

**Literature Review of Declining Birds  
in**

**The Land Between**

By:

Tom Shorney, Qaani Curry, Sara Street and Mark Bishop

# **HABITAT LOSS AND ITS RELATION TO THE DECLINE IN POPULATIONS OF GOLDEN WINGED WARBLER AND FIELD SPARROW.**

Credit For Product, Sara Kelly  
October 8, 2007  
Sara Street

## **INTRODUCTION**

Golden Winged Warbler (GWW) and Field Sparrows (FS) are both habitat specialists which require a very specific habitat structure, the vegetation arrangement is essential (McCracken, 2007). These two species are currently declining and this decline has been said to have been the result of loss of their habitat (Rossell, 2001; Klaus and Buehler, 2001; Davis et al, 2000; Fink et al, 2006; Drapeau et al 2000; Confer et al, 2003; and Walk et al, 2000) . Their habitat is early successional forested grassland areas, GWW prefers wet areas near its habitat, FS especially enjoys a shrubland habitat (Rossell, 2001; Fink et al, 2006; Rodewald and Vitz, 2005). Early successional habitats are very susceptible to natural succession and in order to maintain the quantity and quality of this habitat for GWW and FS, some natural or human intervention is required (Yahner, 2003; Rodewald and Vitz, 2005). **The decline of GWW and FS is largely due to their habitat specificity and the loss of early successional habitats and this review examines the research that has been done to recommend any remedies to this problem.**

## **SOURCES**

1) Allen, A.P., and R.J. O'Connor. (2000). Interactive effects of land use and other factors on regional bird distribution. *Journal of Biogeography*. 27(4), 889-900.

This study focused on the effects that land use and natural processes have on the distribution of bird species. It is important to examine the effects land use has on the

environment as today our populations are rising and development is increasing so we are encroaching on more and more habitat, causing a decline in bird species (FS). The experiment involved representative samples of all lakes within the region, each site was surveyed and examined for bird species, and bird habitat on transects. As well there were environmental factors which were examined which pertained to the lake, watershed surrounding the lakes and the surrounding landscape. The results of the study showed that the interactions between human land use and environmental processes are too complex to be able to determine the particular effects of land use. These interactions however are the building blocks for the vegetation, habitat, and bird community structure and as these factors affect the surroundings there is a decline in native species and an increase in the presence of non-native species. This article was well argued and defended by numerous peer reviewed journals.

2) Confer, J.L., J.L. Larkin, and P.E. Allen. (2003). Effects of vegetation, interspecific competition, and brood parasitism on Golden winged Warbler (*Vermivora chrysoptera*) nesting success. *The Auk*. 120(1), 138-144.

Confer et al describes the GWW nesting success and how it relates to the vegetation characteristics of their territory. They include the effects of the presence of Blue Winged Warbler (BWW) or parasitism by cowbird on the nest success as well. This article helps interpret why it is that the GWW is declining and the findings are very valuable for determining management efforts. The study sites were selected in GWW territory, which was either overlapping BWW, not near BWW, or near a BWW territory. At each site the percent cover of vegetation was measured, birds were surveyed, nests located and nest success was calculated. GWW and BWW were never found to be in high concentrations together in a territory, however territorial overlap was very common.

BWW appears to have no effects on nest success, but does influence the clutch size of GWW. Habitat loss as succession occurs and from human land use accounts for the decline of the population of GWW. The interaction between BWW and GWW negatively affects the clutch size of GWW whenever BWW are present. BWW is negatively affecting the population size of GWW by reducing the clutch sizes. Other studies should focus on different habitat types (Alder swamp, Forest swamp and Tamarack swamp) as this study was limited to upland habitats of GWW, and the interactions between GWW and BWW and their hybrids. This experiment was concise and conducted very thoroughly. It was also supported by several peer reviewed scientific journal articles.

3) Davis, M.A., D.W. Peterson, P.B. Reich, M. Crozier, T. Query, E. Mitchell, J. Huntington, and P. Bazakas. (2000). Restoring Savanna Using Fire: Impact on the Breeding Bird Community. *Restoration Ecology*. 8(1), 30-40.

This study was conducted in order to determine if there is a relationship between the restoration of Savannah by fire and the bird communities. If there is a relationship Davis et al sought to determine what changes it causes in the bird community and vegetation structure. This study was intended to help determine whether Savannah restoration using fire can be a successful management technique to decrease the loss of species. The area of the study was located in a transition zone between grasslands and deciduous and coniferous forest. Seven sites in the area have been under a management plan since 1964 (burned). Davis et al studied the vegetation structure and conducted bird surveys at all sites. Instead of compiling the data on each species of Davis et al used foraging guilds to group the birds. The study concluded that the bird species would benefit from the restored oak savannah, because it creates open country to restart

succession. Another important result from this study is that the use of functional guilds versus individual species will make future efforts for conservation easier to predict.

Davis et al used an interesting concept for their study and conducted it very professionally, this was a relatively untouched topic and the argument was well formulated.

4) Drapeau, P., A. Leduc, J.F. Giroux, J.P.L. Savard, Y. Bergeron, and W.L. Vickery. (2000). Landscape-scale disturbances and changes in bird communities of boreal mixed-wood forests. *Ecological Monographs*. 70(3), 423-444.

Drapeau et al looked at how bird communities respond to the effects of large scale disturbances and the changes to the environment and in turn bird habitat. Species of birds are declining in population size (FS), and this study aims to help determine methods which could be help to mitigate this decline. A pre-industrial site, a timber managed site, and a natural mixed forest, were investigated for bird community structure and composition (using a point count method), and vegetation structure and composition. Human disturbance changes in the forest did not result in an increase in species diversity at a local scale. However early successional bird species increased with human disturbances because large scale openings in the forest cover increased the availability of habitats which increased the number of species present. In fact Drapeau et al discovered that preservation of large sections of natural boreal mixed forests, if properly maintained, may contribute to the conservation of the species. Landscape scale models will end up being an essential part of conservation efforts; they would help make predictions easier by determining thresholds for preserving integrity. Drapeau et al successfully back up their findings using a number of peer reviewed articles, and they are thorough in their investigation of the different sites.

5) Fink, A.D., F.R. Thompson, and A.A. Tudor. (2006). Songbird Use of Regenerating Forest, Glade, and Edge Habitat Types. *Journal of Wildlife Management*. 70(1), 180-188.

