# Bird Team 2012

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The amount of life that exists in the rain forest is extraordinary.

About ⅔- ¾ of all the various species on earth exist in the tropics. And yet rain forests are losing about 50,000 species per year, due to habitat destruction from cattle farming, logging, etc.. The goal of the Forman Costa Rican Rain Forest Project is to spread knowledge about this horrendous catastrophe, and attempt to begin a wave of a change towards preserving the Rainforest. The purpose of the migratory bird team is to preserve the rainforest of Costa Rica through studying Neotropical migrants and other birds of Rara Avis and El Plastico.

In the past, this team has made much progress. The Bird Team was actually one of the first teams created with the Forman Rain forest Project in 1992. Students began to study the various species of birds, their nesting areas, and general information about the birds. However- they did not have a banding permit which greatly inhibited the growth and research of the team. After 1995, the team was disbanded. But in 1999, when the school was authorized with permits to band birds, a new revolution for the project began and it was brought out of retirement. Ever since, this project has flourished immensely, especially in 2000 with the arrival of Frank Gallo, a licensed bird-bander and leader of this project, giving it great direction. The goal of the project at this point was to catch migratory birds, and information flooded in, as the first team caught two migratory birds. From 2001-2004, the teams caught 4, 6, 3 and 2 migratory birds respectively. However, The total number of birds from 1999-2004 was 43, 45, 123, 98, 97 and 53 respectively. Now, the team usually catches about 25 species of birds consistently every year- though they are not all migratory. These birds range from the White ruffed Manakin, the Tawny-capped Euphonia and the Green Hermit to the Brown Violet Ear, Green-fronted Lancebill and the Spotted Woodcreeper. We do catch other birds such as the Black Throated Trogan or Royal Flycatcher. But we do not catch them every year. So overall, when this project was reborn, some significant numbers of birds were inventoried and progress had been formed.

Some great progress has formed in the various equipment we use in Rava Avis and El Plastico. For example, team designed a ‘bird hotel,’ a contraption that holds birds safely during the time for analysis, when we take basic measurements of the bird. Also, the team substituted metal telescoping poles for the old bamboo poles. The poles, which we used to catch the birds, are much more useful and supportive than bamboo supports. However, there have been some failures in the past- such as the canopy study, which was too difficult to perform due to dense plant life in the canopy and liability issues. But it is still clear that much progress has been made- our goal is to continue this progress, especially in the field of the migratory birds.

An isotope study was also something that began during 2005. Isotopes of carbon, hydrogen, and nitrogen can be identified in the feathers of the bird. The isotopes do not decay and the amount of various isotopes is all based on what the bird eats and the weather conditions the birds lives in. An example is deuterium, a stable isotope of hydrogen which occurs in water and enters plant tissues. Certain insects eat these plants which are then eaten by certain birds. Those isotopes will be reflected in the feathers of the birds. Various isotopes in a feather can indicate what the bird eats. We can trace birds’ diet to a certain area and certain weather conditions are indicated by certain isotopes- for example, if there is a large amount of deuterium, the bird lives where there is much water. The isotopes are identified through an experiment with a professor at Keene State College in New Hampshire. The feathers will be frozen with other various solutions and then burned. That chemical weight of what is then created is linked with a certain region usually in North America through the weight of the food source from that area. We then are able to use all of this information to create a flight pattern. This is a possible project that may be done in the future. However, it requires special permits that we have to obtain. So most likely this year, we will not be able to do this study.

The Migratory Birds Project main goal is to track migratory neo-tropical song birds. These birds spend nine months wintering in Costa Rica, and three months summering in the United States, where the nest and breed. It is thus extremely important to figure out exactly where these neo-tropical migrants go for those nine months. Our research is to determine if these birds go back to the exact same area every year. Past evidence indicates that this is the case for several species- we hope to further such data and evidence this year in our research. Conservation decisions need to be made with migratory songbirds in mind. The method used to track migratory birds is called banding; however, in order to band the birds we first need to catch them. Teams of the past have found a safe and effective way to capture them by using mist nets. Mist nets are made of nylon mesh and have loops at each end. Poles then go through the loops to keep the net properly suspended. Unlike many other nets, mist nets are loose and thus are ideal. The give of the net allows the birds landing to be cushioned. Since each net has several built-in pockets, the bird is able to land more softly and the chance of any harm being done dwindles. On top of this, the nets account for human error. If the trap is setup improperly, the birds will bounce off of the net. Since the project has began using mist nets, teams have found ways to stack nets. For example, the 2009 Migratory Birds team figured out how to stack four nine by three meter nets on top of each other, which allows future projects to catch birds that associate themselves with greater elevations.

