DOWNLOAD PDF THERE ARE BIRDS IN THE PROJECTS: UNDERSTANDING THE ECOLOGY OF ADOLESCENT

Chapter 1 : Ecology | calendrierdelascience.com

The Ecology of Bird Loss Project investigates the ecological importance of birds for forests and the consequences of losing birds on ecosystem processes that maintain biodiversity, support functioning ecosystems, and provide ecosystem services to people.

Research Boiga irregularis The Ecology of Bird Loss Project investigates the ecological importance of birds for forests and the consequences of losing birds on ecosystem processes that maintain biodiversity, support functioning ecosystems, and provide ecosystem services to people. Our field research takes place on the Mariana Islands in the western Pacific Ocean. The Brown Tree Snake Boiga irregularis was introduced to the southernmost island in this chain, Guam, in the s. Because Guam also represents a severe example of the global phenomenon of vertebrate decline and extinction, it can offer insights into the scope and severity of the impacts of this phenomenon that are occurring globally. Our research focuses on the following areas: Mariana Fruit Dove Seed Dispersal: Seed dispersal can benefits plants in several ways: We have found that the loss of seed dispersal can severely reduce recruitment of tree species on Guam, with large negative impacts for plants that cannot escape areas of high mortality near members of their same species and for seeds that are not removed from fruit pulp. Dispersal also strongly affects the biodiversity of plants across the landscape, with the biodiversity hotspots of regeneration within forests â€" treefall gaps â€" strongly reduced in the absence of dispersal. Papaya tree in gap Although vertebrates can benefit plants in many ways, plants vary in their dependence on seed dispersal and therefore vary in the negative consequences of losing seed dispersers. Our ongoing work focuses on assessing how tree species vary in their reliance on each of these dispersal benefits. By incorporating this understanding into forest processes simulations, we are working toward predicting the long-term fate of an ecosystem without seed dispersers. Vertebrates take a top role in food webs in ecosystems across the world. On Guam, seven insectivorous bird species formed the top of the terrestrial food web, but are now absent. The loss of top predators can reverberate across food webs, with negative cascading impacts on lower trophic levels. In forests, the loss of insect predators could result in increased insect abundance and therefore increased herbivory on plants, linking bird declines to negative impacts on plants. This is relevant to agricultural systems if birds no longer are present to control agricultural pests. Our research on trophic changes following bird decline has revealed large responses of other important insect predators â€" spiders â€" following bird loss. We found that spider abundances on Guam range from 2 to 40 times greater than spiders on islands with birds. Ongoing projects explore the hypotheses that the increase in spiders represents a form of ecological resilience, buffering the ecosystem from insect abundance and herbivory increases that would otherwise result from bird loss. Two bird species likely pollinated trees in the native forests of Guam: However, there are very few tree species with flowers that clearly follow the bird pollination syndrome. We examined the potential for a lack of bird pollination to mediate plant population decline on Guam, but found that although birds visit the flowers of many species, experimentally excluding birds did not strongly affect the number of seeds they were able to produce. Introduced mammalian predators and herbivores have caused pervasive and often negative impacts in ecosystems where they were formerly absent, especially oceanic island ecosystems. Our work has focused on understanding the consequences of novel species interactions with mammals on Guam, where the only native mammals are bats. Several species of introduced rodents are seed predators on Guam, Saipan, Tinian and Rota, and these species are suspected to have an effect on recruitment and survival of native forest plants. Yet predation of introduced rodents by the Brown Treesnake has led to lower densities on Guam as compared to the other islands. We examined rates of rodent seed predation across a suite of native and exotic tree species on islands with and without treesnakes, to determine the indirect impact of the snake on seed predation. We are investigating the impact of introduced ungulates pigs and deer on the survival of forest trees and the potential for these introduced species as seed dispersers.

Chapter 2 : Sourdough â€“ Rob Dunn Lab

Fundamental ecology, or basic ecology, is the study of organismal diversity and of the interactions between organisms and their abiotic and biotic calendrierdelascience.com main goal is to advance knowledge and understanding, and its results, even if sometimes predictable, are not known with certainty in advance.

