

**OPEN LETTER**

# Urban forests as essential infrastructure for climate resilience and biodiversity: A call to policymakers

## OPEN LETTER TO POLICYMAKERS AT THE 30TH MEETING OF THE CONFERENCE OF THE PARTIES TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (COP 30, BELÉM, BRAZIL)

By 2050, nearly 70% of the global population will live in cities (UN, 2018), increasing the demand for urban green spaces. Urban areas are facing increasing risks from climate change, including heatwaves, flooding, wildfires, and growing social inequality, which challenges urban planning and design. Urban forests form the backbone of green infrastructure supporting resilient, equitable, and sustainable cities. Importantly, their cost-effective benefits advance sustainable development, climate action, and biodiversity conservation.

### WHAT ARE URBAN FORESTS AND WHY DO THEY MATTER?

Urban forests include all woody and understorey vegetation within and around dense settlements, from cultivated trees in streets, parks, and gardens to self-sustaining stands in remnant and peri-urban woodlands (FAO, 2016). As essential nature-based solutions (Cohen-Shacham et al., 2016), urban forests provide multiple ecosystem services. They help cool urban temperatures, reduce air pollution, enhance soil infiltration, slow stormwater runoff, buffer extreme weather, and support human health (Livesley et al., 2016). They contribute significantly to climate adaptation and moderately to mitigation by reducing the energy demand for cooling (McPhearson et al., 2023). Urban forests also enhance biodiversity by providing habitats and climate refugia at multiple scales (Alvey, 2006).

Trade-offs in urban forest benefits, costs, and the impacts of policy interventions, such as those related to measurement, outcomes, or implementation, remain complex (Vogt et al., 2015), but the loss of canopy reduces air quality, biodiversity, and resilience to floods, droughts, pests, and extreme heat (Nowak, 2018). Canopy loss impairs recreation and impacts physical and mental health (Carrus

et al., 2015). Because urban forests are inherently dynamic systems, the death or removal of large and mature trees should be anticipated through proactive planning for their replacement, including careful consideration of which species are selected and why. Unequal access drives social-environmental injustice and health inequities, which can be addressed through greenspace expansion, equitable distribution, and better management (Esperon-Rodriguez et al., 2025).

### URBAN FORESTS AT INCREASING RISK FROM STEWARDSHIP GAPS

Urban forests are increasingly at risk due to significant stewardship gaps. Despite the existence of international management standards, ongoing tree losses result from pests introduced through trade, climate and pollution stress, inadequate legal protections, rapid urban densification, and insufficient maintenance (Esperon-Rodriguez et al., 2022; Paap et al., 2017; Vogt et al., 2015). Planting alone cannot offset accelerated mature tree losses or replace the vital functions these trees provide over their shortened lifespans in urban environments. Closing the stewardship gap demands urgent investment, robust funding, and stronger policy to sustain diverse and resilient urban forests.

### POLICY PRIORITIES FOR VISIONARY ACTION

1. **Invest in urban forests as infrastructure.** Recognize and fund urban forests as essential and critical green infrastructure and natural health systems. Integrate trees into city budgets and legal, financial, accounting (e.g., ecosystem accounting), and planning frameworks. Urban planning must prioritize retaining existing green infrastructure, mature trees, and biodiversity over 'clear and build' approaches. Protecting mature trees requires stronger illegal removal penalties, safeguards, and incentives like property tax reductions proportional to canopy or municipal long-term care support.

Disclaimer: The New Phytologist Foundation remains neutral with regard to jurisdictional claims in maps and in any institutional affiliations.

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2025 The Author(s). *Plants, People, Planet* published by John Wiley & Sons Ltd on behalf of New Phytologist Foundation.

