Vegetation Structure And Function At Multiple Spatial Temporal And Conceptual Scales Geobotany Studies

"Semi-arid ecosystems cover approximately 40% of the earth09s terrestrial landscape and show high dynamicity in ecosystem structure and function. These ecosystems play a critical role in global carbon dynamics, productivity, and habitat quality. Semi-arid ecosystems experience a high degree of disturbance that can severely alter ecosystem services and processes. Understanding the structure-function relationships across spatial extents are critical in order to assess their demography, response to disturbance, and for conservation management. In this research, using state-of-the-art full waveform lidar (airborne and spaceborne) and field observations, I developed a framework to assess the complexity and dynamics of vegetation structure, function and diversity across spatial scales in a semi-arid ecosystem. Difficulty in differentiating low stature vegetation from bare ground is the key remote sensing challenge in semi-arid ecosystems. In this study, I developed a workflow to differentiate key plant functional types (PFTs) using both structural and biophysical variables derived from the full waveform lidar and an ensemble random forest technique. The results revealed that waveform lidar pulse width can clearly distinguish shrubs from bare ground. The models showed PFT classification accuracy of 0.81030.86% and 0.60030.70% at 10 m and 1 m spatial resolutions, respectively. I found that structural variables were more important than the biophysical variables to differentiate the PFTs in this study area. The study further revealed an overlap between the structural features of different PFTs (e.g. shrubs from trees). Using structural features, I derived three main functional traits (canopy height, plant area index and foliage height diversity) of shrubs and trees that describe canopy architecture and light use efficiency of the ecosystem. I evaluated the trends and patterns of functional diversity and their relationship with non-climatic abiotic factors and fire disturbance. In addition to the fine resolution airborne lidar, I used simulated large footprint spaceborne lidar representing the newly launched Global Ecosystem Dynamics Investigation system (GEDI, a lidar sensor on the International Space Station) to evaluate the potential of capturing functional diversity trends of semi-arid ecosystems at global scales. The consistency of diversity trends between the airborne lidar and GEDI confirmed GEDI09s potential to capture functional diversity. I found that the functional diversity in this ecosystem is mainly governed by the local elevation gradient, soil type, and slope. All three functional diversity indices (functional richness, functional evenness and functional divergence) showed a diversity breakpoint near elevations of 1500 m˙03 1700 m. Functional diversity of fire-disturbed areas revealed that th."--Boise State University ScholarWorks.

Much of the North American tallgrass prairie ecosystem has been converted to cropland or urbanized. One threat to the remaining prairie ecosystems, and the streams within, is woody vegetation encroachment. Stream productivity, measured as metabolism, is a fundamental process comprised of gross primary production (GPP) and (CR) community respiration. Understanding GPP and CR is important because these processes are vital to ecosystem function and can be impacted by a change in canopy cover. First, I investigated improvements in existing methods for estimating whole-stream metabolism as estimated from diel patterns of oxygen (O2). I compared measured and modeled O2 and aeration (a physical parameter required for measurement of metabolism) rates to determine if direct measurement of aeration is necessary and the importance of temperature correction of metabolism. Modeling was moderately successful in determining aeration rates, and temperature correction of GPP and CR substantially improved model fits. Second, effects of woody vegetation encroachment on prairie stream function were investigated. Stream metabolism was measured for four years in duplicate reaches with varying canopy cover (closed canopy, naturally open canopy, and vegetation removal reaches). The removal reaches had closed canopy for the first two years and open canopy for the last two years. Canopy cover increased CR rates and had minimal effects on GPP. Third, the same experiment was used to determine the effects of woody vegetation encroachment on prairie stream ecosystem structure and food web interactions. Chlorophyll a and filamentous algal biomass were greater in naturally open and vegetation removal reaches, although the effects were stronger on filamentous algal biomass. As canopy cover decreased, the filamentous algal biomass to chlorophyll ratio increased, indicating a shift in algal community structure. Stable isotope analysis indicated some shift in pathways of nitrogen and carbon flux into the food web related to degree of canopy cover, but overlap in the signature of food sources made distinct food sources difficult to identify. The data indicate that riparian encroachment can influence ecosystem structure and function in prairie streams and restoration to remove woody riparian cover may restore some ecosystem features of naturally open canopy streams.

Vegetation Structure and Function at Multiple Spatial, Temporal and Conceptual ScalesSpringer

Mangrove Ecosystem: Structure and Function

Vegetation

Ecological Analysis

Landscape Complexity and Vegetation Structure as Drivers of Parasitoid Community Structure and Function in the Dry Subtropical Chaco, Argentina

California annual grassland

Chance and Selection in the Assembly of Ecological Communities

We shall limit our observations to the conditions in natural ecosystems, since it would be beyond the scope of this book to embark upon a consideration of secondary, man-made ecosystems. 2. Classification of the Geo-biosphere into Zonobiomes The biosphere is the thin layer of the earth's surface to which the phenomena connected with living matter are confined. On land, this comprises the lowest layer of the atmosphere permanently inhabited by living organisms and into which plants extend, as well as the root-containing portion of the lithosphere, which we term the soil. Living organisms are also found in all bodies of water, to the very depths of the oceans. In a watery medium, however, cycling of material is achieved by means other than those on land, and the organisms (plankton) are so different that aquatic ecosystems have to be dealt with separately. The biosphere is therefore subdivided into (a) the geo-biosphere comprising terrestrial ecosystems, and (b) the hydro-biosphere, comprising aquatic ecosystems, which is the field of hydrobiologists (oceanographers and limnologists) . Our studies are confined to the geo-biosphere (Walter 1976), which constitutes the habitat of man and is, therefore, of special interest. The prevailing climate, being the primary independent factor in the environment, can be used as a basis for further subdivision of the geo-biosphere since the formation of soil and type of vegetation are dependent upon it (see p. 3), and it has not yet been substantially influenced by man.

