Backgrounder:

Regional impacts + the 1.5°C climate target – Europe

European Union (Any country)

The European Union submitted a joint Nationally Determined Contribution, which Climate Action Tracker rates as "insufficient" to reach the 1.5°C temperature target contained in the Paris Agreement. Current EU climate pledges are consistent with the world warming by up to 3°C.

- The EU has ratified the Paris Agreement, and pledged to reduce domestic emissions at least 40% by 2030 on 1990 levels, with no use of carbon trading credits.
- The EU has a long-term goal to reduce emissions 80-95% by 2050, on 1990 levels.

France

France comes under the EU's NDC, which Climate Action Tracker rates as "insufficient" to reach the 1.5°C temperature target contained in the Paris Agreement. Current EU climate pledges are consistent with the world warming by up to 3°C.

- The EU has ratified the Paris Agreement, and pledged to reduce domestic emissions at least 40% by 2030 on 1990 levels, with no use of carbon trading credits.
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Germany

Germany comes under the EU's NDC, which Climate Action Tracker rates as "insufficient" to reach the 1.5°Ctemperature target contained in the Paris Agreement. Current EU climate pledges are consistent with the world warming by up to 3°C.

- The EU has ratified the Paris Agreement, and pledged to reduce domestic emissions at least 40% by 2030 on 1990 levels, with no use of carbon trading credits.
- The EU has a long-term goal to reduce emissions 80-95% by 2050, on 1990 levels.

Poland

Poland comes under the European Union's Nationally Determined Contribution (NDC), which Climate Action Tracker rates as "insufficient" to reach the 1.5°C temperature target contained in the Paris Agreement. Current EU climate pledges are consistent with the world warming by up to 3°C.

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Projected impacts across Europe

With 1.5°C of global warming:

- The amount of freshwater available in rivers and lakes could decrease by 9% across the Mediterranean region.[1]

- 86% of Europe's population could be affected by flood, compared to 93% under 2°C of temperature rise.

- Rising temperatures, drought, and unstable weather patterns have serious implications for global food production. Every degree of global temperature rise reduces global yields of wheat by 6.0%, rice by 3.2%, maize by 7.4%, and soybean by 3.1%.

With more than 1.5°Cof global warming:

- Globally, agricultural yields fall rapidly between one and three degrees celsius of warming. Once local temperatures reach three degrees celsius above pre-industrial levels, all crops are negatively affected, wherever they are in the world - including in temperate regions.[2] Fish species go locally extinct, with serious impacts on fisheries.[3]

- Under 2°C of temperature rise, the number of temperature-related deaths could increase by 15-22% every summer in European cities compared to conditions under 1.5°C of warming.

- Southern Europe is particularly vulnerable to climate change, and likely to be more affected than other parts of Europe. A 2°C temperature rise could lead to summer rain decreasing by 20%. Water availability in the region could decrease by 9% if temperatures rise by 1.5°C, and 17% if they rise by 2°C. As temperatures rise, droughts are likely to become increasingly frequent and severe. Multiple sectors[4] - tourism, agriculture, infrastructure, energy and health - could be affected. If temperatures rise by more than 4°C, much of southern Spain[5] could become a desert by the end of the century.

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[1] Differential climate impacts for policy-relevant limits to global warming: the case of 1.5C and 2C (2015), Earth System Dynamics, Table S4.

[2] IPCC, AR5, WGII, Chapter 7, p.497.

[3] IPCC, AR5, WGII, Chapter 7, p.508.

[4] IPCC, AR5, WGII, Chapter 23, p.1270.

[5] RCP8.5 emissions scenario.

- Almost half of the plants and animals and more than half of the habitats protected by the EU Habitats Directive occur in the Mediterranean region. If temperatures rise by 4°C, Mediterranean ecosystems may survive, but if temperatures rise by 2°C or more, they will change more dramatically than at any point in human history.

- Under a scenario where temperatures rise three degrees celsius by the end of the century, heatwaves could increase by a factor of five by the middle of the century. Droughts are likely to become increasingly frequent and severe in the Mediterranean area, western Europe, and Northern Scandinavia.

