advancing the science of climate change americas climate choices

#climate change science #america's climate choices #advancing climate research #US environmental policy #global warming solutions

Explore the critical efforts in advancing the science of climate change, delving into America's climate choices and the essential research shaping our understanding of global warming. This initiative highlights key strategies for environmental policy and sustainable solutions, guiding the nation towards a resilient future.

Advancing the Science of Climate Change

Climate change is occurring, is caused largely by human activities, and poses significant risks for-and in many cases is already affecting-a broad range of human and natural systems. The compelling case for these conclusions is provided in Advancing the Science of Climate Change, part of a congressionally requested suite of studies known as America's Climate Choices. While noting that there is always more to learn and that the scientific process is never closed, the book shows that hypotheses about climate change are supported by multiple lines of evidence and have stood firm in the face of serious debate and careful evaluation of alternative explanations. As decision makers respond to these risks, the nation's scientific enterprise can contribute through research that improves understanding of the causes and consequences of climate change and also is useful to decision makers at the local, regional, national, and international levels. The book identifies decisions being made in 12 sectors, ranging from agriculture to transportation, to identify decisions being made in response to climate change. Advancing the Science of Climate Change calls for a single federal entity or program to coordinate a national, multidisciplinary research effort aimed at improving both understanding and responses to climate change. Seven cross-cutting research themes are identified to support this scientific enterprise. In addition, leaders of federal climate research should redouble efforts to deploy a comprehensive climate observing system, improve climate models and other analytical tools, invest in human capital, and improve linkages between research and decisions by forming partnerships with action-oriented programs.

Advancing the Science of Climate Change

Climate change is occurring. It is very likely caused by the emission of greenhouse gases from human activities, and poses significant risks for a range of human and natural systems. And these emissions continue to increase, which will result in further change and greater risks. America's Climate Choices makes the case that the environmental, economic, and humanitarian risks posed by climate change indicate a pressing need for substantial action now to limit the magnitude of climate change and to prepare for adapting to its impacts. Although there is some uncertainty about future risk, acting now will reduce the risks posed by climate change and the pressure to make larger, more rapid, and potentially more expensive reductions later. Most actions taken to reduce vulnerability to climate change impacts are common sense investments that will offer protection against natural climate variations and extreme events. In addition, crucial investment decisions made now about equipment and infrastructure can "lock in" commitments to greenhouse gas emissions for decades to come. Finally, while it may be possible to scale back or reverse many responses to climate change, it is difficult or impossible to "undo" climate change, once manifested. Current efforts of local, state, and private-sector actors are important, but not likely to yield progress comparable to what could be achieved with the addition of strong federal policies that establish coherent national goals and incentives, and that promote strong U.S. engagement in international-level response efforts. The inherent complexities and uncertainties of climate change are best met by applying an iterative risk management framework and making efforts to significantly reduce greenhouse gas emissions; prepare for adapting to impacts; invest in scientific research, technology development, and information systems; and facilitate engagement between scientific and technical experts and the many types of stakeholders making America's climate choices.

America's Climate Choices

Global climate change is one of America's most significant long-term policy challenges. Human activity-especially the use of fossil fuels, industrial processes, livestock production, waste disposal, and land use change-is affecting global average temperatures, snow and ice cover, sea-level, ocean acidity, growing seasons and precipitation patterns, ecosystems, and human health. Climate-related decisions are being carried out by almost every agency of the federal government, as well as many state and local government leaders and agencies, businesses and individual citizens. Decision makers must contend with the availability and quality of information, the efficacy of proposed solutions, the unanticipated consequences resulting from decisions, the challenge of implementing chosen actions, and must consider how to sustain the action over time and respond to new information. Informing an Effective Response to Climate Change, a volume in the America's Climate Choices series, describes and assesses different activities, products, strategies, and tools for informing decision makers about climate change and helping them plan and execute effective, integrated responses. It discusses who is making decisions (on the local, state, and national levels), who should be providing information to make decisions, and how that information should be provided. It covers all levels of decision making, including international, state, and individual decision making. While most existing research has focused on the physical aspect of climate change, Informing an Effective Response to Climate Change employs theory and case study to describe the efforts undertaken so far, and to guide the development of future decision-making resources. Informing an Effective Response to Climate Change offers much-needed guidance to those creating public policy and assists in implementing that policy. The information presented in this book will be invaluable to the research community, especially social scientists studying climate change; practitioners of decision-making assistance, including advocacy organizations, non-profits, and government agencies; and college-level teachers and students.