Fink et al conducted their experiment to determine potential limiting factors of bird populations in relation to their habitat. Bird species like FS require intermittent disturbances in their habitat to maintain an early successional state. The experiment involved 3 study sites of 3 different habitats, 3-5 year old forest, dolomite glades and forested edge pasture. In each site bird densities, nest success, vegetation structure and composition (to describe the site) were all recorded and analysed. The pattern of nest success and densities among habitat and year interactions was compared and Fink et al concluded that there was strong support for habitat and year interactions and their effects on bird densities. Edge habitats are not optimum habitat for species as was determined when examining the nest success rates. Management and restoration of glade habitats is important to the conservation of species, succession needs to be set back at times in order to increase habitat and subsequently increase the population of birds. Fink et al suggest that improvement upon evaluations of management techniques effectiveness should incorporate reproductive success. Fink et al argue concisely and offer a solid discussion.

6) Klaus, N.A., and D.A. Buehler. (2001). Golden-winged Warbler breeding habitat characteristics and nest success in clearcuts in the southern Appalachian mountains. *Wilson Bulletin*. 113(3), 297-301.

Klaus and Buehler are attempting to document and relate habitat quality and the occupation of sites, by comparing unoccupied sites of similar land use and occupied sites. This study was conducted with the hopes of helping to conserve populations of GWW by providing land managers with qualities of the habitat that can be related to management activities. Twenty sites were randomly selected; each site was then surveyed for GWW territory boundaries, and nest locations. The study determined that GWW nests on this

site occurred where sapling densities were lower and tree canopy cover was less. Habitat structure is a key factor in nest success, the decline of GWW is due mainly to the repressed management of their habitat, be it natural management or human management. Klaus and Buehler suggest that with proper management large forested areas can be useful at maintaining population levels of GWW. Klaus and Buehler provide a critical experiment and came to many useful conclusions which will be used in future case studies.

7) Peak, R.G., and F.R. Thompson. (2006). Factors affecting avian species richness and density in riparian areas. *Journal of wildlife management*. 70(1), 173-179.

Peak and Thompson introduce their experiment to examine the effects width of the riparian zone and grassland buffers have on bird communities. In other words they are examining the relationship between width of riparian zone (with or without buffer) and bird communities. Twelve study sites along streams, 3 narrow riparian zone with buffer, 3 wide riparian zone with buffer, and 3 narrow riparian zone without buffer, and finally 3 wide riparian zone without buffer. Each site was examined for spot mapping of bird species and vegetation structure composition. Peak and Thompson found that bird species occupied the wide riparian zones with or without buffers. They also found that grassland buffers for either narrow or wide zones increased FS and other similar species. The relationship between species richness and width of riparian zone is that with an increase in zone size there is an increase in the probability of finding habitat for greater number of species of birds. Peak and Thompson suggest that further research could be done concerning nest success and predation. The argument was well constructed and well defended.

8) Rodewald, A.D., and A.C. Vitz. (2005). Edge and Area Sensitivity of Shrubland Birds. *Journal of Wildlife Management*. 69(2), 681-688.

Rodewald and Vitz aim to evaluate the edge and area sensitivity of shrubland birds, for example FS. They conducted this study because disturbance is one of the most important factors influencing and shaping ecosystems and communities. The study site was a heavily forested area (>70%) and was split up using transects to evaluate the sites. Nets and bird counts were done at each site, microhabitat structure and food resources were also included in the report. Rodewald and Vitz found some evidence that there was edge avoidance in the bird species, and that there was weak evidence in support of the theory that some shrubland birds are edge and area sensitive. There is correlation between the shape of the habitat and the edge effects on the bird species present; this may be a very important topic for further research to use towards management of avian shrub species. Finally they found that a few large cuts (of trees) to reset the habitat may actually benefit both shrubland bird species and the mature forest species. Rodewald and Vitz provided a concise experiment.

9) Rossell, C.R.Jr. (2001). Song Perch Characteristics of Golden-winged Warblers in a Mountain Wetland. *Wilson Bulletin*. 113(2), 246-248.

Rossell conducted this experiment because the GWW is a declining species, and that decline is thought to be the result of successional changes in the landscape. These changes in the landscape may also be changing the perching habits of the male GWW. Study sites included wetland areas where a golf course was to go in and so some land had been mowed and groomed. Once the study site was assigned, the GWW territory was established and the height of perch and percent cover over the perch were all recorded. Rossell discovered that perches were found much closer to water than expected, which

suggests that males are choosing the perch sites so that they can enhance their ability to be heard and seen. Rossell also believes that water is a very important factor when it comes to habitat for GWW. Rossell suggests that further research needs to be done about GWW and the significance of water. The article was well written and strongly defended.

10) Smith, A.L., J.S. Ortiz, and R.J. Robertson. (2001). Distribution patterns of migrant and resident birds in successional forests of the Yucatan Peninsula, Mexico. *Biotropica*. 33(1), 153-170.

Species of birds like FS and GWW are habitat specific birds which require a higher structural diversity of vegetation within their habitat. Smith et al conducted their experiment to examine the successional forest gradient by bird communities of Mexico. The study was conducted in a forest in Mexico and each type of successional forest was represented. Each site was divided into transects which were used to measure habitat variables and bird species. Smith et al determined that bird distribution patterns did not appear to be influenced by habitat characteristics. This study suggests that the configuration of habitat is very important to bird distributions in addition to the quality of habitat available. Both migrant and resident species richness and abundance indicated that there was a positive association with successional habitats. In the plan to protect the species we need to consider large areas of continuous early successional habitat.

Although this study was completed in Mexico the content is still very relevant, Smith et al efficiently demonstrate the results of their study throughout the article.

11) Walk, J.W, and R.E. Warner. (1999). Grassland management for the conservation of songbirds in the Midwestern USA. *Biological Conservation*. 94, 165-172.

This article examines the effects of undisturbed, mowed, hayed, grazed, and burned grasslands on the songbird populations (FS). This study was conducted because the songbirds of the grasslands of the United States are declining rapidly and it is

therefore important to examine the effects these management techniques have on bird populations. Sites were assigned and divided into subsections of different management units. Each of the units were assigned a different management/disturbance method. Strip transects were used to survey the plots for bird species, the findings of the study were very interesting. The frequencies of birds were higher in the grazed areas, which were grazed in the fall. The consistently positive response of all species to the light late season grazing provides insight into future management techniques for declining birds. Walk and Warner suggest that more research could be done studying how these habitats and management regimes might affect the bird populations and their habitats. This article is well developed and well researched.

12) Yahner, R.H. (2003). Responses of Bird Communities to Early Successional Habitat in a Managed Landscape. *Wilson Bulletin*. 115(3), 292-298.

