

Russia's Ecocide in Ukraine: Environmental Destruction and the Need for Accountability



JULY 16, 2024

**Briefing of the
Commission on Security and Cooperation in Europe**

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The Helsinki process, formally titled the Conference on Security and Cooperation in Europe, traces its origin to the signing of the Helsinki Final Act in Finland on August 1, 1975, by the leaders of 33 European countries, the United States and Canada. As of January 1, 1995, the Helsinki process was renamed the Organization for Security and Cooperation in Europe [OSCE].

The membership of the OSCE has expanded to 57 participating States, reflecting the breakup of the Soviet Union, Czechoslovakia, and Yugoslavia.

The OSCE Secretariat is in Vienna, Austria, where weekly meetings of the participating States' permanent representatives are held. In addition, specialized seminars and meetings are convened in various locations. Periodic consultations are held among Senior Officials, Ministers and Heads of State or Government.

Although the OSCE continues to engage in standard setting in the fields of military security, economic and environmental cooperation, and human rights and humanitarian concerns, the Organization is primarily focused on initiatives designed to prevent, manage and resolve conflict within and among the participating States. The Organization deploys numerous missions and field activities located in Southeastern and Eastern Europe, the Caucasus, and Central Asia. The website of the OSCE is: <www.osce.org>.

ABOUT THE COMMISSION ON SECURITY AND COOPERATION IN EUROPE

The Commission on Security and Cooperation in Europe, also known as the Helsinki Commission, is an independent U.S. Government commission created in 1976 to monitor and encourage compliance by the participating States with their OSCE commitments, with a particular emphasis on human rights.

The Commission consists of nine members from the United States Senate, nine members from the House of Representatives, and one member each from the Departments of State, Defense and Commerce. The positions of Chair and Co-Chair rotate between the Senate and House every two years, when a new Congress convenes. A professional staff assists the Commissioners in their work.

In fulfilling its mandate, the Commission gathers and disseminates relevant information to the U.S. Congress and the public by convening hearings, issuing reports that reflect the views of Members of the Commission and/or its staff, and providing details about the activities of the Helsinki process and developments in OSCE participating States.

The Commission also contributes to the formulation and execution of U.S. policy regarding the OSCE, including through Member and staff participation on U.S. Delegations to OSCE meetings. Members of the Commission have regular contact with parliamentarians, government officials, representatives of non-governmental organizations, and private individuals from participating States. The website of the Commission is: <www.csce.gov>.

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Commission on Security and Cooperation in Europe Washington, DC

The briefing was held from 2:21 p.m. to 3:38 p.m., Room 210, Cannon House Office Building, Shannon Simrell, Senior Policy Advisor, Commission on Security and Cooperation in Europe, presiding.

Ms. SIMRELL: Welcome, everyone, to today's briefing by the United States Commission on Security and Cooperation in Europe, also known as the U.S. Helsinki Commission. Today's topic, and I believe this is the first time that this specific topic will be addressed on Capitol Hill, is Russia's Ecocide in Ukraine: Environmental Destruction and the Need for Accountability.

In the 10 years since Russia launched its war of aggression against Ukraine, Ukraine estimates that Russia has inflicted some \$60 billion in damages to Ukraine's natural and manmade environment and pushed Ukraine to the brink of ecological collapse. Vast swaths of Ukraine are contaminated with landmines, toxic chemicals, and heavy metals. Hundreds of thousands of square miles of agricultural land are decimated, underground water is contaminated, and nature reserves have been consumed by fire.

However, it is not only Ukraine's water, soil, plants, and animals that have been impacted. In June 2023, the catastrophic destruction of the Nova Kakhovka Dam alone killed or displaced hundreds of Ukrainians limited the availability of water for irrigation and sanitation, and increased the risk of nuclear disaster at the nearby Zaporizhzhia power plant. The magnitude of Russia's ongoing destruction in Ukraine and its environment is difficult to assess, however, it is sufficiently wide-ranging that Ukraine's prosecutor general has investigated—initiated investigations not only into possible war crimes, but also into willful acts of environmental destruction, or ecocide, punishable under Ukrainian law.

No matter what methodologies are eventually used to measure the environmental damage, the cost of reconstruction and rehabilitation, and the toll on the lives of the health of people of Ukraine, it is abundantly clear that the havoc wrought by Russia's actions will endure for decades, and that Ukraine will require international support to adequately address it. This briefing will highlight the immense scope and scale of environmental devastation that Russia has wrought in Ukraine, estimate the still-unfolding

impacts on the people of Ukraine and its natural environment, and consider the complex and multifaceted challenges to ensuring Russian accountability.

Today, we have the pleasure of hearing from three expert panelists. After I introduce them, they will deliver their remarks and we will have time for questions. Speaking first on Putin's destruction of Ukraine's environment as another front in his war to eradicate the Ukrainian people is Dr. Kristina Hook. Dr. Hook is an assistant professor of conflict management at Kennesaw State University's School of Conflict Management, Peace Building, and Development. She is also a nonresident senior fellow at The Atlantic Council's Eurasia Center, specializing in human rights, civilian protection, and war-related environmental destruction.

A specialist in Ukraine-Russia relations, Dr. Hook is a former Fulbright scholar in Ukraine and has conducted extensive fieldwork there since 2015. Dr. Hook previously worked at the United States Department of State, including as a policy advisor for conflict stabilization and as a political officer at the U.S. Embassy in Sofia, Bulgaria. She is a former U.S. presidential management fellow, as well as a former nonresident research fellow at the Marine Corps University. She received her Ph.D. from the University of Notre Dame, master's degrees from Notre Dame and the University of Denver, and a B.A. from the University of Florida.

Then we will hear from Dr. Eugene Z. Stakhiv, who will discuss the toxic impacts of war materiel on Ukrainians and Ukraine's environment. Dr. Stakhiv retired from the Corps of Engineers in 2012, after a 40-year career, after which he became a lecturer and researcher at Johns Hopkins University and a visiting scholar at the Corps' Institute for Water Resources, which he did until 2023. Between 1999 and 2012, Dr. Stakhiv served as U.S. director of the International Great Lakes Study for the International Joint Commission, devising and implementing new water management and regulation plans for the Great Lakes under various climate scenarios.

Concurrently, he was the technical director of the UNESCO International Center for Integrated Water Resources Management. Between 1989 and 2007, he served as co-chair and the lead author for the first three U.N. Intergovernmental Panels on Climate Change. Between 1998 and 2003, Dr. Stakhiv served as a Department of Defense advisor to the water ministries of Bangladesh, Ukraine, Armenia, Afghanistan, and Iraq, and as a consultant for the World Bank for the Aral Sea restoration project. Dr. Stakhiv has a doctorate in environmental engineering from Johns Hopkins University and has authored 75 published papers and over 150 technical reports.

Then we will hear from Dr. Maryna Baydyuk, president and executive director of United Help Ukraine, who will offer on-the-ground insights into the work being done to address this devastation in real-time and to bolster Ukrainian resilience and resistance. Born in Kyiv, Ukraine, Dr. Baydyuk has successfully led United Help Ukraine as a board director since 2017, and as president since 2019. Since Russia's full-scale invasion, United Help Ukraine has provided over \$66 million in humanitarian, medical, and psychological assistance to Ukrainians affected by the war.

Dr. Baydyuk has received several prestigious honors, both domestically and internationally, including the Order of Merit Third Class, presented by Ukraine's President Volodymyr Zelenskyy, an award given to individuals for outstanding achievements in the field of economics, science, culture, military, or political activities. Currently, Dr. Baydyuk also serves as a research professor in the Department of Biology at Georgetown University, where she focuses on understanding the mechanisms of function and repair in the

central nervous system, and where she leads advanced research on discovering novel drug treatments for multiple sclerosis.

Dr. Hook, you have the floor.