Kurzbeschreibung Der Druck des Bevölkerungswachstums auf der indonesischen Insel Java hat zu gravierender Entwaldung und Schädigung von Wäldern geführt, so dass nur noch 8,2 Prozent der ursprünglichen Waldfläche in den Jahren 2006-2007 vorhanden waren. Der Bevölkerungsdruck ließ Javas Waldflächen durch Landumwandlung in Siedlungen und Äcker weiter schrumpfen und kleine, isolierte Waldstücke an Berggipfeln wie die in den Dieng Mountains übrig. Das in der Provinz Zentral-Java gelegene Dieng Mountains Ökosystem spielt eine wichtige Rolle bei der Bereitstellung einer breiten Palette von Waren und Dienstleistungen, insbesondere bei der Versorgung angrenzender Gebiete mit Süßwasser und beim Erhalt der biologischen Vielfalt. Allerdings leiden auch die Bergwälder in den Dieng Mountains in Folge des Bevölkerungsdrucks unter Abholzung. Schlechte landwirtschaftliche Anbaumethoden haben zum Auftreten von Pestizidbelastungen, zu einem hohen Maß an Erosion, Sedimentationen von Seen und Stauseen, Erdrutschen, Schlammlawinen und Überschwemmungen geführt. Waldbrände und illegaler Holzeinschlag, gefolgt von Landbeanspruchung und Wanderfeldbau, führten dazu, dass reife Bergwälder durch junge Sekundärvegetation ersetzt wurden. Wiederbewaldungen sind zu einem bedeutenden Vegetationstyp rund um das Dieng Plateau geworden, und angesichts der gegenwärtigen landwirtschaftlichen Anbaumethoden zeigt der Trend ihres Flächenausmaßes, dass sie auch in Zukunft fortbestehen werden. Bisher hat man sich wenig mit den Wiederbewaldungen in den Dieng Mountains beschäftigt; ihr Wert in Bezug auf die Funktionsweise von Ökosystemen und den Erhalt der biologische Vielfalt wurde nur unzureichend untersucht. Da Bergwälder der Dieng Mountains dafür bekannt sind, viele endemische und seltene Tier- und Pflanzenarten zu beherbergen, ist es wichtig zu verstehen, wie Tier- und Pflanzenarten in diesem Gebiet den Habitatwandel bewältigen. Die vorliegende Forschungsarbeit ist ein Versuch, Auswirkungen von Landnutzungsänderungen, die durch anthropogene Störungen hervorgerufen wurden, auf die lokale Flora und Fauna, speziell auf Vogel- und Säugetiergemeinschaften zu untersuchen. Die Ergebnisse dieser Studie sollen einen Überblick über den gegenwärtigen Zustand des Dieng Mountains Ökosystems geben und dazu beitragen, Informationslücken früherer Studien zu schließen. Diese Untersuchung soll zuständigen Politikern Wissen über den aktuellen Stand der Dieng Mountains bieten. Sie soll ihnen ermöglichen, ein wirksames Programm mit angemessenen Zielen zu entwickeln und geeignete Maßnahmen zu ergreifen, um die ökologischen Bedingungen der Dieng Mountains zu verbessern. Unsere Ergebnisse zeigen, dass die Entwicklung der Sekundärvegetation der Dieng Mountains stark von der Geschichte ihrer Landnutzung und von den Aufforstungsprogrammen der lokalen Regierung beeinflusst wurde. Die Vegetationsstruktur der Wälder und des Buschlandes der Dieng Mountains waren einander ähnlich. Sie kennzeichnete die typische einfache Struktur mit einem offenen Kronendach und dichtem Unterholz, die in der Regel in einem tropischen Sekundärwald vorgefunden wird. Auf Grünland kamen wenige Bäume vor; kein Anzeichen der Einwanderung von Bäumen wurde in diesem Lebensraum gefunden, trotz seiner unmittelbaren Nähe zu natürlichen Waldstücken. Die relativ niedrigen Anteile von Baumverjüngungen in allen Lebensräumen können den in diesen großen Höhen rauen Umgebungsbedingungen, den Auswirkungen von Kahlschlägen in der Vergangenheit sowie der Konkurrenz von Kräutern zugeschrieben werden. Der Einfluss menschlicher Aktivitäten in diesen Lebensräumen kann auch ein wichtiger Faktor sein, der die Erholung der Vegetation verlangsamt. Die Auswirkungen der Aufforstungen auf die Gestaltung der Zusammensetzung der Sekundärvegetation zeigten sich in der Dominanz der Baumarten, die im Laufe des Programms gepflanzt worden waren: die nicht einheimischen Arten Acacia decurrens und Cupressus sempervirens und die indonesische Bergart Schima wallichii. Der Pionierstrauch Melastoma affine, die Gräser Imperata cylindrica und Isachne globosa sowie die Ruderalarten Eupatorium odoratum, Eupatorium riparium, Buddleja asiatica, und Rubus rosaefolius dominierten die Unterholzvegetation. Insbesondere auf Grünland schien die Dominanz des kleinen Farns Gleichenia dichotoma das Wachstum der vorkommenden Grasarten zu unterdrücken, was zur Dominanz einer Krautart, der Conyza javanica, über Pioniergrasarten führte. Naturverjüngungen einheimischer indonesischer Baumarten wurden in einer relativ kleinen Zahl vorgefunden. Verglichen mit ähnlichen Studien in anderen Sekundärwäldern wurde in den Dieng Mountains eine wesentlich geringerer Reichtum an Pflanzenarten, vor allem an Gehölzarten festgestellt. Der Beitrag der Strauch- und Krautkategorien mit mehr als 80 Prozent an der gesamten botanischen Artenvielfalt zeigt den Mangel an Baumarten in unserem Forschungsgebiet an. Generell waren der Reichtum und die Diversität an Pflanzenarten im Buschland am höchsten. Der niedrigste Pflanzenartenreichtum wurde im Wald gefunden, während die geringste Diversität an Pflanzenarten auf Grünland verzeichnet wurde. Diese Ergebnisse können mit dem Grad von Störungen in jedem Lebensraumtyp zusammenhängen, wobei Buschland auf einem mittleren Niveau liegt. Die Ähnlichkeit der Zusammensetzung der Pflanzenarten war zwischen den Habitaten in jeder Kategorie sehr hoch. Dies deutet trotz des Altersunterschiedes zwischen beiden Lebensräumen darauf hin, dass Waldund Buschland noch in einem vergleichbaren Sukzessionsstadium waren, während sich Grünland wohl nicht zu Wald entwickeln wird. Wegen der anhaltenden Bevölkerungsausbreitung in den Dieng Mountains dürfte das Schicksal der sekundären Vegetation dieses Gebietes von dem Ausmaß zukünftiger Störungen durch den Menschen bestimmt werden. Vögel wurden in den verschiedenen Lebensräumen der Dieng Mountains in relativ geringen Dichten gefunden. Nach früheren Studien anderer Autoren sind niedrige Vogeldichten häufig in einer tropischen Landschaft, in der landwirtschaftliche Flächen und Flächen sekundärer Vegetation gemischt in mosaikartiger Verteilung vorliegen. Wald hatte von allen Lebensraumtypen die komplexeste Vegetationsstruktur, und er wies die höchste Dichte und die größte Artenvielfalt von Vögeln auf. Da Vogelabundanzen durch die Lebensraumtypen in ihrer Umgebung beeinflusst werden, kann die Nähe der Waldstücke zu den Urwaldresten auf den Berggipfeln positive Auswirkungen auf die Vogelpopulationen im Wald gehabt haben. Mit einer ähnlichen, aber weniger komplexen Vegetationsstruktur und -zusammensetzung als Wald wies das Buschland ein mittleres Niveau der Dichte und der Artendiversität der Avifauna auf. Trotz seines Mangels an mosaikartiger Heterogenität und des Vorhandenseins von nur einer kleinen Anzahl Bäume zwischen den Flurstücken hatten landwirtschaftliche Flächen die zweithöchste Vogeldichte. Mögliche Ursachen hierfür sind die Nähe von landwirtschaftlichen Flächen zu städtischen Gebieten und zu Buschland mit seinen Randstrukturen holziger Gewächse; diese Faktoren sind dafür bekannt, positive Auswirkungen auf die Abundanz und Artendiversität von Vögeln zu haben. Grünland wies die geringste Artenanzahl, Artendiversität und Vogeldichte auf. Die gesamte Anzahl der Vogelarten in unserem Untersuchungsgebiet war gering im Vergleich zur Anzahl Vogelarten einer früheren Studie, die auch in den Dieng Mountains durchgeführt worden war. Allerdings war die Vogelwelt in unserer Untersuchung sehr heterogen, so dass es wahrscheinlich ist, dass