The Peak
A study of the watershed of Richardson Peak

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Introduction

Belize, a young recently independent country as of 1981, is currently undergoing some extremely critical political crises. Of these, one of the largest globally impacting decisions is its management of its natural resources. Having some of the last pristine environments in the world, the direction that the government steers itself into will be of magnitudinal consequence to these areas.

In determining which of these environments will be spared of the exploitative hands of man, the government must take into consideration the ramifications of its choices. For instance, you can not expect to save the jaguar without conserving its habitat. With no land to roam in and no prey to hunt, the jaguar would not be able to survive in genetically viable numbers.

This is the exact hypocrisy which plagues the country at the present time. The current Port of Honduras Marine Reserve, one part of a three piece conservation plan, aims to protect the area from the northern bank of the Monkey River down to the Southern portion of the Port of Honduras, and eastward as far as the Sapodilla Cayes, and East Snake Caye (Saulnier, 1996). (See Map 2)

As the final segment of an entire watershed continuum, the area enclosed in this proposed marine reserve is dependent on the other components (See Map 3). These divisions, beginning in the Maya Mountain Massive, determine the characteristics of the proposed region. By definition, a watershed continuum is a large ecosystem restricted to the flow of water from rainfall in the mountains, through tributaries and branches of rivers, to the final destination of the sea. Which life forms are found in the sea, is governed by the properties of the entire watershed continuum.
beginning at its headwaters in the mountains. Should the soil be highly acidic in the ridges, the rainwater, performing its duty, shall carry this acidity to the sea. This relationship is constant throughout the watershed; the properties of the upper reaches are expressed in the estuaries and sea water as a result of the flow and transportational properties of water.

Just as the jaguar needs its land to survive, this marine ecosystem needs its water to be pristine. One of the areas major water sources is the Monkey River, whose estuaries flow southward through the proposed area of the Port of Honduras Marine Reserve. This water must remain devoid of chemicals and sterile of impurities, both of which would jeopardize the existence of the coral reefs, which are the foundations of life in the marine ecosystem.

Currently, the Deep River Forest Reserve and the Bladen Nature Reserve, the two other pieces of the plan, are the only other land areas being protected in conjunction with this master scheme. The Monkey River and its headwaters, a major component of which begins on Richardson Peak in the form of Richardson Creek, are not presently being considered for stricter protection.

Should these areas be exploited for their precious natural resources, the Port of Honduras Marine Reserve could become a failure in its entirety. With the land logged, soil erosion shall increase, overloading the mangroves and seagrass beds with filtering responsibilities such that the pristine water surrounding the reefs shall now be corrupted with nutrients, which are sufficient to spawn algal blooms that would surely destroy the reef habitat. Even worse could be the onslaught of the chemicals escaping from the citrus and banana farms along the river’s edge. It is quite clear that reforms should be made on how the land will be managed.

For future recommendations of the land to take place, more information on the area must
be collected. As of now, the only knowledge of Richardson Peak and its immediate watershed is speculative and unclear. Due to its circumferencing rugged terrain, little research has been undertaken on the ecosystem, leaving the land to be classified according to knowledge gathered from similar altitudes in the proximity.

Having been climbed by as few as 6 expeditions to as many as 12, Richardson Peak is largely a mystery (Wright, 1996). Prominently viewed from many different vantage points, the mountain has grown a certain mystique from the indigenous people who view it as an insurmountable conquest (Cho, 1996). As a personal challenge to test and fulfill one’s inner desires, Richardson Peak serves as an awesome template, stressing physical and mental strength to their extremes.

As an educational instrument, the Peak is the most mind elevating classroom that one could possibly hope for. With a direct, live view of the entire watershed, from the beginning of the hike followed by, weather permitting, observing from peak to ocean, researchers and students alike are offered an unsurpassed understanding of the natural system. A trail makes Richardson Peak more accessible, thus facilitating its use as an educational resource to the Belize Foundation for Research and Environmental Education (BFREE), which lies in the close vicinity. It is through education and study that a land can be best understood and protected.

As an avid student of nature both inside and outside of the classroom, I grasp any opportunity that I get to experience it first hand. Although, ironically, I am a bit afraid of heights, I have always been drawn to the challenges of mountain climbing. Starting as a young child, my desire to reach the peak has taken me to many mountain tops throughout the United States and Canada. Naturally, when I heard about Richardson Peak and then laid my eyes upon it, nestled in
a crook of the Maya Mountain Massive, I knew that I would have to climb it. I was drawn by a physical and mental desire that would not let me fail in my task.

Thus, I chose to climb the mountain and collect data on the natural history of the watershed and the Peak, on the way. Through my previous studies of watershed continuums with the School for International Training, I was able to envision the interconnected system from Richardson Peak all the way to the coral reefs in the Sapodilla Cayes. It is this grand ecosystem that lured me to the Port of Honduras Marine Reserve, one part of the whole.

**Background**

Richardson Peak at 960 meters above sea level, stands magnificently as the third highest point in Belize. Easily distinguished by its steep conical peak, it lies amongst the gracefully sloping hills of the Maya Mountain Massive, in the Toledo District of Belize. Due to its formation 280 million years ago (280 mya) in the late Cretaceous period, the Maya Mountains contain some of the oldest rocks in Central America (Holland, 1996).

At this time, the Earth’s plates were all forming into one gigantic land mass called Pangea. In the middle of this was present day Belize and the Maya Mountains. From the convergent forces of the tectonic action caused by the collision of the southern plate, Gondwanaland, with the northern plate, Old Red Sandstone, the sedimentary and metamorphic rocks, which had been deposited during the land’s recent marine existence in the Paleozoic Age (430-230 mya), were uplifted into a conglomerate. Over the next 100 million years the land depressed under sea level and then went through a massive uplifting in the Triassic and Jurassic periods. When it rose
above sea level at this time, there was an extremely hot pluton forming below the land mass. Slowly, veins of this igneous matter began intruding the Paleozoic metamorphic and sedimentary rocks, cooling gradually as a batholithic body. While above water, the land was constantly being eroded by wind and water.

About 100 mya, the land retreated below water again. At this point, life had evolved to a much greater extent on Earth. The sea, which had been previously scarce of fossil bearing life, was now teaming with colonies of crinoids, small animals whose calcium carbonate (CaCO₃) shells were readily preserved. These organisms abounded, and their remains sank to the ocean floor where they were deposited in layers and layers of calcium carbonate. The pressure exerted on the lower layers of these shells from the upper layers, caused them to synthesize into Coban limestone which formed a thick layer over the igneous intruded Maya Mountain Massive (Wright, 1954).

