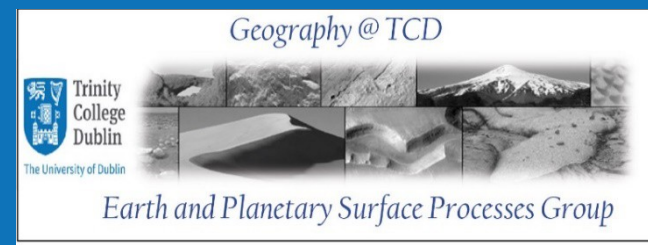




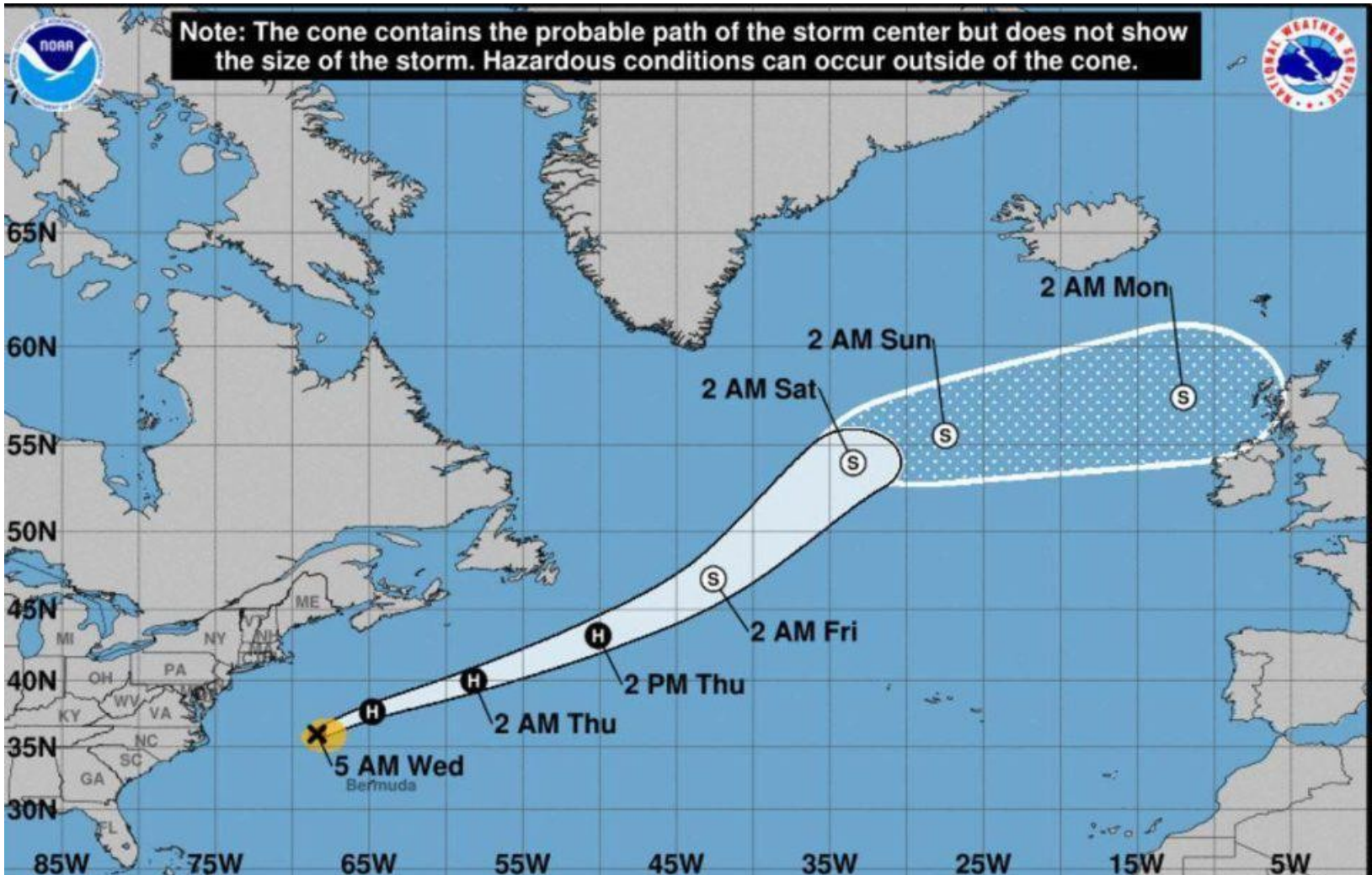
Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin



Professor Mary Bourke
Department of Geography,
Trinity College, Dublin.