2. **Deliver equity and access.** Close canopy gaps in underserved neighborhoods by co-designing local canopy and access targets with communities and securing stewardship of soils, understorey, and habitat. Leverage natural regeneration on vacant lots, rights-of-way, and riparian buffers with community stewardship. Adopt 'retain-and-grow' policies crediting regenerating trees in approvals and protecting recruitment during construction. Prioritize structural and functional diversity, including native and climate-adapted species, understorey, soils, and genetically rich plantings that deliver ecosystem services equitably and sustain diverse urban wildlife. Set diversity thresholds for species and provenance to increase resilience. Public outreach should build on diverse community values and strengths, empowering marginalized groups and embedding green space through inclusive planning to counter densification-driven disparities.
3. **Mainstream in climate and biodiversity governance.** Embed urban forests in global to local strategies for mitigation, adaptation, and biodiversity conservation, supported by climate finance. Set ambitious, ecologically grounded, measurable targets for canopy, diversity, and equitable access, aligned with the Paris Agreement, the Convention on Biological Diversity, and the UN Sustainable Development Goals (CBD, 2025; Paris Agreement, 2015; UN, 2025). Targets must build on past lessons. Recognize urban forests as critical climate and biodiversity infrastructure, include measurable goals (e.g., canopy cover, distribution, five-year survival) in Nationally Determined Contributions (NDCs) and National Biodiversity Strategies and Action Plans (NBSAPs), and ensure financing for long-term stewardship. Multi-level governance and local actor participation are essential.
4. **Strengthen resilience with adaptive, evidence-based management.** Invest in integrated management systems involving cross-sector collaboration, Indigenous and community knowledge, monitoring, research, and planning, capturing public and private trees. Identify funding for long-term maintenance amid rising pests, disease, and climate extremes. Build species and genetic diversity with nursery investments and supply-chain incentives. Promote guided spontaneous regeneration where safe to accelerate recruitment and relieve nursery bottlenecks. Treat trees as urban assets eligible for capital depreciation and tax incentives reflecting long-term benefits.

## WHY ACT NOW?

Urban forests are among the most effective, equitable nature-based solutions available. When protected and resourced, they cool neighborhoods, manage stormwater, store carbon, support biodiversity, and improve health, especially in underserved communities. Yet mature tree loss outpaces replacement amid increasing climate and biological stresses. We urge COP30 policymakers to treat urban forests as essential and critical city infrastructure: safeguard mature trees, set and finance SMART canopy, diversity and access targets,

mainstream urban forests in climate and biodiversity plans, and fund long-term operations, monitoring, nursery capacity, and biosecurity. Implementing this visionary action delivers cooler, healthier, more biodiverse, and more equitable cities now and for future generations.

**KEYWORDS:** canopy cover targets, climate resilience and adaptation, community engagement, ecosystem services, environmental justicegreen infrastructure, nature-based solutions, social equity

## AUTHOR CONTRIBUTIONS

MER and MGT led the initiative and drafted the letter. All authors provided feedback, edited, and agreed with the content of the letter. All authors, except MER and MGT, are listed alphabetically.

## ACKNOWLEDGMENTS

MER received funding from Western Sydney University's Research Theme Program. KDP was supported by the Research Foundation Flanders (FWO, grant 12A0L25N). RMM was supported by a Discovery Early Career Researcher Award (project DE200100649), funded by the Australian Research Council of the Australian Government. JCS received funding from the Danish National Research Foundation (grant DNR173) and EARTHKEEPER (Global South Biodiversity Leadership Initiative). CS's contribution was funded by the National Research Foundation of South Africa (grant no 84379).

## FUNDING INFORMATION










National Research Foundation of South Africa, Grant/Award Number: 84379; Research Foundation Flanders, Grant/Award Number: 12A0L25N; Western Sydney University; EARTHKEEPER (Global South Biodiversity Leadership Initiative); Australian Research Council of the Australian Government, Grant/Award Number: DE200100649; Danish National Research Foundation, Grant/Award Number: DNR173

## CONFLICT OF INTEREST STATEMENT

We declare no conflict of interest.

## DATA AVAILABILITY STATEMENT

There are no data associated with the article.

Manuel Esperon-Rodriguez<sup>1,2</sup>   
 Stefan Arndt<sup>3</sup>   
 Michael Osei Asibey<sup>4</sup>   
 Benno Andreas Augustinus<sup>5</sup>   
 Albert Bach<sup>6,7,8,9</sup>  
 Monica Ballinas<sup>10</sup>   
 Victor L. Barradas<sup>11</sup>   
 David N. Barton<sup>12</sup>   
 Juergen Bauhus<sup>13,14</sup>   
 Linda Beaumont<sup>15</sup> 

