

Southern Downs Regional Council

Climate Change Adaptation Action Plan for Council Operations



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1.0 Introduction

1.1 Context

Climate change has been recognised internationally as a significant issue requiring an urgent response from all levels of government and the community. The Australian and Queensland governments have responded to increased community concern about climate change by committing resources to climate change research, policy setting, mitigation and adaptation.

Climate change poses risks and opportunities that are different for individual local areas. These opportunities and risks need to be clearly understood and impacts identified before climate responsive strategies can be devised. Local government, as the closest level of government to the community, is well placed to respond to local vulnerabilities and priorities arising as a result of climate change, however local government is not sufficiently funded to undertake all adaptation measures that may be identified.

Given the uncertainty of climate change projections and Council's existing spending priorities, for the most part, recommendations for adaptation contained in this report are those that will have least impact on Council's budget planning. Where possible recommendations are designed to result in works and policies that are a natural consequence of Council's normal activities with the added advantage of providing measures for adaptation to climate change.

1.2 Purpose of the Climate Change Adaptation Action Plan

This plan identifies key risks to Southern Downs Regional Council functions associated with climate change and identifies strategies that respond or adapt to the identified risks.

This plan generally follows the methodology proposed in Adapting to Climate Change – A Queensland Local Government Guide.¹ The first part of the plan identifies the likely effects of climate change on the diverse roles and responsibilities of Council in the provision of services for the local region.

The second part of the plan focuses on risks and adaptation. This part provides specific strategies for dealing with the likely effects of climate change.

This plan does not include strategies to reduce emissions. This will be the subject of another report.

¹ Local Government Association of Queensland Inc. - Adapting to Climate Change – A Queensland Local Government Guide – June 2007

2.0 Assessment of Climate Change Risks for Southern Downs Regional Council

2.1 Climate change impacts

CSIRO² has identified that the Southern Downs Region as part of south-east Queensland is likely to become warmer with more hot days and fewer cold nights. Water resources are likely to be stressed due to a decline in annual rainfall and greater evaporation leading to a tendency for less run off into rivers. Droughts are likely to be more frequent and more severe. Fire risk will be higher. Increases in extreme weather events are likely to lead to increased flash flooding.

This risk assessment is in terms of the following climate change impacts:

- Decreasing rainfall and increased prolonged droughts
- Increasing temperature
- Increasing extreme weather events

2.1.1 Decreasing rainfall and increased prolonged droughts

The associated impacts of decreasing rainfall and more prolonged droughts include:

- Reduced or less reliable water availability from local water supplies. Council has already identified that existing urban water supplies for Stanthorpe and Wallangarra are insufficient to meet future demand. Decreasing rainfall will lead to reduced runoff and increased evaporation which will impact on all storages and exacerbate the existing water shortages;
- Increased demand on urban supplies from inside and outside the supply network. Urban and rural residents, commerce and industry will demand more access to urban supplies as on site storage systems fail ;
- Increasing fire hazard. Bushfires will become a greater risk as bushland dries out and areas that have previously been moist and contain significant vegetation will become more prone to bushfire;
- Impacts on rivers and wetland ecosystems. Dry rivers and failed wetlands will result in impacts on agriculture as well as the natural environment;
- Decreased crop yields and productivity;
- Reduction in irrigated agriculture. Loss of irrigation water will result in increases in crop failure and significant changes in agricultural activity as farmers change their focus to new production methods and types that are less reliant on water;
- Damage to infrastructure as a result of ground movement. As black soils dry out ground movements will cause the foundations of buildings and other infrastructure to move.

2.1.2 Increasing temperature

The associated impacts of increasing temperature include:

- Increased evaporation and decreased water storage;
- Increased incidence of death and illness particularly in vulnerable parts of the population as a result of prolonged heat waves;
- Increased heat stress in livestock and wildlife;
- Changes to the types of horticulture that can be undertaken;

² Department of Environment and Heritage Australian Greenhouse Office – Climate change scenarios for initial assessment of risk in accordance with risk management guidance 2006

- Decreased reliability of electrical supply as a result of increased demand for cooling;
- Extended range and activity of pests and weeds;
- Extended range and activity of disease vectors;
- Impacts on ecosystems and changes in the range of native vegetation and wildlife;
- Changes in demand for recreational facilities.

