ABSTRACT

THE WILD BIRD CENTER EXPERIENCE: USING BUSINESS AS A CONDUIT FOR ENVIRONMENTAL CONSCIOUSNESS

By Nicole Lee Lewis

This paper details my experiences and activities at the Wild Bird Center (WBC) in Mason, Ohio from August 2007 through April 2008. During my first six months at the WBC I served as the staff Environmental Scientist and Store Manager. The purpose of this report is to summarize the contributions I made to the WBC as well as the impacts this position provided to my previous training in the environmental science field.
THE WILD BIRD CENTER EXPERIENCE:
USING BUSINESS AS A CONDUET FOR ENVIRONMENTAL CONSCIOUSNESS

An Internship Report

Submitted to the
Faculty of Miami University
in partial fulfillment of
the requirements for the degree of
Masters of Environmental Science
by
Nicole Lee Lewis
Miami University
Oxford, Ohio
2009

Advisor__________________________
(Steve Elliott)

Reader__________________________
(Donna McCollum)

Reader__________________________
(David Russell)
Table of Contents

List of Tables ........................................................................................................................................ iv
List of Figures ......................................................................................................................................... v
List of Appendices .............................................................................................................................. vi

1.0 Introduction .................................................................................................................................. 1
2.0 Learning and Growing .................................................................................................................. 2
  2.1 Responsibilities .......................................................................................................................... 2
  2.2 Birding Products ......................................................................................................................... 4
    2.2.1 Bird Feeder Basics ................................................................................................................ 4
    2.2.2 Bird House Basics ................................................................................................................. 5
  2.3 Presentations ............................................................................................................................... 7
    2.3.1 Out-of-Store Presentations ................................................................................................ 7
    2.3.2 In-Store Presentations ......................................................................................................... 12
    2.3.3 Newsletters ......................................................................................................................... 13
  2.4 Eco-friendly Concepts ................................................................................................................. 13

3.0 Impacts of Internship ................................................................................................................... 15
  3.1 Impacts of Presentations on Sales ............................................................................................. 16
  3.2 Impact of Mailings ....................................................................................................................... 17
  3.3 Other Advertising ....................................................................................................................... 18

4.0 The Future .................................................................................................................................... 19
  4.1 Changes ...................................................................................................................................... 20
  4.2 Contributions .............................................................................................................................. 21

5.0 References ................................................................................................................................... 23

Appendix A: Benchmark Reports ......................................................................................................... 25
  Spreadsheet 1: Monthly Benchmark Tracking .............................................................................. 26
  Spreadsheet 2: Weekly Cumulative Sales and Customer Summary Spreadsheet .................. 27
  Spreadsheet 3: Monthly Inventory Budgeting ............................................................................... 28
  Spreadsheet 4: Number of Transactions ....................................................................................... 31

Appendix B: Birding Products ............................................................................................................. 32
  Figure 1: Two vs. four sided hopper feeder .................................................................................... 33
  Figure 2: Tube feeder ....................................................................................................................... 33
  Figure 3: Basic suet cage ................................................................................................................ 34
  Figure 4: Split peanut feeder .......................................................................................................... 34
  Figure 5: Platform feeder ................................................................................................................ 35
  Figure 6: Hummingbird feeder ....................................................................................................... 35
  Figure 7: Goldfinch feeder .............................................................................................................. 35
  Figure 8: Sanctuary bluebird feeder ............................................................................................... 36
  Figure 9: Nectar oriole feeder ........................................................................................................ 36
  Figure 10: Easy cleaning access .................................................................................................... 36
  Figure 11: Hopper feeder with removable wire bottom tray ............................................................ 37
  Figure 12: Ant mote ........................................................................................................................ 37
  Figure 13: Nectar guard tip ............................................................................................................. 37
  Figure 14: Nesting box .................................................................................................................... 38
List of Tables

Table 1  Out-of-Store Presentation Schedule
Table 2  Bird House Measurement Requirements
Table 3  In-Store Presentation Schedule
Table 4  Sales by Department August 2007-April 2008
Table 5  Lecture Coupon Return Rates
Table 6  Customers New and Returned
Table 7  Sales November 2006-April 2007 vs. November 2007-April 2008
Table 8  Emails Sent and Received
Table 9  Marketing Expenses
List of Figures

Figure 1  Hopper feeders, two vs. four sided
Figure 2  Tube feeder
Figure 3  Basic suet cage
Figure 4  Split peanut feeder
Figure 5  Platform feeder
Figure 6  Hummingbird feeder
Figure 7  Goldfinch feeder
Figure 8  Bluebird feeder
Figure 9  Oriole feeder
Figure 10 Easy cleaning removable bottom
Figure 11 Hopper feeder with removable wire bottom tray
Figure 12 Ant Mote
Figure 13 Nectar Guard Tip
Figure 14 Nesting Box
Figure 15 Roosting Box
Figure 16 Birdhouse with easy open side for cleaning
Figure 17 Protective metal plates on birdhouse entrance
Figure 18 Arm Predator Guard
Figure 19 Black-footed Penguin (Spheniscus demersus)
Figure 20 Parrot
Figure 21 Kookaburra (Halcyonidae dacelo)
Figure 22 Rhinoceros Hornbill (Buceros rhinoceros)
Figure 23 Spectacled Owl (Pulsatrix perspicillat)
Figure 24 Harris Hawk (Parabuteo unicinctus)
Figure 25 Stellar’s Sea Eagle (Haliaeetus pelagicus)
Figure 26 Lanner Falcon (Falco biarmicus)
Figure 27 Presentation coupon
List of Appendices

Appendix A  Benchmarking Reports
Appendix B  Birding Products
Appendix C  Newsletters
Appendix D  PowerPoint Presentations
Appendix E  In-store Presentations
Appendix F  Tables
1.0 Introduction

I performed my internship at the Wild Bird Center (WBC) of Mason, Ohio from August 2007 to April 2008. The WBC is a nationwide franchise store that aims to be the “neighborhood store with the widest range of quality birding products, great customer service, and birding knowledge” to help customers enjoy their backyard to the fullest (Wild Bird Center, 2007). Their leadership and involvement in bird conservation and nature preservation in local communities make the WBC a wonderful and unique resource. The first WBC opened in 1985 and since then the franchise has grown to include 85 stores serving communities across the United States and Canada.

WBC’s offer a complete line of birding products, including seed, suet, feeders, baths, houses, books, mounting hardware, and garden accessories. Whether customers are looking for unique bird houses or require materials to set up their own customized backyard feeding station, the WBC has what they need. Each store has a variety of exciting nature-oriented gifts for any occasion, including a variety of unique local products, hand-picked by the store owner. In addition, most stores provide a regular series of bird walks, demonstrations, children's programs, seminars and educational events.

During the course of this internship I learned a lot and grew not only as a retail manager but also as an environmental scientist. My day-to-day responsibilities and public outreach presentations improved my knowledge of ornithology, birding products, and incorporating eco-friendly concepts into a business. I was able to see the impact my internship had on the WBC through the response to mailings and public outreach presentations. Finally I was able to make some recommendations on changes and improvements that would benefit the store long term.
2.0 Learning and Growing

At the start of this internship I knew a limited amount about birds and birding products. I also had limited knowledge on how to manage a retail store. I found that being a store manager is really just being open to change and allowing oneself to learn something new every day. Throughout the course of my internship I learned more than I ever thought I would; a lot about management and even more about birds and birding products.

2.1 Responsibilities

My roles at the WBC were Store Manager and Environmental Scientist. I was in charge of a variety of tasks, all of which taught me a variety of lessons about business and incorporating environmental benefits into a retail venue. In the role of Store Manager I was in charge of overseeing bookkeeping organization, maintenance, and reconciliation of the books with the bank as well as with vendors while maintaining daily, weekly, monthly, and annual benchmarking reports. A benchmark report establishes a point of reference against which future values can be measured, allowing comparison of sales from month-to-month or year-to-year. Maintaining the benchmarking reports helped me improve my math and problem solving skills (Appendix A). My problem solving skills helped in this area by allowing me to discover reasons and create solutions for financial problems.

Prior to my arrival the WBC had done very little bookkeeping, other than keeping daily records. It was my job to balance the current books as well as the books for the previous eight months. This reinforced how important it is to stay current on records and showed me the value of checks and balances, so that problems can be found and addressed immediately. I developed a variety of measures to help catch and fix mistakes as they were made, rather than tracking down errors from months before when the books did not balance.

As manager I was responsible for maintaining awareness of market trends in the retail industry, understanding forthcoming customer initiatives, monitoring what local competitors were doing, managing stock levels, and making key decisions about stock control. This knowledge was a great help in planning ahead for sale events and in selecting new products. Understanding the price ranges of products in a sales market and what products competitors have helps with setting
prices and selecting new items to carry in the store. This helped the WBC stay competitive by keeping prices in the same range as competitors.

As manager I also organized special promotions, displays and events, updated colleagues on business performance, and prepared and implemented annual programming schedules. Annual programming schedules included promotional activities, planned advertisements, seasonal promotions, and a variety of other seasonal activities in which the store participates. This helped me improve my time management skills because I had to plan events a year in advance and coordinate with a variety of individuals and organizations. This position also improved my communication skills because I had to keep various people up to date on a range of issues, such as the store owner on the store activities and vendors on ordering. My position also allowed me to use software programs that I was previously unfamiliar with, such as QuickBooks (used to keep track of store income, bills, payments to vendors, employee paychecks, and more), helping me expand my computer skills.

In the role of Environmental Scientist I was responsible for several major activities. One activity was consulting with customers, the general public, and media on general questions about conservation and nature. In order to do this I had to maintain a general knowledge about birding, backyard nature, environmental trends, and local nature interests. I also was responsible for developing and presenting educational programming for local schools, scout troops, garden clubs, etc. as well as networking with local conservation organizations such as Audubon Society, Sierra Club, Cincinnati Birding, No Child Left Inside, and the Cincinnati Nature Center (Table 1). Presentation topics and customer questions were always changing, requiring me to constantly expand my knowledge of birds and bird related issues. This also helped improve my comfort level with public speaking which allowed me to present the material more effectively. I became more aware of the challenges of tailoring information and activities to different groups, whether the variation was in group size, age, or gender. Also, it helped me learn to think on my feet, by requiring me to answer the bizarre and random questions that usually followed presentations.

As WBC’s Environmental Scientist I was responsible for drafting a monthly newsletter and maintaining the WBC website on backyard nature issues and seasonal tips for identifying and benefiting wildlife. Creating the newsletters allowed me to improve my computer skills by using
several software programs that I was previously unfamiliar with, such as Microsoft Publisher and Constant Contact (an internet program used for the newsletter delivery).

Overall I learned how challenging it can be to run a retail store. I believe this position made me stronger as both an environmental scientist and a business person.

2.2 Birding Products

Many factors must be considered in order to educate store patrons and presentation attendees about the benefits of different feeders and houses, such as the materials a product is made of and the ease of product cleaning. My responsibilities included being up-to-date on the different types of products available and having a comprehensive knowledge of each one’s environmental and ornithological advantages and disadvantages (Appendix B).

2.2.1 Bird Feeder Basics

Bird feeders come in a wide variety of shapes and sizes; however, there are only two main feeder groups, generalized feeders and specialty feeders. Generalized feeders feed multiple species at once and include styles such as hopper, tube, suet, peanut, and platform feeders (Figure 1-5). Specialty feeders typically target a single species, usually by offering a specific type of food that only appeals to the targeted species or by structural features that limit what birds can feed from the feeder. The most common specialty feeders are for hummingbirds, finches, bluebirds, and orioles (Figure 6-9).

Both generalized and specialized feeders have features that are important to consider. One feature is the ease of cleaning. If feeders are not cleaned properly it increases the chances of making birds ill or spreading existing avian diseases such as Aspergillosis, which is a mold that can form on old or damp seed, resulting in weight loss and breathing trouble (Sterba, 2002). The ability to clean the feeder is based on how easy it is to remove wet or contaminated seed and other contaminants like feathers and fecal matter. The easier it is to access these contaminants the more likely they are to be completely removed from the feeder. Features such as removable bottoms (Figure 10) and drainage trays help owners with feeder cleanliness (Figure 11). If the feeders do not have these features then the only way to clean them is with a bottle brush from the top and the longer the feeder, the more difficult it can be to achieve adequate levels of cleanliness.
Another important feature for customers is product durability. There are three common construction materials used in feeders, wood, plastic, and metal. Wooden feeders tend to hold moisture, particularly during rain events, potentially promoting mold. Also, wooden feeders rot, chip and fade, which substantially decreases their useful life. Plastic and metal feeders, provided they have adequate drainage, are great because as soon as the rain event ends these feeders can quickly dry and do not retain moisture.

Considering the health impact of a product on the birds is also important. Nearly all the products carried by the WBC are ornithologically beneficial; however, some products require extra features to provide the most benefit. For example, hummingbird feeders (Figure 6), which are bottle or dish style feeders that provide a nectar solution for the hummingbirds, have several features to protect the sugar based nectar from insects. Some of the feeders offered by WBC include built-in insect guards and some feeders need to have insect guards added. Insect guards can include several different devices, typically meant to deter ants, bees, and wasps. Ant motes and nectar guard tips are the most common insect repellants. Ant motes, small dish-like feature filled with water or ground cinnamon that hummingbird feeders hang from, are used to prevent ants from getting to the nectar (Figure 12). Wasp and bee deterrents include using nectar guard tips, which are flexible membranes that attach to the end of the feeding tubes making it very difficult for insects to access the nectar (Figure 13). If insects can reach the nectar they can contaminate it and the humming birds will stop feeding.

2.2.2 Bird House Basics

Birds make their homes in a variety of locations, such as in trees or shrubs, or even on the ground, so not all birds will use bird houses. Only cavity-nesting birds that would naturally nest in chambers, typically inside a hollow in a tree, will use a bird house. There are two types of cavity nesters, primary and secondary. Primary cavity nesters include birds like woodpeckers and kingfishers, which are capable of excavating their own cavities. Secondary cavity nesters include birds like the Eastern Bluebird and House Sparrow, which can only use established excavations, sometimes using cavities from previous years and sometimes chasing out the primary cavity nester. Human-provided bird houses are also used by secondary cavity nesters. The term “bird house” typically includes both nesting boxes and roosting boxes. Nesting boxes are used by cavity nesters to lay eggs and rear young (Figure 14). The bird entry hole is at the
top of the box to prevent nestlings from falling out of the box. Roosting boxes are only intended to provide shelter from severe weather for cavity-nesting birds (Figure 15). The size of the opening on the house and its dimensions determine the types of cavity-nesters that can use the house (Table 2). Larger openings accommodate larger birds and smaller openings prevent larger birds access.

Roosting boxes are a critical component of a backyard habitat because they provide protection for birds during storm events. Birds are endothermic and use a lot of energy to keep warm, which they do by fluffing their feathers and shivering. In cold weather songbirds eat almost constantly during daylight hours in order to sustain their energy. If birds can use a roosting box they can conserve energy by reducing heat loss and have a higher chance of survival.

There are two basic types of nesting boxes, those that are functional and those that are mainly decorative. In order to be considered functional versus strictly decorative, the nesting box must be ornithologically sound. This means that it must have proper drainage, ventilation, cleaning access, and protection against predators.

Having good drainage and ventilation in a nesting box is important. Drainage features are used to keep water from accumulating in the bottom of the house as well as to allow wastes to drain away. Ventilation is important in order to keep the house from getting too warm inside, which can have adverse effects on the eggs and nestlings. Features like ventilation and drainage are essential with nesting boxes but are not important in roosting boxes, mainly because these features make it more difficult to hold the heat in the roosting box.

Another key feature is how easily the house is cleaned. Houses need to be cleaned at least twice a year, once after nesting season and again after winter roosting. This prevents the buildup of debris and waste in the house, which can spread disease. Usually houses have one side that opens or a hole to allow for cleaning (Figure 16).

Protection against predators is another important issue. Perches are an issue of concern because birds typically do not use perches on a house, but predators do. For example, raccoons have been known to use the perch as a handle to reach inside the box and take the baby or adult birds. In addition to eliminating perches, protective devices such as plates and arms can be used to help protect houses against predators. Metal plates placed over the hole keep predators from scratching and making the opening on the house bigger (Figure 17). Plastic arms also can be
placed over the opening to make it harder for animals to reach inside, requiring them to have a much longer arm in order to access the house inhabitants (Figure 18).

2.3 Presentations

Throughout the course of my internship I learned a lot about birds and birding products and worked to share that knowledge with our customers and community. The WBC emphasizes public outreach as a way to draw customers into the store and increase interest in backyard wildlife. As part of public outreach the WBC staff arranges presentations in the store as well as in the community, some of these presentations are made by in house staff, other are provided by outside experts (Table 1 and Table 3). In addition, an in-house monthly educational newsletter is distributed to the community (Appendix C).

2.3.1 Out-of-Store Presentations

The most frequent type of public outreach performed by WBC is out-of-store presentations. The WBC makes a variety of educational activities available to any group that is interested. Past presentations have been given to K-12 schools, scout groups, garden clubs, churches, and senior centers, as well as many others. The content of the presentation was decided upon based on the needs or demographic of the group.

As a WBC staff member I created and presented a variety of lectures to community groups. Some lectures were designed specifically for an organization, while some lectures were used multiple times for different groups. The most common presentations that I wrote and presented included ‘Backyard Critters and Recycling’, ‘Birds, Bugs, and Butterflies’, ‘Parasitic Birds’ ‘Birds of the Rainbow’, ‘Kids Wonderful World of Birds’, ‘Life Emerging’, and ‘Wonderful Birds of Winter’ (Appendix D).

The most frequently requested offsite presentation topic was “Backyard Critters and Recycling” (Presentation 1). This presentation was given to local Cub Scout, Boy Scout and Girl Scout groups who were working towards their conservation badges. This lecture was focused on getting the children to look more closely at their surrounding environments in order to help them better understand how they impact the planet. They were taught how they can learn about the environment simply by watching and the impacts, such as extinction, that can happen when steps are not taken to understand the environment. We also talked to the children about some of the
actions they can take to live in a more environmentally friendly manner and went into depth on the recycling process.

We discussed how to learn about animals and environments just by observing them, using birds as an example. The students learned that the shape of a bird’s beak and feet indicates what the bird eats and where it lives. For example, birds with thick short bills, such as a Northern Cardinal or American Goldfinch, are typically seed eaters because the wide base of the bill gives them the strength they need to crack seeds open. In contrast, bills with sharp points at the end, like on a Bald Eagle or Shoebill Stork, are typical of meat eaters, as the sharp point is used to stab live prey. Similarly, a bird’s feet indicate where it lives. For example birds that have a webbed foot, like a Mallard Duck, typically live in/near water and birds that have two toes facing forward and two toes facing backward, like woodpeckers, are usually found climbing the sides of trees.

Instructors also discussed conservation officers, their jobs, and the importance of these people to our local environments. Issues of extinction and endangerment, as well as actions the students could take to make a difference, were also discussed. We talked about issues facing endangered animals like the Black Rhino, Three-toed sloth, Steller’s sea lion, and the Chimpanzee as well as other and how there are 1,200 endangered species of birds (out of 10,000 identified bird species). Extinction and mass extinction were explained, as were some of the causes, like habitat alteration, exploitation and introduction of exotic species, including discussions of extinct animals like the Archelon, Dodo, Saber-tooth tiger, Giant Ground Sloth and others.

We discussed actions the children could take to affect environmental issues like plant a tree, create a compost pile, buy products made from recycled materials, and use cloth grocery bags. Recycling was discussed in depth, breaking down recyclables into paper, plastic, glass, and metal. The children were taught about where these items come from, the process it takes to get them to the store shelf, and what happens once they are collected from the recycling bin. For example, glass is made from sand, soda ash, and limestone. Once a glass jar is collected it gets transported to the recycling facility, then all colors are separated, the glass is melted down then shaped into new jars. We also discussed the benefits of recycling each material, for example making a jar from recycled glass takes 50% less energy than making a jar from virgin materials.
and it generates 20% less air pollution and 50% less water pollution (USEPA, 2008). The scouting groups also built bird houses that they donated to local schools and parks.

Another lecture topic covered several times was “Birds, Bugs, and Butterflies” (Presentation 2). The goal of this presentation was to get the attendants to think about how all of the creatures in their backyard, big and small, play an important role in the environment. For this lecture instructors covered the most common birds, bugs and butterflies in Ohio and ways to attract them. Since this topic was selected mainly by gardening clubs, most of the information provided was related to how birds and insects can improve the health of a garden. We introduced some different native plants that can be used to attract beneficial species. We emphasized how birds, bugs and butterflies are an important component of the ecological system for a variety of reasons, such as the role they play in pollination, cleaning up and recycling plant and animal materials, and natural pest control. The bird section of the program included information on the features that make birds unique including feathers, hollow bones that function as part of the respiratory system, a four-chambered heart, specialized muscles such as those that allow a backwards bending knee, a crop used to store food, and a gizzard used to help digest foods. We also discussed background information on common birds of Ohio such as the Downy Woodpecker, Northern Cardinal, American Goldfinch, Blue Jay, Tufted Titmouse, Dark-eyed Junco, Carolina Chickadee, Eastern Bluebird, European Starling, and Common Grackle.

For the insects section of the program instructors discussed the difference between predators and parasites and their role in ecosystems, a variety of tips to maintain beneficial insects in the garden (e.g., don’t use chemicals, provide water sources, leave some leaf litter, and increase landscape diversity), and background information on common insects in Ohio (including Praying Mantis, Lady Beetles, Green Lacewing, Fireflies, Assassin Bugs, and Parasitic Wasps). The butterfly section of the presentation included information on the metamorphosis of a butterfly (egg, larva, pupa, and adult) and the way to tell the difference between a moth and a butterfly, including the following:

- Most butterflies fly during the day and moths fly at night;
- Butterflies typically rest with their wings held upright over their body, while moths rest with their wings spread flat;
- Moths fly in a jerky pattern and butterflies are usually more graceful;
• Most butterflies have knobs at the ends of their antenna and moths do not; and
• Butterflies have slender bodies and moths have plump bodies.

Background information was discussed for some of the common butterfly species in Ohio, such as Monarch, Eastern Tailed Blue, Cabbage White, Black Swallowtail, Clouded Sulfur, and Spicebush Swallowtail. Also, the plants that attract butterflies and how caterpillars can require different plants then the adult butterfly of the same species were discussed.

Another presentation, “Parasitic Birds”, contained information about the differences between obligate and non-obligate brood parasites and intra-specific and inter-specific parasitism (Presentation 3). This presentation was aimed at educating people on an aspect of bird behavior with which they may not have previously been familiar. The impacts on the host mother and the benefits for the parasitic mother were discussed, as well as the impacts on the host and parasitic young. The parasitic mother and young often possess genetic adaptations to help them overcome defenses of the host mother and young. For example, the Common Cuckoo, or European Cuckoo, is one of the world’s most common parasitic birds. The cuckoo’s eggs have evolved to closely mimic the eggs of the host bird, whose eggs are often removed by the cuckoo. The mimicry can be so good that the difference between host eggs and parasitic eggs can only be determined using genetic markers. The host may recognize the intruding egg and abandon the nest, or it may incubate and hatch the cuckoo egg. Shortly after hatching, the young European Cuckoo, using a scoop-like depression on its back, instinctively shoves any solid object that it contacts over the edge of the nest. With the disappearance of their eggs and rightful young, the foster parents are free to devote all of their care to the young cuckoo. The Brown-headed Cowbird is a nest parasite that is common in Ohio.

Another popular presentation was “Birds of the Rainbow” (Presentation 4). The “Birds of the Rainbow” presentation was designed to educate attendants about basic bird biology, physical features that are unique to birds, and sexual dimorphism. The basic senses, including smell, sight, sound, and taste, of birds were covered along with how their senses compare with humans. For example, a bird’s sense of taste is not very good; a human has over 10,000 taste buds while birds have anywhere from 24 to 400. We also covered specialized features on birds, like their feet and bills. Their importance in an ecosystem, migration, and human uses for birds were also discussed. The main point of this lecture was, however, to discuss the different colors of birds
and the purpose of sexual dimorphism (the systematic difference in form between individuals of different sex within the same species). A variety of birds from Ohio, as well as around the world, were used as examples. Background information and interesting facts were given for birds of every color, including the following:

- Red: Northern Cardinal, Red-headed Woodpecker, I’iwi, and Juan Fernandez Firecrown;
- Orange: Baltimore Oriole, American Redstart, Andean Cock-of-the-rock, and Wilson’s bird of paradise;
- Yellow: American Goldfinch, Evening Grosbeak, Yellow-bellied Sunbird, and Village Weaver;
- Green: Ruby-throated hummingbird, Mallard, Green-headed Tanager, and Peacock;
- Blue: Blue Jay, Indigo Bunting, Blue Lovebirds, and bird of paradise;
- Purple: Purple Martin, Lilac-breasted Roller, Red-legged Honeycreeper, and Violet Saberwing;
- Pink: Flamingo, Roseate Spoonbill, and Australian Pink and Gray Gallah;
- Brown: Brown Creeper, Northern Harrier, Brown Pelican, and Brown Skua;
- Gray: Dark-eyed Junco, Tufted Titmouse, Shoebill Stork, and Gray go-away-bird;
- Black: Red-wing Blackbird, American Crow, Bateleur, and Black-footed Penguin; and
- White: Mute Swan, Snow Goose, African Spoonbill, and Bali Starling.