Share Donate Biodiversity is the variety of life. It can be studied on many levels. At the highest level, one can look at all the different species on the entire Earth. On a much smaller scale, one can study biodiversity within a pond ecosystem or a neighborhood park. Identifying and understanding the relationships between all the life on Earth are some of the greatest challenges in science. Most people recognize biodiversity by speciesâ€"a group of individual living organisms that can interbreed. Biodiversity includes the full range of species that live in an area. At first glance, we can identify different plants, including cattails and water lilies. If we wait a while, we might be able to spot a garter snake, a bullfrog, or maybe a red-winged blackbird. With a closer look, we can see invertebrates and worms under leaves, on grasses and in the pond water. You have not even scratched the surface of the biodiversity within the pond. Using a microscope, we would be able to see hundreds or even thousands of different bacteria that inhabit the pond water. More than Just Species Species diversity is only one part of biodiversity. To properly catalogue all the life on Earth, we also have to recognize the genetic diversity that exists within species, as well as the diversity of entire habitats and ecosystems. Genetic biodiversity is the variation in genes that exists within a species. A helpful way to understand genetic diversity is to think about dogs. All dogs are part of the same species, but their genes can dictate whether they are Chihuahua or a Great Dane. There can be a lot of variation in genesâ€"just think about all the colors, sizes, and shapes that make up the genetic diversity of dogs. Ecological biodiversity is the diversity of ecosystems, natural communities, and habitats. The forests of Maine differ from the forests of Colorado by the types of species found in both ecosystems, as well as the temperature and rainfall. These two seemingly similar ecosystems have a lot of differences that make them both special. Facts on Biodiversity Researchers have estimated that there are between 3 and 30 million species on Earth, with a few studies predicting that there may be more than million species on Earth. Currently we have identified only 1. There is more biodiversity within tropical ecosystems than temperate or boreal ecosystems. In fact, tropical rain forests have the most diversity. The most diverse group of animals are invertebrates. Invertebrates are animals without backbones, including insects, crustaceans, sponges, scorpions, and many other kinds of organisms. Over half of all the animals already identified are invertebrates. Of these, beetles are some of the most numerous species. Biodiversity allows us to live healthy and happy lives. It provides us with an array of foods and materials, and it contributes to the economy. Without a diversity of pollinators, plants, and soils, our supermarkets would have a lot less produce. Most medical discoveries to cure diseases and lengthen life spans were made because of research into plant and animal biology and genetics. Every time a species goes extinct or genetic diversity is lost, we will never know whether research would have given us a new vaccine or drug. Biodiversity is also an important part of ecological services that make life livable on Earth. They include everything from cleaning water and absorbing chemicals, which wetlands do, to providing oxygen for us to breatheâ€"one of the many things that plants do for people. Biodiversity allows for ecosystems to adjust to disturbances like fires and floods. Genetic diversity even prevents diseases and helps species adjust to changes in their environment. Threats to Biodiversity Extinction is a natural part of life on Earth. Over the history of the planet, most of the species that ever existed evolved and then gradually went extinct. Species go extinct because of natural shifts in the environment that take place over long periods of time, such as ice ages. Today species are going extinct at an accelerated and dangerous rate because of non-natural environmental changes caused by human activities. Some of the activities have direct effects on species and ecosystems, such as habitat loss and degradation, overexploitation such as overfishing , and the spread of non-native species and diseases. Some human activities have indirect but wide-reaching effects on biodiversity as well, including climate change and pollution. All of these threats have put a serious strain on the diversity of species on Earth. That includes 29 percent of all amphibians , 21 percent of all mammals , and 12 percent of all birds. If we do not stop the threats to biodiversity, we could be facing another mass extinction with dire consequences to the environment, and human health and livelihood. Ecoregions Take a look at the map of the United States. The country can be divided up in two waysâ€”one by state and one by ecoregion. Whereas state boundaries were created by people, the ecoregion boundaries on this map were created by Mother Nature. Ecoregions are areas that have similar climate, geology, and soils. These abiotic non-biological factors determine what plants and animals can live in the ecosystem. Even though two places might be far apart, if they are part of the same ecoregion, we can predict they will have similar species. For example, a mixed deciduous-coniferous forest in Maine will have similar plants and animals to a mixed deciduous-coniferous forest in Minnesota. By using an ecoregion map, we can gain a lot of clues into the ecology of different places in the United States and the world. This map divides ecoregions into four levels of detail. At the broadest scale, the United States is divided according to patterns of climate. At the province level, ecoregions are divided according to vegetation and other natural land cover. To understand each specific ecoregion of the United States, visit the U. By studying ecoregions, we begin to understand more about the history, ecology, and biodiversity of the United States. Conservationists use ecoregions to help in habitat protection and restoration projects and to produce recovery plans for endangered species. Historians and biologists study ecoregions to map out the connection between the settlements of early indigenous peoples and wildlife and how the ecology has changed over time. Biodiversity World of Biology. The Status of Biodiversity in the United States. Kutner and Jonathan S. Oxford University Press, New York:

Chapter 3 : What We Do Research

Our research in the Social Ecology and Adolescent Development lab broadly focuses on understanding the processes of resilience and positive youth development in adolescence, and evaluating the effectiveness of community based prevention and health promotion programs.