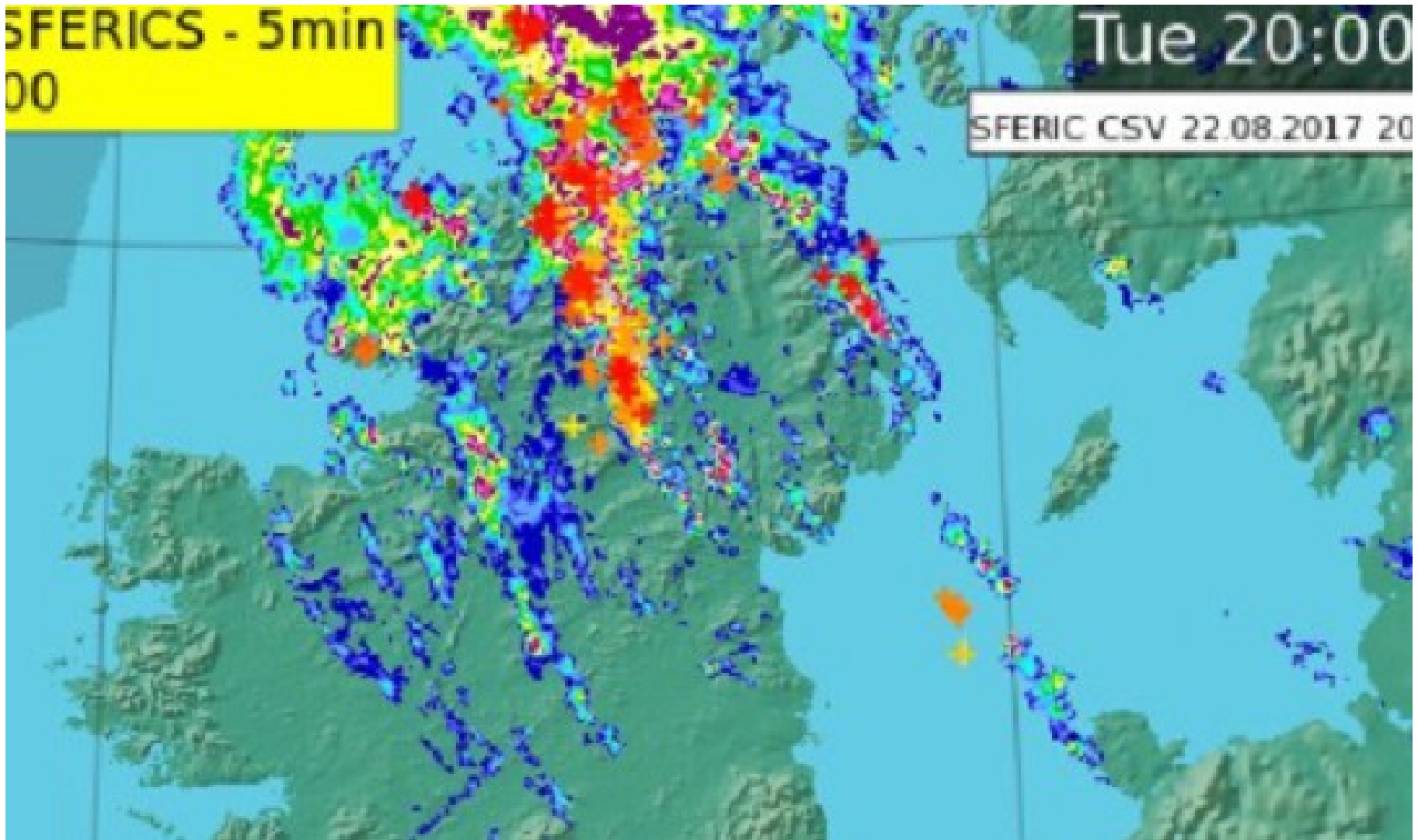
The Storm



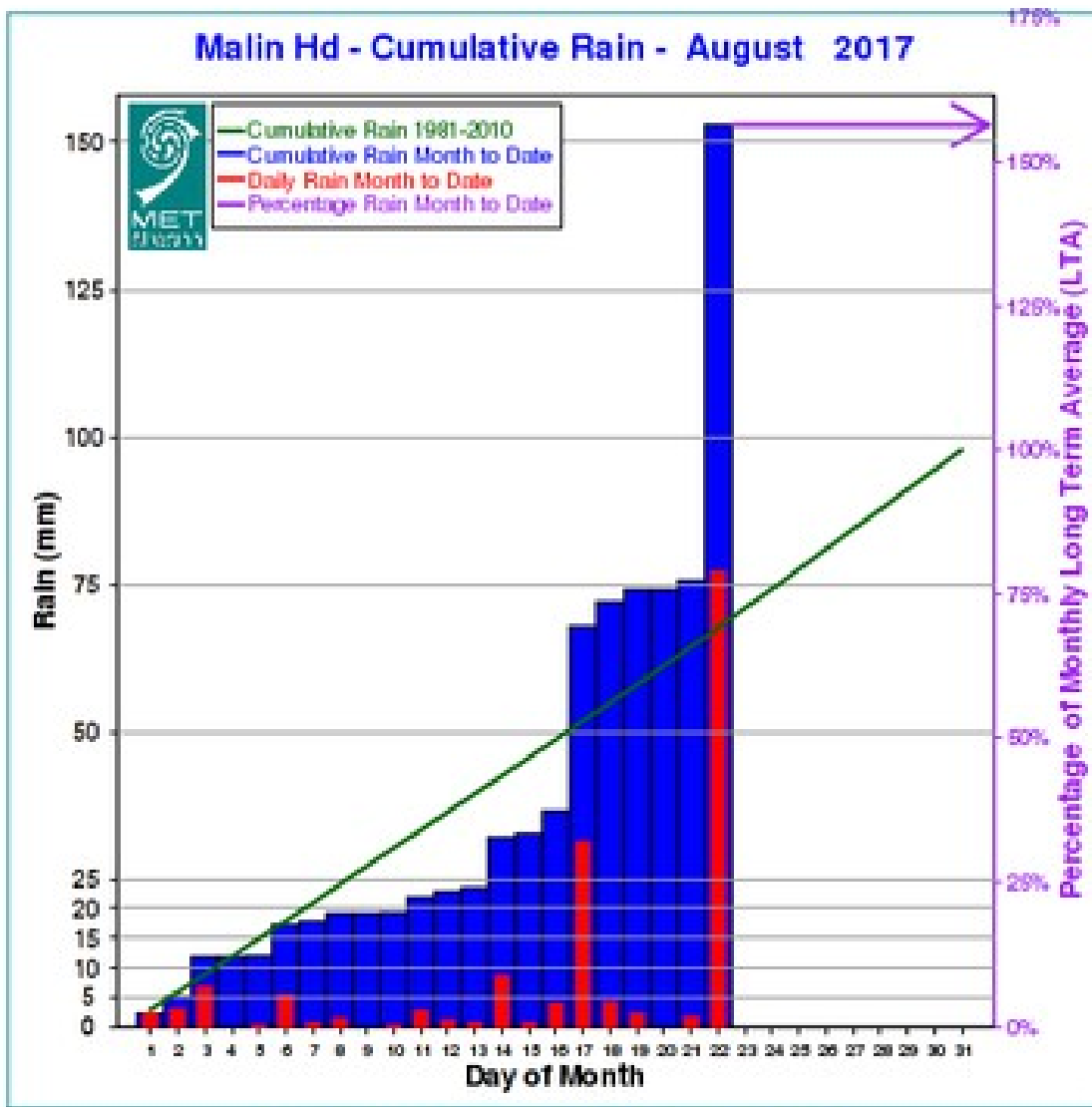
SFERICS - 5min
00

Tue 20:00

SFERIC CSV 22.08.2017 20



- Highest daily rainfall total for Ireland in August 22nd 2017: 77.2 mm
- 63 mm fell in 6 hour period (intense)

