

Assesment of Future Climate Hazards

Hazard No.	Hazard Type	Current Frequency	Projected Frequency	Evidence Base
1	River flood	Frequent	Very Frequent	An analysis of river flows over a period of more than 50 years of data (1972-2017) indicates an increase in river flows across most of the country (Status of Ireland's Climate, EPA) and an increase in the projected frequency of very wet days (>30mm of precipitation) which will likely increase the frequency of flood events (www.climateireland.ie).
2	Pluvial flood	Very Frequent	Very Frequent	When compared with an annual average rainfall of 1186mm for the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall (Status of Ireland's Climate, EPA) and an increase in the projected frequency of very wet days (>30mm of precipitation). Projections of precipitation indicate that precipitation is expected to become more variable with increases in dry periods in the summer and heavy precipitation in winter (www.climateireland.ie).
3	Above average precipitation	Frequent	Very Frequent	When compared with an annual average rainfall of 1186mm in the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall. The last decade from 2006 - 2015 has been the wettest period in the period 1711- 2016 and there is evidence of an increasing trend in winter rainfall and a decreasing trend in summer rainfall (Status of Ireland's Climate, EPA).
4	Extreme precipitation	Very Frequent	Very Frequent	There is an increase in the projected frequency of very wet days (>30mm of precipitation) (Status of Ireland's Climate, EPA) and observed increases in the levels of winter rainfall but a decrease in summer rainfall (www.climateireland.ie).
5	Severe windstorm	Very frequent	Very Frequent	No long-term trend in wind speed can be determined with confidence based on the limited analysis carried out to date. Climate projections (www.climateireland.ie) indicate a decrease in the number of less intense storms but an increase in the storms which are rare events. Due to a limited number of studies, these projections should be considered with a high level of caution (A Multi-model ensemble approach, EPA).
6	Heatwave	Common	Frequent	Climate projections (www.climateireland.ie) indicate an increase in the average surface air temperatures across all seasons which will likely increase the intensity and frequency of heatwaves. There has been an increase in the number of warm days (temperature > 20°C). This is in line with trends evident for the rest of Western Europe (Status of Ireland's Climate, EPA).
7	Drought	Common	Frequent	Climate projections (www.climateireland.ie) indicate an increase in the average surface temperature as well as a decrease in the levels of summer rainfall (Status of Ireland's Climate, EPA) which will likely increase the intensity and frequency of droughts in the summer. An analysis on river flows over a period from 1992-2017 suggests an increase in drought conditions in the summer, particularly in the east of the country (Status of Ireland's Climate, EPA).
8	Above average surface temperature	Frequent	Very Frequent	Climate projections (www.climateireland.ie) indicate an increase in the average surface air temperatures across all seasons which will likely increase the intensity and frequency of heatwaves. There has been an increase in the number of warm days (temperature > 20°C). This is in line with trends evident for the rest of Western Europe (Status of Ireland's Climate, EPA).
9	Cold spell	Common	Occasional	There has been a decrease in the number of frost days (temperatures below 0°C) and a shortening of the frost season duration (www.climateireland.ie).
10	Heavy snowfall	Occasional	Occasional	Snowfall is projected to decrease substantially by the middle of the century (Nolan and Flanagan), but not to the extent where the frequency is considered rare.

Assesment of Future Climate Impacts

Hazard No.	Hazard Type	Current Asset Damage	Projected Change	Rationale
1	River flood	Major	Major	Densification of urban areas to deliver compact growth will potentially increase the amount of properties at risk of flooding. However, the Carlow CDP outlines an objective to ensure vulnerable developments are directed away from areas at risk of flooding. Works will also be continued with OPW to develop flood relief schemes and maintain existing defences. There is a likely increase in river flows across most of the country leading to an increase in severity of flooding (Climate Ireland).
2	Pluvial flood	Moderate	Moderate	Similarly to river flooding, densification of urban areas will potentially increase the amount of properties at risk. Adpation and spatial planning goals include the conversion of land at risk of flooding to less vulnerable uses e.g. parks, gardens and open spaces for natural habitats (Carlow CDP). Works will also be continued with OPW to develop flood relief schemes and maintain existing defences. When compared with an annual average rainfall of 1186mm for the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall (Status of Ireland's Climate, EPA).
