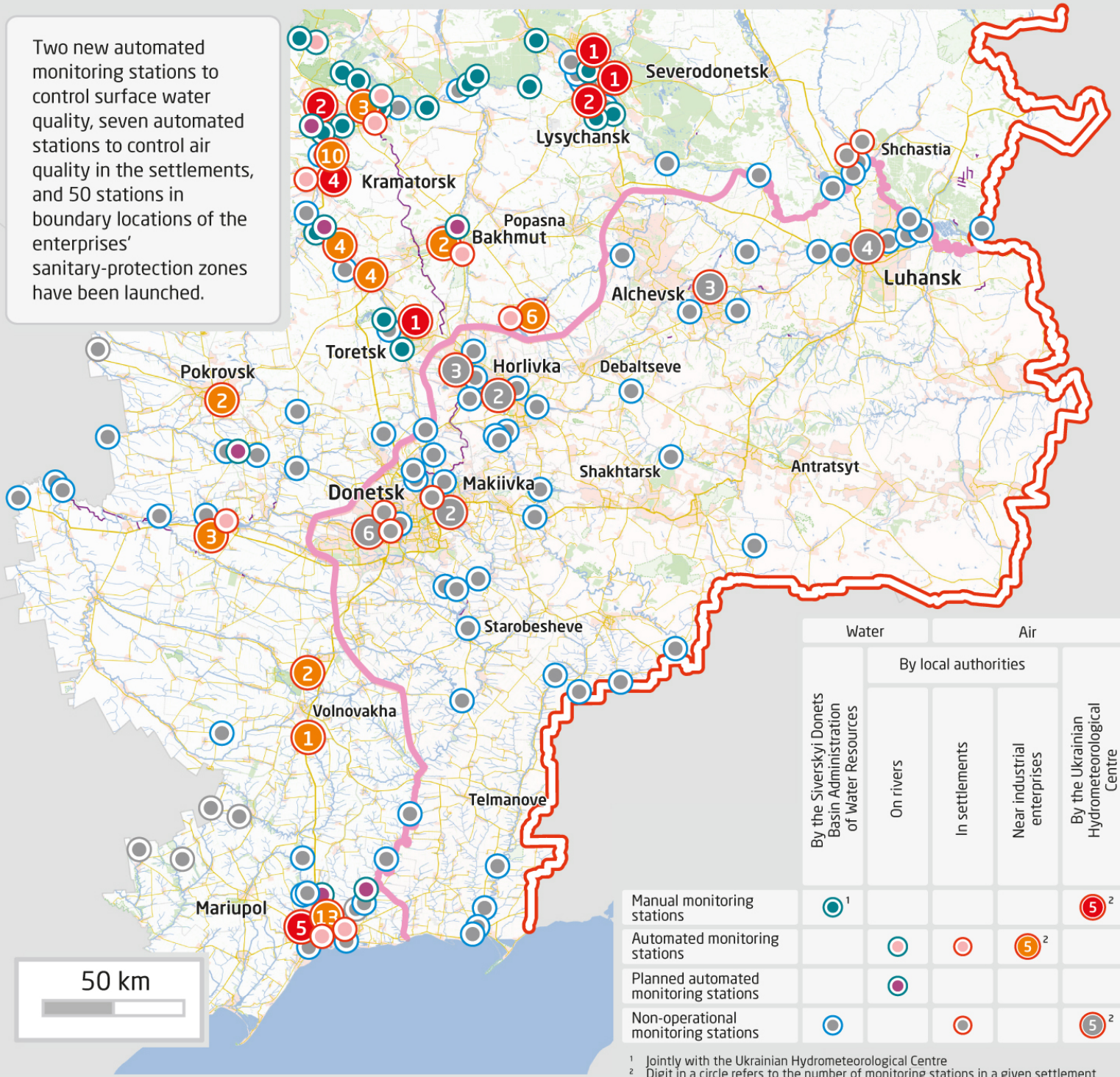


Due to armed hostilities, the Meotyda and Sviati Hory National Parks, sections of the Ukrainian Steppe Reserves of Khomutovskyi Steppe, Kalmiuske, and Kreidova Flora, as well as a significant number of regional landscape parks have been damaged.

ENVIRONMENTAL MONITORING: LOSSES AND GAINS

With the onset of combat operations, water and air quality monitoring stations have ceased functioning in non-governmental controlled areas. Automatic air quality monitoring stations have stopped transferring data from Donetsk, Makiivka, and Shchastia. In government-controlled areas, the monitoring network is currently in the process of optimization according to EU recommendations and experience, including the upgrade of all monitoring equipment.

Two new automated monitoring stations to control surface water quality, seven automated stations to control air quality in the settlements, and 50 stations in boundary locations of the enterprises' sanitary-protection zones have been launched.



More than a half of the monitoring stations are now behind the contact line

Following the onset of combat operations began, 37 of 63 surface water quality monitoring stations belonging to the Siverskyi-Donets Basin Administration of Water Resources are located in non-government controlled areas. 20 of 36 air quality monitoring stations belonging to the Ukrainian Hydro-meteorological Centre are located outside government controlled territory.



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