











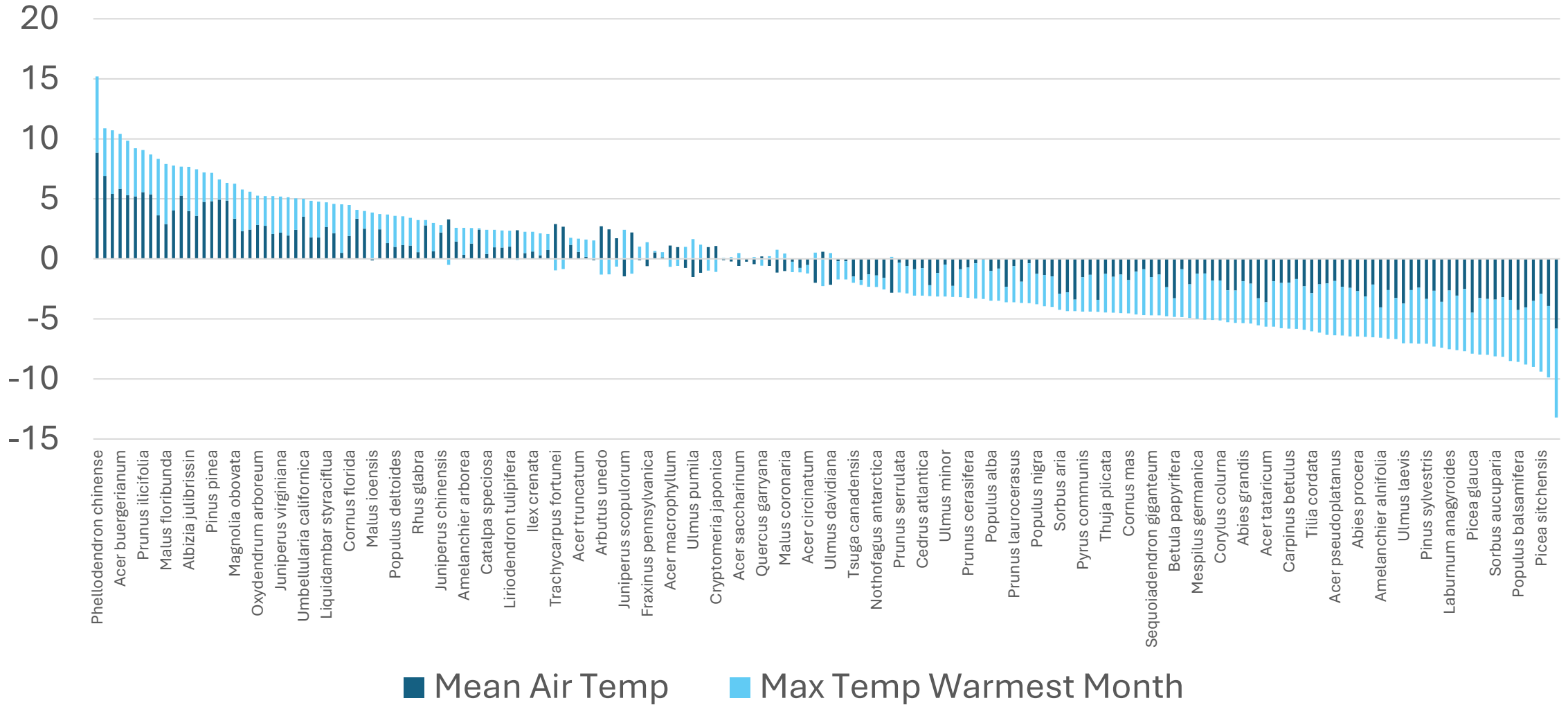
Climate change increases global risk to urban forests

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Species climatic safety margin

The safety margin describes intrinsic species sensitivity to climate change and indicates potential tolerance to changing climate conditions^{18,24} of tree and shrub species within a given city. The safety margin is calculated as the difference between baseline climate conditions (for example, MAT or AP) for the city and the species' tolerance limit in relation to the direction of change for the climate variable being examined (for example, the upper limit in case of warmer MAT or the lower limit in case of drier AP) (Supplementary Fig. 3). For each climate