- Jean-François Bissonnette<sup>16</sup>  Philip Sen<sup>1</sup> 
- Matthew Brookhouse<sup>17</sup>  Charlie Shackleton<sup>37</sup> 
- Pedro Calaza-Martínez<sup>18</sup>  Mahmuda Sharmin<sup>67</sup> 
- Carlo Calfapietra<sup>19</sup>  Megan Shooter<sup>2</sup>
- Tiago Capela Lourenço<sup>20</sup>  Davide Siclari<sup>1</sup> 
- Paloma Cariñanos<sup>21,22</sup>  Sivajanani Sivarajah<sup>68,69</sup> 
- Matteo Clemente<sup>23</sup> Johanna Deak Sjöman<sup>60</sup> 
- Tenley Conway<sup>24</sup>  Henrik Sjöman<sup>60,70,71</sup> 
- Kees de Hoogh<sup>25,26</sup>  Ingjerd Solfeld<sup>72</sup> 
- Karen De Pauw<sup>27,28</sup>  Annick St-Denis<sup>54</sup> 
- Morgane Dendoncker<sup>29</sup>  Jonah Susskind<sup>73</sup>
- Cynnamon Dobbs<sup>30</sup>  Jens-Christian Svenning<sup>32</sup> 
- Peter Duinker<sup>31</sup>  Christopher Szota<sup>3</sup> 
- Ujala Ejaz<sup>32</sup>  María Toledo-Garibaldi<sup>74</sup> 
- Ana Alice Eleuterio<sup>33</sup>  Olivier Villemaire-Côté<sup>68,69</sup> 
- Theodore Endreny<sup>34</sup>  Jess Vogt<sup>75</sup> 
- Diego Esperon-Rodriguez<sup>35</sup>  Ariane Wagenknecht<sup>76</sup>
- Claire Farrell<sup>3</sup>  Mingxuan Wan<sup>77</sup> 
- Rachael V. Gallagher<sup>1</sup>  Linsheng Wen<sup>78,79</sup> 
- Thomas Gates<sup>2</sup> Subashini Anuradha Wijeratne<sup>2</sup>
- Zhengfei Guo<sup>36</sup>  Geoffrey Williams<sup>80</sup> 
- Nanamhla Gwedla<sup>37</sup>  Nicholas Williams<sup>3</sup>
- Richard Hauer<sup>38</sup>  Sylvia Wood<sup>81</sup> 
- Martin Hermy<sup>39</sup>  Hong Wu<sup>77</sup> 
- Peta Jeffries<sup>40</sup>  Pengbo Yan<sup>82</sup> 
- Edith Juno<sup>41</sup>  Yuyu Zhou<sup>36,83</sup> 
- Rachel Knudten<sup>25</sup> Carly Ziter<sup>84</sup> 
- Gervais Lee<sup>17</sup>  Benewindé Jean-Bosco Zoungrana<sup>85</sup> 
- Elizaveta Litvak<sup>42</sup>  Mark G. Tjoelker<sup>1</sup> 
- Stephen Livesley<sup>3</sup> 
- Natalie Love<sup>43</sup>
- Gabriele Manoli<sup>44</sup> 
- Renee M. Marchin<sup>1</sup> 
- Alexander J. F. Martin<sup>45</sup> 
- Pierre Masselot<sup>46</sup> 
- Robert I. Mcdonald<sup>47,48,49</sup> 
- Timon McPhearson<sup>50,51,52</sup> 
- Christian Messier<sup>53,54</sup> 
- Julie Messier<sup>55</sup> 
- Rachel Morgain<sup>56</sup> 
- Harini Nagendra<sup>57</sup> 
- Mark Nieuwenhuijsen<sup>6,7,58</sup> 
- Lukas G. Olson<sup>59</sup> 
- Johan Östberg<sup>60</sup> 
- Diane Pataki<sup>41,42</sup> 
- Sebastian Pfautsch<sup>61</sup> 
- Sally A. Power<sup>1</sup> 
- Mohammad A. Rahman<sup>3</sup> 
- Thomas Randrup<sup>60</sup> 
- Peter B. Reich<sup>1,62,63</sup> 
- Alessio Russo<sup>64</sup> 
- Paul D. Rymer<sup>1</sup> 
- Rossano Schifanella<sup>65,66</sup> 

<sup>1</sup>Hawkesbury Institute for the Environment, Western Sydney University, Penrith, NSW, Australia