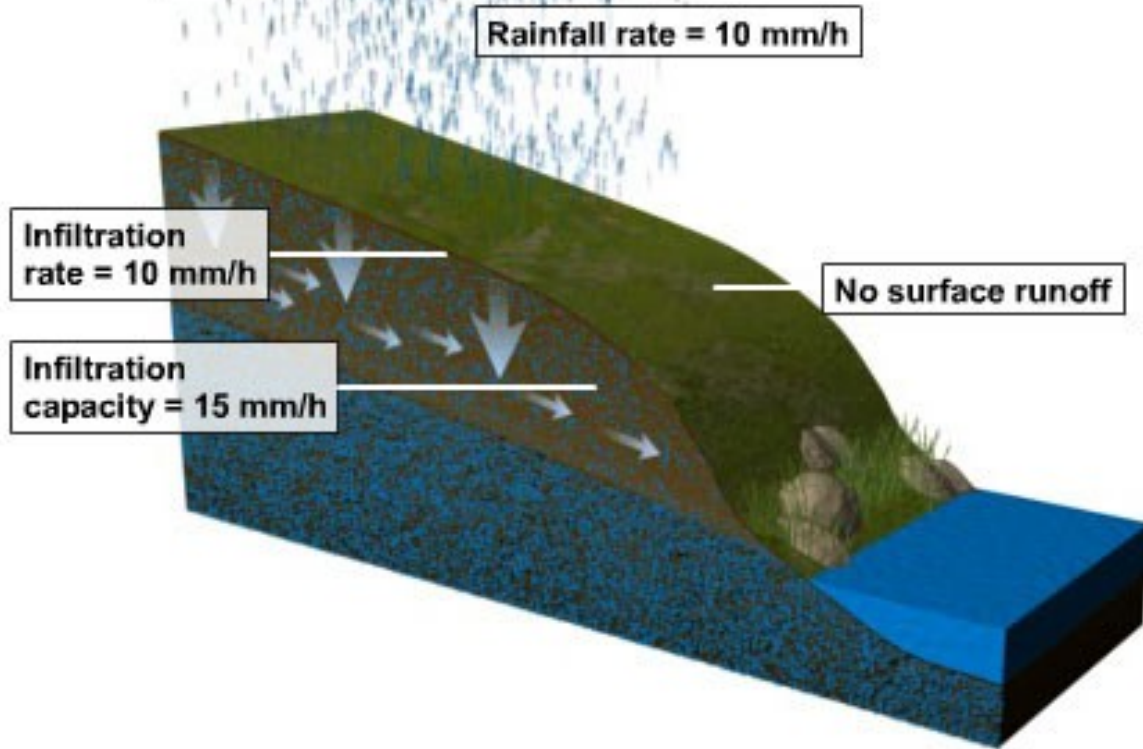


❑ Wettest August since 1992

❑

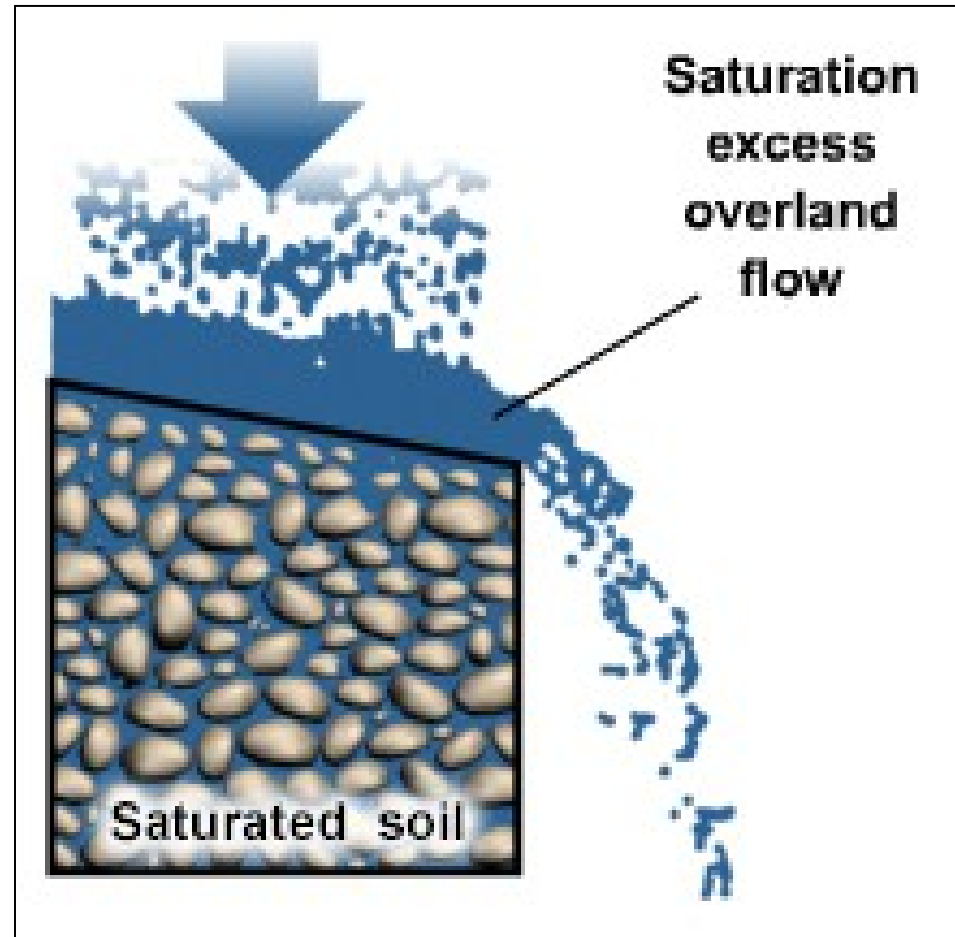
Rainfall-runoff relationships

Relationship between Rainfall, Infiltration, and Runoff
(Rainfall Rate \leq Infiltration Capacity)