Dr. HOOK: Thank you for inviting me today. We can hear each other. Thank you. Since 2015, I have researched how Moscow has inflicted environmental harm linked to their broader goals of controlling and degrading Ukrainian sovereignty. Since 2022, my data has mapped a broader pattern of Russia's escalating atrocities, including through willful environmental devastations. I am very concerned that we are witnessing the full transition of Moscow's intent to destroy, or partially destroy, the Ukrainian people, in part by inflicting environmental harm that reduces the Ukrainian people's ability to live, thrive, and control their own democratic destinies, and their homeland.

Moscow's direct and indirect environmental devastation in Ukraine is interconnected. Confronting these complexities is vital to a robust U.S. national security strategy that degrades Moscow's abilities to wage a war of aggression, as well as its growing global belligerence against the U.S. and U.S. allies. Environmental devastation is occurring through diverse natural arenas, through immediate and long-term impacts on health and economies, and through the targeting of humans and ecology, with global implications.

Therefore, first, arenas. Russia's war has devastated Ukraine's diverse natural landscapes, forests, fields, grasslands, woodlands, steppes, and waterways. At least 30 percent of Ukraine has been contaminated with landmines and unexploded ordnance. That is an area equivalent to my home state of Florida. Deforestation and fires have ravaged at least 30 percent of Ukraine's protected areas. Due to the high-intensity, kinetic warfare occurring in heavily urbanized areas, Russia has inflicted one of the world's worst environmental disasters in terms of soil pollution per unit of time. In eastern Ukraine, this warfare is occurring in very fragile sites that are connected to Soviet nuclear heritage and testing. The risk of intentional or accidental contamination existed prior to 2022, but it has dramatically increased.

In Ukraine and beyond, short- and long-term health impacts abound from toxic elements that leach into the soil. Ukraine's people are immediately in danger today due to Russia's daily attacks, but they are also in danger today due to more subtle impacts, and health dangers like the release of asbestos into the air. Environmental health hazards disproportionately affect the vulnerable, like the elderly and children. Babies have died from environment-induced respiratory illnesses, even after these infants were taken to physically safer locations in Ukraine.

Ukraine's biodiversity and its nature, so important to Ukrainian culture, communities, and mental health, is also under terrible attack. From thousands of Black Sea dolphins dying to the intimate impact on household pets, Russia's outright violence and careless neglect have devastated millions of animals, birds, fish, and other wildlife. Nicknamed the Ukrainian Serengeti, Ukraine's Askania-Nova biosphere is the world's oldest steppe reserve. It is home to wild zebras, buffaloes, and wildebeests. It is now under Russian occupation and, like the rest of Ukraine, fighting for its survival. As Russia has caused Europe's largest refugee flows since World War II, it has also driven millions of animals from their natural habitat, threatening long-term European biodiversity.

Therefore, every day these statistics are worsening, as Moscow devastates Europe's largest country with a significant degree of impunity. Moscow's real or perceived impunity has global implications, particularly for food security, energy security, and air and water

pollution. Russia's damage to Ukraine's famed black soil and farmlands includes intentional devastation, second-order impacts, and the disruption of Ukraine's preexisting and impressive environmental management activities. Despite Ukraine's notable Black Sea military victories, that has enabled a greater shipping of food, Russia's war will have a long-term agricultural impact on Ukraine as a key producer of critical global goods.

In parallel, the significant risks of direct or indirect devastation caused by Moscow's occupation of the Zaporizhzhia Nuclear Power Plant and its military action around Ukraine's 15 nuclear reactors, chemical plants, mines, and other manufacturing facilities, have the potential to spread environmental devastation well beyond Ukraine's sovereign territory. For the reason of these data points and many others, it is not an exaggeration to say that Russia has become one of the world's largest orchestrators of civilian suffering.

In Ukraine, it is incorrect to view the environment solely as collateral damage. The most credible assessments of Russian perpetrator tactics and strategies must also include their willfully inflicted environmental damage. Russia's environmental devastation and the broader human rights violations are speaking loudly to us about Putin's true intentions in Ukraine. Russia's crimes in Ukraine are astronomical, and they challenge even the most dedicated experts to keep track. Within two years, the United Nations has documented nearly 1,700 attacks on Ukraine's health—[audio break]—by Russia's bombing of Ukraine's biggest, best children's hospital in Kyiv just last week.

However, Kyiv prosecutors have also recorded more than 2,400 environmental crimes, suggesting that Russian perpetrators are targeting Ukrainian lives and the world around them in an interconnected strategy. Environmental damage has become a Russian weapon in its own right. Russian perpetrators' total disregard for human lives and for the environment was laid bare by last year's Kakhovka Dam and hydroelectric power plant explosions. At the time, the European Parliament named it the worst environmental disaster in Europe since Chernobyl. Chernobyl, caused by Soviet negligence in Ukraine in 1986, is a strong historical hint of Moscow's disregard for the people it claims in its imperial orbit.

Today, the cycle of impunity for Moscow's violent imperialism, including for environmental devastation, must be broken. Today, global calls to prosecute Russia for ecocide are growing louder and louder. Article 441 of the Ukrainian criminal code also codifies and stipulates what this is. I am hoping we will talk more about it today. There are many options that exist for us to support our Ukrainian partners in their pursuit of justice. The world is looking for American leadership to prevent Russia's weaponization of the environment from becoming just the new normal.

Russia's environmental weaponization is part of its larger strategy to destroy, or partially destroy, Ukrainians for daring to be free. Several days ago, Russia's Foreign Ministry spokesperson made not-so-subtly-veiled threats against the Kyiv Hydroelectric Power Plant and the Kaniv Reservoir, as they also did in the months leading up to the Kakhovka Dam explosion. Such environmental threats also willfully inflict severe mental and physical harm against Ukrainians.

Therefore, from scorched earth to drowned earth, to destroying Ukraine's power grid and letting winter do its deadly work on an unprotected population, Moscow aims to destroy the beautiful lives and the beautiful lands that Ukrainians have cultivated. The rising tide of an authoritarian axis is exemplified by Moscow's weaponization of the environment to kill, maim, and to terrorize Ukrainians. I do believe that history is

watching for U.S. leadership to see if this environmental terrorism will be prevented, deterred, and punished.

Thank you.

Ms. SIMRELL: Thank you so much.

Dr. Stakhiv.

Dr. STAKHIV: That was a good overview of a lot of the things that I am going to be talking about. However, I am getting into a little bit more detail. Since I am an engineer, I am going to get into the costs. Good afternoon. Thanks for inviting me. This is an important forum, and I am glad that we have begun the discussion.

Russia's war against Ukraine has caused nearly 200,000 battlefield casualties, over 10 million refugees, thousands of civilian casualties, and over 20,000 children kidnapped and deported to Russia. The World Bank and other institutions, such as the Kyiv School of Economics, have done a very good job estimating the damage that Russia has done to civilian infrastructure—buildings, schools, energy facilities, roads, hospitals, clinics, factories, water, and wastewater treatment plants. Over \$300 billion to date. These need to be reconstructed as a priority in order for Ukraine to rebound economically.

However, the damage to Ukraine goes much further than that. Russia's actions have devastated the environment, not only the natural environment but the managed human environment, including forestry, agriculture, and water resources. Russia has committed a series of grave war crimes, and ecocide needs to be added to that list, as it is recognized by many international institutions as a war crime. The environment is a silent victim of Russia's assault on Ukraine. Among the most damaging and long-lasting ecological and public health impacts will be from millions of unexploded ordnance and landmines. The war will leave a toxic legacy that will plague Ukraine for generations to come, and public health impacts will become a huge intergenerational problem—just as 11,000 superfund sites are in the U.S., and 1,700 formerly used defense sites.