die tatsächliche Artenzahl deutlich höher als die erfasste war. Die meisten der erfassten Vogelarten haben eine niedrige bis mittlere Abhängigkeit von Wald und können ihre Ansprüche in einer breiten Palette von Lebensräumen decken; es wurden nur sechs Vogelarten erfasst, die vom Wald abhängig sind. Unsere Ergebnisse deuten darauf hin, dass das Dieng Mountains Ökosystem in seinem gegenwärtigen Zustand die Lebensraumansprüche von Populationen verschiedene Vogelarten decken kann. Das beruht vor allem auf dem Vorhandensein von Sekundärvegetation, die als Ersatzhabitat für waldabhängige Arten fungiert. Allerdings wird das Fortdauern dieses Zustandes hauptsächlich von der zukünftigen Ausweitung der Landwirtschaft abhängen. Eine Ausweitung der Agrarlandschaft wird letztendlich die Abundanz und die Vielfalt von Vögeln in den Dieng Mountains verringern. Lässt man es zu, dass sich die Sekundärvegetation zu einer Klimaxgesellschaft entwickelt, so wird die Abundanz und Artendiversität von Vögeln zunehmen. Ähnlich positive Wirkungen kann nach unserer Einschätzung zukünftig die bislang im Untersuchungsgebiet noch nicht praktizierte Agroforstwirtschaft entfalten. Letztendlich muss der Zustand des Dieng Mountains Ökosystems verbessert werden, um seine Eignung als Lebensraum für seine einheimische Vogelwelt sicher zu stellen. Dreizehn kleine bis mittelgroße Säugetierarten wurden in unserem Untersuchungsgebiet mittels direkter Bestandsaufnahmen und Interviews erfasst. Zwei Arten, der schwarze Haubenlangur Trachypithecus auratus und der Java-Leopard Panthera Pardus melas wurden in der Roten Liste der IUCN als gefährdet bzw. vom Aussterben bedroht eingestuft. Unsere Ergebnisse deuten darauf hin, dass die Sekundärvegetation der Dieng Mountains noch einen geeigneten Lebensraum für die Säugetiergemeinschaft aufwies, wobei im Wald und im Buschland jeweils ein viel höherer Artenreichtum herrschte als auf Grünland. Der Artenreichtum an Säugetieren war auf Ackerland fast so hoch wie im Wald und im Buschland, was bedeutet, dass die landwirtschaftlichen Flächen mit ihren angebauten Kulturen Nahrungshabitate für die meisten Säugetierarten in den Dieng Mountains bot. Die Mehrheit der aufgeführten Arten waren Lebensraumgeneralisten und fähig, sich an gestörte Umgebungen anzupassen. Hiervon sind zwei Primatenarten ausgenommen, der Javaneraffe Macaca fascicularis und der schwarze Haubenlangur Trachypithecus auratus, deren Lebensraum nur auf Wald beschränkt war. Die Ergebnisse der Habitatpräferenzanalysen von vier Arten, die direkt erfasst worden waren, waren bei drei Arten mangels ausreichender Daten wenig aussagekräftig. Das Wildschwein Sus scrofa zeigte eine signifikante Präferenz für Wald und Wiesen, es mied Buschland bei der Nahrungssuche. Die Mitglieder der Säugetiergemeinschaft spielen anscheinend eine wichtige Rolle als Samenverbreiter bei der Erholung der Wälder der Dieng Mountains, und wir erhoffen uns, dass diese Studie als Grundlage für die Schaffung eines wirksamen Naturschutzplans zur Verbesserung des Dieng Mountains Ökosystems dient. Betrachtet man den Trend der menschlichen Bevölkerungsexpansion und die Landnutzungsmuster in den Dieng Mountains, mag das Schicksal der Wälder und der Tierwelt in diesem Gebiet vor allem durch die Höhe zukünftiger Störungen durch Menschen bestimmt werden. Günstigenfalls kann sich eine wechselseitige Beziehung zwischen Wald und den Menschen, die ihn nutzen, entwickeln, was ein nachhaltiges Management von Wald und Landschaft zur Folge haben könnte. Weitere Forschung ist notwendig, um die Folgen der landwirtschaftlichen Praktiken in den Dieng Mountains, einschließlich der Auswirkungen von Pestiziden und Düngemitteln auf die Wildbestände, zu untersuchen. Description The pressure from population growth in Indonesia's Java Island has resulted in grave deforestation and forest degradation, leaving only 8.2 percent of forest cover remaining in 2006-2007. Population pressure continued to shrink Java's forest cover through land conversion into settlement areas and agricultural fields, leaving small, isolated forest patches situated on mountain tops, like the ones found in the Dieng Mountains. Located in Central Java Province, Indonesia, the Dieng Mountains ecosystem has an important role in providing a wide range of goods and services, especially in supplying freshwater to its adjacent areas and maintaining biodiversity. However, the montane forests in the Dieng Mountains suffer from degradation caused by population pressure. Poor farming practices have resulted in the occurrence of pesticide pollution, a high level of erosion, soil sedimentation in lakes and reservoirs, landslides, and mud floods. Forest fires, illegal logging, forest looting, followed by land encroachment and shifting cultivation, have replaced the mature montane forests with young secondary vegetation. Regrowth forests have become the major vegetation type surrounding the Dieng Plateau, and with current farming practices, the trend of their formation indicates that they will persist into the future. So far, little has been done to deal with regrowth forests in the Dieng Mountains, and their value in terms of ecosystem functioning and biodiversity preservation has been insufficiently studied. Since the Dieng montane forests are known to harbor many endemic and rare wildlife species, it is important to understand how wildlife species in this area cope with habitat change. This research is an attempt to examine the impact of land use change resulting from humaninduced disturbances to the local flora and fauna, specifically to bird and mammal communities. The results of this research will provide an overview of the present condition of the Dieng Mountains ecosystem and help to fill in the information gaps left by previous studies. This research will provide policymakers with knowledge of the current state of the Dieng Mountains, allowing them to develop an effective program with reasonable goals and take appropriate actions in their effort to improve the ecological conditions of the Dieng Mountains. Vegetation data were collected in habitats that represent various ages of second-growth vegetation, namely woodland, shrubland, and grassland. A stratified systematic sampling with a random start was used to collect data on various growthforms of plant species. Vegetation parameters (i.e. species density, dominance, diameter class distribution) were then calculated. Plant species richness and diversity, and stands similarity were analyzed using SPADE. The bird census was carried out in the same locations chosen for vegetation surveys using the point transect distance method, with additional data collections in agricultural land. The results were then analyzed using the programs DISTANCE 6.0 release 2 for estimating the bird densities, and SPADE for estimating bird species richness and diversity. Surveys of mammal signs were also carried out in the same locations chosen for vegetation surveys and bird censuses by using a strip transect of 2-m width, crisscrossing the habitats in a random direction. Mammal species richness and the habitat preference of each species were then analyzed. In addition, interviews with local people were also conducted to gather supplementary information regarding the mammalian community in the Dieng Mountains. Our results show that the development of the secondary vegetation of the Dieng Mountains was highly influenced by its land use history and reforestation programs run by the local government. The vegetation structure of woodland and