3	Above average precipitation	Moderate	Moderate	Future developments will be required to utilise sustainable urban drainage systems to control the release of water runoff in a managed way (Carlow CDP). The last decade from 2006 - 2015 has been the wettest period in the period 1711- 2016 and there is evidence of an increasing trend in winter rainfall and a decreasing trend in summer rainfall (Status of Ireland's Climate, EPA). This implies there is an increase in severity in winter periods but a reduction in summer periods.
4	Extreme precipitation	Moderate	Moderate	Future developments will be required to utilise sustainable urban drainage systems to control the release of water runoff in a managed way (Carlow CDP). When compared with an annual average rainfall of 1186mm for the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall (Status of Ireland's Climate, EPA).
5	Severe windstorm	Minor	Moderate	Current predictions indicate an increase in the intensity of windstorms (Climate Ireland), increasing the impacts involved.
6	Heatwave	Minor	Minor	Average surface air temperatures are expected to increase across all seasons which will likely increase the intensity of heatwaves (Climate Ireland). New building regulations and materials will be required for use in new developments to accomodate this, but there will also be an increase in the impact of heatwaves due to more compacted urban areas (Carlow CDP).
7	Drought	Minor	Moderate	Average surface temperature are expected to increase, as well as a decrease in the levels of summer rainfall (Status of Ireland's Climate, EPA), leading to an increase in the impact of droughts.
8	Above average surface temperature	Negligible	Negligible	Average surface air temperatures across all seasons are expected to increase (Climate Ireland). New building design and materials will be introduced to accomodate hotter summers without compromising resilience to other climate changes, but densification of urban areas will potentially increase the solar radiation of urban areas (Carlow CDP).
9	Cold spell	Minor	Minor	No changes in the assets affected. There has been a decrease in the number of frost days (temperatures below 0°C) and a shortening of the frost season duration, with projections to be in line with current trends (Climate Ireland). However, the impact remains as a minor impact.
10	Heavy snowfall	Minor	Minor	No changes in the assets affected. Snowfall is projected to decrease substantially by the middle of the century (Noian and Flanagan), but impacts will remain the same.

Hazard No.	Hazard Type	Current Health and Wellbeing Impact	Projected Change	Rationale
1	River flood	Major	Major	Densification of urban areas to deliver compact growth will potentially increase the amount of properties at risk of flooding. However, the Carlow CDP outlines an objective to ensure vulnerable developments are directed away from areas at risk of flooding. Works will also be continued with OPW to develop flood relief schemes and maintain existing defences. There is a likely increase in river flows across most of the country leading to an increase in severity of flooding (Climate Ireland).
2	Pluvial flood	Minor	Minor	The Carlow CDP outlines an objective to ensure vulnerable developments are directed away from areas at risk of flooding. Compared with an annual average rainfall of 1186mm for the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall (Status of Ireland's Climate, EPA).
3	Above average precipitation	Minor	Minor	Promoting awareness for mental health issues and improvement of mental health services are envisaged (Carlow LECP Statement). The last decade from 2006 - 2015 has been the wettest period in the period 1711-2016 and there is evidence of an increasing trend in winter rainfall and a decreasing trend in summer rainfall (Status of Ireland's Climate, EPA). This implies there is an increase in severity in winter periods but a reduction in summer periods.
4	Extreme precipitation	Minor	Minor	Promoting awareness for mental health issues and improvement of mental health services are envisaged (Carlow LECP Statement). When compared with an annual average rainfall of 1186mm for the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall (Status of Ireland's Climate, EPA). This increase in rainfall intensity is seen during the winter season while summers will see a decrease in the level of precipitation, balancing one another.
5	Severe windstorm	Moderate	Major	Changing demographics with an increase in elderly population and densification of urban areas will potentially increase exposure and vulnerability (Carlow LECP Profile). Current predictions indicate an increase in the intensity of windstorms (Climate Ireland), increasing the impacts involved.
