Roinn Cumarsáide, Gníomhaithe ar son na hAeráide & Comhshaoil
Department of Communications, Climate Action & Environment

Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

Hydrological Update on Lough Funshinagh, Co. Roscommon 18TH April 2017

Context

Data and information presented in this document were generated as part of the GWFlood project, a new collaborative project commenced by the Geological Survey to investigate flooding specifically related to groundwater and turloughs. This project will provide the essential technical knowledge through the monitoring, mapping and modelling of turloughs to provide decision makers and relevant stakeholders with greater information on the drivers and mechanisms of groundwater flooding, enabling them to make scientifically-informed decisions regarding flood mitigation measures.

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Water Level Update

Lough Funshinagh has seen relatively sustained drainage throughout the second half of 2016 and early 2017 (figure 1), due to below-average rainfall over the autumn and winter period. Water levels fell to a minimum of 66.4 mAOD in mid-February, rose to 66.77 mAOD in mid-March and have started receding again with a recent water level of 66.71 mAOD. A summary of water levels and volumes within Lough Funshinagh, as of 5th April 2017, are provided in table 1 below. Current water levels are approximately the same as the 2009/2010 flood peak level, 1.5 m below the 2015/2016 peak. This corresponds to a flood volume reduction of approximately 6.5 Mm^3 since March/April 2016.

Table 1: Summary of current water level and volume within Lough Funshinagh, Co. Roscommon.

Latest Water Level (5th Apr 2017)	66.71 mAOD
2015/2016 Peak Water Level	68.25 mAOD
Difference	**1.54 m**

Current Volume (15th Mar 2017)	7.73 Mm^3
2015/2016 Peak Volume	14.24 Mm^3
Difference	**6.51 Mm^3**

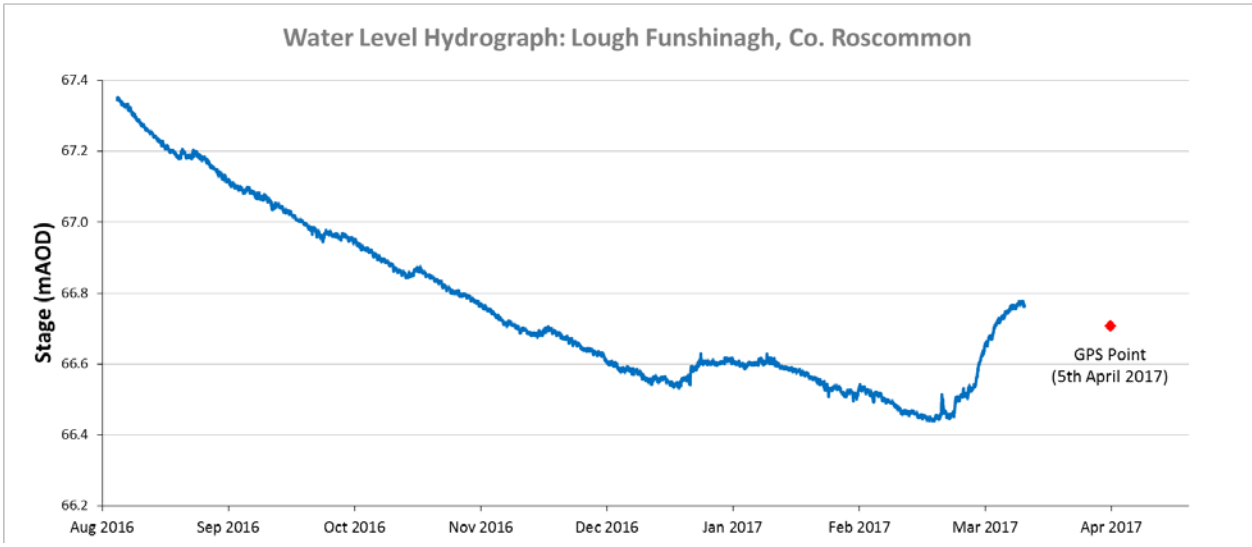

Fig. 1: Water level hydrograph for Lough Funshinagh, Co. Roscommon.