We also discussed how a bird’s diet can impact its color. For example, the Flamingo is born a dull gray color but gets its pink coloration from the brine shrimp it eats; the more vibrant the color the healthier the bird and the more success it has at mating (Alsop, 2001).

Lectures were not limited to presentations; the ones for children frequently included hands-on activities. The hands-on activities were designed to be more fun than educational and to get the children involved with the birds in their own backyard. The most common activities we performed were making edible bird feeders and nesting balls. Making edible bird feeders was as simple as putting peanut butter on a bagel and dipping it in bird seed. The children would get to take the feeder’s home and watch the birds eat them. Making nesting balls involved putting a
variety of nesting materials, such as string, wool, and feathers, in a mesh bag that the children would hang in a tree at their houses. Birds could take materials out of the mesh bags to build their nests. This is great for the children in order to help them understand how and where birds build nests.

2.3.2 In-Store Presentations

The WBC sponsored two talks in the store, co-hosted with the Cincinnati Zoo and Botanical Gardens (Table 3). Advertising for these lectures was done independently by the Cincinnati Zoo and the WBC to target their own patrons. As the WBC Environmental Scientist my role was to organize these talks, to build an interest with our customers, and to facilitate the guest speakers (Appendix E).

The first lecture, given by Kevin Kellner of the Cincinnati Zoo on the miracles of migration, took place in October 2007. Migration is the regular seasonal journey undertaken by many species of birds. Migrations include movements of varied distances made in response to changes in food availability, habitat, or weather. Mr. Kellner brought a Black-footed Penguin (*Spheniscus demersus*), Parrot, Kookaburra (*Halcyonida dacelo*), and Rhinoceros Hornbill (*Buceros rhinoceros*) for the lecture (Figure 19-22). Although all the birds Kevin brought with him were non-migratory birds he discussed the migration process and used the non-migratory birds to make comparisons with similar, migrating species. The human impacts on migration, as well as the importance of maintaining a species’ winter and summer habitats, were discussed for a variety of different bird species.

The second lecture, also given by Kevin Kellner, on birds of prey took place in November 2007. This lecture was about raptors, which are birds that hunt and eat live animals, usually killing with their feet. The term ‘raptor’ refers to owls, eagles, hawks, falcons and vultures. There are approximately 450 species of raptors worldwide and more than 50 in the United States. For this lecture Mr. Kellner brought a Spectacled Owl (*Pulsatrix perspicillata*), Harris Hawk (*Parabuteo unicinctus*), Stellar’s Sea Eagle (*Haliaeetus pelagicus*), and a Lanner Falcon (*Falco biarmicus*) (Figure 23-26). Kevin used the guest birds as examples to explain the different types of birds of prey and to show how to tell what a bird eats simply by looking the bird’s feet and beak.

Issues such as endangerment and laws for protection were also discussed. For instance, it is against the law to possess even one raptor feather without a permit from the U.S. government.
The 1940 Bald Eagle Protection Act and the 1972 Migratory Bird Treaty Act both make it illegal to possess living or dead native birds (or their nests, eggs or parts) without heavy fines or imprisonment.

### 2.3.3 Newsletters

In addition to public presentations, the WBC produces a monthly newsletter that is distributed to customers via e-mail and in the store (Appendix C). The newsletter contains information on important issues for the month, varying from seasonal changes in feeding to information about birds one is likely to see in Ohio in that month. This is a great way to reach out each month and provide new information about how to benefit wildlife in the reader’s area. It was my job to create the newsletter and distribute it to our customer base. Coupons were put in the newsletter to help track its success in bringing customers into the store. Individuals could sign up for our newsletter via our website, so they were not necessarily previous customers.

### 2.4 Eco-friendly Concepts

During the course of my internship I learned a lot about applying eco-friendly concepts to business practices. The main outlet for thinking about the environment in business was through product selection. Taking all the product features into consideration, I tried to select the best available products to carry in the store. This meant looking for products: 1) made locally; 2) with environmentally sound materials/methods; and 3) which were most beneficial for wildlife.

The closer to home a product is made, with more environmentally beneficial material, and the more benefits it has for wildlife, the more eco-friendly the product. An “eco-friendly” product is a product that a minimal impact on the environment.

When I started working at the WBC we began carrying several lines of recycled plastic feeders. All plastic feeders and houses are not necessarily recycled; there are also non-recycled plastic feeders and houses. A non-recycled plastic feeder or house is made of a different grade of plastic, and so is usually transparent and lightweight. Recycled plastic feeders are thicker and made of a plastic composite, giving the plastic additional strength. Feeders and houses made from recycled plastic are usually much heavier than similar feeders made in other materials. Recycled plastic feeders and houses typically can withstand impacts, like falling from a tree, much better than those made of non-recycled plastic, which can easily crack.
Most recycled plastic feeders are smarter investments than wooden feeders for a variety of reasons, not only for the environment but also for the customer. The life span of a recycled plastic feeder is longer than a wooden feeder as they don’t rot, chip, or fade like wooden feeders do. Wooden feeders typically fall apart after around five years due to rot and wear, making the life span relatively short. Recycled plastic feeders are usually very easy to clean and don’t hold moisture like wooden feeders do, which helps keep the seed dryer and less likely to mold. The most obvious reason the recycled plastic is better is the environmental benefit of recycling the plastic rather than it ending up at the landfill. However, just because a feeder is made of recycled materials does not mean it is better environmentally. Wooden feeders made with sustainable harvest practices closer to the point of sale than recycled plastic feeders have a smaller environmental impact overall and are, therefore, more eco-friendly. There are a variety of features to take into consideration when evaluating an item’s environmental friendliness.

Ultimately the WBC is a retail store and the feeders and houses stocked were to be sold. Items made of different construction materials can vary in price, the recycled plastic feeders usually having a greater overhead cost. This meant that occasionally less eco-friendly item with the smaller overhead cost was also purchased for the store. No matter what the product, before it was ordered the building materials and the transportation distance were considered.
3.0 Impacts of Internship

This internship had a variety of impacts on the WBC; the most noticeable involves the fiscal organization of the store. First and foremost, I organized the store’s bookkeeping and set up a system to make it easier for them to keep track of their budget and store profits. Prior to my arrival, in the eight months the store had been open, the books had never been reconciled. This resulted in bounced checks and a variety of payment errors to our suppliers. As part of my internship I balanced all the books, past and present. This allowed the owners to properly pay vendors, eliminate past due invoices, and improve relations/credit with suppliers. I also developed a series of excel spreadsheets for the store to help them monitor monthly/weekly department profits as well as to show yearly trends (Appendix A).

Another impact of my internship was the organization of the products, specifically the inventory. The store owners had never completed inventory prior to my arrival. This made it difficult to keep track of merchandise and next to impossible to appropriately order new items. Eliminating these problems helps ensure proper reporting statistics and a better picture of sales. It also helps insure that all transactions are properly processed.

I helped the owners focus on their goals more efficiently, specifically helping them determine which products were important to carry in the store. The owners often listened to vendors and ordered whatever the vendors hyped. This led to the ordering of a large number of items that deviated from the store theme. By determining which products were most important for the store to carry, they were able to make more-informed ordering choices. As the number of different types of items in inventory increases, the number of each type of item the store can carry decreases, providing less of a variety of each product. For example, if the store orders 3 types of vases, 18 socks, and 1 lamp then the remaining inventory budget may only allow for 4 feeders. However, by focusing in on the theme appropriate items the store has the available budget to order 15 different types of feeders. Including some items that deviate from the general theme of the store can be a great way to add items onto a purchase; however, if the store fails to provide the items that drew customers in initially then the bulk of the customers may not return.
3.1 Impacts of Presentations on Sales

Another impact of my internship on the WBC involved store presentations. As discussed above, it was my responsibility as Environmental Scientist to write and present various presentations to community groups. I presented 24 out-of-store programs over the course of my internship from basics on birds, to conservation and recycling, to butterflies (Table 1).

Most of the out-of-store presentations were scheduled by WBC staff who called local organizations to stimulate interest. Due to the fact that we contacted groups and not the other way around, most of the attendees were unaware of the WBC and by reaching out to the community to provide presentations the WBC was increasing its customer base.

The WBC believes using in-store and out-of-store presentations as an educational tool is critical to getting conservation messages to the public. The WBC attempted to measure the impact of presentations with coupons, but there are, in hindsight, several things that should have been done differently. One way we measured the impact of the programs we hosted was by handing out a special coupon to everyone who attended an outside lecture. At the lectures primarily for children we did not pass out coupons, but they were available for teachers/chaperones. The coupons handed out would be for a certain dollar amount off of a purchase at our store (Figure 27). Attendees of every outside lecture received the same coupon, so it is unclear which talks were most beneficial for drawing interest; there was no way to track which coupons redeemed were distributed at which presentation. However, it was observable how many attendees were interested enough to make a purchase at the store. The return rate of the coupons was monitored and documented. However, the types of purchases customers made was not monitored, therefore it is not possible to track whether purchases were related to the talk. The data suggest that 71% of what the WBC sells is feeders, houses, suet, or seed (Table 4). Therefore, it is not unreasonable to assume that individuals who used the coupon were improving their backyard habitats and, in turn, the natural environment.

We found that we typically had a high return rate for our coupons. Park and Gomez (2004) suggest that a normal return rate on a paper distributed coupon is only around 7%, which we surpassed nearly every month. For example, in December we had a 21.05% return rate (Table 5). While some of the coupons were from previous store customers, the majority were new customers.
With the exception of November 2007 and December 2007, which are holiday months with less time for presentations and higher average sales, there was a slight correlation between the number of presentations given in a month and the number of new customers to the store (Table 6). For example, five presentations were given in March 2008 and in April 2008 and those months had two of three highest numbers of new customers seen during my internship period, exceeded only by December 2007 with its expected high sales volume.

When comparing sales from my internship period, August 2007 to April 2008, to the same time period from the previous year, August 2006 to April 2007, overall sales were up 35.74% (Table 7). This could be due to several reasons. First, the business had only been open eight months prior to my arrival, so the increase could be due to the WBC establishing its customer base. Secondly, we were more aware of what items were likely to sell and which departments were most profitable, so inventory was changed accordingly. Finally, it could be due to an increase in public outreach and marketing efforts, as shown with coupon returns. It is unlikely that the increase in sales can be attributed wholly to one of these factors; rather, all three are likely responsible.

3.2 Impact of Mailings

The WBC did a variety of mailings, from newsletters to postcard coupons. Postcard coupons were sent out seasonally and for holiday events. Newsletters were sent out with no regularity until November 2007 when I began sending them monthly. Our email customer base started in November 2007 with 279 sent emails (Table 8). By April 2008 we had an email customer base of 636 sent emails, a 56% increase. A big reason for the increase in email address was a push by cashiers to have email contact in place of traditional mailing addresses for those customers who wanted to participate in our mailing programs.

At this point, due to the short time the WBC has been doing public outreach presentations and the limited duration of historical sales data, there is no definitive proof that the presentations are correlated to the store growth. However, due to the very high coupon return rate, I think it is fair to say we were successful in drawing new customers into the store.
3.3 Other Advertising

Coupons were not the only method of public outreach; the WBC also participated in other forms of advertising. A big part of the WBC budget is spent on advertising, the impact of which is not tracked well. The WBC spent $14,113.18 on marketing and advertising from August 2007 to April 2008 (Table 9). The advertising budget is broken up into 35.64% television and radio spots, 33.71% postcards, 14.81% newspapers and magazines, 10.06% promotional activities, and 2.19% newsletters. While each paper advertisement had coupons, the coupon source was not tracked when they were brought into the store. It is hard to determine which source of advertising had the most impact on drawing customers into the store since new customers were not asked how they heard about the store.
I believe that businesses have the potential to be excellent conduits for the promotion of environmental issues; it just depends on the motivation and desire of the business owner. I was lucky to work at the WBC of Mason, which is owned by two individuals who are receptive to making changes that will benefit the environment.

Running a business is all about making money and unfortunately many environmentally beneficial practices can be expensive. For example, the location of WBC, the Deerfield Shopping Center, has 60 businesses that get countless cardboard boxes delivered on a regular basis. The WBC and several other stores tried to convince the management company to provide a corrugated cardboard recycling bin; however, once the management company gave the interested parties a spreadsheet of the cost and changes to the garbage pickup charges most of the stores changed their mind about wanting the bins. In that case store profit outweighed environmental benefit.

In some ways the eco-friendly options for running a business also can be financially beneficial for the store. For example, in August the WBC initiated a reusable container discount for customers who either have a plastic container or bring back a 5lb plastic WBC birdseed bag. Any customer that brings in their own container gets 5% off their 5lb seed purchase. This deal is targeted to the 5lb seed bags since the WBC pours them on site. The 5lb seed bags are a plastic zip lock while the 20lb bags are paper and can not be re-sealed or refilled. The cost to the store for one 5lb bag is $0.75, not including the cost of the identification labels and ink to print them. The 5% off will provide savings on the cheapest 5lb bag, Dove & Quail at $5.75, of $0.29 to the customer and $0.46 to the store all the way to the most expensive 5lb bag, Nyjer at $13.25, of $0.66 to the customer and $0.09 to the store. The WBC saves money across the board and customers appreciate the drive to reuse. This also has the potential to increase the store sales of reusable containers. For instance, the plastic zipper bags are reusable, but not indefinitely, and the soft bag can cause spilling when filling a feeder. A hard plastic container, on the other hand, is both longer-lasting and easier to use for filling a feeder. So if the WBC sells plastic containers, repeat customers can benefit from the more stable container and the WBC can benefit from the sale of the containers.
4.1 Changes

There are a variety of changes I would make in order to allow the WBC to measure the impact they are having on the public and, hopefully, on the environment. For instance, the WBC spends a large part of its budget on advertising but makes no real effort to measure the effectiveness of the ad in reaching the target audience; there should be more emphasis in this area. Every paper ad for the store includes a coupon, but the only coupon return rates that are monitored are the postcard coupons the WBC mails out directly, as all coupons from advertisements are grouped together. Since they are not individually accounted for, it is impossible to create reports on the long-term impacts of specific advertising outlets.

The main reason each non-postcard coupon is not tracked is due to confusion about their source. Many of the coupons look very similar and, since most people cut the coupon out before coming to shop, the cashier is uncertain of their source. This could be handled by having staff members aware of the coupons that are out or by simply asking the customer where they obtained their coupon. The design of the coupons could be changed to include a code indicating the advertising source, such as specific numbers or bar codes within the design. Knowing which advertisement sources have the greatest customer draw would help the owners make more educated decisions on marketing for the store.

Just as the individual advertising outlets need to be tracked, so do the different education programs the WBC provides. Currently all presentation attendees receive the same coupon, but if coupons for each presentation were individualized it would be possible to know which groups to target, helping the WBC better develop their marketing and advertising. This could be done easily by adding the presentation date to the coupons. This would allow the store to track the presentation topics and see which ones had the biggest effect on drawing customers into the store. Then it would be possible to track which presentations and/or groups of attendees should be targeted for future presentations. For example, if 50% of the returned coupons came from garden clubs then there needs to be more effort put towards providing presentations to these groups. Knowing which presentation groups brought the most customers into the store would not cause the WBC to limit presentations to the less profitable groups, but simply expand in the areas that had the most financial benefit. It would also allow us to change our presentation
methods to the groups that were less interested in coming to the store in order to see if other educational methods would be more successful for drawing in new customers.

I also would monitor what individuals with presentation coupons bought. This would help determine if the types of products purchased were different as a result of the material covered in the presentation. Hopefully, there would be a correlation between the presentations and the purchase of eco-friendly products. Of course, a change in purchase habits potentially would occur only after presentations where birding products were discussed. If birding products were not discussed then the presentation attendants would have gained knowledge about birds but not about which products are most beneficial; that information would be presented to them in the store.

4.2 Contributions

There are several ways the WBC can continue to improve their impact on the environment and improve as a business. First, they need to continue more long-term planning. This includes keeping up to date on annual scheduling of events and sales, updating inventory levels monthly, and developing long-term ordering goals. The longer the business is open the more historical sales data the owners have and the better their understanding of their customer base. This allows them to know what items are most desired or inquired about by the customer base. With historical sales data they are also going to have a better idea of what items sell best at specific times of year. By using this information they can anticipate slow and busy times, plan sales and advertising, and adjust inventory levels accordingly.

WBC can continue to grow as a business by improving the way it monitors marketing and advertising investments. If they begin to monitor the success of their investment more closely they will be more informed in the decision-making process, allowing them to make better choices in the future and save the store money.

It is important that the WBC also continue to maintain the bookkeeping. In the past, outdated records and unbalanced books have led to strained relationships with vendors. On several occasions late payment resulted in termination of credit, making the WBC unable to carry specific products. This limits what the store can stock, which is particularly harmful when established customers come in looking for that items previously carried; if that product is unavailable they may shop at a competing store.
WBC can continue to improve their impact on the environment by continuing to offer educational outreach programs. The more interest they can create in the environment the better. WBC can also continue making a difference by providing more eco-friendly choices for their customers, such as by continuing to select products based on the benefits they offer to birds and the environment.

This position not only helped me grow tremendously as an environmental scientist and business person but also benefited the WBC enormously and will continue to do so into the future.
5.0 References


Appendix A: Benchmark Reports

Spreadsheet 1  Monthly Benchmark Tracking

Spreadsheet 2  Weekly Cumulative Sales and Customer Summary Spreadsheet

Spreadsheet 3  Monthly Inventory Budgeting

Spreadsheet 4  Number of Transactions
## Spreadsheet 1: Monthly Benchmark Tracking

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net Sales</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>$5,248.61</td>
<td>$12,793.08</td>
<td>$12,740.50</td>
<td>$12,719.32</td>
<td>$18,191.67</td>
<td>$17,061.33</td>
<td>$10,937.82</td>
<td>$10,393.82</td>
<td>$8,517.89</td>
<td>$7,621.14</td>
<td>$116,160.24</td>
</tr>
<tr>
<td>2008</td>
<td>$11,812.60</td>
<td>$11,772.57</td>
<td>$15,523.80</td>
<td>$19,392.10</td>
<td>$19,647.98</td>
<td>$14,665.59</td>
<td>$16,154.06</td>
<td>$16,460.30</td>
<td>$8,496.73</td>
<td>$7,462.02</td>
<td>$141,387.75</td>
</tr>
<tr>
<td><strong>% Increase</strong></td>
<td>55.57%</td>
<td>-8.67%</td>
<td>17.93%</td>
<td>34.41%</td>
<td>7.41%</td>
<td>-16.34%</td>
<td>32.29%</td>
<td>37.25%</td>
<td>-0.25%</td>
<td>-2.13%</td>
<td>17.84%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gross Margin %</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>51.34%</td>
<td>49.18%</td>
<td>54.36%</td>
<td>51.74%</td>
<td>53.00%</td>
<td>51.32%</td>
<td>53.00%</td>
<td>51.13%</td>
<td>57.89%</td>
<td>43.61%</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>47.74%</td>
<td>49.21%</td>
<td>48.51%</td>
<td>52.55%</td>
<td>52.64%</td>
<td>53.15%</td>
<td>51.42%</td>
<td>52.47%</td>
<td>50.91%</td>
<td>51.21%</td>
<td>42.48%</td>
</tr>
<tr>
<td><strong>% Increase</strong></td>
<td>-7.54%</td>
<td>0.06%</td>
<td>-12.06%</td>
<td>1.54%</td>
<td>-0.68%</td>
<td>3.44%</td>
<td>-3.07%</td>
<td>3.95%</td>
<td>-0.43%</td>
<td>-13.04%</td>
<td>-2.66%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No. of Trans.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>207</td>
<td>333</td>
<td>357</td>
<td>374</td>
<td>517</td>
<td>525</td>
<td>345</td>
<td>307</td>
<td>273</td>
<td>238</td>
<td>3476</td>
</tr>
<tr>
<td>2008</td>
<td>324</td>
<td>349</td>
<td>338</td>
<td>461</td>
<td>529</td>
<td>428</td>
<td>440</td>
<td>419</td>
<td>245</td>
<td>211</td>
<td>3744</td>
</tr>
<tr>
<td><strong>% Increase</strong></td>
<td>36.11%</td>
<td>4.58%</td>
<td>-5.62%</td>
<td>18.87%</td>
<td>2.27%</td>
<td>-22.66%</td>
<td>21.59%</td>
<td>26.73%</td>
<td>-11.43%</td>
<td>-12.80%</td>
<td>7.16%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average$ per Cust.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>$25.36</td>
<td>$38.42</td>
<td>$35.69</td>
<td>$34.01</td>
<td>$35.19</td>
<td>$32.50</td>
<td>$31.70</td>
<td>$33.64</td>
<td>$31.20</td>
<td>$32.02</td>
<td>$27.48</td>
</tr>
<tr>
<td>2008</td>
<td>$36.46</td>
<td>$33.73</td>
<td>$45.93</td>
<td>$42.07</td>
<td>$37.14</td>
<td>$34.27</td>
<td>$36.71</td>
<td>$39.28</td>
<td>$34.68</td>
<td>$35.37</td>
<td>$31.30</td>
</tr>
<tr>
<td><strong>% Increase</strong></td>
<td>30.45%</td>
<td>-13.89%</td>
<td>22.30%</td>
<td>19.15%</td>
<td>5.26%</td>
<td>5.16%</td>
<td>13.65%</td>
<td>14.36%</td>
<td>10.03%</td>
<td>9.45%</td>
<td>12.22%</td>
</tr>
<tr>
<td>Week</td>
<td>Weekly Sales (85 Stores)</td>
<td>2007 Sales</td>
<td>Customers</td>
<td>2008 Sales</td>
<td>Customers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------</td>
<td>------------</td>
<td>-----------</td>
<td>------------</td>
<td>-----------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>August 1 - August 7, 2007</td>
<td>$2,155.91</td>
<td>24</td>
<td>1</td>
<td>January 1 - January 5, 2008</td>
<td>$1,799.95</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>August 8 - August 14, 2007</td>
<td>$2,040.68</td>
<td>17</td>
<td>2</td>
<td>January 6 - January 12, 2008</td>
<td>$2,544.38</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>August 15 - August 21, 2007</td>
<td>$2,387.33</td>
<td>26</td>
<td>3</td>
<td>January 13 - January 19, 2008</td>
<td>$3,072.82</td>
<td>31</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>August 22 - August 28, 2007</td>
<td>$2,101.08</td>
<td>30</td>
<td>4</td>
<td>January 20 - January 26, 2008</td>
<td>$3,105.64</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>August 29 - August 31, 2007</td>
<td>$1,643.68</td>
<td>16</td>
<td>5</td>
<td>January 27 - January 31, 2008</td>
<td>$1,289.81</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(69) August Total</td>
<td>$10,328.68</td>
<td>113</td>
<td>(67) January Total</td>
<td>$11,812.60</td>
<td>106</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>September 1 - September 7, 2007</td>
<td>$1,864.82</td>
<td>25</td>
<td>6</td>
<td>February 1 - February 2, 2008</td>
<td>$1,473.63</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>September 8 - September 14, 2007</td>
<td>$1,894.27</td>
<td>22</td>
<td>7</td>
<td>February 3 - February 9, 2008</td>
<td>$2,569.50</td>
<td>34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>September 15 - September 21, 2007</td>
<td>$1,786.34</td>
<td>29</td>
<td>8</td>
<td>February 10 - February 16, 2008</td>
<td>$2,725.53</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>September 22 - September 28, 2007</td>
<td>$2,869.57</td>
<td>20</td>
<td>9</td>
<td>February 17 - February 23, 2008</td>
<td>$2,665.77</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>September 29 - September 30, 2007</td>
<td>$1,141.91</td>
<td>11</td>
<td>10</td>
<td>February 24 - February 29, 2008</td>
<td>$2,338.14</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(74) September Total</td>
<td>$9,546.91</td>
<td>107</td>
<td>(72) February Total</td>
<td>$11,772.57</td>
<td>93</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>October 1 - October 7, 2007</td>
<td>$1,428.21</td>
<td>14</td>
<td>11</td>
<td>March 1, 2008</td>
<td>$439.15</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>October 8 - October 14, 2007</td>
<td>$2,616.85</td>
<td>22</td>
<td>12</td>
<td>March 2 - March 8, 2008</td>
<td>$1,696.26</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>October 15 - October 21, 2007</td>
<td>$1,283.68</td>
<td>19</td>
<td>13</td>
<td>March 9 - March 15, 2008</td>
<td>$3,656.84</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>October 29 - October 31, 2007</td>
<td>$665.79</td>
<td>6</td>
<td>15</td>
<td>March 23 - March 29, 2008</td>
<td>$4,457.45</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(75) October Total</td>
<td>$8,853.68</td>
<td>82</td>
<td>(72) February Total</td>
<td>$11,772.57</td>
<td>93</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>November 1 - November 7, 2007</td>
<td>$2,617.57</td>
<td>15</td>
<td>15</td>
<td>April 1 - April 5, 2008</td>
<td>$3,561.91</td>
<td>38</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>November 8 - November 14, 2007</td>
<td>$2,157.44</td>
<td>19</td>
<td>16</td>
<td>April 6 - April 12, 2008</td>
<td>$3,593.70</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>November 15 - November 21, 2007</td>
<td>$3,708.82</td>
<td>34</td>
<td>17</td>
<td>April 13 - April 19, 2008</td>
<td>$4,170.24</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>November 22 - November 28, 2007</td>
<td>$1,246.50</td>
<td>9</td>
<td>18</td>
<td>April 20 - April 26, 2008</td>
<td>$5,289.30</td>
<td>43</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>November 29 - November 30, 2007</td>
<td>$1,246.50</td>
<td>9</td>
<td>19</td>
<td>April 27 - April 30, 2008</td>
<td>$2,776.95</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(63) November Total</td>
<td>$14,046.48</td>
<td>122</td>
<td>(65) April Total</td>
<td>$19,392.10</td>
<td>166</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 1 - December 7, 2007</td>
<td>$5,651.95</td>
<td>51</td>
<td>20</td>
<td>Grand Total YTD</td>
<td>$56,501.07</td>
<td>489</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 8 - December 14, 2007</td>
<td>$9,587.82</td>
<td>75</td>
<td>21</td>
<td>Cumulative Net</td>
<td>$135,300.27</td>
<td>1219</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 15 - December 21, 2007</td>
<td>$10,719.55</td>
<td>97</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 22 - December 28, 2007</td>
<td>$6,343.09</td>
<td>67</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 29 - December 31, 2007</td>
<td>$1,721.04</td>
<td>16</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(57) December Total</td>
<td>$34,023.45</td>
<td>306</td>
<td>Grand Total YTD</td>
<td>$76,799.20</td>
<td>730</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative Net</td>
<td>$76,799.20</td>
<td>730</td>
<td>Cumulative Net</td>
<td>$76,799.20</td>
<td>730</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Spreadsheet 3: Monthly Inventory Budgeting