shrubland of the Dieng Mountains were similar, characterized with the typical simple structure normally found in a tropical secondary forest, an open canopy, and dense undergrowth. Few trees populated the grassland; no sign of tree invasion was found in this habitat, despite its close proximity to natural forest patches. The relatively low tree regenerations in all the habitats may be attributed to harsh environmental conditions caused by the high altitudinal location and the impact of forest clearings in the past, as well as competition with herbs. The effect of human activities in those habitats may also be an important factor slowing down the vegetation recovery. The impact of reforestations in shaping the floristic composition of the secondary vegetation was seen in the domination of tree species planted during the course of the program: the non-native species Acacia decurrens and Cupressus sempervirens, and Indonesian mountain species Schima wallichii. Pioneer shrub species Melastoma affine and grass Imperata cylindrica and Isachne globosa, as well as ruderal species Eupatorium odoratum, Eupatorium riparium, Buddleja asiatica, and Rubus rosaefolius dominated the undergrowth vegetation. Specifically in grassland, the small fern Gleichenia dichotoma's domination seemed to suppress the growth of coexisting grass species, leading to the domination of a herb species, Conyza javanica, over pioneer grass species. Native Indonesian tree species were discovered as natural regrowth in a relatively small number. Compared with similar studies in other secondary forests, the richness of plant species found in the Dieng Mountains was considerably lower, especially that of woody plants. The contribution of the shrub and herb categories to more than 80 percent of the total species richness indicates the scarcity of tree species in our research area. In general, plant species richness and diversity were found highest in shrubland. The lowest species richness was found in woodland, while the lowest plant species diversity was recorded in grassland. These results may be related to the level of disturbance in each habitat, which shrubland experienced at an intermediate level. The similarity of plant species composition among habitats in each category was very high. This suggests that woodland and shrubland were still in a comparable stage of succession, despite the age difference between both habitats, while grassland may not succeed in developing into a forest. Considering the trend of population expansion in the Dieng Mountains, the fate of the secondary vegetation in this area may be determined by the level of future interference by humans. In various habitats in the Dieng Mountains, birds were found in relatively low densities. Based on previous studies by other authors, the occurrence of birds in low densities is common in a tropical landscape in which farmland and secondary vegetation are mixed into mosaics. The woodland of the Dieng Mountains, which had the most complex vegetation structure compared with the other habitat types, bore the highest bird density and species diversity. As bird assemblages are influenced by their surrounding habitat types, the bird populations in woodland may have been positively affected by woodland's proximity to the patches of remnant forests on the mountain tops. With a similar, yet less complex vegetation structure and composition than woodland, shrubland had an intermediate level of bird density and species diversity. Despite its lack of mosaic heterogeneity and the presence of only a small number of trees between plots, agricultural land placed second in bird density. Possible causes for this include the proximity of agricultural land to urban areas and its adjacency to shrubland, which provided woody edge habitat; these factors are known to have positive effects on bird abundance and diversity. Grassland had the lowest species richness, species diversity, and bird density. The overall bird species diversity in our study area was low compared with the number of bird species listed in a previous study that also took place in the Dieng Mountains in 2001. However, the bird community was highly heterogeneous, making it likely that the actual species richness was considerably higher than the observed one. Most of the bird species encountered have a low to medium dependency on forest and a broad range of habitat suitability; only six forest-dependent species were recorded. Our results suggest that in its current state, the Dieng Mountains ecosystem can still meet the needs of various bird species populations. This is mainly because of the presence of secondary vegetation, which functions as a substitute habitat for forest-dependent species. However, the persistence of this condition will depend mainly on future agricultural expansion. An expanding agricultural landscape will eventually reduce the abundance and diversity of birds in the Dieng Mountains. Allowing the secondary vegetation to develop into a climax community will increase avian abundance and species diversity. Agroforestry, not yet widely practiced in the study area, also has the potential to have similar positive effects on the avifauna. Nevertheless, the condition of the Dieng Mountains ecosystem still needs to be improved to assure its suitability as a habitat for its native avifauna. Thirteen small to medium-sized mammal species were recorded in our study area through direct surveys and interviews. Two species, the Javan langur Trachypithecus auratus and Javan leopard Panthera pardus melas, were categorized as vulnerable and critically endangered, respectively, under the IUCN Red List. Our results suggest that the second-growth vegetation of the Dieng Mountains still provided a suitable habitat for the mammalian community, with woodland and shrubland each supporting much higher species richness than grassland. The species richness observed in agricultural land was almost as high as that of woodland and shrubland, implying that agricultural land with ist cultivated crops provided food and habitat for most mammal species in the Dieng Mountains. The majority of species listed were habitat generalists and capable of adapting to disturbed environments, except for two primate species, the long-tailed macaque Macaca fascicularis and Javan langur, whose habitat was confined only to woodland. The results of habitat preference analyses of mammal species recorded directly in the field were mostly inconclusive, owing to the lack of sufficient data. The most meaningful result was with the wild boar Sus scrofa, which showed a significant preference towards woodland and grassland, while avoiding shrubland for foraging. With their function as seed dispersers, the mammalian community's members play important roles in the Dieng Mountains forest recovery, and therefore we expect this study to serve as a basis for establishing an effective conservation plan towards the improvement of the Dieng Mountains ecosystem. Considering the trend of human population expansion and land use patterns in the Dieng Mountains, the fate of forests and wildlife in this area may mostly be determined by the level of future interference by humans. At best, a mutual relationship can develop between the forest and humans utilizing it, which would give rise to sustainable forest and landscape management. Further research is needed to study the consequences of agricultural practices in the Dieng Mountains, including the effects of pesticides and fertilizers on wildlife populations.