2.1.3 Extreme weather events

The associated impacts of increasing extreme weather events such as intense storms include:

- Increased flood and landslide damage;
- Increased flood runoff;
- Increased erosion;
- Increased risk to human life and health;
- storm damage to buildings and infrastructure;
- Increased inability of existing infrastructure to manage stormwater flows.

2.2 Possible risks across Southern Downs Regional Council functions

2.3.1 Prioritising the Risk

Risk can be assessed by both likelihood and consequence. Risk assessment criteria are attached as Schedule 1. The level of risk will influence the adaptation measures that are appropriate and their budget priority. A risk response table has been prepared for each of the identified risks to SDRC.

2.3.2 Council Functions

The core functions of SDRC are contained in the Corporate Plan.

For the purpose of this assessment the Council functions listed in the Corporate Plan have been grouped under the following headings:

Governance

- Governance framework and corporate planning
- Finance and Budget
- Human Resources
- Information technology

Infrastructure

- Water supply
- Waste water
- Stormwater
- Road networks and public transport
- Other infrastructure

Community Services

- Waste management
- Civic facilities
- Parks and gardens
- Community safety
- Recreation facilities

Planning and Development

- Land use planning
- Economic development
- Tourism and major events

Natural resource management

- Environmental management

It is recognised that an overarching issue for Council is financial viability. Council's viability is dependant on the viability of the entire Region. Climate change will impact on all the sectors of the Region in different ways and the risks associated with these impacts will be explored in a separate document. So although the impacts of climate change may have impacts on agriculture or industry in the Region and the loss or reduction of profitability of those industries will impact on Council's financial viability, this risk is not specifically identified in the attached table but is assumed as a given.

3.0 Risk response table

3.1 Governance risks

Risk	Human Resources Extreme weather events will: <ul style="list-style-type: none"> • prevent Council staff from attending work and delivering services to the community; • cause power outages which will disrupt communication between workplaces resulting in more travel for staff (also caused by load shedding as a response to increased demand for power resulting from high temperatures); • will result in Council staff being diverted to response and recovery operations. Increasing temperatures will cause stress to outside workers
Likelihood	Likely
Consequences	Service delivery disrupted from time to time. Changed working hours for outside staff required. More incidence of heat related illness in outside staff.
Level	Low
Context	Outside staff presently work seasonal hours, cold water is provided to outdoor staff and new plant includes air conditioned cabs. At times of crises there is a community acceptance of some reduction in services.
Adaptation strategy	Consider any required changes to working hours and conditions. Need to budget and plan for training of employees in adaptation strategies.

Risk	Finance and budget <ul style="list-style-type: none"> • Costs associated with any required adaptation measures (including provision of additional water storages); • Increased insurance costs; • Increased maintenance and recovery costs of infrastructure (including stormwater and roads); • Costs associated with cooling Council buildings; • Council asset loss or damage as a result of extreme weather events (including loss or damage to buildings); • Costs of implementing systems for any required carbon accounting; • Costs of any carbon tax; • Increased costs associated with weed and pest management including control of vectors for vector borne diseases; • Increased incidence of litigation and associated compensation claims made on Council as a result of services being impacted by extreme weather events or past planning decisions; • Costs associated with provision of emergency services such as food and accommodation to residents affected by extreme weather events or bushfire; • Costs of responding to emergencies including staff time and equipment;
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	Reduced productivity of agricultural, industrial and tourism enterprises results in Council's reduced financial capacity to deliver services.
Likelihood	Costs resulting from climate change are almost certain. The costs relating to individual risks change with the likelihood of the risk.
Consequences	Council will need to find other sources of income or reduce services.
Level	Low to catastrophic depending on the actual risk.
Context	Every risk will result in financial impact on Council whether direct or indirect. Budget planning currently includes some risk assessment.
Adaptation strategy	Consider how to build climate change risk into the budget process.

Risk	Corporate planning If no consideration or response to climate change is taken by Council it will result in a loss of community confidence in Council and a decline in Council's reputation.
Likelihood	Likely
Consequences	Council loses the confidence of the community as a leader.
Level	Moderate
Context	The Corporate Plan provides the framework for Council's governance.
Adaptation strategy	Review the Corporate Plan and associated operational plans to integrate climate change risk and adaptation and ensure that climate change considerations are incorporated in the development of new corporate strategies, plans and policies.

