

Anneka France

GIS Analyst – The Rivers Trust

Accessing Data for Water Resource Management Using the CaBA Data Package

Do we have enough water resources to meet the demand?

Investigate the catchment water balance using the Catchment Abstraction Management Strategy

- CAMS Water Resource Availability
- CAMS Reliability

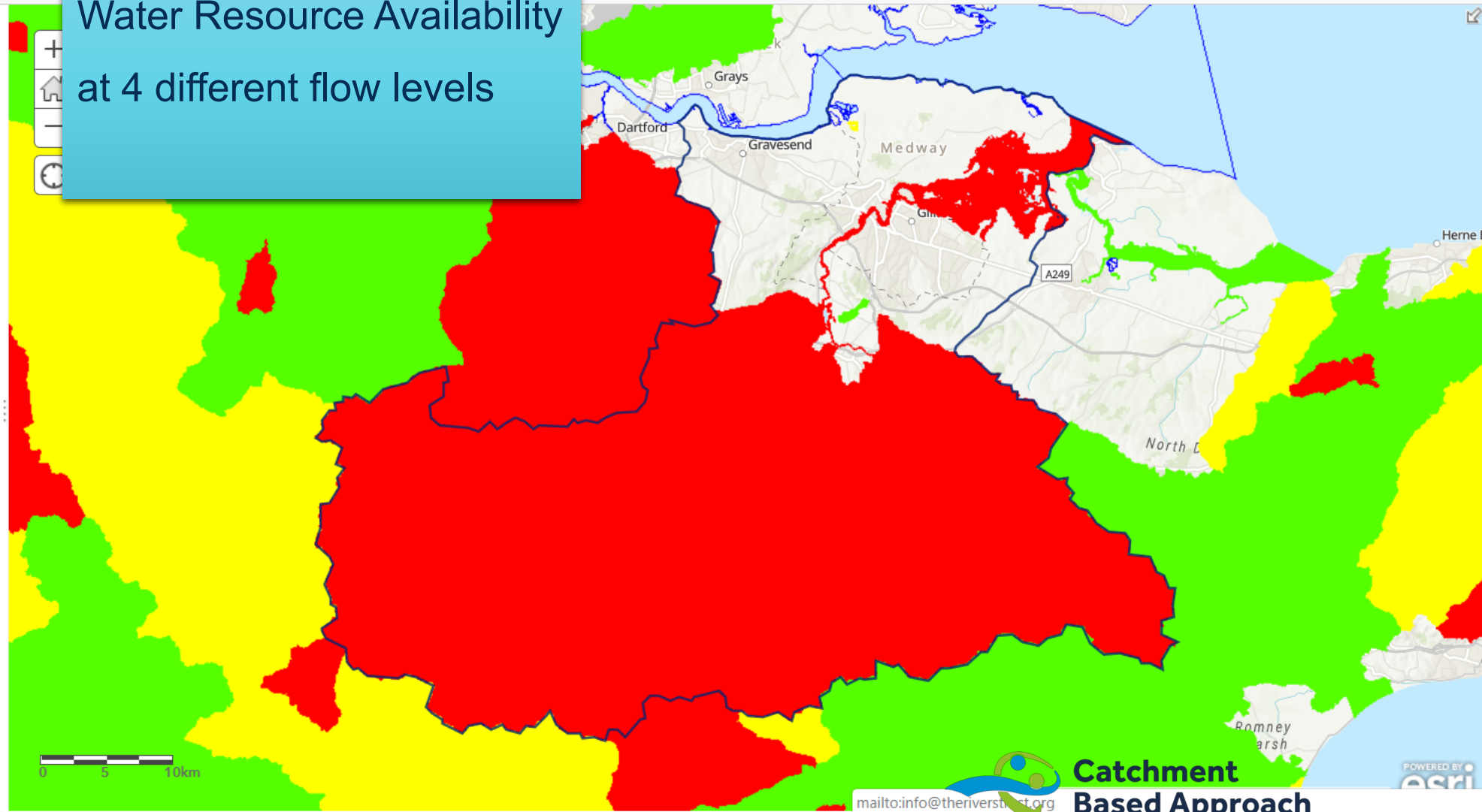
Natural flow – EFI = water available for abstraction

Abstractions vs. discharges

Groundwater & surface water

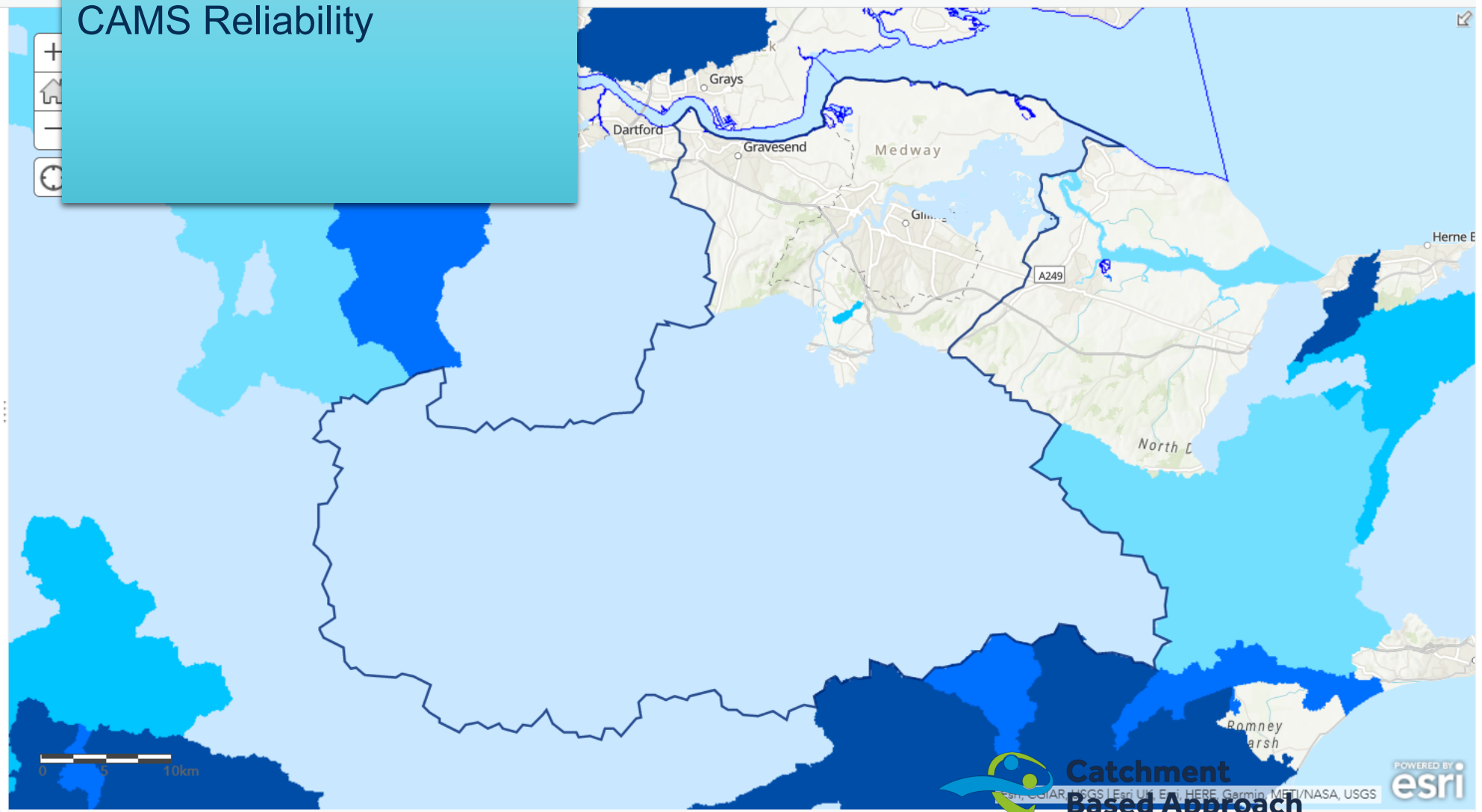
- Water Resource Availability**
- Resource_Availability_at_Q30
- Heavily modified water bodies (and/or discharge rich catchments)
 - Water available for licensing
 - Restricted water available for licensing
 - Water not available for licensing
 - Other

Water Resource Availability
at 4 different flow levels



CAMS Reliability

- Water Resource Abstraction Reliability**
- Resource_Reliability_pct_of_time
- less than 30%
 - at least 30%
 - at least 50%
 - at least 70%
 - at least 95%
 - Other

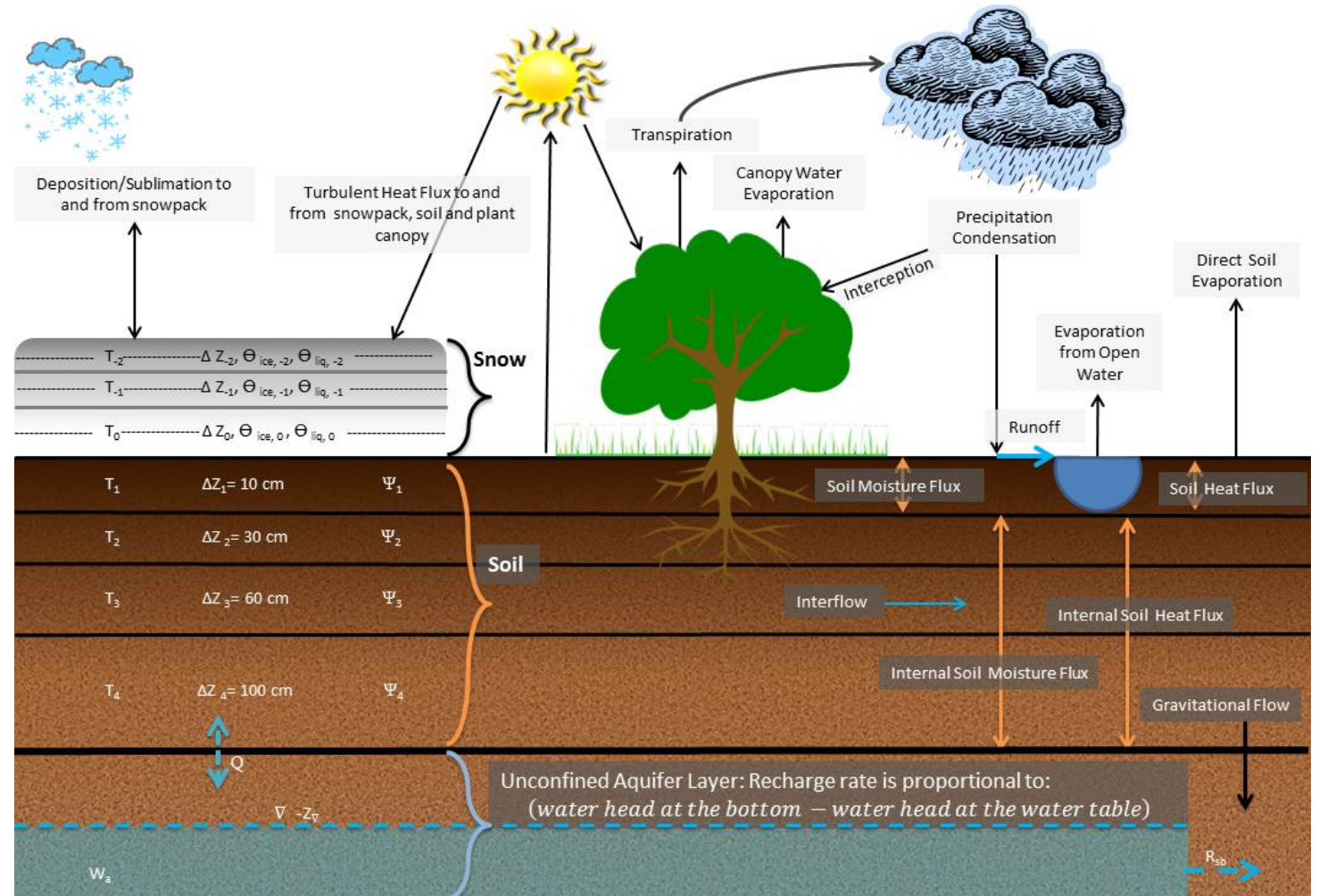


Source

Where does our water come from?