Informing an Effective Response to Climate Change

Climate change, driven by the increasing concentration of greenhouse gases in the atmosphere, poses serious, wide-ranging threats to human societies and natural ecosystems around the world. The largest overall source of greenhouse gas emissions is the burning of fossil fuels. The global atmospheric concentration of carbon dioxide, the dominant greenhouse gas of concern, is increasing by roughly two parts per million per year, and the United States is currently the second-largest contributor to global emissions behind China. Limiting the Magnitude of Future Climate Change, part of the congressionally requested America's Climate Choices suite of studies, focuses on the role of the United States in the global effort to reduce greenhouse gas emissions. The book concludes that in order to ensure that all levels of government, the private sector, and millions of households and individuals are contributing to shared national goals, the United States should establish a "budget" that sets a limit on total domestic greenhouse emissions from 2010-2050. Meeting such a budget would require

a major departure from business as usual in the way the nation produces and uses energy-and that the nation act now to aggressively deploy all available energy efficiencies and less carbon-intensive technologies and to develop new ones. With no financial incentives or regulatory pressure, the nation will continue to rely upon and "lock in" carbon-intensive technologies and systems unless a carbon pricing system is established-either cap-and-trade, a system of taxing emissions, or a combination of the two. Complementary policies are also needed to accelerate progress in key areas: developing more efficient, less carbon-intense energy sources in electricity and transportation; advancing full-scale development of new-generation nuclear power, carbon capture, and storage systems; and amending emissions-intensive energy infrastructure. Research and development of new technologies that could help reduce emissions more cost effectively than current options is also strongly recommended.

Limiting the Magnitude of Future Climate Change

Across the United States, impacts of climate change are already evident. Heat waves have become more frequent and intense, cold extremes have become less frequent, and patterns of rainfall are likely changing. The proportion of precipitation that falls as rain rather than snow has increased across the western United States and Arctic sea ice has been reduced significantly. Sea level has been rising faster than at any time in recent history, threatening the natural and built environments on the coasts. Even if emissions of greenhouse gases were substantially reduced now, climate change and its resulting impacts would continue for some time to come. To date, decisions related to the management and protection of the nation's people, resources, and infrastructure have been based on records in the recent past, when climate was relatively stable. Adapting to the Impacts of Climate Change, part of the congressionally requested America's Climate Choices suite of studies, calls for a new paradigm-one that considers a range of possible future climate conditions and impacts that may be well outside the realm of past experience. Adaptation requires actions from many decision makers in federal, state, tribal, and local governments; the private sector; non-governmental organizations; and community groups. However, current efforts are hampered by a lack of solid information about the benefits, costs, and effectiveness of various adaptation options; climate information on regional and local scales; and a lack of coordination. Adapting to the Impacts of Climate Change calls for a national adaptation strategy that provides needed technical and scientific resources, incentives to begin adaptation planning, guidance across jurisdictions, shared lessons learned, and support of scientific research to expand knowledge of impacts and adaptation.

Adapting to the Impacts of Climate Change

"This report presents the findings of the Committee on Adapting to the Impacts of Climate Change, one of four concurrent panel efforts within the America's Climate Choices Committee study"--Page ix.

