

Here Comes Trouble!

A Look at the Effects of Climate Change on the Landscape

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Heat and extreme rain events are changing landscape management.

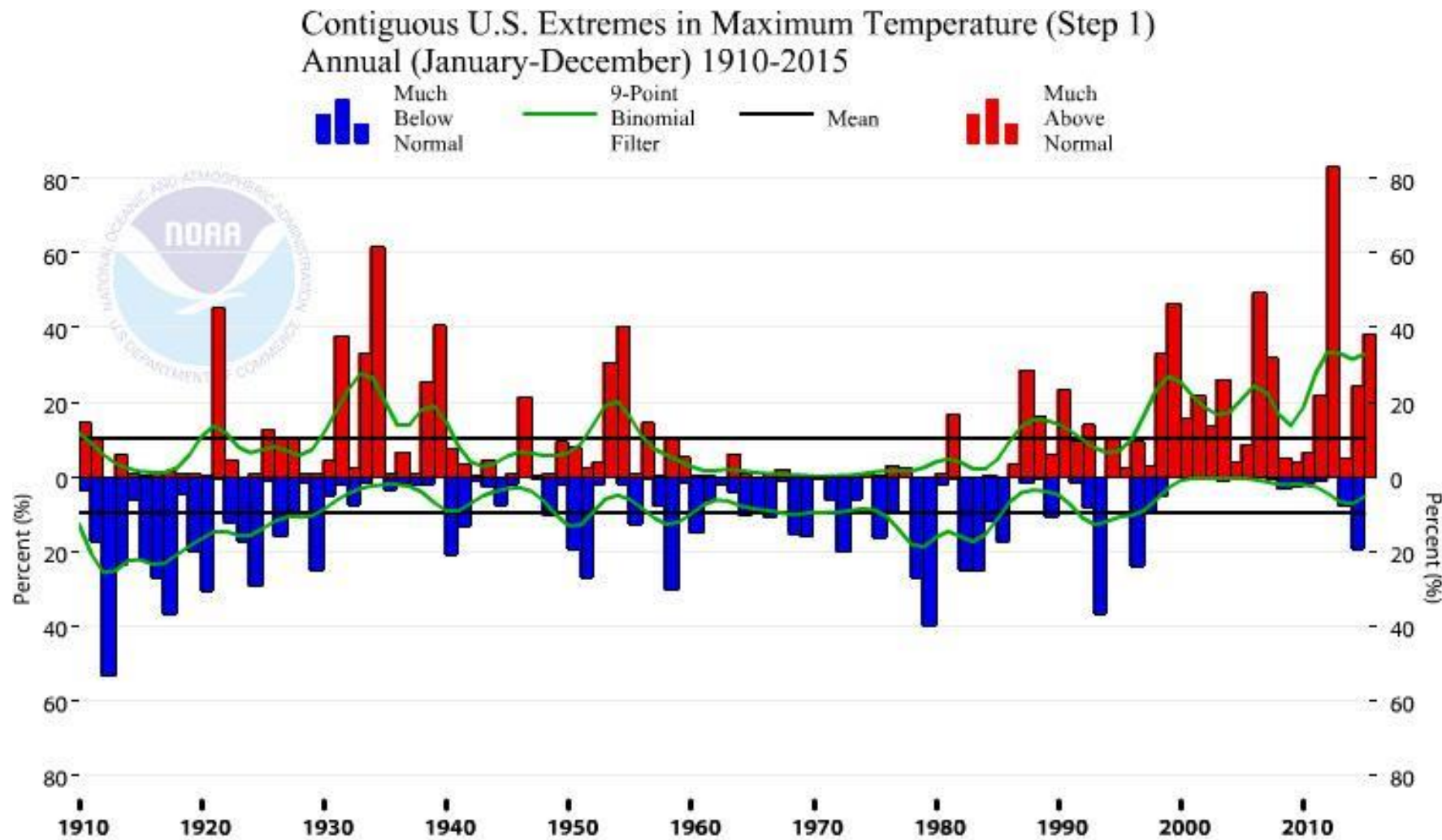


HEAT:

- The Northeastern climate is experiencing noticeable changes that are expected to increase in the future.
- Between 1895 and 2011, temperatures rose by almost 2°F and projections indicate warming of 4.5°F to 10°F by the 2080's.
- The frequency, intensity, and length of heat waves is also expected to increase.