Types of surface runoff:

- i) Saturation excess overland flow
(typical in humid climates)

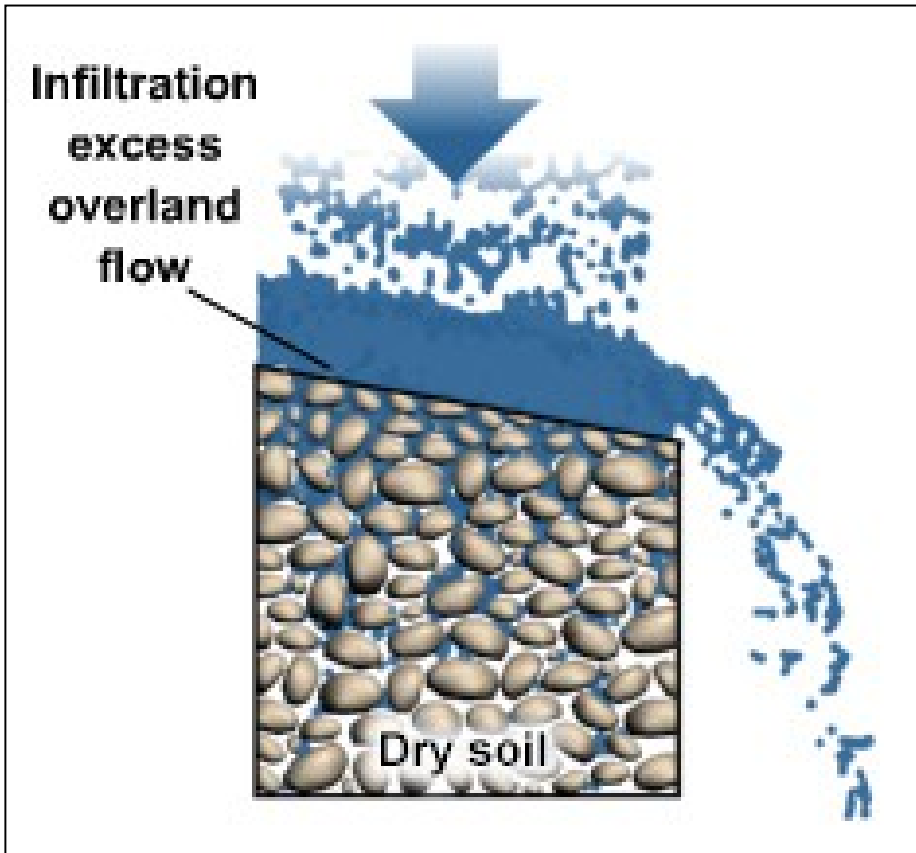


Wet august + low temperatures

Types of surface runoff:

ii) Hortonian overflow.

rainfall exceeds infiltration capacity and depression storage capacity.



Depression storage
has reached capacity

32 mm between 6-8pm = heavy (3) [Violent = >50mm/hr]

1% probability
1 % change of occurring each year

NEWS

SPORT

BUSINESS

OPINION

LIFE & STYLE

CULTURE

Environment > Heritage & Habitat | Illegal Dumping | Water Charges

‘Once in a 100 years’ extreme weather event caused Donegal flooding

Intensity of rainfall overwhelmed drainage systems and destroyed bridges, says Met Éireann

It classified as a single event within the normal variability of weather patterns

The effects



Roads become rivers, roughness causes erosion, soil loss from fields, gravel deposits onto road networks from rivers and from runoff



Gullying of access tracks



Silt, sand, deposits on roads, walls knocked down.