Adapting to the Impacts of Climate Change

Climate Change: Evidence and Causes is a jointly produced publication of The US National Academy of Sciences and The Royal Society. Written by a UK-US team of leading climate scientists and reviewed by climate scientists and others, the publication is intended as a brief, readable reference document for decision makers, policy makers, educators, and other individuals seeking authoritative information on the some of the questions that continue to be asked. Climate Change makes clear what is well-established and where understanding is still developing. It echoes and builds upon the long history of climate-related work from both national academies, as well as on the newest climate-change assessment from the United Nations' Intergovernmental Panel on Climate Change. It touches on current areas of active debate and ongoing research, such as the link between ocean heat content and the rate of warming.

Climate Change

Summarizes the science of climate change and impacts on the United States, for the public and policymakers.

Global Climate Change Impacts in the United States

First Published in 2011. Routledge is an imprint of Taylor & Francis, an informa company.

America's Climate Problem

Part I of this report is a synthesis that highlights eight selected themes, each of which relates to diagnoses, recommendations, and important lines of debate or inquiry. Part II describes the diagnoses and 39 recommendations from the eight working groups.

Adapting to the Impacts of Climate Change

The social cost of carbon (SCC) for a given year is an estimate, in dollars, of the present discounted value of the damage caused by a 1-metric ton increase in CO2 emissions into the atmosphere in that year; or equivalently, the benefits of reducing CO2 emissions by the same amount in that given year. The SCC is intended to provide a comprehensive measure of the monetized value of the net damages from global climate change from an additional unit of CO2, including, but not limited to, changes in net agricultural productivity, energy use, human health effects, and property damages from increased flood risk. Federal agencies use the SCC to value the CO2 emissions impacts of various policies including emission and fuel economy standards for vehicles, regulations of industrial air pollutants from industrial manufacturing, emission standards for power plants and solid waste incineration, and appliance energy efficiency standards. There are significant challenges to estimating a dollar value that reflects all the physical, human, ecological, and economic impacts of climate change. Recognizing that the models and scientific data underlying the SCC estimates evolve and improve over time, the federal government made a commitment to provide regular updates to the estimates. To assist with future revisions of the SCC, the Interagency Working Group on the Social Cost of Carbon (IWG) requested the National Academies of Sciences, Engineering, and Medicine complete a study that assessed the merits and challenges of a limited near-term update to the SCC and of a comprehensive update of the SCC to ensure that the estimates reflect the best available science. This interim report focuses on near-term updates to the SCC estimates.

Americans and Climate Change

There is an increasing consensus in the scientific community that climate change is a real and present threat. Despite the large uncertainty on the timing, magnitude and even the direction of some of the physical and economic effects of this phenomenon, it is widely accepted that the differences are regional and that developing countries as well as lower income populations tend to suffer the most. In this context, it is critical for Latin American countries to develop strategies for adapting to the various impacts of climate change, and for contributing to global efforts aimed at mitigation. Climate Change in Latin America contributes to these efforts by addressing a number of questions related to the causes and consequences of climate change in the case of Latin America. What are the likely impacts of climate change in the region? Which countries and regions will be most affected? What can governments do to tackle the challenges associated with adapting to climate change? What role can Latin America play in the area of climate change mitigation? While the book does not attempt to provide definitive answers to these questions, it contributs new information and analysis that could help to inform the public policy debate on this important issue.

Assessment of Approaches to Updating the Social Cost of Carbon

The global scientific and policy community now unequivocally accepts that human activities cause global climate change. Although information on climate change is readily available, the nation still seems unprepared or unwilling to respond effectively to climate change, due partly to a general lack of public understanding of climate change issues and opportunities for effective responses. The reality of global climate change lends increasing urgency to the need for effective education on earth system science, as well as on the human and behavioral dimensions of climate change, from broad societal action to smart energy choices at the household level. The public's limited understanding of climate change is partly the result of four critical challenges that have slowed development and delivery of effective climate change education. As one response to these challenges, Congress, in its 2009 and 2010 appropriation process, requested that the National Science Foundation (NSF) create a program in climate change education to provide funding to external grantees to improve climate change education in the United States. To support and strengthen these education initiatives, the Board on Science Education of the National Research Council (NRC) created the Climate Change Education Roundtable. The Roundtable convened two workshops. Climate Change Education Goals, Audiences, and Strategies is a summary of the discussions and presentations from the first workshop, held October 21 and 22, 2010. This report focuses on two primary topics: public understanding and decision maker

support. It should be viewed as an initial step in examining the research on climate change and applying it in specific policy circumstances.