Today, we will look the changing weather environment and how it effects non-regional pests and today's landscape management and growing practices.



RAINFALL:

- Our area is experiencing a large increase in the amount of rainfall measured during heavy precipitation events.
- The total amount of precipitation and the frequency of heavy precipitation events has also risen in the region.
- Between 1958 and 2012, the Northeast saw more than a 70% increase in the amount of rainfall measured during heavy precipitation events, more than in any other region in the U.S.



Projections indicate continuing increases in precipitation, especially in winter & spring and in northern parts of the region.

Timing of winter and spring precipitation could lead to drought conditions in summer as warmer temperatures increase evaporation and accelerate snow melt.

This alone is having a an impact on horticulture practices.

- Growing amenity plants will require more water.
- Growing plants like cool season grasses will require more resources like water and fertilizer.

Drought related pest problems will be more frequent.



Should we be amending our maintenance practices?



Gee, it feels warm around here !

- ▶ Warming temperatures have allowed some insects to extend their northern range and move into the mild coastal weather of the northeast.
- ▶ These same warming trends that extend our local mild spring & fall weather, are allowing more generations from insects which have multiple generations.

Examples:

- ▶ The Azalea Lace Bug use to have 2-3 generations per year, now there are 4-5 generations per year, depending on the how long the mild fall drags on.
- ▶ Fungal disease like Southern Blight now regularly over winter in our soils for up to 10 years!



Climatic zones are changing

- Environmental changes are effecting non-regional insects and disease
- Native pests have an increased range and an increased food source, with a lack of or a time lag in the establishment of natural controls
- Invasive pests - increased survival, high food source, no natural controls

These changes have brought new pest pressures to landscape management in the northeast region. LABEL



