*As a global leader in connecting people, resources and ideas, CISR envisions peaceful and prosperous futures for communities impacted by conflict.*

CENTER FOR INTERNATIONAL STABILIZATION & RECOVERY

# Explosive Ordnance Contamination in Ukraine: An Overview

Dr. Suzanne Fiederlein
Director, CISR
fiedersl@jmu.edu

NASEM Workshop on Environmental Damage in Ukraine: Demining Session
May 1, 2024

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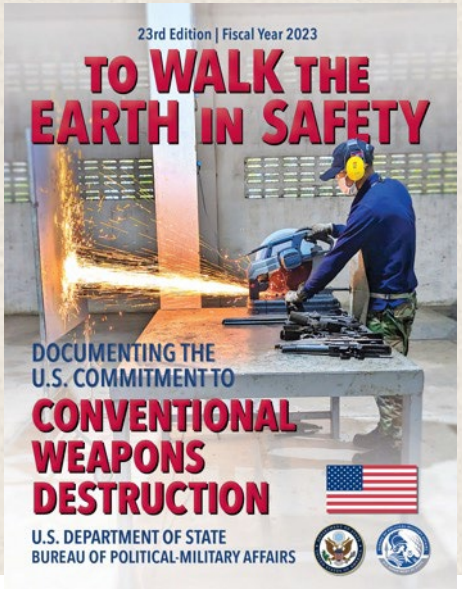
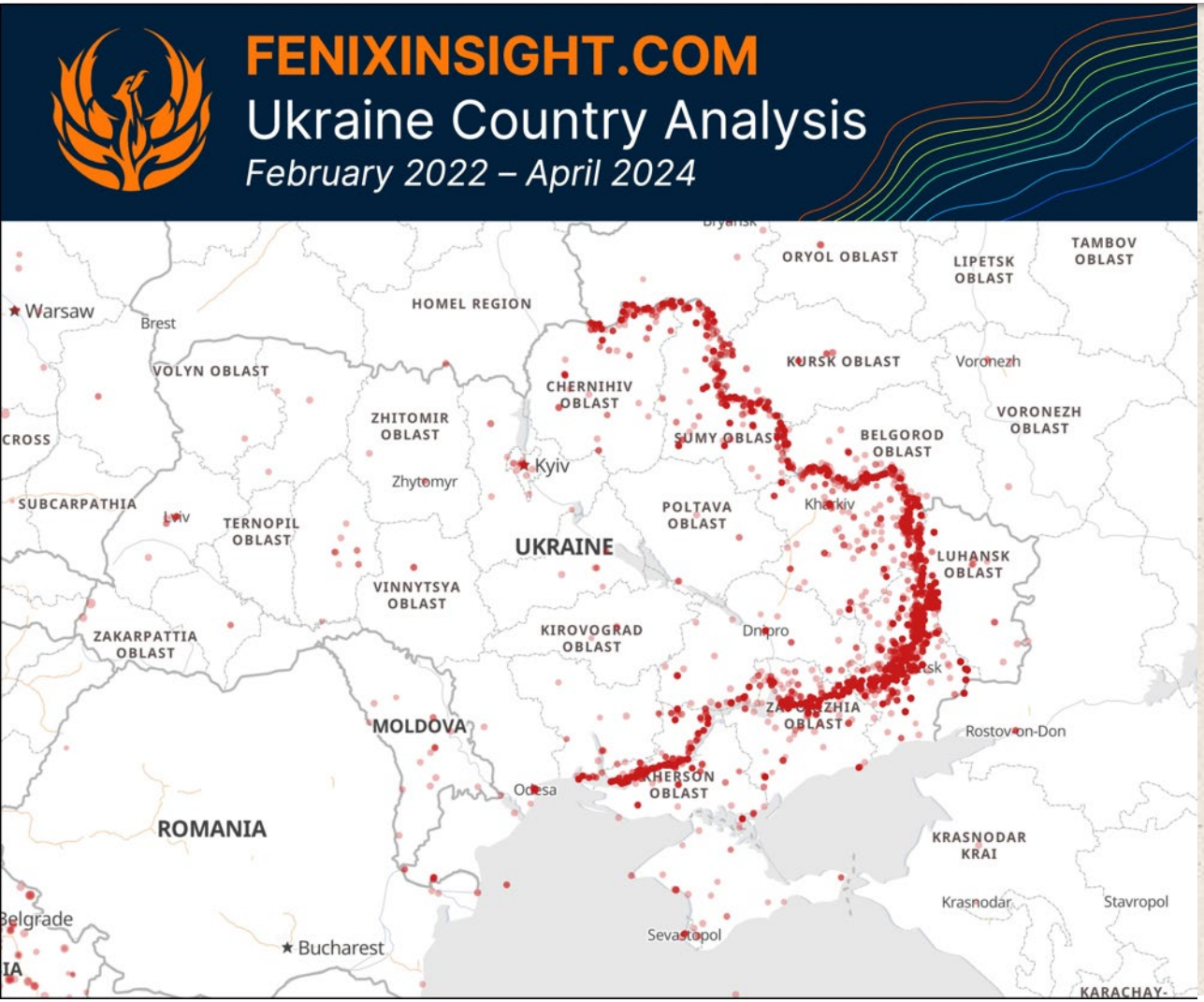
# Center for International Stabilization and Recovery