Since then, the range has resurrected its position above water, and the incessant erosion and weathering has eventually uncovered the massive from its limestone sheath. Mainly dissolved by acid rain, due to its high concentration of calcium (Ca), the limestone remains exclusively in the lowlands and valleys of the range. Now exposed are the metamorphic and sedimentary rocks, but even they have been greatly eroded, and most of what remains on the uppermost parts of the ridge are the igneous intrusions of granite and quartz.

Presently, Richardson Peak, thought to be named after a colonial governor who explored then British Honduras on horseback and was the first documented ascender of the Peak, is a part of the Maya Mountain Forest Reserve (Wright, 1996). This designation permits a minister to lease or license the land for resource extraction (Marlin, 1996).
It has been proposed recently, though, that the land around Richardson Peak and Richardson Creek be apportioned to the Cockscomb Basin Wildlife Sanctuary (Marlin, 1996). If this change is to occur, the new classification of Wildlife Sanctuary would open the Peak and surrounding area to tourism, augmenting the need for management of the land, which presently is nonexistent.

Further considerations for the land could classify it into a much larger scheme, whose specifics are still in the making. In order to ensure proper genetic drift and maintenance of home ranges, there has been a great surge to establish a Mesoamerican Biological Corridor. This would consist of a protected stretch of land being created from northern Canada all the way down to the southernmost tip of South America. As of now, Richardson Peak is being included in this very preliminary plan for the large-scale project (Miller and Marlin, 1996).

Since it is close to Richardson Peak and its watershed, I chose BFREE to be the headquarters for my expeditions. Its secluded environment in the lush subtropical rainforest adjacent to the Bladen Nature Reserve and the Cockscomb Wildlife Sanctuary not only indulged a burning desire to live in such an area, but also expedited my adjustment to the rugged terrains of my journeys. Typically occupied by four persons, the two managers, Jacob and Kelly Marlin, their daughter Sofia, and the cook, Gloria, during most of my studies there were only three of us present. Myself, Jake and my friend, Trond Larsen, an aspiring field biologist who was studying the entomology of BFREE, occupied the facilities. For the first eleven days, we were accompanied with an intern, Dylan Tierney, and the cook Gloria, who both departed on the 13th of November for Honduras and Guatemala respectively. Kelly and Sofia Marlin had left for the United States shortly before my advent.
Methodology

Using the resources and location of BFREE as my headquarters, I was able to coordinate two excursions aimed at reaching the peak and one four day stint to Punta Gorda in order to collect information. With the aid of Jacob Marlin, my project advisor and former climber of Richardson Peak, I carefully orchestrated my expeditions.

The first expedition began with seven of us, Jake, Trond, Dylan, Gloria, Matthew Miller, Jorgen ‘Yogi’, and myself. Our course of movement (See Map 4) led us westward along the Bladen Branch of the Monkey River in search of a dried up creek that we never found. Camp was pitched on a sandy beach along the river. On the next day, we followed the Bladen by land until a mutiny overtook our group, and five turned back leaving just Dylan and me.

For the remainder of the day, we followed Richardson Creek in a northwest direction, until a tributary flowing from the northeast to the southwest transected the creek. At this juncture, we decided to continue on the creek which we had been following, until approximately one-half hour later, we were forced to turn back due to impenetrable landscape. Returning to the tributary which we had disregarded earlier, we chose to hike up it until nightfall forced us to stop. On the following morning, we retraced our paths of the previous two days on account of an inadequacy in food supply, until we reached BFREE in the mid-afternoon, weary and exhausted.

At this point I found it most wise to collect more data on the area and path of ascent. In Punta Gorda, I checked into the Ocean View Hotel on Monday, November 11th, where I spent three nights before returning to BFREE on Thursday, November 14th. From here, I conducted two interviews of Charles Wright.
Formerly employed by the British government to explore and collect data on soils of then British Honduras, he has been coined the "grandfather" of natural history in Belize. With a long history of excellence and experience, Charles Wright undoubtedly has the largest wealth of knowledge on the area and its properties. Having climbed the Peak in 1959, he was able to give me valuable information on its formation and geology, as well as what to expect, and an alternate route of ascent.

Charles Wright then advised me to speak with Brian Holland, a geologist and dolomite miner in Punta Gorda. Highly touted as one of the best geologists in Belize, I performed a brief informal interview with him in which I received technical information and advice on climbing.

From here I went to the Belize Center for Environmental Studies (BCES), where I extracted many valuable resources from their library and was able to speak to both Larry Saulnier, a peace corp volunteer working at BCES, and Will Maheya a prominent member of the staff.

On Thursday, November 14, I left Punta Gorda in search of a guide in Golden Stream. After leaving a note at his thatch-roofed house, we later ran into Margarito Cho on the road in front of the entrance to BFREE.

Margarito arrived at BFREE on Friday, and we packed to leave on Saturday morning. A 33 year old Mopan Maya, Margarito has lived in Golden Stream since he was eight years old. Knowing the area extremely well due to his residence and multiple previous guiding experiences, he seemed to be the perfect choice for this expedition. Consistently guiding scientists through the bush, and having led one excursion for 47 days, Margarito's vast knowledge of the vegetation and landscape proved to be priceless.

We left for Richardson Peak around 9:00 A.M. Saturday morning, November 16,
expecting to reach the top by nightfall. Jake and Trond accompanied us on this final venture.

Our route was to coincide with Charles Wright’s as it seemed fit. Shortly into our hike, however, we strayed, and found ourselves in rugged terrain that was difficult to pass through. Progress was slowed drastically, and we ended up sleeping at an undesirable camp.

In the morning we hiked to water, and set up a base camp from where we could continue our efforts. Jake and Trond left us, but Margarito and I remained in the bush until Thursday November 21, when we returned to BFREE.

During these expeditions, all baseline data was acquired through active observation, where eyesight, touch, smell, and hearing were the primary senses utilized. With the aid of my guide Margarito Cho, I was able to discern many animals, plants, tracks, and calls. The help of the many other companions on the various excursions was very beneficial in my understanding of the landscape. (See Appendix A for itinerary)

Discussion

For the following information to be best absorbed, I have given it a strict order in this discussion section. There are a total of three subsections, Natural History, Implications of the Port of Honduras, and Physical and Mental Challenges.