Vegetation change has been observed across Arctic and boreal regions. Studies have often documented large-scale greening trends, but they have also identified areas of browning or shifts between greening and browning over varying spatial extents and time periods. At the same time, though, there are large portions of these ecosystems that have not exhibited measurable trends in greening or browning. These findings have fueled many questions about the drivers of vegetation dynamics, how trends are measured, and potential implications of vegetation change at local to global scales. In December 2018, the National Academies of Sciences, Engineering, and Medicine, convened a workshop to discuss opportunities to improve understanding of greening and

browning trends and drivers and the implications of these vegetation changes. The discussions included a close look at many of the methodological approaches used to evaluate greening and browning, as well as exploration of newer technologies that may help advance the science. This publication summarizes the presentations and discussions from the workshop.
Vegetation Structure and Function at Multiple Spatial, Temporal and Conceptual Scales
Complexity and Dynamics of Semi-arid Vegetation Structure, Function and Diversity Across Spatial Scales from Full Waveform Lidar
Structure and Function of Mountain Ecosystems in Japan
Five-year Forest Inventory and Analysis Report
The Structure and Function of Kalahari Transect Vegetation
Effects of Riparian Woody Vegetation Encroachment on Prairie Stream Structure and Function with Emphasis on Whole-stream Metabolism