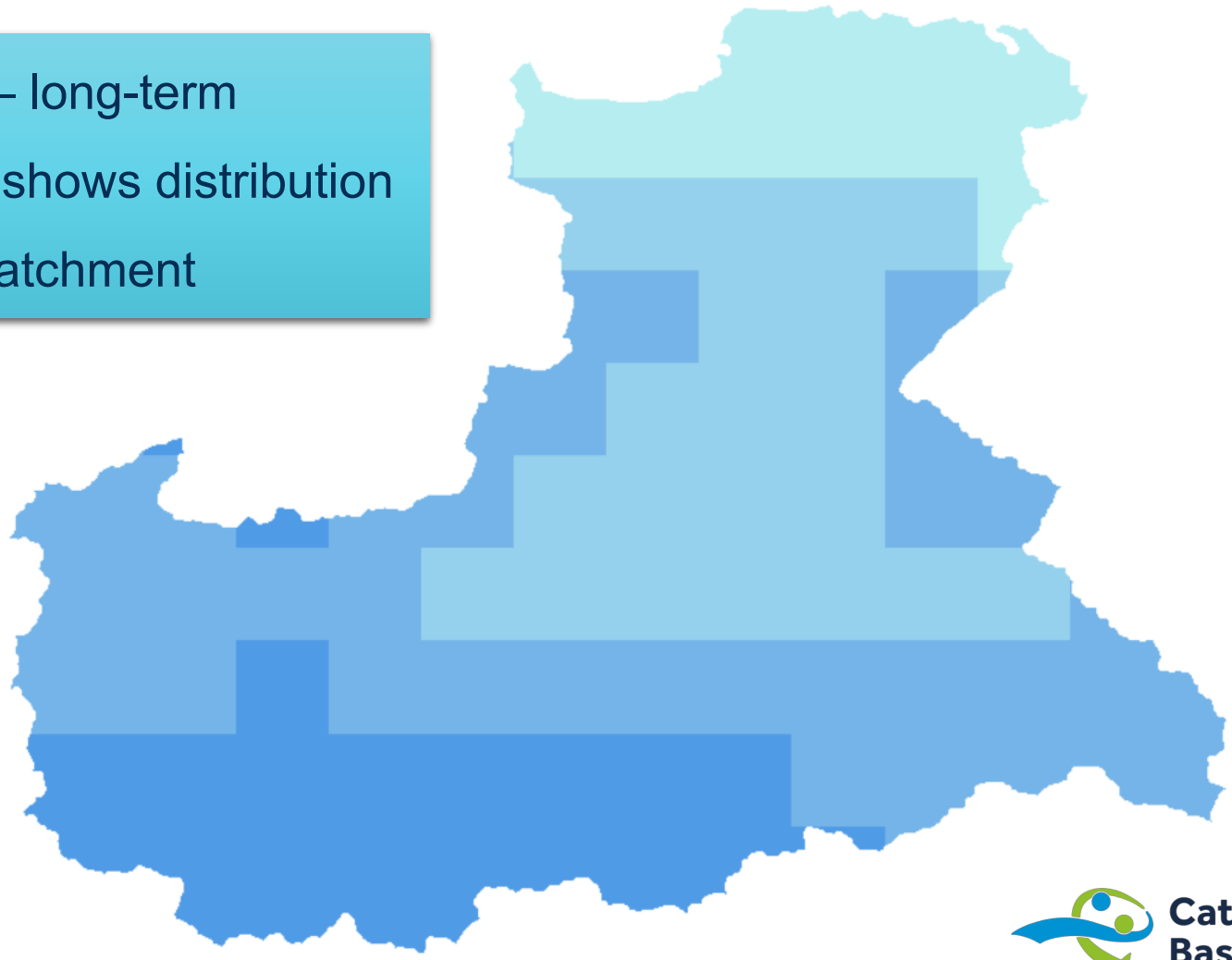
How are our water resources distributed?

Where can they be enhanced?



- CaBA Data Package
 - CaBA Partnership Boundaries 2018
 - 1. What are the opportunities for action?
 - 2. What are the well known issues in the catchment?
 - 3. What are the key characteristics of the catchment?
 - Weather & Climate
 - Annual Average Rainfall 1981-2010 (Met Office) (mm/year)
 - > 3000
 - 2000 to 3000
 - 1500 to 2000
 - 1250 to 1500
 - 1000 to 1250
 - 800 to 1000
 - 700 to 800
 - 600 to 700
 - < 600
 - Land Cover & Land Use
 - Soils & Geology
 - Rivers
 - Groundwater
 - Lakes
 - Estuaries & Coasts
 - 4. What are the possible causes?
 - 5. What actions are being delivered?
 - 6. What Monitoring (third party & Citizen Science) is being
 - 7. Basemapping

Rainfall – long-term average shows distribution across catchment



Details Add Basemap Analysis

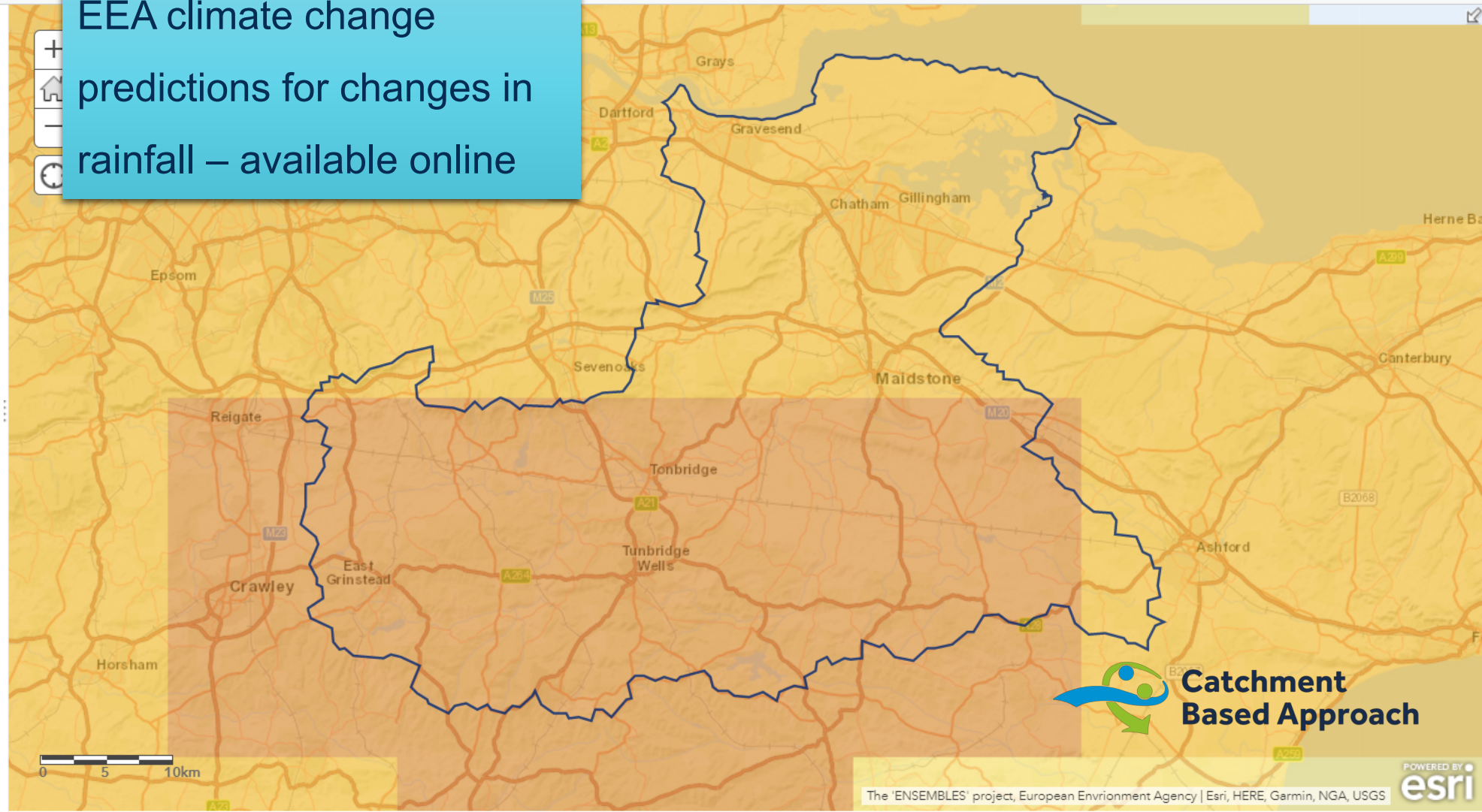
Directions Measure Bookmarks Find address or place

About Content Legend

Legend
Summer Precipitation changes 2071-2100
Projected changes in summer precipitation in percentages under A1B scenario, multi-model ensemble mean for the time periods 2071-2100 relative to 1961-1990 mean.

