Biogeochemistry Of A Subalpine Ecosystem Loch Vale Watershed

#biogeochemistry #subalpine ecosystem #Loch Vale Watershed #nutrient cycling #ecosystem science

Explore the intricate biogeochemical processes within the Loch Vale Watershed, a pristine subalpine ecosystem. This study delves into the cycling of essential nutrients and elements, revealing how physical, chemical, and biological factors interact to shape the environmental dynamics of high-altitude environments. Understanding these complex interactions is crucial for ecological conservation and managing water resources in such sensitive areas.

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Biogeochemistry of a Subalpine Ecosystem

Rocky Mountain National Park was established in 1915, one year before the creation of the National Park Service. The mandate of the National Park Service is to preserve and protect areas of exquisite beauty and cultural value for the benefit and enjoyment of future generations. National parks mean many things to many people, and, in often stirring words, a National Parks and Conservation Association report states the National Park System is a magnificent and uniquely American gift to the American people and the world. In the early years of the Service, park superintendents actively promoted and developed parks to accommodate visitors. Then, as now, parks represented a democratic ideal, that even the greatest treasures should be available to all. Seventy five years ago, however, park managers saw little need for active management of natural resources, unless it was to enhance visitors' experience. And few managers saw the need for a stable and independent research program on which to base management decisions. Thus began a legacy of erratic, often passive, resource management based more on politics and in-house studies than on validated scientific informa tion. The world is a different place than it was 75 years ago. Human population growth, changes in land use, and ever more sophisticated technology affect the very fabric of life on Earth. As local-, regional-, and global-scale changes occur from human tampering with the environment, the integrity of natural ecosystems is threatened worldwide.

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The completion of the initial phase of the U.S. National Acid Precipitation Assessment Program (NAPAP) in 1990 marked the end of the largest environmental research and assessment effort to that time. The resulting series of 27 State of Science and Technology (SOS/T) Reports and the NAPAP Integrated Assessment represent a decade of work by hundreds

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Scientists have been warning for years that human activity is heating up the planet and climate change is under way. We are only just beginning to acknowledge the serious effects this will have on all life on Earth. The federal government is crafting broad-scale strategies to protect wildland ecosystems from the worst effects of climate change. One of the greatest challenges is to get the latest science into the hands of resource managers entrusted with vulnerable wildland ecosystems. This book examines climate and land-use changes in montane environments, assesses the vulnerability of species and ecosystems to these changes, and provides resource managers with collaborative management approaches to mitigate expected impacts. Climate Change in Wildlands proposes a new kind of collaboration between scientists and managers--a science-derived framework and common-sense approaches for keeping parks and protected areas healthy on a rapidly changing planet.

The Effects of Vegetation on Watershed Biogeochemistry at Loch Vale Watershed, Rocky Mountain National Park, Colorado

Savannas are the most widespread ecosystem in the tropics and as such are subjected to great human pressure that may result in massive soil degradation. The book addresses the role of species in the function of savanna ecosystems. It is shown that savannas are enormously diverse and that four factors determine the function of savanna ecosystems: Plant Available Moisture; Plant Available Nutrients; Fire; Herbivores.

National Research Program of the Water Resources Division, U.S. Geological Survey, Fiscal Year 1991

As human populations expand and have increasing access to technol ogy, two general environmental concerns have arisen. First, human pop ulations are having increasing impact on the earth system, such that we are altering the biospheric carbon pools, basic processes of elemental cycling and the climate system of the earth. Because of time lags and feedbacks, these processes are not easily reversed. These alterations are occurring now more rapidly than at any time in the last several million years. Secondly, human activities are causing changes in the earth's biota that lead to species extinctions at a rate and magnitude rivaling those of past geologic extinction events. Although environmental change is potentially reversible at some time scales, the loss of species is irrevo cable. Changes in diversity at other scales are also cause for concern. Habitat fragmentation and declines in population sizes alter genetic di versity. Loss or introduction of new functional groups, such as nitro gen fixers or rodents onto islands can strongly alter ecosystem processes. Changes in landscape diversity through habitat modification and frag mentation alter the nature of processes within and among vegetation patches. Although both ecological changes altering the earth system and the loss of biotic diversity have been major sources of concern in recent years, these concerns have been largely independent, with little

concern for the environmental causes the ecosystem consequences of changes in biodiversity. These two processes are clearly interrelated. Changes in ecological systems cause changes in diversity.