Once the nets are set up, banding begins. The bird team carefully catches the birds, then records the data and bands them. Banding allows the Migratory Bird Project to understand where exactly migratory birds travel to and if they have any certain patterns. It is not only helpful to Rara Avis, but to the whole rain forest. If we can understand the birds behavior and migration patterns, we can further protect the rain forest under the Migratory Bird Act of 1916. This international treaty protects migratory birds from being killed, captured, sold or moved between states or countries. This includes eggs, nests, and feathers. Our project was given a banding permit in 1999, and since then the bird project has been able to band and help the advancement of bird research. Every band placed on a bird provides data, and each one carries an individual number that allow us to keep track of the birds. Banding birds is the Migratory Bird projects main goal as it does not harm the specimen, and is the most effective way to keep track of and help bird populations.

After many years of studying birds and how to band them, the project leader Frank Gallo and the 2006 team decided to further their research and began to observe hummingbirds. They set their focus on two hummingbirds native to Rara Avis, the Green-crowned Brilliant and the Violet Crowned Wood nymph. Recently we have added several other hummingbirds, such as White Necked Jacobin or the Rufus tailed Hummingbird. The goal of the hummingbird project is to see if hummingbirds prefer/distinguish between different levels of sugar concentrations. For the past 6 years, the Bird team has tried to control as many variables as possible. Each team has used six feeders except for the 2010 team which used two different sets of six feeders. They hypothesized it would allow for better results as they would be able to test the hummingbird's senses and figure out their motives for choosing feeders. As well as using the same amount of feeders, they used the same exact feeders. Sugar concentrations have not been changed either since the hummingbird project's conception. Teams of the past have found out that heavy rainfall causes hummingbirds to lessen and the amount of bees to grow. Unfortunately last year's team found out that if it doesn't rain at all, hummingbirds still don't show up.

We as a team have many goals this year. One of the new things that the 2011 rain forest team recommended, with the advice of Wendy Welshans and Megan Jones, is to create a racking system that hangs the birds as we process them instead of just laying them down. In Rara Avis, we used wood dowls and in El PLastico we used nails. This ensures their safety and overall health. The biggest idea that last year's team recommended we do is to "research the migrants more in-depth to understand their favored habitats...". Hopefully this will let us place the nets in places that would allow us to catch more birds, adding to the team's overall database. Also in past years, teams have attempted to get certain birds on footage such as the white collared (strepotoprocne zonaris) or the black swift

(Cypseloides niger). Using photographs of the birds in order to create a pamphlet for the public is another plausible idea that we can do while in Rara Avis and El Plastico. Or the teams have attempted to record bird sounds. However, in some years such as 2003, there was too much rainfall, and if the weather was too humid or wet, the equipment would fizzle, and we would not be able to hear the birds. Sometimes the teams will attempt to record the birds with an mp3 that hooks up to a Bionic booster amplifier that is similar to a satellite dish. This system allows for bird sounds up to one hundred yards away. It is very necessary that we bring a cover to attempt to protect the recorder from the rain, and possibly a bag full of rice, which is very useful should the equipment get wet. This entire project would be very important because the sounds of birds would cause much sympathy among the public. They did this with dolphins and whales, and it is quite possible that in doing this, the public will be sympathetic and have much desire to protect the rain forest. Also, by putting their pictures and sounds out in the world, we might be able to assist the economy of Costa Rica by creating some ecotourism in the country, which benefits the environment and the country in general. The general inventory of the birds is something we also need to focus on, looking at how the different elevations affect the distribution of different bird species. Overall, these are just some ideas that this year we can expand upon and add to the project.