- Summer Precipitation Change 2071-2100
- < -30
 - 30 - -20
 - 20 - -15
 - 15 - -10
 - 10 - -5
 - 5 - 5
 - 5 - 10
 - 10 - 15
 - 15 - 20
 - > 20

EEA climate change predictions for changes in rainfall – available online



- 3. What are the key characteristics of the catchment? ^
 - Weather & Climate
 - Land Cover & Land Use
 - Land Cover Map 2000 (CEH)
 - Land Cover Map 2007 (CEH)
 - Land Cover Map 2015 (CEH)
 - 0
 - Broadleaved woodland
 - Coniferous woodland
 - Arable and horticulture
 - Improved grassland
 - Neutral grassland
 - Calcareous grassland
 - Acid grassland
 - Fen, Marsh and Swamp
 - Heather
 - Heather grassland
 - Bog
 - Inland rock
 - Saltwater
 - Freshwater
 - Supra-littoral rock
 - Supra-littoral sediment
 - Littoral rock
 - Littoral sediment
 - Saltmarsh
 - Urban
 - Suburban
 - Customer Land Database (CLAD)
 - Priority Habitat Inventory (England) (North) (I
 - Priority Habitat Inventory (England) (Central)
 - Priority Habitat Inventory (England) (South) (I
 - Provisional Agricultural Land Classification (A
 - Crop Map of England 2016 (EA)*
 - Crop Map of England 2017 (EA)*

Landcover– can be used to estimate evapotranspiration

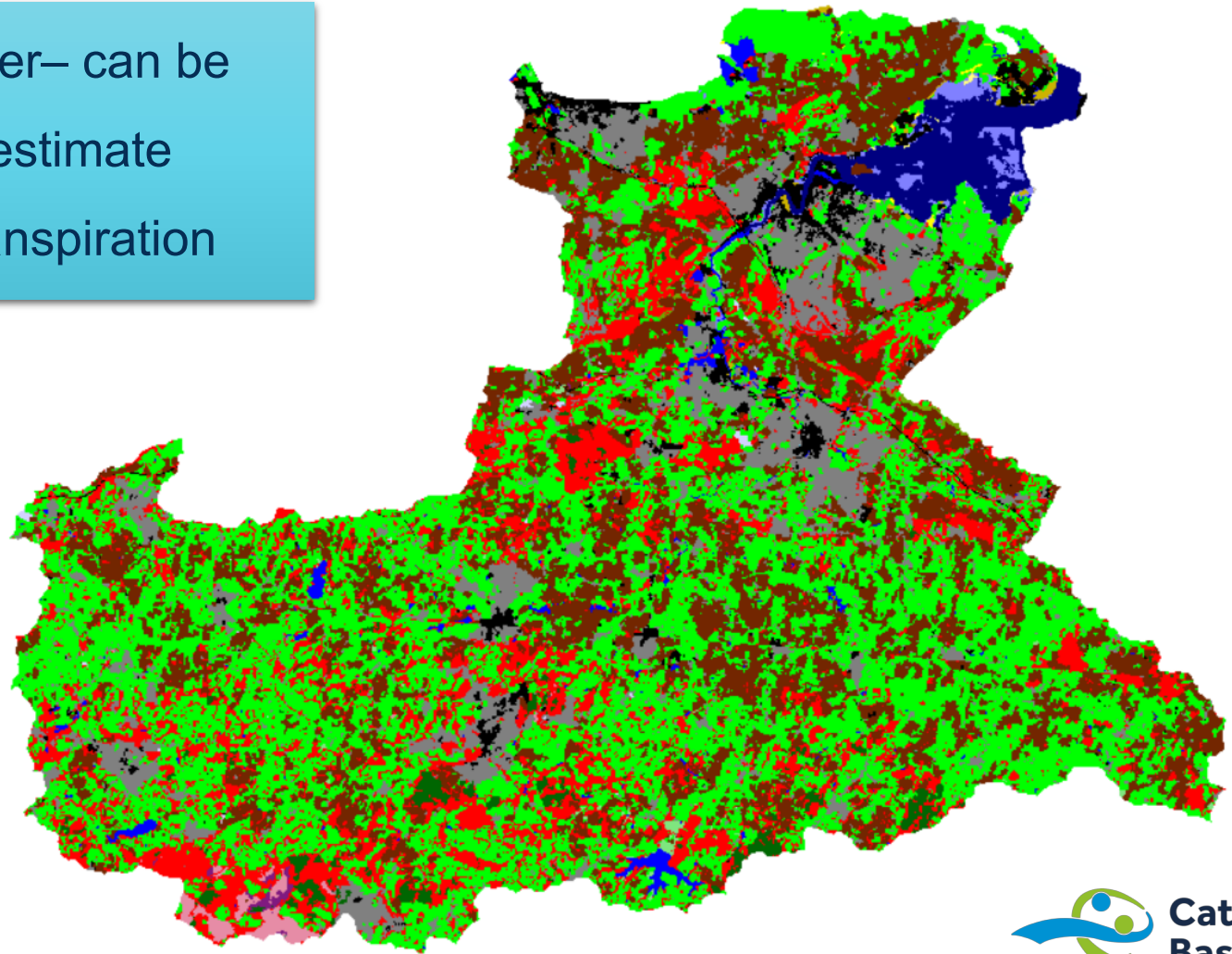
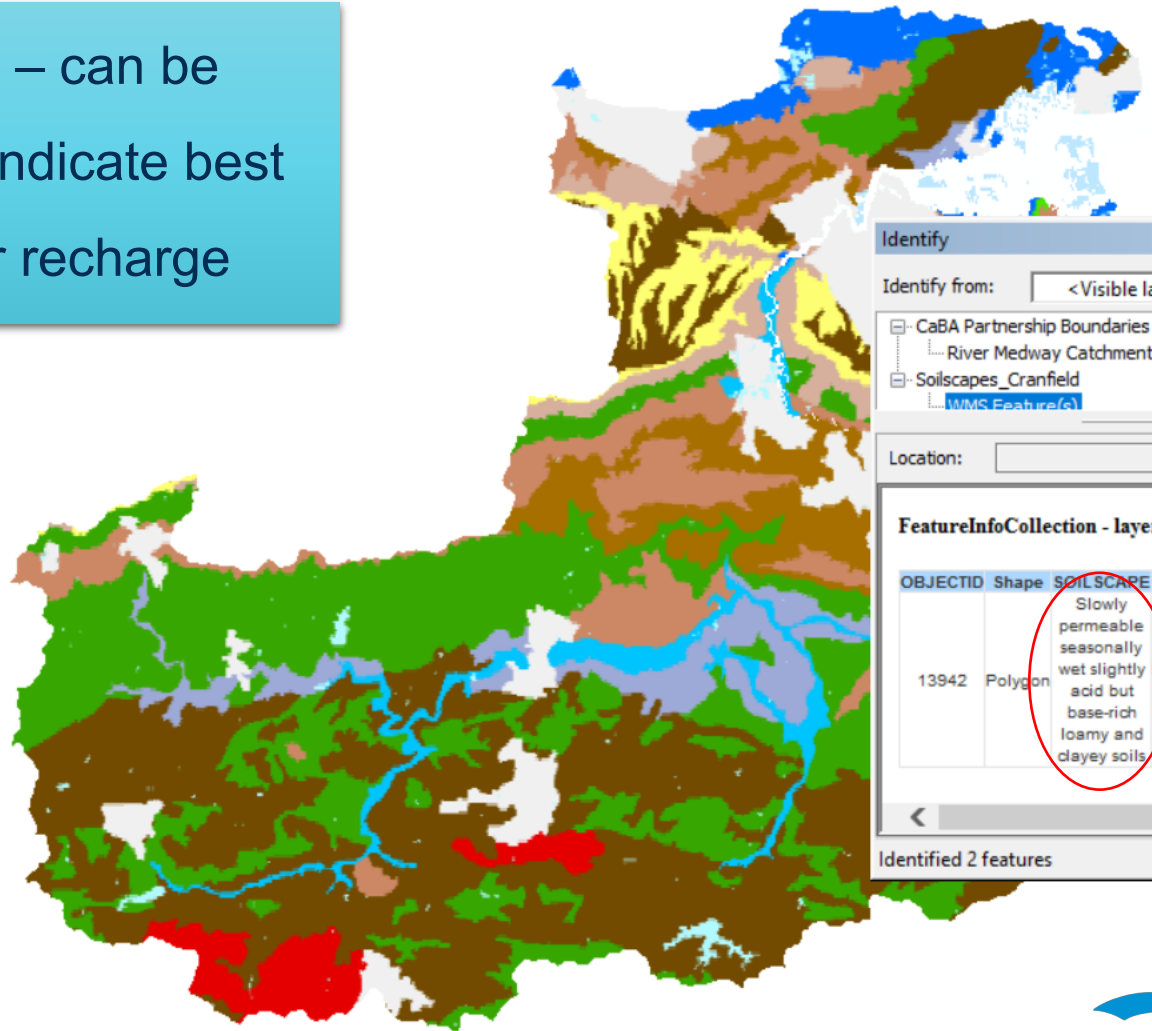


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- CaBA Data Package
 - CaBA Partnership Boundaries 2018
 - 1. What are the opportunities for action?
 - 2. What are the well known issues in the catchment?
 - 3. What are the key characteristics of the catchment?
 - Weather & Climate
 - Land Cover & Land Use
 - Soils & Geology
 - Soils (Cranfield, UK Soil Observatory)*
 - Soil property data (BGS)*
 - Soil Water Management (EU Soils)
 - Rivers
 - Groundwater
 - Lakes
 - Estuaries & Coasts
 - 4. What are the possible causes?
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Soil type – can be used to indicate best areas for recharge



Identify

Identify from: <Visible layers>

- CaBA Partnership Boundaries 2018
 - River Medway Catchment Partnership
- Soils (Cranfield)
 - WMS Feature(s)

Location:

FeatureInfoCollection - layer name: '0'

OBJECTID	Shape	SOILSCAPE	URL
13942	Polygon	Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils	http://www.landis.org.uk/services/soilsgui/ssid=18

Identified 2 features



- CaBA Data Package
 - CaBA Partnership Boundaries 2018
 - 1. What are the opportunities for action?
 - Rural Land Management
 - Urban Land Management
 - Flood Resilience
 - WWNP Riparian Woodland Potential (EA)*
 - WWNP Wider Catchment Woodland Potential (EA)*
 - WWNP Floodplain Woodland Potential (EA)*
 - WWNP Floodplain Reconnection Potential (EA)*
 - WWNP Runoff Attenuation Features 1in30 AEP (EA)*
 - Runoff_Attenuation_Features_3_3perc_AEP
 - Runoff Attenuation
 - Gully Blocking
 - WWNP Runoff Attenuation Features 1in100 AEP (EA)*
 - Priority roads for catchment management of runoff (Highways)
 - Mine Treatment Schemes (Coal Authority)
 - River Restoration and Wildlife
 - Water Quality
 - Water Resources
 - Climate Change
 - Estuaries & Coasts
 - Natural Capital
 - Air Quality
 - Recreation & Culture
 - Socio-economic
 - 2. What are the well known issues in the catchment?
 - 3. What are the key characteristics of the catchment?
 - 4. What are the possible causes?
 - 5. What actions are being delivered?
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 - WFD Waterbodies with CaBA ID
 - Local_authority_boundaries
 - Catchment_sensitive_farming_catchments

NFM - Improve recharge with leaky ponds/soil structure.