The Natural History subsection shall be further subdivided into three distinct zones according to their lotic properties. These subsections are appropriately named the Riparian Forest Adjacent to the Bladen Branch, the Midreaches of Richardson Creek, and the Ridge-Top and Punch Ecosystems. Each of these are further detailed according to their geology, hydrology, flora,
and fauna. Prefacing the subsections of the Natural History shall be a section briefly describing certain members of the fauna whose presence was felt to be noteworthy. Appendix C shall list all of the fauna evidenced either from tracks, contacts, or remains.

Common names shall appear in the standard print, while Latin names will be written in italics, “and Belizean names shall occur in quotation marks.”

Natural History

Fauna

The lush riverain forest proved to be the most abundant supporter of wildlife activity. On every traverse, multiple tracks were seen of many different species, and at least one encounter occurred. The trees were filled with birds, and nuts were scattered on the ground revealing favorite foraging places of the gibnut (Agouti paca). Remnants of jaguar (Panthera onca) kills were seen in the form of strewn about armadillo (Dasypus novemcinctus) or “dilly” hair. All in all, hints of animal activity were witnessed at virtually every juncture of this traverse.

Tracks left by the jaguar were extremely abundant. On many occasions, I would pick up a set of fresh large jaguar tracks left in the mud merely a few hours prior, and would follow them as they seemed to have a similar destination. Along their trail it was not uncommon to find disturbed areas of soil where they had apparently buried their waste in the form of excretions.

At one place, I was lucky enough to see the site of a successful hunt. There in the disturbed scratched up mud flanking the trail, was a mass of strewn about wooly opossum (Caluromys derbianus) hair. This had clearly been the final whereabouts of a victorious killing
for the jaguar, whose tracks were joined by a juvenile shortly after its prize was subdued.

There was no way for me to estimate the number of jaguar present in the area, for without any measuring devices, it was extremely difficult to differentiate tracks between specimens of the same specie. Overall, though, I would speculate that I witnessed the prints of 3-4 different jaguar in this area. Due to the frequency of the pawprints, the evidence left in the form of scratch marks, excretions and calls, the population of jaguars in this area seem to be exceptional, and in no danger of local extinction.

The other cat tracks that were positively identified belonged to the margay (*Felis wiedii*). A very petite cat, the smallest of the five indigenous to Belize, it is unusual to see their footprints, for they are arboreal and nocturnal. None were encountered, and an assessment of their abundance can not be made with the minimal data.

Many "wari" (*Tayassu pecari*) or white lipped peccary along with its close relative the collared peccary (*Tayassu tajacu*) were the other most abundant tracks. "Wari", who travel in droves of 50 or more left large tracks of land in turmoil as the massive numbers stampeded in search of food. At least two large droves of "wari" were active in this area, and one drove was observed for 10 minutes (See Journal Entry1).

Tracks of the collared peccary or just "peccary" were seen commonly in this riparian zone, although none were actually observed. Travelling in small groups of 2-3, the "peccary" is much more aggressive than its cousin the "wari". It is not uncommon to hear of a "peccary" charging a hunter, whereas the "wari" tends to use its size to intimidate its might be assassins, and will remain in one place facing its adversary rather than charging it (Cho, 1996).

The Bairds Tapir (*Tapirus bairdii*) or "mountain cow" was another animal whose tracks
were frequently seen, but whose form was constantly hidden. Nocturnal by nature, these grazing animals reach enormous sizes of up to 500 pounds, and are the largest indigenous terrestrial mammals in Belize. Their footprints were quite common in the mud, sand, and deeper alluvial soils. Tapir tracks of all sizes were seen indicating a healthy population of this species.

Another animal which left many clues of its actions was the armadillo. This odd looking mammal left tracks and holes where it foraged for food all throughout the watershed, and even up many of the treacherous slopes of Richardson Peak.

The gibnut or "royal rat" also had a large range. Though not as adaptable to the changing environment as the armadillo, gibnut tracks were seen in many places along the riparian zone of the Bladen Branch and Richardson Peak. Large collections of eaten cohune nuts, a favorite food of the gibnut, on the ground told of their recent presence.

One of the more exciting observations occurred while Trond, Jake, and I were walking along the broadleaf forest adjacent to the Bladen. There we encountered a tayra (*Eira barbara*) or "bush dog". This odd animal looks much like its relative the weasel. Having a similar shaped body, with distinct colorations, a white head and neck, and a black body, the tayra was foraging when we accidently bumped into one another.

It stood looking at us, not seeming startled at all, just curious. Moving its head around a bit to get a good smell of us, it watched us seemingly fascinated, as we were with it. Slowly, it began doing what it had been doing before, looking for food. Our encounter lasted about five minutes in which time we were able to photograph it before it made its way up a tree.
Riparian Forest Adjacent to the Bladen Branch

The relative flatlands of the constantly adapting subtropical rainforest flanking the Bladen Branch of the Monkey River was the most frequented area of my study, including a total of four traverses (See Map 4). Subjected to frequent flooding, the alluvial soils are periodically degraded and aggraded as the water overwhelms the landscape, creating an ever changing nutrient gradient. It is this fluctuating soil matrix that accounts for and explains the magnificent array of diversity amongst the five kingdoms of life.

Geology

Most of the floral diversity, thus the faunal diversity, and even the hydrological differences can be attributed to the geological characteristics of this riverain habitat. As the valley of an anaclinically sloped mountain massive, this area of land was subjected to a much less destructive degree of erosion. With jointing, fracturing, and the effects of weathering due to wind and acid rain being more prominently restricted to the steeper inclines, the lithosphere of the Bladen Branch riparian area is drastically different. Whereas on the mountainous peaks of the massive and its acutely curving slopes the rocks are generally granitic and the soil is acidic, here, limestone dominates the geology and the soil is neutral to basic in pH.

This pH differential is the cause of the wide diversity of tree species in these lowlands. The lime yields high levels of calcium and magnesium which are “important plant nutrients and decrease the toxicity of certain elements in the soils.” (A. Brorsen, B. Holland) By assimilating these nutrients into their regular growth patterns, trees are capable of much higher production and thus grow more quickly and healthily.
The area is a bit hilly with instances of large limestone outcroppings and occasional uncovered limestone boulders pitted and sculpted by water in all manners. Due to their precipitous behavior, the limestone hills are cratered with many caves, in which can be found ancient relics of the Maya in the form of pottery and bones (Cho, 1996).

**Hydrology**

The river bed of this area is greatly affected by the limestone rock which it runs over. Through years of flowing, the water has consistently eroded the meanders in the limestone banks, which had the rock been granitic, it would not have been capable of doing in the same time frame. Thus, the river follows a much more preferred route, and less erosion is taking place here relative to areas further upstream.