<table>
<thead>
<tr>
<th></th>
<th>January '08</th>
<th>February '08</th>
<th>March '08</th>
<th>April '08</th>
<th>May '08</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLANK</td>
<td>$0.00</td>
<td>0%</td>
<td>-$759.97</td>
<td>-6%</td>
<td>-$466.98</td>
<td>-3%</td>
</tr>
<tr>
<td>ART</td>
<td>$45.96</td>
<td>0%</td>
<td>$80.98</td>
<td>1%</td>
<td>$210.96</td>
<td>1%</td>
</tr>
<tr>
<td>BAFFLES</td>
<td>$5.00</td>
<td>0%</td>
<td>$77.97</td>
<td>1%</td>
<td>$262.89</td>
<td>2%</td>
</tr>
<tr>
<td>BOOKS</td>
<td>$121.49</td>
<td>1%</td>
<td>$177.78</td>
<td>2%</td>
<td>$254.08</td>
<td>2%</td>
</tr>
<tr>
<td>CHILDREN</td>
<td>$154.27</td>
<td>1%</td>
<td>$136.29</td>
<td>1%</td>
<td>$156.65</td>
<td>1%</td>
</tr>
<tr>
<td>CHIMES</td>
<td>$47.99</td>
<td>0%</td>
<td>$99.99</td>
<td>1%</td>
<td>$47.99</td>
<td>0%</td>
</tr>
<tr>
<td>CLOTHING</td>
<td>$73.96</td>
<td>1%</td>
<td>$30.97</td>
<td>0%</td>
<td>$20.00</td>
<td>0%</td>
</tr>
<tr>
<td>FEEDERS</td>
<td>$3,234.72</td>
<td>27%</td>
<td>$3,148.09</td>
<td>27%</td>
<td>$4,951.25</td>
<td>32%</td>
</tr>
<tr>
<td>FOOD PEOPLE</td>
<td>$0.00</td>
<td>0%</td>
<td>$0.00</td>
<td>0%</td>
<td>$0.00</td>
<td>0%</td>
</tr>
<tr>
<td>FOOD WLDLF</td>
<td>$124.59</td>
<td>1%</td>
<td>$109.80</td>
<td>1%</td>
<td>$231.56</td>
<td>1%</td>
</tr>
<tr>
<td>GARDEN</td>
<td>$215.90</td>
<td>2%</td>
<td>$223.76</td>
<td>2%</td>
<td>$673.85</td>
<td>4%</td>
</tr>
<tr>
<td>GIFT CARD</td>
<td>$55.44</td>
<td>0%</td>
<td>$0.00</td>
<td>0%</td>
<td>$410.00</td>
<td>3%</td>
</tr>
<tr>
<td>HARDWARE</td>
<td>$652.78</td>
<td>6%</td>
<td>$444.43</td>
<td>4%</td>
<td>$1,003.06</td>
<td>6%</td>
</tr>
<tr>
<td>HOME</td>
<td>$160.25</td>
<td>1%</td>
<td>$62.94</td>
<td>1%</td>
<td>$125.21</td>
<td>1%</td>
</tr>
<tr>
<td>HOUSES</td>
<td>$260.11</td>
<td>2%</td>
<td>$391.53</td>
<td>3%</td>
<td>$895.65</td>
<td>6%</td>
</tr>
<tr>
<td>JEWELRY</td>
<td>$112.48</td>
<td>1%</td>
<td>$35.97</td>
<td>0%</td>
<td>$15.99</td>
<td>0%</td>
</tr>
<tr>
<td>MEDIA</td>
<td>$224.89</td>
<td>2%</td>
<td>$149.90</td>
<td>1%</td>
<td>$141.75</td>
<td>1%</td>
</tr>
<tr>
<td>OPTICS</td>
<td>$40.09</td>
<td>0%</td>
<td>$199.97</td>
<td>2%</td>
<td>$246.17</td>
<td>2%</td>
</tr>
<tr>
<td>PROGRAMS</td>
<td>$0.00</td>
<td>0%</td>
<td>$766.00</td>
<td>7%</td>
<td>$106.00</td>
<td>1%</td>
</tr>
<tr>
<td>SEED</td>
<td>$4,952.01</td>
<td>42%</td>
<td>$5,650.63</td>
<td>48%</td>
<td>$5,120.95</td>
<td>33%</td>
</tr>
<tr>
<td>STATIONARY</td>
<td>$37.40</td>
<td>0%</td>
<td>$52.96</td>
<td>0%</td>
<td>$22.42</td>
<td>0%</td>
</tr>
<tr>
<td>SUET</td>
<td>$666.38</td>
<td>6%</td>
<td>$560.63</td>
<td>5%</td>
<td>$616.93</td>
<td>4%</td>
</tr>
<tr>
<td>WATER</td>
<td>$626.89</td>
<td>5%</td>
<td>$141.95</td>
<td>1%</td>
<td>$477.42</td>
<td>3%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$11,812.60</td>
<td></td>
<td>$11,772.57</td>
<td></td>
<td>$15,523.80</td>
<td></td>
</tr>
</tbody>
</table>
### Spreadsheet 3: Monthly Inventory Budgeting (continued)

<table>
<thead>
<tr>
<th>INVENTORY SOLD:</th>
<th>January '08</th>
<th>February '08</th>
<th>March '08</th>
<th>April '08</th>
<th>May '08</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLANK</td>
<td>0</td>
<td>16</td>
<td>3</td>
<td>10</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>ART</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>23</td>
</tr>
<tr>
<td>BAFFLES</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>14</td>
<td>15</td>
<td>43</td>
</tr>
<tr>
<td>BOOKS</td>
<td>20</td>
<td>23</td>
<td>22</td>
<td>27</td>
<td>19</td>
<td>111</td>
</tr>
<tr>
<td>CHILDREN</td>
<td>31</td>
<td>21</td>
<td>20</td>
<td>23</td>
<td>11</td>
<td>106</td>
</tr>
<tr>
<td>CHIMES</td>
<td>7</td>
<td>3</td>
<td>3</td>
<td>7</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>CLOTHING</td>
<td>8</td>
<td>5</td>
<td>4</td>
<td>10</td>
<td>4</td>
<td>31</td>
</tr>
<tr>
<td>FEEDERS</td>
<td>101</td>
<td>100</td>
<td>129</td>
<td>213</td>
<td>221</td>
<td>764</td>
</tr>
<tr>
<td>FOOD PEOPLE</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>FOOD WDLF</td>
<td>21</td>
<td>20</td>
<td>29</td>
<td>44</td>
<td>67</td>
<td>181</td>
</tr>
<tr>
<td>GARDEN</td>
<td>14</td>
<td>24</td>
<td>68</td>
<td>74</td>
<td>85</td>
<td>265</td>
</tr>
<tr>
<td>GIFT CARD</td>
<td>3</td>
<td>0</td>
<td>15</td>
<td>1</td>
<td>5</td>
<td>24</td>
</tr>
<tr>
<td>HARDWARE</td>
<td>52</td>
<td>38</td>
<td>63</td>
<td>123</td>
<td>179</td>
<td>455</td>
</tr>
<tr>
<td>HOME</td>
<td>27</td>
<td>6</td>
<td>10</td>
<td>14</td>
<td>12</td>
<td>69</td>
</tr>
<tr>
<td>HOUSES</td>
<td>27</td>
<td>27</td>
<td>29</td>
<td>42</td>
<td>25</td>
<td>150</td>
</tr>
<tr>
<td>JEWELRY</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>6</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>MEDIA</td>
<td>5</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>5</td>
<td>39</td>
</tr>
<tr>
<td>OPTICS</td>
<td>6</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>PROGRAM</td>
<td>0</td>
<td>26</td>
<td>2</td>
<td>30</td>
<td>0</td>
<td>58</td>
</tr>
<tr>
<td>SEED</td>
<td>365</td>
<td>591</td>
<td>365</td>
<td>390</td>
<td>389</td>
<td>2100</td>
</tr>
<tr>
<td>STATIONARY</td>
<td>11</td>
<td>17</td>
<td>8</td>
<td>11</td>
<td>9</td>
<td>56</td>
</tr>
<tr>
<td>SUET</td>
<td>228</td>
<td>183</td>
<td>177</td>
<td>144</td>
<td>157</td>
<td>889</td>
</tr>
<tr>
<td>WATER</td>
<td>12</td>
<td>6</td>
<td>12</td>
<td>14</td>
<td>17</td>
<td>61</td>
</tr>
<tr>
<td>TOTAL INV SOLD</td>
<td>948</td>
<td>1127</td>
<td>990</td>
<td>1215</td>
<td>1231</td>
<td>5511</td>
</tr>
</tbody>
</table>
### Spreadsheet 3: Monthly Inventory Budgeting (continued)

<table>
<thead>
<tr>
<th>GROSS MARGIN:</th>
<th>January '08</th>
<th>February '08</th>
<th>March '08</th>
<th>April '08</th>
<th>May '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLANK</td>
<td>0.00%</td>
<td>0%</td>
<td>0.00%</td>
<td>100.00%</td>
<td>~</td>
</tr>
<tr>
<td>ART</td>
<td>34.96%</td>
<td>70.70%</td>
<td>-397.79%</td>
<td>53.91%</td>
<td>66.71%</td>
</tr>
<tr>
<td>BAFFLES</td>
<td>54.60%</td>
<td>55.29%</td>
<td>48.96%</td>
<td>51.95%</td>
<td>50.96%</td>
</tr>
<tr>
<td>BOOKS</td>
<td>47.00%</td>
<td>40.08%</td>
<td>49.29%</td>
<td>47.33%</td>
<td>54.22%</td>
</tr>
<tr>
<td>CHILDREN</td>
<td>42.59%</td>
<td>55.93%</td>
<td>50.94%</td>
<td>53.01%</td>
<td>53.76%</td>
</tr>
<tr>
<td>CHIMES</td>
<td>53.42%</td>
<td>53.66%</td>
<td>49.36%</td>
<td>54.32%</td>
<td>55.83%</td>
</tr>
<tr>
<td>CLOTHING</td>
<td>-23.38%</td>
<td>-9.65%</td>
<td>-79.00%</td>
<td>-25.65%</td>
<td>-70.08%</td>
</tr>
<tr>
<td>FEEDERS</td>
<td>53.69%</td>
<td>55.22%</td>
<td>56.11%</td>
<td>54.12%</td>
<td>55.69%</td>
</tr>
<tr>
<td>FOOD PEOPLE</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>FOOD WLDLF</td>
<td>50.38%</td>
<td>46.15%</td>
<td>52.91%</td>
<td>51.38%</td>
<td>55.03%</td>
</tr>
<tr>
<td>GARDEN</td>
<td>-15.45%</td>
<td>54.93%</td>
<td>40.48%</td>
<td>41.63%</td>
<td>44.59%</td>
</tr>
<tr>
<td>GIFT CARD</td>
<td>100.00%</td>
<td>0.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
<tr>
<td>HARDWARE</td>
<td>59.10%</td>
<td>60.37%</td>
<td>52.51%</td>
<td>55.33%</td>
<td>56.09%</td>
</tr>
<tr>
<td>HOME</td>
<td>50.49%</td>
<td>55.90%</td>
<td>46.65%</td>
<td>51.98%</td>
<td>50.28%</td>
</tr>
<tr>
<td>HOUSES</td>
<td>47.53%</td>
<td>56.31%</td>
<td>51.88%</td>
<td>55.65%</td>
<td>58.16%</td>
</tr>
<tr>
<td>JEWELRY</td>
<td>36.79%</td>
<td>53.33%</td>
<td>56.97%</td>
<td>50.04%</td>
<td>54.87%</td>
</tr>
<tr>
<td>MEDIA</td>
<td>32.42%</td>
<td>54.11%</td>
<td>49.47%</td>
<td>48.23%</td>
<td>54.75%</td>
</tr>
<tr>
<td>OPTICS</td>
<td>43.66%</td>
<td>53.02%</td>
<td>32.70%</td>
<td>56.35%</td>
<td>0.00%</td>
</tr>
<tr>
<td>PROGRAMS</td>
<td>0.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>SEED</td>
<td>50.54%</td>
<td>42.37%</td>
<td>51.09%</td>
<td>50.95%</td>
<td>50.29%</td>
</tr>
<tr>
<td>STATIONARY</td>
<td>54.78%</td>
<td>55.06%</td>
<td>52.41%</td>
<td>54.03%</td>
<td>51.22%</td>
</tr>
<tr>
<td>SUET</td>
<td>43.00%</td>
<td>48.00%</td>
<td>51.98%</td>
<td>55.26%</td>
<td>53.26%</td>
</tr>
<tr>
<td>WATER</td>
<td>54.00%</td>
<td>56.07%</td>
<td>49.89%</td>
<td>55.70%</td>
<td>54.19%</td>
</tr>
<tr>
<td>GROSS</td>
<td>43.51%</td>
<td>49.21%</td>
<td>48.51%</td>
<td>52.55%</td>
<td>52.64%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CUSTOMERS</th>
<th>January '08</th>
<th>February '08</th>
<th>March '08</th>
<th>April '09</th>
<th>May '09</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007 Totals</td>
<td>137</td>
<td>171</td>
<td>166</td>
<td>144</td>
<td>216</td>
<td>834</td>
</tr>
<tr>
<td>2008 Totals</td>
<td>106</td>
<td>93</td>
<td>124</td>
<td>166</td>
<td>193</td>
<td>682</td>
</tr>
</tbody>
</table>
## Spreadsheet 4: Number of Transactions

<table>
<thead>
<tr>
<th>Week</th>
<th># Trans.</th>
<th>Week</th>
<th># Trans.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 1 - 5</td>
<td>55</td>
<td>Jan 1 - 6</td>
<td>58</td>
</tr>
<tr>
<td>Aug 6 - 12</td>
<td>52</td>
<td>Jan 7 - 13</td>
<td>64</td>
</tr>
<tr>
<td>Aug 13 - 19</td>
<td>67</td>
<td>Jan 14 - 20</td>
<td>86</td>
</tr>
<tr>
<td>Aug 20 - 26</td>
<td>72</td>
<td>Jan 21 - 27</td>
<td>91</td>
</tr>
<tr>
<td>Aug 27 - 31</td>
<td>61</td>
<td>Jan 28 - 31</td>
<td>25</td>
</tr>
<tr>
<td><strong>AUG '07</strong></td>
<td><strong>307</strong></td>
<td><strong>JAN '08</strong></td>
<td><strong>324</strong></td>
</tr>
<tr>
<td>Sep 1 - 2</td>
<td>15</td>
<td>Feb 1 - 3</td>
<td>48</td>
</tr>
<tr>
<td>Sep 3 - 9</td>
<td>61</td>
<td>Feb 4 - 10</td>
<td>97</td>
</tr>
<tr>
<td>Sep 10 - 16</td>
<td>58</td>
<td>Feb 11 - 17</td>
<td>84</td>
</tr>
<tr>
<td>Sep 17 - 23</td>
<td>64</td>
<td>Feb 18 - 24</td>
<td>75</td>
</tr>
<tr>
<td>Sep 24 - 30</td>
<td>75</td>
<td>Feb 25 - 29</td>
<td>45</td>
</tr>
<tr>
<td><strong>SEP '07</strong></td>
<td><strong>273</strong></td>
<td><strong>FEB '08</strong></td>
<td><strong>349</strong></td>
</tr>
<tr>
<td>Oct 1 - 7</td>
<td>47</td>
<td>Mar 1 - 2</td>
<td>21</td>
</tr>
<tr>
<td>Oct 8 - 14</td>
<td>73</td>
<td>Mar 3 - 9</td>
<td>44</td>
</tr>
<tr>
<td>Oct 15 - 21</td>
<td>40</td>
<td>Mar 10 - 16</td>
<td>84</td>
</tr>
<tr>
<td>Oct 22 - 28</td>
<td>58</td>
<td>Mar 17 - 23</td>
<td>72</td>
</tr>
<tr>
<td>Oct 29 - 31</td>
<td>20</td>
<td>Mar 24 - 30</td>
<td>108</td>
</tr>
<tr>
<td><strong>OCT '07</strong></td>
<td><strong>238</strong></td>
<td>Mar 31</td>
<td>9</td>
</tr>
<tr>
<td>Nov 1 - 4</td>
<td>44</td>
<td><strong>MAR '08</strong></td>
<td><strong>338</strong></td>
</tr>
<tr>
<td>Nov 5 - 11</td>
<td>54</td>
<td>Apr 1 - 6</td>
<td>119</td>
</tr>
<tr>
<td>Nov 12 - 18</td>
<td>83</td>
<td>Apr 7 - 13</td>
<td>87</td>
</tr>
<tr>
<td>Nov 19 - 25</td>
<td>100</td>
<td>Apr 14 - 20</td>
<td>88</td>
</tr>
<tr>
<td>Nov 26 - 30</td>
<td>71</td>
<td>Apr 21 - 27</td>
<td>126</td>
</tr>
<tr>
<td><strong>NOV '07</strong></td>
<td><strong>352</strong></td>
<td>Apr 28 - 30</td>
<td>41</td>
</tr>
<tr>
<td>Dec 1 - 2</td>
<td>49</td>
<td><strong>APR '08</strong></td>
<td><strong>461</strong></td>
</tr>
<tr>
<td>Dec 3 - 9</td>
<td>157</td>
<td>Mar 31</td>
<td>9</td>
</tr>
<tr>
<td>Dec 10 - 16</td>
<td>183</td>
<td>Apr 1 - 6</td>
<td>119</td>
</tr>
<tr>
<td>Dec 17 - 23</td>
<td>279</td>
<td>Apr 7 - 13</td>
<td>87</td>
</tr>
<tr>
<td>Dec 24 - 30</td>
<td>120</td>
<td>Apr 14 - 20</td>
<td>88</td>
</tr>
<tr>
<td>Dec 31</td>
<td>19</td>
<td>Apr 21 - 27</td>
<td>126</td>
</tr>
<tr>
<td><strong>DEC '07</strong></td>
<td><strong>807</strong></td>
<td>Apr 28 - 30</td>
<td>41</td>
</tr>
<tr>
<td>Total 2007</td>
<td>1977</td>
<td>Total 2008</td>
<td>1472</td>
</tr>
</tbody>
</table>
Appendix B: Birding Products

Figure 1  Hopper feeders, two vs. four sided
Figure 2  Tube feeder
Figure 3  Basic suet cage
Figure 4  Split peanut feeder
Figure 5  Platform feeder
Figure 6  Hummingbird feeder
Figure 7  Goldfinch feeder
Figure 8  Bluebird feeder
Figure 9  Oriel feeder
Figure 10  Easy cleaning removable bottom
Figure 11  Hopper feeder with removable wire bottom tray
Figure 12  Ant Mote
Figure 13  Nectar Guard Tip
Figure 14  Nesting Box
Figure 15  Roosting Box
Figure 16  Birdhouse with easy open side for cleaning
Figure 17  Protective metal plates on birdhouse entrance
Figure 18  Arm Predator Guard
**Figure 1: Two vs. four sided hopper feeder**

<table>
<thead>
<tr>
<th>What it is</th>
<th>A box or house-like gravity feeder which provides feeding stations on two or four sides of the feeder</th>
</tr>
</thead>
</table>
| Benefits   | - Roof to keep seed dry  
- Holds the widest variety of seed  
- Large perching area for large and small birds  
- The greater the number of sides, the more birds that can feed |

**Figure 2: Tube feeder**

<table>
<thead>
<tr>
<th>What it is</th>
<th>A cylinder where the center is hollow so that it can be filled with seed</th>
</tr>
</thead>
</table>
| Benefits   | - The greater number of ports the more birds that can feed at once  
- Feeds peanut halves or smaller  
- Second most generic feeder, second to hopper feeders |
Figure 3: Basic suet cage

What it is: A metal cage with a plastic coating that can hold a seed cake or block of suet
Benefits: - Attract a different variety of clinging birds

Figure 4: Split peanut feeder

What it is: Split peanut feeders have mesh sides designed for birds to pick peanut pieces threw
Benefits: - A great source of fat for birds
**Figure 5: Platform feeder**

- **What it is**: Flat square framed feeders with wire in the bottom
- **Benefits**: - Great for feeding large seeds to large birds
  - Good for feeding all sizes of seed

**Figure 6: Hummingbird feeder**

- **What it is**: A bottle feeder that provides a nectar solution designed for hummingbirds
- **Benefits**: - A great way to attract birds that don’t come to standard, general bird feeders

**Figure 7: Goldfinch feeder**

- **What it is**: A specialized feeder similar in design to tube feeders but the port openings for the seed are substantially smaller
- **Benefits**: - Made to attract Goldfinches which do not typically feed at a general feeder
Figure 8: Sanctuary bluebird feeder

What it is: Wooden or plastic sided feeders with Plexiglas in the front and back panels that have small entrance holes

Benefits: - Provides protection for small birds while feeding by keeping out large birds

Figure 9: Nectar oriole feeder

What it is: A dish or bottle feeder that supplies nectar with larger openings than hummingbird feeders, designed for beaks of orioles

Benefits: - Good way to supply additional nutrient sources that will attract birds a standard feeder will not

Figure 10: Easy cleaning access

What it is: Tube feeder with an easy removable bottom

Benefits: - Makes it easier to clean the feeder
**Figure 11: Hopper feeder with removable wire bottom tray**

![Hopper Feeder](image)

<table>
<thead>
<tr>
<th>What it is</th>
<th>A removable wire tray at the bottom of a hopper feeder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits</td>
<td>- Provides drainage and an easy way to clean the feeder and remove wet/contaminated seed</td>
</tr>
</tbody>
</table>

**Figure 12: Ant mote**

![Ant Mote](image)

<table>
<thead>
<tr>
<th>What it is</th>
<th>A small dish-like feature that a hummingbird feeder hangs from</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits</td>
<td>- They prevent ants from traveling to the nectar</td>
</tr>
</tbody>
</table>

**Figure 13: Nectar guard tip**

![Nectar Guard Tip](image)

<table>
<thead>
<tr>
<th>What it is</th>
<th>Flexible plastic membranes that fits on the inside of the feeding ports on a hummingbird feeder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits</td>
<td>- They prevent flying insects from accessing the nectar</td>
</tr>
</tbody>
</table>


**Figure 14: Nesting box**

What it is: Roofed, hollow boxes with an opening at the top of the box. A Plexiglas viewing port on one side of a bird house.