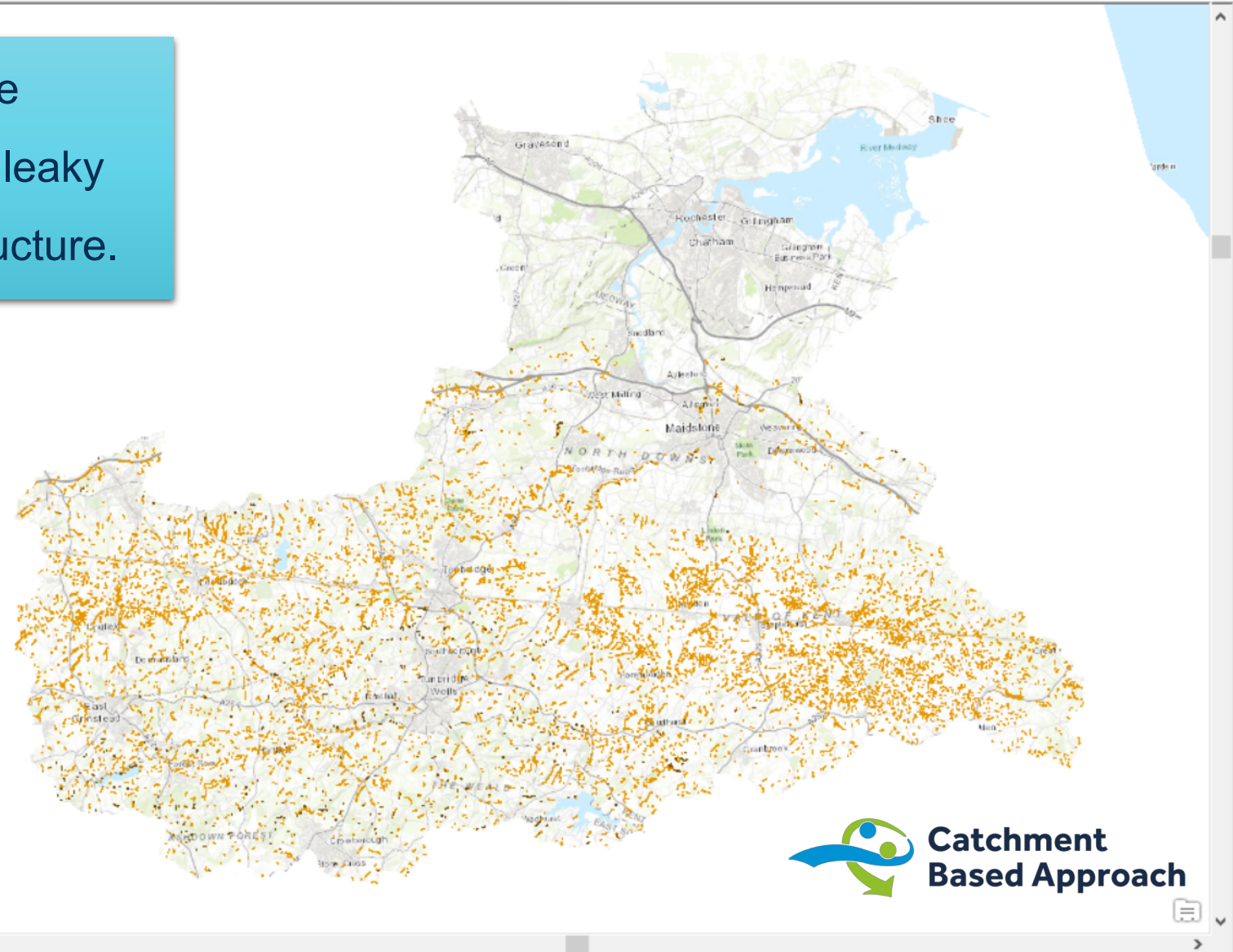
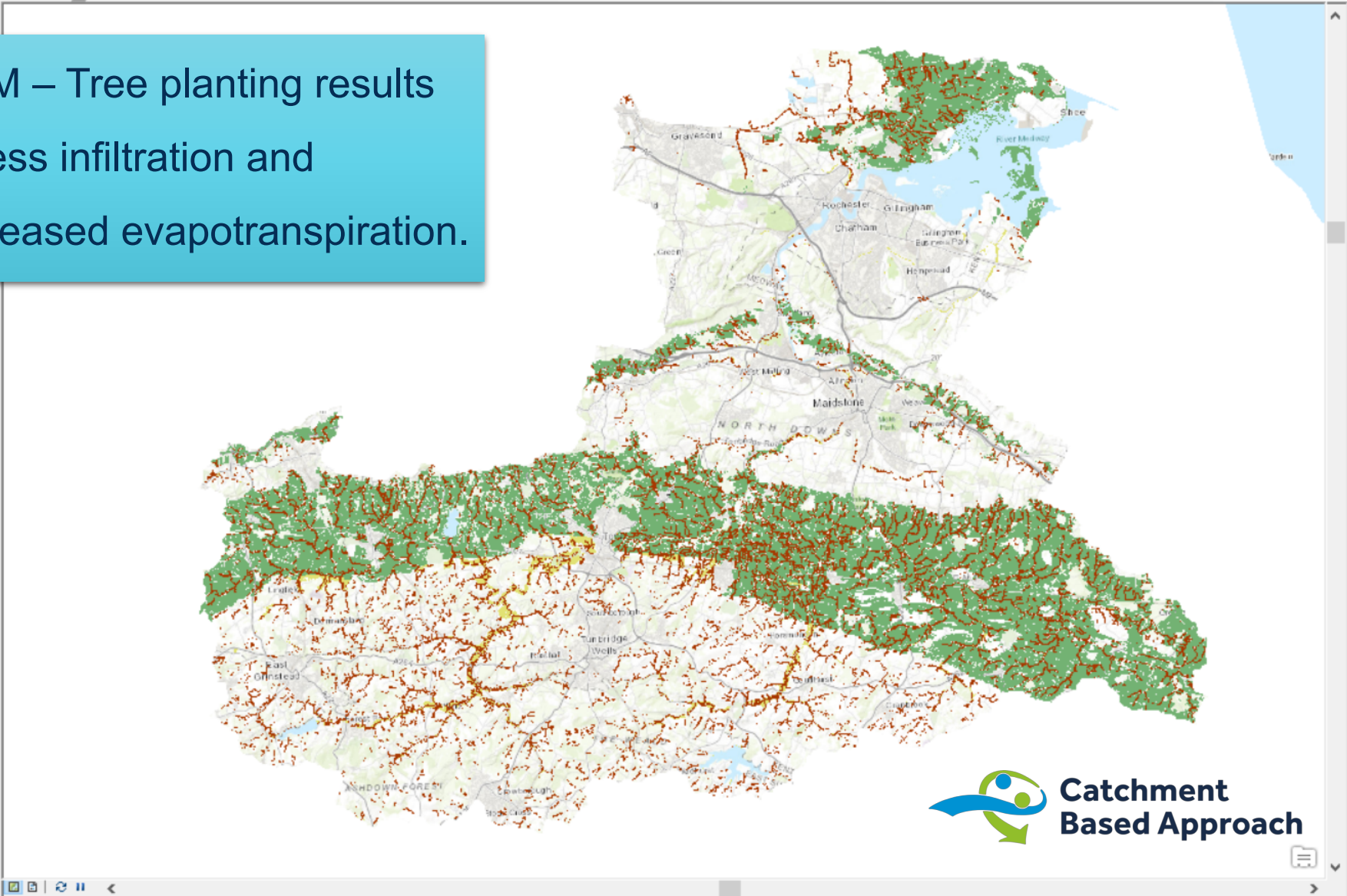


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- CaBA Data Package
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 - 1. What are the opportunities for action?
 - Rural Land Management
 - Urban Land Management
 - Flood Resilience
 - WWNP Riparian Woodland Potential (EA)*
 - Tree_Planting_Riparian
 - WWNP Wider Catchment Woodland Potential (EA)*
 - Tree_Planting_Wider_Catchment
 - WWNP Floodplain Woodland Potential (EA)*
 - Tree_Planting_Floodplain
 - WWNP Floodplain Reconnection Potential (EA)*
 - WWNP Runoff Attenuation Features 1in30 AEP (EA)*
 - WWNP Runoff Attenuation Features 1in100 AEP (EA)*
 - Priority roads for catchment management of runoff (Highways)
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NFM – Tree planting results in less infiltration and increased evapotranspiration.

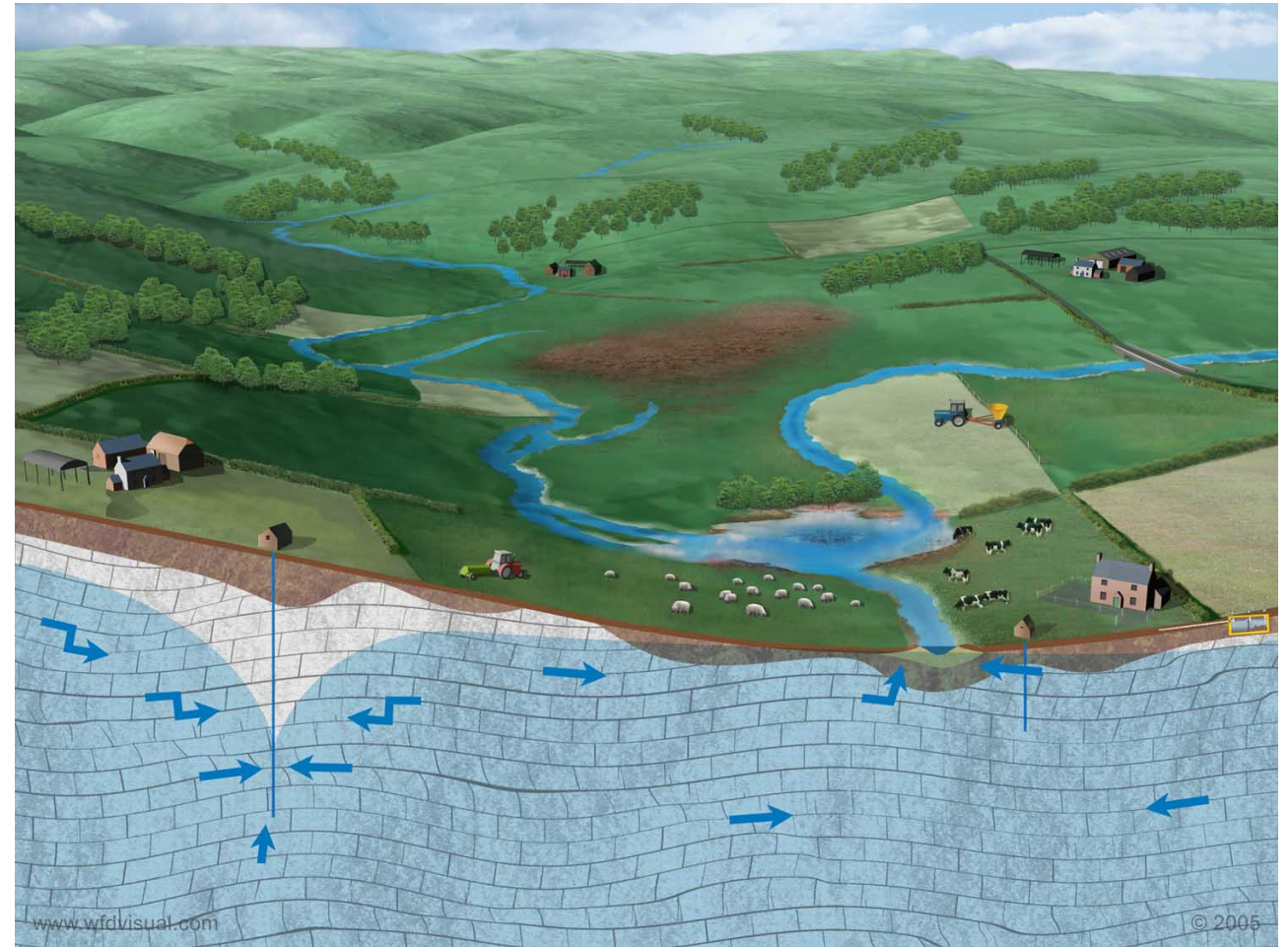


Pathways

How does water travel through the system?