- Founded in 1996 as a grant-funded center to serve as an information clearinghouse for the newly developing humanitarian mine action community
- Best known for publishing *The Journal of Conventional Weapons Destruction* and *To Walk the Earth in Safety* (US DOS PM/WRA), CISR also conducts training, research studies, and field programs.

# Explosive Ordnance Contamination in Ukraine: Scope




Urban areas
Rural/agricultural
Freshwater/marine
Natural areas

Infrastructure

- Housing
- Transportation
- Power grid
- Schools
- Hospitals
- Industry
- Agriculture
- Water systems

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Image credit: Fenixinsight.com

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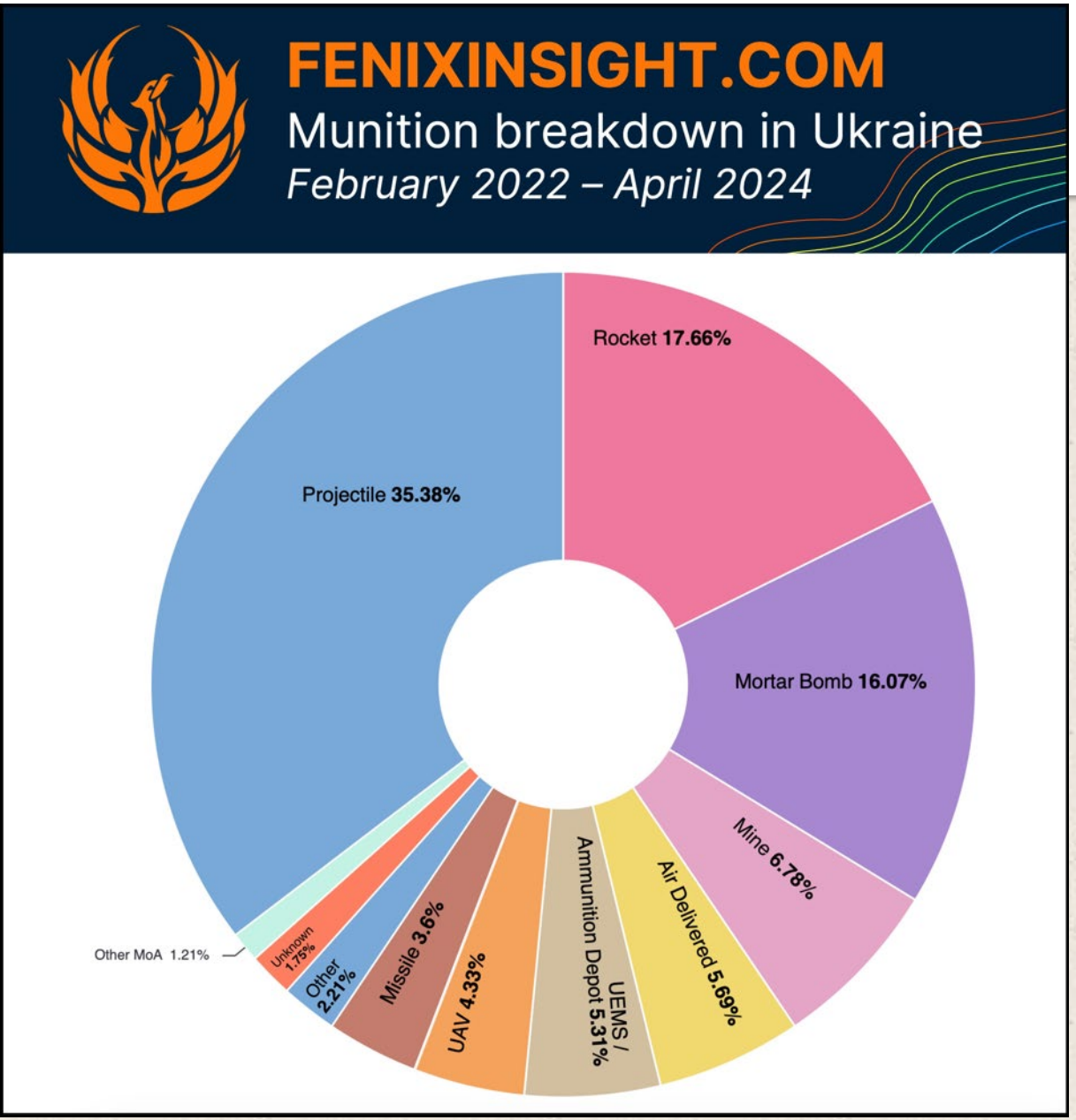
# Types of EO