Yahner discusses the changes seen in early successional species in response to the creation of additional early successional habitat from the cutting of trees. The decline of bird species and the lack of information as to how to mitigate these responses are what motivated Yahner to complete this study. Study sites were divided into cut and uncut sections and then divided again into a selection of 90 representative plots for bird sampling. Species richness and total abundance for each site were calculated during pre and post cut. The species richness of all early successional species increased from pre-cut to post cut. Increase in use of uncut plots which were transitioning into early successional habitats was observed during the course of the experiment, FS and two other early successional species both responded positively to this technique. The findings of this study are critical to conservation of populations of early successional species which are experiencing increasing declines right now. Yahner also found that this strategy

demonstrated potential success for both early successional species and mature forest species within the managed landscape. This article was well organized and defended.

## **CONCLUSION**

After completing the readings above it is clear that GWW and FS, among other species, are in serious need of a management plan to help mitigate the decline of the species. The habitat is also in decline, both because of natural succession and human interference. This habitat loss needs to be stopped and restoration and management techniques need to be put into place. There are many feasible suggestions for the restoration and maintenance of early successional habitats. These habitats are the key indicators of these species, because they are habitat specific they require a particular vegetation structure. Currently it is the absence of this structure which is attributing to the decline in the species (Yahner, 2003; Rodewald and Vitz, 2005). Techniques such as mowing, managed grazing, tilling, burning and tree cutting all have the potential to be important management tools for the future of habitat maintenance for GWW and FS. More research needs to be conducted concerning the success of these management techniques in order to ensure their effectiveness. They are all in the relatively early stages of application, and although they all show great promise for managing early successional habitat more research should be completed.

## **BIBLIOGRAPHY**

Allen, A.P., and R.J. O'Connor. (2000). Interactive effects of land use and other factors on regional bird distribution. *Journal of Biogeography*. 27(4), 889-900.

Confer, J.L., J.L. Larkin, and P.E. Allen. (2003). Effects of vegetation, interspecific competition, and brood parasitism on Golden winged Warbler (*Vermivora chrysoptera*) nesting success. *The Auk*. 120(1), 138-144.

- Davis, M.A., D.W. Peterson, P.B. Reich, M. Crozier, T. Query, E. Mitchell, J. Huntington, and P. Bazakas. (2000). Restoring Savanna Using Fire: Impact on the Breeding Bird Community. *Restoration Ecology*. 8(1), 30-40.
- Drapeau, P., A. Leduc, J.F. Giroux, J.P.L. Savard, Y. Bergeron, and W.L. Vickery. (2000). Landscape-scale disturbances and changes in bird communities of boreal mixed-wood forests. *Ecological Monographs*. 70(3), 423-444.
- Fink, A.D., F.R. Thompson, and A.A. Tudor. (2006). Songbird Use of Regenerating Forest, Glade, and Edge Habitat Types. *Journal of Wildlife Management*. 70(1), 180-188.
- Klaus, N.A., and D.A. Buehler. (2001). Golden-winged Warbler breeding habitat characteristics and nest success in clearcuts in the southern Appalachian mountains. *Wilson Bulletin*. 113(3), 297-301.
- McCracken, Jon. Phone conversation on October 4, 2007.
- Peak, R.G., and F.R. Thompson. (2006). Factors affecting avian species richness and density in riparian areas. *Journal of wildlife management*. 70(1), 173-179.
- Rodewald, A.D., and A.C. Vitz. (2005). Edge and Area Sensitivity of Shrubland Birds. *Journal of Wildlife Management*. 69(2), 681-688.
- Rossell, C.R.Jr. (2001). Song Perch Characteristics of Golden-winged Warblers in a Mountain Wetland. *Wilson Bulletin*. 113(2), 246-248.
- Smith, A.L., J.S. Ortiz, and R.J. Robertson. (2001). Distribution patterns of migrant and resident birds in successional forests of the Yucatan Peninsula, Mexico. *Biotropica*. 33(1), 153-170.
- Walk, J.W, and R.E. Warner. (1999). Grassland management for the conservation of songbirds in the Midwestern USA. *Biological Conservation*. 94, 165-172.
- Yahner, R.H. (2003). Responses of Bird Communities to Early Successional Habitat in a Managed Landscape. *Wilson Bulletin*. 115(3), 292-298.

# **LITERATURE REVIEW**

By

Mark Bishop

To

Sara Kelly

October 29, 2007

## **INTRODUCTION**

The purpose of this paper is to provide insight into habitat loss and fragmentation. This will look at the effects on species and biodiversity. This paper will be looking at articles that cover habitat loss, fragmentations influences on biodiversity, risks to endangered

species recovery, the impact of fishing on habitat structure, and plant and insect interaction after habitat loss just to name a few. All articles were retrieved through EBSCOHOST research database on the Fleming online library website.

**“Habitats loss has always been a concern for conservation, but not much is known about fragmentation. Fragmentation should be seen as a problem when it isolates biodiversity.”**

### ANNOTATIONS

Brookd, T. M., Mittermeier, R. A., Mittermeier, C. G., Da Fonseca, G. A. B., Rylands, A. B., Konstant W. R., Flick, P., Pilgrim, J., Oldfield, S., Magin, G., Hilton-Taylor, C. (1998) *Habitat Loss and Extinction in the Hotspots of Biodiversity*. Conservation Biology, 16(4). Retrieved October 23, 2007, from <http://search.ebscohost.com/Login.aspx?lp=login.asp&ref=http%3a%2f%2ffleming0.flemingc.on.ca%2flrc%2flibrary%2fSubject.HTML&authtype=ip%2cuid>

Nearly half the world's vascular plants and one-third of terrestrial vertebrates are endemic to 25 “hotspots” of biodiversity (Brooks et al, 2002). Each of these regions has lost up 70% of the original size and is under threat of fragmentation by human development. Tropical forest makes up for most of the hotspots but others are found in the Mediterranean, temperate forest, and only one found both the tropical dry forest and one in a semidesert. The problem here is that in these areas there are about 44% of the world's vegetation is found in 1.4% of the space on the earth, and could have implications towards the extinction of species. By using the 1996 IUCN Red List of Threatened Animals they compared species on the list to prediction of other scientists as well as species found within these “hotspots”. Although the Caribbean and

Madagascar “hotspots” have the most extinct species, it is the Philippines that contain the most threatened animals. This article had great diagrams, and contains a lot of citations from other scientists