Large woody debris dams, infrastructure constrictions cause flow diversion & erosion

FLASH FLOODING INISHOWEN 22/8/2017



Floodplain stripping & deposition



Floodplain scour (Buncrana heritage trail)

Flood Damage, Buncrana 2017



18th C ? Bridge damaged



Landslides



River flood timing (1960-2010)

The flooding season is extended in Ireland

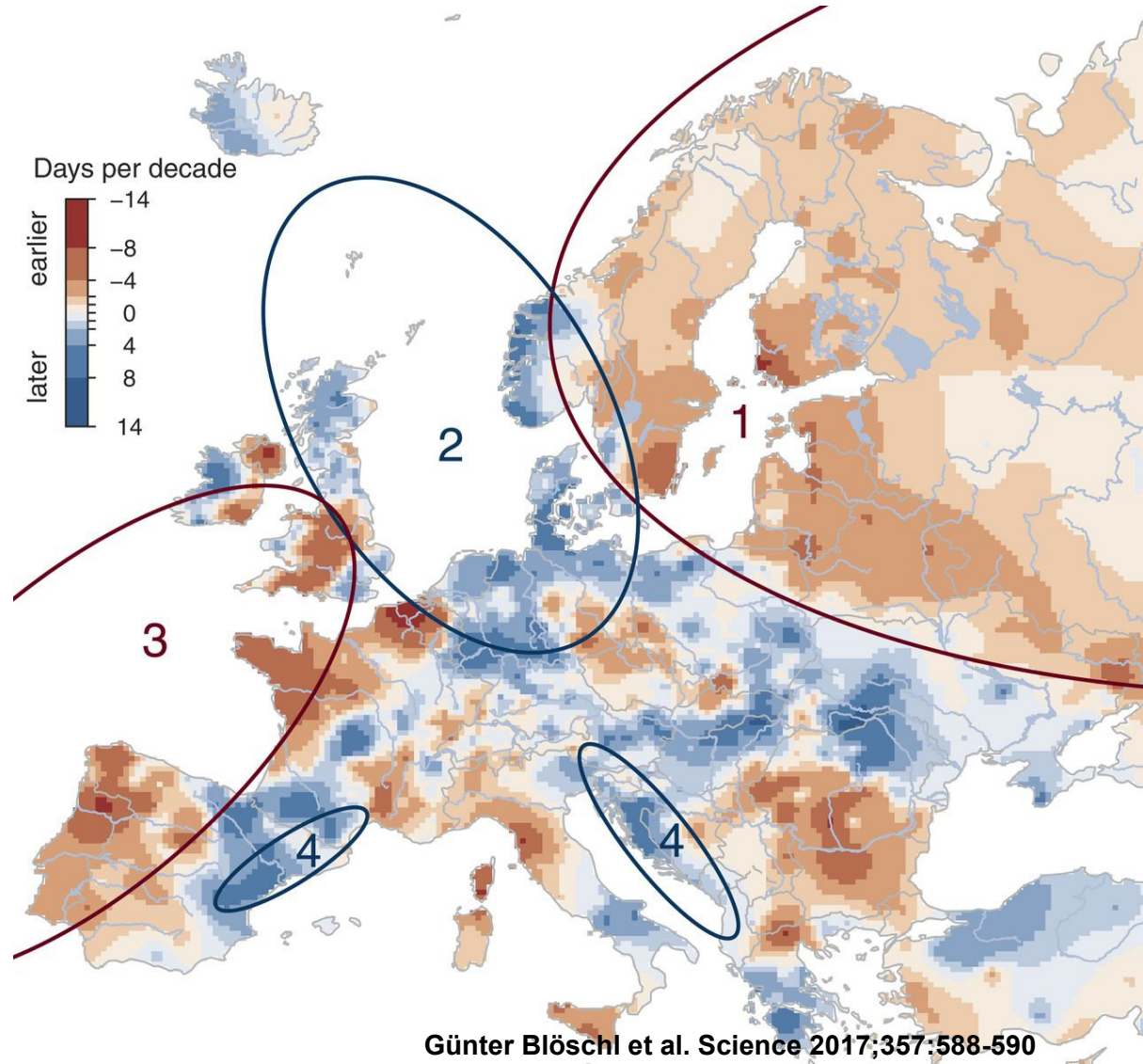
floods

1. Earlier snowmelt

2. later winter storms

3. earlier soil moisture maximum

4. stronger Atlantic influence in winter



A Summary of the State of Knowledge on Climate Change Impacts for Ireland

Authors: Margaret Desmond, Phillip O'Brien and Frank McGovern

OBSERVED

Rainfall: increased by 5%

Extreme weather: No change

Flooding: Increasing winter floods

PREDICTED

Rainfall: Decrease in summer & spring

Extreme weather: Fewer storms but more intense. Storm tracks to extend further south.

Flooding: Increasing winter and spring (20%). Decrease in summer

(40%). Increased duration of standing water on poorly drained soils

Impacts for Ireland?