6	Heatwave	Moderate	Moderate	Average surface air temperatures are expected to increase across all seasons which will likely increase the intensity of heatwaves (Climate Ireland). Protecting and expanding green infrastructure will help to reduce the increase in intensity of this event (Carlow CDP).
7	Drought	Moderate	Major	Changing demographics with an increase in elderly population and densification of urban areas will potentially increase exposure and vulnerability (Carlow LECP Profile). Average surface temperature are expected to increase, as well as a decrease in the levels of summer rainfall (Status of Ireland's Climate, EPA).
8	Above average surface temperature	Negligible	Negligible	Average surface air temperatures across all seasons are expected to increase (Climate Ireland). Adaptation goals for County Carlow include the expansion of the county's green infrastructure, reducing any impacts to health and wellbeing by ensuring the presence of facilities to use in high temperatures (Carlow CDP).
9	Cold spell	Minor	Minor	Increase in vulnerable population, e.g., elderly population, may increase the possible impacts (Carlow LECP Profile). However, there has been a decrease in the number of frost days (temperatures below 0°C) and a shortening of the frost season duration, with projections to be in line with current trends (Climate Ireland). However, the impact remains as a minor impact.
10	Heavy snowfall	Minor	Minor	The increasing elderly population increases the possible impacts of heavy snowfalls (Carlow LECP Profile). However, snowfall is projected to decrease substantially by the middle of the century (Nolan and Flanagan), but impacts will remain the same.

Hazard No.	Hazard Type	Current Environment Impact	Projected Change	Rationale
1	River flood	Moderate	Moderate	Actions to mitigate impacts include managing development in flood risk areas and requiring SuDS to be used in all relevant developments to avoid surface water run-off and pollutants entering watercourses (Carlow CDP). There is a likely increase in river flows across most of the country leading to an increase in severity of flooding (Climate Ireland).
2	Pluvial flood	Minor	Moderate	Actions to mitigate impacts include managing development in flood risk areas and requiring SuDS to be used in all relevant developments to avoid surface water run-off and pollutants entering watercourses (Carlow CDP). When compared with an annual average rainfall of 1186mm for the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall (Status of Ireland's Climate, EPA).
3	Above average precipitation	Minor	Minor	Requirement for the use of SuDS in new developments mitigate the effects of impacts to the environment (Carlow CDP). The last decade from 2006 - 2015 has been the wettest period in the period 1711- 2016 and there is evidence of an increasing trend in winter rainfall and a decreasing trend in summer rainfall (Status of Ireland's Climate, EPA). This implies there is an increase in severity in winter periods but a reduction in summer periods.
4	Extreme precipitation	Minor	Moderate	Requirement for the use of SuDS in new developments mitigate the effects of impacts to the environment (Carlow CDP). When compared with an annual average rainfall of 1186mm for the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall (Status of Ireland's Climate, EPA).
5	Severe windstorm	Moderate	Major	Current predictions indicate an increase in the intensity of windstorms (Climate Ireland), increasing the impacts involved. Protection measures are being implemented on ecosystems such as dune habitat systems (Carlow CDP).
6	Heatwave	Moderate	Major	Changes in phenology are projected to be experienced as average surface air temperatures are expected to increase across all seasons which will likely increase the intensity of heatwaves (Climate Ireland). This will affect the blooming seasons of flora, affecting the pollinating cycle.
7	Drought	Moderate	Major	Given the overall effect of climate change on environmental assets, many will be stressed from a range of factors, reducing the capacity of these assets to sustain acute and chronic events leading to an expected increase in impact. Average surface temperature are expected to increase, as well as a decrease in the levels of summer rainfall (Status of Ireland's Climate, EPA).
8	Above average surface temperature	Major	Catastrophic	Changes in phenology are projected to be experienced as average surface air temperatures across all seasons are expected to increase (Climate Ireland). This will affect the blooming seasons of flora, affecting the pollinating cycle.
9	Cold spell	Negligible	Negligible	There has been a decrease in the number of frost days (temperatures below 0°C) and a shortening of the frost season duration, with projections to be in line with current trends (Climate Ireland). However, the impact remains negligible.