The team will be studying how those decisions affect population numbers, if at all. The goal is to gain a deeper understanding of the geese in both locations, with insights into how decision making explains population change in other genetically similar species. Weegman had already received a Goldwater Scholarship for undergraduate research and decided he would throw his hat in the ring for a Rhodes Scholarship â€" he just needed to find a research project. Weegman started the process by sending emails to conservation organizations in the United Kingdom. One, Wildfowl and Wetlands Trust , responded. Mitch Weegman has updated this display, cataloging and placing the birds by continent. New posters have also been placed to help identify the continent where the birds are from. Click here to learn more about the display. They were working on a number of projects in waterfowl ecology, but focused on swans, scoters and white-fronted geese at the time. Weegman had found his bird. In these crazy storms, the team has seen to hour flights from white-fronted geese. The birds are averaging 10 to 15 miles an hour for 30 to 35 hours. Photo courtesy Mitch Weegman. In , Weegman completed his Ph. This enigmatic population has been declining rapidly during the past 20 years, to the extent of about 1, geese per year. There were approximately 35, Greenland white-fronted geese globally in That number has dwindled to about 18, currently. The team is tracking geese, in North America and Western Europe, with fitted-to-neck collars to learn more about the decisions geese make during their migration. Is it something more cryptic than that? Do the Greenland birds manage their year incorrectly? It may not be as simple as the life history differences. We have no evidence of the Greenland birds turning around and returning after initiating a migration episode. They endure some dangerous weather during migration. From previous tracking data, when the Greenland white-fronted geese hit bad weather, they continue to fly. The average route between breeding areas in Greenland and staging areas in Iceland, and staging areas in Iceland and wintering areas in Great Britain and Ireland, requires 17 hours of nonstop flight. As the two started to discuss past research, they realized their interests were incredibly similar. I think we visited until 3 a. Each researcher brings in different expertise and together it greatly strengthens the project. Weegman and his group have been exceptional to work with and have enabled the European aspect to be integrated into our North American project. The integration of information from greater white-fronted geese from both continents will allow us to investigate some questions that have not been able to be investigated previously, and that allows for a direct comparison between two populations of the same species that must cope with different challenges during migration. The group also filmed the geese to get a better understanding of their movements. Ballard teaches and conducts research on the ecology and management of birds â€" with a focus on waterfowl. Their project is focused on investigating aspects of the movement ecology of white-fronted geese during migration and winter. These geese winter in Texas and Louisiana and breed in Alaska, with an entirely overland migration. The collars are being fitted to only adult, female geese. We get GPS-quality locations and have on-board accelerometers that provide information on body movements that we can later analyze to understand behaviors. Thus, we get information every 30 minutes on where the geese are and every six minutes on what they are doing. VonBank, working toward a Ph. Weegman and students at the University of Missouri. He worked at a waterfowl research center in Illinois from as a research assistant. He also has helped other graduate students with research at the University of Illinois who are working with Canada geese. All of the work collectively paints a very extensive and thorough picture of processes throughout the annual cycle of greater white-fronted geese that are understudied or completely unknown. The migration is treacherous, as the birds fly nearly 1, miles, with the majority of that flight taking place over the North Atlantic Ocean. That means there are really no stopping points or energy sources for the birds during the flight. These geese sometimes fly for 30 hours straight. Their population is counted in Ireland and Scotland, and the number of young are also surveyed during that time. He fitted some of geese with backpack tracking devices, which were used to understand whether individual birds were attempting to breed and failing or just not attempting to breed at all. However, only two of those were successful and brought back young to wintering areas. Tracking collars are being used on all of the geese in the project. The collars include GPS technology, which allows the group to see where the geese are at all times. There are also accelerometers in the collars. The accelerometers measure acceleration of each bird. Each action results in a different acceleration â€" whether it be feeding, flying or sleeping. Thirty years ago, seven of every 10 years produced low snowfall. Currently, seven of every 10 years are producing serious snowfall. We know from arrival dates that the geese appear to be arriving in Greenland at the same time that they did 30 years ago. During that first trip, the group put collars on 10 geese. The birds in North America and the birds in Greenland have different migration routes. The North American birds are going through the central United States and Canada, where they can stop frequently in places like Nebraska and take advantage of the agricultural landscape for food. The Greenland birds are crossing the North Atlantic, and so their options for stopping to refuel are limited. She had, however, done some work with accelerometers. Before I started here, I spent six months at the Smithsonian Conservation Biology Institute and eight months in Texas at Fossil Rim Wildlife Center â€" the whole year was focused on work with scimitar-horned oryx, a large antelope that went extinct in the wild in the s. The team will dig through the data as more of it filters in. Before the oryx were released, several captive individuals were fitted with GPS collars â€" which contained accelerometers. The goal was to see if the collars had any impact on behavior, and the accelerometer data was used to supplement visual observations. After working with large mammals, Cunningham has shifted her focus to geese. She is working to determine whether successful breeders are showing specific behavioral patterns. We can then assign thresholds. For example, feeding might be one to two meters per second. Flying is above two meters per second. Sleeping is less than one meter per second. We can then use these machine learning algorithms categorize the entire data set of acceleration values. Every six minutes is a remarkably frequent interval to understand wildlife behavior throughout the year. She has always had a passion for ecology, and is self-funded through the National Science Foundation. We know that animals have a lot of behaviors.

Chapter 4 : Arctic Ecology | The Pew Charitable Trusts

In February , backyard bird watchers in Maryland noticed something strange. House Finches were showing up at feeders with eyes that were red and crusty, so swollen that they bulged out of the small birds' heads. In Ithaca, N.Y., volunteers at the Cornell Lab of Ornithology's Project.

