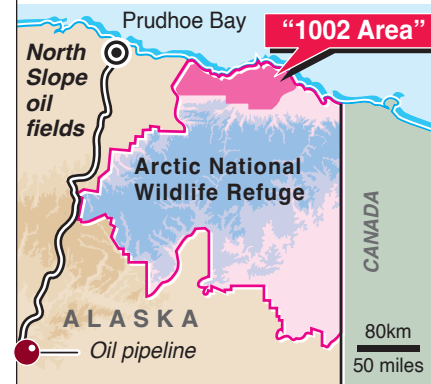


Crunch time for wildlife refuge



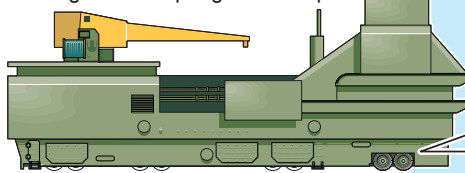
President George W. Bush's plan to drill for oil in the Arctic National Wildlife Refuge would require oil companies to use state-of-the-art technology to avoid damaging the environment. Opponents say the landscape will be permanently scarred and wildlife will be displaced

Stage 1

Exploration, January-April:

New 3-D seismic surveys required to collect data for supercomputers to create 3-D images of oil reserves. **Caravan of 100-120 people with 45 vehicles, including 15 sound-generating and recording trucks, fuel tankers, incinerator and 20-25 shipping containers pulled by Caterpillar tractors**

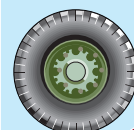
Wildcat wells: Teams of 100 build "ice pads" to move mobile drill rigs before spring thaw in April



Drill rig: 1,200-ton rig travels over ice pad at 2.5mph on 11-foot diameter rubber tyres

Environmental impact: 3-D surveys require grid lines to be spaced about 1,100ft apart. Scars from 2-D trails made in 1984 – which were 4 miles apart – are still visible after 15 years. **Tundra vegetation under shallow snow cover is easily crushed by tyres and skis. Permafrost thaws early under compacted areas – pools form and plants die**

Ice pads: 6-inch-deep piles of ice chips, cemented with 1m gallons of water per mile, sprayed on frozen tundra



Tundra vegetation

Lack of water in **1002 Area** will likely result in a network of permanent gravel pads and roads. **Water depletion will affect migrating birds that feed on invertebrates in lakes and fish that overwinter in rivers**

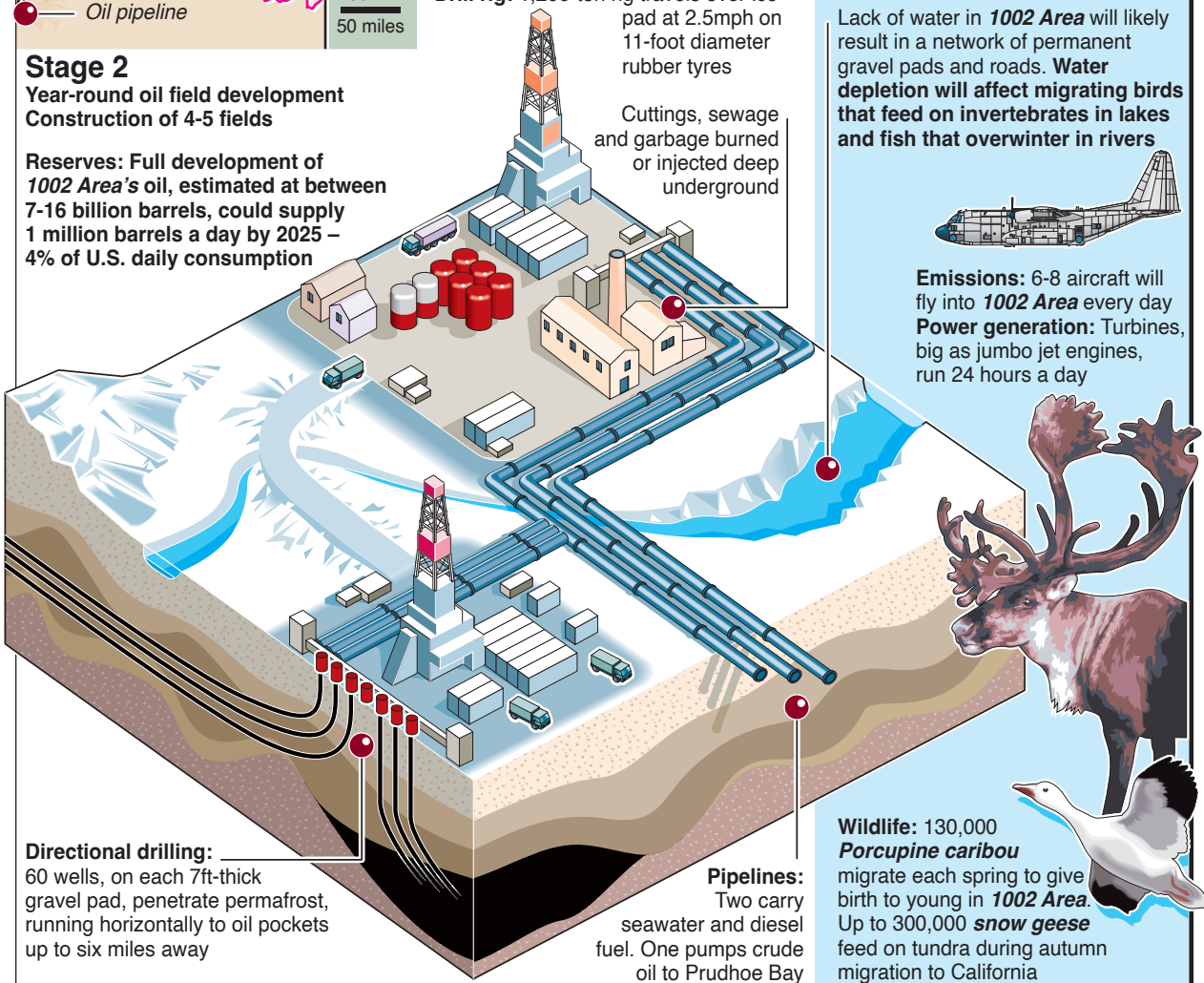


Emissions: 6-8 aircraft will fly into **1002 Area** every day
Power generation: Turbines, big as jumbo jet engines, run 24 hours a day

Stage 2

Year-round oil field development
Construction of 4-5 fields

Reserves: Full development of **1002 Area's** oil, estimated at between 7-16 billion barrels, could supply 1 million barrels a day by 2025 – 4% of U.S. daily consumption



Directional drilling:

60 wells, on each 7ft-thick gravel pad, penetrate permafrost, running horizontally to oil pockets up to six miles away

Pipelines:

Two carry seawater and diesel fuel. One pumps crude oil to Prudhoe Bay