As you can see, we have our work cut out for us. Our goals include meeting, and if not improving on the records of past teams. Banding, netting and hummingbirds included. If we have access to El Plastico like the 2011 team did, we will strive to find more helpful data and work towards strengthening the bird team.

Equipment:

- Green bags full of poles
- blues full of poles
- Parachute lines

- 1 bag of twine
- 1 bag of thread
- 10 red bags of nets
- 1 bag of bags
- white rope
- 1 roll of duck tape
- 1 roll of yellow tape
- one pair of nylons
- 1 bag of long ties
- 1 bag of shirt ties
- two bags of rubber-bands
- 1 connector cable!
- 1 bag of
- 1 scrub brush
- 1 bag of thread
- 1 guides of birds
- 20 geological bags
- 3 bird weighers
- bag of color tape
- scissors, tweezers, batteries, more connector cables
- another hug bag of nets
- Vintage 10X scope
- Bionic ear and headphones
- steel wire
- blue rope
- bag of gloves close-pin
- 3 roles of gift-wrap
- 16 hummingbird feeders
- bag of paper clips
- cameras

## Methods

The Migratory Bird project is one of the longest on going projects in the Forman School's rainforest Project, and because of that our methods have become more efficient and productive throughout the years.

Since the main goal of our project is to band Migratory birds, we first need to catch them. To do this, our team needs to use a system called mist nets. Every year the bird team heads to Costa Rica, we use at least 17-20 poles and about 20 nets. Mist nets are made up of two, eight-foot telescoping poles, a 36 foot-long net. Every set of poles requires its own bag in which to hold the net. To set the poles up, you must have a partner with you to make sure the delicate net does not fall to the ground. If it does, debris from the ground will attach itself to the net, causing an unnecessary amount of time to be spent cleaning the net. If not cleaned or set up properly, the nets will prove ineffective.When starting to set up the poles, one of the partners must stand still, lodging one pole in the ground and making sure the net is tight. The other partner needs to back up, slowly letting the net out until there is no more net left. It must be tense, and not drooping. Each section of the net should form a pocket at the bottom, where the birds will fall into safely.

Afterwords, the net needs to be unravelled and the poles need to be raised. There are four loops on each pole, three black and one white. For the net to function properly, the white loop must be on the top. Since the poles are telescoping, they have a locking function. The function is bypassed by squeezing a small lock near the top of the pole. Next, you can raise the pole to your desired height or put another pole on top of it, effectively creating stacks. Poles can be stacked up to three times, tripling the height and allowing us to catch birds that avoid flying low to the ground. To secure the poles in their final position, the Migratory bird team uses a small hammer to stake them into the ground. If the net gets damaged during our time in Costa Rica, we have the tools necessary to fix it. To move or put the nets away, you twirl the net into the pockets, making it into a somewhat manageable rope. To pack up the net, you pack up the net by holding onto the pole with one hand and grabbing and arms length of net in the other, pulling it close to you and keeping the net tight. It is important to not tangle the net during this process.

Once the birds are caught, we have to get them out of the net while keeping them calm. We have a song which helps us remember the correct order to take the bird out of the net, which is : Tail, Feet, Wings, Head (Now your bird will not be dead!) After we take them from the net, we need to keep them from hurting themselves or flying away. To do this, the Bird team uses bird bags. Bird bags are small bags that the specimens are able to breathe through safely. It helps keep them calm and at the same time we have assurance they can't escape. all the birds are identified by the team itself, uses resources such as the Costa Rican bird guide, and lists of previously captured birds in our area. Our sources are not just reliable, they tell us if we have found a new species as well. After the species has been identified we jot down the location we caught it at on a map. This map allows us to identify patterns and locations of birds. This year, we will possibly be adding to the list with a few new locations in El Plastico.

Once the birds are secure and their location is taken note of, the Migratory bird team examines each specimen. Weight is taken using bird scales, and we have several scales at our disposal including the 10 gram, 20 gram, 50 gram, 100 gram and 500 gram scales. The birds gender is also taken note of. Next, the wingspan of the bird is measured using calipers, or a ruler that displays how long the wings are. To do this, we hold the bird gently and spread out its wing, moving the knob on the caliper till the tip and end of the wind touch opposing sides of said ruler. Examining the wings also helps us to make an inference about their age. After completing the examination, our project then bands the birds using our banding tools. To keep track of the serial numbers, we have a list called the AB list. It is called the AB list because it is the initials of the person, Alice Boyle, who gave us our bands. Our bands differ in size, ranging from 1C, 0, 1, 1B, to 1A, respectively. The band size needed for the bird is located in the AB list. Once the birds are banded, we mark them with a thick pen.