Stream riparian zones are ecotones between terrestrial and aquatic environments. Studying these areas in urban environments is important since they lie adjacent to stream water supplies. I conducted a study of riparian woody and groundcover vegetation along urban, suburban, and rural streams (land-use designations based on % impervious surface) to assess how cities are affecting plant community structure and riparian soil gas flux (carbon dioxide, methane, and nitrous oxide) in relation to water table depth and groundwater nutrient concentrations spanning a 10-month period (January to October, 2008). I found distinct woody and groundcover communities associated with proportion of impervious surface surrounding the research sites. These communities differed regarding diversity and proportion of native, exotic species distributions. The most urban communities generally had lower species richness, more exotic species, and fewer wetland species when compared to rural areas. Urban areas also exhibited the highest streambanks and lowest water tables. Carbon dioxide gas flux rates were higher in urban areas, but methane and nitrous oxide fluxes did not respond uniformly to site differences as classified by proportion of impervious surface. Methane and nitrous oxide differences, in addition to seasonal variability, were more greatly affected by local site level differences in substrate and nutrient ratios as well as soil moisture.

The chapters in this volume are based on a opportumtles for studying the links between symposium, "California grasslands: structure abiotic and biotic components. and productivity", supported by the National The contributions in this volume illustrate Science Foundation. The primary objective of the links between population-level processes this symposium was to integrate the current and system-level phe studied understanding of controls on ecosystem struc community. Unfortunately, some areas of cur ture and function with the approaches of popu rent research (e.g., nutrient cycling) are under lation biology. The annual grasslands are represented in this volume. For other topics eminently suitable for experimental and manip (particularly the role of invertebrate con sumers), the lack of data from the annual studies of ecosystem processes. The short lives and small stature of the component land brought a broader grassland perspective. plant species make experimental work far more Together, however, the contributions illustrate practical than in forests or even in perennial the importance of different ecological ap dominated prairies. The system's small-scale proaches in studying the controls on structure patc obvious importance of and function of a complex system. the region's mediterranean climate in the life cycle of the annual vegetation, afford many L.F. Huenneke and H.A. Mooney Huenneke, L.F. and Mooney, H. (eds) Grassland Structure and Function: California Annual Grassland.

Australian Vegetation has been an essential reference for students and researchers in botany, ecology and natural resource management for over 35 years. Now fully updated and with a new team of authors, the third edition presents the latest insights on the patterns and processes that shaped the vegetation of Australia. The first part of the book provides a synthesis of ecological processes that influence throughout the continent, using a new classification of vegetation. New chapters examine the influences of climate, soils, fire regimes, herbivores and aboriginal people on vegetation, in addition to completely revised chapters on evolutionary biogeography, quaternary vegetation history and alien plants. The book's second half presents detailed ecological portraits for each major vegetation type and offers da and comparative analysis presented in tables, graphs, maps and colour illustrations. This authoritative book will inspire readers to learn and explore first-hand the vegetation of Australia.

Vegetation, Water, Humans and the Climate

Proceedings of a Workshop
Vegetation Types of the Dieng Mountains and Their Influences on Bird and Mammalian Communities
Environmental Impact Statement
Structure, Function, and Dynamics

This book presents studies on current vegetation topics, from polar to tropical regions. It is a festschrift to mark the 70th birthday of Prof. Elgene O. Box, who has studied vegetation all over the world, both through fieldwork and modeling. It reflects a number of his interests, including basic ecological plant forms (cf 'plant functional types'), temperate-zone forests, and evergreen versus seasonal patterns. Section 1 discusses the concept of vegetation series, while Section 2 has two global-scale chapters on plant functional traits and whether they are related more to climate or phylogeny. Section 3 has nine chapters focusing on vegetation history, regional vegetation, and how these have influenced current species organizations and distributions. Regions treated include Russia, China, the USA, Mexico and Mediterranean areas. Lastly, Section 4 addresses aspects of vegetation change and plant ecology. Every chapter in this unique book offers original ideas on the topic of vegetation, as the authors are assembled from a world-wide population of leading vegetational ecologists, whose interests range from local communities to global theoretical questions.

This report highlights key findings from the most recent (2001-2005) data collected by the Pacific Northwest Forest Inventory and Analysis (PNW-FIA) Program across all ownerships in Oregon. We present basic resource information such as forest area, land use change, ownership, volume, biomass, and carbon sequestration; structure and function topics such as biodiversity, older forests, dead wood, and riparian forests; disturbance topics such as insects and diseases, fire, invasive plants, and air pollution; and information about the forest products industry in Oregon, including data on tree growth and mortality, removals for timber products, and nontimber forest products. The appendices describe inventory methods and design in detail and provide summary tables of data, with statistical error, for the suite of forest characteristics sampled.

By the beginning of the twenty-first century, few people could deny the reality of global change. But while most alarm has been over increasing temperatures, other changes are occurring in precipitation patternsÑvariations that may be due in part to global warming but also to factors such as changes in atmospheric circulation and land surfaces. This volume provides a central source of information about this newly emerging area of global change research. It presents ongoing investigations into the responses of plant communities and ecosystems to the experimental manipulation of precipitation in a variety of field settingsÑparticularly in the western and central United States, where precipitation is already scarce or variable. By exploring methods that can be used to predict responses of ecosystems to changes in precipitation regimes, it demonstrates new approaches to global change research and highlights the importance of precipitation regimes in structuring ecosystems. The contributors first document the importance of precipitation, soil characteristics, and soil moisture to plant life. They then focus on the roles of precipitation amount, seasonality, and frequency in shaping varied terrestrial ecosystems: desert, sagebrush steppe, oak savanna, tall- and mixed-grass prairie, and eastern deciduous forest. These case studies illustrate many complex, tightly woven, interactive relationships among precipitation, soils, and plantsÑrelationships that will dictate the responses of ecosystems to changes in precipitation regimes. The approaches utilized in these chapters include spatial comparisons of vegetation structure and function across different ecosytems; analyses of changes in plant architecture and physiology in response to temporal variation in precipitation; experiments to manipulate water availability; and modeling approaches that characterize the relationships between climate variables and vegetation types. All seek to assess vegetation responses to major shifts in climate that appear to be occurring at present and may become the norm in the future. As the first volume to discuss and document current and cutting-edge concepts and approaches to research into changing precipitation regimes and terrestrial ecosystems, this book shows the importance of developing reliable predictions of the precipitation changes that may occur with global warming. These studies clearly demonstrate that patterns of environmental variation and the nature of vegetation responses are complex phenomena that are only beginning to be understood, and that these experimental approaches are critical for our understanding of future change.