‘Considerable economic and environmental consequences as societies and ecosystems have adapted to the average within-year timing of floods’.

September (Meán Fómhair) middle of *harvest*

October (Deireadh Fómhair) end of *harvest*



The cumulative cost of frequent events (nuisance floods) over time may exceed the costs of the extreme but infrequent events for which societies typically prepare

Leads to public inconvenience such as road closure, overwhelms storm drains and compromises infrastructure.



Natural Flood Management (NFM)

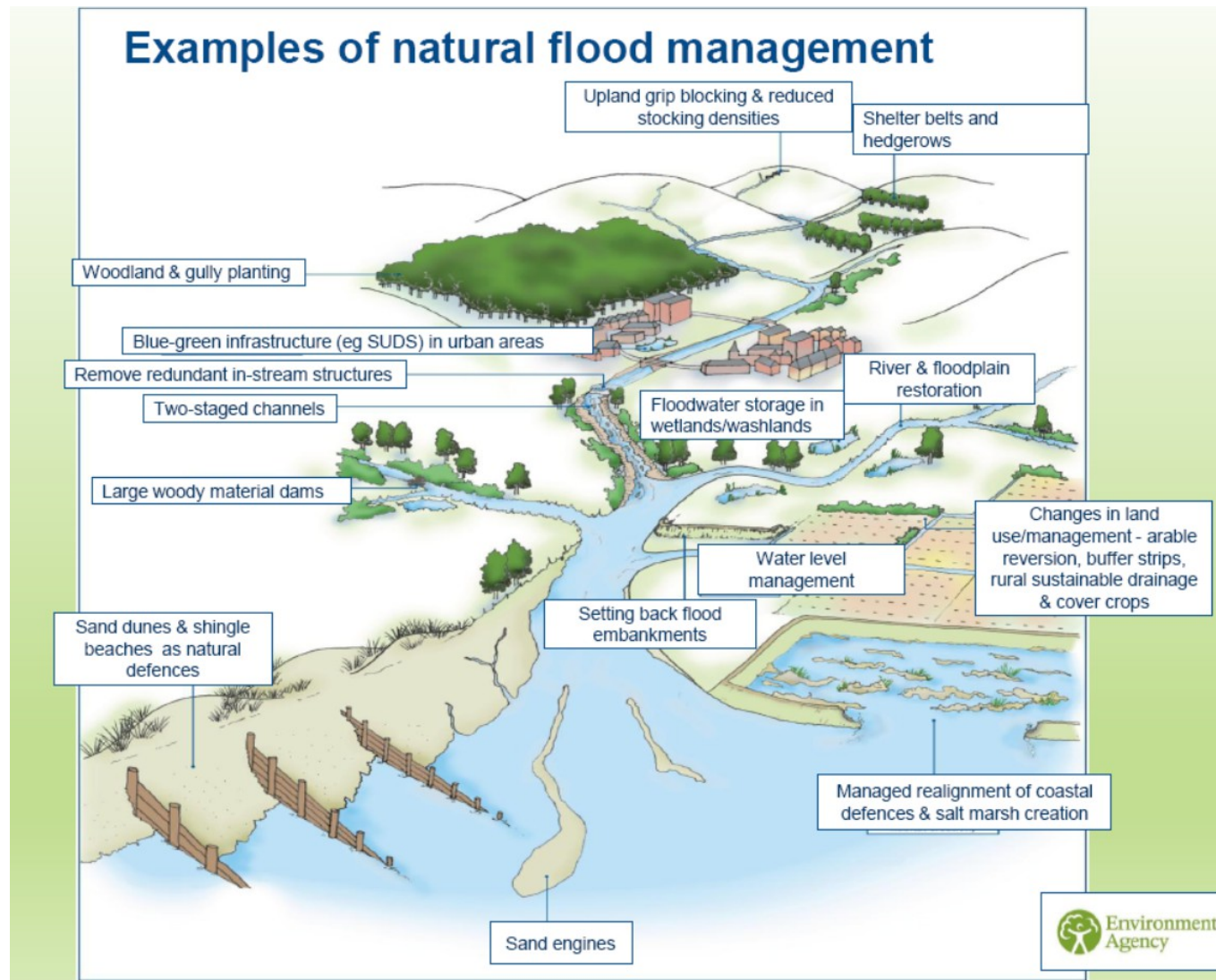
Restore or enhance catchment processes that have been affected by human intervention.