Another important project that we will be continuing this year is our hummingbird project. This involves bringing fifteen hummingbird feeders which we package away beforehand. We also will need duct tape and pencils because we are going to label all of the hummingbird feeders separately- A, B, C, etc. This year we are not sure what to expect with this project. In Rara Avis and possibly El Plastico, we plan to put up our hummingbird feeders. The only problem is that in the past the feeders have been up essentially year round. This year however, the park officials have decided that they should not be providing the hummingbirds food year round. They believed that this was not a natural process, so they took the feeders down. They have agreed to let us put ours up for the time we are there, but this could possibly throw off the results because the hummingbirds are not used to using the feeders anymore. So for the first couple of days of having them up, the hummingbirds might not come to the feeders- or they could, or they might just not show up the entire time. The end result is that the results this year results could potentially be slightly off. The chart that we will use to catalogue or data for the hummingbirds is exemplified below as the first chart. The second chart is where we will document the weather that occurs because the weather controls what types of birds or hummingbirds will show up and how many hummingbirds show up- the hummingbirds like rain but not a lot of rain. Our hypothesis is that different species of hummingbirds would want different concentrations. We think factors such as body size and gender will play a part in which concentration a bird prefered. Also, hummingbirds will like some rain, but not when it is downpouring because it is too difficult to fly. We will essentially sit and watch, recording data on the below exemplified chart from all of the feeders which will have controlled variables such as height and sugar content- unless we find that there are a lot of hummingbirds, then we might vary the sugar content or another variable and thus extend the experiment. It is important to understand that we are not capturing the hummingbirds. We are just watching the feeders, writing down what specific feeder they are going to, and by the eye, determining their species and sex. This is the essential information we are getting out of this experiment.

An additional project that we plan to work on this year is trekking into the forest in order to find rare species of birds that have not been found, seen or caught in some amount of time. Our plan is to hike into the forest and play-back specific bird calls that are pre-recorded. This means we need to bring with us pre recorded bird calls, or a person who knows how to sing specific species' calls and songs. Those bird calls are extremely specific to one species of birds. With birds, their call is specific. Each species of bird has a specific songs and calls. According to ornithology.com, a call that a bird makes is "a brief sound of simple acoustic structure" and they cite examples of cheeps, chatters, squawks, etc. Their definition of a song is "a relatively long, often melodious, series of notes usually associated with some aspect of courtship". These calls and songs are used for reproductive purposes, to establish territories, to find mates, etc. We plan to most likely use both types of sounds to attract certain species of birds. Because when we play a specific call or song of a species, birds of that species will hear and respond. Most likely, only that species will respond, but if other birds respond, we will be able to figure out if they are the correct species based on the type of call they send back because again, each species has its own unique and specific call. By weeding out specific types of birds, we are able to find birds that have not been seen or heard of for years. Our goal in the migratory bird project is to find out whether certain birds come back to Costa Rica and live there that are endangered. With this part of the project, we will be able to locate or relocate birds such as Antpittas, Ant Thrushes, or any other, either difficult to see, rare species that are on the reserves bird list. And so by doing this, we find rare birds that have not been seen in years- endangered birds, which we want to protect. It is in this way that this part of our project furthers our mission.

Overall, these are the methods that we plant to use in order to accomplish our goals of categorizing migratory birds and continuing to make the process of catching birds more effective and accurate. We desire to help save the rainforest by finding reasons- endangered birds and their protected flyways-to help protect the rainforest.

These are the methods that we plan to use.

