Foundations Of Ecological Resilience

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ecological resilience provides a theoretical foundation for understanding how complex systems adapt to and recover from localized disturbances like hurricanes fires pest outbreaks and floods as well as large scale perturbations such as climate change ecologists have developed resilience theory over the past three decades in an effort to explain surprising and nonlinear dynamics of complex adaptive systems resilience theory is especially important to environmental scientists for its role in underpinning adaptive management approaches to ecosystem and resource management foundations of ecological resilience is a collection of the most important articles on the subject of ecological resilience those writings that have defined and developed basic concepts in the field and help explain its importance and meaning for scientists and researchers the book s three sections cover articles that have shaped or defined the concepts and theories of resilience including key papers that broke new conceptual ground and contributed novel ideas to the field examples that demonstrate ecological resilience in a range of ecosystems and articles that present practical methods for understanding and managing nonlinear ecosystem dynamics foundations of ecological resilience is an important contribution to our collective understanding of resilience and an invaluable resource for students and scholars in ecology wildlife ecology conservation biology sustainability environmental science public policy and related fields

resilience thinking challenges us to reconsider the meaning of sustainability in a world that must constantly adapt in the face of gradual and at times catastrophic change this volume further asks environmental education and resource management scholars to consider the relationship of environmental learning and behaviours to attributes of resilient social ecological systems attributes such as ecosystem services innovative governance structures biological and cultural diversity and social capital similar to current approaches to environmental education and education for sustainable development resilience scholarship integrates social and ecological perspectives the authors of resilience in social ecological systems the role of learning and education present a wealth of perspectives integrating theory with reviews of empirical studies in natural resource management and in youth adult and higher education the authors explore the role of education and learning in helping social ecological systems as they respond to change through adaptation and transformation this book also serves to integrate a growing literature on resilience and social learning in natural resources management with research in environmental education and education for sustainable development this book was originally published as a special issue of environmental education research

this title includes a number of open access chapters this book presents the latest research on resilience strategies around the world research such as this is necessary to create new ideas and to evaluate established ones in an effort to make communities more adaptable and to increase people s survival and quality of life while living with the re

scientists and researchers concerned with the behavior of large ecosystems have focused in recent years on the concept of resilience traditional perspectives held that ecological systems exist close to a steady state and resilience is the ability of the system to return rapidly to that state following perturbation however beginning with the work of c s holling in the early 1970s researchers began to look at conditions far from the steady state where instabilities can cause a system to shift into an entirely different regime of behavior and where resilience is measured by the magnitude of disturbance that can be absorbed before the system is restructured resilience and the behavior of large scale systems examines theories of resilience and change offering readers a thorough understanding of how the properties of ecological resilience and human adaptability interact in complex regional scale systems the book addresses the theoretical concepts of resilience and stability in large scale ecosystems as well as the empirical application of those concepts in a diverse set of cases in addition it discusses the practical implications of the new theoretical approaches and their role in the sustainability of human modified ecosystems the book begins with a review of key properties of complex adaptive systems that contribute to overall resilience including multiple equlibria complexity self organization at multiple scales and order it also presents a set of mathematical metaphors to describe and deepen the reader s understanding of the ideas being discussed following the introduction are case studies that explore the biophysical dimensions of resilience in both terrestrial and aquatic systems and evaluate the propositions presented in the introductory chapters the book concludes with a synthesis section that revisits propositions in light of the case studies while an appendix presents a detailed account of the relationship between return times for a disturbed system and its resilienc in addition to the editors contributors include stephen r carpenter carl folke c s holling bengt owe jansson donald ludwig ariel lugo tim r mcclanahan garry d peterson and brian h walker

environmental law envisions ecological systems as existing in an equilibrium state reinforcing a rigid legal framework unable to absorb rapid environmental changes and innovations in sustainability for the past four decades resilience theory which embraces uncertainty and nonlinear dynamics in complex adaptive systems has provided a robust invaluable foundation for sound environmental management reforming american law to incorporate this knowledge is the key to sustainability this volume features top legal and resilience scholars speaking on resilience

theory and its legal applications to climate change biodiversity national parks and water law