How quickly does it travel through the system?

Is the groundwater vulnerable to pollution?



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 - Soils & Geology
 - Soils (Cranfield, UK Soil Observatory)*
 - Soil property data (BGS)*
 - Soil Water Management (EU Soils)
 - No information
 - No water management system
 - A water management system exists to alleviate\waterlogging (drainage)
 - A water management system exists to alleviate\drought stress (irrigation)
 - A water management system exists to alleviate\salinity (drainage)
 - A water management system exists to alleviate both\waterlogging and drought stress
 - A water management system exists to alleviate both\waterlogging and salinity
 - Rivers
 - Groundwater
 - Lakes
 - Estuaries & Coasts
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Water management systems –
can impact water quality and how
water moves through system

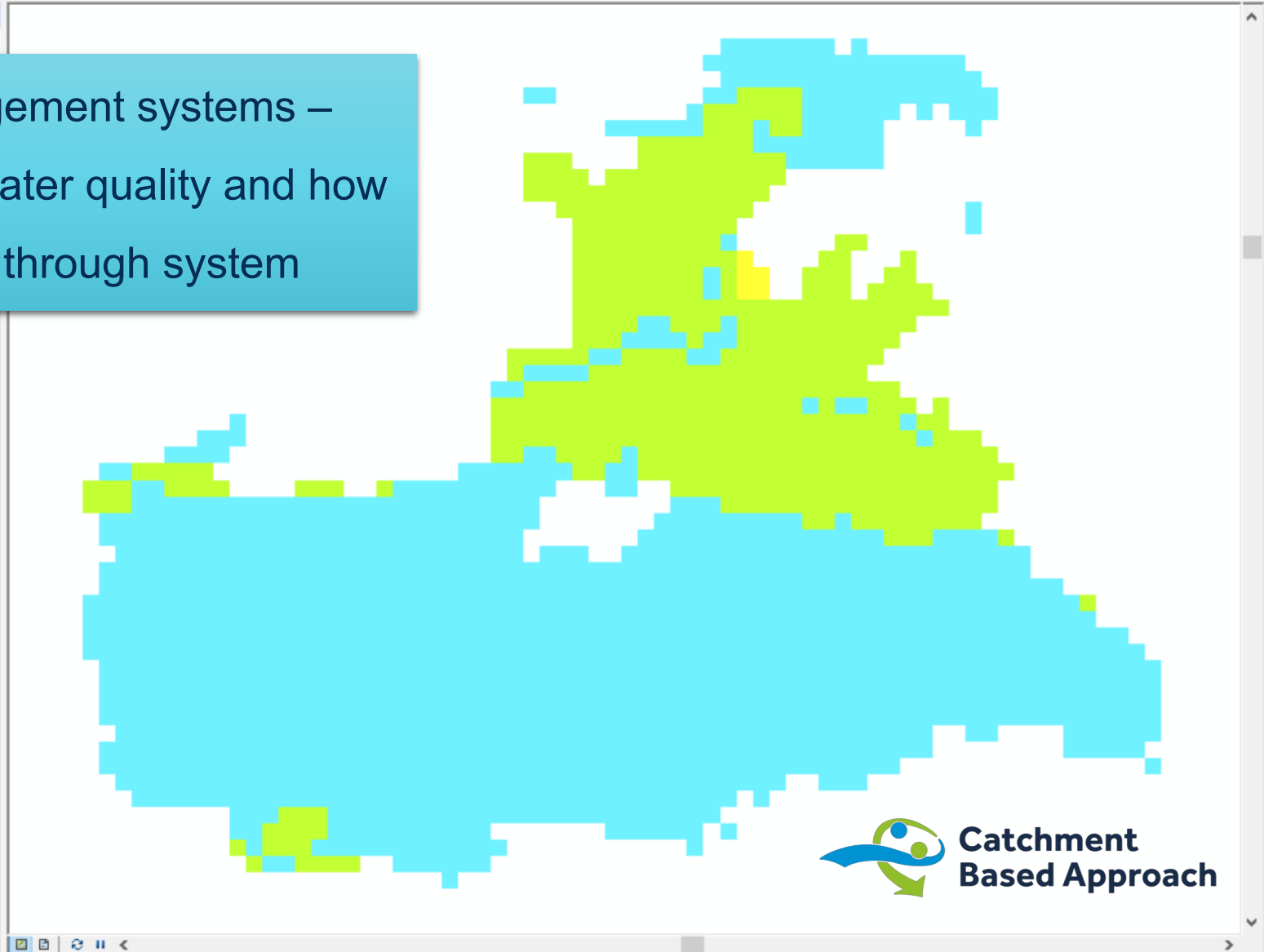
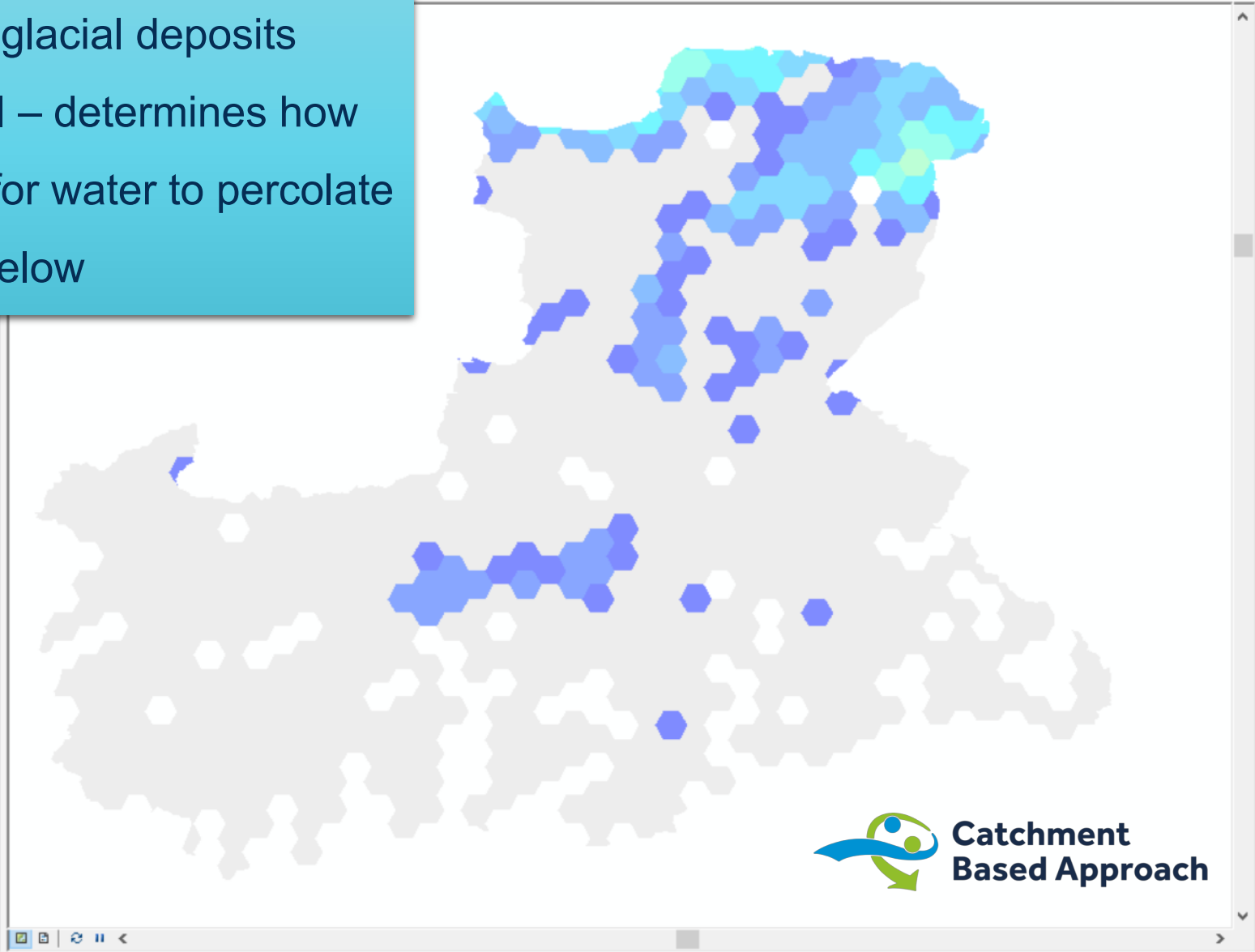


Table Of Contents

- 2. What are the well known issues in the catchment?
- 3. What are the key characteristics of the catchment?
 - Weather & Climate
 - Land Cover & Land Use
 - Soils & Geology
 - Rivers
 - Groundwater
 - WFD Groundwater bodies Cycle 2 (EA)*
 - Superficial Deposit Thickness 1km Hex-Grid (BGS)
 - Average thickness of deposits
 - BSTM_MEAN
 - 1.000000
 - 1.000001 - 2.000000
 - 2.000001 - 5.000000
 - 5.000001 - 10.000000
 - 10.000001 - 15.000000
 - 15.000001 - 20.000000
 - 20.000001 - 25.000000
 - 25.000001 - 30.000000
 - 30.000001 - 35.000000
 - 35.000001 - 40.000000
 - 40.000001 - 45.000000
 - 45.000001 - 50.000000
 - 50.000001 - 55.000000
 - 55.000001 - 60.000000
 - 60.000001 - 65.000000
 - 65.000001 - 70.000000
 - 70.000001 - 90.906185
 - Model coverage (per hexagon cell)
 - Bedrock and Superficial geology (BGS)*
 - GeoIndex Hydrogeology Data Theme (BGS)*
 - GeoSure Soluble Rocks 5km Hex-Grid (BGS)
 - Simplified Groundwater Vulnerability Map 2017 (EA Conditional)*
 - Lakes
 - Estuaries & Coasts
 - 4. What are the possible causes?