In winter, there is little or no sun. In summer, no darkness. At sea, there is a burst of plankton growth in spring that sustains all living things for much of the rest of the year. For at least , years, there has been at least some sea ice in the Arctic Ocean throughout the year. Not surprisingly, Arctic animals have adapted in many ways to cope with these conditions. Today, however, those conditions are changing rapidly. Importantly, none of the climate models that incorporate sea ice had projected such a rapid decline, suggesting that Arctic sea ice is more susceptible to climate change than was previously known. Indigenous hunters report an array of changes to the environment, its animals and the ability of hunters to provide food for their families. Ecosystem Restructuring The rapid loss of sea ice leaves even less time for adaptation by fish, wildlife, and humans to the new conditions they will soon experience. The Arctic ecosystem is restructuring into a new, unknown Arctic system. In , scientists working the Chukchi Sea were surprised to discover massive phytoplankton blooms beneath pack ice, far from the ice edge. The thinning ice and increasing extent of melt ponds on top of the ice is allowing more sunlight to reach the water below, fueling the larger blooms. Primary productivity in such areas may be considerably higher than previously thought. Changes in the Arctic food web are already apparent. The distribution of species is changing along with the structure of food webs. Changes in ocean circulation appear responsible for the first exchanges of zooplankton between the North Pacific and North Atlantic regions in perhaps , years. Changes in distributions allow the transmission of diseases from subarctic animals to Arctic ones and vice versa, posing an additional threat to species already stressed by habitat loss and other impacts. Where these changes lead is not yet clear, but are likely to have far-reaching impacts on Arctic marine ecosystems. Arctic Mammals, Birds, and Fishes Arctic marine mammals thrive in icy waters. Narwhal, beluga and bowhead whales can migrate under sea ice, finding breathing holes in cracks and small openings. Ringed and bearded seals keep holes open through sea ice so they can breathe and haul out. Male polar bears do not hibernate, though they may make a temporary snow den to sit out a storm. Female polar bears make maternity dens in which to give birth and raise cubs until spring. Walrus haul out on sea ice to rest between dives to the seabed to eat clams. Impacts of a Warming Arctic: Arctic Climate Impact Assessment. Arctic Food Web These animals use blubber to stay warm and to store energy. They have evolved in response to an environment with sea ice. Industrial development can cause marine mammals to shift their migratory patterns. Environmental contaminants may pose a health risk for some animals. Many species of seabirds are found in the Arctic, as well as diving ducks such as eiders. They migrate northwards in spring, seeking nesting habitat and the rich feeding that comes with the spring bloom of plankton. Some seabird colonies number in the millions. Birds get entangled in fishing nets, and contaminants can weaken eggs and reduce reproductive success. The Arctic or polar cod is a key species in Arctic food webs. This abundant fish is the main connection between plankton and larger animals. Other fishes are also found in the Arctic, including turbot, different types of cod, various whitefishes and Arctic char. In the Bering Sea, salmon and pollock are the basis for large commercial fisheries. Salmon also sustain traditional communities in the region. Bowhead whales migrate in open leads in the spring sea ice. Seabirds feed in large groups and breed in huge colonies. Many fishes school or concentrate to spawn. All could suffer greatly from oil spills, overfishing, entanglements in fishing nets or other accidents or mismanagement. Increased industrial access to the Arctic brings new threats to the area, at a time when climate change is already altering ecosystems in ways we are only beginning to understand, much less predict. Bowhead whales change course when they hear the sound of offshore drilling. Seabirds require suitable cliffs and other habitat for nesting that are also close enough to food sources to feed vast numbers of birds. If the feeding grounds move or are disturbed, the birds will be forced to nest in less desirable areas or travel further and further to find food. Either course would likely result in lower productivity and eventual declines in numbers. Arctic marine ecosystems are changing rapidly in ways we do not yet understand. It is thus impossible to predict the consequences of our actions. Sustaining Arctic marine ecosystems requires caution and prudence. Massive phytoplankton blooms under Arctic sea ice. Regional variability in food availability for Arctic marine mammals. Ecological Applications 18 2 Supplement: Effects of climate change on Arctic marine mammal health. Arctic climate change and its impacts on the ecology of the North Atlantic. Sea ice retreat alters the biogeography of the Bering Sea continental shelf. Ecological Applications 18 2: Climate of the Arctic marine environment. Footprints of climate change in the Arctic marine ecosystem. Global Change Biology 17 2: Pew applies a rigorous, analytical approach to improve public policy, inform the public, and invigorate civic life.

Chapter 5 : Recent Findings on Peer Group Influences on Adolescent Substance Use

The movement of the birds from their natal and breeding sites to new sites is not fully understood, and scientists who want to understand ecology, evolution, survival rates, biogeography, population genetics, and life-history traits must first understand dispersal.

Underwater devices help decipher marine mammal communication, census populations, and gauge the impact of human-caused noise pollution. Land-based recording units monitor endangered birds, forest elephants, and other animals in remote and inhospitable places. Automated recording devices also document the calls of songbirds that migrate overhead at night. Analyzing Animal Sounds Raven Lite The massive amount of digital acoustic data gathered by our remote recordings devices created the need for a way to automatically scan all that data to pull out sounds of interest for further study. Sound analysis software created at the Cornell Lab, called Raven and Raven Lite , is used by scientists and anyone interested in animal vocalizations to display sounds visually as spectrograms so they can be measured and analyzed. With durable, autonomous recording devices programmed to run for months at a time in remote sites, we gather information about the timing, location, and species composition of nocturnal bird migration. These audio recordings describe massive movements of migrating birds, information that is crucial for conservation planning. Each spring and fall, hundreds of millions of birds make a mile, nonstop flight across the Gulf of Mexico. There is still much basic natural history we do not know about this specific migration path. The collection is always growing as both amateur and professional recordists submit their media online. Researchers, educators, and anyone, anywhere can explore the online archive. Listen to recordings of a given species, watch video of captivating animal behavior. Exploring Species Distribution To explore where birds live and how their distribution may be changing, we developed a new modeling framework that incorporates time- and region-specific elements into a predictive analysis. The resulting spatiotemporal exploratory models STEMs can be used to study how populations respond over time to broad-scale changes in land-use patterns, pollution, or climate. Using these dynamic maps, we will also be able to monitor changes in migration flyways, key to developing conservation strategies for at-risk species. Habitat fragmentation, development, and fire suppression have contributed to a steep population decline in this species. With this information, we can preserve what remains of the genetic variation in the species by translocating birds as well as conserving and restoring habitat. Birds and Climate Change David O. In the short term, weather can influence the timing of migration, territory establishment, breeding, and egg laying. Over the long term, species have adapted to seasonal weather trends. Reproduction, Behavior, and Climate Change Susan Jarnagin via Birdshare In collaboration with researchers at the Smithsonian Migratory Bird Center, we are investigating how bird behavior may change in response to climate change. We also use recordings from our Macaulay Library to examine how song differences between populations may lead to splitting this species in two. Yet the ocean is so noisy from shipping, underwater energy exploration and development, sonar exploration, and other human activities that we are drowning them out, including the highly endangered North Atlantic right whale. Fewer than of these animals remain. We use this information to understand how whales are affected by energy exploration, shipping, and other human activities. With partners, we have established the Right Whale Listening Network in Massachusetts Bay to notify ship captains to slow down when right whales are detected nearby, preventing deadly collisions. We use automated sound-recording equipment to collect their vocalizations. This gives our Elephant Listening Project and local biologists valuable information about elephant numbers, movements, and communication. We use this information to improve our understanding of elephants and to protect their dwindling numbers from poaching and disturbance from logging and seismic energy exploration. The cause was a mutated form of bacteria common in poultry. Studies have surveyed the host distributions of particular avian malaria species and tested the ability of various mosquito species to transmit avian malaria among hosts. Work done in collaboration with the Chicago Field Museum used sequenced DNA from strains of malaria to clarify the genetic evolution of this single-celled organism that originated at least half a billion years ago. In species that engage in extra-pair copulations, adverse weather could cause males to spend less time and effort looking for mates, and reduce the incidence of extra-pair paternity. But the effects of weather on reproductive behavior remain poorly understood. We are examining the influence of weather on rates of extra-pair paternity in Black-throated Blue Warblers along an elevational gradient with a range of climatic conditions. We study the complex relationship between this species and the trees, as well as their fascinating breeding biology. Acorn Woodpeckers live in family groups of up to 15 individuals. Several related males compete to mate with several breeding females, all of whom lay their eggs in a single nest cavity.