Benitez-Malvido, J. (1998) *Impact of Forest Fragmentation on Seedling Abundance in a Tropical Rain Forest*. Conservation Biology, 12(2), 380-389. Retrieved October 25, 2007, from <http://search.ebscohost.com/Login.aspx?lp=login.asp&ref=http%3a%2f%2ffleming0.flemingc.on.ca%2flrc%2flibrary%2fSubject.HTML&authtype=ip%2cuid>

This article looks at different sites with different levels of fragmentation and compares the dispersal of shade tolerant seedlings 5-100cm tall. They compared “unfragmented and fragmented vegetation (Benitez-Malido, 1998)” sites. There were four main habitat used for this study which were continuous forest, 100 ha fragmented forest, 10 ha of fragmented forest, and 1 ha of fragmented forest It was found that there was a decline in seedlings density the smaller the size of fragmented forest. In 100 and 10 ha fragments the edges contained lower densities than the centre of the site. Over all the densities with in the centre of the fragment didn't vary as much between the largest fragment and the smallest fragment. This article was an easy read and simple to understand with good diagrams.

Goss-Custard, J. D., Clarke, R.T., Durell, V., Caldow, R. W. G., Ens, B.J. (1995) *Population consequences of winter habitat loss in migratory shore bird*. Journal of Applied Ecology, 32(1), 337-351. Retrieved October 23, 2007, from <http://search.ebscohost.com/Login.aspx?lp=login.asp&ref=http%3a%2f%2ffleming0.flemingc.on.ca%2flrc%2flibrary%2fSubject.HTML&authtype=ip%2cuid>

This article will be looking at the affects of winter habitat loss on populations of migratory seabirds called oystercatchers (*Haematopus ostralegus ostralegus*). These birds spend their winters in the estuaries and the coastal flats of north-west Europe where there is chance of starvation. Here the concern is human activities that restrict the birds from using the intertidal zone to feed. This article was not as helpful as it did not explain the main focus clear enough; it was difficult to make sense of each chart and graph.

Fahrig, L. (2003) *Effects of Habitat Fragmentation on Biodiversity*.. Retrieved October 25, 2007, from <http://search.ebscohost.com/Login.aspx?lp=login.asp&ref=http%3a%2f%2ffleming0.flemingc.on.ca%2flrc%2flibrary%2fSubject.HTML&authtype=ip%2cuid>

The problem here with fragmentation is that so many different scientists do not measure fragmentation the same way, and that their research is often draws different conclusions then their peers. Studies show that habitat loss is a large contributor to decreasing biodiversity where as fragmentation as weaker effect that can be either negative or positive. To effectively interpret the damage done it would be necessary to do an independent study on habitat loss and fragmentation. Here it is not recognize that fragmentation is different then habitat loss, this is what hinders the data.

Kerr, J. T., Deguise, I. (2004) *Habitat loss and the limits to endangered species recovery*. Ecology Letters, 7, 1163-1169. Retrieved October 25, 2007, from <http://search.ebscohost.com/Login.aspx?lp=login.asp&ref=http%3a%2f%2ffleming0.flemingc.on.ca%2flrc%2flibrary%2fSubject.HTML&authtype=ip%2cuid>

“Canada is one of the last places on earth with extensive wilderness (Kerr et al, 2004)”.

Each year more and more species are becoming threatened or endangered. The paper looks at 243 known species at risk and their remaining natural habitat within their ranger and determines whether there is a significant amount as to not impose any threat on the species. By using satellite data they determined land use and compared it to the range of endangered species. This article has predicted that because of Canada’s centralized land use that causes habitat loss less species are to be affected. This article almost contained a citation for every sentence. It is well written article and is not that complex.

Laurance, W. F., Ferreire, L.V., Rankin-De Merona, J. M., Laurance, S. G., Hutchings, R. W., Lovejoy, T.E. (1998) *Effects of Forest Fragmentation on Recruitment Patterns In Amazonian Tree Communities*. Conservation Biology, 12(2), 460-464. Retrieved October 23, 2007, from <http://search.ebscohost.com/Login.aspx?lp=login.asp&ref=http%3a%2f%2ffleming0.flemingc.on.ca%2flrc%2flibrary%2fSubject.HTML&authtype=ip%2cuid>

Little is know about the way in which fragmentation can alter the ecology of a rain forest, especially in the long term. 13 years of data will assist the researchers in “describing patterns of tree recruitment in a fragmented landscape” (laurance et al, 1998). An inventory was kept of trees 10 cm or more in diameter at bread height with 66 1 ha plots. In these plots it was found that “recruitment rates were higher then in continuous forest” (Laurance et al, 1998). Rates were eve higher within the smallest sites. This article has the same study region as a previous article and yet they came to different conclusion. Good article to read but starting to understand why fragmentation is leading researches to new problems.

Arroyo-Rodriguez, V., Mandujano, S. (2006) *Forest Fragmentation Modifies Habitat Quality for Alouatta palliata*. Retrieved October 25, 2007, from <http://search.ebscohost.com/Login.aspx?lp=login.asp&ref=http%3a%2f%2ffleming0.flemingc.on.ca%2frc%2flibrary%2fSubject.HTML&authtype=ip%2cuidqweweq>

In the case of the howler (*Alouatta palliata*) a small tree dwelling mammal who spends much of their time among the canopy, fragmentation poses a real threat to their niche. Conducting an inventory of tree and plants using their species and diameter was the focus of their research. They “selected 15 sites (8 occupied by howlers and 7 unoccupied) of varying sizes to cover the range represented within each category” (Arroyo-Rodriguez et al, 2006). The team discovered through the use of an important value index that there were 10 species that were preferred and that in “the continuous forest 9 are primary, while in fragments, half of the 10 are secondary species and nonsecondary light demanders (NSLD)” (Arroyo-Rodriguez et al, 2006). This article was well cited and is not quite public reading material.

Swihart, R. K., Gehring, T. M., Kolozsvary, M., Nupp, T. E. (2003) *Responses of ‘resistant’ vertebrates to habitat loss and fragmentation: The importance of niche breadth and range boundaries*. Diversity and Distribution, 9, 1-18. Retrieved October 25, 2007, from <http://search.ebscohost.com/Login.aspx?lp=login.asp&ref=http%3a%2f%2ffleming0.flemingc.on.ca%2frc%2flibrary%2fSubject.HTML&authtype=ip%2cuidqweweq>

There have been many theories on how to predict species sensitivity to habitat loss and fragmentation as it has an importance to conservation strategies. This paper looks for the best indicator to determine a species under stresses of fragmentations and habitat loss. Though comparing data with other articles it was determined that “body size, morphological development and behavioural traits were inferior predictors of tolerance to fragmentation “(Swihart et al, 2003). They found that niche breadth made an important

predictor for habitat alteration. This article was very insightful and important because it set aside any doubt in that field about indicators.