Hydrological Assessment Update

OSI mapping of Lough Funshinagh shows five streams entering the turlough, the largest of which is included in the EPA's hydrometric network (see figure 2). Preliminary analysis of datasets from this station and the GWFlood monitoring station indicates that during filling events, the turlough can receive greater than 40% of its net change in volume from this stream alone. For example, see figure 3 (river discharge is shown in red while turlough volume is shown in blue). Over the period indicated, 514,500 m^3 enters the turlough via the river and the net volume increase in the turlough is 1,226,000 m^3. This accounts for 42% of the net volume increase. Considering the turlough has four more ungauged (albeit smaller) rivers entering it, it is likely that the turlough receives the majority of its recharge from surface water sources.

Fig. 2: Lough Funshinagh surface input features & monitoring stations.

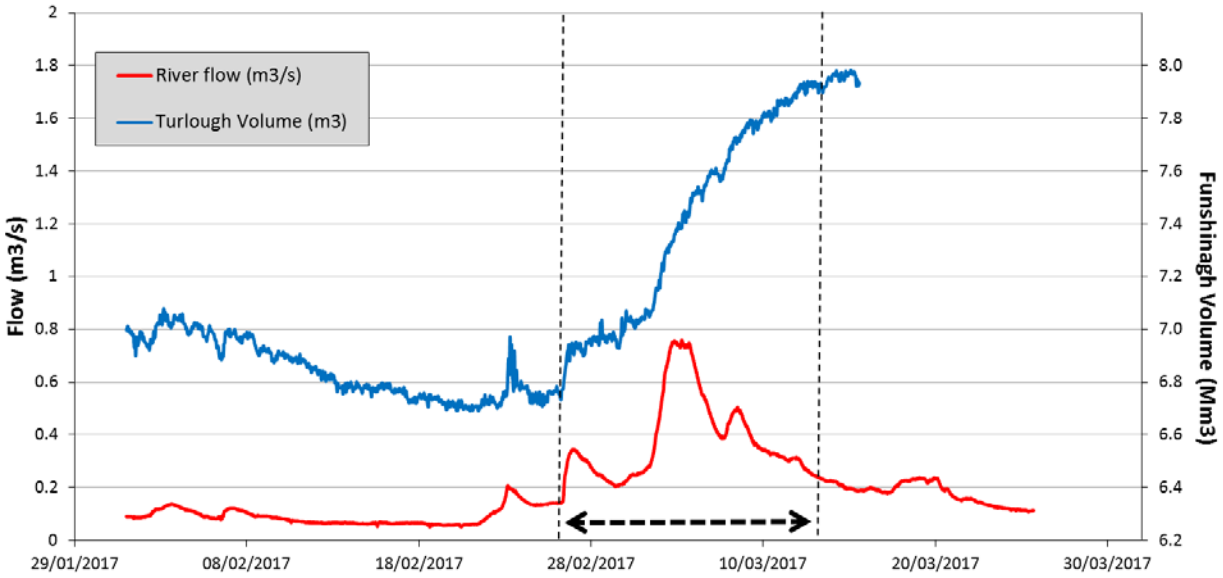

Fig. 3: Lough Funshinagh volume and river inflow comparison, January-March 2017.

Over the GWFlood monitoring period, the rate of inflow into Funshinagh was observed at up to 1.8m^3/s during flooding periods. The rate of drainage during recession was smaller, reaching a maximum of only 0.5m^3/s. These rates of inflow and outflow are comparable with other typically sized turloughs around the country. Funshinagh however is one of the largest turloughs in Ireland, and when compared to a similarly large (and also surface water fed) turlough such as Coole Turlough in Co. Galway, the rates of inflow and outflow at Funshinagh are significantly lower. Over the 2015/2016 flood season, Coole received average daily inflows up to 13.5m^3/s in December 2015 and drained at average daily rates of up to 3.7m^3/s during the subsequent recession. Lough Funshinagh is thus much slower to flood and to drain than similarly large turloughs. This reduced drainage capacity is pivotal to prolonged flood patterns of Lough Funshinagh, and is the reason the turlough is rarely completely empty.