Benefits:
- Provides a spot for cavity nesting birds to rear young. The easy open side allows the owner to monitor birds’ nest and watch nestlings mature.

---

**Figure 15: Roosting box**

What it is: Similar to nesting boxes, they are roofed, hollow boxes with pegged perches along their interior walls and an opening at the bottom of the box.

Benefits:
- They provide shelter from severe weather for cavity-nesting birds.

---

**Figure 16: Birdhouse with easy open side for cleaning**

What it is: A side of a bird house that has a hole which opens to allow for cleaning.

Benefits:
- Makes it easy for the owner to keep the house sanitary and clean.
**Figure 17: Birdhouse with protective metal plate on entrance**

A metal plate that is placed over a bird house entrance hole to keep predators from scratching and making the opening on the house bigger.

**Benefits**
- Provides protection to eggs, nestlings, fledglings, and adult birds
- Prevents unwanted birds/critters from nesting in the box

**Figure 18: Arm predator guard**

Plastic arms can also be placed over the opening of a house to make it harder for predators to reach inside.

**Benefits**
- Provides protection to eggs, nestlings, fledglings, and adult birds
Appendix C: Newsletters

Newsletter 1  November 2007
Newsletter 2  December 2007
Newsletter 3  January 2008
Newsletter 4  February 2008
Newsletter 5  March 2008
The Wild Times of Mason
All Your Backyard Nature News

Winterizing Your Yard for Wildlife

Cool weather signals a time to assess backyards and how wild-life friendly they are. By
providing food, water, and shelter we can make a difference even during the cold winter
months. In winter, birds & animals are looking for high-energy food, reliable water sources
for drinking and bathing, and places to find cover from predators and winter-weather.

Water can be scarce for wildlife in winter when natural sources are frozen. While most
creatures are seeking drinking water, birds are also looking for water to bathe in. Bathing
helps birds to stay warm by keeping their insulating feathers in top-top condition. Keeping
your birdbath clean and free from ice will help birds and other creatures to survive the win-
ter. Heated bird baths, which keep the water just warm enough to keep from freezing and
use little electricity, are also available.

Bird feeders, of course, see the most activity in winter when natural foods are scarce.
High-calorie foods like black-oil sunflower seed and suet can provide enough energy to help
birds through cold winter nights.

Provide places where wildlife can find cover from predators and cold winter weather,
especially in new suburban developments where the land has been cleared of vegetation.
Dead trees can be left standing to provide safe cavities for many species of wildlife, includ-
ing flying squirrels and raccoons. (Winter roosting pockets are also a helpful addition.)

Winter is also great time to create a brush pile. By collecting yard debris like branches,
swigs, and fallen leaves you can create cover for birds and small mammals, like rabbits. At
the same time you offer a place for hibernation for eastern box turtles, salamanders, and
insects.

Keep a field guide and a pair of binoculars at hand to help identify your winter visitors!

Woodpeckers

Southern Ohio enjoys five species of woodpeckers — the Downy, Hairy, Pileated, Red-bellied,
and Red-headed. The Pileated Woodpecker is the largest of Ohio’s woodpeckers and the Downy is
the smallest.

Woodpeckers are primarily cavity nesters and prefer to excavate their own holes, unlike many
other bird species. Song birds such as wrens, spar-
trows, and Bluebirds are secondary cavity nesters
which rely on woodpeckers to make their cavities
for them — you could say that woodpeckers are in
the bird realestate construction business. At times,
woodpeckers will use bird houses or nesting boxes
for nesting.

Woodpeckers eat insects but they also eat nuts, fruit. Oftentimes we find a wood-
pecker pecking on our house. In the spring wood-
peckers can flagged a home a lot to establish
their territory from other woodpeckers. In the winter, if they are hanging on your house you might
want to call an exterminator, they probably ants
inside your walls!

Woodpeckers are very interesting. Did you know
that woodpeckers have different foot shapes than
most birds? Many have two toes that point for-
ward and two that point backward, unlike most birds
which have three pointed forward and one back-
ward. This helps them maintain a strong contact
with surfaces while they are eating their food. Also
woodpeckers have different bone and muscle struc-
ture in their heads and backs to help absorb the
shock from all the pecking.

The most unique thing about woodpeckers is
their tongue. A woodpecker’s tongue is sticky like a
fly paper and can extend twice to four times the
length of its bill. Most woodpecker species also have a
barb at the end. The barb and the stickiness help the bird
catch insects when it licks its tongue into toot. It’s
porked in the tree. When the woodpecker is not
pecking its tongue around its skull.

Interested in the WBC staff speaking to your church group, boy scouts, class, or garden club? Our team is a
Naturalist, Biologist, Zoologist, and Environmental Scientist on staff who can speak on topics ranging from
Bizarre Birds, Nature Arts & Crafts, Beginning Birding,
Designing a Backyard Habitat. To see a complete list of offerings check out our website—www.wildbird.com/AS

Sign-up to receive the WBC of Mason monthly newsletter via email. Send us an email at WildBird10fuse.net
and we’ll add you to our private list.
Winter Jacuzzis for Song Birds

Birds need access to water year round and a water source will draw different birds to your yard during cold weather.

Keeping water fresh and clean is critical to your birds' health. If water is left uncleaned, birds will not drink or bathe in it, and it can become a breeding ground for bacteria and mosquitoes. It is also important to keep your bird bath clean and free from bacteria, algae, Simonella and other disease organisms that may foul the water.

To have a great birding experience provide both seed and water consistently to keep birds coming back again and again. Use a four seasons bird bath that can be kept outside during freezing temperatures or consider adding a small thermostatically controlled water heater to prevent icing in the winter. The idea is to keep the water from freezing but not to actually heat the water like for people Jacuzzis.

Bird baths ought to mimic puddles and should only be 1” to 3” deep at the most or birds will not drink from them. If your bird bath bowl is deeper consider only filling it partially or adding rocks and stones to create perching spots. Ideally, the outer rim of the bath should be shallow, and then gradually slope toward the center.

3 French Hens, 2 Turtle Doves & A Partridge in a Pear Tree

A simple, easy to follow gift guide for your bird-loving family member or backyard nature lover.

1. Suet Feeder with suet cake refills
2. Musical Indoor/Outdoor Chimes
3. A Hummingbird Gift Box Set
4. A Finch Feeder with supply of Nyjer seed
5. A Four Seasons Bird Bath
6. A Bird House with Stuffing
7. Birding ID Software
8. A Year's supply of bird seed (ask us how!)
9. A pair of Alpin Binoculars with straps
10. Stuffed Audubon Birds with real bird calls (great for stuffing stockings)
11. A copper topped bird feeder
12. A Bird Guidebook with Journal

Sign-up to receive the WBC of Mason monthly newsletter via email. Send us an email at WildBirds@fuse.net and we'll add you to our private list.
Winter Bird Watching  Whether you’re watching from the warmth of your home or hiding around outside, there are several steps you can take to make sure your backyard feeding station is a hot spot for wintering birds. One of the most important rules is to be consistent. Once birds know that your yard offers accommodating amenities they will return on even the coldest of days. So what do birds need? First, of course, is nourishment. It is important to keep seed available and fresh. A special bonus is to make tree nuts, dried fruit, and suet available. These winter additions help birds build up fatty reserves and provide critical sources of protein for energy. Second, a non-frozen water source. Not only do birds use water for drinking but most importantly they use water to keep their downy undercoat clean. A clean undercoat means good insulation and heat retention – a critical necessity on an icy winter night. Third, shelter. During the windy, snowy winter birds need places to escape the elements. As developers threaten natural habitats, we can lend a hand by keeping out nesting boxes, putting up roosting boxes or pockets, or creating a brush pile for shelter. Even a simple lean-to or an old fence railing can provide relief from wind, rain and snow. And lastly, enjoyment! Place feeders, water, and roosters near your windows so you can watch. Keep your bird journal and camera close by and enjoy the scenery!

Black-capped Chickadees Part of the titmouse family, the chickadee is one of the most frequent and favored visitors at bird feeders. They often travel in small groups of 4-5 and during the winter join rambunctious flocks of songbirds to form a larger flock. Chickadees often “snack” bird seed and eat it at a different location. They also hide seeds and food items for later recovery. Each item is placed in a different spot and a bird can remember thousands of hiding places. Being cavity nesters, the chickadee will make its nest in old woodpecker holes or dig their own holes in a rotoried tree trunk or stump. They are predominantly insect eaters but during winter seek out suet, blackoil sunflower seeds, shelled peanuts, and dried blueberries and cherries.

Heated Bird Baths  Heated bird baths can offer bird watchers not only more birds, but an even greater diversity of birds to watch during the winter bird feeding season. Offering water is the single most important resource you can give birds in winter. Birds need water in both summer and winter. Much energy is wasted searching for open water sources in winter. By providing a heated water source, you’ll not only be helping the birds, but you will also have a greater variety of birds to watch. Not all birds will come to your feeders, but all birds need water. A heated bird bath will introduce you to birds you didn’t know were in your backyard during winter. Remember the water still needs to be “non-frozen” not
February is National Bird Feeding Month

Whether you're watching from the warmth of your home or taking a hike around outside, there are several steps you can take to make sure your backyard feeding station is a hot spot for wintering birds.

One of the most important rules is to be consistent. Once birds know that your yard offers accommodating amenities, they will return on even the coldest of days. So what do birds need? First, of course, is nourishment. It is important to keep seed available and fresh. A special bonus is to make tree nuts, dried fruit, and suet available. These winter additions help birds build up fatty reserves and provide critical sources of protein for energy. Second, a non-frozen water source. Not only do birds use water for drinking but most importantly they use water to keep their downy undercoat clean. A clean undercoat means good insulation and heat retention - a critical necessity on an icy winter night. Third, shelter. During the windy, snowy winter, birds need places to escape the elements. As development threatens natural habitats, we can lend a hand by keeping out our nesting boxes, putting out roosting boxes or pockets, or creating a brush pile for shelter. Even a small simple lean-to against a fence railings can provide relief from wind, rain and snow. And lastly, enjoy! Place feeders, water, and roosters near your windows so you can watch. Keep your bird journal and camera close by and enjoy the scenery!

Early Bird Program Saves You $$$

Some call it a seed loyalty program, or a seed storage club, or even an Early Bird Program but the nitty gritty of it is that it just plain saves you money. How does it work? We will set up an account for you and you make a minimum deposit of $10. You are then entitled to 15% off all seed and seed products sold in this account. So how does this benefit you? Well, during our Annual Edibles Sale in February, when all edibles are 15% off, you receive the 15% discount and the benefit of savings from the Early Bird Account. In total - you benefit from 30% of savings! So ask us about setting up an Early Bird Account and save some money!

Need a Fundraising Opportunity?

Looking for a way to raise money for your group, club, organization, or church? We can help! Contact Patricia or Mary at the Wild Bird Center to ask about our exciting seed sale fundraising program!
Purple Martins are on the Way

Purple Martins are a coveted cavity nesting bird common in Ohio. They are the largest member of the swallow family in North America. Martins spend their summers in the U.S. and their winters in Brazil. Purple Martins are monogamous to their breeding mate and right now the males are headed north to scout out nesting spots for the 2008 season. They typically return to nest in same spot every year, frequently even the same compartment of a specific house.

A common misconception about Purple Martins is that they eat large quantities of mosquitoes. Actually Martins prefer larger insects like dragonflies, mayflies, moths, and butterflies. They also typically feed at heights of 100 feet or greater, where few mosquitoes are found. They also focus on insects that are active during their feeding time, during daylight hours. Purple Martins are aerial insectivores, doing virtually all of their eating and drinking while in flight. They may not solve your mosquito problems but they will devour hundreds of other flying insects in your backyard. Because they feed only on flying insects they are vulnerable to starvation during droughts or lengthy periods of rain.

While some populations of Martins are undergoing long-term declines, the Purple Martin is not an endangered species. However populations of the Rookies are one of the few bird species that are almost entirely dependent on humans for housing. Populations west of the Rockies nest mostly in abandoned woodpecker cavities. Being a Purple Martin landlord requires a strong level of enthusiasm and commitment. Check out some tips for attracting these birds at the Purple Martin Conservation Association’s website: http://purplemartin.org/main/mgt.html. Or to track Purple Martins migration path - visit here: http://purplemartin.org/sootyreport.

Deterring Starlings and Grackles

If you feed the birds chances are you have battled with Starlings and Grackles. These black birds come in large groups to your feeders, scaring away desirable birds and making a mess of your seed. The European Starling’s feathers are glossy black, heavily spotted with cream or gold spots. This species was introduced to the U.S. in 1890, when 100 birds were intentionally released in Central Park by a group who wanted all the birds mentioned in William Shakespeare’s plays to be present in the United States (Starlings being mentioned in Henry IV). This species is now in number greater than 2 million in the U.S., proving itself very successful as an invasive species.

The Common Grackle can be recognized by its iridescent purple and bronze plumage. The Common Grackle is an opportunistic forager, taking advantage of whatever food sources it can find. It will forage for invertebrates and mice, wade into water to catch small fish, and sometimes kill and eat other birds at bird feeders.

There are several tips that can be successful to avoid these blackbirds from taking over your feeders. First of all you can buy feeders specifically targeted to deter these birds. Caged feeders and upside-down feeders are great feeder styles to try. You can also try rotating seed types. Sunflower is less desirable for the Starling and Grackle. If you put this seed right out by itself then hopefully they will move on to another food source. And if you feed your birds suet by switching to a plain suet cake that doesn’t have nuts and berries. If these don’t work you can always try bird nets or sound recordings, however these can also deter other species of birds.

Cardinal Mix

Want to attract more Cardinals to your bird feeders? Then come try the WBC’s fantastic Cardinal Mix. This blend contains Black Oil Sunflower, Gray striped Sunflower, and Sunflower. Most birds
Appendix D: PowerPoint Presentations

Presentation 1  Backyard Critters and Recycling
Presentation 2  Birds, Bugs, and Butterflies
Presentation 3  Parasitic Birds
Presentation 4  Birds of the Rainbow
Presentation 5  Kids Wonderful World of Birds
Presentation 6  Wonderful Birds of Winter
Presentation 7  Life Emerging
For example, you can tell what a bird eats and where it nests just by looking at it. Birds have specialized beaks to help them eat. Imagine if people all had different mouths depending on what they liked to eat!

**Yellow-rumped Warbler** - It is one of the most common warblers in North America. It is the only warbler able to digest the waxes found in bayberries and wax myrtles. Its ability to use these fruits allows it to winter farther north than other warblers, sometimes as far north as Newfoundland. **Sacred Ibis** – probe in mud for food items, usually crustaceans, various fish, frogs, as well as insects. It lives in marshy wetlands and mud flats, both inland and on the coast. It will also visit cultivation and rubbish dumps. **Cliff Swallow** – flying insects **Black-headed Grosbeak**- primarily insects but can crush seed and fruits with beak
Chipping Sparrow – Grass and other small seeds, small fruits, and insects.
American Goldfinch – Seeds, especially of composite flowers.
Few insects.
Northern Cardinal – Seeds, fruits, buds, and insects

Hummingbird – nectar
Flamingo – tiny water plants and water animals
Toucan – fruit, nuts, and berries
Waterfowl - The Mallard uses beak to filter plants and small invertebrates as it dabbles in the water, and it is also effective for grazing on grass.

Bald Eagle - readily prey upon fish, birds, and small mammals
Gull - beak is effective at handling fish, crabs, sea stars, shellfish and carrion.
Shoebill Stork - preying on lungfish and similar fish. A very large bird, averaging 4 ft tall, 12.3 lbs with a 7.7 ft wingspan. It lives in tropical east Africa in large swamps from Sudan to Zambia.
Pelican – fish and other water animals
Kingfisher - Fish. Also aquatic invertebrates, insects, and small vertebrates.
Birds have specialized feet which can help identify what they eat and where they live.

Climbing food: used to help birds cling to the sides of trees
Perching food: help birds lock their feet around a branch

Lobed Feet - have toes with stiff scale-covered flaps that extend to provide a surface analogous to webbing on a duck as an aid in swimming. Helps Coots walk on the surface of marshy areas where they are frequently found.
Webbed feet- thin webbing between toes to help the bird swim better.

Hunting feet- sharp talons to help catch live prey.
Birds build a variety of homes. Some build nests in trees, some build them on the ground. They can be very tiny or very large. Birds build nests to protect themselves, their eggs, and their young from predators and from adverse weather.

**Red-tailed Hawk** - they build a stick nest in a large tree 13 to 70 ft off the ground or on a cliff ledge 115 ft or higher above the ground, or may nest on man-made structures. The nest is generally 28 to 38 inches in diameter and can be up to 3 feet tall. The nest is constructed of twigs, and lined with bark, pine needles, corn cobs, husks, stalks, aspen catkins, or other plant matter.

**Hummingbird Nest** - The outer part is covered with moss and plant fibers. Sometimes it is shingled with lichens. The rest is made of plant down and spider webs. Spun by the female from spider webs and plant material. Inner diameter of about 1.5in; the outside of the nest is about 2.25in tall.

**American Robin** – An open cup of grass and twigs held together with a thick layer of mud. Lined with fine dry grass. Nest is usually relatively low in a tree on a firm branch with dense foliage, but can be placed from ground to treetop.

**Baltimore Oriole** - Gourd-shaped and woven from hair, plant fibers, and synthetic fibers. Hung by the rim from thin branches or a fork in a tall tree.

**Weavers** – they use straw and other natural materials, building nests that can reach 20 feet across. This one contains more than 135 chambers and 200 birds.

**Chimney Swift** - The swift makes its nest out of sticks and various other materials, binding it together with its glue-like saliva. The nests are located on vertical surfaces in barns, chimneys and hollow trees.

**Ovenbird** – a woven domed cup of dead leaves and plant stems, with the entrance on the side. Placed on ground. Lined with hair. It weighs 7-12 pounds.

**Bald Eagle** - Of all birds in the world, Bald Eagles hold the record for the biggest nest ever built. Large nest of sticks. Lined with finer woody materials. Reused over many years. Placed in large tree, often the largest in the area. Rarely nests on ground or cliff. One nest was 20 feet deep, 9.5 feet wide, and weighed 6,000 pounds.

Many birds also use bird houses that people provide. These birds are called cavity nesters.

The size of the house, the hole, and the height at which you hang the house all depend on the birds you want to attract.
The size of the house depends on the size of the bird and its eggs. **Hummingbirds**: 0.25” x 0.5”, roughly the size of a small jellybean. They are white, non-glossy. **Red-winged blackbird** - about 0.98 by 0.69 inch pale blue eggs are spotted with brown or purple. **Ostrich** - an average egg being 6 inches long, 5 inches wide, and weigh 3 pounds. They are shiny and whitish in color. **Robins** - 1.1 inches long, blue. **Red-tailed Hawk** - shells are a bluish-white with occasional brown splotches and have a granulated or smooth matte surface. The eggs are usually about 2.4 x 1.9 in.

[pass eggs around room]

---

Conservation is the careful use of a natural resource in order to prevent depletion.

Wildlife conservation officers have three main jobs:
- **Research** - to learn more about animals and the environments that they live in
- **Education** - teach people about wildlife, to help them respect and protect nature
- **Management** - to help people and animals interact in a mutually beneficial way, to mitigate human damage. The managers also implement laws

But conservation officers are not the only ones that can help protect the environment, you can get involved too.

---

What happens if we don’t protect the environment and wildlife???
- What is the difference between Endangered Species and Extinct Species?
  - Can you name an animal that is endangered?
  - Can you name an animal that is extinct?

 **Endangered** species are plant and animal species that are in danger of dying out. Over 8,300 plant species and 7,200 animal species around the globe are threatened with extinction.

**Chimpanzee** - Habitat destruction is the greatest threat, also hunting and commercial exportation.
Population - An estimated 100,000 to 200,000 chimpanzees remain in the wild. They live in 21 different African countries.

**African/Asian Elephant** - Habitat loss, increasing conflict with human populations taking over more and more elephant habitat and poaching for ivory are additional threats that are placing the elephant’s future at risk.
Population - there are an estimated 450,000 - 700,000 African elephants and between 35,000 - 40,000 wild Asian elephants.

**Tiger** - Illegally killed or poached and habitat loss due to human population growth and expansion.
Population - estimated total of around 4000-5500 exist in the wild.

**Cook Inlet Beluga Whale** - Unregulated hunting, strandings, disease, contaminants, shipping vessel traffic, noise, prey declines, predators (such as the killer whale) and human-induced habitat changes.

**Three toed sloth** - Habitat destruction has caused them to be endangered. The sloth is the world’s slowest mammal, so sedentary that algae grows on its furry coat. The plant gives it a greenish tint that is useful camouflage in the trees of its Central and South American rain forest home.

**Black rhino** - Endangered due to poaching. Black rhinos are browsers that get most of their sustenance from eating trees and bushes. They can weigh up to 3000 pounds.

**Loris** - Threatened due to habitat destruction, the Loris is a king of primate that feed on large mollusks, birds, insects, and fruit. Lorises generally move slowly and regularly, but can move very quickly when striking to kill their prey. They have opposable thumbs and big toes. They are about 10 to 15 in long.
Extinction is the end of the existence of a group of organisms, caused by their inability to adapt to changing environmental conditions. Extinction is a normal process in the course of evolution but it can be impacted by other organisms. Mass extinction refers to any episode where there was a loss of multiple species. The term is generally reserved for truly global extinction events—events in which extensive species loss occurs in all ecosystems on land and in the sea, affecting every part of the Earth's surface. Scientists recognize five such mass extinctions in the past 500 million years.

Reasons for extinction:
- Habitat alteration, Exploitation, and Introduction of Exotic Species
- Wooly mammoth - Elephant like animals that were equipped with long curved tusks and, in northern species, a covering of long hair.
- Saber tooth tiger - generally more robust than today's cats and were quite bear-like in build. They had canine teeth which could be up to 20 cm long, and extended down from the mouth even when closed.
- Dodo - was a flightless bird that was only found on the island of Mauritius in the Indian Ocean. They were related to doves and pigeons, and stood about three feet tall. They lived on fruit and nested on the ground.
- Giant ground sloth - Despite their size they were probably only used to strip leaves or bark from plants. Their teeth were small and blunt in keeping with their herbivore diet.
- Archelon, The Giant Turtle - was a slow moving creature of the ancient seas during the Cretaceous (65 to 146 million years ago). Some remains measure over 15 feet long.
- Steller's Sea Cow - They grew as large as 35 feet long and weighed up to three-and-a-half tons.
- Wooly Rhinosaurous - The Wooly Rhinoceros lived in the tundra of Europe and Asia. It ate grasses and other plants, was 11 feet long, weighed 2400 lbs, and was hunted by humans. Conservation officers are not the only ones that can help protect the environment, you can get involved too.

There are many things you can do to help the environment and its residents.

- Planting trees not only reduce the amount of carbon dioxide in the air, but they can provide shade for your home (reducing energy costs) and produce fruits that you won’t have to buy at the store.
- Pick a corner that’s out of the way and start your own “garbage garden.” Put fresh soil over grass clippings and food scraps (egg shells, apple cores, coffee grounds, etc.). Then, once or twice a week, turn the whole pile over with a shovel. This lets air into the soil to grow rich and healthy composting material for gardens and lawns. Is a great way to reduce your waste and help your garden at the same time. You can include most food scraps and material like cardboard, which will biodegrade in your yard and produce nutrient-rich fertilizer.
- Did you know that you can buy toilet paper, paper towels and stationery made from recycled paper, tile from crushed light bulbs, garden hoses from used tires and yard furniture from recycled plastic bottles? Look for the recycle symbol and buy smart.
- Clippings won’t damage the lawn. In fact, mulching the grass clippings are good for lawns. And avoiding those bags of grass clippings will reduce the amount of trash that gets dumped in landfills.
- Use the Sunday comics, samples from old wallpaper books, fabric remnants or recycled wrapping paper so you’ll get more than one use out of this paper.
• Organize a neighborhood clean-up
• Use and re-use cloth bags at the grocery store
• Fix leaky pipes and faucets
• Discard plastic beverage rings ONLY AFTER cutting open all of the loops

Suggest that your classroom, scout troop, Sunday school class, or neighborhood friends host a neighborhood clean-up day to pick up litter. It’s a great opportunity to promote recycling in your community.