Telleria, J. L., Baquero, R., Santos, T.(2003) *Effects of forest Fragmentation on European birds*. Journal of Biogeography, 30, 621-628. Retrieved October 25, 2007, from <http://search.ebscohost.com/Login.aspx?lp=login.asp&ref=http%3a%2f%2ffleming0.flemingc.on.ca%2flrc%2flibrary%2fSubject.HTML&authtype=ip%2cuid>

This article takes a look at regional richness, by comparing fragmentations and the number of species that they contain. Currently there are no previous studies done on regional richness only local richness. Regional richness was estimated looking at the distribution of a species. As a result it was determined that center of Europe was highest in regional richness. The research in this article does not seem in depth and assumes things.

Turner, S. J., Thrush, S. F., Hewitt, J. E., Cummings, V. J., Funnell, G.(1999) *Fishing impacts and the degradation or loss of habitat structure*. Fisheries Management and Ecology, 6, 401-420. Retrieved October 27, 2007, from <http://search.ebscohost.com/Login.aspx?lp=login.asp&ref=http%3a%2f%2ffleming0.flemingc.on.ca%2flrc%2flibrary%2fSubject.HTML&authtype=ip%2cuid>

Larger demand for fish has our fisheries working a lot hard and is putting more stress on fish and fish habitat. Its not the fragmentation that the problem here, but the removal of epibenthic organisms. Here there are two major concerns that suggest by the paper. One

topic is managing the protection of habitat and the other topic is habitat restoration. This was not as much a research article as it was a proposal.

Watts, C. H., Didham, R. K.(2005) *Rapid recovery of an insect-plant interaction following habitat loss and experimental wetland restoration*. *Oecologia* (2006), 148, 61-69. Retrieved October 26, 2007, from <http://search.ebscohost.com/Login.aspx?lp=login.asp&ref=http%3a%2f%2ffleming0.fleming.on.ca%2flrc%2flibrary%2fSubject.HTML&authtype=ip%2cuid>

This article focuses on the effect of wetland habitat loss on an interaction between insect and plant. To do this experiment they measure colonization rates and damage done by a particular species of butterfly. By using plants in a pot they were able to set distances and use the one plant as a sample. In the study they found that the further the pot was from the healthy habitat the slower the colonization rate. But to test the response of the interaction with restoration efforts and they were surprised to find that the recovery was very rapid. This article was interesting to see a restoration spin amongst the depressing articles of effects of habitat loss.

Wiegand, T., Revilla, E., Moloney, K. A.(2005) *Effects of Habitat Loss and Fragmentation on Populations Dynamics*. *Conservation Biology*, 19(1), 108-121.

Retrieved October 27, 2007, from

<http://search.ebscohost.com/Login.aspx?lp=login.asp&ref=http%3a%2f%2ffleming0.fleming.on.ca%2flrc%2flibrary%2fSubject.HTML&authtype=ip%2cuid>

This article set out to determine the size of the variation that can be explained by landscape composition, answer why original approaches to this scenario failed, and to estimate fragmentation effects. It was found that fragmented habitat was comparative to a

15% loss of good habitat, but the maximum loss could be as high as losing 80% individuals. This article was hard to read and to comprehend, many of the ideas and methods used were not easily understood or at all.

## **CONCLUSION**

When it comes to modern society it is easy to get caught up in catch phrases like climate change, sustainability, and habitat loss. Things like fragmentation and wildlife corridors get over looked in all the panic and they are not truly assessed as being potential problems or answers.

## **Literature Review of Nightjars/Goatsuckers by: Qaani Curry**

### **Introduction**

Our credit for product project is formulating identification cards for the public regarding specific birds-at-risk that are found in an area currently known as the Land Between. In this literature review, I have narrowed down the scope to cover the Common Nighthawk, and the Whip-poor-will. The guiding concept of the literature reviewed in this document is that these two species are very similar, and monitoring projects need to occur as their populations are dwindling. There is a lack of knowledge about these species, as interest has not peaked until recently.

### **Literature Reviewed**

#### **1.**

Brigham, R.M., Fenton, M.B., Aldridge, H.D.J.N. 1998. Flight Speed of Foraging Common Nighthawks (*Chordeiles minor*): Does the Measurement Technique Matter? American Midland Naturalist. 139(2): 325-330.

The purpose of this study was to determine the accuracy of using Doppler radar in measuring flight speed of Common Nighthawks while they fed. The intent was to allow for other researchers to find an easier, more accurate method of measuring nighthawk flying speeds. During dusk feeding times, flight speeds of the Common Nighthawk were measured using Doppler radar, to the nearest 0.1m/s. Then the data collected was

analyzed and compared using 2-tailed t-tests. The result of Doppler radar measurements was an average flight speed of 6.5m/s, which was 23% faster than previously estimated with alternate speed measuring systems. While this article focused largely on radar, it also provided some valuable information about flying behaviours, which is useful for my purposes.

## 2.

Burt, W. 2000. Nightjars Are Everywhere, But Just Try Finding One. Smithsonian Magazine. 31(4): 74.

This article focuses on the authors search to photograph nightjars in the wild. He details five years of self-guided 'hunting' through the Carolinian woods, as well as calling on experts on nightjars. The article was written for the general public to read and enjoy. The strategy used to locate these birds began with walks in the evening with a flashlight that would reflect in the eyes of the nightjars, he graduated to using recordings of bird calls, and ended with walking gridlines using rope dragged along the ground to flush out the nesting mothers. In the end Burt achieved what he set out to do - getting photographs of the five species of nightjar. The author wrote well, in a manner that caught your attention, while also providing some good tips for finding the birds in the woods.

## 3.

Fisher, R.J., Fletcher, Q.E., Willis, C.K.R. and Brigham, R.M. 2004. Roost Selection and Roosting Behaviour of Male Common Nighthawks. *The American Midland Naturalist*. 151(1): 79-87.