Watershed 93

Brings scientists, policy makers, land and water managers and citizen stakeholders together to resolve natural resource and environmental problems.

Aquatic Effects of Acidic Deposition

Regions with Mediterranean-type climates include parts of California, South America, Australia, and of course, Europe. The effect of global climate change on these heavily populated areas will have major social and political ramifications. This volume addresses issues in these areas, from processes at the leaf level to the individual, ecosystem, and landscape levels. This book will serve to raise awareness on the significance of these types of ecosystems, and on their sensitivity to the threat that global change represents.

Comprehensive Water Quality of the Boulder Creek Watershed, Colorado, During High-flow and Low-flow Conditions, 2000

Regional intercomparisons between ecosystems on different continents can be a powerful tool to better understand the ways in which ecosystems respond to global change. Large areas are often needed to characterize the causal mechanisms governing interactions between ecozones and their environments. Factors such as weather and climate patterns, land-ocean and land-atmosphere interactions all play important roles. As a result of the strong physical north-south symmetry between the western coasts of North and South America, the similarities in climate, coastal oceanography and physiography between these two regions have been extensively documented. High Latitude Rain Forests and Associated Ecosystems of the West Coast of the Americas presents current research on West Coast forest and river ecology, and compares ecosystems of the Pacific Northwest with those of South America.

Biogeochemical Fluxes in the Glacier Lakes Catchments

Palms are tropical miracles. Heinrich Heine, the German poet, stated "Unter den Palmen wandert man nicht ungestraft\

Annual report

The research presented here provides a sound scientific basis for management and policy decisions regarding the productivity and sustainability of forest ecosystems in the context of a rapidly changing global environment. It is the synthesis of 5 years of field and laboratory research on southern forests conducted by the US Department of Agriculture Forest Service to provide scientific assessments to the US Global Change Research Program, and, as such, is invaluable for policy makers and land use managers.

Natural Resources Report

Fire has been recognized as a vital agent influencing the diversity and vigor of landscapes. It is particularly important in Mediterranean ecosystems, such as those of California. This book is of interest to ecologists, policy makers, and land managers.

Water-resources Investigations Report

Following the discovery of large petroleum reserves in northern Alaska, the US Department of Energy implemented an integrated field and modeling study to help define potential impacts of energy-related disturbances on tundra ecosystems. This volume presents the major findings from this study, ranging from ecosystem physiology and biogeochemistry to landscape models that quantify the impact of road-building. An important resource for researchers and students interested in arctic ecology, as well as for environmental managers concerned with practical issues of disturbances.

Acid Rain

Alpine Tundra.

Climate Change in Wildlands

Alaska's great size is mirrored by the large number and diversity of its freshwater ecosystems. This volume reviews and synthesizes research on a variety of Alaskan freshwaters including lakes, rivers and wetlands. The vast range of Alaskan habitats ensures that the chapters in this book will provide valuable information for readers interested in freshwaters, particularly nutrient dynamics, biotic adaptations, recovery mechanisms of aquatic biota, stream succession and the management of human-induced changes in aquatic habitats.

Biodiversity and Savanna Ecosystem Processes

Coral reef communities are among the most complex, mature and productive ecosystems on earth. Their activity resulted in the creation of vast lime constructions. Being extremely productive and having the function of a powerful biofilter, coral reefs play an important role in global biogeochemical processes and in the reproduction of food resources in tropical marine regions. All aspects of coral reef science are covered systematically and on the basis of a holistic ecosystem approach. The geological history of coral reefs, their geomorphology as well as biology including community structure of reef biota, their functional characteristics, physiological aspects, biogeochemical metabolism, energy balance, environmental problems and management of resources are treated in detail.