• Instead of carrying groceries in paper or plastic bags that get thrown away, take your own cloth bags to the store. Even paper or plastic bags can be used several times, and some stores offer a discount for re-using their grocery bags.

• One tiny leak can waste up to 50 gallons of water a day! Save water by taking short showers and washing only full loads of laundry.

• These six-pack plastic rings are harmful to birds and other creatures that often get caught in the plastic loops. If you have a choice, buy soda six-packs made from biodegradable plastic.

• Adjust the temperature in your house
• Save energy in the bathroom
• Grocery shop wisely
• Reduce, Reuse, Recycle, Refuse

Save valuable energy by keeping AC above 75 degrees in your house. Turning off the AC in your car will increase gas mileage and save valuable energy. By turning the heat down just a few degrees, Americans could save more than 500,000 barrels of oil a day. If you’re chilly, put on a sweater instead of turning up the heat!

• Turn off the water when you aren’t using it! Take short showers instead of baths (showers use less H2O), brush your teeth with the water off, and buy a “flush saver” for your toilet (or put a brick in the tank).

• When your family shops, avoid buying things with layers of packaging. Buy the largest sizes possible. You won’t have to shop as often, and you won’t have as much to throw away.

• Remember the three R’s and you’ll have all the information you need to help the environment. Reduce your use of things like water and energy, reuse products before you throw them away and make sure you’re recycling as much as you can.

• Recycling means that something old can be made into something new.

Saves energy
Reduces toxic emissions
Helps to save the world’s resources rather than wasting them by throwing them in the bin.

Mount Rumpke is a megafill, one of the largest landfills in the nation. It was started in 1945, and grows by 2 million tons of household and industrial wastes per year. 2,000,000 tons [short, US] = 4,000,000,000 lbs that is over 65,000,000 8 year olds (at average weight)
Metal
You wash and squash your empty can, then put it into your recycling box/bin at home, or take it to a can recycling bank.
The metal cans are driven to a factory to be recycled.
The metal is shredded into small pieces and cleaned.
The metal is melted in a furnace, then rolled into a new sheet of metal.
The metal can be shaped into new cans, or other things made of metal, e.g. cars, airplanes...
The new metal cans are filled with food or drink and taken to shops to be sold.
Aluminum can that is recycled is back on the grocery shelf as a new can, in as little as 60 days.
Recycling one aluminum can saves enough energy to run your television for three hours.
Recycled aluminum saves 95% energy vs. virgin aluminum
20 recycled cans can be made with the energy needed to produce one new can.
Recycled aluminum reduces pollution by 95% (Reynolds Metal Co.).
Aluminum can be recycled indefinitely, nearly 2/3 of the aluminum ever produced is still in use today.
Enough aluminum is thrown away to rebuild our commercial air fleet 4 times every year.

Source of Aluminum:
Aluminum originates as an oxide called alumina. Because aluminum itself does not occur in nature as a metal, the processing of aluminum took a giant leap forward with the advent of electricity.

Deposits of bauxite ore are mined and refined into alumina—one of the feedstocks for aluminum metal. Then alumina and electricity are combined in a cell with molten electrolyte called cryolite. Direct-current electricity is passed from a consumable carbon anode into the cryolite, splitting the aluminum oxide into molten aluminum metal and carbon-dioxide.

Glass
The filled glass bottles and jars are sent to shops where they are sold.
The melted glass is shaped into new jars and bottles, which are taken to a factory to be filled with food or drink.
The glass is melted in a furnace at very high temperatures.
Each color of glass is recycled separately. Any small pieces of metal, cork or plastic are removed and the glass is crushed into small pieces called "cullet".

Recycled glass saves 50% energy vs. virgin glass (Center for Ecological Technology); recycling of one glass container saves enough energy to light a 100-watt bulb for 4 hours (EPA)
Recycled glass generates 20% less air pollution and 50% less water pollution (NASA)
1 ton of glass made from 50% recycled materials saves 250 lbs. of mining waste (EPA)
Glass can be reused an infinite number of times; over 41 billion glass containers are made each year (EPA)
How it’s made:
Sand, soda ash, and limestone

Paper
The new sheets can then be made into new newspapers, books and magazines to be sold in shops.
The paper goes through large rollers which squeeze out the water and fibers the paper into big sheets.
The shredded paper has water added and is made into pulp which looks a bit like porridge and has the ink cleaned off.
You put your old paper into your recycling box at home, or take it to a paper bank.

Recycled paper saves 60% energy vs. virgin paper (Center for Ecological Technology)
Recycled paper generates 95% less air pollution: each ton saves 60 lbs. of air pollution (Center for Ecological Technology)
Recycling of each ton of paper saves 17 trees and 7000 gallons of water (EPA)
Every year enough paper is thrown away to make a 12’ wall from New York to California
Plastic

You wash and squash your empty bottle and take it to a plastic bottle recycling bank, or you may be able to put it in your recycling box/bin at home.

The plastic bottles are taken to a factory for recycling.

The bottles are sorted into different types of plastic to be recycled separately.

The sorted plastic is washed and shredded into small flakes.

The plastic flakes are melted down and can be made into new items.

The new plastic items are sold in shops.

Plastic milk containers are now only half the weight that they were in 1960 (EPA)

If we recycled every plastic bottle we used, we would keep 2 billion tons of plastic out of landfills (Penn State)

According to the EPA, recycling a pound of PET saves approximately 12,000 BTU's.

We use enough plastic wrap to wrap all of Texas every year (EPA)
Presentation 2: Birds, Bugs, and Butterflies

Slide 1

Birds, Bugs, and Butterflies
A Review of Nature's Winged Creatures

Patrick McCollum
The Bird & Bug Guy and Naturalist
with
Nicole Sojda
Environmental Scientist

Slide 2

Animated joke about pet bird

Slide 3

Animated joke about pet bird
Birds

- Bipedal, warm-blooded, vertebrate, lays hard-shelled eggs
- Beak with no teeth, feathers
- Four chambered heart
  - 75% / 25%
- 10,000 living species – 1,200 threatened
- Found from Arctic to Antarctic
- Monogamous, Polygynous & Polyandrous

Migration

- Triggered by light
- Up to 40,000 miles
- Sooty Shearwaters
- Social, communicating through song
- Range in size from 2 inches to 9 feet

Birds are Theropod Dinosaurs

- Crop for storage & gizzard with stones for grinding
- Poor sense of smell
- Ultraviolet (UV) sensitive cone cells
  - Plumage naked to human eye
  - Beaks adapted for eating
**Birds**

- Nectar, insects, fruit, plants, seeds, carrion

---

**Important part of ecological system**

- Pollinators
- Natural pest control
- Poultry meat for humans
- Feathers for insulation
- Guano for fertilizer
- Pets
- Hobby for “Birders”

---

**Downy Woodpecker**

The smallest woodpecker in North America.

**Habitat:** These birds are mostly permanent residents. (Northern birds may migrate further south; birds in mountainous areas may move to lower elevations.) Downy Woodpeckers nest and roost in tree cavities.

**Food:** They mainly eat insects, also seeds and berries. In winter, especially, Downy Woodpeckers can often be found in treed suburban backyards and will feed on suet at birdfeeders.

**Life Span:** 1-2 years, oldest 11 years

---

**Northern Cardinal**

**Habitat:** Its natural habitat is woodlands, gardens, shrublands, and swamps. This bird is a permanent resident throughout its range, although it may relocate to avoid extreme weather or if food is scarce.

**Food:** The Northern Cardinal mainly eats grain but will also feed on insects and fruit.

**Reproduction:** Three or four eggs are laid in each clutch and it takes 12 to 13 days to hatch. The young fledge 10 to 11 days after hatching. Two to three, and even four, broods are raised each year. The male cares for and feeds each brood as the female incubates the next clutch of eggs.

**Life span:** The oldest wild Cardinal banded by researchers lived at least 15 years and 9 months, although 28.5 years was achieved by a captive bird. The average lifespan is only about a year.
**American Goldfinch**  
*Male in breeding plumage and winter plumage*

**Habitat:** Prefers open country where weeds thrive, such as fields, meadows, flood plains, as well as roadides, orchards, and gardens.

**Food:** It is mainly granivorous, but will occasionally eat insects which it feeds to its young in order to provide them with protein. However, it also consumes tree buds, maple sap, and berries.

**Reproduction:** They lay four to six bluish-white to greenish-blue eggs, which are oval in shape and roughly the size of a peanut. Incubated by the female alone, the male brings her food as she nests. The chicks hatch 12–14 days after incubation begins.

**Life span:** 7 years

**Blue Jay**

**Habitat:** The Blue Jay occupies a variety of habitats within its large range, from the pine woods of Florida to the spruce fir forests of northern Ontario. It is less abundant in the heavier forests, preferring mixed woodlands with oaks and beeches.

**Food:** Its food is sought both on the ground and in trees and includes virtually all known types of plant and animal sources, such as acorns and beech mast, weed seeds, grain, fruits and other berries, peanuts, bread, meat, eggs and nestlings.

**Reproduction:** Both sexes build the nest and rear the young, though only the female broods them. The male feeds the female while she is brooding the eggs. There are usually 4–5 eggs laid and incubated over 16–18 days. The young are fledged usually between 17–21 days.

**Life span:** 4 years, oldest 16 years

**Tufted Titmouse**

**Habitat:** Deciduous and mixed woods. These birds are permanent residents and often join small mixed flocks in winter.

**Reproduction:** They nest in a hole in a tree, either a natural cavity or sometimes an old woodpecker nest. They are known to pluck hair from living animals, including humans, to make their nests.

**Diet:** Insects and other animal matter, seeds, fruit, and mast. Titmice hoard food in fall and winter. They enjoy suet and mealworms.

**Life span:** 2 years, oldest 13 years

**Dark-eyed Junco**

The Dark-eyed Junco includes five forms that were once considered separate species. The "slate-colored junco" is the grayest, found from Alaska to Texas and eastward.

**Habitat:** Northern birds migrate further south; many populations are permanent residents. Breeds in coniferous and mixed forest.

**Diet:** These birds forage on the ground. In winter, they often forage in flocks that may comprise several races. They mainly eat insects and seeds.

**Life span:** 10 years
Carolina Chickadee
Will breed with black capped chickadee
Habitat: Deciduous and mixed deciduous/coniferous woodlands, swamps, riparian areas, open woods and parks. Also in suburban and urban areas. Nest in holes, typically in dead trees or rotten branches. Will use nest boxes.
Food: Insects, spiders, seeds, and fruits.
Life span: 7 years, oldest 12

Eastern Bluebird
Habitat: Frequently used grassy areas include meadows, pastures, yards, roadsides, power line rights-of-way, and farmlands. Open grassy areas provide foraging habitat, and nearby trees serve as perching or possible nesting sites.
Diet: Approximately two-thirds of the diet of an adult consists of insects and other invertebrates. The remainder of the bird's diet is made up of wild fruits (such as blackberries, bayberries, fruit of honeysuckle, Virginia creeper, red cedar, and pokeberries).
Life span: 6 years
Population is in serious decline due to habitat destruction, Pesticide use, and Nest predation by non-native introduced species.

European Starling
Habitat: Uses a variety of habitats with open country, fields, and trees for nesting; especially near people in agricultural and urban areas.
Food: Broad diet of many kinds of invertebrates, fruits, grains, seeds, and garbage.
Life span: 15 years
Their North American population, estimated at over 200 million birds, all descended from 100 birds released in New York's Central Park in the early 1890s. A group dedicated to introducing America to all the birds mentioned in Shakespeare's works set the birds free.

Common Grackle
Habitat: Found in a variety of open areas with scattered trees, including open woodland, boreal forest, swamps, marshes, agricultural areas, urban residential areas, and parks.
Food: An opportunistic forager, taking advantage of whatever food sources it can find. Primarily insects, other invertebrates, grain, seeds, acorns, and fruit. Also fish, small birds, mice, and frogs.
Life span: 10 years
Predators and Parasites

There are basically two categories of insects used as beneficials - predators and parasites. Both can do a tremendous job of controlling pests in your garden. Predators are organisms that kill and feed on their prey outright. They are generally larger than their prey and must eat lots of prey to complete their development. Parasites, on the other hand, are usually smaller and often weaker than their prey. They lay eggs on or within a host insect. The immature larvae use the host for food over time. A parasite will use only one or a few insects for food.

Tips to Maintain Beneficial Insects

• Don't use chemicals. If you must apply pesticides, stick with less toxic ones
• Provide water. A simple dish or pan filled with pebbles will provide drinking water for a variety of insects.
• Provide shelter. Leaving some leaf litter and debris under shrubs may provide beneficial insects a place to hide during adverse conditions such as hot summer days.
• Increase the diversity of your landscape. Grow a variety of plants to support a variety of insects. Don't be overly concerned with neatness, either.
• Do not use zapper lights that electrocute insects. These lights may kill more beneficial insects than pests.

Bugs (Insects)

• A major group of arthropods and most diverse group of animals on earth
• Over 1 million described species
• 2-50 million remain undiscovered

<table>
<thead>
<tr>
<th>Insects</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dragonfly</td>
<td>5,000</td>
</tr>
<tr>
<td>Praying Mantis</td>
<td>2,000</td>
</tr>
<tr>
<td>Grasshopper</td>
<td>20,000</td>
</tr>
<tr>
<td>Butterfly &amp; Moth</td>
<td>170,000</td>
</tr>
<tr>
<td>Fly</td>
<td>120,000</td>
</tr>
<tr>
<td>True Bug</td>
<td>82,000</td>
</tr>
<tr>
<td>Bees, Wasp, &amp; Ant</td>
<td>360,000</td>
</tr>
<tr>
<td>Beetles</td>
<td>110,000</td>
</tr>
</tbody>
</table>

Important part of ecological system
• Pollinators (in decline)
• Produce honey, wax, lacquer, and silk
• Medical (maggots)
• Entomophagy
• Scavengers that clean up & recycle
• Pest Control – good eating bad
Bugs (Insects)

- The average square yard of garden contains 1,000 bugs
- What good bugs do for you in the garden
  - Pollination
  - Break down & oxygenizes soil
  - Recycle waste & create compost
  - Control bad bug populations

www.WildBird.com/MAS WILD BIRD CENTER of MASON

---

Bugs (Insects)

- Beneficial bugs – predators & parasites
- Encourage or Import
- Integrated Pest Management (IMP)
  - Don't use chemicals
  - Provide Water & Shelter
  - Increase diversity of landscaping
  - Don't use zappers

www.WildBird.com/MAS WILD BIRD CENTER of MASON

---

Lady beetles – ladybugs [larval stage]
There are over 5,000 species, more than 450 native to North America alone.

**Diet:** They are generally considered useful insects as many species feed on aphids or scale insects, which are pests in gardens, agricultural fields, orchards, and similar places. They are opportunistic feeders and will eat pests other than aphids, such as mites and insect eggs. They are helpful for growers any crop that is attacked by aphids.

**Habitat:** Lady beetles are mobile as adults and reasonably so as larvae, and they are generalists. They will not remain on a plant, or in the vicinity, once the readily accessible prey has been consumed.

**Life span:** 28 days in their immature stages, then around 11 months as adults.

**Praying mantis**
There are about 20 species native to the United States. Two species (the Chinese mantis and the European Mantis) were deliberately introduced to serve as pest control for agriculture, and have spread widely in both countries. Many people believe that the female mantis always bites the head off her mate, BUT it's not true. It happens more in captivity, and even then she eats her mate only 15% of the time.

**Diet:** Although their diet primarily consists of small invertebrates including flies and aphids; large mantises have been observed eating small vertebrates such as lizards, mice, snakes, and small birds such as hummingbirds.
Green lacewings
Habitat: widespread in woods and fields.
**Diet:** The larvae are the only predatory form of this insect. Lacewing larvae can tackle a great number of aphid species, as well as other soft-bodied pests such as immature scale insects, mealybugs, whiteflies and other insect eggs.
**Life span:** 30 days in their immature stages, and about two months as adults

Fireflies
Fireflies produce a chemical called luciferin that reacts with oxygen to create light.
**Habitat:** Many species can be found in marshes or in wet, wooded areas where their larvae have abundant sources of food.
**Diet:** Fireflies eat at night. Immature fireflies, or larvae, consume snails and worms. Adult fireflies eat nectar or do not eat at all.
**Life span:** 1-3 weeks

Assassin bugs
Nearly 3000 species of assassin bugs exist and scientists feel that many more will be discovered.
**Diet:** The prey on a broad range of prey including fleahoppers, lygus bugs, aphids, caterpillar eggs and larvae and boll weevils. They will also eat other preaceous insects such as lady beetles and big-eyed bugs. Considered beneficial. Assassin bugs lie in wait for insects and then stab the prey with their proboscis (the beak) and inject a toxin that dissolves tissue. The assassin bug then sucks up the other bug's tissues.

Parasitic wasps
Too small to be noticeable, these miniwasps don't bother people or pets. These parasites reproduce by laying their eggs in a pest host (adult or egg). The immature wasp feeds inside and kills its host, causing the insect or egg to turn dark. A round hole can be often seen where the adult parasite has chewed its way out.
**Diet:** Different species may attack aphids, whiteflies, and butterflies or moths, such as cabbage loopers and hornworms.

Butterflies in the world: ~20,000 species
Butterflies in the lower U.S.: ~575 species
Butterflies in Ohio: ~14 species recorded

Range in size from 3/8 inch to 11 inches
The largest butterfly, Queen Alexandra's birdwing of Papua New Guinea, has a wingspread of about 11 inches.
One of the smallest butterflies is the western pygmy blue of North America. It has a wingspread of about 3/8 inch.

The greatest diversity of butterflies occurs in Central and South America where there are around 7500 species.

Play an important role as pollinators
Butterflies

- Lepidoptera Order of Insects
  - Lepidos = scales
  - Ptera = wings
- Life Span – 2 to 4 weeks but Monarchs up to 9 months
- Symbiotic relationship with ants
- Most noted for their life cycle

Ants and Butterflies: In some species, larvae are attended and protected by ants while feeding on the host plant, and the ants receive sugar-rich honeydew (secretions high in amino acids and carbohydrates) from them, throughout the larval life. The butterfly larvae in turn obtain protection from parasitism and predation from ants in return.

1. A butterfly begins its life as a tiny egg. Eggs can be laid from spring, summer or fall. This depends on the species of butterfly. Females lay a lot of eggs at once so that at least some of them survive.
2. A caterpillar hatches from the egg and feeds on the plant it was laid on. Its job during the larva stage is to eat. Caterpillars can grow 100 times their size during this stage. For example, a monarch butterfly egg is the size of a pinhead and the caterpillar that hatches from this tiny egg isn't much bigger. But it will grow up to 2 inches long in several weeks. When the caterpillars skin becomes too small, the old skin splits open and the caterpillar pops out with a new skin on. This happens four or five times.
3. When the caterpillar is fully grown it makes a little silk pad on a leaf or twig and attaches itself to it. The caterpillar's skin splits for the last time. It is now in the pupa stage or the chrysalis. The wings, legs and rest of the butterfly are formed inside the chrysalis. This stage can last from a few weeks, a month or even longer. Some species have a pupa stage that lasts for two years.
4. The last stage is the adult stage when the chrysalis splits and the butterfly comes out. As a larva its job was to eat, now as a butterfly its job is to mate. Most adult butterflies live only one or two weeks, but some species hibernate during the winter and may live several months.

Butterflies use ultraviolet light in order to navigate
How can you tell the difference between a Moth and a Butterfly?

Most butterflies fly during the day, there is only 1 known species in the tropics that flies at night. The majority of moths, on the other hand, fly at dusk or at night, however not all of them.

(2) Most butterflies rest with their wings held upright over their bodies. Most moths rest with their wings spread out flat.

(3) Moths have a jerky flight pattern where as butterflies are usually graceful.

(4) Most butterflies have slender bodies. The majority of moths are plump.

(5) Most butterflies have knobs at the ends of their antennae. The antennae of most moths are not knobbed.

MONARCH:
**HABITAT:** This species occurs in virtually any open habitat. Typical habitats include old fields, roadsides, prairie remnants, gardens, and yards.

**HOSTPLANT(S):** Milkweeds are the primary hosts of this butterfly (common milkweed, swamp milkweed and butterfly-weed).

**ADULT ENERGY RESOURCES:** Red clover, alfalfa, common milkweed, swamp milkweed, butterfly-weed, Indian hemp, wild carrot, dame's rocket, Canada thistle, thistles, and numerous garden flowers.

**EASTERN TAIRED BLUE:**
**HABITAT:** This species occurs in any open habitat where suitable legume hostplants grow. Typical habitats include alfalfa and clover fields, soybean fields, roadsides, railroad rights-of-way, old fields, vacant lots, prairie remnants, lawns, and gardens.

**HOSTPLANT(S):** Many different legumes are used throughout its range. Many of the legumes listed as adult energy resources may serve as host plants.

**ADULT ENERGY RESOURCES:** Lupine, red clover, white clover, alfalfa, yellow sweet clover, white sweet clover, soybeans, shrubby cinquefoil, blue vervain. This butterfly is an avid visitor to damp soil, damp gravel, and damp sand.

**CABBAGE BUTTERFLY:**
**HABITAT:** This species inhabits virtually any open area, but particularly old fields, pastures, vacant lots, roadsides, and gardens. This species is also encountered within woodlands in early spring.

**HOSTPLANT(S):** Primarily species of cultivated and wild mustards. In Ohio this species has been found and reared on garlic mustard and cut-leaved toothwort.

**ADULT ENERGY RESOURCES:** Alfalfa, red clover, white clover, white sweet clover, yellow sweet clover, dame's rocket, black mustard, cauliflower, broccoli, and Brussels sprouts, shrubby cinquefoil, wood sorrel, loosestrife, Indian-hemp, self-heal, catnip, giant hyssop, peppermint.

**BLACK SWALLOWTAIL:**
**HABITAT:** Virtually any open habitat. This species can be found in old fields, pastures, along roadsides, in meadows, and flower gardens.

**HOSTPLANT(S):** This species uses virtually any cultivated or wild member of the carrot family, Apiaceae. In Ohio, it has been found and reared on wild and cultivated carrot, parsley, cultivated celery, and wild parsnip. The larva is sometimes referred to as the "parsley worm".

**ADULT ENERGY RESOURCES:** Alfalfa, red clover, common milkweed, swamp milkweed, thistle, purple coneflower, winter cress, teasel, and ironweed.
**CLOUDED SULPHUR:**

**HABITAT:** This species can be found in virtually any open area. It is especially common in clover and alfalfa fields, pastures, old fields, and along roadsides.

**HOSTPLANT(S):** In Ohio, this species has been recorded on two introduced plants, red and white clover. Other legumes are also probably used.

**ADULT ENERGY RESOURCES:** Alfalfa, red clover, white clover, dandelion, winter cress, common milkweed, butterfly-weed, peppermint, butter-and-eggs, sunflower, horseweed, and asters.

**SPICEBUSH SWALLOWTAIL:**

**HABITAT:** The spicebush swallowtail inhabits deciduous forests and adjacent open habitats such as old fields, woodland roads, and brushy areas. Adults are common in flower gardens and clover fields.

**HOSTPLANT(S):** Sassafras and spicebush are the principal hosts in Ohio. These plants are the primary hostplants throughout this butterfly's range.

**ADULT ENERGY RESOURCES:** Red clover, winter cress, common milkweed, swamp milkweed, butterfly-weed, Joe-Pye weed, thistle, swamp thistle, honeysuckle, teasel, monarda, dane's rocket, brambles, lilac, weigela, and common blue phlox.

**WEATHER:** Butterflies like a lot of sunshine as well as areas that have natural vegetation, like meadows, prairies, & savannas. Areas with a greater diversity of plants will have a greater diversity of butterflies. A great place to look for butterflies is in areas with bordering habitats, where a forest meets a meadow. They are most active on sunny days with a temp over 60. However the warmer the day the less critical the sunshine is.