Researchers in Saskatchewan looked at day roost habits of the Common Nighthawk in an attempt to understand habitat requirements and possible reasons for their population decline in North America. They kept their study limited to one area in order to keep the data simple, but looked at many different factors surrounding the chosen roosts. This journal article was written for those with a scientific background, and even included suggestions for possible research studies that would enhance the information they gathered. A number of male and female Nighthawks were captured, banded, and affixed with a radio collar to allow for tracking once they were released. From a distance, these birds were located, the tree locations were marked with GPS, and studied later. Some of the factors looked at were tree height in relation to surrounding canopy, DBH of both the tree and the branches chosen for roosting, slope aspect, tree species, and whether the branches chosen were dead or alive. This study suggests that the male Common Nighthawk chooses trees above the canopy to allow for easy relocation of the roost site, as well as allowing for the cooling action of the wind. Branch diameters are often similar to the width of the bird, and their positions were parallel to prevent detection from predators. As well, roosting sites were chosen only on north facing slopes, suggesting that the birds were strategically choosing places with lower temperatures. An interesting beginning to knowledge of habitat choices for Nighthawks.

**4.**

Hunt, P.D. 2006. Northeast Nightjar Survey: 2006 Summary. New Hampshire Audobon.

9pp.

The purpose of this report was to discuss the viability of current protocols used by the Nightjar Working Group in research related to nightjars, most specifically the Whip-poor-will. Current observation practices have room for improvement, and they tested new ideas. Routes in northern states were assigned to bird watchers for data collection, with point spacing of a half mile, stretching over a five mile line. Counts were conducted, with observers listening for calls, attempting to determine distance of the bird they heard, as well as recording any visual sightings. Errors occurred in this type of monitoring due to increment weather that limited Whip-poor-will activity, inexperience of observers, inability to accurately distinguish between individual birds or determine distance, and lack of knowledge about current habitat ranges of the bird. The author concluded that work needs to be done to improve the current monitoring protocols in order to lessen the amount of biased data that is collected. It was refreshing to read a report that didn't claim to be error-free and provided for improvement in methods used in current testing.

**5.**

Lepczyk, C.A. 2005. Integrating Published Data and Citizen Science to Describe Bird

Diversity Across a Landscape. *Journal of Applied Ecology*. 42: 672-677.

This article is an attempt to discover the importance or relevance of bird monitoring by the public. By designing a monitoring survey that offered the public incentive in responding, Lepczyk was able to conduct an experiment that provided good information that supports citizen science. Surveys were mailed out to all landowners in an area of Michigan, with specific instructions about when the bird data could be collected. This was done in an effort to reduce bias, and increase land coverage for bird presence that could be reported. The public was asked simply to identify the bird species they witnessed on their land, then to send in the completed cards. After reviewing and analyzing the data received, it was determined that assistance of the public is a valid and important tool in monitoring bird species. The author is clear in his ideas and expression, and while including information about the possible errors of this kind of data collection, he still made it obvious that it is important to get the public involved in monitoring programs.

## 6.

Lane, J.E., Brigham, M.R., Swanson, D.L. 2004. Daily Torpor in Free-Ranging Whip-poor-wills (*Caprimulgus vociferous*). *Physiological and Biochemical Zoology*. 77(2): 297-304.

Scientists in South Dakota decided to study whether Whip-poor-wills engage torpor, or short term hibernation, in cooler temperatures in order to reduce energy expenditures. They expanded on previous, smaller scale studies, to get a more accurate and larger data-

set. Using recorded Whip-poor-will calls, and mist nets, they captured 35 birds, recorded physiological measurements, affixed the subjects with radio transmitters that would record skin temperatures, and then released them. Radio received temperatures were recorded every 30 minutes or better. Once the data was collected and tabulated, it was determined that a small percentage of individuals entered into torpor. When this process was used however, the time frame was generally early in the morning, and lasted for 3 hours or longer into the afternoon, and primarily it is males that practice torpor. The researchers suggest that in this species, daily torpor is utilized only in emergency situations, not as a general energy saver. A well, written, though somewhat dry article.

## 7.

Line, L. 1991. Goatsuckers Get Some Respect - Nighthawks and Related Bird Species. National Wildlife Magazine. 29(6).

This article centres around Mark Brigham, a top ornithologist who specializes in goatsucker species and bats. Information is provided about many species, including the Common Nighthawk and Whip-poor-will. The intent of this article is to provide information that will intrigue the public, as there is not much interest in these species. Subjects covered include common myths about these birds, flying patterns, feeding habits as well as describing the beauty of their calls and seeing their spring/fall migrations. This was a well written article, providing a lot of information in a very short read.

## 8.

Moore, L. 2003. Atlassing For Goatsuckers. Ontario Breeding Bird Atlas Newsletter.  
3(1): 8-10.

Moore attempts to inform the public about how to locate and identify two species of goatsuckers: the Common Nighthawk and the Whip-poor-will. The author discusses key ID features, the range of preferred habitat, call identifying, the best times of day to locate them, as well as providing helpful hints on how to see the birds. Moore is providing this information to assist bird-watchers so they can report any sightings or signs to the upcoming bird atlas. There are three years remaining until the next atlas comes out, and currently the bird data has dropped 26% and 34% for these two birds. The hope is that with more knowledgeable birders, higher numbers of the dwindling populations can be recorded. A very informative and helpful article for any birder looking to help provide bird data for researchers.

## 9.

Roth, A.J., Argyros, G.C., Browning, R.B. 2003. Visual Signals in the Crepuscular  
Common Nighthawk (*Chordeiles minor*). American Midland Naturalist. 150(1):  
191-193.

The purpose of this study was to determine whether size of neck rings, wing bands or white spots on the tail feathers of the Common Nighthawk played a role in attracting a mate. They collected 144 male Nighthawks and measured widths of said markings on each bird, and cross referenced this data with the relative age of the specimen. The birds

were divided into groups of the yearling, second year, and after second year. After running statistical tests on the data collected it was determined that tail markings and wing bands were more prominent in older birds, signifying a higher success rate of keeping territory, suggesting these birds would make a better mate. Though the data was statistically analyzed, the researchers assumptions that more prominent markings attracting mates was not tested. The experiment would benefit from more testing as opposed to interpretation.

## 10.

Salt, J.R. 1998. Displacement of Common Nighthawk (*Chordeiles minor*) Eggs and Young at Natural Nest-Sites. *British Columbia Birds*. 8(1998): 19-20.

It was discovered randomly by researchers in British Columbia that Common Nighthawks would shift their nest sites. J.R. Salt periodically checked the nests to determine their progress and often found they had been moved from as little as a few centimetres to 60 metres away from the original site. This most often occurred on gravel roof sites, but would happen in natural areas as well. In response to pooling water, too much or too little sunlight, or fallen debris, the Nighthawk would shift herself, her eggs, or young into a more suitable area. Also noted in this casual study was as human development increased into the birds territory some nest sites were abandoned entirely, leaving behind unhatched eggs. There was little structure to this study, as it was not designed, and seemed to be undertaken simply for interests sake. However, relatively

frequent visits to known nest sites provided them with a base of information that is highly interesting. Previous to this I had assumed bird nests were immobile.