**Data/ Analysis**

**1. Trekking Project:**

This year, the bird team introduced a new sub-project into the research. The Trekking, or Antpitta Project showed a lot of potential, yet also a lot of areas that could use improvement. The first trial took place in El Plastico on the Levi trail. The Migratory bird team played six different type of bird calls (bird calls here) two times each at several locations on the trail. We would play the call, then listen for several minutes and repeat. The six birds that we played were the Streak-chested Antpitta, Ochre-breasted Antpitta, Scaled Antpitta, Black-crowned Antpitta ,Thicket Antpitta, and the White-lored Antpitta.

We recorded the location on GPS whether we received a response to our recordings or not. We also recorded the location of any antpittas we heard at random while hiking the trails. At our second location, the intersection between Levi and Atradercer, we heard a potential antpitta call. However, it was unable to be properly identified. The other four trials on Levi yielded no results. The second trial took place on the hike up to Rara Avis on the Atajo trail. Once again, we played six different species of antpittas, two times each, at several locations. The weather conditions were more favorable; Sunny and warm. On the 3rd stop, after playing several calls, we positively I.D. an antpitta, the Thicket Antpitta, and we were able to call it closer. Once again, only one of the locations showed results. However, it is still progress. Since it was the first time we tried this experiment, we were bound to find areas that could use improvement. For example, it rained incredibly hard, and we were unable to properly protect our gear OR hear the birds. In the end we had to cut leaves to create a makeshift umbrella. Plus, the GPS used batteries extremely fast. It was impossible to change the batteries without somehow getting the GPS wet, which would damage it. So we only took coordinates at one or two of our stops.

Instead, we marked the trail by taking off bark from a tree or putting a plastic bag on the ground.

The 2012 team suggests that any future teams doing this project bring the following: An umbrella, loud speakers, and a bionic ear to hear the birds more clearly once you get a positive return-call. Also, try and go on several different trails instead of Atajo and Levi.

## 2. Hummingbird Project

This year, the hummingbird project was done in two locations, El Plastico and Rara Avis. Our team hypothesized that different species of hummingbirds would want different concentrations. We thought factors such as body size and gender would play a part in which concentration a bird prefered. Once again, the same solutions were used. Starting at zero grams of sugar, each solution increased by 25 gram increments all the way up to 125 grams. This gave us a total of 6 feeders to use. In El Plastico, our feeders were set up on the second day. The first location used was behind the schoolhouse, next to the river. After several trials, no hummingbirds came to the feeders. On the next day, we moved the feeders in front of the dining area, so as to be more visible to the hummers. Once again, no hummingbirds came to the feeders. Since no hummingbirds came to ANY of the feeders, our team thought that the hummingbirds did not have enough time to recognize the feeders as a source of food. If possible, next years' team should have the feeders set up several weeks before arriving in el plastico.

In Rara Avis, we took data for 5 hummingbirds. The female violet crowned woodnymph, which can be seen in this picture, is the most common hummingbird in Rara Avis. Another hummingbird we took data on was the female green crowned brilliant. We did not get any male green crowned brilliants, but the females are larger than both the male and female violet crowned woodnymph. We also got data on the White Necked Jacobin, the Bronze Tailed Plumeleteer and the Rufous Tailed Hummingbird, but it is extremely hard to tell the difference between male and females.

Our hypothesis was close. This first graph represents the results for violet crowned woodnymphs.

As you can see, female violet crowned woodnymphs have a preference towards the 75% concentration, which is consistent with previous years data. This year the males prefered the 125% concentration, compared to 2010 where both males and females preferred the 75% concentration. However, we did not have many data points for males, so this year's results are inconclusive.

On sunny warm days, both male and female violet crowned woodnymphs choose 75% solution. But on rainy days, there is a dramatic increase in their preference for higher concentration of sugar. We believe that this makes sense because when it rains and the temperature drops, the hummingbirds have a higher need for energy.

For the 2010 Green Crowned Brilliant data, males prefered 50% concentration while females prefer 75% concentration. In 2012, the female green crowned brilliants' food preferences were nearly identical to the 2010 data. The data for 100% concentration is slightly different, but otherwise the graphs are the same. However, no males visited our feeders in 2012, so we have no data points.

In this graph, you see the food preference in response to weather for the green crowned brilliants' in 2010.