Risk	Information technology and records <ul style="list-style-type: none"> • Extreme weather events will cause power outages and loss of communication between workplaces; • Power shedding as a response to increased use of power at times of intense heat will cause power outages and loss of communication between workplaces; • Loss of physical records as a result of extreme weather events; • Loss of all Council records.
Likelihood	The loss of all Council records would be a rare event. All other risks are likely.
Consequences	Council operations will be disrupted and service levels reduced.
Level	Loss of all Council records – catastrophic All other risks – low
Context	Electronic communication between workplaces relies on Telstra IPWAN for data and VoIP and the Telstra mobile network for mobile phone and mobile users. The Telstra networks are used for all other communication.
Adaptation strategy	Review information management arrangements to respond to climate change risks.

3.2 Risks to infrastructure

Risk	Water supply <ul style="list-style-type: none"> • Inadequate urban water supply to maintain current lifestyle demands and provide for growth; • Water supply to a particular urban area will fail; • Increased costs of water treatment as levels in storages drop; • Bushfire in the dam catchments;
Likelihood	Almost certain
Consequences	<p>Restricted growth or population decline, restricted industry and business growth or decline as a result of inadequate urban water supply.</p> <p>Road works and other infrastructure projects are cancelled or postponed due to lack of construction water.</p> <p>Increased treatment costs as a result of declining water quality.</p>
Level	<p>Inadequate or failed supply – major to catastrophic</p> <p>Poor quality - low</p>
Context	Both quantity and quality of urban water supply is closely monitored, there are presently limited options for urban water supply augmentation.
Adaptation strategy	<p>Water supply</p> <ul style="list-style-type: none"> • Increase water storage associated with all new buildings; • Increase restrictions on water use; • Truck water into urban areas from other localities when necessary; • Construct new water storage; • Identify and implement building design elements that result in reduced use of water and dependency on urban supplies. This may include such strategies as the incorporation of grey water tanks in all new developments. • Redeploy staff to tasks that do not depend on water supply. <p>Water quality</p> <ul style="list-style-type: none"> • Protection of catchments from wildfire by hazard reduction operations; • Invest in upgrades of water treatment processes.

Risk	Waste water <p>Reductions in the amount of waste water produced will result in</p> <ul style="list-style-type: none"> • The quantity of waste water to irrigate parks and playing fields will be reduced; • Decreased flows in waste water networks causing blockages; • Increased corrosion and cracking of sewer pipes; • A reduction in the available supply of waste water for irrigators. <p>Flooding as a result of an extreme weather event could cause flooding of sewerage treatment plants and cross contamination of water and sewer systems</p>
Likelihood	Likely
Consequences	<p>Increased maintenance required on the sewerage system.</p> <p>Some existing park plantings and playing field surfaces will die.</p>

Level	Moderate
Context	Declining urban water reliability has resulted in increasing dependence on waste water for park and playing field maintenance. Aging sewer pipe infrastructure is prone to cracking and corrosion. Council has contracts with irrigators for use of waste water for agricultural purposes..
Adaptation strategy	Parks and playing fields <ul style="list-style-type: none"> • Changes in the type of plants established in parks; • Changes to the surfaces of playing fields; • Reduction in garden plantings in parks. Sewer infrastructure <ul style="list-style-type: none"> • Rehabilitate deteriorating pipes; • Increased maintenance and repair of sewer infrastructure. Council to adopt a policy for the allocation of waste water between urban users, including parks and gardens, and irrigators.

Risk	Stormwater Extreme weather events will cause the stormwater network to overflow causing local flooding which will then impact on property and traffic safety. Council receives an increase in complaints as a result of inadequate inter allotment drainage.
Likelihood	Almost certain
Consequences	Increased stormwater entering property, damage to roads, increased number of accidents and consequent potential for injury and death and litigation. Council is under pressure to upgrade inter allotment drainage in existing subdivisions
Level	Moderate
Context	The urban stormwater system is not comprehensive and most is not designed to deal with extreme events. Older subdivisions have little, or no, provision for inter allotment drainage.
Adaptation strategy	Develop local urban stormwater management plans for the most affected catchments that address potential local alternative uses for stormwater and include measures to reduce peak flows in wet weather. Limit urban expansion in areas where there are potential constraints to the development and capacity of the stormwater systems. Condition all new development to make provision for inter allotment drainage.