The river does not vary much in depth, but remains consistently shallow at 2-4 feet. There are occasional potholes in the bed which appear to be favorite residencies of the fish. Velocities in the water are relatively slow due to the straight and level flowing of the river. Most of the riverbed is composed of rocks of igneous origin that have floated down from the volcanic headwaters. As you travel from higher to lower elevations, shapes of the rocks become smoother, the sizes smaller, and the pebbles finer. Having dark red colorations, the river seems to glow a distinct hue when the light hits it in a certain way, giving it a most perilous appearance.

**Flora**

The limestone bedrock provides a magnificent foundation for the growth and sustenance of many plant and tree species. In this riparian zone, the trees seem to grow to their maximum capacity. Magnificently spreading their branches horizontally over the rest of the canopy, the large trees capture enough sunlight to grow to mammoth proportions so typical of riverside forests.
This tall broadleaf forest is dominated by no specific tree specie or species, but instead is a wonderfully diverse matrix. Old growth forest is apparent due to the large specimens of the myriad of different species. Steve Bremer, a botanist studying the area, has, to date, recorded over 500 tree species in the vicinity of Solomon Camp (See Map 4). (Marlin, 1996). Of the trees present, the most commonly seen are the Santa Maria (Calophyllum brasiliense), Cohune Palms (Orbignya cohune), Quam Wood (Schizolobium parahybum), Banak (Virola koschnyi), and Yemeri (Vochysia hondurensis). (Charles Wright) Also seen frequently are the Ceiba (Ceiba pentandra), Breadnut (Brosimum alicastrum), Iron Wood (Dialum quianense), Wari Cohune (Astrocaryum mexicanum), Mohagony (Swintenia macrophylla), Bay Leaf, Kaway, and the Acacia trees. These are some of the trees that form the main canopy that averages a height of 70-80 feet, and serves as the primary blanket to the sun, "often blocking up to 90% of the sun's light before it reaches the ground."(Wilson, 1993). It is due to the level of foliage that the forest in this area isn't well lit, although light shining in from the tree gap that falls over the riverbed provides substantial light for vision.

In this area, it is the huge buttressed trees that overwhelm the environment. Sometimes 10-15 feet in diameter at breast height, these trees send their thick trunks slightly above the rest of the canopy at a height of about 125 feet, where they spread their branches horizontally over their competitors. Appealing to the eyes, these trees with their massive ridge-like curving buttresses often captivated me as I forged on to the Peak.

The understory is fairly crowded in this area consisting of mainly prickly yellows, palms, and young saplings. Being so dense, without a well-cut trail, this area is extraordinarily difficult to traverse. It is quite easy to get entangled in vines or engouged with multiple spines.
Overall, it is a breathtaking broadleaf forest with a dense understory consisting of the more herbaceous plants, and the greater canopy composed of majestic buttressed trees.

**Fauna**

The wildlife diversity of this region is surpassed by no other. Encompassing the environment were traces of the globally endangered yet locally abundant species. Jaguar tracks were plentiful, along with "wari" tracks, and peccary tracks. The roaring of howler monkeys (*Alouatta pigra*) vibrated through the canopy. Green tree snakes (*Leptophis ahaetulla*) or "Green tommy-goff" were seen slithering on tree trunks camouflaging themselves amongst the vines. Fer-de-lances (*Bothrops asper*) or "Tommy-goff" darted under rocks while tyra an coatamundi foraged in the leaf litter. Huge indentations made by 500 pound tapir were juxtaposed against the miniature pawprints of the margay. Frightened, "quam" and partridges squawked as they became airborne, aware of our presence. Kingfishers (*Ceryle sp.*) darted straight down from their branches into the water, flying away with their prize. Gibnut and armadillo tracks, as well as their residue from lunch lay strewn about the forest floor. Terrestrial and arboreal life abounded not to mention aquatic life.

In the pools of the river, many varieties of fishes were seen. Large 12-14 inch tuba, muchaca, and mountain mullet (*Agnostomous monticola*) were seen swimming around lethargically cooling themselves in the deeper water. A moreletts crocodile (*Crocodylus moreletti*) was observed briefly before its keen hearing discerned the noise from our footsteps, and it submerged itself out of view. Many smaller fishes such as billum were observed, while snails covered the rocks of the riverbed.
Midreaches of Richardson Creek

The area as constituted by the midreaches of Richardson Creek could be classified as a transitional area (See Map 4). Some aspects of this zone were similar to the riparian forest along the Bladen Branch and other parts more similar to the ridge top, with species abundance decreasing in an inverse relationship against altitude. This transition is due mostly to the major properties of the geology and soils of the area being somewhat of a mixture of the region prior and following. Like the forests juxtaposed along the Bladen Branch, the forests here have a relatively thick layer of topsoil which consists of rapidly decomposing biomass. It is the bedrock which differs in the midreaches. The primary rock gradually changes initially from the sedimentary limestone rocks into igneous granite and metamorphic gneisses and slates.

Plant life in this region tends not to grow as large or tall, but the vegetation is more tightly packed in the land. Light is more scarce in these forests, as the inclines and densities of vegetation serve as an umbrella to the penetrating rays of the sun.

Geology

As in the riparian zone along the Bladen Branch, the geology in this area is the determining factor for the other aspects of the natural history. It is because of this change in bedrock type that the forest, river, and wildlife have skewed from their patterns in the previously described landscape. Years of major erosion are storied from the tall 15 foot granite banks lining either side of the Creek, while to this day, the water continues to actively erode away at them.

Granite is a much stronger more durable rock than limestone. It is also much less susceptible to precipitation from acid rain because it is not composed of calcium. The soil yielded
from a granitic bedrock, though, is extremely poor. Most plants are not able to compete successfully in the high levels of acidity associated with a granitic soil, and thus the forests present in these areas are highly adapted and predictable.

The topsoil of the upper midreaches of Richardson Creek, though acidic, is thick enough, due to years of biomass decomposition, that it has become tolerable to a wide variety of plant species, whose roots strive to anchor the trees upright in their perilously angled stances. In this large transitional area, the gradual shift from limestone to granite accounts for the gradual decline in floral diversity.

Hydrology

Clearly the most powerful and dominating force in this area is water. Pounding and splashing off of rocks for years, the water has managed to carve multiple paths from the ridges all the way to the mouth of the Monkey River. Most of the turns in the rivers could not be considered meanders, they are fairly sharp, rough turns influenced and controlled by the bedrock geology. Nothing about this area is gentle. Here, the battle between strong erosion resistant rock and ever flowing powerful water takes the forefront. A deafening noise is created as the rock slowly gives way to the onslaught of the water, such that it is difficult to communicate with someone more than 5-10 feet away from you.