Ecocide may not be as visible or as easily valued as the destruction of a bridge or a school, but it has been well documented. From the destruction of hundreds of thousands of acres of natural preserves to the demolition of Kakhovka Reservoir. We can value those losses in economic terms using widely accepted methods. We know it is costly. The Ukrainian government estimates damage to the environment at 56 billion dollars. As large as this number is, it captures only a portion of the total costs. I want to quickly draw attention to several additional types of environmental damage beyond the 56 billion dollars that must be accounted for.

The toxic legacy of UXOs, unexploded ordnance and landmines, loss of biodiversity, species, and habitat, lost productivity by industry, agriculture, and forestry, and in particular the public health and safety consequences of bombing and landmines across a combat front line that extends 1,500 kilometers—from Kyiv through Kharkiv to Kherson. They are interrelated. For example, the destruction of Kakhovka Reservoir a year ago destroyed aquatic ecosystems in the lower Dnipro River Basin, ultimately affecting migratory birds and waterfowl from Central Asia, which are greatly diminished in numbers. There have been studies on that.

However, ecological loss also has a human dimension. More than a million and a half acres are now without irrigation water formerly provided by the Kakhovka Reservoir. As a result, fields lie fallow, affecting food production, jobs, health, and self-sufficiency for thousands of farmers in that area. A full accounting of these impacts will be necessary

after the war. As an example, a recent study showed that while the direct physical losses to infrastructure from the Kakhovka Reservoir—meaning damaged buildings, the reservoir itself—was \$2.3 billion, the indirect losses to the economy were four times as much, over \$11 billion. These losses must be compensated somehow.

I want to use a few analogous examples in the U.S. and France to offer a sense of the scope and scale of environmental damage and the long-term costs associated with restoration of habitat and remediation of toxic and hazardous waste sites. You all recall the recent train derailment in East Palestine, Ohio. The cleanup already costs more than a billion dollars and counting. The public health costs are mounting. There are hundreds of such sites in Ukraine. We know the technologies and the costs of remediation in the U.S. for comparable problems. Over \$23 billion for superfund sites and billions more for formerly used defense sites. These are useful analogs for Ukraine's looming toxic remediation problems.

Nine hundred days of relentless Russian bombardment over 2 million Russian landmines, and roughly 2 million unexploded—UXOs will impose the worst damage, creating safety and pollution hazards, a situation similar to the aftermath of World War I battles a century ago in Verdun, France. After the war, France would not allow people, housing, farming, or forestry in this area, creating a Zone Rouge, a crescent of land 250 miles long where French and German armies had fired about 10 million artillery shells. To this day, there are still millions of UXOs in the soil around Verdun.

Ukraine has a similar exclusionary zone around Chernobyl, an area of roughly 1,000 square miles north of Kyiv. Now, with the constant shelling, death, and destruction, Russia has created a comparable, but much longer and larger, archipelago of toxic, contaminated wastelands. A 900-mile arc stretching from Kyiv to Kherson. Ten million shells? Russia fired that many in 2023 alone. The big difference, though, between the damage in France and Ukraine is landmines, were not used much in World War I. There are over 2 million mines that have been laid since Russia's invasion, already contributed to more than 1 million civilian injuries and fatalities.

In this archipelago of death and desolation, an area roughly the size of South Carolina, are landmines and other UXOs whose toxic residues will contaminate the land, ecosystems, agriculture, and groundwater for generations to come. Like France's Zone Rouge, it is unusable—it is unusable for generations. There is a dilemma, though. The cheaper, faster way of removing these mines, blowing them up in place, creates the longest-lasting pollution, and damage, leading to a suite of adverse secondary and tertiary effects. Manual diffusing, on the other hand, is laborious, time-consuming, and costly. The World Bank estimates that demining alone will cost \$37 billion.

Based on recent comparable incidents in the U.S., treating just the long-term public health consequences associated with toxic contamination, landmines, and UXOs will be extremely costly. Yet, they have not been taken into account in any of the analyzes. For example, the recent Camp Lejeune settlement for effects on human health from contaminated groundwater is estimated to cost about 21 billion dollars over the next 20 years. The Everglades restoration project provides a sense of what will have to be done to restore Ukraine's damaged natural environment and the scale and scope of these efforts.

The project scale, complexity, and costs of the Everglades project rival what Ukraine will probably need over the next three decades to restore the numerous habitats, and ecosystems destroyed by Russian operations. The cost of the Everglades projects as of last year totaled \$23 billion. Thus far, I have enumerated at least \$100 billion in costs to deal

with the intergenerational adverse environmental impacts of Russia's indiscriminate bombing and mining. I will continue to monitor the devastation. Welcome your questions. Thank you for the opportunity to be heard and thank you for your commitment to environmental justice.

Ms. SIMRELL: Thank you.

Dr. Baydyuk.

Dr. BAYDYUK: Good evening. Shannon, thank you very much for organizing this panel and inviting me to speak here today on this important topic. Thank you to Dr. Hook and Dr. Stakhiv for giving a very detailed and powerful overview of the devastation in Ukraine and the ecocide created by Russia's invasion.

I will give a little bit of a different perspective, speaking on behalf of my organization, United Help Ukraine, and how the stories and information that our team receives on a daily basis informs our understanding of the immense environmental devastation and human impact caused by Russia's war in Ukraine. Our organization's mission is to provide the people of Ukraine with critical support that will enable them to survive in the face of adversity, to defend and regain their sovereign territory, and to rebuild and thrive well into the future. We provide humanitarian, medical, and psychological assistance to those affected by the war. Additionally, we focus on raising awareness and advocating for Ukraine to remain a free, democratic, and independent nation.

When considering the ecocide and environmental impacts of the war, various images and harsh realities come to mind. As was described previously by Dr. Stakhiv and Dr. Hook, we have several of those that we should consider. Water pollution and contaminated rivers and lakes affect both human populations and wildlife. Impact on soil and biodiversity that leads to destruction of fertile land, leading to loss of plant and animal species. Destruction of land and marine ecosystems leads to the devastation of forests, wetlands, and coastal regions. Air pollution and climate change, increased emissions, and long-term effects on the global climate.

What ties together all of these issues are Russia's persistent targeting of Ukrainian civilian populations and infrastructure, especially in frontline zones. It is crucial for us to recognize that environmental destruction is directly aligned with the Russian Federation's goal to dismantle Ukraine and harm Ukrainians in every conceivable way, including through the destruction of the lands and environment valued by so many Ukrainians. Allow me to discuss some of United Help Ukraine's programs that have identified these realities and provided innovative solutions and opportunities to combat ecocide.

As a nonprofit organization continually assessing the evolving situation in Ukraine, we strive to respond promptly and adjust accordingly. One notable project, born from such circumstances, was our initiative in response to the destruction of the Kakhovka Dam in southern Ukraine. We heard today about the Kakhovka Dam damage to the area in southern Ukraine. It was not only—it had not only devastating effects on the local civilian populations, resulting in the loss of hundreds of lives due to direct flooding, but also profoundly impacted wildlife, water supply, farming, energy, and the broader environment. The dam's destruction washed away vegetation, eroded riverbanks, and contaminated drinking water sources.

As soon as the effects of the dam's destruction became clear, we as an organization acted promptly by dispatching humanitarian medical supplies to affected locals within days of the disaster. Our team also identified serious health and environmental risks

posed by contaminated well systems. We took swift action to address those concerns by setting up water filtration systems in affected communities. Focused primarily on rural areas in southern Ukraine, particularly in the Kherson and Dnipropetrovsk region, the United Help Ukraine's team installed reverse osmosis systems capable of serving between 6,000 to 12,000 people daily with clean water.

Due to the proximity of the front lines and Russia's disregard for international humanitarian law, these stations must actively avoid direct targeting and destruction. Moreover, they face ongoing challenges in maintaining power connections, given Russia's targeting of the Ukrainian power grid. It is important to note that in some villages and towns that have taken in internally displaced people, or IDPs, the population has doubled or even tripled, overwhelming the existing infrastructure, including the water supply. This sudden population increase places significant additional strain on water resources, and it exacerbates the challenges of providing clean and reliable water.