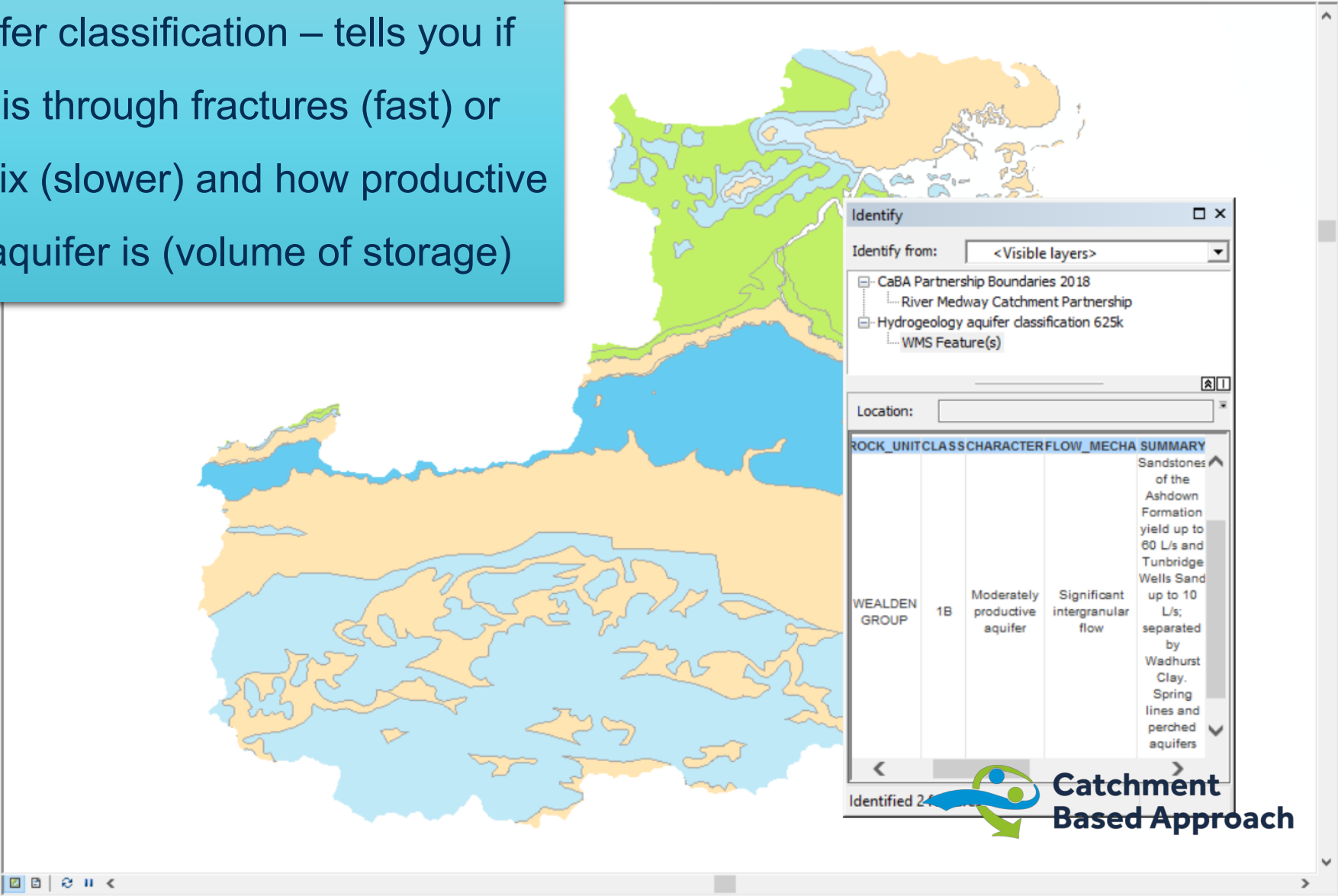
Thickness of glacial deposits under top soil – determines how long it takes for water to percolate into aquifer below

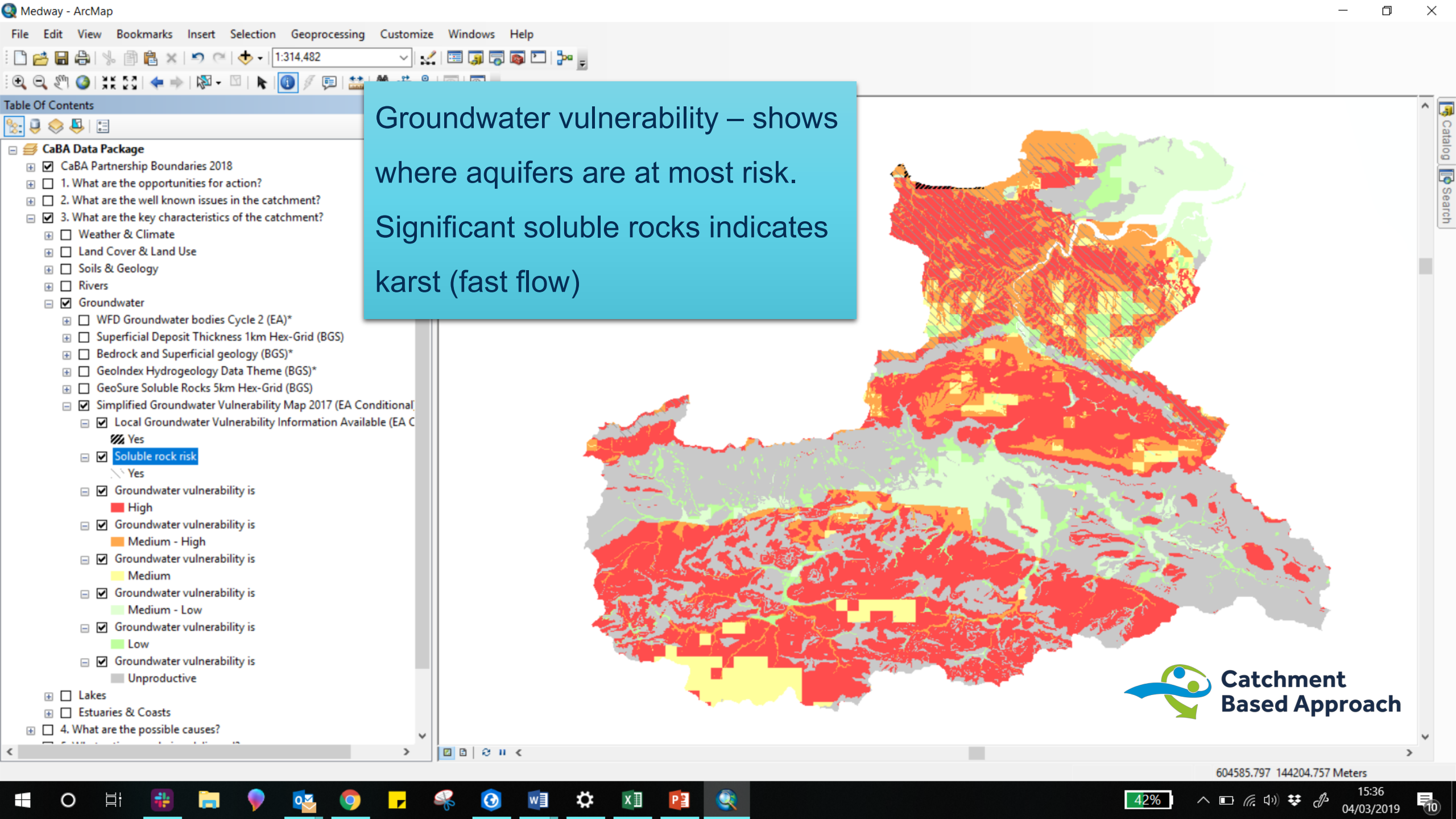


CaBA Data Package

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 - WFD Groundwater bodies Cycle 2 (EA)*
 - Superficial Deposit Thickness 1km Hex-Grid (BGS)
 - Bedrock and Superficial geology (BGS)*
 - GeolIndex Hydrogeology Data Theme (BGS)*
 - Hydrogeology aquifer classification 625k
 - GeoSure Soluble Rocks 5km Hex-Grid (BGS)
 - Simplified Groundwater Vulnerability Map 2017 (EA Conditional)*
 - Lakes
 - Estuaries & Coasts
- 4. What are the possible causes?
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Aquifer classification – tells you if flow is through fractures (fast) or matrix (slower) and how productive the aquifer is (volume of storage)





Groundwater vulnerability – shows where aquifers are at most risk.
Significant soluble rocks indicates karst (fast flow)

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 - Rivers
 - Groundwater
 - WFD Groundwater bodies Cycle 2 (EA)*
 - Superficial Deposit Thickness 1km Hex-Grid (BGS)
 - Bedrock and Superficial geology (BGS)*
 - GeolIndex Hydrogeology Data Theme (BGS)*
 - GeoSure Soluble Rocks 5km Hex-Grid (BGS)
 - Simplified Groundwater Vulnerability Map 2017 (EA Conditional)
 - Local Groundwater Vulnerability Information Available (EA C)
 - Yes
 - Soluble rock risk
 - Yes
 - Groundwater vulnerability is High
 - Groundwater vulnerability is Medium - High
 - Groundwater vulnerability is Medium
 - Groundwater vulnerability is Medium - Low
 - Groundwater vulnerability is Low
 - Groundwater vulnerability is Unproductive
 - Lakes
 - Estuaries & Coasts
 - 4. What are the possible causes?

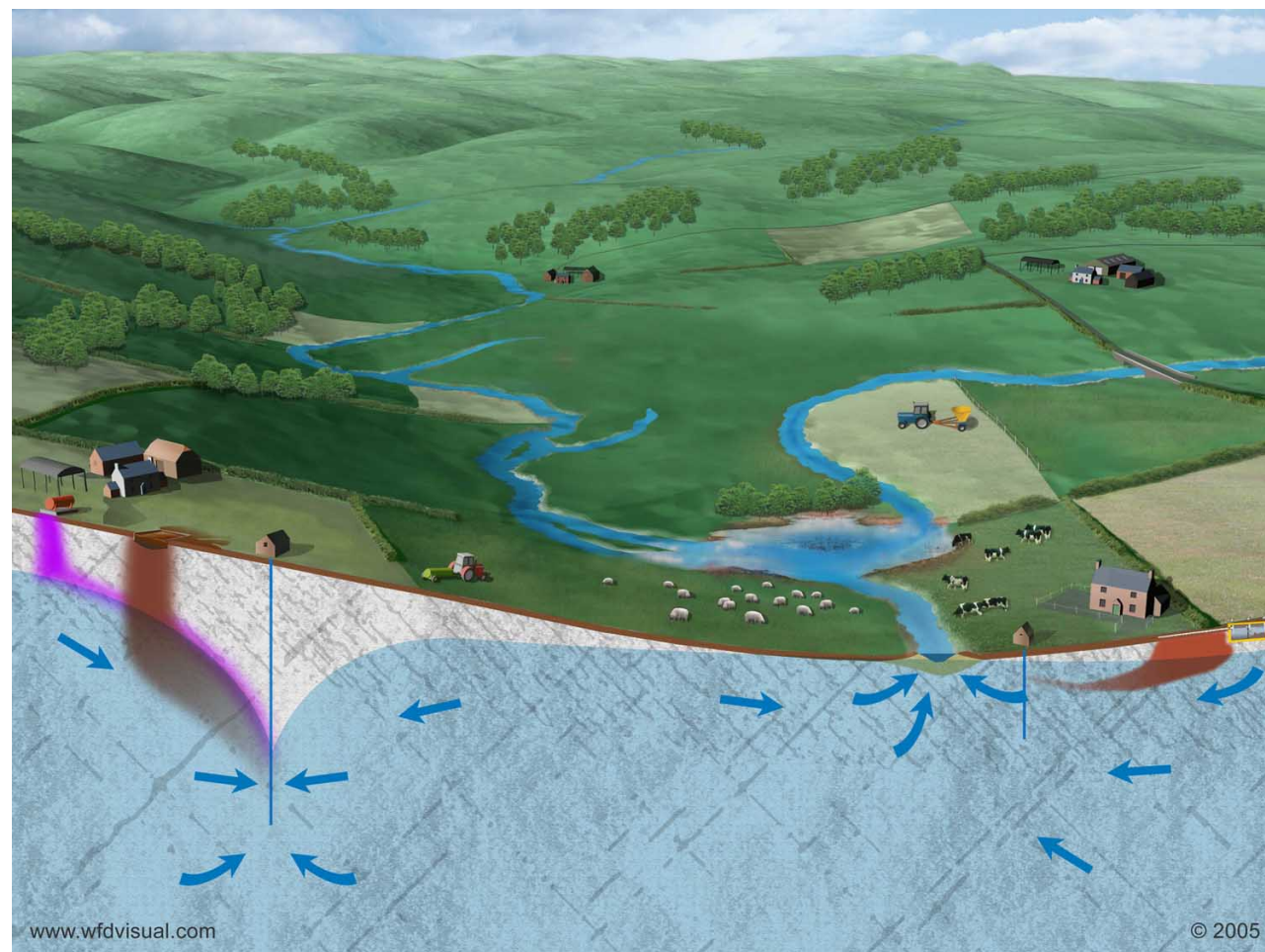


Receptors

Where does water end up?