Fed by myriads of vein-like tributaries cascading down the ridges, the raging creek of Richardson has managed through the years to gorge out a path which enables it to reach the ocean via the Bladen Branch and the Monkey River. Much of its route travels through solid rock with granite banks flanking both sides at a height, which, at 15 feet reveals the amount of downcutting that the river has accomplished throughout the years. The bed of the river consists
of large rough rocks that have been carried down from the narrow steep tributaries, and these rocks increase in size with altitude.

**Flora**

The plant life in this area varies greatly as the creek is further ascended. Beginning with a lush variety of herbaceous tall broadleaf plants mixed in with wide hardwoods and softwoods, the diversity in plant-life seems to flourish beyond all imaginal belief as the ridge-top areas are approached. Humidity increases in the upper limits of this region, and a moist lush epiphytical jungle thrives on the trunks and branches of its supporting deciduous forest. Tree types in this area abound, yet certain species seem to dominate to a much further extent. A gradual trend in the decrease of broadleaf trees occurs, until close to its uppermost borders, it is difficult to find much more than an occasional cabbage palm (*Euterpe macrospadix*).

On the lowermost limits of the midreaches, the forest type consists of a wide variety of tree species. The undergrowth is dense, but begins to thin out rapidly. Trees, initially spaciously placed, begin to crowd up with more candidates vying for the valuable energy provided by sunlight. Common trees become the Breadnut, Cedar (*Cedrela odorata*), Pine (*Pinus oocarpa*), and Santa Maria who compose the canopy at a height of 40-50 feet. Vines abound hanging from tree to tree curving all the way to the ground. Strangler Figs (*Ficus schippii*) are readily identified as they attempt to constrict and eventually consume the tree chosen as a host.

As the slopes become more treacherous, the tree cover becomes much more dense, and their trunks do not grow to nearly the same widths or altitudes. Pine becomes a much more dominant specie in this area, although there is never a spot that could be considered lone pine. Still in large numbers, and possibly even the most frequently noted, were the Santa Maria,
Sapodilla (*Manilkara zapota*), Wild Guava (*Alibertia edulis*), and Pidgeon Plum (*Hirtella racemosa*).

Dominating the landscape, it wasn't until an altitude between 500-700 meters above sea level was reached that the epiphytical jungle began. Consisting mainly of the Santa Maria, Sapodilla, White Nargusta (*Terminalia amazonica*), and White Breadnut trees, this extraordinarily moist area is certainly the pinnacle of epiphytical life. Completely covering all of the trees, mosses, bromeliads, fungi, and flowering vines saturated the canopy. Running all the way up the trunks of the trees, dripping wet blankets of moss had hidden in them germinating saplings. Rocks were covered with lichen and mosses alike. The trees and rocks of this highly eroded, moist, cloud-forest served as the template upon which the many shapes, colors, and forms of epiphytical life displayed their exquisiteness in an artgallery type fashion.

Thickly covered with leaf litter, the topsoil was thick drawing its moisture from the humidity of the air due to elevation, and the multitude of flowing creeks.

*(See Journal Entry 2)*

**Fauna**

Animal life did not seem as abundant, yet there were still many signs of foragers. Gibnut feeding areas were identified by large mounds of cohune nut shells piled near the cohune palms that they fell from. Armadillo tracks, as well as their holes dug into the ground in search of food, were seen quite frequently. This would suggest the presence of top carnivores such as the puma and jaguar, however no tracks were found, and the relative sparsity of their prey would indicate a low population density at best.

A beautiful coral snake (*Micrurus diastema*) was observed, as Margarito paralyzed it
beneath his walking stick. Its brilliant bright red, yellow and black bands forewarned us of its deadly bite. Also seen was a brown salamander (*Bolitoglossa mexicana*) which crawled along a rock bordering our fire. During the night owls of two species called with their shrill voices haunting the peaceful night.

**Ridge-Top and Peak Ecosystems**

As the final area of the watershed system, the ridge-top and peak area contain the least amount of diversity amongst all of the kingdoms of life. Tree and plant species are narrowed to merely a few, traces of animals of any type are far and few between, even the geology becomes quite uniform. The slopes are steep so as not capable of supporting any tall heavy plants, thus, those trees which are found are stunted and grow to heights of no more than 10-12 feet. Still humid, the air is capable of supporting large quantities of lichen, but the bromeliads, vines, and mosses of the previous area are left behind in what is now a fern covered nightmare.

**Geology**

Highly eroded and exposed, are the virtually sheer cliffs of granite leading up the cone. Very brittle, the rocks crumble under the weight of your body falling for what sounds like the entire 800-960 meters that the Peak stands above the sea. What little soil is found is highly leached and devoid of sustainable amounts of nutrients. Veins of quartz can be seen in the dilapidated rocks.

**Hydrology**

At these high elevations water is scarce. The roar of the creeks below can be heard from the Peak and the ridge-tops, but unless their is a rainstorm, their is virtually no water available.
Occasionally, it is possible to find a rock in which a trickle of water drips from a hidden spring, but even these are rare. When a rainfall does come, however, many little streams are formed, all leading to the tributary carrying their sediment, which in turn is brought to Richardson Creek, to the Bladen Branch, further along to the Monkey River, and then eventually to the sea and the coral reefs, completing the watershed continuum.

**Flora**

Although plant species do not abound here, their is probably a wider range of plants than animals if the insects are excluded. The two dominant tree species are the pine and the Wykachustik, which are very sparsely dispersed. Both stunted at about 8 feet, the two species are easily uprooted due to the thin soil. Scrappily looking, neither tree specie appears to be in its preferrred habitat.

On the way up to the peak, where the woody plants have been almost completely burnt away due to lightning strikes, lies the realm of the most dreaded fern, *Dicranopteris sp.*. This hellacious fern covers the ground in densely entangled mats starting at about 250 feet from the top. Being virtually impossible to cut through with a machete, the best way to pass through this foliage is to merely fall into it, get up, and then fall into the next patch right in front of it.

**Fauna**

Animals were virtually nonexistent in this final area of the watershed. Only two were seen, of these two, one was a bird, a collared aracari (*Pteroglossus torquatus*). The other animal was quite a surprise, as it was found on the very tip of the Peak, where their was no other
evidence of life. Here I found what I thought to be a new specie of snake, but later found out was known, but uncommon. *Scaphiodontophis annulatus*, a snake with the first third of its body resembling a coral snake with red, black, and yellow stripes, and the other two-thirds a solid brown color, approached me curiously on the peak. Watching each other carefully, it was not until I tried to catch it until it slithered away, hidden amongst the fern entangled fern roots.