Chapter 6 : The Ecology of Bird Loss Project: Research

There's no better laboratory for conservation and biology field studies than the Galapagos Islands. From the waters teeming with species found only here, to the highlands inhabited by giant tortoises, you'll work to understand and protect this fragile ecosystem.

Although segments of the golden eagle population in the western United States have been extensively studied, relatively little is known about golden eagles east of the Mississippi. Increasing awareness of the significance of this population is one of the goals of the Eastern Golden Eagle Working Group, an international partnership founded in in order to address research gaps and gather basic information on the distribution and ecology of this magnificent raptor. Appearance Golden eagles may be confused with immature bald eagles due to similarities in size and coloration. Both species undergo a sequence of molts in their first four years that allow for identification of individual birds to age class. These immature birds are dark brown, with white areas on the wings and tail. Adult birds are entirely dark brown except for the rear crown, nape and sides of the neck, which are of the golden color which gives the bird its name; there are also gray bars on the tail and pale areas on the wings and the rear underparts. Within North America, the species breeds primarily in the western half of the continent, from Alaska south to Central Mexico. A smaller, geographically isolated and potentially distinct population breeds in northeastern Canada, and is thought to migrate through the central Appalachians of New York and Pennsylvania and winter in Virginia, West Virginia and neighboring states. Its winter range in Virginia is primarily associated with the Appalachians, although some birds may also be found in the Coastal Plain and records exist for the Piedmont. Migration and Winter Ecology Eastern golden eagle migration is strongly associated with the Appalachian ridgelines, and the majority of golden eagle records during this period are generated through fall hawk-watch stations. In Virginia the birds can be seen migrating southward between October and early December, and northward during April and May. Wintering eagles spend the months of December through March in the Commonwealth. Although Highland County is arguably the most popular Virginia destination for viewing golden eagles during the winter, the birds are likely distributed across suitable sites along the entire Ridge and Valley. Within Virginia and the broader Appalachian range, wintering golden eagles are primarily associated with small forest openings along ridgelines, although they may also be seen soaring over the valleys between ridges. During the winter months they feed on medium-sized mammals such as rabbits and scavenge on carcasses. Very little is known about their movements during this period, and basic data is needed relating to habitat use, winter range size and other aspects of their ecology. Within Virginia, the primary goals of this project are to 1 determine winter habitat associations, landscape use and ranging behavior of golden eagles; determine migratory pathways throughout the Ridge and Valley; and evaluate the potential impacts of wind energy development on Golden eagles during the winter and migration periods. Adult golden eagle takes flight. Photo by Liam McGranaghan. Golden eagles are trapped using rocket nets at sites baited with road killed deer. Birds are weighed, measured and banded, and outfitted with a GSM telemetry unit affixed to a backpack harness. The devices collect data on the location of individual birds at minute intervals during the winter and summer months. This will allow researchers to calculate the size of individual winter home ranges and breeding territories and to characterize habitat use patterns. During migration the backpack units collect data points every 30 seconds. Researchers will use this more intensive data set to model the flight characteristics and patterns of individual birds during this period, which sees the birds spending the greatest proportion of their time in the air. It is during migration that golden eagles may be most vulnerable to potential collisions with wind energy structures. The research in Virginia is part of a broader project examining the ecology of golden eagles throughout their annual cycle. Project partners are studying the winter ecology of the species in other parts of their central and southern Appalachian range; examining migration ecology of golden eagles in the central Appalachians of Pennsylvania and New York; and collaborating with colleagues studying the breeding biology of the bird in southern Quebec. These diverse partners together comprise the Eastern Golden Eagle Working Group, whose work is designed to broaden our knowledge of the small golden eagle population in the eastern United States and to increase awareness of its conservation needs. View this video showing its first flightâ€”on February 16, â€”after a month of rehabilitation.

Chapter 7 : College of Agriculture, Food, and Natural Resources // Comparing Populations

If all birds ate exactly the same food, lived in exactly the same place, and tried to raise their young in exactly the same habitat, they would all be competing for the same types of food, water, shelter, and space.