Where do we abstract water?

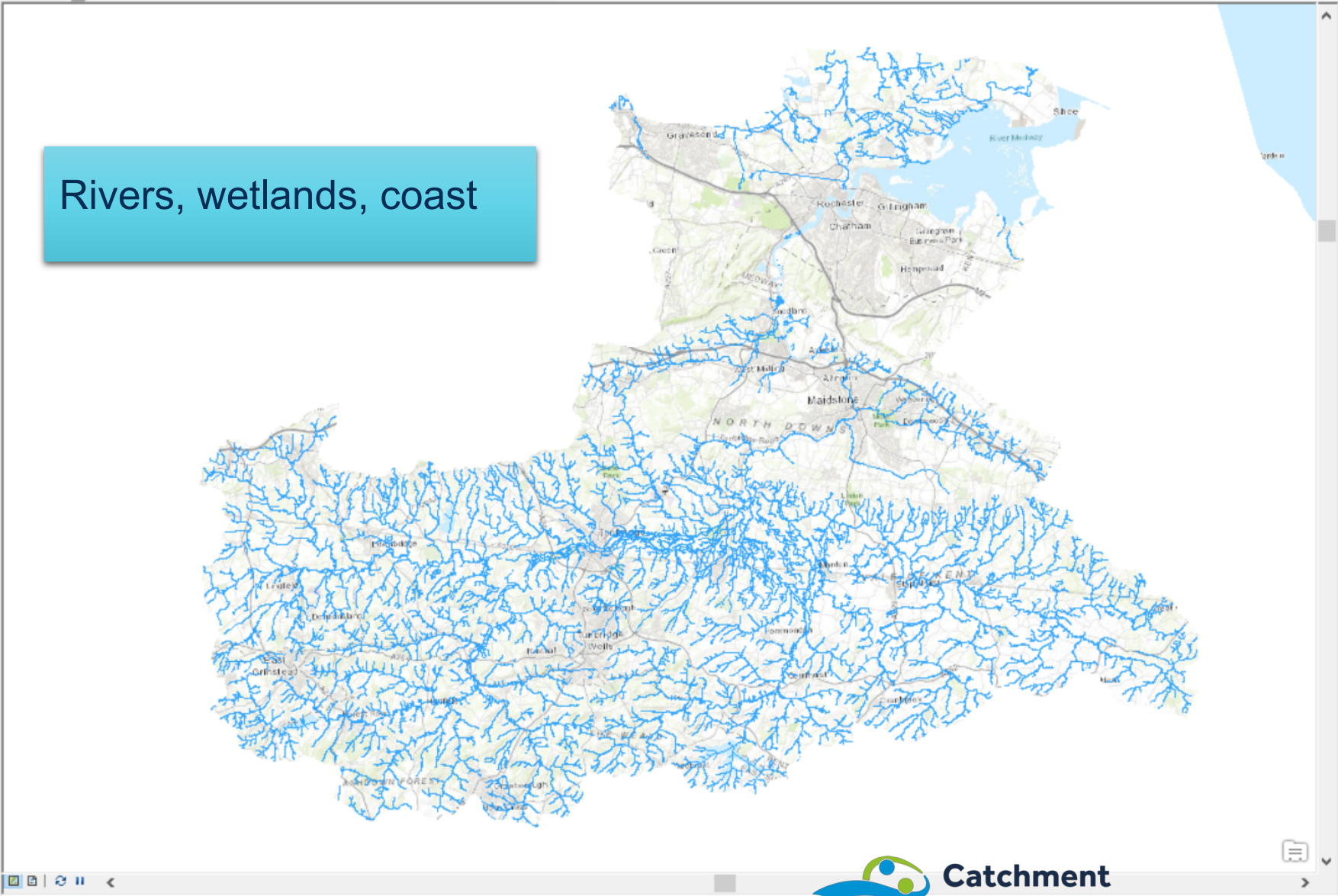
Where are there significant water management issues?








CaBA Data Package

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 - WFD Waterbodies with CaBA ID
 - Local_authority_boundaries
 - Catchment_sensitive_farming_catchments
 - Detailed River Network (EA)
- Administrative Boundaries - Environment Agency and Natural England
- Ordnance Survey 250k
- OS Open Greyscale*
- Basemap
 - World Topographic Map

