

# Winter gifts for river ecosystems: a massive supply of earthworms in early winter

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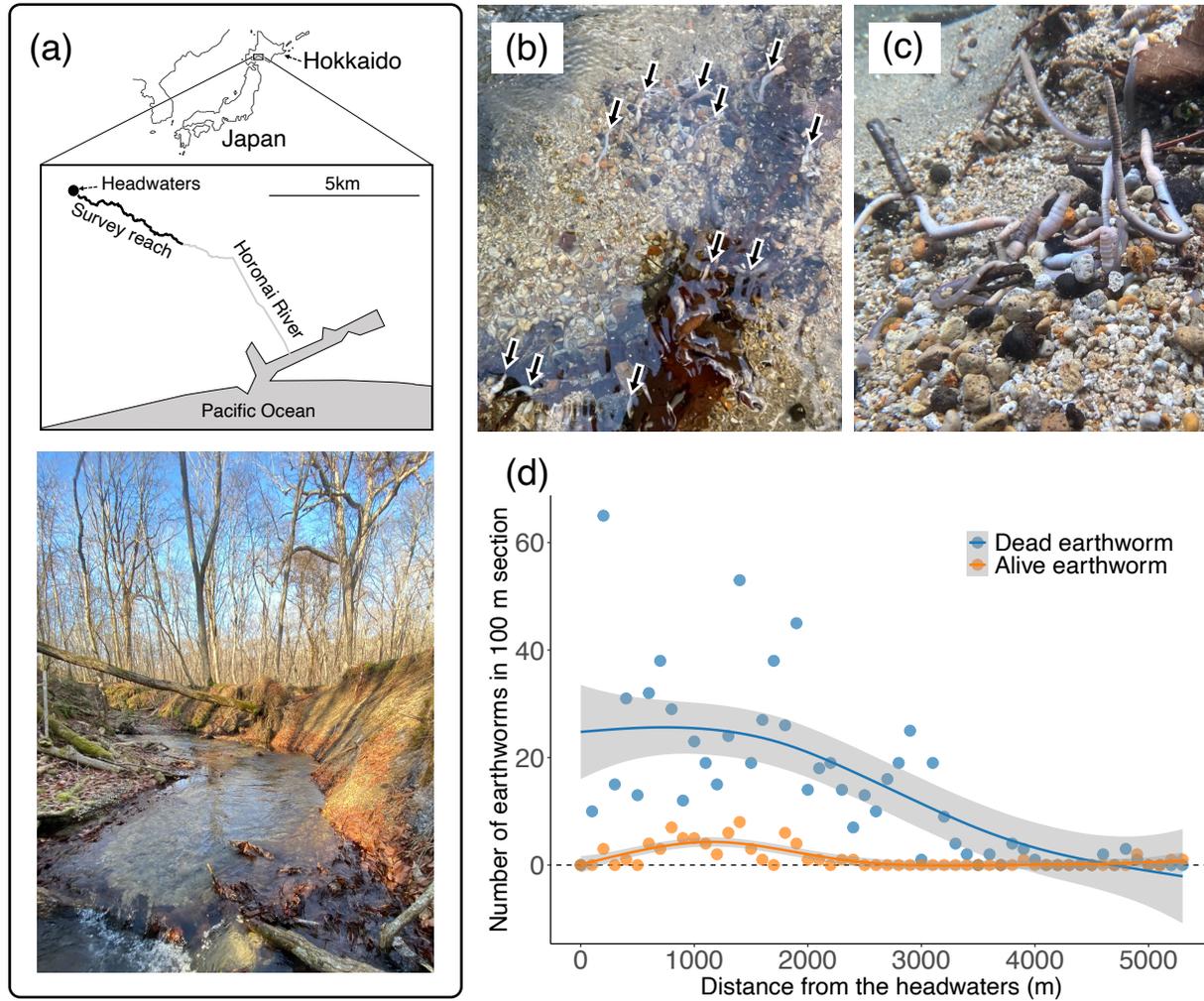
## Abstract

Terrestrial resource pulses can significantly affect the community dynamics of freshwater ecosystems. Previously, its effect on the river community is considered to be stronger in summer, while weaker in winter when terrestrial invertebrates are less abundant. The movement of the terrestrial earthworms are triggered in winter, so they may be supplied to winter rivers as terrestrial resource pulse, but little is known about it. Here, we report that the massive numbers of the terrestrial earthworms were supplied intensively to an upstream of the small river in early winter. In particular, we found large numbers of Megascolecidae earthworms were supplied in an upstream of the small river in Northern Japan. Furthermore, we observed that supplied earthworms were consumed by salmonid fish species (masu salmon, white spotted char and rainbow trout) and aquatic invertebrates (gammarid amphipod, planarian flatworm and stonefly larvae). These findings suggests that the terrestrial earthworms may play a key role in ecosystem functioning in winter when severe and other resources are scarce.

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**Figure 1**



**Figure 2**