Risk	Road networks and public transport Extreme weather events and associated flooding will result in <ul style="list-style-type: none"> • Significant number of road washouts; • Flooded roads leaving areas inaccessible for prolonged periods; • Erosion of riverbanks and bridge foundations. Decreased rainfall and associated lack of water supply will result in postponement or cancellation of road works. High temperatures will change the rates of deterioration of road surfaces.
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Likelihood	Almost certain
Consequences	Increased demand for maintenance of roads and bridges; Increased demand for new flood free road accesses; Changes to works programmes and consequent non delivery of works within design time frames.
Level	Moderate
Context	The budget for road works currently provides for new works and maintenance.
Adaptation strategy	Modify the road works programme to ensure that climate change impact considerations are included.

Risk	Other infrastructure Council infrastructure including pipelines, pump stations and water treatment plants are damaged or destroyed as a result of bushfire. Infrastructure elements including pipelines, pump stations and water treatment plants are not designed to respond to climate challenges.
Likelihood	Possible
Consequences	Service break down
Level	Moderate
Context	Many of these infrastructure elements are located in bushfire prone areas.
Adaptation strategy	Increase operations and strategies to protect these infrastructure elements from bushfire. For infrastructure elements with a long life, design for staged construction if possible to allow for future climate change impacts to be incorporated in the construction.

3.3 Risks to community services

Risk	Waste management Extreme weather events or bushfire result in large, unplanned for amounts of landfill and other waste. Extreme weather events result in flooding at landfills. Waste collections disrupted by extreme weather events.
Likelihood	Possible
Consequences	Existing landfills filled and new landfills have to be constructed. Contaminated floodwaters enter surface and ground water systems. Residents are inconvenienced by delayed waste collections.
Level	Landfill area reduction and flooding at landfills – major Delayed collections - minimal
Context	Landfill areas are expensive to design and operate and are designed to withstand most levels of flooding.
Adaptation strategy	Landfills are designed to withstand extreme flooding events. Increase monitoring and maintenance of existing controls for flooding.

Risk	Civic facilities Council assets are damaged or destroyed by an extreme weather event. Increased use of some Council facilities such as pools and libraries as refuges from extreme temperatures.
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	Need to upgrade Council buildings (including pensioner housing) to respond to extreme temperatures. Changes in the age, background and expectations in the population will affect the response to climate change impacts.
Likelihood	Possible
Consequences	Council assets are either replaced or lost to the community if they are destroyed. There may be demand to extend the capacity and range of facilities used to escape from the heat. Existing Council buildings will be retrofitted to respond to extreme temperatures.
Level	Moderate - Major
Context	Council owns many facilities in different parts of the Region. All are susceptible to damage, however Council does carry insurance to pay for repairs. The pensioner houses and units do not have air conditioning.
Adaptation strategy	Council to review its insurance arrangements. Monitor buildings and their users so that any modifications or retrofitting occurs prior to absolute need. Adopt climate sensitive designs for any new buildings including the provision of informal spaces within public buildings that may be used as refuges for heat and cold. Provide insulation for existing pensioner units as a first strategy followed by awning and sunshades for windows and water tanks to allow for gardens during times of water restrictions.

Risk	Parks and gardens Demand for increased shade in parks and gardens. Changed garden design and plant selection as a result of decreased availability of waste water. Increased demand for community gardens as residents are unable to maintain domestic gardens because of restrictions on urban water use.
Likelihood	Almost certain.
Consequences	In the short to medium term parks and garden budgets will need to increase to provide for the required change. In the long term water efficient landscaping may result in lower costs for maintenance.
Level	Low
Context	Parks and gardens assist in providing identity and beauty to the Region. Residents will be concerned if Council allows parks and gardens to deteriorate.
Adaptation strategy	Council to review all park plans to incorporate water efficient design elements including planting, maintenance and where possible, elements for storing stormwater. Monitor existing irrigation systems to ensure that irrigation is effectively used. Ensure that community gardens are located in areas where there is a supply of water that is independent of urban supplies.