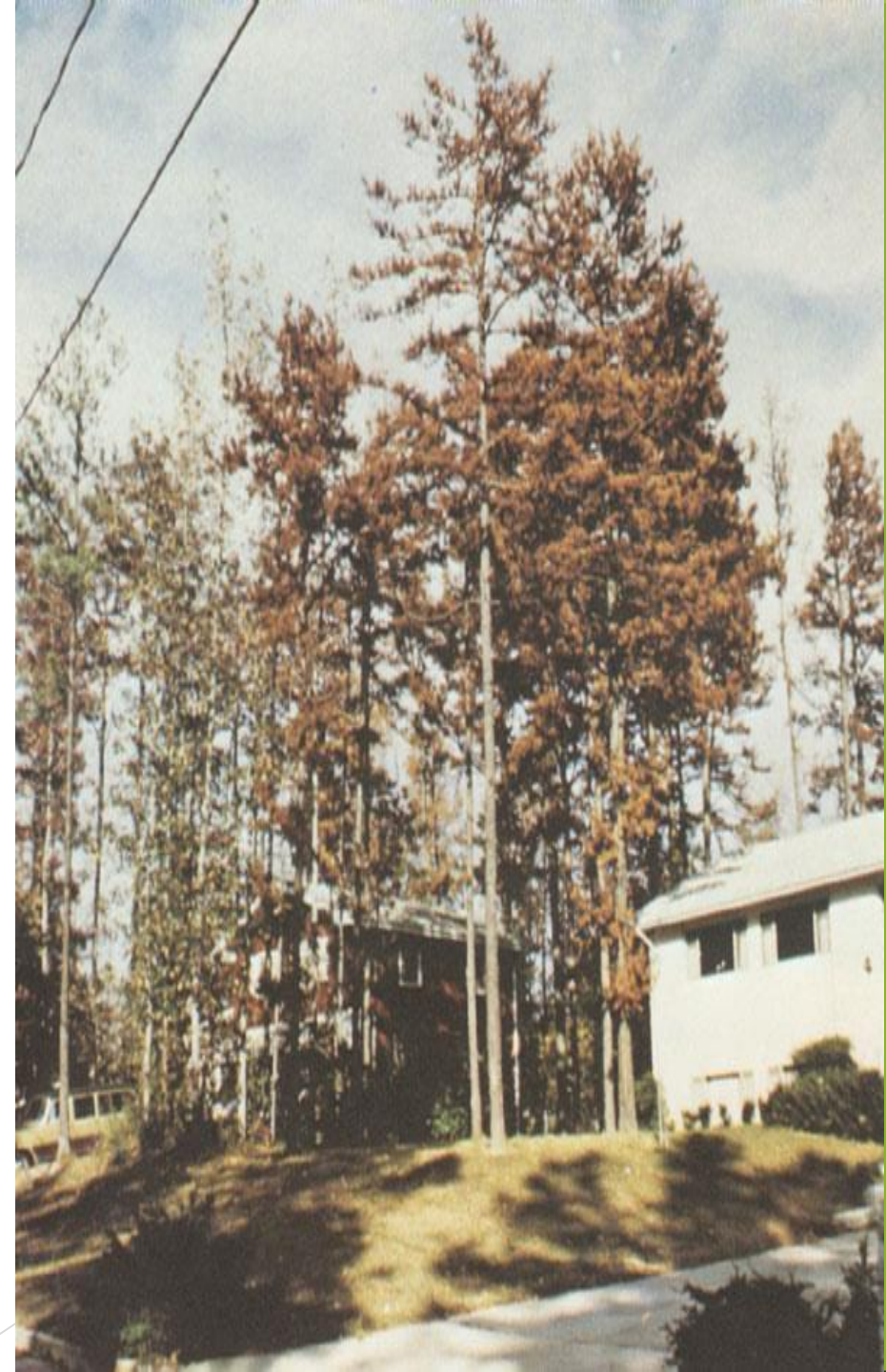
Box Blight

- Boxwood Blight's favorable conditions include temperatures above 80°F and high humidity (June-September)
- This summer's weather pattern was very favorable for the Box Blight pathogen.



Southern Pine Bark (SPB) Beetle

- ▶ It is the most economically destructive insect in the southeastern U.S.
- ▶ Until recently, it was considered to be restricted largely to the southeastern states.
- ▶ In 2009, it was found in N.J. and, in late 2014, in the extensive pine stands on Long Island.
- ▶ In 2015, they were found in CT.
- ▶ In 2022, they were found in Westchester County, N.Y.



Life Cycle Changes

- In warmer parts of the United States, SPB may have 6 or more generations/year and can overwinter in all life stages.
- Development is faster in the summer (26 days) than during the winter (54 days).
- At its northern fringes, it is not yet known how many generations may occur in the course of a single growing season.



Blue Stain Fungus - Vectors



Should this pic below
be here?



Florida Wax Scale

- Three or more generations of Florida Wax Scale occur in Florida.
- Now 2 generations/year are common throughout coastal Northeast.
- Each generation lasts about 3 to 4 months.
- Little evidence of control levels of beneficials in the northern coastal areas. **Is this sentence correct?**

Florida Wax Scale

Reported on many species:

- citrus
- holly
- elm
- crape myrtle
- oak
- flowering shrubs
- Deodar cedar
- citrus
- hardwoods &
- many herbaceous plants



Southern Blight

- Southern Blight is a lethal fungal disease that is most common in the tropics and subtropics.
- In the south this disease causes serious damage in the landscape and in agriculture.
- Southern blight is now causing problems in temperate locations like the northeast during periods of warm, moist weather.



Southern Blight

- Wide host range affecting over 500 plant species.
- Vegetable and fruit hosts include tomato, pepper, onion, strawberry, lettuce, cucumber, carrot.
- Ornamental hosts include aster, black-eyed Susan, dahlia, daylily, gladiolus, hosta, impatiens, peony, petunia, rose, salvia, sedum and viola.



Southern Blight

- Segments of hyphae can serve as inoculum, and the fungus can overwinter as mycelium in infected plants, plant debris, or as sclerotia.
- Sclerotia may remain viable for several years in soil, potting media, or on plant debris in areas with mild winters.
- High temperature and moisture levels are very important factors in the spread and development of this pathogen.



Peach Scale

- Armored scale that is a serious pest of fruits and ornamentals in the southern U.S.
- Common landscape pest found in the eastern coastal states, particularly from Maryland southward
- Peach Scale is now detected in many northeast coastal areas including Massachusetts.



Peach Scale

In the past, in states north of Maryland, it use be more likely that the White Prunicola Scale (very closely related) is what is being detected.