<sup>2</sup>School of Science, Western Sydney University, Penrith, NSW, Australia

<sup>3</sup>School of Agriculture, Food and Ecosystem Sciences, Faculty of Science, The University of Melbourne, Richmond, Victoria, Australia

<sup>4</sup>Department of Planning, College of Art and Built Environment, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

<sup>5</sup>Forest Health and Biotic Interactions, Swiss Federal Research Institute WSL, Birmensdorf, Switzerland

<sup>6</sup>Barcelona Institute for Global Health (ISGlobal), Barcelona Biomedical Research Park (PRBB), Barcelona, Spain

<sup>7</sup>CIBER Epidemiología y Salud Pública (CIBERESP), Madrid, Spain

<sup>8</sup>Universitat Pompeu Fabra (UPF), Barcelona, Spain

<sup>9</sup>Autonomous University of Barcelona (UAB), Barcelona, Spain

<sup>10</sup>Centro de Investigación en Ciencias de Información Geoespacial, Ciudad de México, Mexico

<sup>11</sup>Instituto de Ecología, Universidad Nacional Autónoma de México, Mexico

<sup>12</sup>Norwegian Institute for Nature Research (NINA), Oslo, Norway

<sup>13</sup>Institute of Forest Sciences, Faculty of Environment and Natural Resources, University of Freiburg, Baden-Württemberg, Germany

<sup>14</sup>Future Forests Cluster of Excellence, University of Freiburg, Baden-Württemberg, Germany