As you can see here, when it rains, male's preference for a higher concentrations of sugar goes down. In contrast, females preference for a higher concentration of sugar goes up. We believe that this means that in general males have a lower energy need than females, and have a different strategy for dealing with cold temperatures and the rain. Males can sit quietly and do nothing when it rains, but Females need more energy to attend to nestlings and to continue to produce eggs.

As you can see in 2012, our results are similar and show that the energy needs of females increased with lower temperatures and rain.

For the first time, we were to able to collect data on three other species of hummingbirds: The white necked Jacobin, the Red foot plumeleteer, and the rufous tailed hummingbird. The Jacobin and the Plumeleteer showed preference for the 125% concentration. Interestingly, the Rufous tailed showed little preference, and went to any feeder that was 50% concentration or above.

The three birds have different feeding strategies .For example, the Jacobin would spend long periods of time at one feeder. While the Plumeleteer would come back to the same feeder over and over again over long periods of time. The Rufous tailed would dart around to all of the different feeders, not showing a preference to any specific one. In conclusion, this year we were able to get some very interesting data through our hummingbird experiment.

**3. Bird Inventory/ Banding Project**

Our processing of the birds went well this year. At first, it was a little difficult figuring our the simple things- such as holding a bird. But once the basics were down, we figured out how to get the bird out of the net, measure wing chord, weigh the bird, figure out the identity of the bird, sex, age, and if it was a migrant or not. An example of one of our data sheets where we recorded all of our data can be seen here

This specific data sheet is extremely important because it contains all of our information about migrants. We collect extra information on migrants. For example, we look to see if migrants have fatty deposits. As they get ready to migrate back to America, migrants will gain fat deposits on their neck in order to save energy for their flight. When rating how much fat deposits the migrants have, we can basically keep track of when the migrants are getting ready to fly back. It is extremely important to keep track of this cycle. If migrants begin to fly back at a different time, it is evidence that something is changing the temperature of the area and is disturbing the area. Global Climate Change could be a caught of the birds flying back later and later for example. It was thus that the processing of the birds was extremely important. With Migrants, we also looked at the varying degrees of the shape of the migrants' feathers, different shapes in their plumage, parasites, etc. This process can be time consuming, but this information is extremely important in figuring out the identification and health of the bird.

At the end of each night, the team would sit down and catalogue all of the various birds we had caught and seen during day. So, during any free time that we had during the day, when it was drizzling too much to attract birds or there was a slow period, we would go bird watching. We walked around attempting to identify any birds. From our bird list, we can see what species are extremely common- for example, a scarlet rumped tanager- or those that are uncommon, such as the Black-Throated Trogan.

This information is extremely important at El Plastico because our team has never taken a species inventory of the area. The team has only gone to El Plastico twice now, so the seventeen birds that we caught, including the Tropical Pewee which is a bird that the team has not seen before, is going to be extremely important for future teams. Doing a species inventory of El Plastico is not only interesting, because we can compare it to Rara Avis and see how two areas of rainforest can be so different even though they are only miles apart, but it is also extremely important in making better conservation decisions about El Plastico. The goal of our project is to find reasons to preserve and protect the areas that we are studying. By finding important species such as migrants in an area, we strive to prove that migrants come back specifically to El Plastico every year. We did find a migrant in El Plastico this year. Thus our data is extremely important as a baseline data for future years to come.

Our data in Rara Avis is a continuation from the past years data. We ended up catching 104 total birds, which contained 42 total species of birds. However, we saw many more species in the area that we did not catch. This not only shows us that there is an extremely large amount of biodiversity in Rara Avis, but that the ecosystem is much more complex than we thought. But such information is important in understanding the ecosystem of Rara Avis, and in making conservation decisions concerning the area. We ended up catching 8 total migrants on our project. This is the most amount of migrants that the bird team has ever caught, the previous record being seven migrants from 2011. One of the birds that we caught this year, the Swainson's Thrush, was actually a recapture. This represents what our project is completely about. We caught this bird for the first time in 2010, and recaptured it in the exact same net, on almost exactly the same day. This proves that each year, migratory birds come back to the exact same spot every year.  If we were to cut down an area of the rainforest, the habitual ritual that the birds go through would be disturbed. So under the Migratory Bird of 1913, 1916 and 1929, any habitats that are under federal protection that migratory birds go to every year cannot be disturbed.  This is what we need to keep in mind when making conservation decisions.