The third major problem area of modern technological society is that of preserving a healthy environmental balance. Though humans have been damaging the environment for centuries by overcutting trees and farming too intensively and though some protective measures, such as the establishment ofâ€¦ Evolutionary ecology also examines broader issues, such as the observations that plants in arid environments often have no leaves or else very small ones or that some species of birds have helpers at the nestâ€"individuals that raise young other than their own. A critical question for the subject is whether a set of adaptations arose once and has simply been retained by all species descended from a common ancestor having those adaptations or whether the adaptations evolved repeatedly because of the same environmental factors. In the case of plants that live in arid environments, cacti from the New World and euphorbia see spurge from the Old World can look strikingly similar even though they are in unrelated plant families. Physiological ecology asks how organisms survive in their environments. There is often an emphasis on extreme conditions, such as very cold or very hot environments or aquatic environments with unusually high salt concentrations. Examples of the questions it may explore are: How do some animals flourish in the driest deserts, where temperatures are often high and freestanding water is never available? How do bacteria survive in hot springs, such as those in Yellowstone National Park in the western United States, that would cook most species? How do nematode s live in the soils of dry valleys in Antarctica? Physiological ecology looks at the special mechanisms that the individuals of a species use to function and at the limits on species imposed by the environment. Behavioral ecology examines the ecological factors that drive behavioral adaptations. The subject considers how individuals find their food and avoid their enemies. For example, why do some birds migrate see migration while others are resident? Why do some animals, such as lion s, live in groups while others, such as tiger s, are largely solitary? Population ecology , or autecology , examines single species. One immediate question that the subject addresses is why some species are rare while others are abundant. Interactions with other species may supply some of the answers. For example, enemies of a species can restrict its numbers, and those enemies include predators, disease organisms, and competitorsâ€"i. Consequently, population ecology shares an indefinite boundary with community ecology , a subject that examines the interactions between several to many species. Population ecology asks what causes abundances to fluctuate. Why, for example, do numbers of some species, typically birds and mammals, change perhaps threefold or fourfold over a decade or so, while numbers of other species, typically insects, vary tenfold to a hundredfold from one year to the next? Another key question is what limits abundance, for, without limits, species numbers would grow exponentially. Biogeography is the study of the geographical distribution of organisms, and it asks questions that parallel those of population ecology. Some species have tiny geographical ranges, being restricted to perhaps only a few square kilometres, while other species have ranges that cover a continent. Some species have more-or-less fixed geographical ranges, while others fluctuate, and still others are on the increase. If a species that is spreading is an agricultural pest, a disease organism, or a species that carries a disease, understanding the reasons for the increasing range may be a matter of considerable economic importance. Biogeography also considers the ranges of many species, asking why, for example, species with small geographic ranges are often found in special places that house many such species rather than scattered randomly about the planet. Community ecology , or synecology, considers the ecology of communities , the set of species found in a particular place. Because the complete set of species for a particular place is usually not known, community ecology often focuses on subsets of organisms, asking questions, for example, about plant communities or insect communities. There are many large-scale patterns; for example, more species are present in larger areas than smaller ones, more on continents than on islands especially remote ones , and more in the tropics than in the

Arctic. There are many hypotheses for each pattern. Ecological factors also cause the diversity of species to vary over smaller scales. For example, though predators may be harmful to individual species, the presence of a predator may actually increase the number of species present in a community by limiting the numbers of a particularly successful competitor that otherwise might monopolize all the available space or resources. The questions above are generally applied to species at the same trophic levelâ€”say, the plants in a community, or the insects that feed on the plants there, or the birds that feed on the insects there. Yet a different set of questions in community ecology involves how many trophic levels there are in a particular place and what factors limit that number. Conservation biology seeks to understand what factors predispose species to extinction and what humans can do about preventing extinction. Species in danger of extinction are often those with the smallest geographic ranges or the smallest population sizes, but other ecological factors are also involved. Ecosystem ecology examines large-scale ecological issues, ones that often are framed in terms not of species but rather of measures such as biomass, energy flow, and nutrient cycling. Carbon is the basis of life see carbon cycle , so these questions may be framed in terms of energy. How much food one has to eat each day, for instance, can be measured in terms of its dry weight or its calorie content. The same applies to measures of production for all the plants in an ecosystem or for different trophic levels of an ecosystem. A basic question in ecosystem ecology is how much production there is and what the factors are that affect it. Not surprisingly, warm, wet places such as rainforest s produce more than extremely cold or dry places, but other factors are important. Nutrients are essential and may be in limited supply. The availability of phosphorus and nitrogen often determines productivityâ€”it is the reason these substances are added to lawns and cropsâ€”and their availability is particularly important in aquatic systems. On the other hand, nutrients can represent too much of a good thing. Human activity has modified global ecosystems in ways that are increasing atmospheric carbon dioxide , a carbon source but also a greenhouse gas see greenhouse effect , and causing excessive runoff of fertilizers into rivers and then into the ocean , where it kills the species that live there. Methods in ecology Because ecologists work with living systems possessing numerous variables, the scientific techniques used by physicists, chemists, mathematicians, and engineers require modification for use in ecology. Moreover, the techniques are not as easily applied in ecology, nor are the results as precise as those obtained in other sciences. It is relatively simple, for example, for a physicist to measure gain and loss of heat from metals or other inanimate objects, which possess certain constants of conductivity, expansion, surface features, and the like. To determine the heat exchange between an animal and its environment, however, a physiological ecologist is confronted with an array of almost unquantifiable variables and with the formidable task of gathering the numerous data and analyzing them. Ecological measurements may never be as precise or subject to the same ease of analysis as measurements in physics , chemistry , or certain quantifiable areas of biology. In spite of these problems, various aspects of the environment can be determined by physical and chemical means, ranging from simple chemical identifications and physical measurements to the use of sophisticated mechanical apparatus. The development of biostatistics statistics applied to the analysis of biological data , the elaboration of proper experimental design, and improved sampling methods now permit a quantified statistical approach to the study of ecology. Because of the extreme difficulties of controlling environmental variables in the field, studies involving the use of experimental design are largely confined to the laboratory and to controlled field experiments designed to test the effects of only one variable or several variables. The use of statistical procedures and computer models based on data obtained from the field provide insights into population interactions and ecosystem functions. Mathematical programming models are becoming increasingly important in applied ecology, especially in the management of natural resources and agricultural problems having an ecological basis. Controlled environmental chambers enable experimenters to maintain plants and animals under known conditions of light, temperature , humidity, and day length so that the effects of each variable or combination of variables on the organism can be studied. Biotelemetry and other electronic tracking equipment, which allow the movements and behaviour of free-ranging organisms to be followed remotely, can provide rapid sampling of populations. Radioisotopes are used for tracing the pathways of nutrients through ecosystems, for determining the time and extent of transfer of energy and nutrients through the different components of the ecosystem, and for the determination of food chains. The use of laboratory microcosmsâ€"aquatic and soil micro-ecosystems, consisting of biotic and nonbiotic material from natural ecosystems, held under conditions similar to those found in the fieldâ€"are useful in determining rates of nutrient cycling, ecosystem development, and other functional aspects of ecosystems. Microcosms enable the ecologist to duplicate experiments and to perform experimental manipulation on them.