Arctic and Alpine Biodiversity: Patterns, Causes and Ecosystem Consequences

Crassulacean acid metabolism (CAM) represents one of the best-studied metabolic examples of an ecological adaptation to environmental stress. Well over 5 % of all vascular plant species engage in this water-conserving photosynthetic pathway. Intensified research activities over the last 10 years have led to major advances in understanding the biology of CAM plants. New areas of research reviewed in detail in this book include regulation of gene expression and the molecular basis of CAM, the ecophysiology of CAM plants from tropical environments, the productivity of agronomically important cacti and agaves, the ecophysiology of CAM in submerged aquatic plants, and the taxonomic diversity and evolutionary origins of CAM.

Natural Resource Management Reimagined

The frontier images of America embrace endless horizons, majestic herds of native ungulates, and romanticized life-styles of nomadie peoples. The images were mere reflections of vertebrates living in harmony in an ecosystem driven by the unpre dictable local and regional effects of drought, frre, and grazing. Those effects, often referred to as ecological "disturbanees," are rather the driving forces on which species depended to create the spatial and temporal heterogeneity that favored ecological prerequisites for survival. Alandscape viewed by European descendants as monotony interrupted only by extremes in weather and commonly referred to as the "Great American Desert," this country was to be rushed through and cursed, a barrier that hindered access to the deep soils of the Oregon country, the rich minerals of California and Colorado, and the religious freedom sought in Utah. Those who stayed (for lack of resources or stamina) spent a century trying to moderate the ecological dynamics of Great Plains prairies by suppressing fires, planting trees and exotic grasses, poisoning rodents, diverting waters, and homogenizing the dynamies of grazing with endless fences-all creating bound an otherwise boundless vista. aries in Historically, travelers and settlers referred to the area of tallgrasses along the western edge of the deciduous forest and extending midway across Kansas as the "True Prairie. " The grasses thlnned and became shorter to the west, an area known then as the Great Plains.

Global Change and Mediterranean-Type Ecosystems

In the past years, much work has been carried out on either life-history evolu tion or structure and function of food webs. However, most studies dealt with only one of these areas and often touched upon the other only marginally. In this volume, we try to synthesize aspects of both disciplines and will concen trate on how the interactions between organisms depend on their life-history strategies. Since this is a very comprehensive topic, this volume will focus on vertical interactions to remain within a clearly arranged field. We present some scenaria based on life-history variation of resource and consumer, and show how particular patterns of life-history combinations will lead to particular patterns in trophic relationships. We want to deal with the selective forces underlying these patterns: the degree of specificity of the consumers deter mines the dependence on its resource, and its adaptation to the spatial and temporal availability of the resource. In this respect, the spatial structure of the

resource and its "quality" may play an important role. The impact of natural enemies is another important selective force which may influence the evolu tion of interactions between species and the structure of communities. Here, the acquirement of an enemy-free space may provide selective adavantages. The importance of the impact of enemies is also expressed by the development of numerous and sometimes very subtle defense strategies. This will be dem onstrated especially for various aspects of chemical ecology.

High-Latitude Rainforests and Associated Ecosystems of the West Coast of the Americas

An analysis of the interactions between pelagic food web processes and element cycling in lakes. While some findings are examined in terms of classical concepts from the ecological theory of predator-prey systems, special emphasis is placed on exploring how stoichiometric relationships between primary producers and herbivores influence the stability and persistence of planktonic food webs. The author develops simple dynamic models of the cycling of mineral nutrients through plankton algae and grazers, and then goes on to explore them both analytically and numerically. The results thus obtained are of great interest to both theoretical and experimental ecologists. Moreover, the models themselves are of immense practical use in the area of lake management.

Palms in Forest Ecosystems of Amazonia

The book provides a review and synthesis of boreal mire ecosystems including peat soil properties, mire hydrology, carbon and nutrient cycling, and classification of mire sites. The emphasis, however, is on peatland forests as a renewable natural resource. The approach originated in northern Europe, because there, especially in Finland, operational scale forest drainage has a long tradition based on research aiming to maintain and increase wood production on peatlands. Whenever relevant, a closer look is also given to other countries in Europe, Canada, and the USA. The results of recent studies on different environmental effects of peatland forestry are also discussed in detail.