**Implications of the Port of Honduras Marine Reserve**

As of now, plans to begin the protection of the Port of Honduras Marine Reserve are in the making. This area (See Map 2) has been chosen due to its importance as a breeding ground for all of the fishes of the Caribbean Sea. Efforts are being made to protect the waterway in conjunction with the Bladen Nature Reserve and the Deep River Forest Reserve.

Presently taking the backburner, though, is the Monkey River and its watershed. Posing a problem because a large amount of the riverside property is privately owned, and much of it is worked as citrus and banana farms, it is difficult to get all of these individuals to agree to an appropriate management plan. Thus, while the marine reserve is being pushed to being enacted, the Monkey River watershed’s future management remains uncertain. Currently, plans to get farmers to abide by the 66 foot law, and hopefully more, as well as agreements for citrus and banana farms to construct holding pools that would catch the runoff from their crops (Will Maheya). Again, though, enacting the Port of Honduras Marine Reserve is taking precedence over securing the Monkey River watershed.

Richardson Peak and Richardson Creek, part of the Monkey River watershed, are now
located in the Maya Mountain Forest Reserve, and is the only tributary of the Bladen Branch not included in the Bladen Nature Reserve. There is speculation, though, that they will be partitioned to the Cockscomb Basin Wildlife Sanctuary (Marlin, 1996). Whether this happens or not, the land may be logged, for both Wildlife Sanctuary and Forest Reserve designations allow for resource extraction to occur.

Should logging occur in this area, major soil erosion would occur. It is estimated that over 20,000 times more soil runs off of deforested land than does when undisturbed (Jones, 1996). This would cause a massive influx in the amount of soil reaching the mangroves and sea grass beds.

Serving as filters to extract the nutrients and sediments from the river water, they ensure the survival of the coral reefs. The reefs require unpolluted nutrient poor water to thrive. If the mangroves and sea grass beds are overburdened with work, and sediments and nutrients reach the corals, their would be drastic ramifications. It is very likely that the reefs could die due to an algal bloom which would be caused by the advent of the nutrients (Jones and Nelson, 1996).

It is quite possible that the reefs would die should the Richardson Peak watershed be logged, let alone from the chemical runoff from the citrus and banana plantations along the Monkey River. Satellite pictures show the plumes of the rivers, and from these pictures it is quite clear that the water and sediment from the Monkey River flow into the proposed area for the Port of Honduras Marine Reserve. Without the Monkey River watershed being protected or managed properly, the Marine Reserve's abundance of life will disappear as the mass local extinctions of the corals and their inhabitants begin.

In light of the fact that the proposed Mesoamerican Biological Corridor, which shall
provide animals with the safe passage from North America to South America, shall include the Richardson Peak area, and noting the area's importance to the Port of Honduras Marine Reserve, it is imperative that it be properly managed.

**Mental and Physical Challenges**

This project proved to be a very strenuous one both mentally and physically. Besides the typical aches and pains associated with difficult exercise, I developed and most certainly revolutionized the word fester. Cultivating these oozing pusing wounds immediately following the first excursion, they plagued me throughout the entire project, and continue to do so as I write this paper. Their constant pain and inability to heal left me incapable of walking for two and a half days. My movement, when necessary during these periods, was extremely slow, and filled with tremendously intense pain. Tylenol and antibiotic cream both failed in their valiant efforts to thwart the ever infected festers which seemed to multiply daily. There was a point when even sleeping was made difficult by these festers, for they are painful upon contact, and having them all over my legs, buttocks, and arms made it difficult to maneuver at night.

These festers were just part of my physical pains, though. The landscape of the Richardson Peak watershed is far from people friendly. Prickly yellows constantly pierce your flesh, while vines and stumps attempt to trip you to the ground where more thorns wait, upright to slice through your skin. In the creek, water constantly pounds against your legs tiring out the muscles so that when it is time to walk upon the sharp water slick rocks on the bank, you no longer have the strength to resist the action of slipping from the rocks.
During these stages I suffered multiple cuts and scrapes, bruises and twists. My body would ache for days while I attempted to recover from the torments of the terrain. It forced my skin to thicken and my body to reject the minor pains and focus solely on healing the major ones.

I learned to live without food. I learned to live without water. During the first excursion I was forced to share a small bag of peanuts for dinner after minimal food the whole day and exhausting exercise.

The first day of the second excursion found four of us high up on the ridges. We were being pounded by the sun, were physically exhausted from a full day of strenuous hiking, and had been out of water for many hours. All of our mouths were dry, it was difficult to speak, and there was no sign of water anywhere around. There was no way for us to reach water before nightfall, so we were forced to live without. Urine florescent yellow, we were dehydrated to the bone. Survive we had to and survive we did. We awoke early the next morning and descended what we had spent all day climbing, in search of water. Hours later, parched, we came upon a small creek and indulged ourselves for a good while.

It was not just lack of water that I suffered either. Besides this, and the pounding the water gave me, I dealt with the freezing cold that a wet body deals with on a windy frigid night high amongst the ridges of the mountains. Not able to sleep on three nights due to the cold, Margarito and I would wake up in the morning wet, cold, and fatigued. Water depressed me and water invigorated me. I came to know and respect water like I never had before.

The whole adventure exposed me to physical challenges which pushed me to the brink of my capabilities. Climbing waterfalls that at 60 feet high, water pounding down, rising at an 85-90° angles, any slip could mean death. Pulling my body over vertical rocks as my footholds
crumbled beneath my weight, strained my muscles and my mind to their limits.

It was the mental hardships, though, that made the project so difficult yet so rewarding. The defeats that sparked the flame for the conquests, taming my mind proved to be the most important aspect of the excursions. Overexcitement led to many false expectations whose ramifications offset the goals of the study. Disappointment almost led to the abortion of the mission, when my mind got the better of me.

The thrill of thinking that I had reached the top was an encompassing feeling of victory, but the even more powerful feeling of defeat when realizing that the whereabouts of the actual peak is unknown, is heartbreaking. Dealing mentally with all of the physical punishment alone, convincing myself that it was all worth it and to continue on, was enough of a struggle. Knowing that the mountain had turned me back after my first attempt was sufficient to manifest my body with anger and defeat (See Journal Entry 3). Knowing that the mountain had been climbed in a single day, and here on the second day of my second excursion, I was not going to reach the top, and did not even know where it was in relation to me, challenged my mind.