Chapter 8 : Social Ecology & Adolescent Development Lab | at Georgia State University

But there is more to the story, more than just ecology. Step 2: Understanding the Evolutionary History of Sourdough Starters Some sourdough starters are very old, heritage starters.

This season, the team will refine and improve techniques to increase survival of macaw chicks using foster macaw parents in the wild. The project has always been headquartered at Tambopata Research Center owned by Rainforest Expeditions. In fact, our company, Rainforest Expeditions most likely would not exist if it were not for the macaws of Tambopata. At first, the founders of RFE were the directors of the Tambopata Macaw Project, but as both expanded and evolved, the Tambopata Macaw Project found an adoptive father: The Tambopata Macaw Project is a long-term multidisciplinary study of natural history, conservation and management of large macaws and parrots. The main topics of study included monitoring and observation of macaw nests, increasing survival rates of younger Scarlet Macaw chicks, documenting patterns of clay lick use by large macaws and other parrots, and documenting and understanding the impact of tourism on macaw clay licks. Rainforest Expeditions has supported the macaw project since its foundation with complimentary food and lodging for researchers, with logistical support and with funds for researcher salaries. We also are careful to react appropriately to recommendations on tourism management at the clay lick. Finally, we have also hosted a variety of researchers over the years, on an ad-hoc basis. Over a thousand mornings of clay lick observation and literally hundreds of thousands of registrations may be the largest set of parrot data ever assembled. We have come a long way in understanding these interactions and now have a much better idea of what drives the annual life cycles of the macaws and parrots in Tambopata. Due to their large size and great beauty, macaws make excellent flagship species and serve as charismatic focal points for the conservation of the ecosystems where they occur. Unfortunately, throughout most of tropical America, large macaws have suffered major population declines. The Tambopata Macaw Project was begun in under the field direction of Eduardo Nycander with the goal of learning about the basic ecology and natural history of large macaws so that this information could be used to help their conservation. Brightsmith took over the direction and operations of the project. The project is developing and evaluating techniques for increasing reproductive output of wild macaws, expanding our knowledge of macaw nesting behavior, increasing our understanding of the complexities of clay lick use, tracking macaw movements through satellite telemetry, and evaluating tourism as a method of protecting macaws and their habitat. This scientific information is being dispersed through a variety of channels to local native communities, to the Peruvian government, and via the Internet to classrooms and conservationists worldwide. The following relationships have been discovered: The daily weather has a strong influence on the number of parrots that use the lick: The seasonal climate changes drive the fluctuations in the annual food supply for parrots and macaws flowers, unripe fruits, and ripe fruits. Food availability is apparently lowest at the end of the wet season and early dry season March â€” July and highest in the early to mid wet season December and January. The annual fluctuations in food supply drive two things: During the seasons of lowest food availability, the birds apparently leave the area around TRC as the number of birds in the forest drops dramatically from April â€" July. The timing of breeding is apparently driven by the food supply: However, not all species breed simultaneously. Smaller species apparently breed earlier than larger ones. The movements of parrots out of the area during periods of low food abundance reduce the number of birds using the clay lick. In addition, when food supplies are high, the birds apparently congregate in the vicinity of the lick. The timing of breeding also influences the number of birds at the clay lick, because for most parrot species, clay lick use peaks during the breeding season, specifically when the birds have young chicks in the nest. We have found that Scarlet Macaws feed their chicks large amounts of clay, especially when the chicks are young. As the chicks age, the amount of clay they receive drops and the total use of the lick by the species drops as well. As a result the number of birds at the clay lick is the result of the daily weather, seasonal climate, seasonal fluctuations of food supply driven by seasonal climate , nomadic wanderings of the parrots driven by changes in food supply, and the timing of the breeding season also driven by changes in food supply. We have seen parrots engaging in behavior similar to that seen at clay licks while visiting the sodium-rich mineral springs in Contamana central Peru We have documented parrots behaving as though they were at clay licks but eating palm trees in other sections of the Tambopata National Reserve. We suspect that the palms are rich in sodium and for this reason the birds are eating them. These new results give us a much more complete understanding of the forces that drive annual changes in clay lick use and give us insight into the forces driving the annual cycle of the macaws and parrots. The conservation implications of this research are many: It suggests that conserving the areas near clay licks is very important because these areas: As a result, large-scale destruction of the forests adjacent to the Tambopata National Reserve and an increase in pet trade resulting from the Trans-Oceanic Highway could significantly impact the populations of parrots that use the clay licks around Tambopata Research Center and other licks located deep within the reserve. Natural, PVC, and wooden nest boxes all have vastly different hatching success rates. Twenty-four percent of all Scarlet Macaw chicks monitored 9 of 37 died of starvation or would have if the researchers had not intervened. Our findings suggest that sibling competition and not the overall food supply may be the determining factor in chick survival, but larger sample sizes are needed to confirm these preliminary findings. Clearing for agriculture, targeted destruction of parrot nests by collectors and selective felling of key species will reduce the density of suitable nest cavities. Across three studies two in Costa Rica and the one in Peru a total of 71 Scarlet Macaws have been released. Breeding attempts have been recorded at all three sites and hand-raised birds with wild mates have successfully fledged young in Peru. Supplemental feeding post-release played an important role in establishing a core flock at all three release sites. This means that approximately the same number of birds go to the clay lick regardless of the number of people watching the birds. The tourists are kept together and relatively quiet at a distance of m or more from the lick. These results suggest that the protocol in use by Rainforest Expeditions is not causing major reductions in the number of birds using the lick, but additional analyses are needed to determine if there are more subtle impacts on the birds. During the early years, the founding research team of the Macaw Project learned to identify specific birds and even couples. They could track the comings and goings of macaws, based on the individual characteristics identified through photographs. Studies on food habits and behavior have developed over the years. TRC and the Macaw Project have hosted dozens of researchers, filmmakers, and photographers â€” all interested in the colorful birds that inspired the original Macaw project team so many years ago. Today, we continue to support macaw research and specifically the Tambopata Macaw Project. This is a long-term research project which studies the ecology and conservation of macaws and parrots. Macaws are among the most effective flagship species for ecosystem conservation in the Amazonian rainforest. At least three species of macaws have already gone extinct in the wild with 16 species remaining 1 Critically Endangered, 3 Endangered, 3 Vulnerable, 1 Near Threatened, and 8 Least Concern. From Refugio Amazonas, the Tambopata Research Center is four hours upriver, and a few minutes walking from the river. The Macaw Project hosts volunteers throughout the year. If you are interested in becoming a volunteer please contact us at sales rainforestexpeditions.