Adapting to the Impacts of Climate Change

NEW YORK TIMES BESTSELLER For the first time ever, an international coalition of leading researchers, scientists and policymakers has come together to offer a set of realistic and bold solutions to climate change. All of the techniques described here - some well-known, some you may have never heard of - are economically viable, and communities throughout the world are already enacting them. From revolutionizing how we produce and consume food to educating girls in lower-income countries, these are all solutions which, if deployed collectively on a global scale over the next thirty years, could not just slow the earth's warming, but reach drawdown: the point when greenhouse gasses in the atmosphere peak and begin todecline. So what are we waiting for?

Low Carbon, High Growth

This open access volume draws on a multidimensional model of educational change, the book reviews the field of climate change education and identifies some of the areas in which past efforts have fallen short in supporting effective pedagogical change at scale. It then formulates an approach to engage university students and faculty in partnering with schools and adult education institutions and directly contribute innovative curricula on climate change. The approach is illustrated with several case studies which present curricula developed to support school-based innovation in the Middle East and in Guatemala, and adult education in Haiti and Pakistan, and educators preparation at the university level. The approach followed to develop innovative curriculum follows five steps: 1) What are the specific impacts of climate change in this jurisdiction? How do they impact various human populations? 2) What knowledge, dispositions and behaviors could mitigate the impact of climate change and are there ways in which changes in the behaviors of populations in this jurisdiction could slow down climate change? 3) What are the means of delivery to reach each of the specific populations in this jurisdiction who needs to be educated on climate change? 4) What curriculum can help educate each population? 5) What role can the institution we are collaborating with play in advancing climate change education in that jurisdiction? The various chapters of the book present the conceptual foundation of these programs and illustrate how these programs respond to specific characteristics of local contexts. These programs focus in schools, non-formal settings and educator preparation institutions. The chapters offer examples of general value beyond the specific contexts for which they were designed, as they illustrate how in order to be optimally useful climate change education needs to be firmly grounded in the specifics of a context and responsive to that context.

Climate Change Education

‘Nathaniel Rich’s account starts in Washington in the 1990s and tells the story of how climate change could have been stopped back then, if only the powerful had acted. But they didn’t want to.’ – Observer By 1979, we knew all that we know now about the science of climate change – what was happening, why it was happening, and how to stop it. Over the next ten years, we had the very real opportunity to stop it. Obviously, we failed. Nathaniel Rich tells the essential story of why and how, thanks to the actions of politicians and businessmen, that failure came about. It is crucial to an understanding of where we are today. ‘The excellent and appalling Losing Earth by Nathaniel Rich describes how close we came in the 70s to dealing with the causes of global warming and how US big business and Reaganite politicians in the 80s ensured it didn’t happen. Read it.’ – John Simpson ‘An eloquent science history, and an urgent eleventh-hour call to save what can be saved.’ – Nature ‘To change the future, we must first understand our past, and Losing Earth is a crucial part of that when it comes to the environmental battles we’re facing.’– Stylist

Limiting the Magnitude of Future Climate Change

"Unsettled is a remarkable book—probably the best book on climate change for the intelligent layperson—that achieves the feat of conveying complex information clearly and in depth." —Claremont Review of Books "Surging sea levels are inundating the coasts." "Hurricanes and tornadoes are becoming fiercer and more frequent." "Climate change will be an economic disaster." You've heard all this presented as fact. But according to science, all of these statements are profoundly misleading. When it comes to climate change, the media, politicians, and other prominent voices have declared that "the science is settled." In reality, the long game of telephone from research to reports to the