However, for over a year now the stations that we installed have successfully provided local communities near the front lines with a vital resource, access to clean water, addressing a basic necessity that many rural communities urgently require. Environmental devastation is a crucial issue for Ukrainians returning to their homes, especially for those in recently liberated territories. Many return to find destroyed infrastructure, limited access to social services, and challenges in farming and land use. We address this issue by directly assessing people in frontline zones through a program that distributes seed packages. In 2023, we distributed over 5,000 packages containing a variety of seeds, such as tomatoes, cucumbers and others, each package containing more than 20 different varieties of seeds.

The full-scale invasion has had a profound impact on the Kharkiv region in the east, bordering Russia, where daily rocket attacks and extensive infrastructure damage have occurred. The seed program has been crucial for rural communities in this region, particularly as residents began returning after Ukrainian forces liberated occupied areas. The demand for these resources has increased significantly over the past year, with our team distributing this year, in 2024, over 12,000 seed packages. While the Kharkiv region remains a priority, recipients also include areas such as Zaporizhzhia, Sumy, Chernihiv, Dnipro, and Donetsk. Many recipients have shared with us how our project enabled them to survive through these challenging times.

Addressing environmental impacts serves not only to meet essential needs for sustainability and self-sufficiency during wartime, but also to uplift returning residents by including things like flowers in seed packages, providing a symbol of resilience and optimism amid their enduring hardships. By offering a sustainable means for Ukrainians to reclaim their liberated homes and restore green spaces amid the destruction caused by the Russian military, this initiative has become a unique form of resistance during these difficult times. Despite ongoing attacks on critical infrastructure affecting energy and the power grid, Ukrainians and local partners are steadfast in addressing environmental destruction and advancing sustainable solutions.

United Help Ukraine started collaborations with American companies like Energy Select and Amicus Solar to foster a sustainable energy-independent future. This partnership focuses on enhancing solar energy production and transitioning from unreliable Soviet-era systems. Solar initiatives support economical continuity, can operate by internally displaced people, and can aid recovery efforts amidst the ongoing war. Our organization, alongside hundreds of others in Ukraine and abroad, seeks solutions rooted

in community empowerment. Ukrainians demonstrate a deep commitment to tackling these issues, evident in rebuilding efforts, wildlife initiatives, and the resilience of rural communities.

Accountability and progress are essential as we confront the impacts of war, particularly in frontline zones where Russia disregards international law. Sustainable innovative approaches to energy and water sources are enabling Ukrainians to provide for themselves and support the local economy. By focusing on broader issues of ecocide and beyond, we emphasize the importance of respecting international law and protecting the environment. Ultimately, providing Ukraine with everything it needs is the top priority to ensure that both the Ukrainian people and their land are protected, as required.

As we navigate this period of the war, the global community must stand in solidarity with Ukraine, supporting its path to stability, democracy, and environmental stewardship. Together, we can empower Ukrainians to rebuild their nation and safeguard their future. Thank you.

Ms. SIMRELL: Thank you, indeed. Thank you to our panelists for your insightful and wide-ranging summaries and indications on Russia's pattern of disregard for life, the environment, and the international rules-based order, and how the environmental destruction in Ukraine is not only impacting things like farming, but also essential services, and even Ukrainians' right to return.

With that, I am going to open the floor to questions. Because the room is so full, they do not have in this room a microphone to pass. We do have a podium on the side but, for the sake of logistics, I can propose that if you would kindly like to ask a question, raise your hand. I can call on you. If you stand up in place and give your name and your affiliation, I would be glad to make sure that I repeat your question into the microphone so that everyone understands what is being asked. We can go from there. Thank you so much.

Would you like to begin? Can you give me your name, please, and affiliation? Thank you.

Question: [Off mic.]

Ms. SIMRELL: Thank you. That is Mohamed from Dean Phillips' office.

The question is: How long to recover? If that is not necessarily directed to any one specific panelist, I will look to you to each, in turn, offer your responses. Thank you so much for being flexible today. If you will always just project your voice a bit so we can—everyone can benefit. Thank you.

Dr. HOOK: Thank you. Thank you for this question. Thank you for getting this conversation going. Thank you to so many of us joining us today.

I love this question because it is so multifaceted. It is so broad. What does recovery mean? What does it mean for health? What does it mean on the land? What does it mean on the way that maybe watching animals you love or the land you love be destroyed in some of the specific ways my colleague talked about, what does that do to your mental health? Therefore, the way we think about recovery, even in a conversation on the environment, we need to sort of think broadly and deeply so we can figure out how to solve it.

Now, when we talk about recovery, I think that we need to sort of face the reality that life will not return to the way that it was. That is a hard truth. However, we face the truth, and we move on from that. I think that what we can do is we can—you know,

they say that trauma is different from a stressor, in that it is almost like a bone break. Like, something that is broken. It is not going back to the way that it was.

Therefore, what you do is it is less about the language of recovery. I do not necessarily want to use that language, because it sounds like we can put a Band-Aid on it, and it is okay. However, what we can do is we can support the Ukrainian people's ability to grow and, as a part of their victory, recover from this in such a way that they, through everything they have been through—without downplaying that at all—go on to thrive. They go on to receive the needs that this has created for them—like justice, like environmental redress—that are so valid.

I will mention, though, when we are thinking long term, I want to focus our mind a little bit on the environment and health. That is something that I have seen—because I have worked in many post-conflict situations—I have seen that sometimes we kick these things down the road. Therefore, we say, like, you know, everything is so urgent, we feel this urgency, maybe we can wait a little bit on the environment, maybe we can wait a little bit on trauma. Maybe we can wait a little bit on, you know, second-order health impacts that do not look so urgent.

What we have found, what we have quite a lot of data on, is when we do that, we actually create more expenses to the costs of recovery over the long term because it puts into place, for example, some untreated PTSD, which has been shown to have, for example, an economic impact. Therefore, when we think about recovery, I think these issues, we—first of all, we need to frontload them in our analysis. We need to understand environmental issues are telling us something about the perpetrators, and their ideology, and what they are trying to do. We also need to bring into our conversations of recovery now, not something that can be kicked down the road but something that we fold into all of the other very urgent things that we are also trying to do. Thank you.

Dr. STAKHIV: Therefore, as we—as the war is going on, people are spending money. We have lots of donors, have been—have been providing money for the restoration of critical infrastructure because that is the priority. What is critical infrastructure? The energy system. It is constantly being destroyed, and it is being rehabilitated. I do not think that the Ukrainians could keep up with the damage that is occurring. Therefore, they have been getting—you know, you had the G-7 conferences, all kinds of donor's conferences committing tens of billions of dollars. Wastewater treatment plants, clinics, hospitals, all of these things are reconstructed first.

Unfortunately, the environment is not in that priority. Therefore, it will take—it will take a generation, at least. It is not surprising. It should not be surprising. If you think about what is happening in the United States, I have been involved in many of these big environmental restoration projects including the Florida Everglades, that began in 2000. Thus far, they have only completed—in 25 years, they probably completed 30 percent of the project. Therefore, that is the way you have to think about these problems.

Dr. BAYDYUK: That is a great question, and we look at this question from different angles. We have infrastructure. Of course, the damage to infrastructure is visible. Environment, the damage is visible and invisible. Then also devastation on the human side is incomprehensible. We think about how long it will take. It is very hard to say, and one of the reasons is because the war is still ongoing. If you look at the wars—World War II, and World War I, how long did it take for generations to recover from those wars? The world knows it is quite a bit, several generations.

Ukraine went through a very difficult period of time during Holodomor, a man-induced famine when millions of people died, again, because of starvation and, again, caused by Russian communists. People are still recovering from Holodomor. Families still mourn the losses of their loved ones during 1937-1939. That is generations. Generations have passed. This war will certainly have a devastating effect on Ukraine on many levels. The sooner the war ends, the sooner we will start seeing recovery efforts. They are ongoing.