## **11.**

Todd, L., Poulin, D., Brigham, R.G., Mark, R. 1998. Diet of Common Nighthawks (*Chordeiles minor: Caprimulgidae*) Relative to Prey Abundance. The American Midland Naturalist. 139(1): 20-28.

The question these researchers were looking at was whether the Common Nighthawk consumes specific insects, or if they are merely opportunistic. The research paper was based on the study of sixteen birds captured in Cypress Hills, but also compared their results to another study conducted in British Columbia. In order to complete their research, they captured birds after dusk feeding times, and kept them captive until their feces could be collected and analyzed. In order to measure the relative abundance and diversity of insects in the area, they utilized lighted suction traps to collect bugs, then identified them. It was found that the Nighthawk was discriminatory in their selection of insects to consume, though the insect choices varied slightly between Cypress Hills and B.C., possibly due to abundance levels of insects and varying habitat types. The research was interesting, however the results may not be repeatable. Other studies had been done that contradicted their findings.

## **12.**

Wilson, M.D., Watts, B.D. 2006. Effect of Moonlight on Detection of Whip-poor-wills: Implications for Long-term Monitoring Strategies. *Journal of Field Ornithology*. 77(2): 207-211.

Due to population decline of the Whip-poor-will in many areas standardized, and optimal monitoring techniques need to be utilized. This article discusses the necessity of proper timing for future studies by scientists who are looking at the Whip-poor-will. This study was looking at the effect of the lunar phase on the number of calls that were observed. Using seventy-eight plots in North Carolina, one observer would conduct 5 minute bird point counts (looking specifically at the Whip-poor-will), and would record data as to weather conditions, lunar phase, lunar height, and times. Data collection occurred within half an hour after dusk and continued until one hour before dawn. Throughout the course of the study, 698 birds were observed. They determined that Whip-poor-wills were more than twice as likely to be active when the moon more than half illuminated, than when the lunar light was less than half. These birds are nocturnal and depend on illumination to locate their prey, so the results obtained from this study were expected. The suggestion is to time observational studies on well lit evenings in order to get a better idea of the true number of this bird species in the area. This was a short, but informative piece of writing, with important suggestions to researchers that have troubles locating these birds.

## **Conclusion**

The Common Nighthawk and Whip-poor-will are alike in many ways, and though monitoring strategies can be similar, some changes must be made in research efforts to account for minor behavioural variances. Research into these two species is on a trial and error basis, but due to habitat loss that is threatening this species, studies must continue.

## Literature Review: Tom Shorney

The birds of our environment are an integral indicator species, inhabiting many complex ecosystems. With the global population growing exponentially larger and larger, our demand for food, housing and industry has effected our environment negatively. We have destroyed forests for houses, lost prime habitat to farm fields, dug out land for aggregates. Our impact on this planet has become obviously evident, threatening many species of birds. We currently live in a “me” society which can be very careless towards environmental health, only worrying about personal qualities. In order to re-establish the bird habitats, change will have to take place. **The increase in agriculture, development and industries has led to the destruction of many non-threatened, threatened and endangered bird habitats.** The information gathered from the twelve journal pieces will further educate us on the threats that the yellow-throated vireo and the broad-winged hawk have recently been sustaining within the Land Between.

Boswell, Randy. (2007, June 18). Bird Populations Plummeting at Alarming Rate. The Ottawa Citizen, P. A3.

A U.S. based study says there is a major decline of many North American birds, due to habitat loss. The article states that Canada’s vast quantities of wilderness will be essential to many of the species recovery. The study was conducted using information from the everyday birder and by the U.S. geological survey. Many of the bird species in decline are in abundance, just rapidly losing habitat to development, agriculture, invasive species to the great lake regions, melting of the artic and loss of wetlands. The most crucial component to preserving these species will be to protect the breeding and feeding grounds of the boreal forest. This was an article in a daily newspaper.

Bradley, J. E., Marzluff, J. M. (2003). Rodents as Nest Predators: Influences on Predatory Behaviour and Consequences to Nesting Birds. Retrieved oct

The authors Bradley, and Marzluff believe that the main cause of poor bird survival is predation of nests. A major food source for the northern flying squirrel (*Glaucomys sabrinus*) and deer mice (*Peromyscus maniculatus*) are eggs and live nestlings of birds.

The study was conducted by capturing ten individual rodents. These rodents were caged with an imitation nest, to see if they would feed on the nest material. It has become well recognized that rodents have a negative effect on avian nesting success, by preying on the eggs. The study confirmed that mice and flying squirrels continually attempt to prey on eggs. This study was put together well, accompanied by a scientific report.

Brawn, D. J., Gabbe, P. A., Robinson, K. S. (2001). Tree-Species Preferences of Foraging Insectivorous Birds: Implications for Floodplain Forest Restoration. *Conservation Biology*, 16(2), P462-470. Retrieved October 2, 2007, from <http://web.ebscohost.com>

This particular study looks at the preferences of foraging insectivorous birds, one being the Yellow-throated Warbler (*Dendroica dominica*). For many breeding forest birds in North America, habitat loss has been a significant obstacle to overcome. Forest ecosystem restoration has become a mainstream process, though little attention has been given to the effects of artificial vegetative structure. The goal of this project was to restore 24,000 ha of land to hard wood forests. The forest has been replanted, allowing the forest to grow through natural succession, hopefully later being inhabited by the yellow-throated vireo. This particular vireo was the most selective species, inhabiting the upper part of deciduous and mixed coniferous/deciduous forest. This was a scientific report, for an educated audience.

Brawn, D. J., Robinson, K. S., Thompson, R. F. (2001). The Role of Disturbance in the Ecology and Conservation of Birds. *Annual Review of Ecology and Systematics*, 32, 251-277. Retrieved October 3, 2007, from <http://web.ebscohost.com>

Natural disturbances such as flooding or wildfire can be extremely beneficial to the conservation of birds. These natural phenomena's help create habitat which would have otherwise been lost to development or agriculture. Although human disturbances can be catastrophic to habitats, natural disturbances are quite beneficial. This report describes the beneficiary properties natural disturbances have on bird habitats. The end result from these natural occurrences, are a positive boost to the overall health of these ecosystems, promoting regeneration of an even healthier ecosystem. This was an informal essay on natural disturbances.

