FloodMAP and EA FRM Land Management Funding

Upland Hydrology Group Meeting

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FloodMAP

- Known peat restoration links at a local scale:
  - Biodiversity
  - Habitat protection
  - Carbon sequestration
  - Discolouration of water
  - Hydrology
- No evidence that these impacts scale up

FloodMAP

- Hydrological Benefits of Peat Restoration
  - Flood risk: reduce and manage the risk, CFMP actions
  - Water resources: CAMS
  - Fisheries: reduce sediment into rivers, complies with WFD
- Links to EA Corporate Strategy and Vision

FloodMAP- Basic Aims

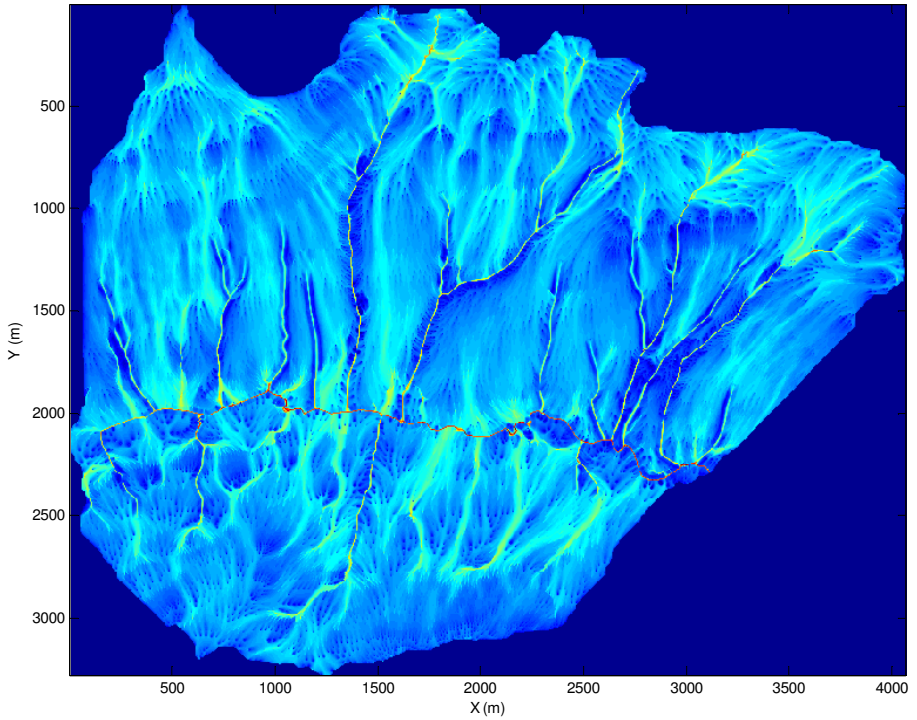
- To produce a model, to explore grip blocking effects on downstream flood risk
- To provide the model in a simple and easy to use format (SAGA GIS)
- To understand how the model behaves using a test catchment
- To assess whether or not grips impact on flood risk (and low flows)

FloodMAP- The model

- The model sits within SCIMAP
- Runs in SAGA GIS, a free GIS resource
- Trial catchment Oughtershaw, upper Wharfedale
- Assesses the time a pocket of water falling across a catchment takes to reach the outlet
- Grips then added and run again
- Two modelled hydrographs showing the difference between gripped and ungripped

FloodMAP- The outputs

- Estimated topographic index without grips (blue dry to red wet)



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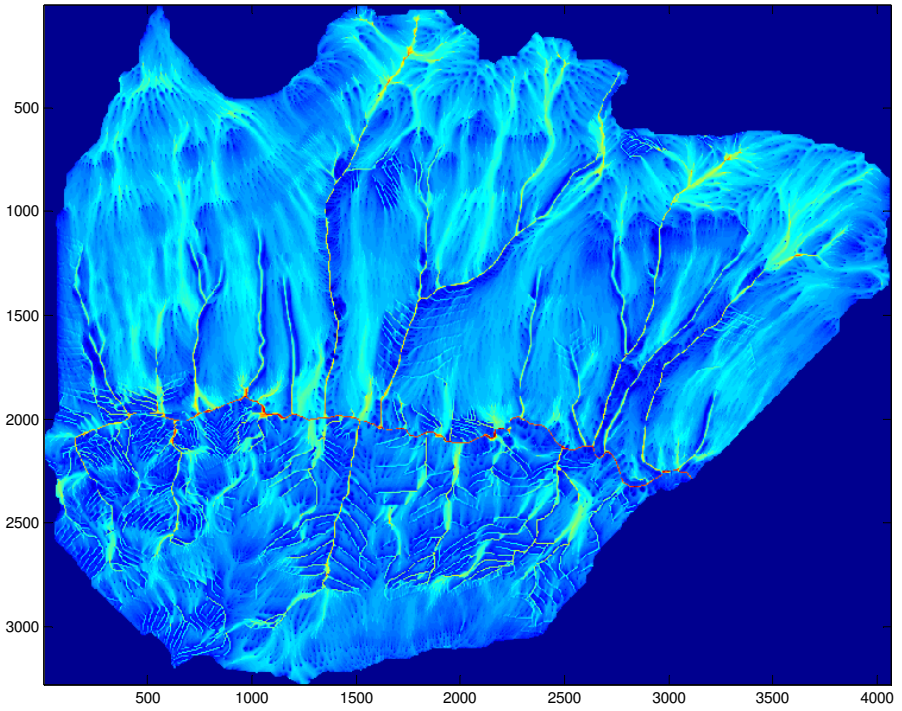
FloodMAP- The outputs