Landmines only a small part of explosive ordnance contamination

- Projectiles
- Rockets
- Mortar Bombs

Newer types of weapons:
UAVs (drones)

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Image credit: Fenixinsight.com

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# Types of Explosive Ordnance

- Article available (online) in Ukrainian & English
- Catalogues more than 340 different types of munitions
- Updated version of guide now available

THE JOURNAL of Conventional Weapons Destruction

Issue 27.3, Fall 2023

## AMMUNITION IDENTIFICATION GUIDE FOR UKRAINE

### A Collaborative Project Amidst War

By Lieutenant Perederii,[i] Tony Salvo,[ii] and Drew Prater[iii]
[ National Police of Ukraine,[i] Bomb Techs Without Borders,[ii] and Relyant Global[iii] ]

During explosive hazard clearance operations, identification of munitions is of the utmost importance. Once the munition is positively identified and its filler and safeties are known, it can be dealt with in a safe and controlled manner. While clearing Fallujah, Mosul, and surrounding areas in Iraq, abandoned explosive ordnance (AXO) and explosive remnants of war (ERW) from twenty-three different countries was encountered, challenging even the most ardent explosive ordnance disposal (EOD) technician. To this end, an ordnance identification document based on the munitions encountered was compiled, the latest version containing more than 340 different munitions.[1] Those working diligently to clear explosive ordnance (EO) in Ukraine, as well as first responders, are facing a similar problem, encountering munitions from twenty-six different countries, some of which are newly identified munitions. An informal group of experienced, international EOD technicians help with identification including former military personnel. Identification is also done through manufacturer websites and publications as well as open source.

Destroyed buildings on the edge of Kharkiv.
*All images courtesy of the authors.*



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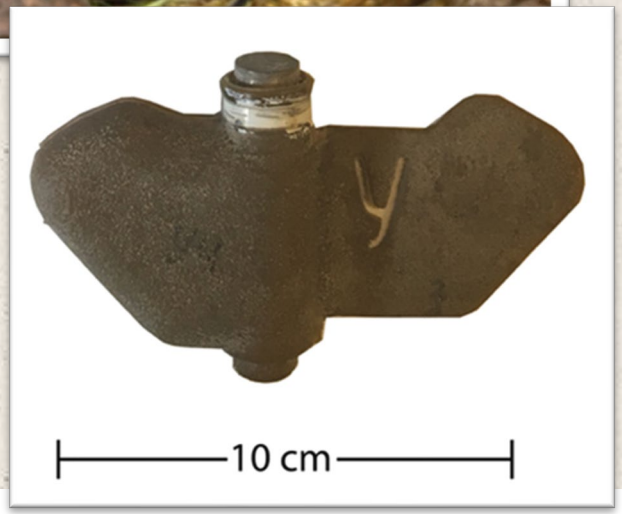
# Landmines