Risk	Community safety Increased incidence of extreme weather events and bushfire will require Council to increase its commitment to relief efforts. Increasing demand for Council to provide accessible air
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	<p>conditioned public facilities.</p> <p>Increasing demand for outdoor drinking facilities.</p> <p>Outbreaks of vector borne diseases</p>
Likelihood	Likely
Consequences	<p>There will be budget impacts associated with disaster responses provided by Council.</p> <p>Council's environmental health officers in conjunction with officers from the Health Department are well placed to monitor disease vectors and to educate the public about control and avoidance but would need to be better resourced to undertake control activities.</p>
Level	Moderate
Context	Community safety is a responsibility that is shared by Council and other government agencies including health and emergency services.
Adaptation strategy	<p>Review disaster management plans including the Community Recovery Plan and improve community disaster preparedness.</p> <p>Be prepared to lobby government for disaster management financial and physical assistance.</p> <p>Increased awareness and monitoring of vector populations and increased activity to control disease vectors including reduction in breeding areas and spraying.</p>

Risk	<p>Recreational facilities</p> <p>Change of demand for recreation facilities from outdoor facilities to indoor facilities.</p> <p>Demand for additional shade at all recreation venues.</p>
Likelihood	Almost certain
Consequences	<p>Some outdoor recreation facilities may become redundant or require different treatment such as changed surfaces for playing fields and shade for spectators and off field players.</p> <p>The community will demand the provision of shade structures.</p> <p>Possible litigation if people sustain harm through lack of shade at facilities.</p>
Level	Low
Context	Council is responsible for a number of outdoor recreation facilities. There may be an opportunity to partner with dominant users such as clubs to address shade issues.
Adaptation strategy	<p>Conduct shade audit to determine adequacy of existing shade.</p> <p>Include provision of shade in budgeting for all new recreation facilities.</p> <p>Encourage private enterprise to develop indoor recreation facilities.</p> <p>Monitor use of outdoor facilities particularly playing fields for maintenance needs.</p> <p>Encourage scheduling of organised sporting events to avoid the hottest part of the day.</p>

3.4 Risks for planning and development

Risk	<p>Land use planning</p> <p>Inappropriate location of urban expansion areas.</p> <p>Increased uncertainty in long term infrastructure planning.</p> <p>Council required to incorporate and administer Increased government regulations regarding climate change.</p>
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Likelihood	Possible
Consequences	Increased probability of damage to built infrastructure. Possible costs to Council of relocating housing and other urban infrastructure from inappropriate areas.
Level	Low - catastrophic
Context	Council's future planning is regulated by the planning scheme. The effectiveness of the planning scheme in correctly determining the appropriate location of urban development and infrastructure depends on the information that is available.
Adaptation strategy	Identify areas that are vulnerable to bushfire and flood and, by means of planning scheme regulations restrict inappropriate development in these areas. Incorporate provisions in planning schemes designed to ensure that new development is responsive to climate change challenges. Ensure the timely review of planning schemes to ensure that new information and knowledge about climate change is incorporated in the scheme. Ensure that planning schemes assess the implications of new development on existing urban water supplies.

Risk	Economic development Economic development will be limited by consequential impacts of climate change.
Likelihood	Likely
Consequences	Restricted growth and employment opportunities.
Level	Moderate
Context	Ongoing economic growth is required to ensure that the Region does not stagnate. Loss of employment opportunities will lead to increasing unemployment and residents leaving the Region. Slow economic development will impact on Council's funding. Consequential impacts of climate change including inadequate urban water supplies and loss of biodiversity and scenic beauty restrict economic development.
Adaptation strategy	Target new businesses that are not reliant on urban water. Encourage resilience in existing businesses.

Risk	Economic development – population change and growth The Southern Downs Region may become increasingly attractive to residents of coastal areas in order to avoid climate change risks in the coastal areas.
Likelihood	Possible
Consequences	Changed growth and employment opportunities. Increased requirements for infrastructure. Changed demands for services and facilities.
Level	Moderate
Context	Increased population will assist economic development but will be associated with increased pressures on infrastructure including water supplies. Residents from large centres on the coast will bring with them increased expectations of the facilities and services offered by Council.

