

E40 waterway could pose increased radiation risk for millions of people

Expert analysis of radioactivity in Polesia suggests that construction of waterway through Chernobyl exclusion zone is not feasible, undermining the entire project



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Summary

The feasibility study on the proposed E40 waterway failed to consider some of the major dangers posed by radiation from the 1986 Chernobyl nuclear disaster. Chernobyl, which is situated in the Ukrainian part of Polesia around 110 kilometres north of Kiev, remains in the process of decommissioning. Experts provided an initial evaluation of the impact of the construction and maintenance of the E40 waterway on the distribution of radioactive material. They warn that a more comprehensive study is essential to better understand the many threats to human health.

They found that:

- Contamination from key radioisotopes such as cesium-137, strontium-90, and isotopes of plutonium pose a significant risk to public health.
- The Chernobyl exclusion zone will remain uninhabitable for decades.
- Radiation is also a major issue beyond the Chernobyl exclusion zone.
- E40 waterway risks disturbing several radiation hotspots – International Atomic Energy Agency (IAEA) recommends leaving contaminated sediment undisturbed.
- E40 waterway would expose workers to dangerous levels of radiation and millions of people downstream to increased radiation risk; key sites have not been decommissioned in accordance with IAEA guidelines; circumstances render construction of E40 unfeasible, undermining the entire project.
- International standards on radiation and the environment, project justification, and public participation, have not been met.

Background: Polesia and the E40 waterway

Polesia is a vast wilderness area stretching across Belarus, Poland, Russia and Ukraine¹. The E40 waterway² is a transnational initiative aiming to link the Baltic and Black Seas by an approximately 2,000 km long navigable connection running from Gdansk in Poland to Kherson in Ukraine. This could have very serious impacts on the natural and cultural heritage and people of Polesia, as well as more wide-ranging effects on economies and the global carbon balance.

Although the planning of E40 waterway is still at an early stage, a feasibility study was published in 2015³. This proposes that the route would go through the river systems of Vistula, Bug, Pina, Pripyat and Dnieper (see figure 1). Along the majority of its course it would go through free-flowing rivers, and several parts would need to be straightened, dammed, dredged, or drained. While some shipping channels already exist, the extent of the proposed new development is so massive that it threatens an environmental catastrophe in the region.

The whole Dnieper watershed is contaminated by the 1986 Chernobyl nuclear disaster and the Pripyat crosses the Chernobyl exclusion zone and passes directly next to the Chernobyl Nuclear Power Plant (see figure 2).