10	Heavy snowfall	Minor	Minor	Snowfall is projected to decrease substantially by the middle of the century (Nolan and Flanagan), but impacts will remain the same.

Hazard No.	Hazard Type	Current Social Impact	Projected Change	Rationale
1	River flood	Moderate	Moderate	Actions to avoid locating vulnerable developments in areas at risk of flooding are envisaged (Carlow CDP). There is a likely increase in river flows across most of the country leading to an increase in severity of flooding (Climate Ireland).
2	Pluvial flood	Minor	Minor	Actions to avoid locating vulnerable developments in areas at risk of flooding are envisaged (Carlow CDP). When compared with an annual average rainfall of 1186mm for the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall (Status of Ireland's Climate, EPA).
3	Above average precipitation	Minor	Minor	Promoting awareness for mental health issues and improvement of mental health services are envisaged (Carlow LECP Statement). The last decade from 2006 - 2015 has been the wettest period in the period 1711-2016 and there is evidence of an increasing trend in winter rainfall and a decreasing trend in summer rainfall (Status of Ireland's Climate, EPA). This implies there is an increase in severity in winter periods but a reduction in summer periods.
4	Extreme precipitation	Minor	Minor	Promoting awareness for mental health issues and improvement of mental health services are envisaged (Carlow LECP Statement). When compared with an annual average rainfall of 1186mm for the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall (Status of Ireland's Climate, EPA).
5	Severe windstorm	Minor	Minor	Changing demographics with an increasing elderly population and densification of urban areas will potentially increase exposure and vulnerability (Carlow LECP Profile). Current predictions indicate an increase in the intensity of windstorms (Climate Ireland), increasing the impacts involved for the vulnerable population, e.g., the homeless.
6	Heatwave	Minor	Minor	Changing demographics with an increasing elderly population and densification of urban areas will potentially increase exposure and vulnerability (Carlow LECP Profile). Average surface air temperatures are expected to increase across all seasons which will likely increase the intensity of heatwaves (Climate Ireland).
7	Drought	Moderate	Moderate	Changing demographics with an increasing elderly population and densification of urban areas will potentially increase exposure and vulnerability however, not enough to make this a moderate future impact. Average surface temperature are expected to increase, as well as a decrease in the levels of summer rainfall (Status of Ireland's Climate, EPA).
8	Above average surface temperature	Negligible	Minor	Average surface air temperatures across all seasons are expected to increase (Climate Ireland). Uncomfortable conditions for more vulnerable population may be at risk of an increased impact.
9	Cold spell	Minor	Minor	There has been a decrease in the number of frost days (temperatures below 0°C) and a shortening of the frost season duration, with projections to be in line with current trends (Climate Ireland). However, the impact remains as a minor impact.
10	Heavy snowfall	Negligible	Negligible	Snowfall is projected to decrease substantially by the middle of the century (Nolan and Flanagan), but impacts will remain the same.

Hazard No.	Hazard Type	Current Financial Impact	Projected Change	Rationale
1	River flood	Moderate	Major	The increase in impact across a range of areas of the local authority could lead to an increasing financial burden on the local authority (Carlow CDP). There is a likely increase in river flows across most of the country leading to an increase in severity of flooding (Climate Ireland).
2	Pluvial flood	Negligible	Minor	The increase in impact across a range of areas of the local authority could lead to an increasing financial burden on the local authority (Carlow CDP). When compared with an annual average rainfall of 1186mm for the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall (Status of Ireland's Climate, EPA).
3	Above average precipitation	Negligible	Negligible	The last decade from 2006 - 2015 has been the wettest period in the period 1711- 2016 and there is evidence of an increasing trend in winter rainfall and a decreasing trend in summer rainfall (Status of Ireland's Climate, EPA). This implies there is an increase in severity in winter periods but a reduction in summer periods. It is unlikely the financial burden will be increased.
4	Extreme precipitation	Minor	Minor	When compared with an annual average rainfall of 1186mm for the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall (Status of Ireland's Climate, EPA).