Current Temperature Safety Margins



Safety

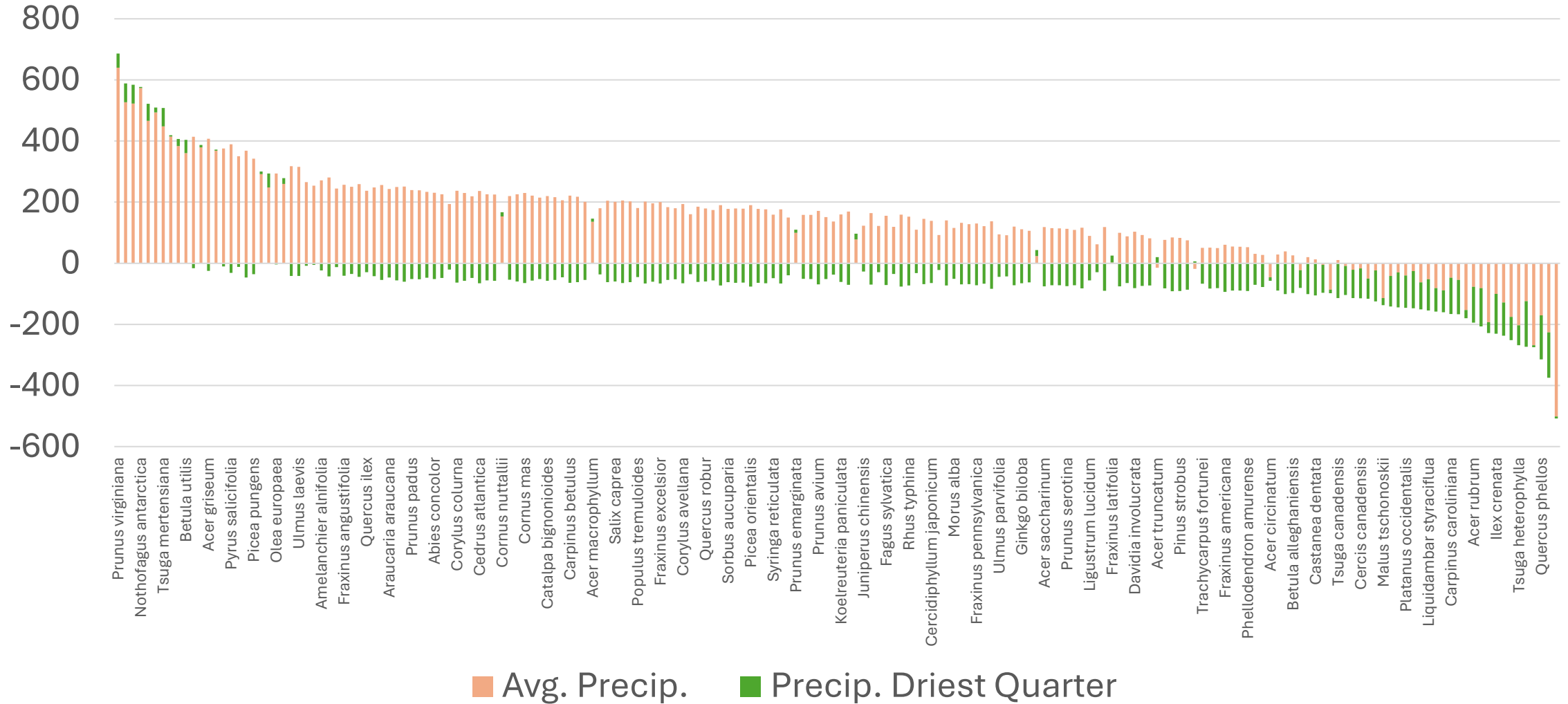
20
15
10
5
0
-5
-10
-15



- Phellodendron chinense
- Acer buergerianum
- Prunus ilicifolia
- Malus floribunda
- Albizia julibrissin
- Pinus pinea
- Magnolia obovata
- Oxydendrum arboreum
- Juniperus virginiana
- Umbellularia californica
- Liquidambar styraciflua
- Cornus florida
- Malus ioensis
- Populus deltoides
- Rhus glabra
- Juniperus chinensis
- Amelanchier arborea
- Catalpa speciosa
- Liriodendron tulipifera
- Ilex crenata
- Trachycarpus fortunei
- Acer truncatum
- Arbutus unedo
- Juniperus scopulorum
- Fraxinus pennsylvanica
- Acer macrophyllum
- Ulmus pumila
- Cryptomeria japonica
- Acer saccharinum
- Quercus garryana
- Malus coronaria
- Acer circinatum
- Ulmus davidiana
- Tsuga canadensis
- Nothofagus antarctica
- Prunus serrulata
- Cedrus atlantica
- Ulmus minor
- Prunus cerasifera
- Populus alba
- Prunus laurocerasus
- Populus nigra
- Sorbus aria
- Pyrus communis
- Thuja plicata
- Cornus mas
- Sequoiadendron giganteum
- Betula papyrifera
- Mespilus germanica
- Corylus colurna
- Abies grandis
- Acer tataricum
- Carpinus betulus
- Tilia cordata
- Acer pseudoplatanus
- Abies procera
- Amelanchier alnifolia
- Ulmus laevis
- Pinus sylvestris
- Laburnum anagyroides
- Picea glauca
- Sorbus aucuparia
- Populus balsamifera
- Picea sitchensis

■ Mean Air Temp ■ Max Temp Warmest Month

Current Precip Safety Margin



800
600
400
200
0
-200
-400
-600

- Prunus virginiana
- Nothofagus antarctica
- Tsuga mertensiana
- Betula utilis
- Acer griseum
- Pyrus salicifolia
- Picea pungens
- Olea europaea
- Ulmus laevis
- Amelanchier alnifolia
- Fraxinus angustifolia
- Quercus ilex
- Araucaria araucana
- Prunus padus
- Abies concolor
- Corylus colurna
- Cedrus atlantica
- Cornus nuttallii
- Cornus mas
- Catalpa bignonioides
- Carpinus betulus
- Acer macrophyllum
- Salix caprea
- Populus tremuloides
- Fraxinus excelsior
- Corylus avellana
- Quercus robur
- Sorbus aucuparia
- Picea orientalis
- Syringa reticulata
- Prunus emarginata
- Prunus avium
- Koelreuteria paniculata
- Juniperus chinensis
- Fagus sylvatica
- Rhus typhina
- Cercidiphyllum japonicum
- Morus alba
- Fraxinus pennsylvanica
- Ulmus parvifolia
- Ginkgo biloba
- Acer saccharinum
- Prunus serotina
- Ligustrum lucidum
- Fraxinus latifolia
- Davidia involucreta
- Acer truncatum
- Pinus strobus
- Trachycarpus fortunei
- Fraxinus americana
- Phellodendron amurense
- Acer circinatum
- Betula alleghaniensis
- Castanea dentata
- Tsuga canadensis
- Cercis canadensis
- Malus tschonoskii
- Platanus occidentalis
- Liquidambar styraciflua
- Carpinus caroliniana
- Acer rubrum
- Ilex crenata
- Tsuga heterophylla
- Quercus phellos

■ Avg. Precip. ■ Precip. Driest Quarter



Chokecherry in Bloom (*Prunus virginiana* 'Shubert') Jack Scheper ©2014 Floridata.com



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