However, recovering and rebuilding is one thing. Then building something new, as a new Ukraine, with new energy sources, with much better infrastructure, independent energy sources from other countries, that is a goal for Ukraine and Ukrainians right now. They express the wish to look into the future and not rebuild what they had but build something new, a country that Europe will look at and say it is part of Europe, or maybe even a leading country in Europe, in many areas including rehabilitation, energy, recovery. This is something that I think Ukraine should look forward to. Not just rebuilding and recovering, but building something new and better.

Ms. SIMRELL: In the back, please. As loud as you can, please. Thank you.

Question: Yes. Hello. Therefore, my name is—[inaudible]—and I am representing the Razom advocacy team. Today I am here with my colleagues. Of course, as Ukrainians, who understand the central concept of—[inaudible]—ecocide. I personally just came from Kyiv. I know—[off mic].

Ms. SIMRELL: Thank you so much. I will get your name from the colleagues, to make sure it goes into the record correctly. Therefore, the first—the second half of the question is Russian accountability, which I really appreciate you asking for. Then how quickly it can begin was the first part of this question. Thank you.

Dr. HOOK: Sure. Therefore, I think that it is very important sometimes, when we are setting an issue, to break it apart into its issue sets. We are here to talk about the environment, but also to remember the broader context that is occurring around it. That is why sometimes we cannot talk about the environment without talking about accountability, especially due to the willful nature of so much of what is happening. Now I also want to just take a moment, because I think we have sketched the reality of this huge problem. That is important. I think that part of accountability is facing what Russia has done, facing the intentionality.

I also want to bring up the fact that this is occurring in the context of an unprovoked war of aggression. Therefore, even some things that we might think about as second-order military emissions, or things like that, are also taking place in the context of broader illegality, in addition to that willful destruction that we see. Therefore, it is very important. It is very important in this room because I am speaking to people who have the power to do something about it and to stand up to Russia. That is critical. However, I also would love to answer this question by also having had the privilege of working—living and working in Ukraine for almost a decade now, of just being there myself.

To just mention that, you know, even as we look at how huge this problem is, it is very hard to lose hope when you are actually, regularly in Ukraine, as I have the privilege of being. I want to point out because I think that I am speaking from things that I have heard there, is something my colleague also just said. Is, "okay, this has happened, but let us build something new." I do believe that we have seen that in the updating of the legal code. Therefore, for example, in 2023 asbestos is outlawed. Therefore, when I talked

about asbestos being released into the air, that's older legacy buildings. It is outlawed. Therefore, that is a legal innovation for the environment.

I have looked at some really incredible projects that are happening—Ukrainian-led projects, or sometimes projects that have Ukrainian colleagues and international experts working together, things that—they will take the rubble from buildings. They have figured out a process to turn it into cement. Not just any cement. The things I have learned about cement. Cement that is certified as so strong that it can even be used for bridges, sort of—the sort of highest safety grades for the quality of cement.

As I was reading about this Ukrainian-led project, I also saw that they were bringing veterans in to help dismantle the rubble. Therefore, we see this all connected. We see this innovation. Therefore, even as we look at what Russia has done, I truly do believe that with support Ukraine can again give to the world, can give the sort of innovative projects that I think will come out of demining, will come out of environmental redress. That will help Ukraine. It will help the Ukrainian people. But I think that that is a positive impact that will also spread beyond Ukraine.

Dr. STAKHIV: One of the reasons I have been pushing for a good economic accounting of all of these damages, which have not been done well to date by various groups, and—because ultimately the international—the U.N. International Compensation Court, the International Criminal Court will come to the realization that there has to be some compensation from Russia to Ukraine. Therefore, the question becomes, how much and where? That will be a long-term process. I will give you just one little example.

The first Gulf War. Most of you in this room were not born at that time. It is 1991. It took until two years ago for Iraq to finally pay Kuwait for the—to compensate them for the environmental damages that were caused by burning the gas and oil fields if you recall. They polluted the Persian Gulf. Therefore, they got \$3 billion just for the environmental losses, and \$50 billion for all of the other losses, Kuwait did from that war. Therefore, it took 30 years. Well, that is what we are looking at. It will take these courts and the legal systems that long. However, we have to develop the information today to present it to those courts.

Dr. BAYDYUK: Therefore, did I hear that you are from Razom? Yes. Therefore, your organization is also one of the humanitarian organizations providing assistance on the ground and actually participating in the recovery. I just wanted to say that the recovery is ongoing. I think it started on the first day of the war. People started recovering from the first shock of understanding that this full-scale invasion, that so many people feared, was actually happening. Therefore, recovery is a long process. As we said, we are looking for something new. It is not a recovery from old.

Ukraine is doing everything to come up with new reforms so they can be part of European Union. They know what they need to do in terms of environmental effects, in terms of green energy, corruption, and other parts that will be put together as a package so they, Ukraine, can enter a European Union. Therefore, that part of recovery also has started. We heard that Ukraine is irreversibly on the path to being part of NATO just a week ago at the NATO summit here. That is another recovery part that is taking place.

Therefore, there are many—there are many levels at which Ukrainians are now rebuilding their country—on the political level. Small communities—small, rural communities are doing that as well. Ukraine is now very much decentralized. Small communities have power. Our goal is to empower local communities to do more on the ground for

sustainable, long-term solutions for their communities to thrive. There are different—of course, there are different approaches for each community. What is important is for the global community to give Ukraine the power to build what Ukraine sees as its new country.

Ms. SIMRELL: Thank you. Over here, please. Thank you.

Question: [Off mic.]

Ms. SIMRELL: Thank you. Jeffrey Love with the Treasury. What coercive economic tools can we leverage to achieve these ends?

Dr. HOOK: Therefore, speaking a little bit, because I have talked a lot about how this is connected to Russia's larger ideology. Therefore, first of all, I think the best thing that we can do for recovery is to get this to stop, right? Therefore, we are not just recovering from yesterday we are going to also face destruction today or tomorrow. Therefore, I think that some of the broader ideas for sanctioning the Russian military machine is very important. It is that military machine that is illegally in Ukraine and that is causing this environmental harm.

I think that it is also very important, when you are trying to communicate a message to the Kremlin, for there to be an action that is taken for a specific reason that is clear to them. Therefore, whether that is through public statements or back-channel statements, making them aware that a coercive economic action is taken in response to some of these illegal environmental crimes would be a place to start. That deterrent effect is very, very important. I talked a little bit about Moscow's real or perceived immunity. Both of those—impunity—are both very important.

Now, when we are looking at recovery, we—I know that there are ongoing conversations about Russian frozen assets. I think that is an appropriate conversation to have. That is, you know, something that—Russia has done this damage. All of it, from top to bottom, has been in the context of an illegal war. Therefore, that is something that Russia should pay for. There is also a particular justice of it being something that would be paid for by the money held by kleptocratic actors. Therefore, those are a few that come to mind. However, again, as much as we are thinking about recovery, getting it to stop is also part of that conversation.

Dr. STAKHIV: Well, you know very well that we have imposed all kinds of sanctions on Russia and various allies. They have not had much of an impact. They found ways around it with China, North Korea, and Iran, and now even India—supposedly a friend of the United States. Therefore, I—offhand, I cannot think of any specific economic forcing functions to get them to change their behavior or to—or to compensate Ukraine. The only path is victory. Russia has to lose.

Dr. BAYKYUK: I cannot agree more. I think this is the number one priority for the global community, to ensure that Ukraine wins this war as soon as possible. When we talk about the territories and the devastation of occupied territories in an ecological sense, we also know what is happened—what type of atrocities are happening on those occupied territories? When people say Zelenskyy—President Zelenskyy and the Ukraine government should think about giving part of the territory to Russia to stop this war, the answer is absolutely no. Because it is not just about territory. It is also about the people who live there and who are—definitely want to be part of Ukraine and want to be back. For the global community, including the U.S. government, the number-one economic priority is to give more money and weapons, so the war stops now.

