

ASSESSING AND ADAPTING TO THE IMPACT OF PAST WEATHER EVENTS IN THE HORTICULTURE SECTOR



Royal
Botanic Garden
Edinburgh

Case study: Royal Botanic Garden Edinburgh

Horticulture and visitor services staff at the Royal Botanic Garden Edinburgh (RBGE) and its Regional Gardens are already adapting to climate uncertainty – dealing with floods, prolonged periods of low rainfall, unseasonable temperatures and high winds. This case study looks at the process used to investigate the impact of weather events across the different gardens and how this can be used to best deal with projected climate change.

Scotland's changing climate

We are already seeing evidence of Scotland's climate changing. Over the last few decades our climate has warmed, sea-levels have risen, rainfall patterns have changed and we have been impacted by extreme weather events. These changes are projected to continue in the decades ahead.

The UK Climate Projections 2009 data suggests that, for Scotland:

- the average climate will become warmer throughout the year;
- rainfall is likely to become more seasonal with
 - a typical summer becoming drier, and
 - a typical autumn and winter becoming wetter; and
- sea levels will rise.

We can also expect to see:

- increase in summer heat waves, extreme temperatures and drought;
- increased frequency and intensity of extreme precipitation events; and
- reduced occurrence of frost and snowfall.

Source: ukclimateprojections.metoffice.gov.uk

**Adaptation
Scotland**
supporting climate change resilience

The process

1. Getting people on board

The first action was to meet with the garden curators to explain the aim of the project, how it would be of value, and the output that would be produced.

2. Gathering information

Next, visits to each garden were arranged to interview key personnel and gather information on:

- observed impacts of current weather conditions and extreme weather experienced, and any adaptive actions taken as a result;

- risks related to weather or climate change that have been identified;
- potential opportunities arising from a changing climate; and
- records of garden closures to visitors and staff and historic weather data.

3. Site visit

At each garden, the curator also did a walk round to explain the garden features and see weather impacts and adaptive actions first-hand. Visitor services staff, who are well placed to see the impact of weather events on visitors, were also consulted.

The Gardens

The Royal Botanic Garden Edinburgh was established in 1670.

During the 20th century it acquired three Regional Gardens. The four gardens experience quite different weather conditions; Inverleith in Edinburgh is the driest, Dawyck the coldest, Benmore the wettest and Logan the mildest. Together they represent one of the world's largest living collections of plants.

Across the different Gardens, most kinds of extreme weather have been experienced.





The findings

1. Plants

The iconic Redwood Avenue of trees at Benmore gardens (pictured) is at risk of waterlogging due to inadequate drainage in intense rain. The waterlogged soil causes physical stress to the trees due to root death. No air spaces are left in the saturated soil and roots literally drown.

All the gardens have seen trees lost or damaged in storms. This provides both challenges, when specimens are of particular conservation importance, and opportunities for planting new species.

Mild winters increase the risk of pests and diseases. Impacts include an increase in aphids such as green spruce aphid on *Picea* (spruce), and soft scale, previously considered a glasshouse pest, on rhododendron.

2. People

As the climate changes, the gardens have to close more frequently due to severe weather. This has a number of impacts:

- Loss of work hours; as staff are also excluded from the garden for safety reasons.
- Loss of income; for example at Logan the Potting Shed Bistro has

to close if the garden is closed due to weather.

- Disappointed visitors.
- Staff time to clear up after a storm; for example at Dawyck the removal of one fallen Noble fir took 200 man hours as machinery could not be used safely due to its location.

3. Infrastructure

The increase in heavy rainfall events has made the use of bark and grass paths impractical. All the gardens are now replacing these paths with gravel, or other porous paths together with improved drainage measures.

Storm damage has resulted in multiple broken panes of glass in the glasshouses at Inverleith, in Edinburgh (pictured), leaving tender plants exposed to the elements.

Adaptation measures

Adaptation is site specific. The four different sites allow RBGE to draw on a wide range of experience in dealing with different weather events and site impacts. Some adaptation measures include:

- Planting a mix of species. This increases resilience to pests and diseases, and provides a more effective windbreak and structure to shelter belts.
- When re-designing garden infrastructure, locate facilities such as visitor centres and cafes outside the pay zone to provide access even if the garden is closed.
- When planning staff resource and time, include allowance for clear-up and remedial work following extreme weather events.
- Replacing paths with gravel or other porous materials.
- Providing additional drainage and factoring in staff time for keeping drains clear.

- Researching glasshouse structures and glazing systems that are less susceptible to wind damage.
- Adopting a zero tolerance maintenance procedure to glass damage such as cracks, and keep more glass on site to reduce repair time.

Next Steps

- Compare anecdotal evidence about changing weather with actual weather records from the weather stations at each garden.
- Highlight the opportunities, such as being able to grow new species in a milder future climate.
- Produce maps of the gardens with a 'trail' showing adaptation features, and develop interpretative signage to explain climate impacts and adaptation measures to visitors.

Recommendations

1. Gain high-level support for initiatives
2. Consider the aims of the organisation and how this process can add value, for example communication and engagement.
3. Talk to as many personnel as possible, and listen to their experiences.

Further information

For more information about this project, visit <http://journals.rbge.org.uk/index.php/rbgesib/article/view/44>

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Adaptation support

The Adaptation Learning Exchange (ALE) is a programme to support organisations with adaptation planning, enabling them to address common adaptation challenges and explore opportunities. For more about the ALE, visit our website or contact sophie@sniffer.org.uk

www.adaptationscotland.org.uk

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