The Productivity and Sustainability of Southern Forest Ecosystems in a Changing Environment

Ecologists are increasingly being drawn into the task of addressing problems of environmental degradation. They are expected to find solutions that will lead to sustainable resource use throughout the world. In doing so, the robustness of the science becomes increasingly important, and the problem of extrapolating the results of research conducted within what is usually a relatively limited geographical scope is increasingly highlighted. One approach to developing a globally robust ecology involves more or less formal intercontinental comparative studies, usually focused on the question of ecological convergence. These studies are directed at testing the prediction that similar physical and other environmental factors in different parts of the world, through their selective influences, will give rise to ecosystems which share com mon structural and functional features. Should this be true, the predictive power of ecology developed within such a framework should be sufficient to solve similar problems elsewhere in such biomes. There is a long history of such an approach in mediterranean type ecosystems, documented in a series of volumes and their accompanying scientific papers beginning with that of Di Castri and Mooney (1973).

The Role of Fire in Mediterranean-Type Ecosystems

Continuous cultures, i.e. chemostats with an continuous dilution rate, are model ecosystems for the study of general regulation principles in plankton communities. Further to an introduction, general continuous culture methods and especially the characteristics of rotifer continuousculture systems are presented. Sections on metabolism and energetics in chemostats, growth models, competition and predator-prey interactions, as well as the application of rotifer continuous cultures to ecotoxicology and their use in aquaculture are included.

Landscape Function and Disturbance in Arctic Tundra

Increasing amounts of various types of wastes and pollutants including nutrients enter the coastal waters via rivers, direct discharges from land drainage systems, diffuse land runoff, dumping and via the atmosphere. This has led to coastal eutrophication and in extreme cases to hypertrophication. Until recently, coastal eutrophication and the resulting effects on marine macrophytes were mainly treated as local short-term problems. However, the local nearshore problems developed into overall coastal and inshore phenomena, and recently we have been facing coastal eutrophication problems on a global

scale. This book is the first comprehensive document, systematically covering the entire coastline of Europe, on the effects of eutrophication on the marine benthic vegetation.

Report to Congress

The rapid growth of the discipline of aquatic ecology has been driven both by scientific interest in the complexities of aquatic ecosystems and by their enormous environmental importance and sensitivity. This book focuses on the remarkably diverse roles played by underwater plants, and is divided into three parts: 10 thematic chapters, followed by 18 case studies, and rounded off by three integrative chapters. The topics range from macrophytes as fish food to macrophytes as mollusc and microbe habitat, making this of interest to aquatic ecologists as well as limnologists, ecosystem ecologists, microbial ecologists, fish biologists, and environmental managers.

National Acid Precipitation Assessment Program

The public's attitude toward air pollution in the United States evolved substantially during the 1960s. One of the results of the nation's emerging environmental ethic was the creation of the U. S. Environmental Protection Agency (EPA) in December of 1970. Prior to this time, research was focused on the impacts of air pollution on human health and welfare and was largely conducted by several federal research agencies, which included the Department of Health, Education, and Welfare; the National Oceanic and Atmospheric Administration; and the U. S. Department of Agricul ture. After the creation of the EPA, much of this work was consolidated in one regulatory agency, which resulted in periodic evaluations of the various effects of atmospheric pollution on human health, materials, agriculture, and forest ecosystems. At the same time that environmental interest was growing in the United States, concern increased in the European scientific community and public over the ecological impacts of acidic deposition. As the magnitude of the damage to European lakes and streams and the widespread decline in Norway spruce and silver fir was reported, concern that similar problems were occurring in the United States increased substantially. This concern was heightened by press reports of high elevation spruce-fir forest declines in the Adirondack and Appalachian Mountains and the decline and death of sugar maples in the northeastern United States and Canada.

Structure and Function of an Alpine Ecosystem

Freshwaters of Alaska