5	Severe windstorm	Negligible	Minor	The increase in impact across a range of areas of the local authority could lead to an increasing financial burden on the local authority (Carlow CDP). Current predictions indicate an increase in the intensity of windstorms (Climate Ireland), increasing the impacts involved.
6	Heatwave	Negligible	Negligible	Average surface air temperatures are expected to increase across all seasons which will likely increase the intensity of heatwaves (Climate Ireland). Use of new materials to accommodate higher temperatures are unlikely to increase the financial burden to the point where the impacts are minor (Carlow CDP).
7	Drought	Minor	Moderate	Average surface temperature are expected to increase, as well as a decrease in the levels of summer rainfall (Status of Ireland's Climate, EPA). Drier summers result in an increasing financial burden for the provision of water.
8	Above average surface temperature	Negligible	Minor	Average surface air temperatures across all seasons are expected to increase (Climate Ireland). A possible increase in the measures to protect and enhance green infrastructure to accommodate this increase in baseline temperatures may lead to an increased burden on finances. There is a large draw on resources currently which may increase if more resilient planting is introduced.
9	Cold spell	Minor	Minor	There has been a decrease in the number of frost days (temperatures below 0°C) and a shortening of the frost season duration, with projections to be in line with current trends (Climate Ireland). However, the impact remains as a minor impact.
10	Heavy snowfall	Minor	Minor	Snowfall is projected to decrease substantially by the middle of the century (Nolan and Flanagan), but impacts will remain the same.

Hazard No.	Hazard Type	Current Reputational Impact	Projected Change	Rationale
1	River flood	Moderate	Moderate	There is a likely increase in river flows across most of the country leading to an increase in severity of flooding (Climate Ireland). The local authority has a role in addressing these issues, and could therefore suffer reputational damage from local, national, and international perspectives. The CARO progress report 2022 indicates progress has been made with regards to climate change adaptation implementation with this event.
2	Pluvial flood	Minor	Minor	When compared with an annual average rainfall of 1186mm for the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall (Status of Ireland's Climate, EPA). The local authority has a role in addressing these issues, and could therefore suffer reputational damage from local, national, and international perspectives. The CARO progress report 2022 indicates progress has been made with regards to climate change adaptation implementation with this event.
3	Above average precipitation	Negligible	Negligible	The last decade from 2006 - 2015 has been the wettest period in the period 1711- 2016 and there is evidence of an increasing trend in winter rainfall and a decreasing trend in summer rainfall (Status of Ireland's Climate, EPA). This implies there is an increase in severity in winter periods but a reduction in summer periods. The local authority has a role in addressing these issues, and could therefore suffer reputational damage from local, national, and international perspectives. The CARO progress report 2022 indicates progress has been made with regards to climate change adaptation implementation.
4	Extreme precipitation	Minor	Minor	When compared with an annual average rainfall of 1186mm for the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall (Status of Ireland's Climate, EPA). The local authority has a role in addressing these issues, and could therefore suffer reputational damage from local, national, and international perspectives. The CARO progress report 2022 indicates progress has been made with regards to climate change adaptation implementation.
5	Severe windstorm	Negligible	Negligible	Current predictions indicate an increase in the intensity of windstorms (Climate Ireland), increasing the impacts involved. The local authority has a role in addressing these issues, and could therefore suffer reputational damage from local, national, and international perspectives. The CARO progress report 2022 indicates progress has been made with regards to climate change adaptation implementation.
6	Heatwave	Negligible	Negligible	Average surface air temperatures are expected to increase across all seasons which will likely increase the intensity of heatwaves (Climate Ireland). The local authority has a role in addressing these issues, and could therefore suffer reputational damage from local, national, and international perspectives. The CARO progress report 2022 indicates progress has been made with regards to climate change adaptation implementation.
7	Drought	Minor	Moderate	Average surface temperature are expected to increase, as well as a decrease in the levels of summer rainfall (Status of Ireland's Climate, EPA). The local authority has a role in addressing these issues, and could therefore suffer reputational damage from local, national, and international perspectives.