Ms. SIMRELL: Thank you. Other questions? Yes, in the back, please.

Question: I am Douglas from Senator Scott's office.

Is there ever a point where the goal of a Ukrainian victory and saving the environment contradict each other, in order for Ukraine to wage war against Russia they are going to have to undergo more environmental damage, doing it themselves and allowing Russia to harm their own environment.

Ms. SIMRELL: Thank you so much. That is Douglas from Senator Scott's office. The question is whether saving the environment and Ukrainian victory is over at odds. Actually, we can mix it up a little. Would you like to start at the end, Dr. Baydyuk?

Dr. BAYDYUK: Sure, I can start that. Actually, it kind of follows up what I just said about the devastation that Russia brings to not just territories in an ecological sense, but also the damage on human lives that's occurring. There is—I do not think there is—there is no contradiction for winning against Russia and the devastation—the ecological devastation that the war, if it goes longer, can bring. We see that if Russia—if we—if there is peace on Russian terms now, what type of ecological damage will occur on those occupied territories?

We know that the Zaporizhzhia nuclear power station is under Russia. Do we know what is happening there? Who has control of that? We do not have—Ukrainians do not have control of that, right? Therefore, we do not know what kind of disaster awaits with Zaporizhzhia nuclear station being in the hands of Russia. Therefore, it is for other territories. The goal for Ukraine, and I think, again, for everyone else, is to see Ukrainian victory as soon as possible. The longer it takes, the longer—the more devastation we will see, including ecocide and genocide that Russians do on Ukrainian territories. Therefore, there is only one solution to that, the sooner victory.

Dr. STAKHIV: You know, what you are posing as an asymmetric moral conundrum for Ukraine. In other words, you are saying the more you fight, the more ecological damage there is. You should ask that question of Russia, not of Ukraine.

Dr. HOOK: Yes. To answer this question, I think that we have some data that we can look at. Because we know what happens under Russian occupation. Therefore, we can look at looting. We can look at the total breakdown of community structures. I also have written a lot, prior to 2022, about Ukraine's environmental management protection activities. I just feel much better at night, any fragile site, especially some of this—the nuclear heritage sites, that are under the environmental management control of Ukraine versus Russia. Therefore, again, it is an asymmetric question because, you know, if Ukraine were to stop emitting emissions as it—as it fights this defensive war, then Russia would take it over. We would—we would see in these occupied areas not only horrific human suffering, but we would absolutely see a degradation of the environment and contamination.

I think that what I have seen among Russian actors in these occupied areas is both the sort of active callous cruelty, and it is also a really massive neglect. Therefore, to draw our minds back to early 2022, do you recall the Russian military just sort of marching on through the Chernobyl exclusion zone, digging into it? Some of them ended up dying. I mean, that is what I am talking about with careless neglect. However, when you are carelessly neglectful around Chernobyl, again, that has broader implications. Certainly, the Ukrainian people do not deserve that. However, that, again, has broader implications. Therefore, I would assess the danger to just increase and increase and increase with every

meter that the Russian military takes, or with every day that the war goes on by Russia, worsening this environmental damage.

Ms. SIMRELL: Other questions? We have a couple more minutes. I am going to use the prerogative of the moderator to ask my own question. Therefore, you have done a really wonderful job today to begin to highlight just a few of the incredibly multifaceted areas on the impact, the nexus between Russia's war of aggression against Ukraine and the health of its environment and its people. We have talked about the intergenerationally of these impacts. We have talked about the scope and the scale, and the need to be able to measure, understand, respond, and end the cycle of continued destruction. In your estimation—we have heard about Ukrainian resilience, Ukrainian innovation, and the incredible will and spirit of the Ukrainian people. What, in your estimation, can and should the international community be doing to help strengthen, and bolster those efforts, especially as we look at these issues?

Dr. STAKHIV: One thing that came up when I was thinking about this is that there are many tools available now—satellites, drones—to do the actual monitoring of the environmental damage. You know, especially agriculture. You know, what types of—what types of products, wheat, rye, the different types of grains, how much has been damaged. Then what effect of the pollution is on the yield of the crops? They go down, they go up. Therefore, you could differentiate these things. Ukraine does not have those technologies available because everything is oriented towards war. Therefore, Europeans, and USAID, for example, NASA should be getting more involved in providing that information for Ukraine.

Secondly, the intelligence services have satellites roaming around and focusing on Ukraine. They have a lot of data. I know that, because I used to work with these guys, okay? They have tons of data that they are not sharing with anyone—with NASA or anyone—because they are using it for military purposes. Therefore, they are afraid if they divulge that information—that information is extremely valuable for doing a much more focused and quantitative analytical assessment of the ecological damage.

Therefore, if we could get some of the intelligence agencies, like the [NSO] Naval Staff Academy to release some of that less sensitive—because they have information that square meters, okay? Not kilometers. Square meters, really detailed stuff. If we could get them to release some of that information, that would be very helpful in making a better—much better quantitative assessment of the ecological damage, and water quality losses. For example, you could figure out—you could figure out the pollution in the near shore area, in the Sea of Azov, in the Black Sea, in the Dnipro River. Everywhere where wastewater treatment plants have been damaged, you could see the effluent flowing into the rivers. You could quantify that.

Ms. SIMRELL: Thank you.

Dr. BAYDYUK: Therefore, how I see it is several steps that international communities can take to provide Ukraine what it needs to recover and combat the ecocide. Therefore, one is, as Dr. Stakhiv said, the ability to analyze data, which will take time. However, the data analysis will certainly uncover a lot of issues and problems, which then should be discussed both with Ukrainian scientists and Ukrainian engineers and Ukrainian communities, together with the international community. Therefore, this collaboration and conversation between Ukraine and the global community is a must to, first, global community, provide those resources, tools, and some infrastructure. However, Ukrainians should

be able to decide for themselves what will work best in any situation, including local communities.

The final step is, of course, providing economic—and enhancing economic growth of those local communities. Therefore, what a lot of—a lot of us are advocating now for American and European businesses to come invest in Ukrainian agriculture business and other economic developments. That will be key for Ukraine to start the process of reconstruction, rebuilding, and building something new.

Dr. HOOK: Mmm hmm. Yes, I have a few practical recommendations that come to mind. Therefore, first of all, you know, I have talked about the Russian willingness, and not just on environmental crimes. I mean, I mentioned that 2,400 have been documented. There are obviously more. Therefore, Russia is committing crimes at a very, very fast rate. Therefore despite how incredibly capable Ukraine is, we are in a situation where it is all hands on deck with a lot of the documentation of these crimes. Therefore, I think that there would be a real benefit for an increase in technical capacities, by which I mean other humans from other countries that can help document them, and knowledge sharing around this.

Therefore, again, I see this benefiting Ukraine, but I also have heard firsthand a lot of Ukrainian willingness to advocate for people in other countries. Therefore, I think that this would be an investment that would pay forward in very positive ways. We also have up and running a sort of registry of damage that has been passed. Therefore, I think maybe a registry of these environmental crimes might be a very practical way that we are building the sort of portfolio and the data that we will need for legislation.

Then also, in the spirit of all hands on deck—so we have technical capacities. We have this human capacity. We have—if there could be exchanges, expert to expert, or scholars, or lawyers who could help train, perhaps, policemen. That is an area that we have seen. Policemen are now—policemen who signed up to be a policeman, signed up to protect their community, and are having to learn quite a lot about international law because they are part of the accountability process for war crimes, and atrocity crimes. I think in that same spirit that there would be a lot of willingness to benefit from learning how to gather in real time what is needed.