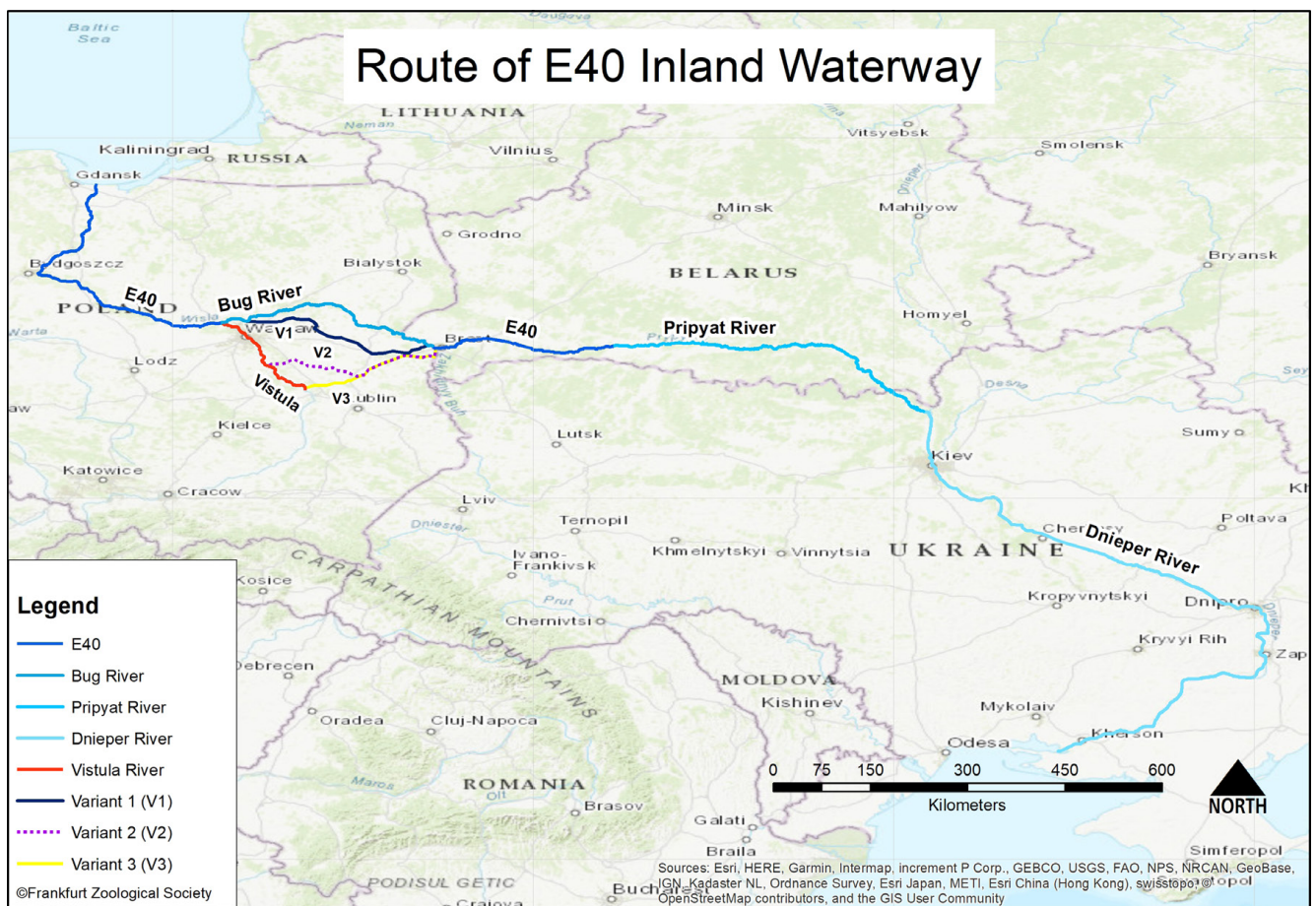


Figure 1: Outline map of the proposed E40 waterway

¹ See factsheet "About Polesia – A unique wilderness of global importance"

² See factsheet "Polesia under threat – How a new waterway could destroy Polesia's natural environment"

³ Maritime Institute in Gdansk [2015] Restoration of Inland Waterway E40 Dnieper – Vistula: from Strategy to Planning. Final Feasibility Study Report – Corrected Report (According to the remarks and requirements introduced by Willem Zondag, Legal and Technical Consultant). Gdansk, December 2015.



Figure 2: Location of Pripet passing the Chernobyl Nuclear Power Plant in the Chernobyl exclusion zone (Ortophoto: Google)

Expert studies

To better understand the potential impacts of the E40 waterway on Polesia, we commissioned a range of experts to look at the following factors: hydrology, transport economics, radioactivity, and potential alternative development scenarios for Polesia. This factsheet summarises the findings of the radioactivity assessment. It has been carried out by experts from *Association pour le Contrôle de la Radioactivité dans l'Ouest* (ACRO). The full report is available [here](#)⁴.

What the assessment looked at

Researchers analysed in detail the 2015 feasibility study from a radiological perspective and provided an initial evaluation of the impact of the construction and maintenance of the E40 waterway.

The key issues considered were:

- The radioactive elements with the biggest risk to human health;
- The current situation in the Chernobyl exclusion zone;
- The current situation outside the exclusion zone;
- The risk of impacting radiological hotspots due to the construction of the E40 waterway;
- The exposure of people to increased levels of radioactivity due to the E40 waterway;
- The international standards and principles applied.

Findings

Contamination from key radioelements poses threat to public health

Chernobyl is the most severe industrial accident in history. More than 30 years later, residual radioactive contamination means people are prohibited from living in an extensive exclusion zone. At the present time, contamination is dominated by cesium-137, strontium-90 and various isotopes of the highly toxic plutonium. Cesium-137 binds to clay sediments, while strontium-90 is more mobile. Americium-241, the daughter nucleus of plutonium-241, is also highly toxic and has an increasing contribution that is expected to dominate the radiological impact in the future.

The International Atomic Energy Agency (IAEA) has undertaken several important studies into radiological conditions in the Dnieper river basin⁵ and into the environmental consequences of the Chernobyl accident and their remediation⁶.

The Chernobyl exclusion zone is uninhabitable and will remain so for decades

The general strategy is to wait for the slow radioactive decay. Only the most radioactive hotspots – the Chernobyl cooling pond, which is the most contaminated area, and about 90 radioactive waste storage sites will be decommissioned. The Chernobyl exclusion zone will remain uninhabitable for decades.

⁴ Association pour le Contrôle de la Radioactivité dans l'Ouest (ACRO) (2020) Chernobyl heritage and the E40 trans-Europe waterway. January 2020.

⁵ IAEA (2006a) Radiological Conditions in the Dnieper River Basin – Assessment by an international expert team and recommendations for an action plan, 2006. Available from https://www-pub.iaea.org/MTCD/publications/PDF/Pub1230_web.pdf

⁶ IAEA (2006b) Environmental Consequences of the Chernobyl Accident and their Remediation: Twenty Years of Experience, Report of the Chernobyl Forum Expert Group 'Environment', 2006 Available from http://www-pub.iaea.org/MTCD/publications/PDF/Pub1239_web.pdf

Radiation remains a major issue beyond the exclusion zone

The daily lives of millions of people are still affected by residual contamination. The whole Pripjat-Dnieper watershed was contaminated by nuclear fallout and direct transfers to the river. Dominating contaminants are cesium-137, which tends to be fixed in bottom sediments, and strontium-90, which is continuously transported down to the Black Sea through the Dnieper cascade. Sediments contaminated by cesium-137 have been slowly covered by less contaminated and clean sediments at the bottom of the Kiev reservoir, offering a natural shield to this pollutant. The IAEA recommends leaving these sediments in place and avoiding processes that will lead to their resuspension. The level of strontium-90 cannot be reduced actively, it will wash through the river system and slowly decay.

