

Grasslands and Climate Change

Grasslands are the most extensive terrestrial biome on Earth and are critically important for forage, biodiversity, and ecosystem services. This book brings together an international team of researchers to review scientific knowledge of the effects of climate change on world grasslands, a process we are only just starting to understand. Part I assesses how climate change will impact the distribution of grasslands, as well as production, biogeochemical cycling, and ecosystem services. Part II considers the consequences for the spread of invasive species, demographic change, trophic-level relationships, soil biota, and evolutionary change within grassland biodiversity. Part III proposes how ecologists can respond to climate change effects, focusing on grazing systems, cultural ecology, range management, and restoration. The concluding chapter sets grasslands in the context of the Anthropocene era and identifies the vital research and conservation needs for grassland ecosystems to remain environmentally sustainable under climate change.

David J. Gibson FRSB is Distinguished Professor of Plant Biology, Southern Illinois University Carbondale, USA. He is the Executive Editor of *Journal of Ecology*, the Editor-in-Chief of *Oxford Bibliographies* in Ecology, and has written two books, *Grasses and Grassland Ecology* (Oxford University Press, 2009) and *Methods in Comparative Plant Population Ecology, 2nd Edition* (Oxford University Press, 2015).

Jonathan A. Newman is Dean of the College of Biological Science, University of Guelph, Ontario, Canada, where he was also the founding Director of the School of Environmental Sciences and Chair of the Department of Environmental Biology. He is the lead author of *Climate Change Biology* (CABI, 2011) and *Defending Biodiversity* (Cambridge University Press, 2017).

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Edited by

DAVID J. GIBSON
Southern Illinois University, Carbondale

JONATHAN A. NEWMAN
University of Guelph



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Contributors

SARA G. BAER

Department of Plant Biology
Southern Illinois University
Carbondale, IL
USA
sgbaer@siu.edu

RICHARD D. BARDGETT

School of Earth and Environmental
Sciences
University of Manchester
Manchester
UK
richard.bardgett@manchester.ac.uk

COLIN BEALE

Department of Biology
University of York
York
UK
colin.beale@york.ac.uk

RANDALL B. BOONE

Natural Resource Ecology Laboratory
Colorado State University
Fort Collins, CO
USA
randall.boone@colostate.edu

JOHN BRADFORD

US Geological Survey
Southwest Biological Science Center
Flagstaff, AZ

USA

jbradford@usgs.gov

JANE A. CATFORD

Department of Geography
King's College London
London
UK
jane.catford@kcl.ac.uk

MICHAEL R. DOVE

Yale School of Forestry &
Environmental Studies
Yale University
New Haven, CT
USA
michael.dove@yale.edu

MIKE DUNIWAY

US Geological Survey
Southwest Biological Science Center
Moab, UT
USA

mduniway@usgs.gov

ERIKA J. EDWARDS

Department of Ecology and
Evolutionary Biology
Yale University
New Haven, CT
USA
erika.edwards@yale.edu

X LIST OF CONTRIBUTORS

JOHAN EHRLÉN
 Department of Ecology,
 Environment and Plant Sciences
 Stockholm University
 Stockholm
 Sweden
 johan.ehrlen@su.se

ELISABETH J. FORRESTEL
 Department of Viticulture and
 Enology
 UC Davis
 Davis, CA
 USA
 ejforrestel@ucdavis.edu

LAUCHLAN H. FRASER
 Thompson Rivers University
 Kamloops
 Canada
 lfraser@tru.ca

DAVID J. GIBSON
 Department of Plant Biology
 Southern Illinois University
 Carbondale, IL
 USA
 djgibson@siu.edu

HEATHER A. HAGER
 Department of Integrative Biology
 University of Guelph
 Guelph, Ontario
 Canada
 hhager@uoguelph.ca

WILLIAM HARRIS
 Department of Biology
 University of North Dakota
 Grand Forks, ND
 USA
 williamkendahl@gmail.com

SUE E. HARTLEY
 Department of Biology
 University of York
 York
 UK
 sue.hartley@york.ac.uk

GEOFFREY M. HENEBRY
 Department of Geography,
 Environment, and Spatial Sciences &
 Center for Global Change and Earth
 Observations (CGCEO)
 Michigan State University
 East Lansing, MI
 USA
 henebry@msu.edu

HUGH A.L. HENRY
 Department of Biology
 University of Western Ontario
 London
 Canada
 hhenny4@uwo.ca

MARIO HERRERO
 CSIRO
 St Lucia, Queensland
 Australia
 mario.herrero@csiro.au

LORETTA C. JOHNSON
 Division of Biology
 Kansas State University
 Manhattan, KS
 USA
 johnson@ksu.edu

LIZZIE P. JONES
 School of Biological Sciences
 Royal Holloway
 University of London
 Egham