The White Prunicola Scale is a temperate species, and now we have mixed populations of peach and Prunicola in our area.



Name that ravine



Changing Weather

- Not only are we seeing different pathogens and insects now, we are experiencing changes in how plants grow, and how we take care of them!



Weather Events

- Rapid extreme temperature swings
- Some areas are effected by large bodies of water not freezing
- Prolonged fall and spring mild temperatures
- Lack of snow cover
- The ground does not freeze solid anymore (in our area)
- Overall yearly rain fall is about the same but it's not consistent often it's dry followed by heavy rains

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Looking back 18 months

- Summer 2022 - long and severe drought
- Late December, 2022 - bomb cyclone occurred w/ extreme temperature drop in a very short period of time. A lot of cold damage on odd things, such arborvitae and cherry laurel.
- Early January, 2023 the ground slightly froze
- Mid-February - spring-like conditions, day temps in the low 80⁰'s days began, the soil hadn't really frozen.
- May 27, a strong, late spring frost kills flowers on many ag-crops.
- July 8-9 regionally excessively heavy rain fall 4"-9" in 3 hours
- A very dry spring growing season, only a hand full of rain days over a 75 day period
- Followed by excessive rain and warm summer temperatures.



Changing weather conditions are likely to have consequences for horticulture & agriculture

- Effecting planting, maintenance and growing schedules-
Ex: fertilizer may volatilize or be flushed from plants use.
- The extended growing season may require more fertilizer.
- Pruning and the whole dormant vs. verdant decision.
Canker-causing pathogens are active at about 40⁰F.
- Temperature changes also influence the timing of important ecological events, causing birds to migrate sooner and plants to bloom and leaf earlier.
- Out of season blooming is becoming frequent

Out-of-Season Blooming

- Hotter and more severe heat waves are expected to increase evaporation and moisture stress on plants.
- Stress during early August can be influential in causing unusual fall blooms.
- According to the current understanding, *the process of overcoming winter dormancy is also related to stress, and possibly summer drought is able to evoke a similar response.*



Frost, Dormancy, Chilling

Frost poses a risk that is enhanced through climate change

Warmer spring & fall temperatures may be followed by cold snaps, causing frost damage

Spring *frost-free* planting dates can vary by more than 3 weeks

Even a light frost can cause extreme damage to young spring plants, bring the colorful display of late summer, tender plants to a screeching halt or affect dormancy process.

Lack of consistent cold temperatures is happening more often.

Bud set & dormancy are impacted because a certain amount of chilling by cold temps in the winter are required for fruit set and flowering in spring





3rd time I'm seeing
this pic. Is there a
message in this pic?

- In vegetables, physiological processes such as vernalization and winter chilling strongly rely on temperature.
- Therefore, heat stress may cause irregularities in yield production (lawns) and planning the harvest.
- Plant hardiness zones are changing
- Growing cool season plants will require more resources
- Longer growing seasons may increase pressure from weeds.
- Temperature stress will require more water resources to grow the plants we are accustomed to growing



Changing Precipitation has Consequences

- Rapid and excessive rain all at once allows water runs to off
- This allows less water for recharging the ground water
- And erosion is more likely
- Heavy precipitation events can damage plants
- Wetter springs may delay planting, resulting in longer establishment time
- Harvest time or opportunity is impacted.
- Longer, drier summers may reduce water availability and increase plant heat stress, also impacting plants
- Irrigation needs will increase putting demands on our natural resources
- Diseases such as Cytospora are aggravated by drought.



Abiotic disorders in horticulture are also related to changing temperatures and humidity. **Is this the title of this slide?**