**PLANTS:** most butterflies are relatively habitat limited, occasionally you can find one out of place.

**TIME:** Butterflies are not morning creatures, they are not typically active until 9 or 10 am.

**Butterflies – Favorite Ohio Plants**

- Asters
- Bee balm
- Spanish needles
- Blazingstars
- Buckweats
- Wild lilac
- Coreflowers
- Dogbanes
- Thoroughworts
- Frogfruit
- Forget-me-nots
- Wild geranium
- Goldenrods
- Golden fleece
- Jupiter’s beard
- Lantana
- Milkweeds
- Mountain-mints
- Ox-eye daisy
- Violets

Slide 30

Slide 31

Slide 32
Plant host plants for caterpillars. Female butterflies will only lay eggs on the plants that caterpillars will eat.

Nature Deficit Disorder is a term coined by Richard Louv in his 2005 book *Last Child in the Woods*, which refers to the alleged trend that children are spending less time outdoors, resulting in a wide range of behavioral problems.
**Presentation 3: Parasitic Birds**

**Slide 1**

Brood parasitism, in which an egg-layer leaves her eggs with another individual's brood, is more common among birds than any other type of organism. After a parasitic bird lays her eggs in another bird's nest, they are often accepted and raised by the host at the expense of the host's own brood.

*Obligate brood parasites* means the parasite bird must lay their eggs in the nests of other species because they are incapable of raising their own young.

*Non-obligate brood parasites* means the parasite bird sometimes lay eggs in the nests of other species to increase their reproductive output even though they could have raised their own young.

One hundred bird species, including honeyguides, icterids, estrildid finches and ducks, are obligate parasites, though the most famous are the cuckoos.

**Slide 2**

Host species can be divided into two groups, acceptor species and "rejector species." Acceptors include many warblers, vireos, phoebes, and Song Sparrows, while robins, catbirds, Blue jays, and Brown Thrashers are rejectors. The Song Sparrow just happens to have eggs very similar in size and spotting pattern to those of the cowbird, and almost invariably raises the cowbird young. In contrast, catbirds and robins, which lay unmarked blue eggs, almost invariably eject cowbird eggs from their nests. Phoebes, strangely, usually have unmarked eggs but are acceptors — perhaps their habit of nesting in dark recesses has reduced their awareness of egg pattern.

Parasitized birds typically fledged fewer of their own young, on average, than birds not burdened with "adopted" offspring. Parasitic birds, on the other hand, increased their fitness. Not only were they successful in fledging all of their young, but all of their eggs identified as having been laid in host nests were fledged by the foster parents, as well. Instead of averaging about three young, they managed to produce four or five.

**Slide 3**

Impacts on Host Mother

- Fewer of their own offspring
- Decrease personal fitness
Interspecific parasitism

Between two different species

Parasite Mom’s vs. Natural Mom’s:

- Burglary
- Destruction
- Spying
- Distraction
  - One bird distracts while the other lays an egg in the nest
- Math
- Egg Camouflage

Cat burglary
- Pipping, or puncturing a hole in the existing eggs
- Watch the nest until the mother bird leaves then lay eggs

Math
- Push out original eggs than make sure to lay the same number of eggs that were originally there

Distraction
- Team up, one bird distracts while the other lays an egg in the nest

Egg Camouflage
- Over time lay eggs that look like host birds eggs to prevent detection

The gray catbird and robin, for example, throw out cowbird eggs. Others bury the cowbird egg and their own first egg or eggs by building another nest floor over the eggs. Still other species, such as cardinals and yellow-breasted chats, simply desert parasitized nests.

Eggs of parasites sometimes appeared in nests several days after the hosts had started to incubate their own eggs. In spite of this, the parasite eggs hatched synchronously with the host eggs. This means that they required less incubation time than the host eggs, an adaptation frequently found in brood parasites that attack members of other species. Swallows were also frequently observed entering neighbors' nests and tossing out eggs. Presumably many of the vandals were parasites that later replaced a tossed egg with one of their own. If this is the case, then the frequency of parasitism in the study colony may be even higher than estimated from the number of appearances of “extra” eggs within a day — since many parasitic eggs would go undetected by the daily egg census. It is therefore possible that well over a quarter of the nests in some colonies harbored parasites.
Many hosts of the Common Cuckoos, such as the Great Reed Warbler, learned to recognize the parasitic eggs and would simply eject the foreign eggs from their nests. The cuckoos countered by evolving eggs that mimicked those of the host. In fact, this mimicry is so good that one ornithologist had to use genetic markers to tell the difference between host eggs and parasitic eggs. The picture below is an excellent illustration on just how good this mimicry has become.

Adaptations to help them kill their competitors

**Early hatching:** Some brood parasites are adapted to hatch before their host's young, which allows them to destroy the host's eggs by pushing them out of the nest or to kill the host's chicks; this ensures that all food brought to the nest will be fed to the parasitic chicks.

**Hooks on beak:** African Honeyguide nestlings are born with sharp hooks on the end of their bills. They use these hooks to kill the host nestling, thereby reducing competition for food and nest space. After they mature these hooks simply fall off.

**Scooped back:** the young European Cuckoo, using a scoop-like depression on its back, instinctively shoves over the edge of the nest any solid object that it contacts.
Intraspecific parasitism

Within a species- Brood parasitism is not restricted to females of one species laying eggs in the nests of other species. Some solitary breeding birds (especially waterfowl) occasionally parasitize their own species, producing abnormally large clutches.

In addition to some of our North American cuckoos, females of a wide variety of species sometimes lay eggs in the nests of other females of the same species. Cliff Swallows have now been shown to have an unusually high degree of intraspecific brood parasitism.

A mallard hen and brood containing a redhead duckling (the yellow duckling).

Common Goldeneye (can have 5-16 eggs) – babies marked with yellow from different female.

Examples

Black-billed and yellow-billed cuckoos, grebes, rails, the roadrunner, brown thrasher, starling, sparrows and some finches all victimize other birds. The duck family has several members whose behavior approaches obligate parasitism–21 species are known for this behavior. The redhead and the ruddy duck are well known parasites. Several pheasant species are parasitic, and both California and Bob White quail lay in other ground-nesting birds’ nests.

Towhee
Scarlet tanager

Cuckoos: contains about 50 obligatory parasite species, some of which are host generalists and some specialists. The Common Cuckoo has an especially interesting pattern of host use: although it parasitizes over 100 species across its range, in any one locality only a few species are parasitized, and most individual female cuckoos use only one host species. Furthermore, some lay eggs that mimic those of their host.

This Reed Warbler is raising the young of a Common Cuckoo.

The North American Yellow-billed and Black-billed Cuckoos only rarely lay their eggs in the nests of other species, but occasionally lay some of their eggs in the nests of other members of their species. Our cuckoos usually build nests of their own and rear their own young. Only about 40 percent of cuckoo species worldwide are brood parasites, the rest care for their own eggs and young.
Cowbird - In contrast to the cuckoo, the cowbird is a generalist at the level of both the species and the individual. Compared with the 50 species of parasitic cuckoos, there are only five species of parasitic cowbirds. There is no evidence that cowbirds lays eggs mimetic of its hosts' eggs. However, many cowbird hosts accept these nonmimetic eggs.

The Brown-headed Cowbird has been recorded as a parasite of more than 200 other species. Cowbirds do tend to hatch earlier than their hosts, to grow faster, and to crowd out or at least to reduce the food intake of the host's young. Cowbirds thus can place powerful selection pressure on a host bird species to learn to recognize and reject cowbird eggs.

Pale-headed Brush Finch (Atlapetes pallidiceps) feeding a young Cowbird – an endangered species

A blonde named Pam is appearing on "Who Wants To Be A Millionaire" with Meredith Viera. Meredith: "Pam, you're up to $500,000 with one lifeline left...phone a friend. The next question is worth one million dollars if you get it right. If you get it wrong you drop back to $32,000. Are you ready? Pam: "Yes." Meredith: "Which of the following birds does not build it's own nest? Is it: a) Robin, b) Sparrow, c) Cuckoo, d) Thrush."

Pam: "I think I know who it is...but I'm not 100%. I'd like to phone a friend. I'd like to call Carol." Carol (also a blonde) answers the phone: "Hello..." Meredith: "Hello Carol, it's Meredith Viera from Who Wants to be a Millionaire. I have your friend Pam here who needs your help to answer the one million dollar question. The next voice you hear will be Pam's..." Pam: "Carol, which of the following birds does not build it's own nest? Is it: a) Robin, b) Sparrow, c) Cuckoo, d) Thrush."

Carol: "Oh geez, Pam. That's simple...it's a Cuckoo." Pam: "Are you sure?" Carol: "I'm sure." Meredith: "Pam, you heard Carol. Do you keep the $500,000 or play for the million?" Pam: "I want to play; I'll go with c) Cuckoo". Meredith: "Is that your final answer?" Pam: "Yes." Meredith: "Are you confident?" Pam: "Yes; I think Carol's pretty smart." Meredith: "You said c) Cuckoo...and you're right! Congratulations, you have just won ONE MILLION DOLLARS!!!!" To celebrate, Pam flies Carol to New York. That night they go out on the town. As they're sipping champagne, Pam looks at Carol and asks her, "Tell me, how did you know that it was the Cuckoo that does not build its own nest?" "Pam, it was easy. Everybody knows that a Cuckoo lives in a clock!"
Birds of the Rainbow
Nicole Sojda – Environmental Scientist

Birds come in a variety of colors, shapes and sizes from a The Bee Hummingbird, the world's smallest bird, which is around 2.5 inches to 9 foot tall Ostriches – the world’s largest bird. Some birds specialize in flying, running, swimming and even diving.

Birds are Theropod Dinosaurs
Found from Arctic to Antarctic
10,000 living species – 1,200 threatened
900 in United States
400 in Ohio

Birds – Bipedal, vertebrate, lays hard-shelled eggs, beak, and feathers

What do we know about birds?
Bipedal – two legs
Vertebrate – a back-bone and central skeletal structure
Hard shelled eggs – who lays soft shelled eggs? Insects, fish, snakes, turtles
Beak – no teeth
Feathers – only animal that has feathers (except for some dinosaurs)
The Bird’s Body

- Bones & Muscles
- Respiratory System
  - Heart has four chambers
- Warm Blooded
- Wishbones

Bones – birds have hollow bones that are part of the respiratory system. The bones have air-filled spaces that link to the lungs and air sacs because of this birds only use 75% of the oxygen the breath, the rest is filtered out.

Birds have a backward bending knee – this tendon works like a fist and allows a bird to clamp onto a perch and “lock in their stance.” Respiratory system – a bird has a four chambered heart which helps pump air to its wings and hollow bones.

Warm blooded – just like humans, so birds get cold on winter days – fluff up their feathers for insulation, huddle together closely to use each other’s body heat, shiver also raises their temperature.

Wishbones are a bird’s version of a collar bone.

The Bird’s Body

- Eating & Excreting
  - Crop
  - Gizzard
  - No bladder

Crop is like a second stomach or pocket so birds can eat and run – this is so they can flee predators.

Turkeys and Chickens have big crops that stick out from their esophagus.

A gizzard takes the place of teeth – a bird may swallow sand, grit or small pebbles to further grind their meals.

Birds do not have bladders but they do produce urine – at the end of a bird’s intestine the urine mixes with poop and comes out a white paste – bird poop – a two for one deal.

The Bird’s Body

- Seeing
- Hearing
- Smelling
- Tasting

Who has heard of Eagle-eyed eyesight? Eagles can see clearly up to a mile away and can see ultra violet light – they use UV to spot mates, hunt prey (urine tracks of mice) and have great night vision.

Hearing – birds don’t have stick-em-out ears but small openings covered with feathers – birds hearing spans a wider range than human hearing.

Smelling – most birds have a poor sense of smell but some have sensitive noses like the Kiwi – who uses his nose to poke the soil in search of earthworms.

Tasting – not so good tasting – a human has over 10,000 taste buds while birds have anywhere from 24 to 400.
Slide 7

Birds
- Migration
  - Triggered by light
  - Up to 40,000 miles
- Social, communicating through song
- Range in size from 2 inches to 9 feet

Slide 8

Birds
- Important part of ecological system
  - Pollinators
  - Natural pest control
  - Poultry meat for humans
  - Feathers for insulation
  - Hobby for “Birders”

Slide 9

Finding Food
- Fuel
  - Change diets from season to season
  - Storage
  - Clean-up Crew
  - Specialized beaks
Birds
• Nectar, insects, fruit, plants, seeds, carrion

Birds have different beaks, feet, and colors to help adapt to unique environments.

Slide 11

Specialty feet

Slide 12

Nesting
Sexual Dimorphism

Sexual dimorphism is the systematic difference in form between individuals of different sex in the same species.

Cardinals: They mate for life. The male cardinal will feed the female cardinal. This is part of their mating ritual. The average lifespan is only about a year. The oldest wild Cardinal banded by researchers lived at least 15 years and 9 months, although 28.5 years was achieved by a captive bird.

Red headed woodpecker: One of only four woodpeckers known to store food, and it is the only one known to cover the stored food with wood or bark. It hides insects and seeds in cracks in wood, under bark, in fence posts, and under roof shingles. Grasshoppers are regularly stored alive, but wedged into crevices so tightly that they cannot escape.
I‘iwi: The third most common bird in the Hawaiian Islands. Their long curved bill evolved from the long curved flowers they feed from however the iwi’s bill size has apparently shrunk in the past 100 years due to this change in food supply.

Juan Fernandez Firecrown [male is red, female is green]: This spectacular hummingbird occurs only on the Juan Fernandez island. The species is ranked Critically Endangered

Baltimore oriole: The oriel eats a variety of fruits and jellies. They will be migrating back to Ohio in early April.
**American Redstart:** This is one of the most numerous warblers in North America, because its favored habitat, second-growth woodland, covers such extensive areas of the continent. Only after a full year do males acquire the black-and-orange adult plumage, so it is not unusual to find what appears to be a female singing and displaying like a male.

**Wilson’s bird of paradise:** The head is naked blue with black double cross pattern on it.

**Andean Cock-of-the-rock:** The Andean Cock-of-the-rock is the national bird of Peru. Found from Venezuela, through Colombia, Ecuador and Peru. The diet consists mainly of fruits. The females build shallow nests with mud and plant material on the walls of rocks, hence the common name.
American goldfinch: Since this goldfinch's main food is seeds, nesting does not begin until midsummer or late summer, when weed seeds are available. Thus goldfinches remain in flocks until well past the time when other species have formed pairs and are nesting. In the winter the male turns a dull greenish yellow and loses his black cap.

Evening grosbeak: This grosbeak formerly bred no farther east than Minnesota, but more food available at bird feeders may have enabled more birds to survive the winter, and the species now breeds east to the Atlantic. In spring the outer coating of the bill peels off, exposing the blue-green color beneath.

Yellow bellied sunbird: It is more often found on the edge of the rainforest, frequently building nests around human habitation.
**Village weaver:** Common in sub Sahara Africa, the male attracts females by hanging upside down from the nest while calling and fluttering his wings. Village Weaver feeds principally on seeds and grain, and can be a crop pest, but it will readily take insects, especially when feeding young, which partially redresses the damage to agriculture.

**Ruby-throated Hummingbird:** The Ruby-throated Hummingbird beats its wings 53 times a second. The extremely short legs of the Ruby-throated Hummingbird prevent it from walking or hopping. The Ruby-throated Hummingbird does not show a strong preference for any particular color of feeder. Instead, it prefers specific feeder locations.

**Mallard:** The Mallard is believed to be the ancestors of all domestic ducks. They usually eat plants but have been recorded to eat small frogs. Mallards have shown high rates of homosexuality, in some cases, as many as 19% of pairs in a Mallard population.
**Green Headed Tanager:** found in south east Brazil and part of Argentina and Paraguay. They tend to move around in flocks of 10 to 20 birds and also to form part of mixed flocks. They feed on fruit and insects normally fairly high in the tree canopy.

**Peacock:** peafowl, the male is called a peacock, the female a peahen. Peafowl are omnivorous and eat plant parts as well as some reptiles, and amphibians. The peafowl are forest birds that nest on the ground. Is the national symbol of India.

**Blue Jay:** The Blue Jay frequently mimics the calls of hawks, especially the Red-shouldered Hawk. It has been suggested that these calls provide information to other jays that a hawk is around, or that they are used to deceive other species into believing a hawk is present.

Tool use in birds is rare. Captive jays have shown to used strips of newspaper to rake in food pellets from outside of their cages.

Many people dislike the Blue Jay because it is known to eat the eggs and nestlings of other birds. However, in an extensive study of Blue Jay feeding habits, only 1% of jays had evidence of eggs or birds in their stomachs. Most of the diet was composed of insects and nuts.
Indigo Bunting: migrates at night, using the stars for guidance. The sequences of notes in Indigo Bunting songs are unique to local neighborhoods. Males a few hundred meters apart generally have different songs.

Blue Lovebirds: from small area of east-central Africa. They are a popular pet bird in the US. They are about 13-17 cm, which puts them among the smallest parrots in the world. Their lifespan is said to be 10 to 15 years.

Bird of paradise: There are 42 species of Birds of Paradise distributed mainly across the Islands of Papua New Guinea as well as in North Eastern Australia. Birds of Paradise are related to crows. A relatively long-lived bird with lives extending well over 15 and perhaps up to 25 years.
Purple martin: The largest of the North American swallows, the Purple Martin is a popular tenant of backyard birdhouses. In fact, in eastern North America it has nested almost exclusively in nest boxes for more than 100 years. The Purple Martin gets all its food and water in flight. It skims the surface of a pond and scoops up the water with its lower bill.

Lilac breasted roller: It is widely distributed in sub-Saharan Africa. The Lilac Breasted Roller feeds on grasshoppers, beetles, occasionally lizards, crabs, and small amphibians. It is frequently seen perching conspicuously at the tops of trees, poles or other high vantage points from where it can spot insects, lizards, scorpions, snails, frogs, small birds and rodents moving about at ground level. Its about 14.5 inches tall.

Red-legged honeycreeper: found from Southern Mexico, through Latin America to Northern South America. They are about 4-1/2 inch birds and eat nectar and soft fruits.
**Violet Sabrewing:** native to southern Mexico and Central America as far south as Costa Rica. Live in understory and edges of mountain forests, especially near streams.

**Flamingo:** Flamingos filter-feed on brine shrimp. Young flamingos hatch with grey plumage, but adults range from light pink to bright red due to aqueous bacteria and beta carotene obtained from their food supply. A well-fed, healthy flamingo is more vibrantly colored and thus a more desirable mate. A white or pale flamingo, however, is usually unhealthy or malnourished.

**Roseate Spoonbill:** A resident breeder in South America, the Caribbean, and the Gulf coast of the USA. A bizarre wading bird that uses its odd bill to strain small food items out of the water. Its bright pink coloring leads many Florida tourists to think they have seen a flamingo.
**Australian Pink and Grey Galah:** The Galah is one of the most abundant and familiar of the Australian parrots, found in large flocks, in a variety of timbered habitats, usually near water. Galahs form permanent pair bonds, although a bird will take a new partner if the other one dies.

**Brown creeper:** Brown Creeper nests often have two openings, one which serves as an entrance and the other as an exit. Entrances face downward and exits upward.

**Northern Harrier:** Unlike other hawks, the Northern Harrier relies on its hearing as well as its vision to capture prey. The feathers of the face are stiff to help transmit sound, and it shows a pronounced "facial disk," much like that of an owl. Populations declined in 20th century from loss of wetlands and changes in farming practices.
**Brown pelican:** Unlike most birds, which warm their eggs with the skin of their breasts, pelicans incubate their eggs with their feet. They hold the eggs under the webs that stretch from the front toes to the hind toe, essentially standing on the eggs to warm them. This peculiar incubation method made them vulnerable to the effects of the pesticide DDT. The DDT made the eggshells thin, and the incubating parents frequently cracked their eggs.

**Brown Skua:** found on the Falklands, some areas of Antarctica, some areas of New Zealand. Brown Skuas are predators as well as scavengers. They have been witnessed attacking and eating baby penguins.

**Dark eyed junco:** Juncos are the "snowbirds" of the middle latitudes. In the eastern United States, they appear in all but the most northern states only in the winter, and then retreat each spring.
Tufted Titmouse: they are cavity nesters. They line the nest with soft materials, sometimes plucking hair from a live animal such as a dog. Beginning in the 1940s, the Tufted Titmouse began expanding its range northward. Explanations offered for the expansion include global warming, the maturation of abandoned farmlands to forest, and increased number of winter bird feeders.

Shoebill Stork: they are also known as Whalehead. A very large bird, averaging 4 ft tall, 12.3 lbs and a 7.7 ft wingspan. It lives in tropical east Africa in large swamps from Sudan to Zambia. It eats meat and can be quite aggressive.

Gray go-away-bird: Southern African bird. It has a distinctive loud alarm call fancifully sounding like "Go-away".
Red wing blackbird: Perhaps the most abundant bird in North America. The Red-winged Blackbird is a highly polygynous species, with one male having up to 15 different females making nests in his territory. The black male can hide the brilliant red shoulders or show them off in a dazzling display.

American Crow: In the United States it is legal to hunt crows in all states usually from around August to the end of March and anytime if they are causing a nuisance or health hazard. The American Crow appears to be the biggest victim of West Nile virus. No other North American bird is dying at the same rate from the disease, and the loss of crows in some areas has been severe.

Bateleur: is a medium size eagle found in sub-Saharan Africa. The Bateleur’s feet and facial color can vary from a pale color to brilliant red depending on the mood of the bird.
**Black footed Penguin:** also known as the African penguin, is found on the southwestern coast of Africa. Usually live to be around 10 to 11 years. This species is especially susceptible to germs but in particular Aspergilosis, a disease of the respiratory pathway caused by mold. Only 40% ever reach maturity.

**Mute swan:** Usually silent, but utters hissing and barking notes. The black knob at the base of the male Mute Swan's bill swells during the breeding season and becomes noticeably larger than the female's. As an introduced species it is of concern because of its effects on native wildlife. Its aggressive nature can disrupt the nesting of native waterfowl. It is protected in some states, but not others. Some states are attempting to control Mute Swan numbers through hunting.

**Snow goose:** Typically they are all white but there is a darker, gray-brown version known as blue geese. These birds were once thought to be two separate species, but they have recently been found to be merely two different color morphs of the same bird. Chicks can swim and eat on their own within 24 hours, but families remain together through the young's first winter. Snow geese fly in V-formation to reduce wind drag and risk of collision.
African spoonbill: commonly found in several of countries in the southern part of Africa. It is born with a short beak, that gradually develops into its spoon-like shape. It is usually silent, except for an occasional grunt when alarmed.

Bali Starling: Found only in Bali, Indonesia. Critically endangered, hovering immediately above extinction in the wild. Decline towards extinction has been caused by the urbanization of the island and by illegal trapping for the caged-bird trade.

Any Questions???
Presentation 5: Kids Wonderful World of Birds

Slide 1

The Wonderful World of Birds

Nicole Sojda – Environmental Scientist

Slide 2

What makes a Bird a Bird????

Is it their color??

Slide 3

No -- other animals, like fish and insects, come in all sorts of beautiful colors too.
Slide 4

Is it there Bill or Beak???

Slide 5

No -- other animals, like the duck billed platypus (a mammal), have bills too.

Slide 6

Is it the eggs???
No -- other animals, like fish, amphibians, reptiles, insects and even some mammals, hatch from eggs as well. (Map turtle egg)

Is it their wings???

No -- other animals, like insects and some mammals, have wings
Then what is it!?

Feathers!!!

Feathers are used for many reasons. Soft down keeps them warm, wing feathers allow flight and tail feathers are used for steering. The color of the feathers can be used to hide the bird or to help the bird find a boyfriend or a girlfriend!

Nests

Birds build a variety of homes. Some build nests in trees, some build them on the ground. They can be very tiny or very large.

**Red-tailed Hawk** - they build a stick nest in a large tree 13 to 70 ft off the ground or on a cliff ledge 115 ft or higher above the ground, or may nest on man-made structures. The nest is generally 28 to 38 inches in diameter and can be up to 3 feet tall. The nest is constructed of twigs, and lined with bark, pine needles, corn cobs, husks, stalks, aspen catkins, or other plant matter.

**Hummingbird Nest** - The outer part is covered with moss and plant fibers. Sometimes it is shingled with lichens. The rest is made of plant down and spider webs. Spun by the female from spider webs and plant material. Inner diameter of about 1.5in; the outside of the nest is about 2.25in tall.

**American Robin** – An open cup of grass and twigs held together with a thick layer of mud. Lined with fine dry grass. Nest is usually relatively low in a tree on a firm branch with dense foliage, but can be placed from ground to treetop.