UK
 lizzie.jones.2017@rhul.ac.uk

MIKE B. JONES
 Department of Botany
 Trinity College
 University of Dublin
 Dublin 2
 Ireland
 mike.jones@tcd.ie

LAURA M. LADWIG
 Department of Integrative Biology
 University of Wisconsin Madison
 Madison, WI
 USA
 lmladwig@wisc.edu

SANDRA LAVOREL
 Laboratoire d'Ecologie Alpine
 CNRS – Université Grenoble Alpes
 Grenoble
 France
 sandra.lavorel@ujf-grenoble.fr

SETH MUNSON
 US Geological Survey
 Southwest Biological Science Center
 Flagstaff, AZ
 USA
 smunson@usgs.gov

JONATHAN A. NEWMAN
 College of Biological Science
 University of Guelph

Guelph
 Canada
 jonathan.newman@uoguelph.ca

ZAK RATAJCZAK
 Department of Integrative Biology
 University of Wisconsin Madison
 Madison, WI
 USA
 zratajczak@wisc.edu

MARINA SEMCHENKO
 School of Earth and Environmental
 Sciences
 University of Manchester
 Manchester
 UK
 marina.semchenko@manchester.ac.uk

PHILIP K. THORNTON
 CGIAR Research Programme on
 Climate Change, Agriculture and
 Food Security, International
 Livestock Research Institute
 Nairobi 00100
 Kenya
 p.thornton@cgiar.org

KATHRYN A. YURKONIS
 Department of Biology
 University of North Dakota
 Grand Forks, ND
 USA
 kathryn.yurkonis@und.edu

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Preface

The even mead, that erst brought sweetly forth
The freckled cowslip, burnet and green clover,
Wanting the scythe, all uncorrected, rank,
Conceives by idleness and nothing teems
But hateful docks, rough thistle, kecksies, burs,
Losing both beauty and utility.

William Shakespeare. *Henry V*, Act V, Scene II, lines 48–54

The decision to put this book together arose because we realised that there was a pressing need to consider how the Earth's most extensive terrestrial biome was responding to climate change, arguably its largest threat. As Shakespeare noted, it is well understood that grasslands ('mead' is a poetic term for a type of wet meadow grassland) are subject to change. Yet, as researchers we have been coming at the topic of grasslands and climate change from different angles. David Gibson had summarised the status of global grasslands in his textbook *Grasses and Grassland Ecology* (1), and Jonathan Newman and colleagues had addressed the climate change threat in his books *Climate Change Biology* (2) and *Defending Biodiversity: Environmental Science and Ethics* (3). We realised that we needed to bring these topics together. The Ecological Reviews series of the British Ecological Society (BES) provides the perfect platform and opportunity, and we are grateful to the BES for its encouragement to do so. To meet this challenge, we are fortunate to have assembled a diverse, international team of prominent grassland ecologists to address the most pressing issues related to grasslands and climate change. Each author team was invited to address a particular topic, but they were afforded leeway in how to do so as we wanted to provide voice for their differing perspectives. To cover as broad a range of topics as possible within the space constraints of the Ecological Reviews book series, each chapter was limited to approximately 6000 words (including references, and table and figure legends), putting an emphasis on brevity and conciseness – which most authors failed to do spectacularly with their first draft.

XIV PREFACE

The 19 chapters in this book are organised into four main sections. The Introduction section (three chapters) provides an overview of grasslands and climate change and reviews methodology for detecting climate change and for making future projections. Following the Introduction section, the subsequent sections address: Part I (Chapters 4–8), Grassland dynamics and climate change; Part II (Chapters 9–14), Species traits, functional groups, and evolutionary change; and Part III (Chapters 15–19), Dealing with climate change effects. An overview introduces each of these sections.

We are grateful to the BES for the opportunity to put this volume together, to all the authors for taking the time to write their chapters and putting up with our nagging to submit their manuscripts, and to the following external peer-reviewers: Nick Barber, James Bullock, Wayne Dawson, Gerlinde De Deyn, Phil Fay, Miguel Franco, Kathleen Galvin, Emily Lines, Pierre Mariotte, Rebecca McCulley, Tony Parsons, Wayne Polley, David Pyke, Christopher Reyer, Justin Schoof, and Tim Seastedt. Thanks also to Phil Warren and Kate Harrison with the British Ecological Society, and Jenny van der Meijden, Dominic Lewis, and Maeve Sinnott with Cambridge University Press for help in bringing the book to publication. As always, we thank our families for their forbearance as we worked on editing this book over weekends and holidays. As before, this is the last book either of us will work on, until the next one.

David Gibson & Jonathan Newman
May 2018

References

1. Gibson DJ. Grasses and grassland ecology. Oxford: Oxford University Press; 2009.
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