Therefore, then also, you know, I am in this room as a product of the Fulbright program to Ukraine, which is suspended right now. Therefore, just sort of thinking for those people who would be willing and able, are there roles that the U.S. government could play to support those of us who may have some knowledge to share with our Ukrainian colleagues, and to learn from our Ukrainian colleagues in this very beneficial, innovative cycle to move the ball forward in Ukraine, both there and also, I think, to the benefit of the United States and to the benefit of other places, would be—would be very helpful.

Dr. STAKHIV: I just wanted—I just wanted to add that President Zelenskyy signs executive orders, just like our president does. He set up a couple of commissions to do exactly that, to register both the, let us call them the socioeconomic war crimes, as well as the ecological war crimes. Therefore, they are collecting this information. They have various teams out in Ukraine doing that. Therefore, that registry is being—is being filled. I do not know how well right now. Of course, they do not have access to eastern Ukraine, that part that is occupied by Russia, where—which, in my view, has probably the worst ecological damage.

Ms. SIMRELL: Mmm hmm. You raise excellent points, including on the fact that it can be measured—it is important that it be measured. It is vital that it be measured. However, it can only be measured and assessed insofar as Ukrainians can access the territory and be able to log the damage. Thank you so much.

I am looking around. I am sure there are a couple more. Yes. In the back. Please, your name.

Question: Charlie from Dale Strong's office.

Could you guys focus on the agricultural impact that has happened since the war started? That means food security or insecurity for the Ukrainian people.

Ms. SIMRELL: Sure. Can you give your member's office name again, please?

Question: Dale Strong.

Ms. SIMRELL: Thank you so much. The impact on agriculture.

Dr. HOOK: Sure. Therefore, in 2022, when the biggest sort of shock to the world food prices and the system happened, I believe—without having the numbers—but I believe it was about 50 million people in 45 different countries were assessed by the World Food Program as being food insecure, sort of teetering on the edge of famine. Therefore, that was a real shock to the system in terms of food prices and things like that. Now, to Ukraine's enormous credit, they have pushed the Russian Black Sea Fleet from that area. There is more food being shipped. However, we do need to sort of look at the reality of food production, look at the areas where Kakhovka was and how that is changing, the ecology, the irrigation system that has been impacted there. You know, we cannot grow things in the desert. Irrigation is very important.

Therefore, when we look at this—and this is really what led me to look at the facts and really talk about Russia as orchestrating not just a devastating, devastating humanitarian crisis against the Ukrainian people, but really willfully and with full knowledge. In their own words, we have had Russian state propagandists talking about all of our hopes are on the famine. This was said in public remarks in 2022. To use famine, to use things that are impacted by the environment to continue to build their clout. However again, that is a clout built on human rights violations and criminality. Therefore, if that has shown to work, then it will be replicated by other actors.

Therefore, when we are thinking about the long-term agricultural impact, I benefited enormously from just being on a panel just a few weeks ago with the Ukrainian technical expert who does nothing but look at agricultural numbers. I would be happy to connect with you if you are looking for specific statistics. However, she was talking about, for example, it is not just the damage, but there was a little bit of a boost in Ukrainian agriculture last year that had to do with favorable weather conditions, and that that was really important. But, again, we cannot always hope for favorable weather conditions.

Therefore, it is looking at the predictability of the agricultural cycle, trying to figure out, through several agricultural seasons, the impact of the damage and how the weather would average out, and those yields. I think, again, that this is going to be part of where there needs to be real innovation. Therefore, in this area of irrigation, are there technologies that exist, that have been pioneered by other countries, I have one in mind, that are good at, you know, growing crops in these places that are prone to being very dry? Are there ways that some of these technologies could be tried out in a different ecosystem, like Ukraine, to the benefit, again, of Ukraine and us for our own learning, and for global food security?

Dr. BAYDYUK: I just want to add to this that if you think about 30 percent of—25 to 30 percent of Ukraine is mined currently. That is mostly the agricultural land that is covered with different types of explosives. Also, if you think about the frontline zone, where lots of land was completely destroyed by shelling and bombing. That will add to, again, unfavorable—potentially unfavorable situation—unfavorable situation in the future.

Therefore, this is definitely going to affect not only Ukraine but as Ukraine—as we know, Ukraine is the breadbasket of Europe. That would definitely be affecting the situation in Europe. Globally, countries like—I mean, continents like Africa, and countries in Africa, for example, where they depend on Ukrainian grain—I think 20 percent or something of grain in Africa is exported from Ukraine. Therefore, those countries will be affected. Food security globally can be affected as well, depending on whether the situation is stable or situation being exacerbated.

Dr. HOOK: I think it is also worth—when we look at the issue of global food insecurity, it is also worth really mentioning the very clear link between food insecurity in multiple places around the world and the increase of violent conflict. Therefore, that is something that we have seen strongly correlated. Therefore, when we are thinking about not only, you know, the devastating personal impact of a person being at risk for food, we might also expect to see, according to the way that it has worked out in many places in the past, an increase in violent conflict in those places. Therefore, when we are sort of thinking about how we make our decision making, it would not only be doing this great humanitarian good for food security but there is a real clear link there between also deterring, as best we can, a strong potential for war and conflict to break out in other places as well.

Ms. SIMRELL: Please. Here. Thank you.

Question: I am Ryan. I am with Representative Greg Stanton's office.

Ecocide is—it obviously encompasses a large range of environmental damages. A lot of today's talk and discussion has been regarding, understandably, the Ukrainian people. However, I am interested in also how—or what emphasis is going to be placed on restoring ecological niches and restoring animals that have been displaced from, obviously, combat and warfare. Also, what those spells for the Ukrainian people, like, a loss of biodiversity, loss of animals, and disruption of those ecosystems.

Ms. SIMRELL: Thank you. Therefore, that is Greg Stanton's office. Thank you so much for the question. Restoring bio niches, animals, and Ukraine's biodiversity.

Dr. HOOK: Therefore, I brought along with me the definition from Article 441 of the Ukrainian Criminal Code. I know you were waiting for it. However, it is what ecocide is. It is—I pulled out just a piece of it. However, it is the mass destruction of flora and fauna, the poisoning of air or water resources, and also any other actions that may cause an environmental disaster. Therefore, just to sort of quickly clarify what we are talking about on this issue, your question was about—was it about ecocide? Was it about accountability? Remind me?

Ms. SIMRELL: Restoring.

Dr. HOOK: Restoring. I also remember the part where you asked about biodiversity and bringing those animal populations back. I mean, that just sort of—that is a great question. It stopped me in my tracks for a minute, because I was thinking, like, how great would that be? I have really mapped and looked at how animals are being moved. How-

ever, it again, gets back to this place where you could not, in any sort of ethical sense or even practical sense, introduce these animals back into places that, (a), are under Russian occupation and they cannot get to, or, (b), might be near the front line. Or even, what is very, very challenging, is that Russia considers all of Ukraine to be its front line, right?

We have seen civilian targeting across the entire country. Therefore, bringing those animals back is a question that will need to happen, I would assess unless our animal rights specialists have different ideas. But that needs to happen when those places are safe for those animal populations to recover. Therefore, again, I think that this very, very important question that you are asking about not just Ukrainian biodiversity—biodiversity does not respect state borders—but European biodiversity. I think that this is another question that falls into the bucket that I have heard on this panel, which is that Ukraine needs to win as quickly as possible.

Dr. STAKHIV: Yes. I mentioned that Ukraine is a major area for migratory waterfowl from Central Asia all the way to Africa. Therefore, they have these resting places. You destroy the resting places, they are—like, they have this network. They are called emerald sites, which are natural areas in Ukraine. Therefore, the Russians destroyed about half of them. There are 115 of those sites, something like that, out of the 250 that they have. Therefore, restoring these natural areas can be done. As an example, here in the United States many agencies—the Corps of Engineers, the Bureau of Reclamation, National Park Service, et cetera—they restore hundreds of thousands of acres every year.