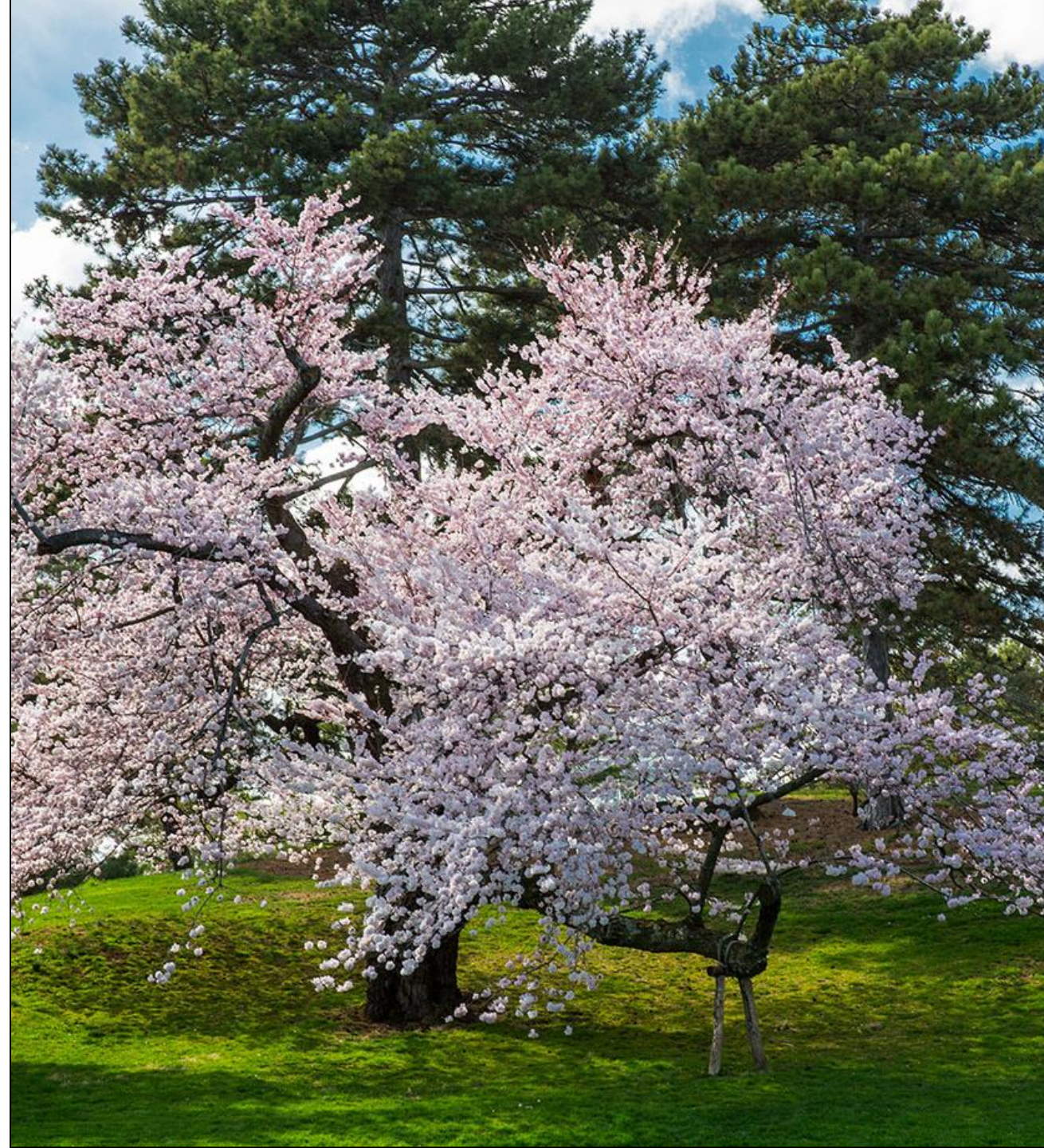
- Soil moisture extremes
- Flooding soils act different. Soil biology is affected by lack of O₂; nutrients can be flushed from the soil
- Photosynthesis is greatly reduce in temperatures over 95⁰F
- Soil organisms are damaged by higher soil temperatures and lack of soil oxygen
- These factors negatively impact root growth and health.

Adjusting!

- The Tri-State area has changed due to the USDA Plant Hardiness Zone Map
- We are now Zone **7b**
- Our common plant pallet for the area is more suited to our past climate and will suffer without sufficient cold temperatures
- Landscape architects and designers will need to adjust their selection.

What should we do? This is super important to get your message across to our members.

- Changing plant selection
- Expanded pest monitoring
- Soil moisture control
- Changing planting and maintenance practices
- **Good place to have a discussion with the audience**



A polar bear is standing on a small, flat piece of ice that is floating in a vast, open body of water. The bear is looking towards the left. The water is a deep blue, and the sky is a pale, clear blue. The horizon is visible in the distance.

Questions?

Many thanks!

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