8	Above average surface temperature	Negligible	Negligible	Average surface air temperatures across all seasons are expected to increase (Climate Ireland). The local authority has a role in addressing these issues, and could therefore suffer reputational damage from local, national, and international perspectives. The CARO progress report 2022 indicates progress has been made with regards to climate change adaptation implementation.
9	Cold spell	Negligible	Negligible	There has been a decrease in the number of frost days (temperatures below 0°C) and a shortening of the frost season duration, with projections to be in line with current trends (Climate Ireland). However, the impact remains negligible.
10	Heavy snowfall	Negligible	Negligible	Snowfall is projected to decrease substantially by the middle of the century (Nolan and Flanagan), but impacts will remain the same.

Hazard No.	Hazard Type	Current Cultural Heritage Impact	Projected Change	Rationale
1	River flood	Moderate	Major	There could be an increase in the number of cultural heritage assets exposed to river flooding due to an increase in severity of flooding events. There is a likely increase in river flows across most of the country leading to an increase in severity of flooding (Climate Ireland). The objective is to continue to work alongside OPW to carry out flood relief schemes and maintain existing defences (Carlow CDP).
2	Pluvial flood	Minor	Moderate	There could be an increase in the number of cultural heritage assets exposed to pluvial flooding due to an increase in severity of flooding events, and an increase in the overall impact is expected. When compared with an annual average rainfall of 1186mm for the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall (Status of Ireland's Climate, EPA). The objective is to continue to work alongside OPW to carry out flood relief schemes and maintain existing defences (Carlow CDP).
3	Above average precipitation	Moderate	Moderate	Above average precipitation does not impact the majority of cultural heritage assets so a significant increase in overall impact is not envisaged. The last decade from 2006 - 2015 has been the wettest period in the period 1711 - 2016 and there is evidence of an increasing trend in winter rainfall and a decreasing trend in summer rainfall (Status of Ireland's Climate, EPA). This implies there is an increase in severity in winter periods but a reduction in summer periods.
4	Extreme precipitation	Moderate	Moderate	Extreme precipitation does not impact the majority of cultural heritage assets so a significant increase in overall impact is not envisaged. When compared with an annual average rainfall of 1186mm for the period 1961-1990, the thirty year period 1990-2019 shows a 70mm or almost 7% increase in rainfall (Status of Ireland's Climate, EPA).
5	Severe windstorm	Moderate	Moderate	The projected changes in severe windstorms indicate a reduction in lesser storms but an increase in major storms. The overall impact is expected to remain relatively unchanged as storms may be less frequent but the damage caused may increase. Current predictions indicate an increase in the intensity of windstorms (Climate Ireland), increasing the impacts involved.
6	Heatwave	Moderate	Moderate	Areas of cultural heritage may have an increase in visitors during these events, increasing pressure on these areas, but not enough to increase the impact. Average surface air temperatures are expected to increase across all seasons which will likely increase the intensity of heatwaves (Climate Ireland).
7	Drought	Negligible	Negligible	Droughts do not impact the majority of cultural heritage assets so a significant increase in overall impact is not envisaged (Carlow CDP). Average surface temperature are expected to increase, as well as a decrease in the levels of summer rainfall (Status of Ireland's Climate, EPA).
8	Above average surface temperature	Moderate	Moderate	Areas of cultural heritage may have an increase in visitors as a result of increased average surface temperatures, increasing pressure on these areas, but not enough to increase a major impact. Average surface air temperatures across all seasons are expected to increase (Climate Ireland).
9	Cold spell	Minor	Minor	Cold spells do not impact the majority of cultural heritage assets so a significant increase in overall impact is not envisaged. There has been a decrease in the number of frost days (temperatures below 0°C) and a shortening of the frost season duration, with projections to be in line with current trends (Climate Ireland). However, the impact remains as a minor impact.
10	Heavy snowfall	Minor	Minor	Heavy snowfalls do not impact the majority of cultural heritage assets so a significant increase in overall impact is not envisaged. Snowfall is projected to decrease substantially by the middle of the century (Nolan and Flanagan), but impacts will remain the same.