We caught birds this year that the team has not caught before or is only our second time catching them, such as both a male and female Black Throated Trogan or the Royal Flycatcher, which has whiskers that it uses to catch insects, and a giant crest on the top of its head, which it uses to warn off predators. Another interesting or hard to see birds that we saw were Mealy Parrots, which is a large and green bird that is one of the largest parrots in Central or South America, and is an Amazon parrot.The keel billed toucan was was one of our absolute favorites that we saw. It was one of the four types of toucans that could be seen in Costa Rica, three of which we saw on our trip. One member of our team saw the Umbrella Bird, which is hard to do. But the bird looks extremely interesting because the feathers on the top of its head flops over and covers its eyes, sort of like an umbrella. The common paraque was a bird that we heard a lot of in El Plastico, and caught in Rara Avis. We could hear this bird as late as 2am in El Plastico.This was because apparently, there were two males that were having a territorial dispute while we were there. One bird that has a call that is equally loud and interesting as the common paraque is the a broad billed motmot. We did not catch it, but we saw it right next to our research station. It was easy to find because it sounds like a train whistle. Some other birds that we enjoyed seeing were the orange billed sparrow, the emerald tanager, and the green honeycreeper.

As a side note, another research team was working in Rara Avis the same time as us, studying White Ruffed Manakin and their mating ritual that the males do to attract the females attention. Whenever we caught any white ruffed manakins, we banded them using her colored tags. We also shared our data. This was just another aspect of banding birds of Rara Avis- though they were not neo-tropical migrants.

We have various recommendations for next years team. First of all, make sure that Frank gives you a specific "how to identify birds" class or two before you go. In it, he will teach you things such as the basic parts of the bird, how to identify if a bird eats fruit versus seeds, how to use binoculars, etc. Also, makes sure he gives you a list of the top twenty birds or so, and make sure that he quizzes you on them before you go to Costa Rica. This may seem annoying, but it will help you immensely. Some other advice is to bring lots of tall or socceer socks, be prepared to work hard, be prepared to not talk to your family, and be prepared to be in uncomfortable situations. Shower in the morning in Rara Avis, this is because the water will occasionally be the perfect temperature at this time. With bird team specifically, make sure that you have extra batteries and an umbrella when going on any Antpitta walk, and do not get frustrated when it comes to taking birds out of the net. In Conclusion, this project was extremely successful this year. Not only did we catch the most amount of migrants ever caught in the twelve years that this project has occured, but we caught 104 total birds, which is the third most amount of birds ever caught by this project. Overall we were able to collect much data that we can use to try and cause better conservation decisions. We would like to send a special thanks out to Frank Gallo, we taught us a lot about not only birds but about life in general. We would also like to thank everyone else who made our journey possible. On the following pages, we have an example of our hummingbird data sheet as a reference, and our weather data sheet, which we used to catalouge the weather. We used that information to see what kind of weather the birds were most likely to fly in. We hope next year's' team is able to take what we told them, and continue to grow and expand the bird project.

Works Cited

http://www.ornithology.com/Lectures/SongsandCalls.html

Wikimedia Commons

http://www.britannica.com/EBchecked/topic/27127/antbird

Past Migratory Bird Team Papers

Frank Gallo

Birds of Costa Rica written by Richard Garrigues and Robert Dean

**Example of Humming Bird Sheet:**

**Hummingbird Feeder Observations** Temp:_______

Species:______________________ Date:_______ Start Time:____

| | | | | | | | <----Concentration |
|---|---|---|---|---|---|---|---|
| Sex | A | B | C | D | E | F | Comments |
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Weather: End Time:

## Example of Weather Sheet

Weather Chart:

| Day | Rainy Day (Observations) | Non- Rainy Day (Observations) |
|---|---|---|
| March 2nd | | |

| | | |
|---|---|---|
| March 3rd | | |
| March 4th | | |
| March 5th | | |
| March 6th | | |
| March 7th | | |
| March 8th | | |
| March 9th | | |
| March 10tha | | |
| March 11th | | |
| March 12th | | |
| March 13th | | |
| March 14th | | |
| March 15th | | |