- <sup>15</sup>School of Natural Sciences, Macquarie University North Ryde, Sydney, New South Wales, Australia
- <sup>16</sup>Faculty of Forestry, Geography and Geomatics, Laval University, Quebec, QC, Canada
- <sup>17</sup>Fenner School of Environment & Society, The Australian National University, Canberra, ACT, Australia
- <sup>18</sup>Spanish Association of Public Parks and Gardens (AEPJP), Madrid, Spain
- <sup>19</sup>Research Institute on Terrestrial Ecosystems (IRET) National Research Council (CNR), Porano, TR, Italy
- <sup>20</sup>Centre for Ecology, Evolution and Environmental Changes (CE3C) & Global Change and Sustainability Institute (CHANGE), Faculdade de Ciências, Universidade de Lisboa, Lisbon, Portugal
- <sup>21</sup>Department of Botany, Faculty of Pharmacy, University of Granada, Granada, Spain
- <sup>22</sup>IISTA-CEAMA, Andalusian Institute for Earth System Research, University of Granada, Granada, Spain
- <sup>23</sup>Department for Innovation in Biological, Agro-Food and Forest Systems (DIBAF), University of Tuscia, Viterbo, Italy
- <sup>24</sup>Department of Geography, Geomatics and Environment, University of Toronto at Mississauga, Mississauga, ON, Canada
- <sup>25</sup>Swiss Tropical and Public Health Institute, Allschwil, Switzerland
- <sup>26</sup>University of Basel, Basel, Switzerland
- <sup>27</sup>Forest & Nature Lab, Department of Environment, Faculty of Bioscience Engineering, Ghent University, Melle-Gontrode, Belgium
- <sup>28</sup>Meise Botanic Garden, Meise, Belgium
- <sup>29</sup>Earth and Life Institute, Université catholique de Louvain, Louvain-la-Neuve, Belgium
- <sup>30</sup>Centro de Estudios Territoriales, Universidad de Los Andes, Chile
- <sup>31</sup>School for Resource and Environmental Studies, Dalhousie University, Halifax, Nova Scotia, Canada
- <sup>32</sup>Center for Ecological Dynamics in a Novel Biosphere (ECONOVO), Department of Biology, Aarhus University, Aarhus C, Denmark
- <sup>33</sup>Instituto Latino-Americano de Economia, Sociedade e Política, Universidade Federal da Integração Latino-Americana, Brazil
- <sup>34</sup>Department of Environmental Resources Engineering, SUNY College of Environmental Science and Forestry (ESF), Syracuse, NY, USA
- <sup>35</sup>Centro Universitario de Ciencias Sociales y Humanidades, Universidad de Guadalajara, Mexico
- <sup>36</sup>Department of Geography, The University of Hong Kong, Hong Kong, China
- <sup>37</sup>Department of Environmental Science, Rhodes University, Makhanda, South Africa
- <sup>38</sup>College of Natural Resources, University of Wisconsin–Stevens Point, Stevens Point, Wisconsin, USA
- <sup>39</sup>Division of Forest, Nature and Landscape, University of Leuven, Leuven, Belgium
- <sup>40</sup>Gulbali Institute of Agriculture, Water & Environment, Charles Sturt University, Dubbo, NSW, Australia
- <sup>41</sup>National Advocacy Center, National Wildlife Federation, Washington, DC, USA
- <sup>42</sup>School of Sustainability, Arizona State University, Tempe, Arizona, USA
- <sup>43</sup>Negaunee Institute for Plant Conservation Science and Action, Chicago Botanic Garden, Glencoe, IL, USA
- <sup>44</sup>School of Architecture, Civil and Environmental Engineering, École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland
- <sup>45</sup>Doctoral Training Centre, University of Oxford, Oxford, UK
- <sup>46</sup>Environment & Health Modelling (EHM) Lab, Department of Public Health Environments and Society, London School of Hygiene & Tropical Medicine, London, UK
- <sup>47</sup>The Nature Conservancy, Berlin, Germany
- <sup>48</sup>CUNY Institute for Demographic Research, New York, NY, USA
- <sup>49</sup>Humboldt University, Berlin, Germany
- <sup>50</sup>New York University, Urban Systems Lab, New York, NY, USA
- <sup>51</sup>Cary Institute of Ecosystem Studies, Millbrook, NY, USA
- <sup>52</sup>Stockholm Resilience Centre, Stockholm University, Stockholm, Sweden
- <sup>53</sup>Institut des sciences de la forêt tempérée, 58 rue principale, Département des sciences naturelles, Université du Québec en Outaouais, Québec, Canada
- <sup>54</sup>Centre d'étude de la forêt, Département des sciences biologiques, Université du Québec à Montréal, Montréal, Québec, Canada
- <sup>55</sup>Department of Biology, University of Waterloo, Waterloo, Ontario, Canada
- <sup>56</sup>Melbourne Biodiversity Institute and School of Social and Political Sciences, University of Melbourne, Victoria, Australia
- <sup>57</sup>School of Climate Change and Sustainability, Azim Premji University, Bangalore, Karnataka, India
- <sup>58</sup>Department of Experimental and Health Sciences, Universitat Pompeu Fabra, Barcelona, Spain
- <sup>59</sup>Department of Forest Resources Management, Faculty of Forestry, University of British Columbia, Vancouver, BC, Canada
- <sup>60</sup>Department of Landscape Architecture, Planning and Management, Swedish University of Agricultural Sciences, Lomma, Sweden
- <sup>61</sup>School of Social Sciences (Urban Studies), Western Sydney University, Penrith, NSW, Australia
- <sup>62</sup>Institute for Global Change Biology, University of Michigan, Ann Arbor, MI, USA
- <sup>63</sup>Department of Forest Resources, University of Minnesota, St Paul, MN, USA
- <sup>64</sup>School of Architecture and Built Environment, Queensland University of Technology, Brisbane, Australia
- <sup>65</sup>Computer Science Department, University of Turin, Turin, Italy
- <sup>66</sup>ISI Foundation, Torino, Italy
- <sup>67</sup>Department of Forestry and Environmental Science, Shahjalal University of Science and Technology, Sylhet, Bangladesh
- <sup>68</sup>Département des sciences du bois et de la forêt, Faculté de foresterie, de géographie, et de géomatique, Université Laval, Québec, QC, Canada
- <sup>69</sup>Le Centre d'étude de la forêt (CEF), Québec, QC, Canada
- <sup>70</sup>Gothenburg Botanical Garden, Gothenburg, Sweden
- <sup>71</sup>Royal Botanic Gardens, Kew, Richmond, UK
- <sup>72</sup>Faculty of Landscape and Society, Norwegian University of Life Sciences (NMBU), Ås, Norway

<sup>73</sup>SWA Group, Sausalito, California, USA

<sup>74</sup>Red de Ecología Funcional, Instituto de Ecología, A.C., Veracruz, Mexico

<sup>75</sup>Department of Environmental Science and Studies Department, DePaul University, Chicago, IL, USA