popular media is corrupted by misunderstanding and misinformation. Core questions—about the way the climate is responding to our influence, and what the impacts will be—remain largely unanswered. The climate is changing, but the why and how aren't as clear as you've probably been led to believe. Now, one of America's most distinguished scientists is clearing away the fog to explain what science really says (and doesn't say) about our changing climate. In Unsettled: What Climate Science Tells Us, What It Doesn't, and Why It Matters, Steven Koonin draws upon his decades of experience—including as a top science advisor to the Obama administration—to provide up-to-date insights and expert perspective free from political agendas. Fascinating, clear-headed, and full of surprises, this book gives readers the tools to both understand the climate issue and be savvier consumers of science media in general. Koonin takes readers behind the headlines to the more nuanced science itself, showing us where it comes from and guiding us through the implications of the evidence. He dispels popular myths and unveils little-known truths: despite a dramatic rise in greenhouse gas emissions, global temperatures actually decreased from 1940 to 1970. What's more, the models we use to predict the future aren't able to accurately describe the climate of the past, suggesting they are deeply flawed. Koonin also tackles society's response to a changing climate, using data-driven analysis to explain why many proposed "solutions" would be ineffective, and discussing how alternatives like adaptation and, if necessary, geoengineering will ensure humanity continues to prosper. Unsettled is a reality check buoyed by hope, offering the truth about climate science that you aren't getting elsewhere—what we know, what we don't, and what it all means for our future.

Drawdown

Climate change is occurring, is very likely caused by human activities, and poses significant risks for a broad range of human and natural systems. Each additional ton of greenhouse gases emitted commits us to further change and greater risks. In the judgment of the Committee on America's Climate Choices, the environmental, economic, and humanitarian risks of climate change indicate a pressing need for substantial action to limit the magnitude of climate change and to prepare to adapt to its impacts. A principal message from the recent National Research Council report, America's Climate Choices, this brief summary of how climate change will shape many aspects of life in the foreseeable future emphasizes the vital importance of preparation for these changes. The report points to the importance of formal and informal education in supporting the public's understanding of those challenges climate change will bring, and in preparing current and future generations to act to limit the magnitude of climate change and respond to those challenges. Recognizing both the urgency and the difficulty of climate change education, the National Research Council, with support from the National Science Foundation, formed the Climate Change Education Roundtable. The roundtable brings together federal agency representatives with diverse experts and practitioners in the physical and natural sciences, social sciences, learning sciences, environmental education, education policy, extension education and outreach, resource management, and public policy to engage in discussion and explore educational strategies for addressing climate change. Two workshops were held to survey the landscape of climate change education. The first explored the goals for climate change education for various target audiences. The second workshop, which is the focus of this summary, was held on August 31 and September 1, 2011, and focused on the teaching and learning of climate change and climate science in formal education settings, from kindergarten through the first two years of college (K-14). This workshop, based on an already articulated need to teach climate change education, provided a forum for discussion of the evidence from research and practice. The goal of this workshop was to raise and explore complex questions around climate change education, and to address the current status of climate change education in grade K-14 of the formal education system by facilitating discussion between expert researchers and practitioners in complementary fields, such as education policy, teacher professional development, learning and cognitive science, K-12 and higher education administration, instructional design, curriculum development, and climate science. Climate Change Education in Formal Settings, K-14: A Workshop Summary summarizes the two workshops.

Education and Climate Change

Psychology and Climate Change: Human Perceptions, Impacts, and Responses organizes and summarizes recent psychological research that relates to the issue of climate change. The book covers topics such as how people perceive and respond to climate change, how people understand and communicate about the issue, how it impacts individuals and communities, particularly vulnerable communities, and how individuals and communities can best prepare for and mitigate negative climate change impacts. It addresses the topic at multiple scales, from individuals to close social networks