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# Agricultural Impacts

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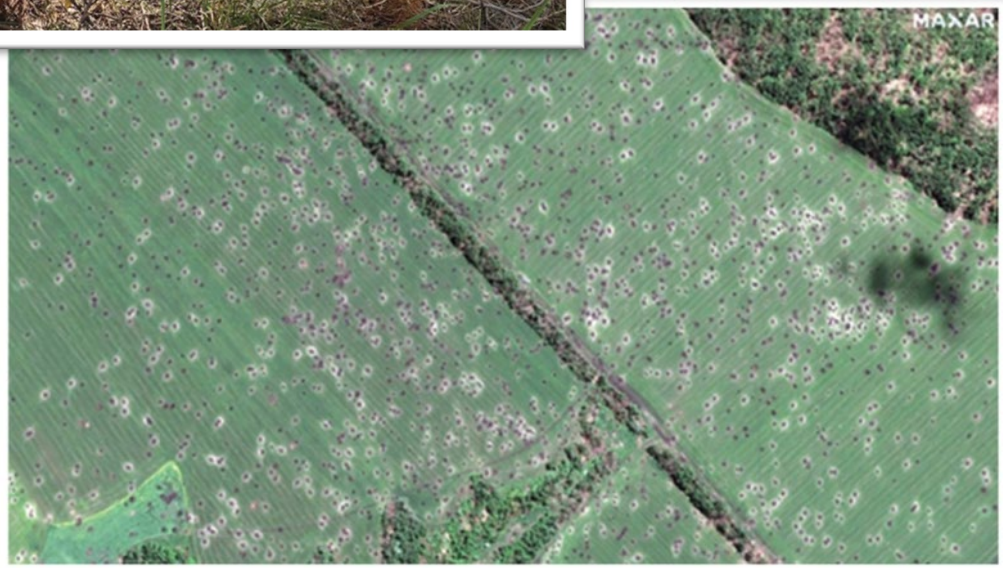
# Impacts

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# Urban Impacts

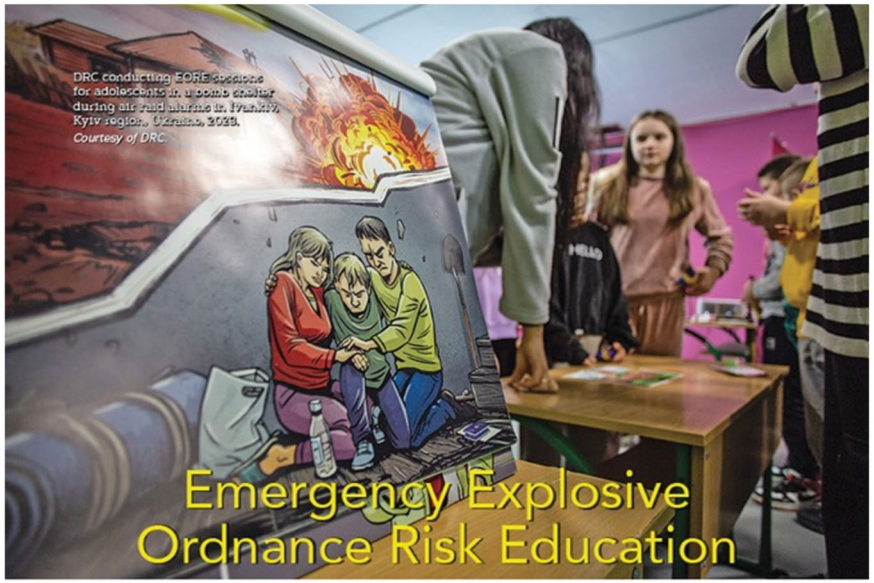
# Impact on People

Keep people safe until hazards are removed

- Explosive Ordnance Risk Education (EORE)
- Victim Assistance

# Risk Education


# Risk Education




## LESSONS LEARNED FROM UKRAINE

By Nick Vovk [ Danish Refugee Council ]

Following the Russian Federation military offensive launched on 24 February 2022, the context and extent of Ukraine's explosive ordnance (EO) contamination drastically changed, leaving mine action (MA) operators with the need to provide emergency explosive ordnance risk education (EORE). Faced with scarce up-to-date guidance and good practices on the topic, the global EORE Advisory Group (AG)[1] produced a refreshed document to support implementation. In September 2023, the Danish Refugee Council (DRC) also surveyed the entire MA community in Ukraine and organized a joint Lessons Learned Workshop to review the past eighteen months of emergency EORE programming. The workshop addressed various aspects of the latter, as prioritized by EORE practitioners: coordination and monitoring, informational materials, provision of EORE for persons-on-the-move and those in hard-to-reach areas, digital EORE, as well as the integration of EORE with the broader humanitarian response. This article is dedicated to summarizing the results and public discussions to inform both the global and Ukrainian EORE community of practice.