<sup>76</sup>Faculty of Arts, Design & Architecture, UNSW, Sydney, Australia

<sup>77</sup>Department of Landscape Architecture, The Pennsylvania State University, University Park, PA, USA

<sup>78</sup>State Key Laboratory for Subtropical Mountain Ecology of the Ministry of Science and Technology and Fujian Province, Fujian Normal University, Fuzhou, China

<sup>79</sup>School of Geographical Sciences, School of Carbon Neutrality Future Technology, Fujian Normal University, Fuzhou, China

<sup>80</sup>Michigan State University, East Lansing, MI, USA

<sup>81</sup>Habitat, QC, Canada

<sup>82</sup>School of Tourism Ecology and Environment, Guilin Tourism University, Guilin, China

<sup>83</sup>Institute for Climate and Carbon Neutrality, The University of Hong Kong, Hong Kong, China

<sup>84</sup>Biology Department, Concordia University, Montreal, Canada

<sup>85</sup>Département de Géographie, Université Joseph KI-ZERBO, Ouagadougou, Burkina Faso

### Correspondence

Manuel Esperon-Rodriguez, Hawkesbury Institute for the Environment, Western Sydney University, Locked Bag 1797, Penrith, NSW 2751, Australia.

Email: [m.esperon-rodriguez@westernsydney.edu.au](mailto:m.esperon-rodriguez@westernsydney.edu.au)