I was driven to the point of a breakdown. On my final excursion, not knowing where I was, parched, behind schedule, having put all of my money and heart into this expedition, all of the research, the time spent studying a trail, coming to the realization that I was about to fail on my mission to reach the top; it was at this point, this critical moment that I was saved. Jake, fulfilling the role of an advisor to the point of redefining it, took me aside. He stopped me, sat me down, and we talked, taking my mind off of my possible failure, and he helped me to put everything into perspective. This talk enabled me to continue and to finally achieve the pinnacle of my goals, to stand on Richardson Peak.
It was my ability to take all of the negative energy that was parasitically eating away at my mind, and transform it into desire and hunger, that gave me the power to eventually reach the Peak.

In total, eight of us attempted to reach the peak, only one of us made it. The feeling of being on the top of the mountain alone, as the only survivor of the conquest, after spending three weeks trying to ascend it, dealing with the mental and physical traumas; this feeling made it all worth it. I was on top of the world all by myself. I succeeded in standing where only a few people in history have been able to stand while many have tried and failed. (See Journal Entry 4)

**Conclusion**

My ascent of Richardson Peak, though both mentally and physically rigorous, was a complete success. I was enriched by the hardships of my adventure, and tasted the nectar of the gods when I stood alone on the Peak with only myself to look at as the motivator. Emotionally satisfied, I conquered the mountain.

During my travels, I observed some of the most beautiful landscape that I have ever seen and surely that exists on the earth. Magnificent majestic trees with epiphytes of all types clinging to them added to the magnificence of the area. Abundant wildlife in healthy populations scoured the land to survive. I witnessed the destructive forces of water as it monotonously pounded through the granite, falling 60 feet from a sheer rocky face. The transitions from limestone to granite, diversity to uniformity, abundance to scarcity; it is all present in the small watershed area of Richardson Peak.
From the peak, seeing the overall picture; rock flowing off of the ridges like the buttresses had from the trees in the riparian zone along the Bladen Branch. The clouds above and below, the ocean looming on the horizon, the whole watershed in its splendor, it can all be seen from the Peak.

The area, so important because of its beauty, because of its diversity, because of its location within the Mesoamerican Biological Corridor Scheme, deserves special conservation management considerations. Ramifications from its wanton protection could be felt worldwide, for should the reefs be contaminated due to a polluted or heavily sediment laden river, the Caribbean Sea could be rendered void of many of its precious marine organisms.

Thus, I recommend that the area be designated as a National Park so that no logging or harmful actions could occur to the land, yet it could still be accessed by people for aesthetic as well as educational purposes. This designation should be sought after before any further measures are taken to enact the Port of Honduras Marine Reserve, for if the entire watershed is not properly managed, all of the efforts poured in to enact the Marine Reserve legislation would be for naught. The ideas to help manage, and laws that mitigate runoff from banana and citrus plantations should reduce the risk of contaminating the river, but they need to be implemented and enforced now. The residues of the farms should be closely monitored to insure that the river water remains suitable for survival of the final segments of the watershed, the reefs located in the proposed area of the Port of Honduras.

To the aesthetic adventurer, I highly recommend hiking through the area. A four night camping excursion would be sufficient to observe a brief but satisfying amount of the many different plants, animals, and fungi present. It would also allow the hiker a chance to reach the
peak, spend the night on top of the peak and view a watershed system in its entirety.

It would be a wonderful task for BFREE to not only maintain the trails that were cut to the peak, but also to investigate new fascinating areas for trails. A guided educational trip to the peak, through the variations of the watershed could be a very valuable addition to the School for International Training's terrestrial ecology unit, for it encompasses everything that is taught in this watershed focused course. By spending an extra two days at BFREE, or even just deviating slightly complete the current agenda upon arriving at BFREE, the students could view what they had been studying in its complete natural form, as well as providing them with an exciting deep bush camping experience.
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Journal Entry 1

At first we noted their distinct pungent odor, for the wind was blowing toward us. Then with Margarito leading the way, we crossed the river, and approached the drove, which unaware of us, continued to grunt and snort happily as it slowly foraged through the bush. We were within 30 yards when we got our first glimpse of the massive drove. They were walking in what appeared to be a single line. There were lots of them, many more than 100, mostly females and their young, with the large males on the outside apparently acting as a protective buffer against possible predators. We watched at our distance for a bit, and then decided to move closer in order to get a better glimpse of their faces.

It was as we approached that the action began. Suddenly, there was a loud clacking noise, the squeals became louder, and the drove’s pace increased. As I looked up, no more than 20 yards ahead of me was a large male “wari” facing me, apparently ready to charge. I cringed at the sight of the prehistoric looking beast as I began backing up.

Large, about 100-150 pounds, the boar-like animal had large incisors, which when struck against each other, produced the loud clacking noise. The hair on its body was short, stiff, and gray except for this huge erect main which spanned the length of its body all the way to its forehead. Its face was white, making it look bit spooky.

The drove began responding to the clacking and moved away a bit concerned, but clearly not scared. More males joined in, facing us and clacking their teeth. After my initial fear, I realized that I was in no danger. They obviously didn’t feel threatened by our presence, for they hadn’t charged, and
the females and young were still around. We broke the contact so as no to disturb them anymore.

Margarito later explained to me upon my inquiry why they hadn’t attacked us. He said that because of the remote bush that we were in, the “wari” have very little contact with humans. Our scent and appearance is foreign to them, and so they are more curious than scared. Had we been a jaguar, they would have recognized the scent, and if it got close enough, they would have killed it. It’s a shame that other animals that have grown accustomed to humans now flee in our presence. Why we have to be so wantonly destructive is a great mystery to me.
Journal Entry 2

I finally got a chance today to spend some time looking at the forest around me without hiking. Since we set up camp early, there was a two hour period before nightfall which I spent looking at the trees and plants around me. What a place! This could be the most beautiful forest that I have ever been in. The trees, tall and majestic covered in epiphytcal life. Moss blanketing the trees and rocks in the area. Moisture everywhere, supporting the multitudes of life.

Beautiful tank bromeliads with their flowers dangling down, yellow balls on the end just like a jester’s hat with bells. Lichen, spiraling around tree trunks resembling ancient Asian temples. Greens, yellows, oranges, reds, all adorning the vegetation of the area.

Majestic Santa Maria stretching their branches to the sky. Each tree decorated with different species, each branch so magnificently ornamented that not one tree could be compared to another. They each took on their own personal identity. The grand one in front of me, clearly the king dressed in his royal mossy garments, beautiful green lush vines dangling from him like the folds of his robe. A large crown-like bromeliad resting of his head. His court stood all around him, smaller in stature to the king, his knights of the round table basked in the glory of their king as the sunlight shone on their noble armor. Lichens and fungi taking the place of the kings moist robes.