ecological resilience nature s lessons in sustainability is a captivating exploration of the intricate web of life and its resilient responses to environmental challenges this insightful book delves into case studies spanning rainforests coral reefs grasslands and urban ecosystems unraveling the strategies that enable these diverse habitats to adapt and thrive through meticulous analysis and real world examples readers gain a profound understanding of the delicate balance between ecosystems and the impact of human activities the book navigates the dynamic landscapes of rainforests revealing the biodiversity hotspots and the critical role indigenous communities play as stewards of resilience it immerses readers in the mesmerizing world of coral reefs exploring their adaptive strategies and the urgent need for restoration efforts the vast grasslands come to life as the book examines the role of fire megafauna interactions and the delicate balance between human activities and conservation in the concrete jungles of urban ecosystems readers discover the resilience strategies embedded in green infrastructure coexistence with wildlife and innovative sustainable urban planning the book extends its focus to in depth case studies comparing tropical rainforests resilience across different regions showcasing successful community based conservation initiatives and exploring economic alternatives to deforestation moving forward the narrative shifts to proactive measures dissecting coral reef restoration innovations grassland rewilding projects and nature based solutions in urban planning readers are introduced to the delicate interplay of sustainable resource management responsible ecotourism and effective policy interventions in rainforest conservation as the chapters unfold the book provides a compelling overview of the human connection with nature it emphasizes the cultivation of ecological intelligence learning from indigenous wisdom and adopting sustainable practices to shape a resilient future the intricacies of cultural ecology biophilia in urban design and the spiritual dimensions of landscapes are explored emphasizing ethical consumerism and the power of community based conservation the journey continues with a detailed analysis of monitoring urban biodiversity employing citizen science initiatives and embracing remote sensing technologies in chapter 4 the human connection the narrative unfolds into the realms of ecological intelligence indigenous wisdom sustainable practices and bridging the gap between people and the environment

the significance of the concept of resilience in determining the static and the dynamic behavior of jointly determined ecological economic systems has been recognized by ecologists for quite some time now however there are very few formal studies of ecological economic systems that explicitly analyze the ecological and the economic aspects of the joint determination problem as such this paper has two goals first a new stationary probability based technique is used to

describe the concept of ecological resilience next this description is used to analyze aspects of the problem of optimal species conservation

since the middle of the last century rapid population growth and urbanization have led to the encroachment of a large number of natural spaces resulting in a series of ecological security issues such as environmental pollution resource depletion and habitat destruction which have severely challenged global sustainable development urban ecological security is an important barrier to urban residents production and life the foundation and core of national or regional ecological security and it is of great significance to promote green development and harmonious coexistence between humans and nature with global warming frequent natural disasters and other multifactorial threats the issue of ecological security in cities as centers of the settlement have become a focus of international attention however cities are complex systems with social economic and natural conditions coupled with each other under the overlapping of many factors the basic problems such as the mechanism of urban development on ecological security have not been fully explained and there is also a lack of quantitative assessment methods corresponding to urban ecological conditions let alone simulation and prediction

global environmental change is occurring at a rate faster than humans have ever experienced climate change and the loss of ecosystem services are the two main global environmental crises facing us today as a result there is a need for better understanding of the specific and general resilience of networked ecosystems cities organisations and institutions to cope with change in this book an international team of experts provide cutting edge insights into building the resilience and adaptive governance of complex social ecological systems through a set of case studies it focuses on the social science dimension of ecosystem management in the context of global change in a move to bridge existing gaps between resilience sustainability and social science using empirical examples ranging from local to global levels views from a variety of disciplines are integrated to provide an essential resource for scholars policy makers and students seeking innovative approaches to governance

in the effort towards sustainability it has become increasingly important to develop conceptual frames to understand the dynamics of social and ecological systems drawing on complex systems theory this book investigates how human societies deal with change in linked social ecological systems and build capacity to adapt to change the concept of resilience is central in this context resilient social ecological systems have the potential to sustain development by responding to and shaping change in a manner that does not lead to loss of future options resilient systems also provide capacity for renewal and innovation in the face of rapid

transformation and crisis the term navigating in the title is meant to capture this dynamic process case studies and examples from several geographic areas cultures and resource types are included merging forefront research from natural sciences social sciences and the humanities into a common framework for new insights on sustainability

the landscape resilience framework is designed to facilitate application of resilience principles to ecosystem management by detailing the seven dimensions of a landscape that contribute to resilience it represents a synthesis of thinking across empirical ecological studies and social ecological resilience theory and was reviewed by a team of expert advisors our goal was to create a concise and comprehensive set of key considerations that could be integrated into identifying on the ground actions across urban design conservation planning and ecosystem management that would contribute to resilient future landscapes

this technical report is one of a series of foundation papers for the british columbia ministry of forests and range s future forest ecosystems initiative ffei the series of foundation papers will increase awareness about the potential impact of climate change on forest range resources in british columbia it will also provide information to help assess the vulnerability of british columbia s forest and range resources to climate change and guide the development of adaptation strategies this report summarizes the theory of ecological resilience and explores how this aspect of complex system science provides guidance for managing forests in a changing climate

never ever in the annals of human civilization the importance of ecological resilience has become so important and imperative as we are perceiving now both the need and greed of food economics have driven the resource bases of our ecosystem to a dilapidated and fragile status by 2050 the worlds population will touch close to 9 5 billion and we have to scale up our food production 60 more over what it is right now in india by 2040 we have to cross 450 million tonnes of our targeted food production to keep rhythm with population growth by 2035 we are going to cross the population of china the book uniquely and empirically estimated the following parameters in predicting resilience in agriculture uncertainty index of yield uncertainty index of income uncertainty index of crop uncertainty index of marketability uncertainty index of weather vulnerability crop biodiversity index and i hope for the present and incoming researchers students and faculties across the will be benefitted while studying in the realm of ecological residence in agriculture and food security