**Baltimore Oriole** - Gourd-shaped and woven from hair, plant fibers, and synthetic fibers. Hung by the rim from thin branches or a fork in a tall tree.
**Weavers** – they use straw and other natural materials, building nests that can reach 20 feet across. This one contains more than 135 chambers and 200 birds.

**Chimney Swift** - The swift makes its nest out of sticks and various other materials, binding it together with its glue-like saliva. The nests are located on vertical surfaces in barns, chimneys and hollow trees.

**Ovenbird** – a woven domed cup of dead leaves and plant stems, with the entrance on the side. Placed on ground. Lined with hair. It weighs 7-12 pounds

**Bald Eagle** - Of all birds in the world, Bald Eagles hold the record for the biggest nest ever built. Large nest of sticks. Lined with finer woody materials. Reused over many years. Placed in large tree, often the largest in the area. Rarely nests on ground or cliff. One nest was 20 feet deep, 9.5 feet wide, and weighed 6,000 pounds.

---

Birds lay eggs.

**Hummingbirds**: 0.25” x 0.5”, roughly the size of a small jellybean. They are white, non-glossy

**Red-winged Blackbird** - About 0.98 by 0.69 inch pale blue eggs are spotted with brown or purple.

**Ostrich** - An average egg being 6 inches long, 5 inches wide, and weigh 3 pounds. They are shiny and whitish in color

**Robins** - 1.1 inches long, blue

**Red-tailed Hawk** - Shells are a bluish-white with occasional brown splotches and have a granulated or smooth matte surface. The eggs are usually about 2.4 x 1.9 in.

---

Birds have specialized beaks to help them eat. Imagine if people all had different mouths depending on what they liked to eat!
Insect Eaters

- **Yellow-rumped Warbler** - It is one of the most common warblers in North America. It is the only warbler able to digest the waxes found in bayberries and wax myrtles. Its ability to use these fruits allows it to winter farther north than other warblers, sometimes as far north as Newfoundland.
- **Sacred Ibis** – probe in mud for food items, usually crustaceans, various fish, frogs and other water creatures, as well as insects. It lives in marshy wetlands and mud flats, both inland and on the coast. It will also visit cultivation and rubbish dumps.
- **Cliff Swallow** – flying insects
- **Black-headed Grosbeak** – primarily insects but can crush seed and fruits with beak

Seed Eaters

- **Chipping Sparrow** – Grass and other small seeds, small fruits, and insects.
- **American Goldfinch** – Seeds, especially of composite flowers. Few insects.
- **Northern Cardinal** – Seeds, fruits, buds, and insects

Plant Eaters

- **Hummingbird** – nectar
- **Flamingo** – tiny water plants and water animals
- **Toucan** – fruit, nuts, and berries
- **Waterfowl** - The Mallard uses beak to filter plants and small invertebrates as it dabbles in the water, and it is also effective for grazing on grass.
Bald Eagle - readily prey upon fish, birds, and small mammals
Gull - beak is effective at handling fish, crabs, sea stars, shellfish and carrion.
Shoebill Stork - preying on lungfish and similar fish. A very large bird, averaging 4 ft tall, 12.3 lbs with a 7.7 ft wingspan. It lives in tropical east Africa in large swamps from Sudan to Zambia.
Pelican - fish and other water animals
Kingfisher - Fish. Also aquatic invertebrates, insects, and small vertebrates.

Feet
- Climbing foot – Woodpeckers
- Perching foot – Chickadee

Lobed Feet - have toes with stiff scale-covered flaps that extend to provide a surface analogous to webbing on a duck as an aid in swimming.
Slide 22

Hunting foot - Raptors

Slide 23

Wingspan
How big is your wingspan?

This bird’s wingspan is 4.25 inches

Ruby-throated Hummingbird – 4 inches
American Robin – 15 inches
Rock Dove – 25 inches
Peregrine Falcon and Crow – 40 inches
Andean Condor and Marabou Stork – 10 feet
Wandering Albatross – 12 feet

Slide 24

Bird Bingo

I love Bingo!

I hope Bingo loves me too!
Discuss the different kinds of feeders and houses and bring in some examples to show them. Talk about why it’s important to provide feeders and houses for birds and some of the types of birds they are likely to see.
Presentation 6: Wonderful Birds of Winter

Slide 1

The Wonderful Birds of Winter

Winterizing your backyard for your Feathered friends!!

Nicole Sojda – Environmental Scientist

Slide 2

Birding As A Hobby

• Bird Watching is the fastest growing and most popular hobby in the US
• Over 43% of Americans enjoy feeding and watching birds in their backyards
• More money spent annually on bird watching than movie tickets

Slide 3

Why Watch Birds?

• It’s fun, enjoyable, and relaxing
• It can be enjoyed by people of all ages
• It’s economical
• It’s educational
• It can be done inside and outside
• It makes us more aware of nature
• Anyone can do it!
Slide 4

Bird Watching In Ohio

- 413 bird species
- 190 breed in Ohio
- Range of Ohio habitat types: lakes, prairies, hills, and woodlands, Ohio River
- Busy migration period
- Plenty of opportunities

Slide 5

Creating a Bird Paradise

Rules of Thumb

- Enjoy Yourself
- Place feeders where you can watch the birds
- Keep a journal of the birds you see
- Let nature take its course

Slide 6

There are several steps you can take to improve your backyard for your winter friends

Water
Nut seeds
Roosting pockets
Most roosting pockets are made from natural materials and provide a nice warm place for winter birds to huddle for warmth. Birds can save energy during the colder months by roosting in a warm, sheltered place. You will often see multiple species of birds in a single roosting pocket. These pockets also provide a warm nesting place in the spring for smaller birds such as wrens.

Bird can suffer from lack of water in the summer and in the winter. Birds need water for preening, insulation.

Providing additional fat sources by adding nuts to your backyard feeding stations [pass around seed blends with nuts in them]
Common Goldeneye - The female often lays eggs in the nest of another female as well as in the nests of other species of ducks. Common and Barrow's goldeneyes lay in each other's nests, and Wood Ducks and Hooded Mergansers often lay in the goldeneye's nest too.

Brown Creeper - Nests often have two openings, one which serves as an entrance and the other as an exit. Entrances face downward and exits upward. Found in coniferous and mixed coniferous-deciduous forests. Eat small insects, spiders, and other invertebrates. Also small quantities of seeds.

Golden-crowned Kinglet - The female usually raises two large broods of young (3-11 eggs per clutch), despite the short nesting season of the northern boreal forest. They eat small insects and their eggs.

Pine Siskin – aka winter finch; eats thistle. Following a large irruptive winter flight, some individuals may stay near a dependable food source and breed far south of the normal breeding range. The heavily insulated nest helps keep the eggs warm in cold climates. In addition, the female incubates the eggs constantly, and is absent from the nest only for brief periods. Her mate feeds her while she sits on the nest.

Dark-eyed Junco - Breed in coniferous and mixed forest. Winters in fields, suburbs, cemeteries, chaparral, parks, gardens, grassy dunes, and fencerows. They feed primarily on ground and eat seeds and insects.

White-crowned Sparrow – Four of the five subspecies of White-crowned Sparrows are migratory. The sedentary race lives in a very narrow band along the California coast. Because male White-crowned Sparrows learn the songs they grew up with and do not travel far from where they were raised, song dialects frequently form. Males on the edge of two dialects may be bilingual and able to sing both dialects.

American Tree Sparrow – During the summer, the American Tree Sparrow eats nearly 100% animal matter (mostly insects). In the winter it eats none, turning then to eating entirely seeds and other plant foods.

White-throated Sparrow - The White-throated Sparrow comes in two color forms: white-crowned and tan-crowned. The two color forms are determined by genetic differences, and are unique among birds. Oddly, individuals almost always mate with a bird of the opposite morph. Although they look nothing alike, the White-throated Sparrow and the Dark-eyed Junco occasionally mate and produce hybrids. The resulting offspring look like grayish, dully marked White-throated Sparrows with white outer tail feathers.
**Mute Swan** – Downy young Mute Swans come in two color morphs: a gray form and a white form. The gray (or "Royal") chicks start off with gray down and grow in gray-brown and white feathers, giving them a mottled look. White (or "Polish") chicks have all white down and juvenal feathers. Adults of the white morph may have pink or gray legs and feet instead of black, but otherwise the adults look alike.

The Mute Swan is reported to mate for life. The black knob at the base of the male Mute Swan’s bill swells during the breeding season and becomes noticeably larger than the female’s. The rest of the year the difference between the sexes is not obvious.

**Evening Grosbeak** – They appear not to have a well developed song used in the normal functions of mate attraction and territory defense.

**Fox Sparrow** - The Fox Sparrow comes in four different forms, sometimes considered separate species. The red or eastern form has reddish streaks on chest and back, a rufous cap, and a gray face. The sooty form is dark brown all over. The slate-colored form has a gray back and reddish wings, as well as a longer, reddish tail. The large-billed form has a gray back, reddish wings and tail, and a very thick bill.

**Yellow-rumped Warbler** – It is one of the most common warblers in North America. The Yellow-rumped Warbler is the only warbler able to digest the waxes found in bayberries and wax myrtles. Its ability to use these fruits allows it to winter farther north than other warblers, sometimes as far north as Newfoundland.

**Red-breasted Nuthatch** - The Red-breasted Nuthatch applies sticky conifer resin globules to the entrance of its nest hole. It may carry the resin in its bill or on pieces of bark that it uses as an applicator. The male puts the resin primarily around the outside of the hole while the female puts it around the inside. The resin may help to keep out predators or competitors. The nuthatch avoids the resin by diving directly through the hole.

**Sharp-shinned Hawk** – The habit of hunting around bird feeders has been suggested as an explanation for the decrease in numbers of Sharp-shinned Hawks seen at eastern hawk watches. Fewer hawks may be migrating south, preferring instead to stay farther north near a dependable food source: feeder birds.
American Kestrel - Nestling kestrels back up, raise their tails, and squirt feces onto the walls of the nest cavity. The feces dry on the cavity walls and stay off the nestlings. The nest gets to be a smelly place, with feces on the walls and uneaten parts of small animals on the floor.

Coopers Hawk - A Cooper's Hawk captures a bird with its feet, and will squeeze it repeatedly to kill it. It does not bite the prey to kill it in the fashion of falcons, but holds it away from its body until it dies. It has been known to drown its prey, holding a bird under water until it stops moving.

Red-tailed Hawk – most common hawk in north america; the call is most often used in movies.
Slide 1

**Presentation 7: Life Emerging**

**Slide 2**

**Table of Contents**

- What Are Indicator Species
- Springtime Plants
- What Is Hibernation
- Springtime Birds
- What Is Migration
- Rebirth
- Backyard Habitats

Slide 3

A species whose presence, absence, or relative well-being in a given environment is a sign of the overall health of its ecosystem. By monitoring the condition and behavior of an indicator species, scientists can determine how changes in the environment are likely to affect other species that are more difficult to study. Today we are going to look at some species that indicate the weather is changing and that spring is on the way.
Examples of Indicators
• Gray Jay – quality of water
• Atlantic Puffin – quality of oceans
• Lichens – quality of air

Recent examples of North American species affected by environmental changes are the American Dipper and the Gray Jay. The Gray Jay has become less common in southerly (warmer) parts of its range, apparently because its food supply has been affected by rising temperatures due to global warming.

Many indicator species of the ocean systems are fish, invertebrates, macrophytes and specific species of ocean birds (like the Atlantic Puffin). Amphibians are also common indicator species, as they may have become repositories of bioindicator chemicals, or of ecological conditions relating to global warming, air pollution chemicals, or environmental pressure on the ecosystem, which affect the population numbers, and the quality of the individuals.

Lichens are indicators of air quality. They are particularly sensitive to sulfur dioxide, a gas emitted from exhaust and industrial fumes, and so are rarely found in large cities and towns or by roads.

The Beginnings of Spring
• Defrost
• Awakening
• Warmer Temperatures
• Longer Days
• Spring Showers
• Growth

In Ohio’s woodlands, you are likely to encounter trout lilies, violets, dutchman’s breeches, jacob’s ladders, geraniums, and the queen of woodland flowers - the trilliums.
Trout lily \((Erythronium americanum)\) is one of the most common of our native woodland flora that come up in early spring. While known for its small, lily-shaped flowers, its foliage is just as striking. The small, ovate leaves are mottled with colors. Trout lily usually occupies rich moist sites such as those found in floodplains and can form extensive colonies.

Spring beauty \((Claytonia virginica)\) is one of the smallest and earliest wildflowers to emerge in the woodlands. A member of the mustard family, it forms small seed-pods along its stems.

Dutchman’s breeches It consists of a rosette of basal leaves spanning about 6" across. These basal leaves are grayish green and hairless. Each of these leaves is ternately compound and divided into 3 primary leaflets, while each primary leaflet is divided into 3 secondary leaflets. These secondary leaflets are pinnately cleft into linear or oblong-shaped lobes. The petiole of each compound leaf is long and slender; it is often brown-colored.

Trilliums are a common spring wildflower and Ohio hosts several species.

One of the more common is the large-flowered trillium \((Trillium grandiflorum)\). It is one of the largest of the spring wildflowers and is easily recognized by its whorl of three leaves and the three-petaled creamy white flower.

Red trillium \((Trillium erectum)\) & Painted trillium \((Trillium undulatum)\)

Trilliums can occur in large colonies. It is believed that these colonies owe their existence to the efforts of ants. The trillium seeds contain a structure called a strophiole that is attractive to ants as a food source. By moving the seeds to underground burrows, the ants help ensure that the trillium seeds end up in a suitable environment for germination.

Trillium is one of many plants whose seeds are spread by ants and mice. Trillium seeds have a fleshy organ called an elaiosome that attracts ants. The ants take the seeds to their nest, where they eat the elaiosomes and put the seeds in their garbage, where they can be protected until they germinate. They also get the added bonus of growing in a medium made richer by the ant garbage.

Bloodroot \((Sanguinaria canadensis)\) usually occurs as solitary plants on fertile hillsides. A delicate white flower on a long stalk appears shortly before the emergence of an unusually-shaped, large, single leaf. It is named for a red fluid that is present in the roots of the plant. It was used by Native Americans as a dye.

Wild ginger \((Asarum canadense)\) is a sprawling plant that is actually semi-evergreen and can form thick colonies. The stems and roots emit a smell surprisingly similar to culinary ginger. The flowers are seldom seen by the casual observer because they are covered by the large, heart-shaped leaves. If you gently separate the leaves, you can see the small, maroon to brownish-colored flowers. These unusual flowers are mainly pollinated by beetles.

Rue Anemone \((Thalictrum thalictroides)\) is a herbaceous plant, it is a perennial which can reach 23cm in height (9inches). The stems are often very dark in color. The leaves are whorled. What appears to be individual leaves are actually 3 stemmed leaflets from a seemingly un-stemmed leaf making the leaf arrangement opposite instead of whorled. Each rounded leaflet is notched but not deeply lobed usually with three small lobes. The flowers are white sometimes pinkish. Blooms first appear in late winter and continue into early spring.
Hibernation is one of the most intriguing methods animals use to survive cold weather. When an animal hibernates, its heart rate, body temperature and other life processes slow down, putting them into a kind of a deep sleep.

There are a variety of animals that hibernate, such as bats, frogs, snakes, groundhogs, prairie dogs, ladybugs, box turtles, ground squirrels, bears

**Groundhogs**, also known as woodchucks, are one of Ohio's true hibernators. During a groundhog's hibernation, which lasts an average of five months, its body temperature lowers by almost half and its heart slows down from 160 to four beats per minute.

**Chipmunk** - With the onset of winter in November, chipmunks disappear below ground. At present, it is not known exactly what happens when chipmunks retire to their burrows for the winter. One view is that they immediately go into a torpid state. (In this state, the body temperature, rate of breathing, and rate of heartbeat drop to very low levels, reducing the amount of energy required to maintain the chipmunk.) Periods of torpor last from one to eight days, and perhaps longer. Between periods of torpor, chipmunks wake up and consume part of their food supply. They have occasionally been seen above ground on warm winter days. A second view of chipmunk hibernation is that chipmunks do not actually hibernate until their food supply has been exhausted.

With the first warm days of March, chipmunks begin to emerge.

Snakes, turtles, frogs and most other cold-blooded animals crawl into holes or burrows where they remain inactive all winter.

**Frogs** hibernate at the bottom of streams and ponds where the water does not freeze. Woodland frogs find shelter under leaves and dirt. During the winter they freeze but thaw out and wake up in the spring.

**Snakes** travel to one spot where hundreds of them can hibernate together so they can stay warm. Snake dens can be found in rocks, burrows, or old wells and basements.

Some **Bats** are hibernators, like Ohio’s Indiana Bat (pictured above). In the fall large flocks of Big Brown Bats find shelter for the winter. The bats hang upside down and pull their wings and tails close to their bodies to keep warm. Their body temperature drops and they seem to be dead. Bats hibernate from October to April, waking up once a month. Bats like warm buildings to hibernate in and are able squeeze through a hole the size of a thumb.

**Ladybugs** spend the winter in a type of hibernation called "diapause". They fatten up for the winter by eating plenty of aphids and pollen. Then they hide in buildings, or under logs, rocks or piles of leaves.
Many migrating birds fly thousands of miles away from Ohio, seeking nutrient-rich habitats.

Migration is defined as predictable movement from one location to another that is linked to resource availability (food), seasonal changes, and reproduction.

Most of the bird species which migrate into and out of the U.S. are called Neotropical migrants. Neotropical migrants spend spring and summers in the U.S. and travel to Mexico, and Central and South America to spend winters there. Their migration has nothing to do with weather, but is primarily driven by available light by a phenomenon called photoperiod, which is an organism’s physiological reaction to length of available daylight.

Many bird species like hawks migrate during the day to take advantage of warm thermals they can ride, but most migratory birds travel at night, when the air is more stable, and cooler temperatures mean they expend less energy in flight. Ruby Throated hummingbirds are an excellent example of nocturnal migrators. They can cover great distances at night. The trip across the Gulf of Mexico usually takes around 20 hours of non-stop flight. The hummingbirds usually begin the journey either way just before dusk to take advantage of the upcoming night. They fly low over the tops of the ocean waves where its coolest on their way back to the U.S. Another advantage is there are fewer predators that can pose a problem by night flying as well.

Other species may spend summers in the Arctic regions and winter in the Central and Southern U.S. Examples would be Juncos and red breasted nuthatches.
**Purple Martin:** In eastern North America it has nested almost exclusively in nest boxes for more than 100 years. Winters in South America. Eat and drink almost exclusively while in flight.

**Yellow-headed Blackbird:** Nest an open cup woven of strips of reeds, attached to dead or live reeds. Always placed over water. Winters from southern Arizona and western Texas southward to southern Mexico. Some birds winter in California.

**Louisiana Waterthrush:** Open cup of mud, leaves, plant stems, pine needles, and small twigs built on foundation of wet leaves. Lined with fine plant stems, rootlets, hair, and moss. Nest placed in small hollow or cavity on stream bank, under fallen log, or within roots of an upturned tree. Winters from Mexico to northern South America, and in the Caribbean.

**Broad-winged Hawk:** Large bowl of sticks, lined with bark chips. Often decorated with green twigs. May be placed on old crow or squirrel nest. Winters from southern Mexico southward to South America, and in Caribbean. Some winter in southern Florida.

**Eastern Kingbird:** Nest an open cup of twigs, roots, dry weed stems, and strips of bark lined with plant down, fine rootlets, and hair. Nest placed on horizontal limb in tree, in crotch of tree limb, or on top of snag or fence post. Winters in South America.

**Red-eyed Vireo:** Open cup suspended from a forked tree branch. Made of twigs, bark strips, grasses, pine needles, and lichen held together with spider web. Inner lining of grasses, plant fibers, and hair. Winters in northern South America in the Amazon Basin.

**Bobolink:** On ground; outer wall of dead grass with central lining of fine grass or sedges. May have canopy of dead grass hanging over top. Winters in central and southern South America.

**Ruby-throated Hummingbird:** Nest an open cup placed on top of small tree branch. Made of thistle and dandelion down, held together with spider web and covered on outside with lichens. Placed at 6-50 feet height, average of 10-20 feet. Winters in southern Mexico and Central America south to Costa Rica.

**Barn Swallow:** An open cup of mud and grass. Lined with fine grass stems, hair, and feathers. Nest is fastened to a vertical wall under an overhang or placed on a ledge. Southern Mexico through Central America and throughout lowland South America.

**Black-and-white Warbler:** Open cup of dry leaves, grass, bark, and pine needles, lined with fine grasses, horsehair, and moss, usually placed on ground next to a tree. Winters near the coasts of the southeastern United States, Bermuda, and many islands in the Caribbean, throughout most of Mexico, Central America, and northern South America.

**Hooded Warbler:** Winters in southern Mexico, Central America, and Caribbean.
Wood Thrush: Open cup of leaves and grasses lined with mud, placed on lower limbs of tree or shrub. Winter in lowlands of Central America, from southern Mexico to western Panama; rarely in southeastern United States.

Least Flycatcher: Neat open cup woven of bark strips, grass, caterpillar webs, lichens, hair, feathers, rootlets, mosses, and other bits of vegetation; lined with fine grasses, feathers, hair, down, and plant stems; placed in crotch or fork of small tree. Winters in southern Mexico and Central America.

Western Kingbird: Nest an open cup of grass stems, rootlets, fine twigs, bark and plant fibers, lined with fine material such as wool, cotton, hair, feathers, and cloth. Built in trees or on human-made structures, such as utility poles and fence posts. Winters in Southern Mexico and western Central America. Also in southern Florida in small numbers.

Baltimore Oriole: Gourd-shaped and woven from hair, plant fibers, and synthetic fibers. Hung by the rim from thin branches or a fork in a tall tree. Winters in Florida, the Caribbean, central Mexico and Central America to northern South America. Also small numbers in southern California.

Rose-breasted Grosbeak: A loose, open cup of sticks, twigs, grasses, weed stems, decayed leaves or straw, lined with fine twigs, rootlets, or hair. Placed in trees, shrubs, or vines. Winters from southern Mexico to northern South America and the Caribbean.

Scarlet Tanager: almost all Scarlet Tanager nests have four characteristics in common: nests are placed (1) in a leaf cluster, or at least with several leaves shading the nest, (2) on a nearly horizontal branch, (3) with a clear, unobstructed view to the ground below, (4) with clear open flyways from adjacent trees to the nest.

Yellow Warbler: Nest a deep cup of grasses and bark, covered on the outside with plant down and fine fibers, lined with fur or fine plant fibers. Placed in upright fork of shrub or tree. Winters in Mexico, Central and South America.

Cliff Swallow: Nest is a covered bowl made of mud pellets, with a small entrance tunnel on one side. Lined with grass. Nest placed on a vertical wall, usually just under an overhang. Winters in southern South America.
In springtime, love is truly in the air. Competition for mates is bad enough, but finding suitable nesting sites is even more difficult. Amount of natural habitat lost in the U.S. is 6,700 acres each day—which annually is a little more than 2 million 250 thousand acres. In the last 100 years alone we’ve lost more than half of our wetlands and still do at the rate of 26,000 acres each year.

Two out of every three woodland species of birds has declined 50% in the last 30 years, and 3 out of every 4 grassland species has declined more than 50% in the last 30 years. Ohio alone has lost 99.7% of its prairie grassland in the past 50 years.

Most woodlands in eastern United States are less than 100 acres in size, and one problem that creates is this allows parasitic brown-headed cowbirds and predators easy access to the nests of Neotropical migratory birds breeding there further reducing their numbers.