Adaptation, Plasticity and Relation to Herbivory
Changing Precipitation Regimes and Terrestrial Ecosystems
Riparian Corridor Vegetation Structure and Soil Function Along Urban, Suburban, and Rural Streams in Louisville, Ky, USA
Transmission Facilities Vegetation Management Program
A North American Perspective
From Plant Traits to Vegetation Structure

Biodiversity: Structure and Function is a component of Encyclopedia of Environmental and Ecological Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. The Theme on Biodiversity: Structure and Function discusses matters of great relevance to our world such as: Characterization of Biodiversity; Biodiversity and Ecosystem Functioning; Spatial and Temporal Dimensions of Biodiversity Dynamics; Evolutionary and Genetic Aspects of Biodiversity; Biodiversity Monitoring, Assessment, Data Management, and Indicators; The Value of Biodiversity; Halting Biodiversity Loss: Fundamentals and Latest Trends of Conservation Science and Action; Application of Ecological Knowledge to Habitat Restoration. These two volumes are aimed at the following five major target audiences: University and College students Educators, Professional practitioners, Research personnel and Policy analysts, managers, and decision makers and NGOs.
The development of the Klamath Network vital signs monitoring has emphasized the importance of documenting status and trends in the composition, structure, and function of ecosystems. Vegetation is a foundation for terrestrial ecosystem composition, structure, and function. Vegetation also ranked among the highest potential vital signs for monitoring in the Network's vital signs selection process. The reasons are simply that vegetation dominates biomass and energy pathways and defines the habitat for most other forms of life. Changes in vegetation composition, structure, and function will therefore have a profound effect on ecosystems. Monitoring vegetation change is thus imperative to detecting and understanding status and trends in park ecosystem vital signs, the overriding goal of NPS Inventory and Monitoring.
The book presents an account of mangrove forest ecosystem, its structure and function. Mangroves are littoral plant formation found in tropical and sub-tropical countries and occurs on the margins of oceans and estuaries. In this book all the aspects of mangrove forest have been discussed. The biodiversity, floristic composition and taxonomy have been enumerated very nicely. The loss of mangrove forest and its conservation and management aspects have been given in details. A case study of mangrove forests of Andaman islands and South Japan has been documented in details. This is very good book for those who are working on mangrove ecology, taxonomy, physiology and coastal ecology.
Australian Vegetation
Plant Form and Vegetation Structure
Vegetation Structure and Function Measurement and Modelling Using Drone Based Sensing Techniques
Multivariate analysis in vegetation research
Structure and Function of Vascular Plant Communities in Created and Restored Wetlands in Ohio
Grassland structure and function

This commemorative volume of invited papers in vegetation science covers a full range of topics, objectives, methods and applications, including conservation and management tasks. These require study at different temporal and spatial scales, often simultaneously. Methodology is important in science, since it responds to particular questions and raises others. It is also closely related to the scale of investigation. Chapters in this book illustrate this interdependence, even in basic tasks such as vegetation sampling and description, measurements and mapping. Individual chapters present globally applicable systems, regional syntheses and local analyses and applications, plus conceptual methodologies, including currently debated hot topics. Vegetation types treated include tropical rainforests, temperate forests, dry steppes and scrub and local turf, sedge and moss communities. There are also chapters on re-vegetation, woodlot management, ecology of an invasive species, and trajectory planning in conservation. This book will be useful to both students and practitioners, for its reviews and examples and as a potential textbook suitable for graduate-level courses and seminars.

Estructural elements of the rain forest; Spatial aspects of vegetation structure; Vegetation structure and growth; Animal species diversity in tropical forest; The abundance and biomass of forest animals; The abundance of energy and chemical elements; Productivity of tropical rain forest ecosystems and the implications for their use as future wood and energy sources; Nutrient cycling and nutrient conservation; Food webs: who eats what, why, how and with what effects in a tropical forest?; Reproductive biology of plants in tropical forest; Adaptations of tropical trees to moisture stress.

The Kalahari Transect provides a unique opportunity to investigate the ways in which small-scale vegetation pattern affects the simulation of plant processes in semi-arid savanna ecosystems. Spatial pattern is aggregated for all trees in the vegetation communities at most research sites, with no occurrence of aggregation in trees at the most southern arid site. Lower than expected understory density is observed at the northern and southernmost sites in the transect. The understory density is significantly higher than expected at intermediate sites. The correspondence between maximum vegetation cluster size and the observed transition in scaling behavior of the NDVI mosaic reinforces the hypothesis that observed multi-scaling is related to the structural characteristics of vegetation canopies across the rainfall gradient. Variability in vegetation structure leads to a range of simulated annual productivity within one site (600 mm) that accounts for 110% of the total range in mean simulated productivity across all sites. Simulated productivity at the various scales of aggregation results in similar overall patterns of average NPP for both trees and grasses, but drastically reduced distributions of productivity due to reduced structural heterogeneity. A coupled energy and water balance model is used to simulate the effects of large tree canopies on soil moisture and water stress across a series of sites spanning a regional moisture gradient in southern Africa. Tree canopies serve to reduce soil moisture stress of under canopy vegetation in the middle of the rainfall gradient. At the dry end of the rainfall gradient, the effect of tree canopies on soil moisture is dependent on the amount of yearly rainfall received.

Monitoring Vegetation Composition, Structure and Function in the Parks of the Klamath Network
Oregon's Forest Resources, 2001-2005
A New Perspective on an Interactive System
Vegetation Dynamics
Vegetation of the Earth and Ecological Systems of the Geo-biosphere
Impacts and Recovery of the Deepwater Horizon Oil Spill on Vegetation Structure and Function of Phragmites Australis

Structural and functional characteristics of the dominant vegetation of mitigation bank wetlands (

Interdisciplinary and Sustainability Issues in Food and Agriculture is a component of Encyclopedia of Food and Agricultural Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. The Theme on Interdisciplinary and Sustainability Issues in Food and Agriculture provides the essential aspects and discusses a number of issues of importance in the development of specific agriculture and food supply systems that are closely related to general developmental trends of humankind. In this context technology and economic development as well as socio-cultural developments affect productivity and a secure supply with food. These three volumes are aimed at the following five major target audiences: University and College students Educators, Professional practitioners, Research personnel and Policy analysts, managers, and decision makers and NGOs.

