

## New records of New Zealand Pigmyweed, *Crassula helmsii* (Crassulaceae), in two Irish lakes

Caroline Plant<sup>1\*</sup>, Hugh B. Feeley<sup>2</sup>, Neasa McDonnell<sup>3</sup>, Ruth Little<sup>1</sup>, Deirdre Tierney<sup>2</sup>

<sup>1</sup>Environmental Protection Agency, Inniscarra, County Cork, Ireland

<sup>2</sup>Environmental Protection Agency, Richview, Dublin 14, Ireland

<sup>3</sup>Environmental Protection Agency, The Glen, Monaghan, Ireland

\*Corresponding author: [c.plant@epa.ie](mailto:c.plant@epa.ie)

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### Abstract

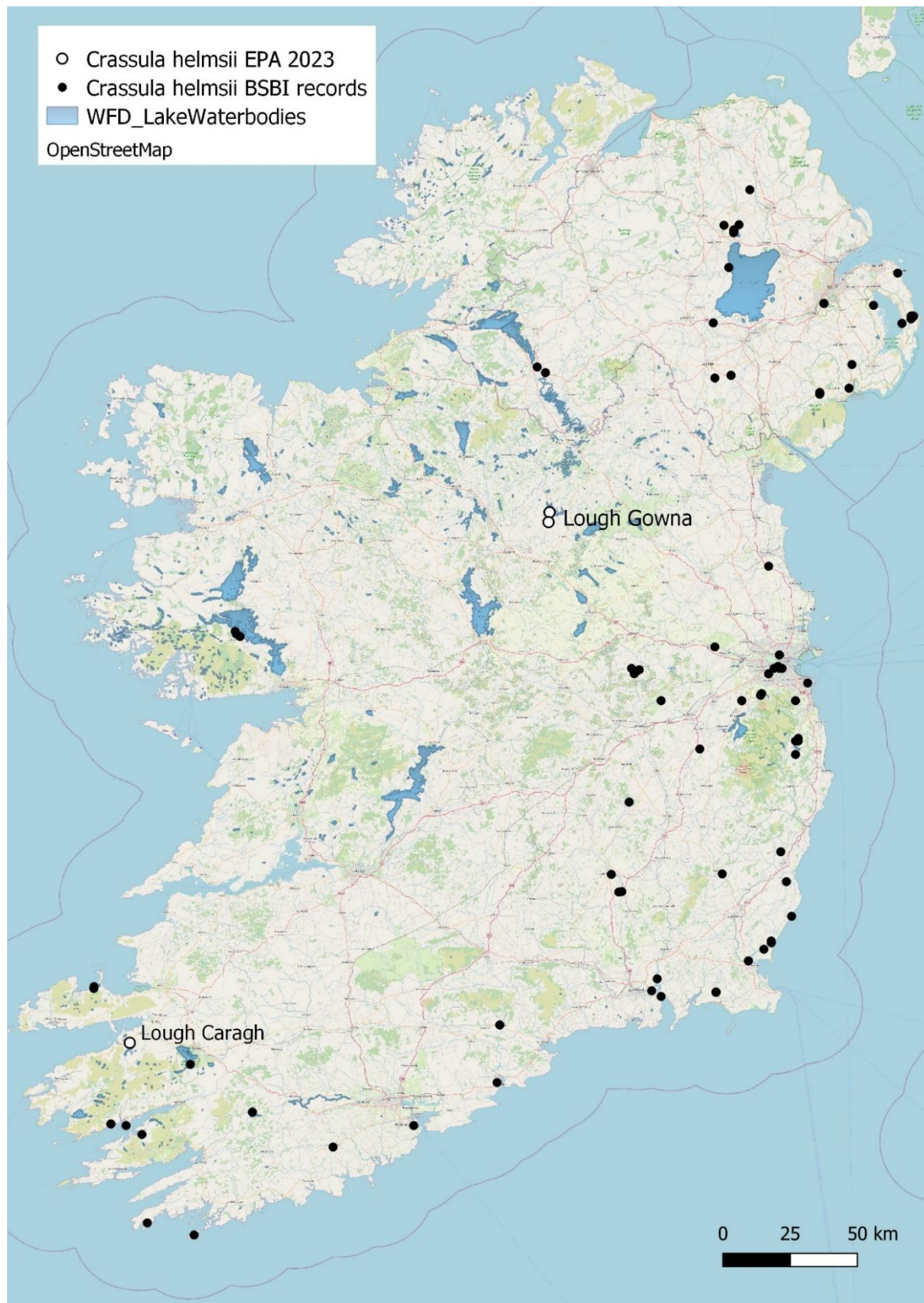
*Crassula helmsii* (Kirk) Cockayne (New Zealand Pigmyweed) is an invasive aquatic macrophyte first recorded on the island of Ireland in 1984. Since then, it has been found at numerous sites on the island, mostly in the east and south. This note provides information on new records collected in the Summer of 2023 in two Irish lakes. The records show a continued spread from east to west and provide confirmation of its presence in the headwaters of the largest riverine system on the island.