Downstream of the Chernobyl exclusion zone, the Dnieper river serves as a water source for approximately 8 million Ukrainians and its waters are used to irrigate crops consumed by as many as 20 million people. Upstream of the Chernobyl exclusion zone, there are zones along the Pripjat river that were contaminated by radioactive fallouts at the time of the accident. Cesium-137 is the biggest contaminant. The overall strategy there is also to wait for the slow radioactive decay.

E40 development risks disturbing radiation hotspots

Two IAEA radiological hotspots present a significant risk. The Pripjat river floodplain within the Chernobyl exclusion zone will be a danger if inundated by dam construction as this will resuspend the radioactivity currently held in the soils in the contamination hotspots. The Chernobyl cooling pond will be a danger if the dam that separates it from the Pripjat river is breached. In addition, the Kiev reservoir is heavily contaminated with Cesium-137 and is in danger of becoming another hotspot if the sediments are disturbed.

Construction and operation of E40 waterway would expose workers to dangerous levels of radioactivity and would pose an increased radiation risk for millions of people downstream

The E40 waterway would pass through the Chernobyl exclusion zone and close to the Chernobyl Nuclear Power Plant. Experts warn that construction and maintenance workers would be exposed to dangerous levels of radiation. They also state that the contamination of drinking water, fish, and the use of dredged material as fertiliser in fields, could lead to further radiation exposure of people who depend on the Pripjat and the Dnieper rivers and on crops grown in the area. A more comprehensive radiological study will be essential given the proposed E40 waterway would require heavy engineering work in the most contaminated part of the route, such as dam construction and alignment of the river course.

Based on their initial assessment, experts believe that the radiation exposure of workers forecast is unacceptably high. Furthermore, they warn that the heavily contaminated Chernobyl cooling pond and temporary radioactive waste stores in the floodplain of the Pripjat river have not been decommissioned in accordance with IAEA recommendations. Therefore, they state that construction work could not feasibly be carried out on the section of the E40 waterway that crosses through the area. With no realistic alternatives, this undermines the idea of the entire project.

Without this section, the entire stretch of E40 waterway that lies upstream of the Chernobyl exclusion zone would have no connection to the Dnieper river, rendering it redundant. Therefore, work on the meandering Pripjat river to make it suitable for large vessels would have no justification.

The section of the E40 waterway running from the Black Sea to the Kiev reservoir would require regular dredging work. The feasibility study suggests there will be 68,000m³ of dredging work every year in the Kiev reservoir. This reservoir has cesium-137 in its bottom sediments and dredging would be contrary to the IAEA's recommendations to leave the sediments in place. This is because it would expose people who depend on the water from the Kiev reservoir to higher levels of radiation.

International standards have not been met

In infrastructure projects such as the E40 waterway, the International Commission on Radiological Protection (ICRP)⁷ principles, the Aarhus convention, and the Espoo convention, require environmental and radiological studies, a justification of the project, and the participation of the stakeholders and the general public in the decision-making process. At present none of these requirements have been satisfied.

⁷ ICRP (2007) The 2007 Recommendations of the International Commission on Radiological Protection, ICRP Publication 103, Ann. ICRP 37 (2-4), 2007. Available from <http://www.icrp.org/publication.asp?id=ICRP%20Publication%20103>

Who is Save Polesia?

Our coalition includes six organisations from four countries.



APB – Birdlife Belarus

APB's mission is the conservation of biological diversity for the benefit of the present and future generations and involvement of people in active nature protection activities.



Bahna, Belarus

The aim of Bahna is to prevent further degradation of the environment and to preserve natural habitats and biodiversity of our country.



FZS – Frankfurt Zoological Society, Germany

FZS invests in wilderness areas of global significance – “legacy landscapes” – with aesthetic and natural values, pristine landscapes, important ecosystem processes or values, and endemic and endangered species.



NECU – National Ecological Centre of Ukraine

NECU is an NGO with branches in a dozen of Ukrainian cities. It works to bring environmental consideration into the core of any decision making.



OTOP – Polish Society for the Protection of Birds

OTOP's mission is to protect birds and their habitats and establish and manage new bird reserves. The organisation has strong educational work in order to increase public support for nature conservation.



USPB – Ukrainian Society for the Protection of Birds

USPB's mission is to conserve the biodiversity of Ukraine by saving birds, sites and biotopes.



Contact for more information

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