I brushed my hand through the thick soft moss soothing a rock. Water held afloat by the individual mosses dripped to the ground as my hands caressed the rocks. Life abounds in this moist cloud-forest. Seeds were actually germinating in the water captured by the blankets of moss. What a place!
Journal Entry 3

On this day, Dylan and I walked back to BFREE after realizing that we were tired, without food, and didn’t know how to get to the mountain. It was discouraging, downright painful to know that the mountain had beaten me, constantly pounding water at my legs, eluding my eyesight at each meander in the creek; forcing me to give it my all, sweating out each moment wondering whether I would slip on the next water slicken rock, or plunder to my virtual death, for even the slightest injury could mean death or ... because the closest person was at least a days walk away.

There was a burning hot ember ignited in me by all of this. The mountain had burnt me on the first attempt, but at the same time, the raging flame it had set to burning in me had grown to a strength so magnificent in its innocence, in its purity, in its faith, that it would eventually, maybe not on the second or third try, but on the forth or the fifth, douse the mountain with my virgin victorious triumph; stomp upon its highest igneous outcrop and immerse my eyes with the land that I suffered on, that I live on, that all of the people live on, the sea that the fish live in, the great blue ocean that Christopher Columbus first sailed across. But the mountain stole from me my only device capable of capturing its splendorous view, for on the way up it had drown my camera rendering it useless, leaving its prize, its reward to only those few aesthetics who will live through the experience, and reach the peak on their own accord.
Journal Entry 4

After three weeks of work, I finally made it to the peak. What can I say? How can I express these feelings? I have done what I set out to do. Discouraged and doubtful at certain times, I was able, somehow, to convince myself to continue on. There isn't a feeling much greater than that of pushing yourself to exhaustion, spending so much time to do something that you want to do, and then finally after so many difficulties, achieving your goal and holding yourself responsible for the feat.

Here I am on the peak, looking out over the watershed, the sea in the distance, the Bladen, the Monkey River, here it all is before me. Ridges flowing off of the Massive just as buttresses flow off of the trees. The beautiful blue sky filled with thick white nebulous clouds.

Probably the most impressive, is the wind. I hear the wind now like I never have before. From one direction the loud roar embraces me while a the sound of a gust from another direction causes me to shiver from its pure strength. It comes from all directions bombarding me, ricocheting off of ridges, the noise heard here can not be heard even only 20 feet below.

I love this place. I love this feeling. I think that even had my journeys brought me to the most miserable place imaginable, I would still be overjoyed to have made it, proud of my accomplishments.
Appendix A

ITINERARY

October 30
October 31
November 1
November 2
November 3
November 4
November 5
November 6
November 7
November 8
November 9
November 10
November 11
November 12
November 13
November 14
November 15
November 16
November 17
November 18
November 19
November 20
November 21
November 22
November 23
November 24
November 25
November 26
December 2
December 3
December 4
December 5
December 6

- Went to Belmopan; researched
- Went to Belize City; researched
- Researched at Monkey Bay
- Left for BFREE; settled in
- Went to Punta Gorda for supplies
- Planned and packed for Excursion 1
- Left for Richardson Peak
- Most of group turned back, Dylan and I stayed
- Returned to BFREE in late afternoon
- Rest and recovery
- Wrote data collected on Excursion 1
- Left to Punta Gorda; spoke to Charles Wright
- Spoke with Charles Wright
- Spoke with Larry Saulnier and Charles Wright
- Spoke with Brian Holland, Will Maheya, Larry Saulnier
- Prepared for Excursion 2
- Began Excursion 2
- Hiked and set up Base Camp 1
- Hiked up Creek towards mountain
- Hiked and set up Camp 2
- Reached the Peak
- Returned to BFREE
- Recovered
- Wrote info. About excursion
- Wrote info. About excursion
- Began rough draft
- Finished rough draft
- Drove to Monkey Bay via P.G.
- Reviewed Rough Draft
- Working in Belmopan
- Working in Belmopan
- Working in Belmopan
- Hand in final draft
Appendix B

Animal Life

1- Present in Riparian Zone | 2- Present in Midreaches | 3-Present on Peak and Ridge-Tops

<table>
<thead>
<tr>
<th>Common Name/Belizean Name</th>
<th>Latin Name</th>
<th>Area Present</th>
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</thead>
<tbody>
<tr>
<td>Jaguar</td>
<td><em>Panthera Onca</em></td>
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<tr>
<td>Gibnut</td>
<td><em>Agouti Paca</em></td>
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<tr>
<td>Armadillo</td>
<td><em>Dasypus novemcinctus</em></td>
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</tr>
<tr>
<td>Wooly Opossum</td>
<td><em>Caluromys derbianus</em></td>
<td>1,2</td>
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<tr>
<td>Margay</td>
<td><em>Felis wiedii</em></td>
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<tr>
<td>“Wari”</td>
<td><em>Tayassu pecari</em></td>
<td>1,2</td>
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<tr>
<td>Collared peccary</td>
<td><em>Tayassu tajacu</em></td>
<td>1,2</td>
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<tr>
<td>Tapir</td>
<td><em>Tapirus bairdii</em></td>
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</tr>
<tr>
<td>Tayra</td>
<td><em>Eira barbara</em></td>
<td>1,2</td>
</tr>
<tr>
<td>Green Tree Snake</td>
<td><em>Scaphiodontophis annulatis</em></td>
<td>3</td>
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<tr>
<td>Fer-de-lance</td>
<td><em>Leptophis ahaetulla</em></td>
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<td>Black Howler Monkey</td>
<td><em>Bollitoglossa mexicana</em></td>
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<td><em>Alovalia Pigra</em></td>
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<td><em>Agnostomous monticola</em></td>
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## Appendix C

### Temperatures

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<td></td>
<td></td>
<td>74 F</td>
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<td>Base Camp 1</td>
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<td>Partway up Cone</td>
<td>73 F</td>
</tr>
<tr>
<td>11/18/96 Bedtime</td>
<td>Base Camp 1</td>
<td>73 F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>11/19/96 Wakeup</td>
<td>Base Camp 1</td>
<td>68 F</td>
</tr>
<tr>
<td>11/19/96 Lunch</td>
<td>Base Camp 2</td>
<td>74 F</td>
</tr>
<tr>
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<tr>
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</tr>
<tr>
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<td>Base Camp 1</td>
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<tr>
<td></td>
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