**Keywords:** invasive aquatic plant; Lough Gowna; Lough Caragh

### Introduction

*Crassula helmsii* (Kirk) Cockayne (New Zealand Pigmyweed) is an invasive aquatic macrophyte first recorded on the island of Ireland, in County Armagh (v.c.H37), in 1984 (Reynolds, 2002). Since then, it has been found at numerous sites on the island particularly in the north-east, the east coast and the south. The Botanical Society of Britain and Ireland (BSBI) had 138 records of *C. helmsii* in Ireland up to the year 2023 (Fig. 1; BSBI, 2020). This species would originally have been sold commercially as an ornamental plant for ponds and pond margins, or as an oxygenator for aquariums. However, due to its invasive nature and increasing difficulties with controlling populations in waterbodies in other European countries, it was listed as a "Non-native species subject to restrictions under Regulations 49 and 50" in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 and has since been banned from sale (Government of Ireland, 2011). A risk assessment produced by Inland Fisheries Ireland subsequently concluded that *C. helmsii* posed a very high risk as an invasive species in Ireland (Milane & Caffrey, 2014). The species is highly plastic in its ecological requirements. It can grow submerged to 3 m or as an emergent form in shallower water in lakes, ponds, and slow-flowing waterbodies such as canals and larger rivers. It can also grow as a terrestrial on the edges of waterbodies and on wet ground (Milane & Caffrey, 2014). It can form dense stands of vegetation that can outcompete native macrophytes and, in common with some other very problematic invasive aquatic macrophytes, it is able to regenerate from tiny vegetative fragments (Milane &

Caffrey, 2014). Two new records of *C. helmsii* were found in lakes in 2023 during routine macrophyte sampling for ecological water quality assessment.



**Figure 1. Map of Ireland showing records of *Crassula helmsii* from the BSBI Online Plant Atlas 2020 as black dots and new records for Loughs Gowna and Caragh as white dots**



## Methods

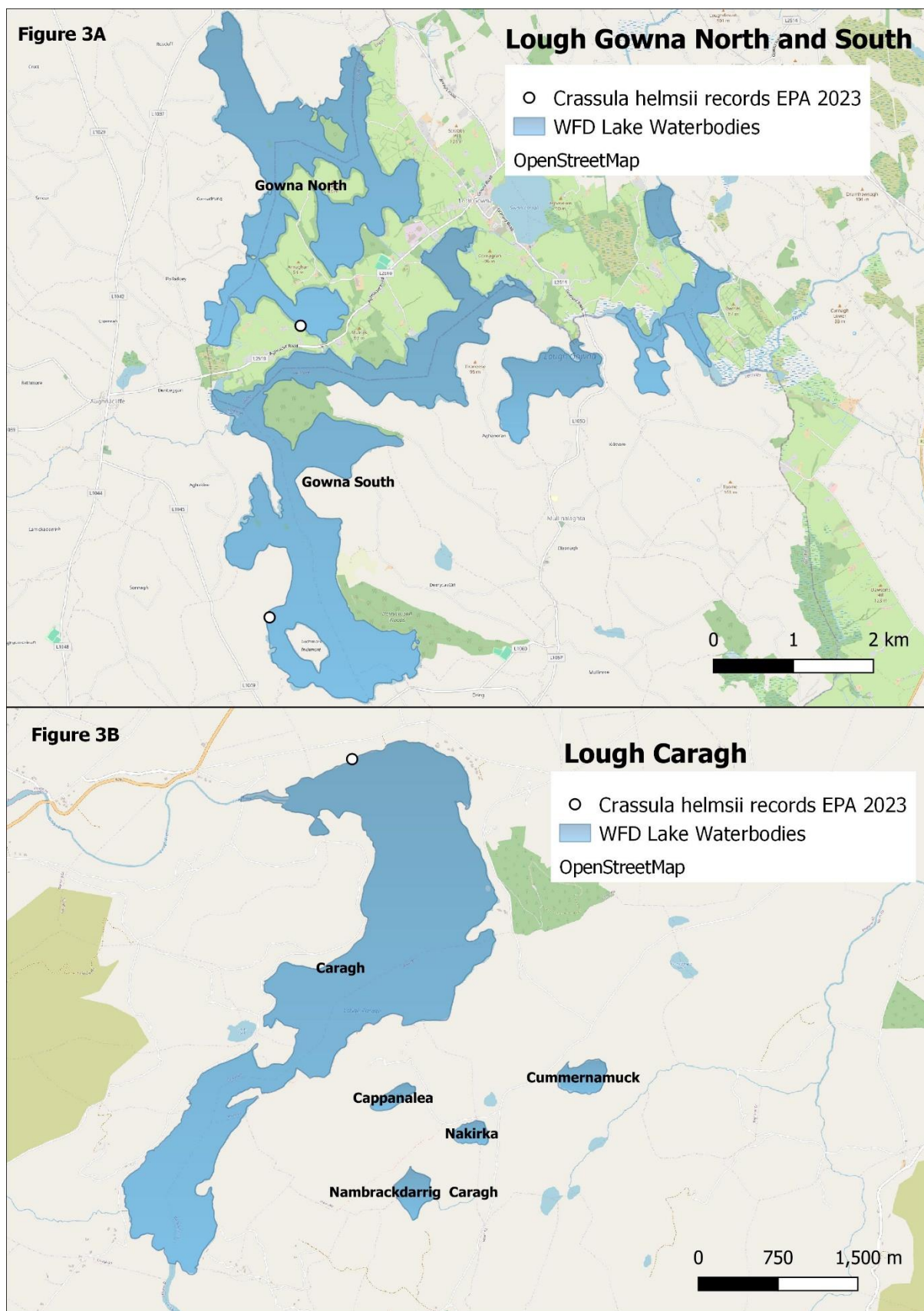
As part of the National Lake Monitoring Programme, the Environmental Protection Agency (EPA) undertakes aquatic macrophyte surveys at predetermined fixed transects on over 200 lakes on a three-year cycle (EPA, 2023). Transects are 100 m in length. They begin on the shore followed by sampling points in the water at 2.5 m, 5 m, 7.5 m, 10 m, 25 m, 50 m, 75 m and 100 m from the starting position. Sampling is carried out using both a bathyscope and a rake to lift the plants up from the sediment for identification. A maximum of four rakes are thrown at each position. The position depth and a relative abundance estimate of each macrophyte taxon is recorded.