### ORCID

Manuel Esperon-Rodriguez  <https://orcid.org/0000-0003-3649-2134>

Stefan Arndt  <https://orcid.org/0000-0001-7086-9375>

Michael Osei Asibey  <https://orcid.org/0000-0002-5534-2695>

Benno Andreas Augustinus  <https://orcid.org/0000-0001-7371-7713>

Monica Ballinas  <https://orcid.org/0000-0003-4093-4193>

Victor L. Barradas  <https://orcid.org/0000-0001-8622-7190>

David N. Barton  <https://orcid.org/0000-0002-6501-9381>

Juergen Bauhus  <https://orcid.org/0000-0002-9673-4986>

Linda Beaumont  <https://orcid.org/0000-0001-6307-1680>

Jean-François Bissonnette  <https://orcid.org/0000-0002-5064-4432>

Matthew Brookhouse  <https://orcid.org/0000-0002-1127-255X>

Pedro Calaza-Martínez  <https://orcid.org/0000-0001-6719-5752>

Carlo Calfapietra  <https://orcid.org/0000-0001-5040-4343>

Tiago Capela Lourenço  <https://orcid.org/0000-0002-8796-5993>

Paloma Cariñanos  <https://orcid.org/0000-0002-8955-2383>

Tenley Conway  <https://orcid.org/0000-0002-9452-1629>

Kees de Hoogh  <https://orcid.org/0000-0001-5974-2007>

Karen De Pauw  <https://orcid.org/0000-0001-8369-2679>

Morgane Dendoncker  <https://orcid.org/0000-0002-3240-0100>

Cynnamon Dobbs  <https://orcid.org/0000-0001-9845-6660>

Peter Duinker  <https://orcid.org/0000-0002-4189-6056>

Ujala Ejaz  <https://orcid.org/0000-0003-0516-7232>

Ana Alice Eleuterio  <https://orcid.org/0000-0003-0197-3827>

Theodore Endreny  <https://orcid.org/0000-0002-1891-261X>

Diego Esperon-Rodriguez  <https://orcid.org/0000-0002-3471-7945>

Claire Farrell  <https://orcid.org/0000-0002-5822-7529>

Rachael V. Gallagher  <https://orcid.org/0000-0002-4680-8115>

Zhengfei Guo  <https://orcid.org/0000-0001-8806-1307>

Nanamhla Gwedla  <https://orcid.org/0000-0001-6096-1661>

Richard Hauer  <https://orcid.org/0000-0002-8274-8148>

Martin Hermy  <https://orcid.org/0000-0002-5403-0139>

Peta Jeffries  <https://orcid.org/0000-0001-6302-0971>

Edith Juno  <https://orcid.org/0000-0002-3928-8203>

Gervais Lee  <https://orcid.org/0000-0002-4901-4492>

Elizaveta Litvak  <https://orcid.org/0000-0003-4724-4427>

Stephen Livesley  <https://orcid.org/0000-0003-3506-2458>

Gabriele Manoli  <https://orcid.org/0000-0002-9245-2877>

Renee M. Marchin  <https://orcid.org/0000-0002-4154-8924>

Alexander J. F. Martin  <https://orcid.org/0000-0002-4573-8899>

Pierre Masselot  <https://orcid.org/0000-0002-7326-1290>

Robert I. Mcdonald  <https://orcid.org/0000-0002-7273-6549>

Timon McPhearson  <https://orcid.org/0000-0002-9499-0791>

Christian Messier  <https://orcid.org/0000-0002-8728-5533>

Julie Messier  <https://orcid.org/0000-0003-1637-6793>

Rachel Morgain  <https://orcid.org/0000-0003-4847-7177>

Harini Nagendra  <https://orcid.org/0000-0002-1585-0724>

Mark Nieuwenhuijsen  <https://orcid.org/0000-0001-9461-7981>

Lukas G. Olson  <https://orcid.org/0000-0001-9894-8761>

Johan Östberg  <https://orcid.org/0000-0001-8519-3662>

Diane Pataki  <https://orcid.org/0000-0001-7209-514X>

Sebastian Pfautsch  <https://orcid.org/0000-0002-4390-4195>

Sally A. Power  <https://orcid.org/0000-0002-2723-8671>

Mohammad A. Rahman  <https://orcid.org/0000-0001-9872-010X>

Thomas Randrup  <https://orcid.org/0000-0003-1368-3915>

Peter B. Reich  <https://orcid.org/0000-0003-4424-662X>

Alessio Russo  <https://orcid.org/0000-0002-0073-7243>

Paul D. Rymer  <https://orcid.org/0000-0003-0988-4351>

Rossano Schifanella  <https://orcid.org/0000-0002-3745-5792>

Philip Sen  <https://orcid.org/0009-0002-8636-9070>

Charlie Shackleton  <https://orcid.org/0000-0002-8489-6136>

Mahmuda Sharmin  <https://orcid.org/0000-0003-2958-4081>

Davide Siclari  <https://orcid.org/0000-0002-3726-7847>

Sivajanani Sivarajah  <https://orcid.org/0000-0002-0530-4615>

Johanna Deak Sjöman  <https://orcid.org/0000-0001-5686-3188>

Henrik Sjöman  <https://orcid.org/0000-0002-5526-6303>

Ingjerd Solfeld  <https://orcid.org/0009-0009-8330-4299>

Annick St-Denis  <https://orcid.org/0009-0002-9222-5110>

Jens-Christian Svenning  <https://orcid.org/0000-0002-3415-0862>

Christopher Szota  <https://orcid.org/0000-0002-8837-591X>

María Toledo-Garibaldi  <https://orcid.org/0000-0002-0421-2815>

Olivier Villemaire-Côté  <https://orcid.org/0000-0003-2384-8007>

Jess Vogt  <https://orcid.org/0000-0002-7892-0670>

Mingxuan Wan  <https://orcid.org/0009-0000-3704-8903>

Linsheng Wen  <https://orcid.org/0000-0001-7312-3368>

Geoffrey Williams  <https://orcid.org/0000-0001-7585-704X>

Sylvia Wood  <https://orcid.org/0000-0003-2224-3890>  
 Hong Wu  <https://orcid.org/0000-0002-9728-8455>  
 Pengbo Yan  <https://orcid.org/0009-0002-5124-0250>  
 Yuyu Zhou  <https://orcid.org/0000-0003-1765-6789>  
 Carly Ziter  <https://orcid.org/0000-0002-3731-9678>  
 Benewindé Jean-Bosco Zoungrana  <https://orcid.org/0000-0002-5233-6126>  
 Mark G. Tjoelker  <https://orcid.org/0000-0003-4607-5238>