- Estimated topographic index with grips (blue dry to red wet)



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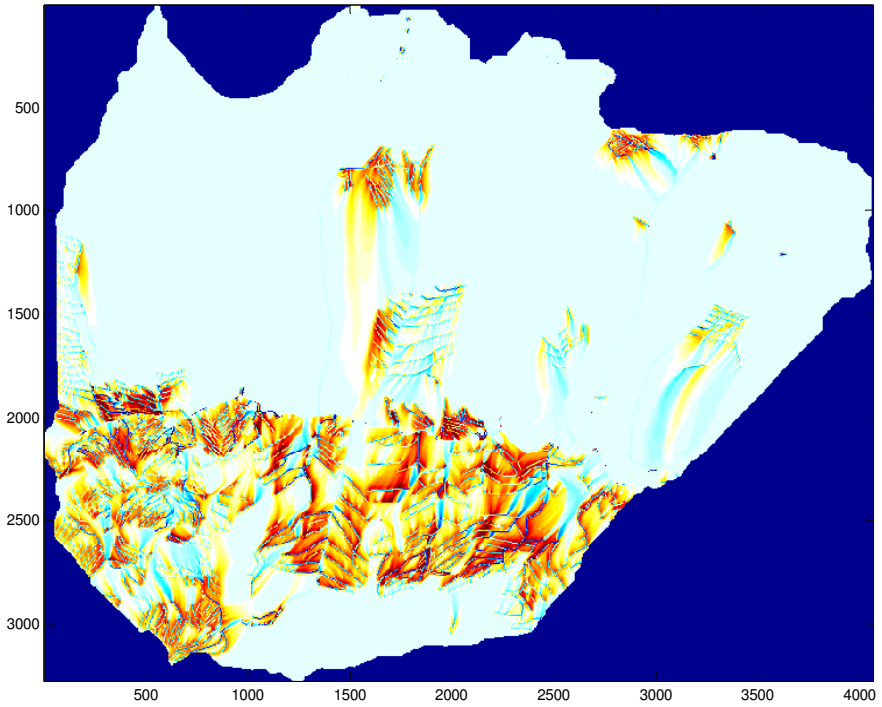
FloodMAP- The outputs

- Associated change in topographic index based on soil moisture changes (red drying, blue wetting)



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FloodMAP- Data and IT requirements

Datasets:

1. Rainfall [hourly]
2. Discharge [hourly] - calibration or checking
3. Topography [< 3 m precision <10 m resolution]
4. Grip network - as a vector shapefile or binary grid

Model Versions:

1. MATLAB – for development; flexible for multiple runs but command line driven and requires 3rd party software. Pre-processing in SAGA.
2. SAGA – for release; free, open source GIS package, fairly intuitive and already familiar to rivers trust.

System Requirements: v low spec, runs on standard 32 bit windows PC

FloodMAP- Conclusions

- In this catchment, with the grip network, using this model
  - Dominant effect of blocking grips at the catchment-scale in relation to flood risk, is to reduce catchment storage and so increase rapid runoff generation
  - Grips have converted peat into well-drained soils
  - Counteracting effect of slowing the flow is comparatively small, primarily because it has a temporally restricted effect
  - But blocking of individual grips, if targeted sensibly, may have some beneficial effects
- Generalising results from this modelled catchment to other catchments must be undertaken with caution as other kinds of grip network may produce varying results

FloodMAP- Limitations and Future Developments

- Grips are either blocked or unblocked
- Groundwater issues
- Gullies
- Data, worked examples

EA FRM Land Management Funding

- Land Management funding is difficult to attain!
- "Land Management" doesn't just mean upland land management
- Corporate Strategy looks to achieve FCRM benefits. Land management is **one solution** that will enable those benefits to be realised

So what can we do……

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EA FRM Land Management Funding

- What does the CFMP say?
- Is there evidence to back up proposal?
- Are there multiple benefits?
- Could the work be done in collaboration?

- WFD funding
- Green Infrastructure
- Local Levy