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The importance of ditches in the greenhouse gas balances of managed and rewetted peatlands

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Globally, millions of hectares of peatlands have been drained for agriculture and forestry by the digging of ditches, amounting to millions of kilometres of drainage ditches. It has been known for three decades that these ditches can be landscape-scale hotspots of the potent greenhouse gas (GHG) methane (CH_4), as well as acting as sources of carbon dioxide (CO_2) and nitrous oxide (N_2O). Rewetted peatlands also feature remnant ditch networks that may be partially infilled or blocked, or still used for water management, and these waterbodies can continue to emit large amounts of GHGs.

Although a growing number of studies have measured and reported peatland ditch emissions, substantial knowledge gaps remain. Here, I will draw on my own research and that from the literature to give an overview of the importance that ditch emissions play in the GHG budgets of peatlands. This will include peatlands drained for forestry, grassland, and cropland, as well as rewetted peatlands. I will also highlight knowledge gaps and questions that remain to be answered about the role peatland ditches play in the carbon and GHG cycles.