### INTRODUCTION

After relocating from Donbas to Kyiv on 23 February 2022, my evacuation flight was booked for the next day. In the early hours of 24 February 2022, a Notice to Airmen was circulated as the first shelling hit Boryspil airport. Despite telltale signs, a war between Ukraine and the Russian Federation in the proportions we know today was unforeseen. In the weeks and months thereafter, millions of Ukrainians became displaced or trapped in besieged



In-person sessions for children & adults plus advances in digital delivery methods

CISR THE JOURNAL of Conventional Weapons Destruction
Issue 28.1, Winter-Spring 2024
JAMES MADISON UNIVERSITY.

# Mine Action in Ukraine

## Mine Action Subcluster

Coordination

**Gov UA:** MFA, MOD, STS, MIA, SESU, Police, MRToT

**UN:** UNDP, UNICEF, UNOPS, UNHCR

**IO:** OSCE PCU, GICHD, ICRC, URC

**INGOs:** HALO, FSD, DRC, HI*, NPA*, MAG* DCA*

**NGOs:** UDA, Airlight

**Donors on MASC**

**MASC Working Groups**

IM | EORE | VA | Survey | Equipment | Debris

Additional participants: e.g. Tetra Tech, ITF, FoU, JICA, TRI, Save the Children, iMMAP and others

# Survey & Clearance

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MINE ACTION AND FOOD SECURITY:

## The Complexities of Clearing Ukraine's Agricultural Lands

Non-technical survey in Chernihiv, 2023.
*All images courtesy of FSD.*

By Markus Schindler and Anthony Connell [ Fondation suisse de déminage, FSD ]

Over the past decade, peace has eluded Ukraine. The annexation of Crimea and a separatist insurgency—sufficiently concerning in their own right—proved to be a mere prelude to Russia's full-scale invasion of Ukraine in February 2022. The largest land-war that Europe has seen since the Second World War is causing immense human suffering, devastating destruction, and extensive explosive remnants of war (ERW) contamination. Mines, submunitions, and unexploded ordnance (UXO) continue to cost the lives of countless civilians and the death toll is rising by the day. Mine action organizations such as Fondation suisse de déminage (FSD) are working in Ukraine to clear these hazardous remnants of war and to prevent and mitigate their impact on Ukraine's people and infrastructure. This article provides an overview of FSD's operations in Ukraine, both prior to and during the war. It particularly emphasizes FSD's work to clear Ukraine's vital agricultural areas, highlighting the intricate link between mine action and food security. The article also underscores some of the key challenges that FSD has encountered while working in war-torn Ukraine.



# Clearing Agricultural Lands

- History of Ukraine's contamination
- FSD's role and activities
- Importance of Ukraine's agricultural sector
- Training & equipment
- Non-technical survey
- Clearance

THE JOURNAL
of Conventional Weapons Destruction
Issue 27.2, Summer 2023

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# Impact on the Environment

THE JOURNAL of Conventional Weapons Destruction

Issue 26.1 & 26.2, Fall 2022

Authors from CEOB (Linsey Cottrell & Eoghan Darbyshire) and NPA (Kristin Holme Obrestad)

Also see other reports from Conflict and Environment Observatory and Zoï Environment Network

EXPLOSIVE WEAPONS USE AND THE ENVIRONMENTAL CONSEQUENCES:

## Mapping Environmental Incidents in Ukraine

By Linsey Cottrell, Eoghan Darbyshire, PhD [ Conflict and Environment Observatory ], and Kristin Holme Obrestad [ Norwegian People's Aid ]

All conflicts result in environmental impacts. The use of explosive weapons can cause massive damage to civilian and industrial infrastructure, resulting in the contamination of air, soil, and water resources. The war in Ukraine has highlighted the heavy toll on the environment, and the risk of significant environmental harm.