and communities. Further, it considers the role of social diversity in shaping vulnerability and reactions to climate change. Psychology and Climate Change describes the implications of psychological processes such as perceptions and motivations (e.g., risk perception, motivated cognition, denial), emotional responses, group identities, mental health and well-being, sense of place, and behavior (mitigation and adaptation). The book strives to engage diverse stakeholders, from multiple disciplines in addition to psychology, and at every level of decision making - individual, community, national, and international, to understand the ways in which human capabilities and tendencies can and should shape policy and action to address the urgent and very real issue of climate change. Examines the role of knowledge, norms, experience, and social context in climate change awareness and action Considers the role of identity threat, identity-based motivation, and belonging Presents a conceptual framework for classifying individual and household behavior Develops a model to explain environmentally sustainable behavior Draws on what we know about participation in collective action Describes ways to improve the effectiveness of climate change communication efforts Discusses the difference between acute climate change events and slowly-emerging changes on our mental health Addresses psychological stress and injury related to global climate change from an intersectional justice perspective Promotes individual and community resilience

Losing Earth

This book demystifies the models we use to simulate present and future climates, allowing readers to better understand how to use climate model results. In order to predict the future trajectory of the Earth’s climate, climate-system simulation models are necessary. When and how do we trust climate model predictions? The book offers a framework for answering this question. It provides readers with a basic primer on climate and climate change, and offers non-technical explanations for how climate models are constructed, why they are uncertain, and what level of confidence we should place in them. It presents current results and the key uncertainties concerning them. Uncertainty is not a weakness but understanding uncertainty is a strength and a key part of using any model, including climate models. Case studies of how climate model output has been used and how it might be used in the future are provided. The ultimate goal of this book is to promote a better understanding of the structure and uncertainties of climate models among users, including scientists, engineers and policymakers.

Unsettled

The climate change is coming. To prepare for it, we need to admit that we can’t prevent it.

Climate Change Education in Formal Settings, K-14

"Today, about 98 percent of scientists affirm that climate change is human made, and about 2 percent still question it. Despite that overwhelming majority, though, about half the population of rich countries, like ours, choose to believe the 2 percent. And, paradoxically, this large camp of deniers grows even larger as more and more alarming proof of climate change has cropped up over the last decades. This disconnect has both climate scientists and activists scratching their heads, growing anxious, and responding, usually, by repeating more facts to 'win' the argument. But, the more climate facts pile up, the greater the resistance to them grows, and the harder it becomes to enact measures to reduce greenhouse gas emissions and prepare communities for the inevitable change ahead. Is humanity up to the task? It is a catch-22 that starts, says psychologist and climate expert Per Espen Stoknes, from an inadequate understanding of the way most humans think, act, and live in the world around them. With dozens of examples, he shows how to retell the story of climate change and apply communication strategies more fit for the task."--Publisher's description.

Medium- and Heavy-Duty Fuel Efficiency Improvement Program

Due to the lack of success in climate change mitigation efforts, the importance of adaptation is becoming more and more apparent and is now one of the main imperatives of international research and action. However, research on adaptation is mostly not directly applicable to adaptation policy or practice, leaving a gap between scientific results and practical advice for decision makers and planners. This book seeks to address this problem and bridge the gap and should provide readers with practical and applicable information on climate change adaptation. Following an introduction, the book is organised into four main sections, each reflecting an essential component in the adaptation process. Climate change adaptation is an emerging subject area and has gained increased political and academic attention within the last decade. Whereas most books in the field focus on adaptation

in developing countries, this volume provides an examination of predominantly European policy and offers inter-disciplinary insight into cutting edge knowledge and lessons learnt in a relatively new field of implementation.