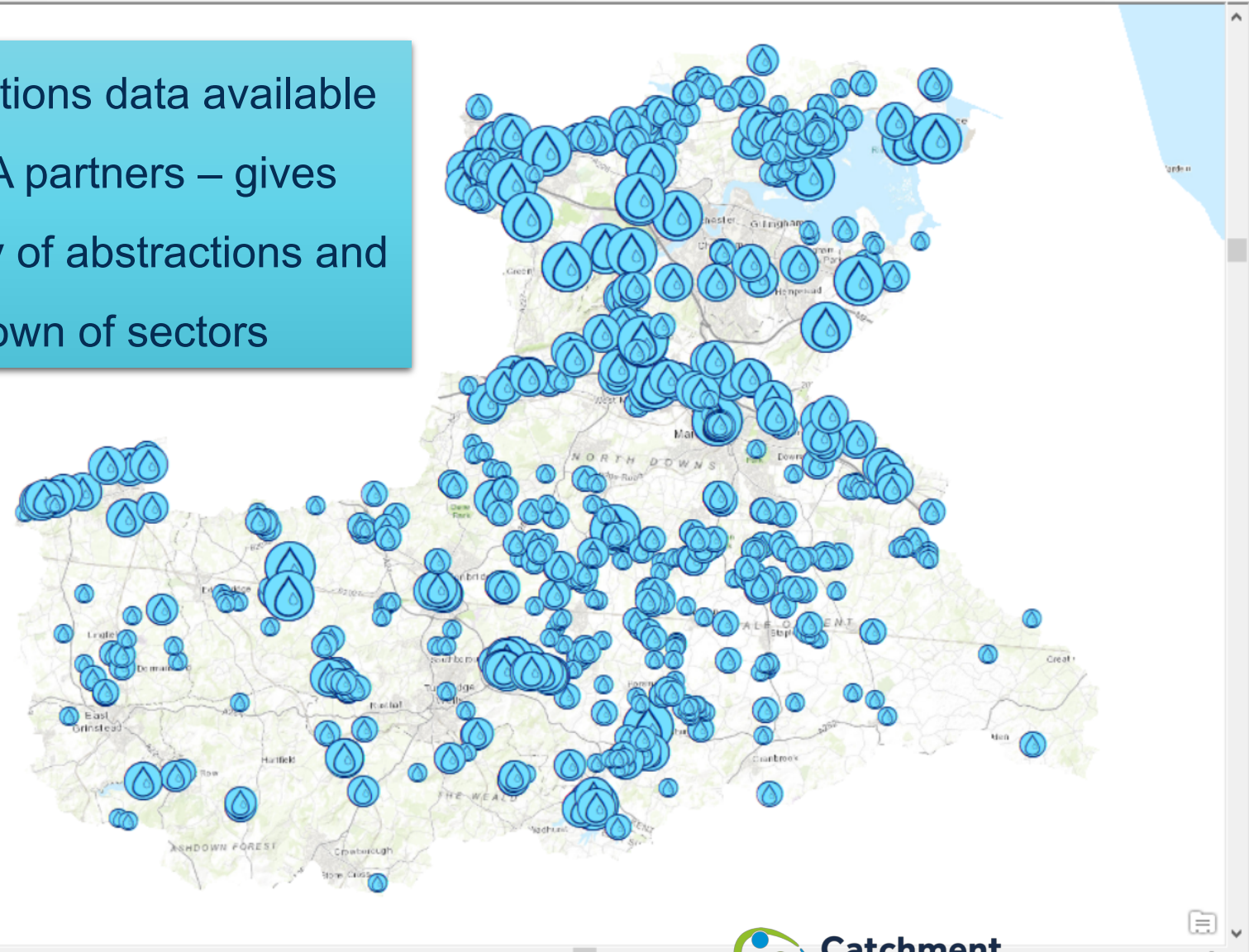
Rivers, wetlands, coast



CaBA Data Package

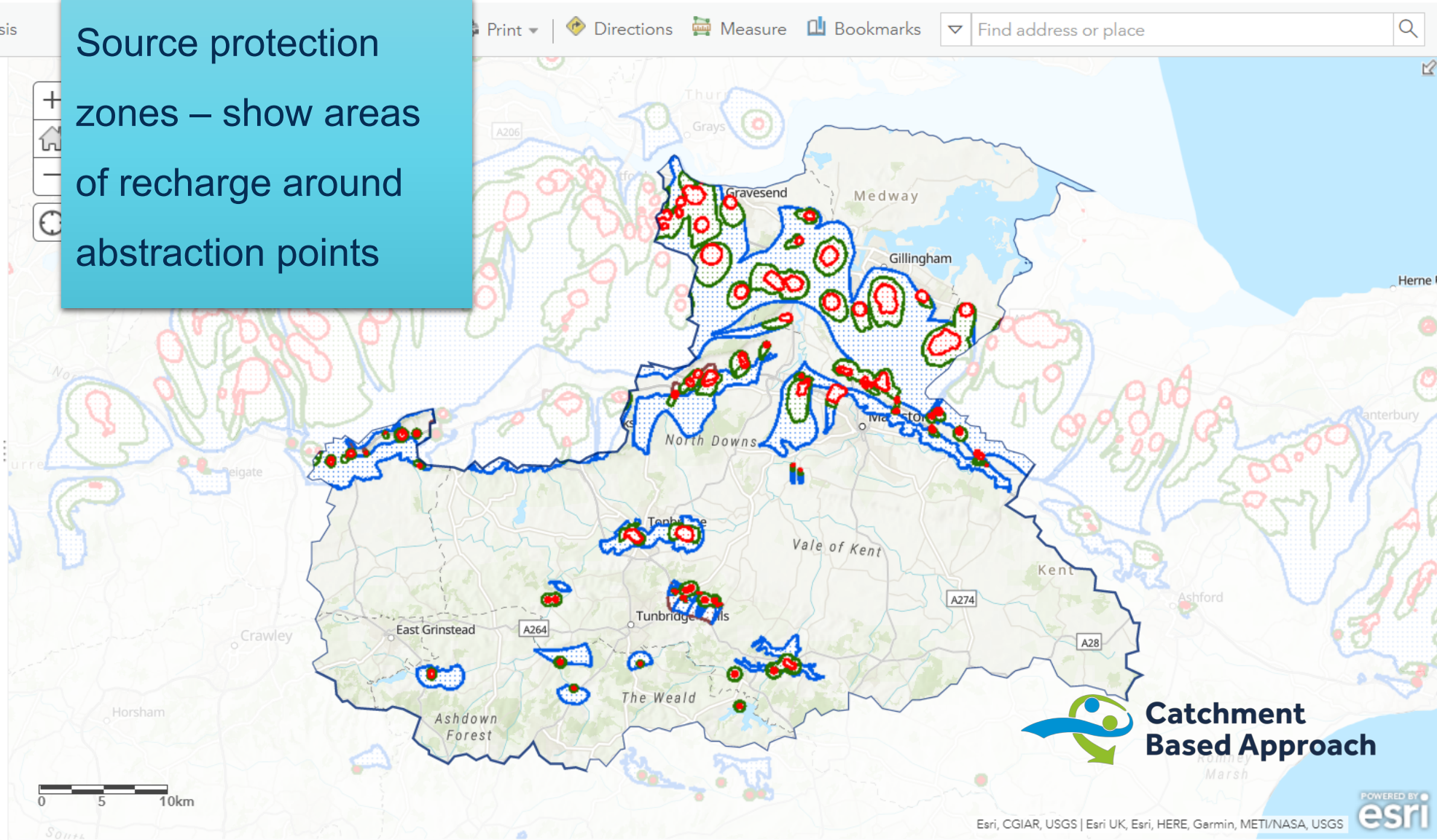
- 1. What are the opportunities for action?
- 2. What are the well known issues in the catchment?
- 3. What are the key characteristics of the catchment?
- 4. What are the possible causes?
 - Pollution
 - Water Abstraction
 - Water Abstraction Licences by Sector (EA)
 - Water Abstraction Licences by Volume (EA)
 - Max Annual Allowance (Mega Litres)
 -  <10
 -  10 - 100
 -  100 - 1,000
 -  1,000 - 10,000
 -  >10,000
- Physical Modification
- Reasons for not achieving good status
- 5. What actions are being delivered?
- 6. What Monitoring (third party & Citizen Science) is being done?
- 7. Basemapping
 - CaBA Partnership Boundaries 2018
 - Basemap
 - World Topographic Map

Abstractions data available to CaBA partners – gives quantity of abstractions and breakdown of sectors



- Contents
- CaBA Catchment Partnerships 2018
 - SourceProtectionZonesMerged
 - Water Resource Abstraction Reliability
 - Water Resource Availability
 - Topographic

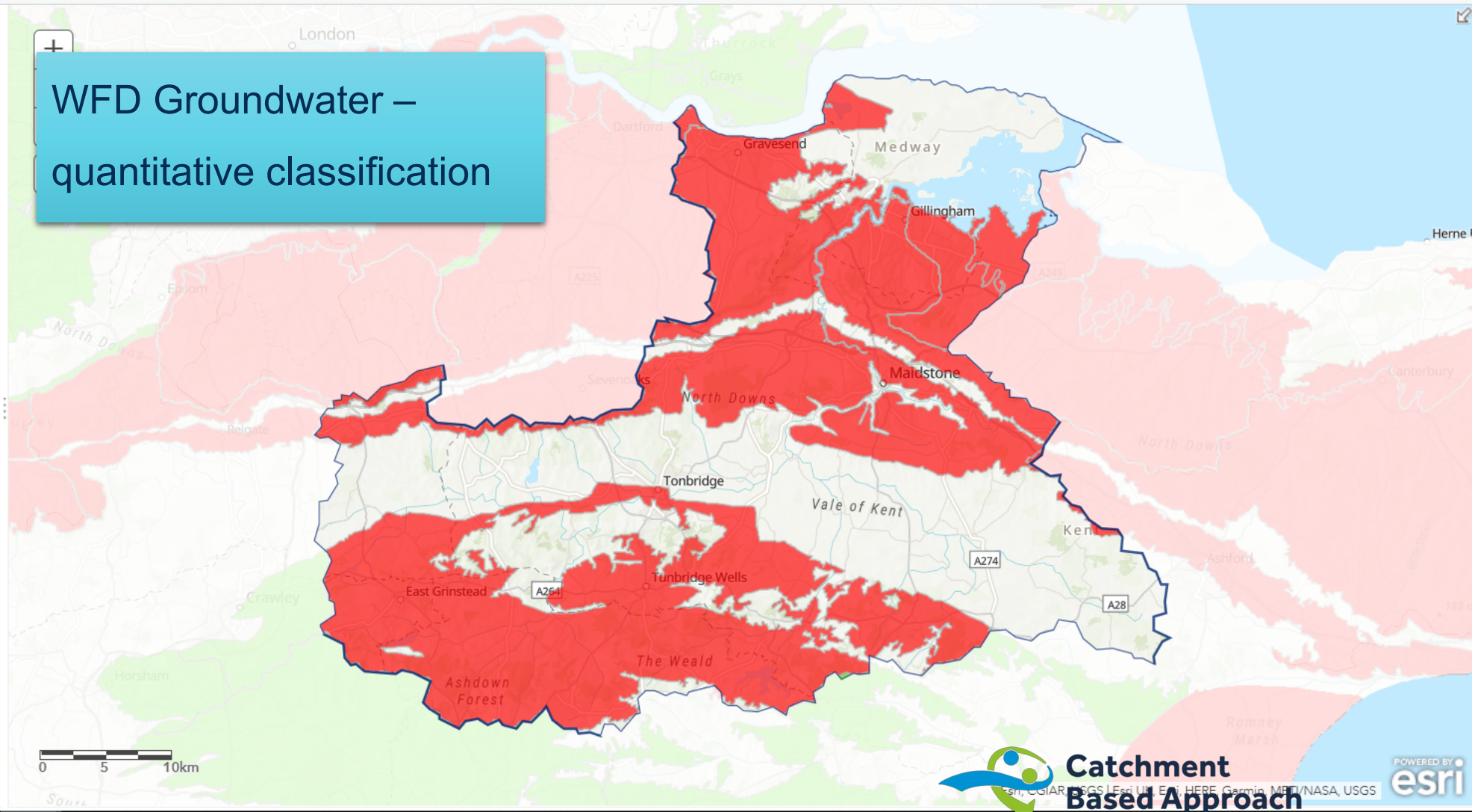
Source protection zones – show areas of recharge around abstraction points



Contents

- WFD Groundwater Status
- CaBA Catchment Partnerships 2018
- WFD Groundwater Status
- WFD Reasons for Not Achieving Good Status - Flow
- SourceProtectionZonesMerged
- Water Resource Abstraction Reliability
- Water Resource Availability
- Topographic

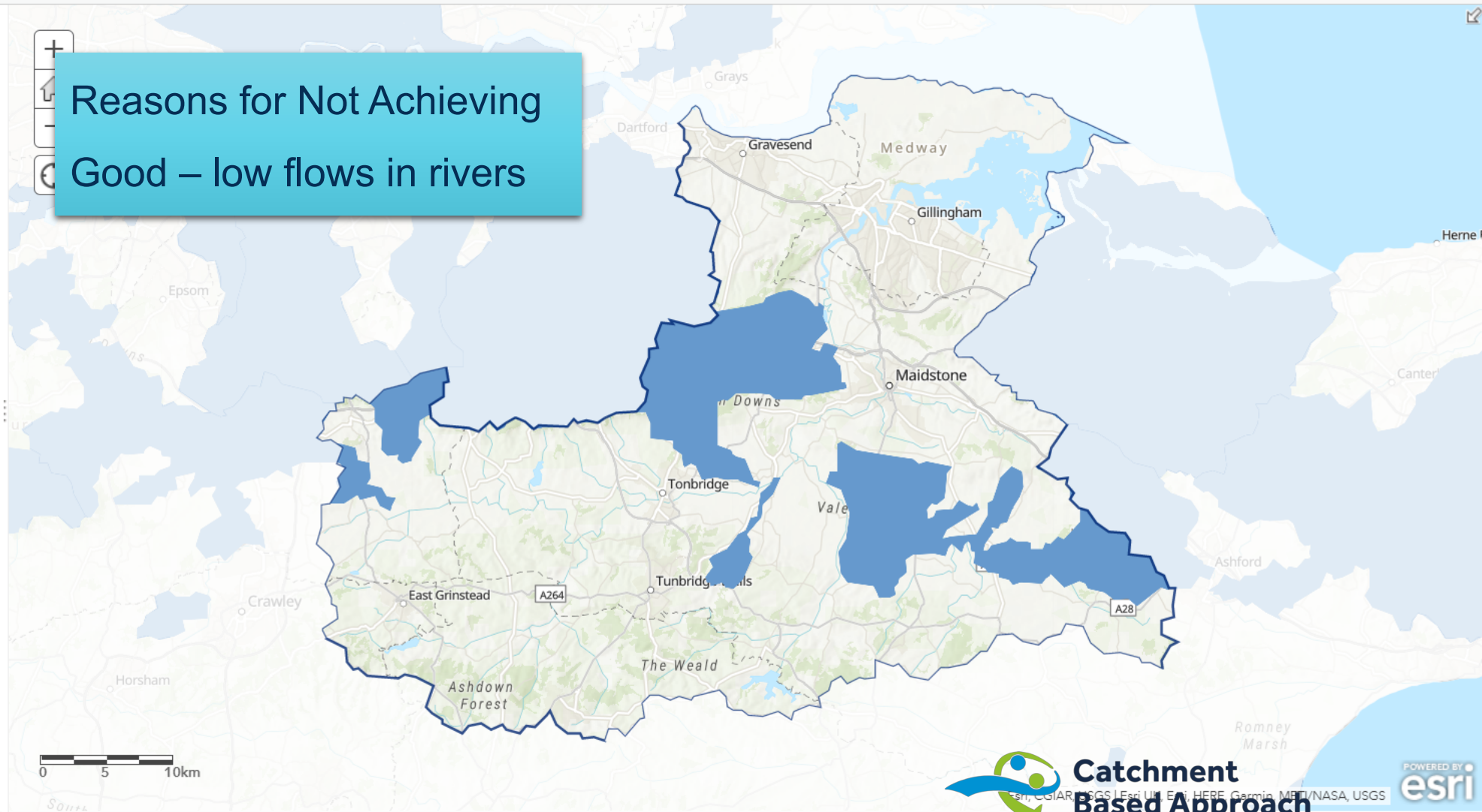
WFD Groundwater – quantitative classification



Contents

- CaBA Catchment Partnerships 2018
- WFD Reasons for Not Achieving Good Status - Flow
- SourceProtectionZonesMerged
- Water Resource Abstraction Reliability
- Water Resource Availability
- Topographic

Reasons for Not Achieving Good – low flows in rivers



Enrich understanding with local data

Enough info for a simple conceptual model to understand the water resources environment and potential issues/opportunities

Then challenge and refine the catchment scale understanding with local data

We will be running a webinar soon with a more detailed breakdown of the data & evidence available for water resources – keep an eye out on the CaBA website!