- Changes in snowfall are expected to reduce ski tourism overnight stay numbers by 10 million people in Austria, France, Italy, and Switzerland under 2°C of warming.

- Under 3.5°C temperature rise, agricultural yields are projected to drop by 10% by the 2080s, with southern Europe experiencing a 20% decline.[6]

- Under 4°C of warming, monthly summer temperatures in the Mediterranean are expected to rise by more than six degrees celsius.[7]

- Under 4°C of warming, the whole European continent, with the exception of Iceland, will be affected by more frequent and severe droughts.

[6] UK Climate Change Risk Assessment 2017: Evidence Report (Northern Ireland), p.75.

[7] World Bank report: Turn down the heat: why a 4°C warmer world must Be avoided, p.38.

United Kingdom

The United Kingdom comes under the European Union's Nationally Determined Contribution (NDC), which Climate Action Tracker rates as "insufficient" to reach the 1.5°C temperature target contained in the Paris Agreement. Current EU climate pledges are consistent with the world warming by up to 3°C.

- The EU has ratified the Paris Agreement, and pledged to reduce domestic emissions at least 40% by 2030, on 1990 levels, with no use of carbon trading credits.

- The EU has a long-term goal to reduce emissions 80-95% by 2050, on 1990 levels.

Projected impacts across the UK

With more than 1.5°C of global warming:

- Globally, agricultural yields fall rapidly between one and three degrees celsius of warming. Once local temperatures reach three degrees celsius above pre-industrial levels, all crops are negatively affected, wherever they are in the world - including in temperate regions.[8] Fish species go locally extinct, with serious impacts on fisheries.[9]

- Rising temperatures, drought, and unstable weather patterns have serious implications for global food production. Every degree of global temperature rise reduces global yields of wheat by 6.0%, rice by 3.2%, maize by 7.4%, and soybean by 3.1%.

- Under 2°C of warming, the number of people in England at risk of flooding could hit 1.7 million by the middle of next century. Under 4°C of warming, this could rise to 2.2 million, assuming no population growth.[10]

- Under 2°C of warming, agricultural land in Scotland at risk of flooding annually is expected to increase by 21% by the 2080s.[11]

- 27% of native species in England would be at medium or high risk of decline by the 2080s under 2°C of temperature rise.[12]

- Under three degrees celsius of warming, the amount of groundwater recharge (where water moves down from the surface to groundwater) in England could fall to 22% below current levels[13] by 2050.

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[8] IPCC, AR5, WGII, Chapter 7, p.497.

[9] IPCC, AR5, WGII, Chapter 7, p.508.

[10] UK Climate Change Risk Assessment 2017: Evidence Report (England), p.67.

[11] UK Climate Change Risk Assessment 2017: Evidence Report (Scotland), p.22.

[12] UK Climate Change Risk Assessment 2017: Evidence Report (England), p.11.

[13] IPCC, AR5, WGII, Chapter 3, p.249.

- Under a two to 4°C temperature rise, the number of non-residential properties in the UK at risk of significant flooding is expected to increase by 2050. Countries will experience an average increase of:
    - 48% in Northern Ireland[14] with expected damages costing an average £10 million annually,
    - 35% in Wales[15] with damages costing an average £37 million annually,
    - 15% in Scotland[16] with damages costing an average £48 million annually,
    - 30% in England[17] with damages costing an average £275 million annually.

- In Scotland, damages from coastal flooding are expected to increase by about 450% by the 2080s under 4°C of temperature rise.[18]

Under 2°C of temperature rise, 142,000 people in Wales would be living in areas at a 1-in-75 or greater chance of flooding in any given year. This could increase to 209,000 people under 4°C of warming.[19]

This paper was prepared by GSCC to support understanding of issues arising from the IPCC's Special Report on 1.5°C warming.

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16 UK Climate Change Risk Assessment 2017: Evidence Report (Scotland), p.78.
17 UK Climate Change Risk Assessment 2017: Evidence Report (England), p.86.
18 UK Climate Change Risk Assessment 2017: Evidence Report (Scotland) p.80.
19 UK Climate Change Risk Assessment 2017: Evidence Report (Wales) p.52.