## Results

*Crassula helmsii* was found in two lakes surveyed in 2023, both of which are new records for this species. Lough Gowna (Latitude: 53.870917; Longitude: -7.573588) (v.c.H30) is a relatively large lake on the border between counties Cavan and Longford and is the uppermost lake on the River Erne system. Lough Gowna consists of two basins, with the South basin the larger and deeper waterbody. *Crassula helmsii* was found in both basins of this lake in 2023. In Gowna North it was found in its terrestrial form on the bank growing abundantly and luxuriantly along the southern shore of the lake basin (Fig. 2). It was also found at this location growing as an emergent in 0.2 m of water, 2.5 m from the bank. In Gowna South a very small amount of plant material was found growing fully submerged at 2.1 m depth, 75 m from the shore on the western side of the lake basin (Fig. 3A).



**Figure 2. *Crassula helmsii* growing on the shore of Lough Gowna North**



**Figure 3. Location of *Crassula helmsii* records (white dots) found in Lough Gowna and Lough Caragh in 2023**



*Crassula helmsii* was also discovered in 2023 in Lough Caragh, Co. Kerry (Latitude: 52.055559; Longitude: -9.856714) (v.c.H1). Here it was found growing in 2 m of water, 50 m from the shore (Fig. 3B). This location is close to the public slipway, which is a launch point for recreational craft and swimmers. A relatively small amount of the plant was found and searching in the immediate area yielded no extra material. There are other records of *C. helmsii* in County Kerry although there is no previous record for it in any water body hydrologically connected to Lough Caragh (BSBI, 2020).

## Discussion

Given its high-risk status as a nuisance species it is concerning to find *C. helmsii* in Lough Gowna. The macrophyte surveys carried out by the EPA on each lake every three years are not whole lake assessments but are at fixed transect locations. Eighteen transects were sampled in Lough Gowna in June 2023. This lake has a surface area of 11.5 km<sup>2</sup>. Finding *C. helmsii* at two of the 18 locations sampled, and its presence in both north and south basins, suggests this invasive plant may already have a broad foothold in the lake. Because Lough Gowna is the uppermost lake on the river Erne system the presence of the species poses a threat to both the Erne system and the broader Shannon-Erne river system given its ability to regenerate from small vegetative fragments. There are two records of *C. helmsii* in Enniskillen upstream of Lough Erne, however these were not recorded in the main channel (BSBI, 2020).

Similarly, Lough Caragh has a surface area of almost 5 km<sup>2</sup>. Finding *C. helmsii* at one of the six fixed transect locations sampled suggests it may already be more widespread in the lake than was found on the day. Other records for *C. helmsii* in Co. Kerry include the golf course in Castlegregory, 25 km north as the crow flies on the Dingle Peninsula and adjacent to the roadside in the National Park in Killarney, 22 km south on the Iveragh Peninsula (Fig. 1). Its presence in three adjacent public recreation areas suggests the possibility of human mediated species spread among the three sites, although the actual cause of the spread will likely never be conclusively known.

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