F-MAPT: Flooding Measures Automatic Placement Tool. Assessing the strategic placement of Natural Flood Management measures in farmed landscapes to deliver ecosystem services.

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In response to increasing flood risk across Europe, Natural Flood Management (NFM) represents a valid option to reduce flood risk alongside traditional techniques. The intensification of agriculture can increase the downstream peak discharge. However, downstream lands can benefit from upstream NFM measures and, at the same time, enhance several UN Sustainable Development Goals such as nutrient and sediment retention. For these reasons Natural Flood Management (NFM) is gaining momentum as an option for managing flood risk. Generally, before NFM is installed within a catchment, practitioners carry out modelling and opportunity mapping in order to determine where best to install NFM. There are numerous decision support tools which help practitioners locate measures through opportunity mapping approaches, however, these maps generally identify coarse grid cells rather than the actual specific location and metrics of the proposed NFM measure. Therefore, there is a need for tools that indicate the specific place for a measure to be located. The output from these tools should be used in engagement for discussions with landowners. One type of measure not previously explored by any GIS toolkit approach is overland flow disconnection bunds within rural landscapes. These measures temporarily store overland flow generated within farmed fields thereby managing flood runoff. These features can capture fine sediments that are a result of soil erosion from farmland. Here we describe an open source GIS workflow that can be used to locate overland flow disconnection bunds in the farmed landscape, the specific objectives being to define the best location a measure should be placed and to determine the volume of each measure, ease of construction and its effectiveness. The workflow was tested in a small Scottish catchment (Balruddery) accompanied by a field survey. The comparison between measures identified by the on-the-ground survey and identified by the GIS workflow proved the validity of the GIS approach. Results gained positive feedback from stakeholders and were considered as a platform for integration of other ecosystem services with the NFM functions to contribute the achievement of the UN SDGs particularly working towards application in bigger areas. We also discuss ongoing development to further enhance the toolkit.