Helping Nature Nest
- Nesting Material
- Nesting Boxes
- Berms
- Shrub Piles
- Lean To’s
- Plant/Tree Cover

Nesting Boxes
- Important Considerations
  1. Dimensions
  2. Materials
  3. Ventilation
  4. Drainage
  5. Cleaning
  6. Inside Grooves
  7. Overhang
  8. Mounting
Things to consider when designing backyard habitats for wildlife:
Should provide shelter and places to raise young=evergreens, rock or woodpiles, birdhouses etc.
Provide a food source, through food producing plants or providing feeders
Provide a water source
Try and plant native species= this is what our wildlife has learned to adapt to and utilize.
## Appendix E: In-Store Presentations

<table>
<thead>
<tr>
<th>Figure 19</th>
<th>Black-footed Penguin (<em>Spheniscus demersus</em>)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 20</td>
<td>Parrot</td>
</tr>
<tr>
<td>Figure 21</td>
<td>Kookaburra (<em>Halcyonida daceo</em>)</td>
</tr>
<tr>
<td>Figure 22</td>
<td>Rhinoceros Hornbill (<em>Buceros rhinoceros</em>)</td>
</tr>
<tr>
<td>Figure 23</td>
<td>Spectacled Owl (<em>Pulsatrix perspicillat</em>)</td>
</tr>
<tr>
<td>Figure 24</td>
<td>Harris Hawk (<em>Parabuteo unicinctus</em>)</td>
</tr>
<tr>
<td>Figure 25</td>
<td>Stellar’s Sea Eagle (<em>Haliaeetus pelagicus</em>)</td>
</tr>
<tr>
<td>Figure 26</td>
<td>Lanner Falcon (<em>Falco biarmicus</em>)</td>
</tr>
<tr>
<td>Figure 27</td>
<td>Presentation coupon</td>
</tr>
</tbody>
</table>
In-store Presentations

Miracles of Migration Lecture

The “Miracles of Migration” lecture took place in October 2007, for which about twenty-five people were present. The purpose was to educate attendants about the migration process and the human impacts on migration as well as the importance of maintaining a species winter and summer habitats. The Cincinnati Zoo brought in a Rhinoceros Hornbill (*Buceros rhinoceros*), Kookaburra (*Halcyonida dacelo*), Parrot, and Black-footed penguin (*Spheniscus demersus*).

![Figure 19: Black-footed penguin (*Spheniscus demersus*).](image1)

![Figure 20: Parrot.](image2)

![Figure 21: Kookaburra (*Halcyonida dacelo*).](image3)

![Figure 22: Rhinoceros Hornbill (*Buceros rhinoceros*).](image4)
Raptors Lecture
The “Birds of Prey” lecture took place in November 2007, for which about forty people were present. This lecture was about raptors, the guest host explained the different types of birds of prey and how to tell what a bird eats simply by looking the bird’s feet and beak. Issues such as endangerment and laws for protective were also discussed.

Figure 23: Spectacled Owl (*Pulsatrix perspicillat*)

Figure 24: Harris Hawk (*Parabuteo unicinctus*)

Figure 25: Stellar’s Sea Eagle (*Haliaeetus pelagicus*)

Figure 26: Lanner Falcon (*Falco biarmicus*)
Out-of-store Presentations

Figure 27: Presentation Coupon

Wild Bird Center of Mason
THE ULTIMATE BACKYARD NATURE STORE™

Wild Bird Center
Deerfield Towne Center
5859 Deerfield Boulevard
Mason, Ohio 45040
(513) 234-0789

Please visit us at
www.wildbird.com/mas
or e-mail us at
wildbird1@fuse.net

Bring this coupon in to receive

$5 OFF your purchase of $25 or more

$10 OFF your purchase of $50 or more

$20 OFF your purchase of $100 or more

Not to be combined with other offers.

The Ultimate Backyard Nature Store™—
offering a wide variety of quality nature
products to enhance your backyard experience.
**Appendix F: Tables**

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Out-of-Store Presentation Schedule</td>
</tr>
<tr>
<td>Table 2</td>
<td>Bird House Measurement Requirements</td>
</tr>
<tr>
<td>Table 3</td>
<td>In-Store Presentation Schedule</td>
</tr>
<tr>
<td>Table 4</td>
<td>Sales by Department August 2007-April 2008</td>
</tr>
<tr>
<td>Table 5</td>
<td>Lecture Coupon Return Rates</td>
</tr>
<tr>
<td>Table 6</td>
<td>Customers New and Returned</td>
</tr>
<tr>
<td>Table 7</td>
<td>Sales November 2006-April 2007 vs. November 2007-April 2008</td>
</tr>
<tr>
<td>Table 8</td>
<td>Emails Sent and Received</td>
</tr>
<tr>
<td>Table 9</td>
<td>Marketing Expenses</td>
</tr>
<tr>
<td>TALK GIVEN</td>
<td>GROUP</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Wonderful Birds of Winter</td>
<td>Almost Retired Methodist Men (ARMM)</td>
</tr>
<tr>
<td>Kids Wonderful World of Birds</td>
<td>Montgomery Community Church Preschool</td>
</tr>
<tr>
<td>Birding and Backyard Habitats</td>
<td>Natorp's Garden Center</td>
</tr>
<tr>
<td>Birds of the Rainbow</td>
<td>Lebanon Gardening Group</td>
</tr>
<tr>
<td>Wonderful Birds of Winter</td>
<td>Mason Senior Center</td>
</tr>
<tr>
<td>Backyard Critters &amp; Recycling</td>
<td>Mason Cub Scout Group</td>
</tr>
<tr>
<td>Birding and Backyard Habitats</td>
<td>Western Row Senior Center</td>
</tr>
<tr>
<td>Parasitic Birds</td>
<td>Natorp's Garden Center</td>
</tr>
<tr>
<td>Birds, Bugs, &amp; Butterflies</td>
<td>Lebanon Gardening Club</td>
</tr>
<tr>
<td>Backyard Critters &amp; Recycling</td>
<td>Mason Cub Scouts Group</td>
</tr>
<tr>
<td>Kids Wonderful World of Birds</td>
<td>Home Schooling Group</td>
</tr>
<tr>
<td>Bagel Bird Feeders</td>
<td>Granny’s Garden</td>
</tr>
<tr>
<td>Birds, Bugs, &amp; Butterflies</td>
<td>Middletown Garden Club</td>
</tr>
<tr>
<td>Backyard Critters &amp; Recycling</td>
<td>Mason Cub Scouts Group</td>
</tr>
<tr>
<td>Birding and Backyard Habitats</td>
<td>The Lodge Retirement Community</td>
</tr>
<tr>
<td>Nesting Balls</td>
<td>Montgomery Community Church Preschool</td>
</tr>
<tr>
<td>Parasitic Birds</td>
<td>Twin Towers Retirement Center</td>
</tr>
<tr>
<td>Life Emerging</td>
<td>Mason Parks</td>
</tr>
<tr>
<td>Birds of the Rainbow</td>
<td>Lebanon Farmers Club</td>
</tr>
<tr>
<td>Kids Wonderful World of Birds</td>
<td>Montessori Community School</td>
</tr>
<tr>
<td>Bagel Bird Feeders</td>
<td>Natorp's Garden Center</td>
</tr>
<tr>
<td>Backyard Critters &amp; Recycling</td>
<td>Mason Girl Scouts</td>
</tr>
<tr>
<td>Backyard Critters &amp; Recycling</td>
<td>Lebanon Girl Scouts</td>
</tr>
<tr>
<td>Birding and Backyard Habitats</td>
<td>Mason Adult Literacy Group</td>
</tr>
<tr>
<td>BIRD SPECIES</td>
<td>FLOOR SIZE</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Barn Owls</td>
<td>10&quot; x 18&quot;</td>
</tr>
<tr>
<td>Bluebirds</td>
<td>5&quot; x 5&quot;</td>
</tr>
<tr>
<td>Chickadees</td>
<td>4&quot; x 4&quot;</td>
</tr>
<tr>
<td>Common &amp; Northern Flicker</td>
<td>7&quot; x 7&quot;</td>
</tr>
<tr>
<td>Flycatchers</td>
<td>6&quot; x 6&quot;</td>
</tr>
<tr>
<td>House Finch</td>
<td>6&quot; x 6&quot;</td>
</tr>
<tr>
<td>House Sparrows</td>
<td>4&quot; x 4&quot; to 5&quot; x 5&quot;</td>
</tr>
<tr>
<td>Nuthatches</td>
<td>4&quot; x 4&quot;</td>
</tr>
<tr>
<td>Osprey</td>
<td>48&quot; x 48&quot; Platform</td>
</tr>
<tr>
<td>Phoebes</td>
<td>6&quot; x 6&quot;</td>
</tr>
<tr>
<td>Purple Martins</td>
<td>6&quot; x 6&quot;</td>
</tr>
<tr>
<td>Downy Woodpecker</td>
<td>4&quot; x 4&quot;</td>
</tr>
<tr>
<td>Hairy Woodpecker</td>
<td>6&quot; x 6&quot;</td>
</tr>
<tr>
<td>Pileated Woodpecker</td>
<td>8&quot; x 8&quot;</td>
</tr>
<tr>
<td>Red-Bellied Woodpecker</td>
<td>6&quot; x 6&quot;</td>
</tr>
<tr>
<td>Red-Headed Woodpecker</td>
<td>6&quot; x 6&quot;</td>
</tr>
<tr>
<td>Red-Tailed Hawk and Great Horned Owl</td>
<td>24&quot; x 24&quot; Platform</td>
</tr>
<tr>
<td>Screech Owls and Kestrels</td>
<td>8&quot; x 8&quot;</td>
</tr>
<tr>
<td>Barn Swallows</td>
<td>6&quot; x 6&quot;</td>
</tr>
<tr>
<td>Violet-Green and Tree Swallows</td>
<td>5&quot; x 5&quot;</td>
</tr>
<tr>
<td>Titmice</td>
<td>4&quot; x 4&quot;</td>
</tr>
<tr>
<td>Prothonotary Warbler</td>
<td>5&quot; x 5&quot;</td>
</tr>
<tr>
<td>Wood Ducks</td>
<td>10&quot; x 18&quot;</td>
</tr>
<tr>
<td>Wrens</td>
<td>4&quot; x 4&quot;</td>
</tr>
<tr>
<td>Yellow-Bellied Sapsucker</td>
<td>5&quot; x 5&quot;</td>
</tr>
</tbody>
</table>
Table 3: In-Store Presentation Schedule

<table>
<thead>
<tr>
<th>TALK GIVEN</th>
<th>PRESEONOR</th>
<th>DATE</th>
<th># ATTENDED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miracles of Migration</td>
<td>Kevin Kellner, Cincinnati Zoo and Botanical Gardens</td>
<td>Oct-07</td>
<td>25</td>
</tr>
<tr>
<td>Birds of Prey</td>
<td>Kevin Kellner, Cincinnati Zoo and Botanical Gardens</td>
<td>Nov-07</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 4: Sales by Department August 2007-April 2008

<table>
<thead>
<tr>
<th>DEPARTMENT</th>
<th>AUG '07 TOTAL SALES</th>
<th>SEP '07 TOTAL SALES</th>
<th>OCT '07 TOTAL SALES</th>
<th>NOV '07 TOTAL SALES</th>
<th>DEC '07 TOTAL SALES</th>
<th>JAN '08 TOTAL SALES</th>
<th>FEB '08 TOTAL SALES</th>
<th>MAR '08 TOTAL SALES</th>
<th>APR '08 TOTAL SALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERALL</td>
<td>$10,328.68</td>
<td>$8,517.89</td>
<td>$7,621.14</td>
<td>$14,046.48</td>
<td>$34,023.45</td>
<td>$12,016.05</td>
<td>$11,772.57</td>
<td>$15,523.80</td>
<td>$19,392.10</td>
</tr>
<tr>
<td>FEEDERS</td>
<td>$2,995.67</td>
<td>$3,099.68</td>
<td>$1,855.81</td>
<td>$4,249.13</td>
<td>$13,173.98</td>
<td>$3,234.72</td>
<td>$3,148.09</td>
<td>$4,935.26</td>
<td>$7,175.51</td>
</tr>
<tr>
<td>HOUSES</td>
<td>$195.13</td>
<td>$266.48</td>
<td>$75.92</td>
<td>$776.79</td>
<td>$2,120.04</td>
<td>$260.11</td>
<td>$35.97</td>
<td>$895.65</td>
<td>$943.33</td>
</tr>
<tr>
<td>SEED</td>
<td>$3,490.12</td>
<td>$2,612.39</td>
<td>$2,897.20</td>
<td>$3,272.70</td>
<td>$5,504.04</td>
<td>$5,155.46</td>
<td>$5,650.63</td>
<td>$5,120.95</td>
<td>$5,202.14</td>
</tr>
<tr>
<td>SUET</td>
<td>$295.91</td>
<td>$514.20</td>
<td>$326.26</td>
<td>$701.08</td>
<td>$1,530.33</td>
<td>$666.38</td>
<td>$564.87</td>
<td>$621.92</td>
<td>$536.41</td>
</tr>
<tr>
<td>WATER</td>
<td>$396.13</td>
<td>$78.44</td>
<td>$636.12</td>
<td>$598.85</td>
<td>$2,176.18</td>
<td>$626.89</td>
<td>$135.96</td>
<td>$471.43</td>
<td>$438.33</td>
</tr>
</tbody>
</table>

** Bolded values indicate the department with the highest sales for that month.

Table 5: Lecture Coupon Return Rates

<table>
<thead>
<tr>
<th>DATE</th>
<th># PRESENTATIONS</th>
<th>PEOPLE ATTENDED</th>
<th>RETURNED CARDS</th>
<th>% RETURNED</th>
</tr>
</thead>
<tbody>
<tr>
<td>October '07</td>
<td>2</td>
<td>46</td>
<td>8</td>
<td>17.39%</td>
</tr>
<tr>
<td>November '07</td>
<td>2</td>
<td>56</td>
<td>4</td>
<td>20.69%</td>
</tr>
<tr>
<td>December '07</td>
<td>1</td>
<td>30</td>
<td>12</td>
<td>20.69%</td>
</tr>
<tr>
<td>January '08</td>
<td>5</td>
<td>95</td>
<td>20</td>
<td>21.05%</td>
</tr>
<tr>
<td>February '08</td>
<td>6</td>
<td>170</td>
<td>15</td>
<td>8.82%</td>
</tr>
<tr>
<td>March '08</td>
<td>5</td>
<td>71</td>
<td>11</td>
<td>15.49%</td>
</tr>
<tr>
<td>April '08</td>
<td>5</td>
<td>109</td>
<td>21</td>
<td>19.27%</td>
</tr>
</tbody>
</table>

Table 6: Customers New and Returned

<table>
<thead>
<tr>
<th>MONTH</th>
<th>TOTAL TRANSACTIONS</th>
<th>NEW CUSTOMERS</th>
<th>REPEAT CUSTOMERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>August '07</td>
<td>307</td>
<td>113</td>
<td>194</td>
</tr>
<tr>
<td>September '07</td>
<td>273</td>
<td>107</td>
<td>166</td>
</tr>
<tr>
<td>October '07</td>
<td>238</td>
<td>82</td>
<td>156</td>
</tr>
<tr>
<td>November '07</td>
<td>352</td>
<td>122</td>
<td>230</td>
</tr>
<tr>
<td>December '07</td>
<td>807</td>
<td>106</td>
<td>106</td>
</tr>
<tr>
<td>January '08</td>
<td>324</td>
<td>106</td>
<td>218</td>
</tr>
<tr>
<td>February '08</td>
<td>349</td>
<td>93</td>
<td>256</td>
</tr>
<tr>
<td>March '08</td>
<td>338</td>
<td>124</td>
<td>124</td>
</tr>
<tr>
<td>April '08</td>
<td>461</td>
<td>166</td>
<td>295</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3449</td>
<td>1219</td>
<td>2230</td>
</tr>
</tbody>
</table>
Table 7: Sales November 2006-April 2007 vs. November 2007-April 2008

<table>
<thead>
<tr>
<th>DEPARTMENT</th>
<th>11/06-04/07 QTY SOLD</th>
<th>11/06-04/07 TOTAL SALES</th>
<th>11/07-04/08 QTY SOLD</th>
<th>11/07-04/08 TOTAL SALES</th>
<th>DIFFERENCE</th>
<th>% SALES INCREASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERALL</td>
<td>5276</td>
<td>$68,615.93</td>
<td>7390</td>
<td>$106,774.45</td>
<td>$38,158.52</td>
<td>35.74%</td>
</tr>
<tr>
<td>FEEDERS</td>
<td>857</td>
<td>$23,773.71</td>
<td>1003</td>
<td>$35,916.69</td>
<td>$12,142.98</td>
<td>33.81%</td>
</tr>
<tr>
<td>HOUSES</td>
<td>174</td>
<td>$3,843.32</td>
<td>249</td>
<td>$5,387.45</td>
<td>$1,544.13</td>
<td>28.66%</td>
</tr>
<tr>
<td>SEED</td>
<td>1375</td>
<td>$11,750.34</td>
<td>2472</td>
<td>$29,905.92</td>
<td>$18,155.58</td>
<td>60.71%</td>
</tr>
<tr>
<td>SUET</td>
<td>810</td>
<td>$3,123.20</td>
<td>1387</td>
<td>$4,620.99</td>
<td>$1,497.79</td>
<td>32.41%</td>
</tr>
<tr>
<td>UNDEFINED</td>
<td>149</td>
<td>$918.38</td>
<td>32</td>
<td>($1,544.69)</td>
<td>($2,463.07)</td>
<td>159.45%</td>
</tr>
<tr>
<td>ART</td>
<td>48</td>
<td>$1,737.61</td>
<td>67</td>
<td>$1,687.55</td>
<td>($50.06)</td>
<td>-2.97%</td>
</tr>
<tr>
<td>BAFFLES</td>
<td>48</td>
<td>$979.96</td>
<td>53</td>
<td>$1,184.77</td>
<td>$204.81</td>
<td>17.29%</td>
</tr>
<tr>
<td>BOOKS</td>
<td>143</td>
<td>$1,489.44</td>
<td>170</td>
<td>$1,762.35</td>
<td>$272.91</td>
<td>15.49%</td>
</tr>
<tr>
<td>CHILDREN</td>
<td>279</td>
<td>$2,130.07</td>
<td>296</td>
<td>$2,682.85</td>
<td>$552.78</td>
<td>20.60%</td>
</tr>
<tr>
<td>CHIMES</td>
<td>51</td>
<td>$1,431.90</td>
<td>44</td>
<td>$1,349.04</td>
<td>($82.86)</td>
<td>-6.14%</td>
</tr>
<tr>
<td>CLOTHING</td>
<td>71</td>
<td>$690.04</td>
<td>54</td>
<td>$413.31</td>
<td>($276.73)</td>
<td>-66.95%</td>
</tr>
<tr>
<td>FOOD PEOPLE</td>
<td>4</td>
<td>$20.80</td>
<td>3</td>
<td>$23.97</td>
<td>$3.17</td>
<td>13.22%</td>
</tr>
<tr>
<td>FOOD WLDLF</td>
<td>119</td>
<td>$791.63</td>
<td>173</td>
<td>$1,172.40</td>
<td>$380.77</td>
<td>32.48%</td>
</tr>
<tr>
<td>GARDEN</td>
<td>62</td>
<td>$1,146.08</td>
<td>234</td>
<td>$3,623.95</td>
<td>$2,477.87</td>
<td>68.37%</td>
</tr>
<tr>
<td>GIFT CARD</td>
<td>15</td>
<td>$615.38</td>
<td>63</td>
<td>$1,856.60</td>
<td>$1,241.22</td>
<td>66.85%</td>
</tr>
<tr>
<td>HARDWARE</td>
<td>530</td>
<td>$5,823.52</td>
<td>438</td>
<td>$5,932.84</td>
<td>$109.32</td>
<td>1.84%</td>
</tr>
<tr>
<td>HOME</td>
<td>123</td>
<td>$1,637.44</td>
<td>218</td>
<td>$1,703.84</td>
<td>$66.40</td>
<td>3.90%</td>
</tr>
<tr>
<td>JEWELRY</td>
<td>43</td>
<td>$475.62</td>
<td>60</td>
<td>$976.46</td>
<td>$500.84</td>
<td>51.29%</td>
</tr>
<tr>
<td>MEDIA</td>
<td>92</td>
<td>$1,743.24</td>
<td>57</td>
<td>$1,232.01 ($511.23)</td>
<td>-41.50%</td>
<td></td>
</tr>
<tr>
<td>OPTICS</td>
<td>37</td>
<td>$515.63</td>
<td>27</td>
<td>$685.09</td>
<td>$169.46</td>
<td>24.74%</td>
</tr>
<tr>
<td>PROGRAM</td>
<td>0</td>
<td>0</td>
<td>58</td>
<td>$1,303.00</td>
<td>$1,303.00</td>
<td>100.00%</td>
</tr>
<tr>
<td>STATIONERY</td>
<td>154</td>
<td>$496.28</td>
<td>128</td>
<td>$450.42 ($45.86)</td>
<td>-10.18%</td>
<td></td>
</tr>
<tr>
<td>WATER</td>
<td>92</td>
<td>$3,482.34</td>
<td>104</td>
<td>$4,447.64</td>
<td>$965.30</td>
<td>21.70%</td>
</tr>
</tbody>
</table>

** Numbers in parenthesis are negative dollar values.

Table 8: Emails Sent and Received

<table>
<thead>
<tr>
<th>MONTH</th>
<th>SENT</th>
<th>BOUNCES a</th>
<th>OPENS b</th>
<th>CLICKS c</th>
</tr>
</thead>
<tbody>
<tr>
<td>November '07</td>
<td>279</td>
<td>52</td>
<td>18.6%</td>
<td>122</td>
</tr>
<tr>
<td></td>
<td></td>
<td>32%</td>
<td>53</td>
<td>43.4%</td>
</tr>
<tr>
<td>December '07</td>
<td>369</td>
<td>62</td>
<td>16.8%</td>
<td>153</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19.8%</td>
<td>68</td>
<td>44.4%</td>
</tr>
<tr>
<td>January '08</td>
<td>481</td>
<td>69</td>
<td>14.3%</td>
<td>199</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19.7%</td>
<td>22</td>
<td>11.1%</td>
</tr>
<tr>
<td>February '08</td>
<td>555</td>
<td>73</td>
<td>13.2%</td>
<td>209</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16.8%</td>
<td>6</td>
<td>2.9%</td>
</tr>
<tr>
<td>March '08</td>
<td>574</td>
<td>14</td>
<td>2.4%</td>
<td>261</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.1%</td>
<td>15</td>
<td>5.7%</td>
</tr>
<tr>
<td>April '08</td>
<td>636</td>
<td>0</td>
<td>0.0%</td>
<td>275</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0%</td>
<td>8</td>
<td>2.9%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>4999</td>
<td>340</td>
<td>6.8%</td>
<td>1926</td>
</tr>
</tbody>
</table>

a: Bounces are automatic messages sent informing the sender of delivery failure. Bounce rate is the percent of emails returned unread out of the total number sent.
b: Opens are customers that opened the email. Open rate is the percent of the sent emails that was open from the total amount sent.
c: Clicks are the number of individuals that opened an email and then clicked on a link inside the newsletter (our website). Click rate is the percent of the total email recipients that clicked on the WBC website link.
Table 9: Marketing Expenses

<table>
<thead>
<tr>
<th>TYPE</th>
<th>AMOUNT</th>
<th>% TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magazine Ads</td>
<td>$2,090.00</td>
<td>14.81%</td>
</tr>
<tr>
<td>In Touch Magazine</td>
<td>$990.00</td>
<td></td>
</tr>
<tr>
<td>Livings’ Great Ads</td>
<td>$1,100.00</td>
<td></td>
</tr>
<tr>
<td>TV &amp; Radio Ads</td>
<td>$5,030.00</td>
<td>35.64%</td>
</tr>
<tr>
<td>Gift Cards &lt;sup&gt;a&lt;/sup&gt;</td>
<td>$5,030.00</td>
<td></td>
</tr>
<tr>
<td>Promotions</td>
<td>$1,420.11</td>
<td>10.06%</td>
</tr>
<tr>
<td>Staff Presentation Time</td>
<td>$1,300.00</td>
<td></td>
</tr>
<tr>
<td>Educational Programming</td>
<td>$90.11</td>
<td></td>
</tr>
<tr>
<td>Postcards</td>
<td>$4,757.38</td>
<td>33.71%</td>
</tr>
<tr>
<td>Postcards</td>
<td>$3,407.38</td>
<td></td>
</tr>
<tr>
<td>Mailing Services</td>
<td>$1,200.00</td>
<td></td>
</tr>
<tr>
<td>Photo use fee</td>
<td>$150.00</td>
<td></td>
</tr>
<tr>
<td>Newsletters</td>
<td>$308.78</td>
<td>2.19%</td>
</tr>
<tr>
<td>Constant Contact &lt;sup&gt;b&lt;/sup&gt;</td>
<td>$65.50</td>
<td></td>
</tr>
<tr>
<td>Paper Copies of Newsletter</td>
<td>$243.28</td>
<td></td>
</tr>
<tr>
<td>In Store Marketing</td>
<td>$506.91</td>
<td>3.59%</td>
</tr>
<tr>
<td>Wrapping</td>
<td>$431.91</td>
<td></td>
</tr>
<tr>
<td>Signs</td>
<td>$75.00</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$14,113.18</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>: Gift cards traded to TV and radio stations for the advertisement (they would sell the cards).

<sup>b</sup>: Email distributer of newsletters