Based on maximum observed average daily outflow rates over 2015/2016 flood season, and assuming these outflow rates lasted throughout the recession, Coole turlough has the hydraulic capacity to completely empty from the 2015/2016 maximum within 77 days. Lough Funshinagh however would require approximately 320 days to drain. In reality drainage in Lough Funshinagh has been found to decrease with falling water levels, so the actual drainage rate would be significantly lower than the maximum. Using a more realistic rate of drainage, such as that observed when Lough Funshinagh was receding during August-December 2016, Lough Funshinagh would require over 600 days to drain until empty (assuming there are no flood events). Based on these assumptions, Lough Funshinagh could take a number of years to recover from the peak levels in early 2016. However, the winter of 2016/2017 was unusually dry. There was no significant increase in lake levels due to the seasonal rainfall and as a result, Lough Funshinagh has dropped to levels comparable with those directly after the 2009 floods. Considering that after the 2009 floods, water levels had receded to near empty levels of approx. 64.5-65m (based on Landsat imagery) by the following autumn (2010), it is possible that, with a dry summer, Lough Funshinagh could continue to drop and reach “normal” flood levels before the start of the 2017/2018 flood season. This would essentially mean that Funshinagh has ‘reset’ after the 2015/2016 flood event. It should be noted however that even without the ‘reset’ occurring, the current situation is unlike the start of winter 2016/2017 in which an average winter’s rainfall would have caused a flood risk to homes. In 2017, it would take above average rainfall to cause flood risk to homes during the oncoming flood season.

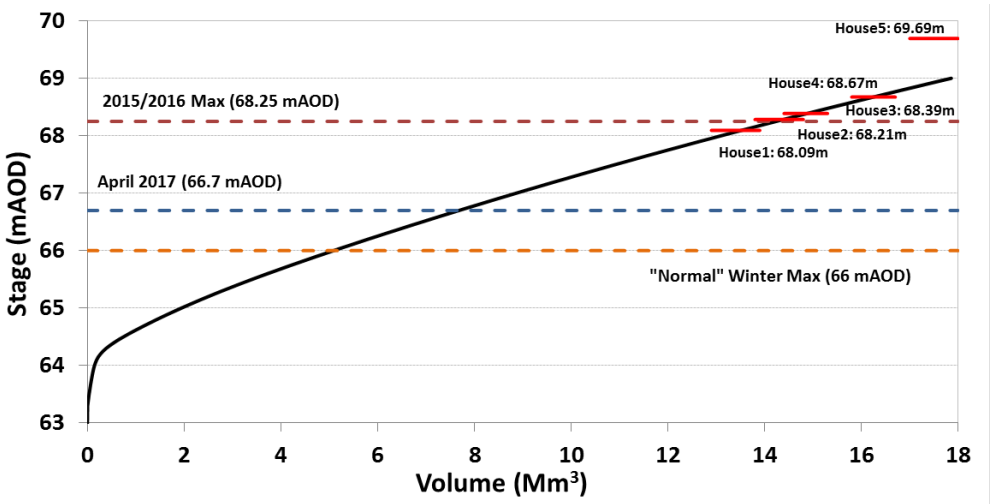

Fig. 3: Stage-volume curve and flood receptors (finished floor level) for Lough Funshinagh.

Land Availability due to Sustained Flooding

The sustained nature of flooding around Lough Funshinagh means that significant portions of previously eligible land have not been available to farm payment applicants during the last year, and so may not comply with the rules on land eligibility under the various EU payment schemes. However, these temporarily ineligible lands may be appealed at a regional level on the grounds of force majeure.

The sustained flooding that persisted around Lough Funshinagh throughout 2016 does not represent the natural level for the lake, but is a legacy of the unprecedented rainfall which occurred during the winter of 2015/2016. The amount of water within the lake in 2015/2016 was approximately 15 million m^3, or around twice the volume of the previous peak from 2009. As described above, the groundwater flow system which drains Lough Funshinagh does so at relatively slow rate compared to its overall size, and so lake levels remained high throughout 2016 as floodwaters slowly drained away. However, given sufficient time and no further extreme events, the floodwaters should recede and the lake boundary return to "normal" levels. This could potentially occur as soon as winter 2017/2018. Therefore, any areas that were previously deemed as eligible agriculture land should remain so as, despite over a year passing since the storms of 2015/2016, their unavailability still represents a force majeure event.