Chernihiv, April 2022.
*Image courtesy of Oleksandr Ratushniak / UNDP Ukraine (flickr).*



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# Damage to Infrastructure

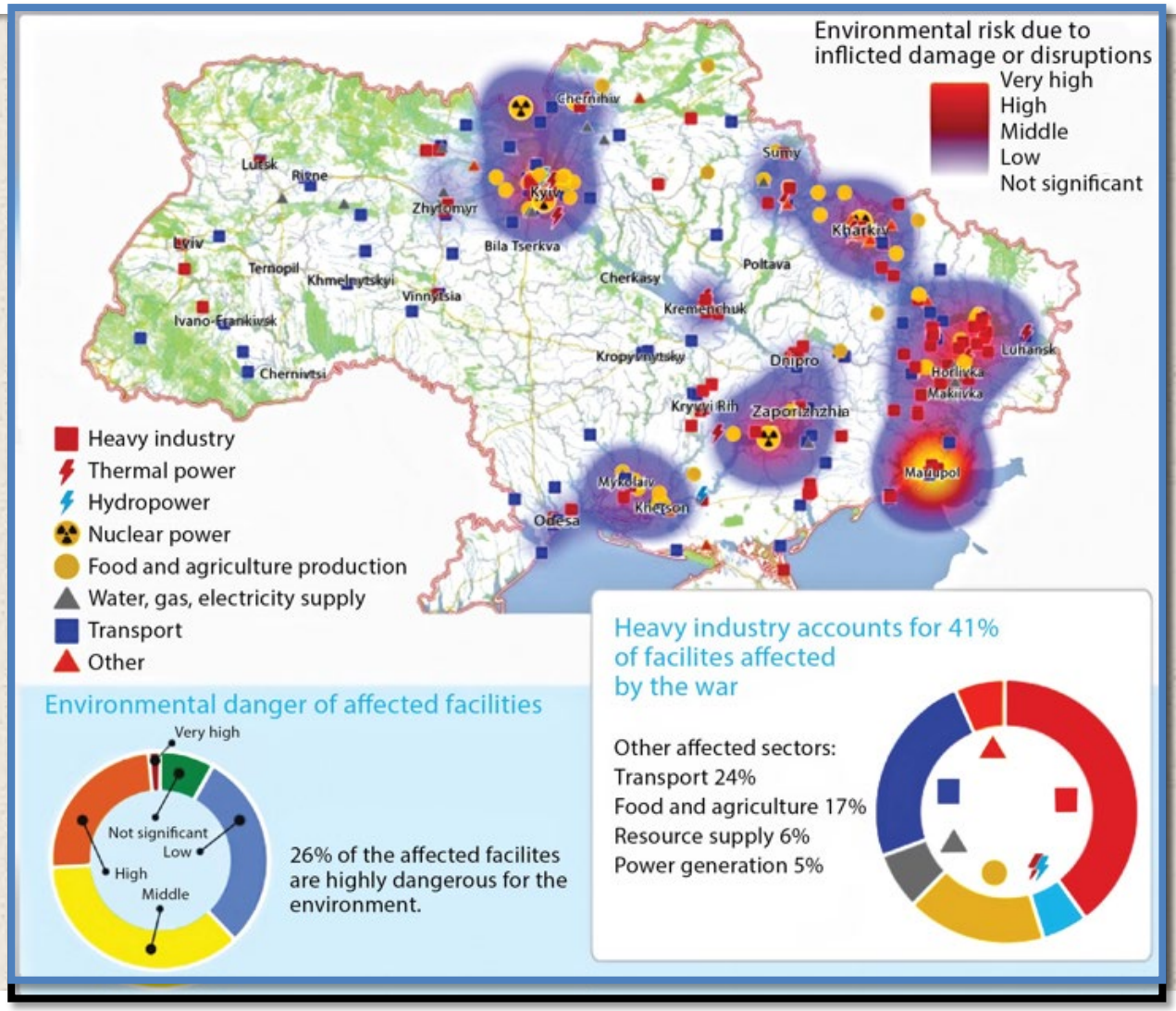


*Image courtesy of Zoï Environment Network (as appears in JCWD Issue 26.1)*

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Dr. Suzanne Fiederlein
CISR Director
fiedersl@jmu.edu

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