However, it costs a lot of money. It costs—you know, I think the budget is somewhere in the order of \$1 to \$2 billion a year. Therefore, we know what the costs of restoration are. We know the different types of habitats that need to be restored, and how much that costs. Therefore, again, this comes down to the inventory. What are those sites? Each of those—of those emerald sites supports a different type—a different complex of species and biodiversity. What is required? Is it a wetland? It is a marsh. Is it, you know, a forested wetland? Those are the types of things that are fairly well known and can be reconstructed, with assistance—technical assistance from the U.S.

Dr. BAYDYUK: I just want to say that cleaning up the wetlands, the land, will be the first priority. The explosive mining and others. Restoring those ecosystems will certainly take a long time. It is not going to be overnight, or it will take definitely decades to make sure it is restored. However, some of them probably will never be restored. Some of those—of those ecosystems will never come to the way they used to be. Probably there is going to be a new, different type of biodiversity in some of the areas, which we should embrace. Ukrainians probably should embrace it as well. Therefore, it is not a—it is not an easy question. That will definitely require long research and a long time to put it all together. Therefore, that is a great question, but really thought-provoking for all of us to think how that can be accomplished in the future.

Ms. SIMRELL: Thank you so much. Thank you for your questions. Thank you for coming today. I am going to just do a few small closing remarks and then offer the floor to our esteemed panelists, in case there is something else you would like to offer at this time.

This is a long—a long, ongoing issue that is with us today and that will be with us for the future to come. Your expertise will continue to be needed, certainly, here. It is appreciated today. Partnership with Ukraine and working with Ukrainians at all levels I heard very clearly today. I heard that the problem is as vast and as varied as are the options on the way forward, in terms of the things that we can prioritize and tackle. Cer-

tainly, something that came through very strongly was the absolute need to understand what the scope and scale of the problems are, and then to prioritize—to work them into the plan to address them. That includes people-to-people expertise. That includes international goodwill. That includes Russian accountability. That includes money. That includes training and partnership.

I think we could probably carry on indefinitely today, but maybe I can just turn it over to Dr. Baydyuk. Why do not you start to lead us off, and then we will come back down to the table and close for the day?

Dr. BAYDYUK: Sure. Thank you all for the wonderful questions today. As we said, this is just a scratch on the surface to start understanding the problem of ecocide in Ukraine and how it is related to the genocide that Russia started back in 2014. As you think—we would think about this as a full-scale invasion since 2022, however, this devastation started back in 2014 in areas in Donbas, such as Luhansk and Donetsk regions that have currently under occupation since 2014. We do not know how ecosystems are damaged there and what type of devastation Russia brought to those areas at the moment.

However, overall, just want to bring something that we all discussed today—and, Shannon, you summarized it so well—that we have to work together to provide necessary assistance to Ukraine so it can survive and prosper. Also, for us to come up with sustainable, long-term solutions that can be implemented in local communities, at the government level—at different levels in Ukraine, they can bring together professionals who understand the problem, who can come up with good solutions to implement those suggestions that were brought by local communities, also global scholars. Together, they can certainly make a difference in Ukraine. Thank you all for your attention. It was definitely a great panel, that is very important for us to discuss. I will give it to Dr. Stakhiv.

Dr. STAKHIV: This is obviously a nice beginning, a good start. I hope you continue the series. It is important. In my mind and priorities, I think the State Department needs to start pushing a little harder in making ecocide a war crime. Because there are initiatives underway. For example, the United Nations—I forget what they are—some organization that they have, they have already established something like 25 principles for ecocide, and definitions of ecocide. Therefore, that information is there. They have had, like, 20 meetings already. I am sure the U.S. is involved in that. But they need to push it a little faster than the normal legal processes.

Secondly, the reconstruction part—the infrastructure and reconstruction part is moving along fairly well. There is money involved. The Ukrainians are reconstructing as Russians damage the infrastructure. Therefore, that is a different problem. We need to focus a little bit more on demining. The Europeans are putting in quite a bit of money. The Japanese are. The U.S. has \$100 million in the latest appropriations act on technology and training. It needs to move a little bit faster, a little bit more money is involved there as well.

Right now, the demining is not occurring along the battlefield. The military is doing that for military purposes. We are talking about demining around urban areas that have previously been bombed by the Russians so that people can move back in. They are not keeping pace with that as well. You cannot reconstruct a village or a city unless you demine it first.

Dr. HOOK: Therefore, in closing, I would say that we need to listen to the perpetrators. We need to look at their patterns of behavior and what they are telling us. We need

to put it in its appropriate context and analyze it carefully. Therefore, can we solve this problem? Therefore, I think that, for example, when I think about just the environmental impacts, when I see the Kakhovka Dam, when I see the individual elements of animal cruelty that I have documented there when I look at this kind of destructive ideology, we need to face that head-on. That this is not a sort of, like, give me five meters of your border and, like, everything will be fine. This is a real, kind of, whipped into a frenzy, a very complex sociopolitical process that has been harnessed for this very mammoth, I would say, destructive energy. We are seeing it in Ukraine, but I do not think that this will end in Ukraine. Therefore, we need to support our Ukrainian partners to let it be so.

Then I think that we also need to just remember the global implications of this. We do have a lot on our plates. There are—there is a lot going on with just Russia and Ukraine. But I just will draw our attention to the fact that one of the environmental issues that we would think about and that we would talk about in the language of environmental issues is the occupation by a foreign state of one of the world's largest nuclear power plants, the Zaporizhzhia Nuclear Power Plant. We need to think about both the environmental impact. I think we need to really harness ourselves for the urgency of that moment.

I want to draw your attention to the fact too that we need to think about human capacity—the sort of—the human people that do environmental, or nuclear safety, or all of that. Because in the Zaporizhzhia site, I imagine that those people are going through a really horrific experience. Therefore, even though that they are real technical experts, and clearly, for sort of surviving this occupation period, very strong. Let us sort of think about how comfortable you would feel about the impact of what we can imagine would be several years of torture for technical experts who are living through those kinds of conditions. Therefore, I think that we need to just be really clear that this—what we talk about in the language often of environmental issues, also has very global national security issues, including in the nuclear column.

I think that we can also—let us just be practical. Therefore, you know, I always say that you know, for those of us who are documenting environmental crimes, who are documenting atrocity crimes, we have to work at least as hard as the perpetrators. They are working very, very hard. They have committed a long list of crimes. However, there is lots for us to do in outworking them. Therefore, I am very encouraged when I meet people who have a lot of technical expertise that is relevant to this issue, very, very finite issues such as soil or, you know, the recovery of flooding zones, or things like that. Just sort of getting this all hands on deck to the extent that you can. I think that you have a huge bandwidth here to encourage that kind of person-to-person connection.

I see that as very beneficial to the U.S. as well, because we are looking at Ukraine, for example, pioneering paradigms that are really changing the way we look at warfare, for example, with drones and things like that. I expect that there is going to be some paradigm-shifting areas of demining and environmental redress. Therefore, learning from this process. Not read about it in 10 years, but learning about it now so, perhaps, we can apply it at home, with some of the places you talked about, and also share our own lessons. Then I think that I would just stress that, you know, every day that this goes on that the risks continue, that we need to keep our eye on the ball there. That truly these environmental issues will begin to fully recover when the Ukrainian people are fully safe and securing in their homeland.

Ms. SIMRELL: Thank you so much for your expertise, your contributions, the recommendations, and for ultimately bringing it back to what happens—in focusing our minds on the fact that what happens in Ukraine does not stay in Ukraine, whether it is global food insecurity and the ripples that are felt when Ukrainian grain and agricultural land is bombed or delayed, and then, of course, the implications of empowering autocrats, and the impunity that they—we do not want them to face, and we do not want them to feel.

With that, I thank you, again, so much for your time and your contributions. I close the meeting. Slava Ukraini. [**Glory to Ukraine**] [Applause.]

[Whereupon, at 3:38 p.m., the briefing ended.]





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