Aim to:

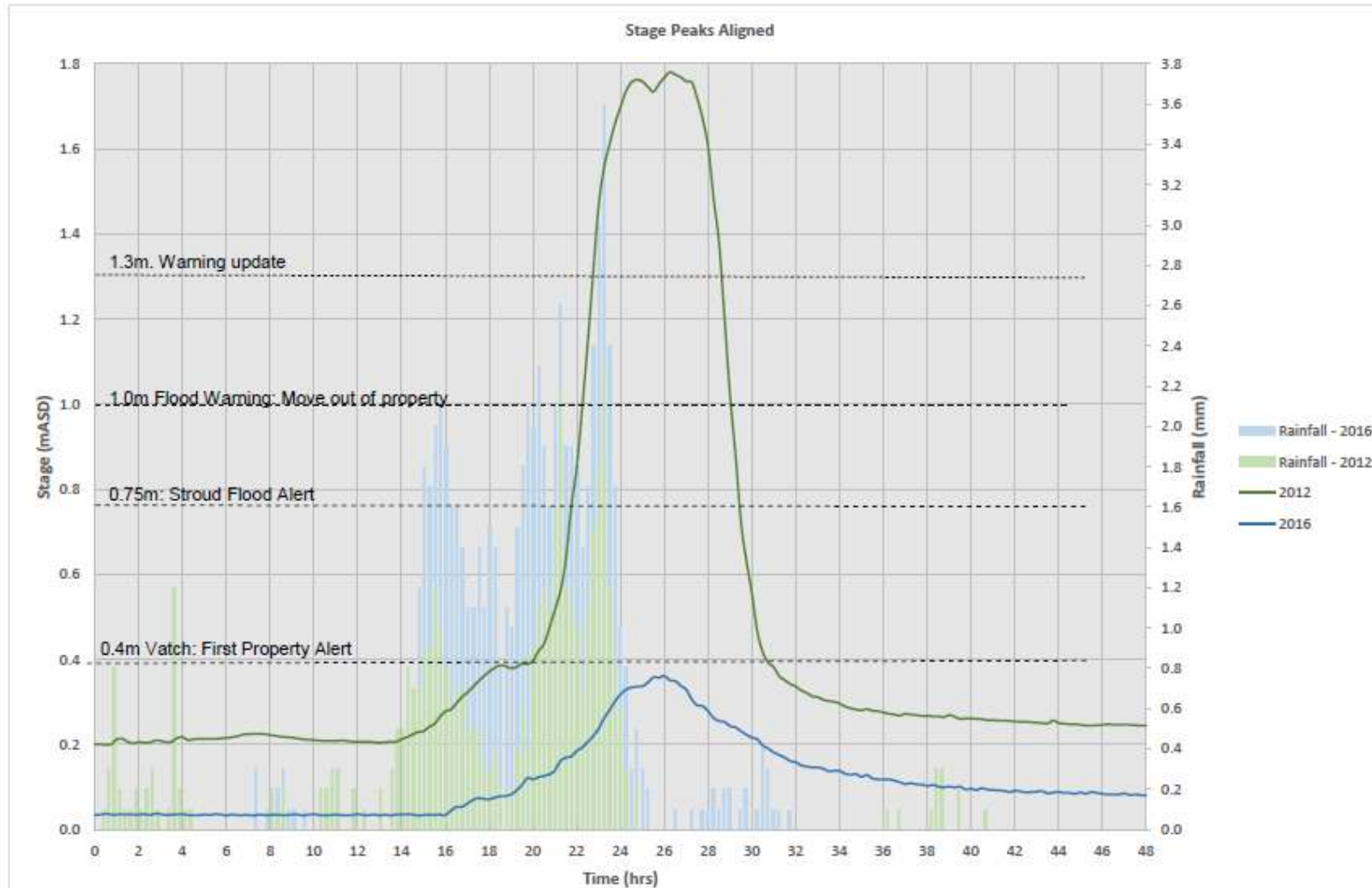
reduce flood hazard



Large number of small interventions dispersed around catchment, low risk, low Cost.



280+ Interventions (170 Large Woody Debris leaky dams in 4 tributaries).
21% of the Stroud Frome catchment discharges through NFM features



Natural Flood Management

Does it work?

- It has been proven for small catchments and lower magnitude floods.
- Don't have the data yet to assess if it is applicable to large catchments OR large magnitude floods.



Other benefits (ecosystem services)

Co-benefits include

- ❖ enhanced biodiversity,
- ❖ improved soil and water quality,
- ❖ carbon sequestration,
- ❖ reduced soil erosion,
- ❖ greater agricultural productivity and
- ❖ improved public health and well-being.