ABSTRACT: Climate warming in the arctic may shift vegetation from graminoids to deciduous shrub dominance, potentially altering the structure and function of the ecosystem through influences on the abiotic and biotic controls over carbon (C) and nitrogen (N) cycling. Shrubs may influence the soil microclimate and litter inputs to the soil, altering the rate at which nutrients are cycled back to soil and thus become available to plants. In the arctic tundra near Toolik Lake, Alaska, we experimentally manipulated snow depth across three arctic plant communities that varied in their initial shrub abundance to test whether the snow that accumulates around arctic deciduous shrubs alters the soil microclimate enough to increase soil N availability and nutrient turnover. Specifically, we tested whether the addition of snow provides a more favorable microclimate for N mineralization and litter decomposition. In addition, we investigated the influence of soil organic matter (SOM) and litter quality on N availability and nutrient turnover. We found that winter snow addition increased soil N availability in the summer only through increased rates of N mineralization but had no effect on litter decomposition rates. In addition, SOM quality was greatest in the plant community with the highest abundance of shrubs resulting in faster turnover and greater N availability. In contrast, litter decomposition rates were slower in shrub dominant communities resulting in slower nutrient turnover and higher retention of N on the litter. We conclude, that on a short time scale shrub interactions with snow increase N availability, at least in the summer, at a time when plants are more active. In addition, our study suggests that a transition to a shrubbier arctic could lead to retention of N in the litter layer and an increase in N availability in the soil potentially leading to a positive feedback to increased shrub growth.

Vegetation Structure in Relation to Carbon and Nutrient Economy
Tropical rain forest ecosystems. Structure and function / ed. by F.B. Golley
Biodiversity and Vulnerability to Climate Change
The Effects of Soil Type and Management Strategy on Vegetation Structure and Function in a Semi-arid Savanna, South AFrica
Ecosystems of the World
Biodiversity : Structure and Function - Volume I

Explains how natural selection, combined with methods in statistical physics, can predict and explain the assembly of ecological communities.
Understanding ecosystem structure and function requires familiarity with the techniques, knowledge and concepts of the three disciplines of plant physiology, remote sensing and modelling. This is the first textbook to provide the fundamentals of these three domains in a single volume. It then applies cross-disciplinary insights to multiple case studies in vegetation and landscape science. A key feature of these case studies is an examination of relationships among climate, vegetation structure and vegetation function, to address fundamental research questions. This book is for advanced students and researchers who need to understand and apply knowledge from the disciplines of plant physiology, remote sensing and modelling. It allows readers to integrate and synthesise knowledge to produce a holistic understanding of the structure, function and behaviour of forests, woodlands and grasslands.
The purpose of this book is to summarize new insights on the structure and function of mountain ecosystems and to present evidence and perspectives on the impact of climate change on biodiversity. This volume describes overall features of high-mountain ecosystems in Japan, which are characterized by clear seasonality and snow-thawing dynamics. Individual chapters cover a variety of unique topics, namely, vegetation dynamics along elevations, the physiological function of alpine plants, the structure of flowering phenology, plant–pollinator interactions, the geographical pattern of coniferous forests, terrestrial–aquatic linkage in carbon dynamics, and the community structure of bacteria in mountain lake systems. High-mountain ecosystems are characterized by unique flora and fauna, including many endemic and rare species. On the other hand, the systems are extremely vulnerable to environmental change. The biodiversity is maintained by the existence of spatiotemporally heterogeneous habitats along environmental gradients, such as elevation and snowmelt time. Understanding the structure and function of mountain ecosystems is crucial for the conservation of mountain biodiversity and the prediction of the climate change impacts.The diverse studies and integrated synthesis presented in this book provide

readers with a holistic view of mountain ecosystems. It is a recommended read for anyone interested in mountain ecosystems and alpine plants, including undergraduate and graduate students studying ecology, field workers involved in conservational activity in mountains, policymakers planning ecosystem management of protected areas, and researchers of general ecology. In particular, this book will be of interest to ecologists of countries who are not familiar with Japanese mountain ecosystems, which are characterized by humid summers, cold winters, and the snowiest climate in the world.

Urban Vegetation

Plant Soil Feedbacks with Changing Vegetation Structure and Composition in a Warming Arctic

Ecological Analysis--a Preliminary Investigation of Vegetation Structure and Ecosystem Function of the Lower Salmon River

Geographical Changes in Vegetation and Plant Functional Types

A Synthesis of Plant Ecophysiology, Remote Sensing and Modelling

Production, Decomposition and Atmospheric Interception

N ä hrstoffzyklus, N ä hrstoffe (Morph. Anpassung), N ä hrstoffe.

A state-of-the-art overview of the influence of terrestrial vegetation and soils within the Earth system. The text deals especially with interactions between the terrestrial biosphere and the atmosphere via the hydrological cycle and their interlinkage with anthropogenic activities. Measurements gathered in integrated field experiments in the Sahel, the Amazon, North America and South-east Asia confirm the importance of these interactions. Observations are complemented by modelling studies, including regional models that simulate flows and transport in river catchments, coupled land-cover and regional climate systems, and Earth-system and global circulation models. Water, nutrient and sediment fluxes in river basins are also discussed and are shown to be highly impacted and regulated by humans through land use, pollution and river engineering. Finally, the book discusses environmental vulnerability and methodologies for assessing the risks associated with regional and global climatic and environmental variability and change. The results reported in this book are based on the research work of many individual scientists and teams around the world associated with the objectives of the IGBP-BAHC and WCRP-GEWEX international research programmes.

Hydrologic and Edaphic Factors as Determinants of Vegetation Structure and Function

Monitoring Vegetation Composition, Structure, and Function in the Parks of the Klamath Network

An Analysis of Wisconsin Vegetation on the Basis of Plant Structure and Function

The Tana River Floodplain Forest, Kenya

Understanding Northern Latitude Vegetation Greening and Browning

A Preliminary Investigation of Vegetation Structure and Ecosystem Function of the Lower Salmon River