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***Scientific American* feature: Devastating potential impact on US population of an attack on US nuclear missile silos modelled in unprecedented detail \*IMAGES\***

One to two million people would likely die from acute radiation exposure following a nuclear attack on the nuclear weapons silos in US inland states according to exclusive modelling published in *Scientific American* today. The modelling predicts an estimated further 300 million people would be at risk of lethal fallout (involving radiation doses at least 1,000 times greater than the current annual limit for exposure of the public). The exclusive feature is published as part of a *Scientific American* special report examining the US's \$1.5 trillion plan to remake its atomic arsenal.

Five US states, Colorado, Wyoming, Nebraska, Montana and North Dakota, are home to the 450 missile launch facilities (silos) of the US's land-based intercontinental ballistic missiles (ICBMs), kept on continuous launch alert and intended to deter nuclear attack by a foreign adversary. Over time, it has come to be understood that these sites would be a "sponge" for a foreign attack, as an adversary would need to focus their efforts on hitting all these sites simultaneously to avoid a retaliatory strike. As part of current \$1.5 trillion plans to modernise the US nuclear arsenal, existing missiles at these sites are intended to be replaced with new versions and infrastructure refurbished. However environmental impact reports have not assessed the risks associated with an actual attack.

Previous studies of projected fallout from such an attack were published in *Scientific American* in 1976 and 1988, but all past studies relied on relatively simple fallout models and average seasonal winds. In the new feature, academic and nuclear weapon expert Sebastien Philippe of Princeton University uses higher resolution weather data from 2021 together with current modelling capabilities to show the risk to local populations as well as people across North America, including predicted fatalities and radiation exposure, to a level of detail never previously possible. In addition to the assessment of fatalities count, the feature also includes maps that demonstrate how fallout and fatalities could shift with changing weather patterns, which locations in the US are riskiest and what the worst-case scenario could look like for any location across North America. Many communities have little or no idea they are in a radiological risk zone, in part because previous research has underestimated the risk. The new maps illustrate that nearly the entire population of the contiguous US and the most populated areas of Canada, as well as the northern states of Mexico, could be at risk of lethal fallout, depending on the weather conditions at the time of an attack.

The feature is part of a special report that explores the remaking of the US's nuclear arsenal from multiple scientific and social angles, and includes two other in-depth feature articles, a 20 minute documentary and a five-part podcast series. An accompanying *Scientific American* editorial calls for the US to back away from updating its aging nuclear weapons, in particular the silo-launched missiles, and learn from the lessons of the 20th century.

Further content includes two other extensive features. One details a rare behind-the-scenes tour of the plutonium facility at Los Alamos National Laboratory in New Mexico where scientists have been tasked to produce 30 new plutonium pits every year to form new cores

for the US's nuclear weapons. The other, which follows plutonium from “cradle to grave” on a road trip through the American West, provides a narrative perspective on the past, present and future of what the US nuclear weapons infrastructure has done and will do to the people who live in its shadow.

Finally, the special report includes two multimedia exclusives, premiering on 14 November. One is a 20-minute documentary that traces the legacy of nuclear weapons in the American West, from the site of the first nuclear bomb detonated over US soil to the scientific lab that is creating the new generation of atomic bomb triggers. The other is a five-part podcast series, hosted by Ella Weber, a junior at Princeton University and a member of the Mandan, Hidatsa and Arikara Nation, the only Native American tribe hosting nuclear weapons in the US. Ella will take listeners on a personal journey as she discovers more about her community and the past, present and future of nuclear missiles located on her reservation.

Laura Helmuth, Editor in Chief of *Scientific American*, commented: “*Scientific American* has a long history of helping the public to understand the science of nuclear weapons, including the risks associated with land-based missiles. In 1976 and 1988 we published studies illustrating the likely fall out from attacks on these sites. Now, in 2023, sophisticated modelling allows us to map the likely radiological risks in unprecedented detail. These maps send a clear message with which the many nuclear safety and environmental experts we spoke to concur: these are not risks that we should be taking. We need to learn from the past and step back from a course that could threaten humanity’s future.”

**Note: This press release refers to a *Scientific American* special report of features and additional content, not journal research papers. The feature article modelling the potential impact of nuclear attack was not peer reviewed.**

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