Chapter 9 : Virginia Golden Eagle Research and Conservation | VDGIF

The Washington departments of Ecology, Fish and Wildlife and Natural Resources (DNR) jointly developed a marine spatial plan after a six-year planning process. The plan sets a framework for evaluating new projects and uses proposed in an ocean area nearly 6, square nautical miles in size between Cape Flattery and Cape Disappointment.

Search Share Can biologists sequence the genomes of all the plants and the animals in the world, including this greater bird of paradise in Indonesia? Harris Lewin, an evolutionary genomicist at the University of California, Davis, who is part of the group that came up with this vision 2 years ago, says the EBP would take a first step toward its audacious goal by focusing on eukaryotesâ€"the group of organisms that includes all plants, animals, and single-celled organisms such as amoebas. Many details about the EBP are still being worked out. But as currently proposed, the first step would be to sequence in great detail the DNA of a member of each eukaryotic family about in all to create reference genomes on par or better than the reference human genome. Next would come sequencing to a lesser degree a species from each of the , to , genera. Finally, EBP participants would get rough genomes of the 1. These lower resolution genomes could be improved as needed by comparing them with the family references or by doing more sequencing, says EBP co-organizer Gene Robinson, a behavioral genomics researcher and director of the Carl R. In this representation of the tree of life, there are very few completed genomes red lines in inner rim among named eukaryotes green , but many more among bacteria blue and archaea purple. Although some may find the multibillion-dollar price tag hard to justify for researchers not studying humans, the fundamentals of matter, or the mysteries of the universe, the EBP has a head start, thanks to the work of several research communities pursuing their own ambitious sequencing projects. These include the Genome 10K Project, which seeks to sequence 10, vertebrate genomes, one from each genus; i5K, an effort to decipher arthropods; and B10K, which expects to generate genomes for all 10, bird species. The EBP would help coordinate, compile, and perhaps fund these efforts. But at a planning meeting this week, it became clear that significant challenges await the EBP, even beyond funding. They proposed that the EBP could help develop sequencing and other technological experts and capabilities in those regions. The Global Genome Biodiversity Network, which is compiling lists and images of specimens at museums and other biorepositories around the world, could supply much of the DNA needed, but even broader participation is important, says Thomas Gilbert, an evolutionary biologist at the Natural History Museum of Denmark in Copenhagen. The planning group also stressed the need to develop standards to ensure high-quality genome sequences and to preserve associated information for each organism sequenced, such as where it was collected and what it looked like. Getting DNA samples from the wild may ultimately be the biggest challengeâ€"and the biggest cost, several people noted. Not all museum specimens yield DNA preserved well enough for high-quality genomes. Even recently collected and frozen plant and animal specimens are not always handled correctly for preserving their DNA, says Guojie Zhang, an evolutionary biologist at BGI and the University of Copenhagen. After he outlined the EBP in the closing talk at BioGenomics, he was surrounded by researchers eager to know what they could do to help. We need lots of expertise and lots of people who can contribute.