rapid global change is one of the greatest threats to contemporary society an increasing emphasis has been placed on understanding and applying concepts of ecological resilience that is the

amount of disturbance that a system can absorb before transitioning to an alternative ecological regime with its own unique set of structures and functions understanding factors that promote or erode resilience across scales is pertinent for managing and conserving valued ecosystem services in this dissertation i investigate patterns and outcomes of a predominant global change driver wildfire in the central united states first i assess wildfire patterns across multiple scales in the u s great plains i find large wildfires are increasing in number and that contemporary wildfires are most likely to occur in wooded and grassland land cover types across scales i also find that contemporary large wildfires are not associated with large scale persistent transitions in vegetation functional groups second i use data collected from forest grassland ecotones to investigate concepts of spatial resilience regime identity and ecological legacies of wildfire my findings support the concept of spatial resilience by demonstrating the ability of spatial attributes to influence the probability of wildfire driven regime shifts i also demonstrate the complexity of wildfire legacies that are not currently captured in regime identities used in application and highlight how current management tactics can erode ecological legacies of wildfire further i assess ties between tree plantings in grasslands and woody encroachment finding social ecological landscape factors predict woody spread from tree plantings with potential implications for fire risk finally i assess the response of wildlife to the heterogeneity created by wildfire finding that time since fire and fire severity shapes bighorn sheep habitat selection over broad scales

nowadays the whole world faces frequent natural and anthropogenic hazards from drought to flood to deforestation which impends a large number of people into catastrophic destruction and damage since natural hazards cannot be eliminated quantifying these events and creating reliable forecasts can alleviate their detrimental effects which can help build a more resilient and safe society this research topic will comply with the available knowledge of the multi hazards in response to monitoring and management and intends to fulfil the gap between science policy and the community concerned it also focuses on the use of precision techniques remote sensing and gis technologies for the quantification of various natural and environmental hazards along with the capacity and sustainable mitigation strategies for resilient societies

the time has come for us to collectively reexamine and ultimately move past the concept of sustainability in environmental and natural resources law and management the continued invocation of sustainability in policy discussions ignores the emerging reality of the anthropocene which is creating a world characterized by extreme complexity radical uncertainty and unprecedented change from a legal and policy perspective we must face the impossibility of even defining let alone pursuing a goal of sustainability in such a world melinda harm benson and robin kundis craig

propose resilience as a more realistic and workable communitarian approach to environmental governance american environmental and natural resources laws date to the early 1970s when the steady state balance of nature model was in vogue a model that ecologists have long since rejected even before adding the complication of climate change in the anthropocene a new era in which humans are the key agent of change on the planet these laws and american culture more generally need to embrace new narratives of complex ecosystems and humans role as part of them narratives exemplified by cultural tricksters and resilience theory updating aldo leopold s vision of nature and humanity as a single community for the anthropocene benson and craig argue that the narrative of resilience integrates humans back into the complex social and ecological system known as earth as such it empowers humans to act for a better future through law and policy despite the very real challenges of climate change

this book introduces a new approach to environmental sociology by integrating complexity informed social science marxian ecological theory and resilience based human ecology it argues that sociologists have largely ignored developments in ecology which move beyond functionalist approaches to systems analysis and as a result environmental sociology has failed to capitalise not only on the analytical promise of resilience ecology but on complementary developments in complexity theory by tracing the origins and discussing current developments in each of these areas it offers several paths to interdisciplinary dialogue eoin flaherty argues that complexity theory and marxian ecology can enhance our understanding of the social aspect of social ecological systems whilst a resilience approach can sharpen the analytical power of environmental sociology

social ecological resilience and sustainability by shelley ross saxer and jonathan rosenbloom is designed to help students understand and address new changing and complex economic environmental and social systems this book introduces resilience and sustainability as analytical frameworks and illustrates how these concepts apply in various contexts water food shelter land use energy natural resources pollution disaster law and climate change the first two chapters part i provide students with a conceptual foundation to explore the interdisciplinary nature of resilience and sustainability and the meanings of complexities embedded in and the overlap and differences between these frameworks each of the remaining eight chapters part ii views resilience and sustainability in a specific law and policy context strategically placed throughout part ii the authors describe eight useful tools strategies to facilitate implementation to help identify assess integrate or utilize resilience and sustainability as analytical frameworks key features a two part approach that first provides students with a conceptual foundation and then allows students to view resilience and sustainability in eight law and policy contexts described above

numerous graphics throughout to illustrate concepts depict events described and otherwise enliven the content case studies that examine human decisions that led to unsustainable and non resilient systems and societies new and innovative ways to explain complex systems and in turn rethink traditional notions of law and policy

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