Adaptation strategy	Target new businesses that are not reliant on urban water. Encourage resilience in existing businesses.
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Risk	Tourism and major events Events are postponed or cancelled as a result of extreme weather events. Participants are adversely affected by heat wave conditions.
Likelihood	Possible
Consequences	Loss of reputation for Region as host of an event and for event organisers.
Level	Low
Context	Council is not responsible for the largest events in the year however is frequently a stakeholder or sponsor.
Adaptation strategy	Make and adopt emergency contingency plans for major events in cooperation with relevant state agencies and event organisers. Encourage the scheduling of events at times that avoid the hottest and most stormy times of the year.

3.4 Risks for natural resource management

Risk	Environmental management Changes in distribution of invasive species and associated loss of biodiversity. Changes to bushfire intensity reducing ecosystem resilience.
Likelihood	Likely
Consequences	Invasive species increasingly affect agricultural production. The natural beauty of the Region is adversely affected as weeds displace native plants. Increased costs in controlling weed species as the number and spread increases.
Level	Low
Context	Council has a Pest Management Plan.
Adaptation strategy	Implement conservation management plans for Reserves and other land under Council control. Encourage private land conservation and provide education about appropriate management. Incorporate the implications of climate change impacts in the Pest Management Plan. Revise spraying schedules to take into account changed climatic conditions including bushfire that affect growth and dispersion of weeds.

Appendix 1 Risk Assessment Criteria –

Consequence assessment criteria for the full spectrum of Council interests.³

Rating	Public safety	Local economy and growth	Community and lifestyle	Environment and sustainability	Public administration – financial and or legal liabilities
Minimal	Appearance of a threat but no actual harm.	Minor shortfall relative to current forecasts.	There would be minor areas in which the Region was unable to maintain its current services.	No environmental damage.	There would be minor instances of public administration being under more than usual stress but it could be managed – say <\$50 K No legal action
Low	Serious near misses or minor injuries.	Individually significant but isolated areas of reduction in economic performance relative to current forecasts.	Isolated but noticeable examples of decline in services.	Minor instances of environmental damage that could be reversed.	Isolated instances of public administration being under severe pressure – say >\$50 K - <\$100 K. Litigation / fines to \$100 K Minor delays in statutory requirements.
Moderate	Small numbers of injuries	Significant general reduction in economic performance relative to current forecasts.	General appreciable decline in services.	Isolated but significant instances of environmental damage that might be reversed with intensive efforts.	Public administration would be under severe pressure on several fronts – say > \$100 K - > \$1 M Litigation / fines to \$1 M Moderate delays to statutory requirements.
Major	Isolated instances of serious injuries or loss of lives.	Regional stagnation such that businesses are unable to thrive and employment does not keep pace with population growth.	Sever and widespread decline in services and quality of life within the community.	Severe loss of environmental amenity and a danger of continuing environmental damage.	Public administration would struggle to remain effective and would be seen to be in danger of failing completely – say > \$1 M - < \$5 M Litigation / fines to \$5 M Major delays to statutory requirements.
Catastrophic	Large numbers of serious injuries or loss of lives.	Regional decline leading to widespread business failure, loss of employment and hardship.	The Region would be seen as very unattractive, moribund and unable to support the community.	Major widespread loss of environmental amenity and progressive irrecoverable environmental damage.	Public administration would fall into decay and cease to be effective – say \$5 M Litigation / fines over \$5M Unable to meet statutory requirements.

³ Local Government Association of Queensland Inc. - Adapting to Climate Change – A Queensland Local Government Guide – June 2007

Likelihood Scale

Rating	Recurrent risks	Single events
Almost certain	Could arise several times per year	More likely than not – probability greater than 50%
Likely	May arise about once per year	As likely as not – 50 / 50 chance
Possible	May arise once in ten years	Less likely than not but still appreciable – probability less than 50% but still quite high.
Unlikely	May arise once in 10 years to 25 years	Unlikely but not negligible – probability low but noticeably greater than zero.
Rare	Unlikely during the next 25 years	Negligible – probability very small, close to zero.