Psychology and Climate Change

Adaptation is the poor cousin of the climate change challenge -the glamour of international debate is around global mitigationagreements, while the bottom-up activities of adaptation, carriedout in community halls and local government offices, are oftenoverlooked. Yet, as international forums fail to deliver reductionsin greenhouse gas emissions, the world is realising that effectiveadaptation will be essential across all sectors to deal with theunavoidable impacts of climate change. The need to understand howto adapt effectively, and to develop appropriate adaptation optionsand actions, is becoming increasingly urgent. This book reports the current state of knowledge on climatechange adaptation, and seeks to expose and debate key issues inadaptation research and practice. It is framed around a number ofcritical areas of adaptation theory and practice, including: Advances in adaptation thinking, Enabling frameworks and policy for adaptation, Engaging and communicating with practitioners, Key challenges in adaptation and development, Management of natural systems and agriculture under climatechange, Ensuring water security under a changing climate, Urban infrastructure and livelihoods, and The nexus between extremes, disaster management andadaptation. It includes contributions from many of the leading thinkers andpractitioners in adaptation today. The book is based on keycontributions from the First International Conference on ClimateChange Adaptation ‘Climate Adaptation Futures’, held onthe Gold Coast, Australia, in June 2010. That three-day meeting ofover 1000 researchers and practitioners in adaptation from 50countries was the first of its kind. Readership: The book is essential reading for a widerange of individuals involved in climate change adaptation,including: Researchers, Communication specialists, Decision-makers and policy makers (e.g. government staff, localcouncil staff), On-ground adaptation practitioners (e.g. aid agencies,government workers, NGOs), Postgraduate and graduate students, and Consultants.

Demystifying Climate Models

Cambridge, UK : Cambridge University Press, 1998.

What If We Stopped Pretending?

In response to the Chief of Naval Operations (CNO), the National Research Council appointed a committee operating under the auspices of the Naval Studies Board to study the national security implications of climate change for U.S. naval forces. In conducting this study, the committee found that even the most moderate current trends in climate, if continued, will present new national security challenges for the U.S. Navy, Marine Corps, and Coast Guard. While the timing, degree, and consequences of future climate change impacts remain uncertain, many changes are already underway in regions around the world, such as in the Arctic, and call for action by U.S. naval leadership in response. The terms of reference (TOR) directed that the study be based on Intergovernmental Panel on Climate Change (IPCC) scenarios and other peer-reviewed assessment. Therefore, the committee did not address the science of climate change or challenge the scenarios on which the committee's findings and recommendations are based. National Security Implications of Climate Change for U.S. Naval Forces addresses both the near- and long-term implications for U.S. naval forces in each of the four areas of the TOR, and provides corresponding findings and recommendations. This report and its conclusions are organized around six discussion areas--all presented within the context of a changing climate.

What We Think About When We Try Not To Think About Global Warming

This second edition of this important and authoritative survey provides students and researchers with up-to-date and accessible information about the ecology of freshwater and estuarine wetlands. Prominent scholars help students understand both general concepts of different wetland types as well as complex topics related to these dynamic physical environments. Careful syntheses review wetland soils, hydrology, and geomorphology; abiotic constraints for wetland plants and animals; microbial ecology and biogeochemistry; development of wetland plant communities; wetland animal ecology; and carbon dynamics and ecosystem processes. In addition, contributors document wetland regulation, policy, and assessment in the US and provide a clear roadmap for adaptive management and restoration of wetlands. New material also includes an expanded review of the consequences

for wetlands in a changing global environment. Ideally suited for wetlands ecology courses, Ecology of Freshwater and Estuarine Wetlands, Second Edition, includes updated content, enhanced images (many in color), and innovative pedagogical elements that guide students and interested readers through the current state of our wetlands.

Climate Change Adaptation Manual

Education for sustainable development, the educational offshoot of the concept of ‘sustainable development’, has rapidly become the predominant educational response to the global environmental crisis. The authors apply a critical lens to the field and find it wanting in many regards. Sustainability Frontiers is an international, academic non-governmental organization based in Canada and the United Kingdom. It engages in research and innovation in the broad fields of sustainability and global education challenging dominant assumptions and current orthodoxies as it seeks to foster learner empowerment and action. It places particular emphasis on climate change, disaster risk reduction and peacebuilding and their implications for the nature and directions of sustainability education.