Brooke, M. (2004). Birds in Decline Around the Globe. *New Scientist*, 181(2438). Retrieved October 3, 2007, from <http://web.ebscohost.com>

This article is summarizing the world conference of birdlife international, where talks conclude that 1211 out of about 10,000 known bird species are facing extinction. In the last 10 years bird populations have decreased significantly due to habitat loss. The conference was promoting immediate action to restoring bird habitats. There is little evidence of progress towards slowing the loss of habitat before 2010. As conservation experts become aware of the problem we are faced with, more efforts will be taken. This report was a summary of talks at the World's Birds 2004 conference.

Buehler, D., Klaus, D., Saxton, A. (2005). Forest Management Alternatives and Songbird Breeding Habitat on the Cherokee National Forest, Tennessee. *Journal of Wildlife Management*, 69(1), 222-235. Retrieved September 29, 2007, from <http://proquest.umi.com>

This research report studies the relationship between forest management techniques and songbird breeding habitat. There were 6 songbird species being looked at; over a 60-year forest simulation, to see how specific forest management techniques effect the bird populations. The experiment was conducted throughout the Cherokee national forest. The 60-year simulation was based on previous harvesting practices and natural disturbances over 10 year intervals. The habitats for all 6 of the species were applied to the interval models. It was discovered that late-successional species showed increases in habitat availability over the 60-year period. While, habitat for early-successional species had remained stable or declined over the study period. This report was written for a scientific driven audience.

Ens, B. J., Houston, A. I., Weber, T. P. (1999). Consequences of Habitat Loss at Migratory Stopover Sites: A Theoretical Investigation. *Journal of Avian Biology*, 30(4), 416-427. Retrieved October 2, 2007, from <http://web.ebscohost.com>

This scientific report describes the troubles arctic breeding migratory birds go through due to destruction of habitat. All around the globe bird habitats are being lost to coastal development, land reclamation, gas exploitation and increased tourism. The experiment was conducted within the wintering grounds, stopover sites and the breeding grounds measuring whether the species had enough fat for the duration of the migration. In many

instances the habitat at the stop over site had been destroyed, which resulted in an unsuccessful migration. Ideally, migratory strategies need to evolve, depending on the availability of alternative sites. This was a scientific report paper.

Frances, C. M., Gartshore, M. E., McCracken, J. D., Whittman, R. M. (2002). The Effects of Selective Logging on Nest-Site Selection and Productivity of Hooded Warblers in Canada. *Canadian Journal of Zoology*, 80(4), 644-655. Retrieved October 3, 2007, from <http://web.ebscohost.com>

This study was done to see the effects that selective logging has on forest dwelling birds. Selective logging creates a forest edge, which has been a major concern, disturbing the thick forest habitat. There were two pine plantations being used in the study, comparing the results from each sight. The study concluded that these forest dwelling birds were greatly affected by even the most sustainable forestry practices, leaving these species vulnerable to predators. This was a scientific study.

Guthrie, P. R. (1993). Survival: It's not easy for a Small Bird. *The Conservationist*, 48(1), 28-35. Retrieved September 29, 2007, from <http://proquest.umi.com>

“Seeing waves of warblers crowding treetops along migration routes may be a thing of the past,” says the national Audubon society. The migration for smaller songbirds has become significantly more difficult with the destruction of ocean shorelines to up scale resorts. This causes problems for the latter portion of there long flight, leaving them exhausted on sandy beaches, open for hungry predators. This article summarizes in detail the increasing challenges migratory birds have been going through with the destruction of there southern habitats. The author concludes that migratory bird populations are under stress when they leave for the winter to the south. An effort has to be put forth on both ends to preserve the birds habitat. The article was written well, for the novice to expert birder.

Hannon, S. J., Norton, M. R., Schmiegelow, F. K. A. (2000). Fragments are not Islands: Patch Vs. Landscape Perspectives on Songbird Presence and Abundance in a Harvested Boreal Forest. *Ecography*, 23(2), 209-223. Retrieved October 2, 2007, from <http://web.ebscohost.com>

The authors of this research paper, were studying the effects that clear-cut patches had on forest songbirds. They were looking to see the relationship between the forestry practices and habitat loss, noting whether or not the birds compensated. The study took place at a commercial timber site, where the team assessed how songbirds would deal with the loss of the deciduous forest. Then a portion of coniferous forest had been clear-cut, monitoring where the specific birds had went for cover. The study revealed that the species of songbird's demonstrated habits, which led the researchers to believe the birds were compensating for the loss of habitat. This report was written very concisely, clearly presenting each process.

Martinette, P., Valiela, I., (2007). Changes in Bird Abundance in Eastern North America: Urban Sprawl and Global Footprint. *Bioscience*, 57(4), 360-371. Retrieved October 3, 2007, from <http://web.ebscohost.com>

This report discussed the differences in behavior between North American and neo-tropical bird species. It's been discovered that the birds of North America have more difficulty adapting to habitat loss than that of neo-tropical species. They discovered that the changes in land cover have a greater effect on bird species in the northern latitudes, due to our influence on the environment. Development and non-sustainable forestry practices have begun to destroy bird abundance through rapid habitat loss. For changes to occur, we will need to establish much smaller ecological footprints. This scientific essay has been written for an educated audience.

Talley, Jenell. (2003). A Raptor on the Rise. *National Parks*, 77(1/2), 53-54.

The snail kite, which is native to the everglades in Florida, has been enduring significant habitat loss due to the drainage of swamps. Talley has written this article to help educate the public on the endangered snail kite and its habitat loss. The everglades have had a permanent loss of water, which is threatening this sensitive bird. The Everglades national park is trying to establish a natural source of water to encourage the introduction of lost

habitat. The park is having trouble dealing with political, agricultural and development obstacles. This article written for the national parks was written well, bringing to subject the troubles this particular species of bird is going through.

## **Conclusion**

With many ecosystems being destroyed, it has been suggested that birds have the ability to compensate to lost habitats. Some scientists figure this is our only hope of restoring populations of birds, encouraging species to inhabit different areas. While we continue to take over forests with subdivisions, and fill wetlands in; to support industrial parks, these birds will have no choice but to choose an ecosystem which doesn't perfectly support there needs. All around the world bird species have been faced with the obstacle of lost habitat, during migration and within breeding grounds. I believe it's time we stop thinking only about ourselves, and try to protect the habitat for our fine-feathered friends.