## REFERENCES

- Alvey, A. A. (2006). Promoting and preserving biodiversity in the urban forest. *Urban Forestry & Urban Greening*, 5(4), 195–201. <https://doi.org/10.1016/j.ufug.2006.09.003>
- Carrus, G., Scopelliti, M., Laforteza, R., Colangelo, G., Ferrini, F., Salbitano, F., Agrimi, M., Portoghesi, L., Semenzato, P., & Sanesi, G. (2015). Go greener, feel better? The positive effects of biodiversity on the well-being of individuals visiting urban and peri-urban green areas. *Landscape and Urban Planning*, 134, 221–228. <https://doi.org/10.1016/j.landurbplan.2014.10.022>
- CBD. (2025). *The convention on biological diversity*. Secretariat of the Convention on Biological Diversity. <https://www.cbd.int>. Accessed August 2025.
- Cohen-Shacham, E., Walters, G., Janzen, C., & Maginnis, S. (2016). *Nature-based solutions to address global societal challenges*. IUCN.
- Esperon-Rodriguez, M., Gallagher, R., Calfapietra, C., Cariñanos, P., Dobbs, C., Eleuterio, A. A., Esperon Rodriguez, D., Jahani, A., Litvak, E., Livesley, S. J., Manoli, G., Marchin, R. M., McPhearson, T., Messier, C., Östberg, J., Roman, L. A., Russo, A., Saffariha, M., Shackleton, C., ... Tjoelker, M. G. (2025). Barriers and opportunities for resilient and sustainable urban forests. *Nature Cities*, 2, 290–298. <https://doi.org/10.1038/s44284-025-00212-2>
- Esperon-Rodriguez, M., Tjoelker, M., Lenoir, J., Baumgartner, J., Beaumont, L., Nipperess, N., Power, S., Richard, B., Rymer, P., & Gallagher, R. (2022). Climate change increases global risk to urban forests. *Nature Climate Change*, 12, 950–955.
- FAO. (2016). In F. Salbitano, S. Borelli, M. Conigliaro, & Y. Chen (Eds.), *Guidelines on urban and peri-urban forestry*. FAO Forestry Paper No (Vol. 178). Food and Agriculture Organization of the United Nations.
- Livesley, S., McPherson, E. G., & Calfapietra, C. (2016). The urban forest and ecosystem services: Impacts on urban water, heat, and pollution cycles at the tree, street, and city scale. *Journal of Environmental Quality*, 45(1), 119–124.
- McPhearson, T., Kabisch, N., & Frantzeskaki, N. (2023). *Nature-based solutions for cities*. Edward Elgar Publishing. <https://doi.org/10.4337/9781800376762>
- Nowak, D. J. (2018). Quantifying and valuing the role of trees and forests on environmental quality and human health. In M. van den Bosch & W. Bird (Eds.), *Nature and public health. Oxford textbook of nature and public health* (pp. 312–316). Oxford University Press.
- Paap, T., Burgess, T. I., & Wingfield, M. J. (2017). Urban trees: Bridgeheads for forest pest invasions and sentinels for early detection. *Biological Invasions*, 19(12), 3515–3526. <https://doi.org/10.1007/s10530-017-1595-x>
- Paris Agreement. 2015. *Paris agreement. report of the conference of the parties to the United Nations framework convention on climate change* (21st session, 2015: Paris). HeinOnline. <https://unfccc.int/process-and-meetings/the-paris-agreement>. Accessed August 2025.
- UN. (2018). *United Nations: The world's cities in 2018* (pp. 1–34). Department of Economic and Social Affairs, Population Division, World Urbanization Prospects.
- UN. (2025). *The 17 goals. Sustainable development*. United Nations. <https://sdgs.un.org/goals>. Accessed August 2025.
- Vogt, J., Hauer, R. J., & Fischer, B. C. (2015). The costs of maintaining and not maintaining the urban forest: A review of the urban forestry and arboriculture literature. *Arboriculture & Urban Forestry*, 41(6), 293–323. <https://doi.org/10.48044/jauf.2015.027>

**How to cite this article:** Esperon-Rodriguez, M., Arndt, S., Asibey, M. O., Augustinus, B. A., Bach, A., Ballinas, M., Barradas, V. L., Barton, D. N., Bauhus, J., Beaumont, L., Bissonnette, J.-F., Brookhouse, M., Calaza-Martínez, P., Calfapietra, C., Lourenço, T. C., Cariñanos, P., Clemente, M., Conway, T., de Hoogh, K., ... Tjoelker, M. G. (2026). Urban forests as essential infrastructure for climate resilience and biodiversity: A call to policymakers. *Plants, People, Planet*, 8(1), 14–19. <https://doi.org/10.1002/ppp3.70125>