Climate Adaptation Futures

What does successful adaptation look like? This is a question we are frequently asked by planners, policy makers and other professionals charged with the task of developing and implementing adaptation strategies. While adaptation is increasingly recognized as an important climate risk management strategy, and on-the-ground adaptation planning activity is becoming more common-place, there is no clear guidance as to what success would look like, what to aim for and how to judge progress. This edited volume makes significant progress toward unpacking the question of successful adaptation, offering both scientifically informed and practice-relevant answers from various sectors and regions of the world. It brings together 18 chapters from leading experts within the field to present careful analyses of different cases and situations, questioning throughout commonly avowed truisms and unspoken assumptions that have pervaded climate adaptation science and practice to date. This book offers not one answer but demonstrates how the question of success in important ways is normative and context specific. It identifies the various dimensions of success, such as economic, political, institutional, ecological, and social, explores the tensions between them, and compiles encouraging evidence that resolutions can be found. The book appraises how climatic and non-climatic stressors play a role, what role science does and can play in adaptation decision making, and how trade-offs and other concerns and priorities shape adaptation planning and implementation on the ground. This is timely interdisciplinary text sheds light on key issues that arise in on-the-ground adaptation to climate change. It bridges the gap between science and practical application of successful adaptation strategies and will be of interest to both students, academics and practitioners.

The Regional Impacts of Climate Change

Responding to the issues and challenges of teaching and learning about climate change from a science education-based perspective, this book is designed to serve as an aid for educators as they strive to incorporate the topic into their classes. The unique discussion of these issues is drawn from the perspectives of leading and international scholars in the field. The book is structured around three themes: theoretical, philosophical, and conceptual frameworks for climate change education and research; research on teaching and learning about global warming and climate change; and approaches to professional development and classroom practice.

The American Energy Initiative

Learn more about the impact of global warming and climate change on human health and disease The Second Edition of Global Climate Change and Human Health delivers an accessible and comprehensive exploration of the rapidly accelerating and increasingly ubiquitous effects of climate change and global warming on human health and disease. The distinguished and accomplished authors discuss the health impacts of the economic, climatological, and geopolitical effects of global warming. You'll learn about: The effect of extreme weather events on public health and the effects of changing meteorological conditions on human health How changes in hydrology impact the spread of waterborne disease and noninfectious waterborne threats Adaptation to, and the mitigation and governance of, climate change, including international perspectives on climate change adaptation Perfect for students of public health, medicine, nursing, and pharmacy, Global Climate Change and Human Health, Second Edition is an

invaluable resource for anyone with an interest in the intersection of climate and human health and disease.

National Security Implications of Climate Change for U.S. Naval Forces

Learn the foundations of climate science and human health Global Climate Change and Human Health examines the environmental crisis from a public health and clinical health perspective, giving students and clinicians the information they need to prepare for the future of health care. Edited by George Luber, associate director for climate change at the Centers for Disease Control and Prevention, and Jay Lemery, associate professor at the University of Colorado School of Medicine and section chief of Wilderness and Environmental Medicine in the Department of Emergency Medicine, and including chapters written by luminaries in the field, this landmark book provides a comprehensive introduction to climate change and health. Students will learn about climate changes direct effect on health, including extreme weather events, altered and degraded ecosystems, and threats to human security and welfare. Discussions on mitigation and adaptation strategies, including disease surveillance, communications, and greening health care, as well as a primer on the core concepts of climate change science are presented. Each chapter has a specific section on the clinical correlations of the impact of climate change on health. Informative illustrations depict increasing aeroallergens, shifting vector habitats, emergent risks, and more. Visual teaching materials broken down by chapter (including PowerPoint lecture slides) are available for instructors. This book shows how human health will be —and already has been — affected and how health care practitioners need to start preparing. Understand the science behind climate change and climate variability Learn how the availability of food and clean water will affect public health Consider the diseases that will surge as vector populations swell Discover mitigation strategies targeted toward the health care community Understanding how climate change affects human rights and how international institutions are responding Increased temperatures bring algal blooms that threaten clean water. Degraded air quality brings allergies, asthma, and respiratory diseases. Ground pollutants lower the nutritional value of food crops. It's clear that climate change is very much a public health concern, and Global Climate Change and Human Health helps those preparing to be on the front lines of health care.

Ecology of Freshwater and Estuarine Wetlands

Environmental Health Perspectives