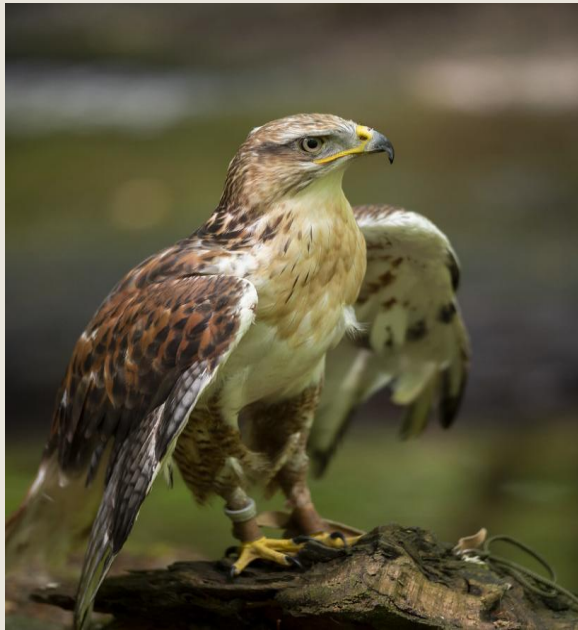


A How-To Guide for Building Re-designed Artificial Nesting Structures to Protect and Rehabilitate Ferruginous Hawk Populations in Manitoba

A student-lead project by Breanna Sheppard



In Co-operation With



Executive Summary

Ferruginous Hawk Breeding Population Rehabilitation in Manitoba

The breeding population of Ferruginous Hawk in Manitoba has suffered a major 82% decline in the last 24 years. This is due to farming and industrial development that has decreased their prey populations (gophers) and destroyed natural habitats (trees and large rocks). They used to roam and thrive in the open prairies with all the food and habitat they desired.

This guide was created with the intention to educate and engage everyone, especially private landowners, on the importance of conserving species like the Ferruginous Hawks. It is with the help of the private landowners that proper steps can be taken, such as building a nesting structure, to support and protect the hawk populations and in turn protect their farm, conserving and protecting cattle and native grass prairies.

The project will take place at Manitoba Beef & Forage Initiatives Johnson Farm Site 3exx, and will replicate a successful artificial nesting structure design used in Alberta, with modifications based on Manitoba conditions. The goal of the project is to monitor the newly constructed nesting structures for seven years and to observe a pair of breeding Ferruginous Hawks using them by or before May, 2027.

Title page artwork: Ponsford, B. (2018, June 9). *Ferruginous Hawk*. [Photo] Retrieved from: <https://www.flickr.com/photos/benponsford/42803951201/in/photostream/>

Disclaimer

This is a student-lead project and does not necessarily represent the overall views of the recovery of the Ferruginous Hawk. For more information or any questions, get in contact with Manitoba Beef & Forage Initiatives.

Acknowledgments

Rehabilitating endangered species today cannot be solved over night nor can it be done by just one person; it takes a village.

Firstly, I would like to thank Manitoba Beef & Forage Initiatives (MBFI) for their continued support with the project from beginning to end. Specifically, Jordan Dickson, extension and research coordinator, who has devoted her time and energy to the project and the hawks. Also Mary-Jane Orr, the general manager, who has taken the time to revise project budgets and taken an overall interest in the project. The encouragement throughout the project has been tremendous and I can't thank MBFI enough.

Secondly, I would like to thank the ones who helped create the landowner guide book. Allison Danielson, Regional Wildlife Biologist for the Government of Manitoba, for taking supplying multiple information outlets and resources, tips, and contacts, to help point the project in the right direction. Thank you to Timothy Poole and Ken De Smet (retired), Species at Risk Biologist for Manitoba Agriculture and Resource Development. Ken studied Ferruginous Hawks for 20 years as an endangered species and had the idea for the more "basket-like" nesting structures opposed to the flat platforms. And Timothy Poole has continued to offer resources and support throughout the entirety of the project. And thank you to Colin Murray, who helped supply relevant data for the project.

I would like to thank The Alberta Ferruginous Hawk Recovery Program (with permission), The Alberta Species at Risk Program, and the National Recovery Program for Ferruginous Hawks. They helped shape the annual and initial setup surveys, and provided a lot of information about the hawks found throughout the guide. They created a successful design structure that attracted Ferruginous Hawks and were able to stabilize their population in Alberta. This created a model to be used for land practices in the future.

Thank you to the project sponsors who donated supplies to this project. Manitoba Hydro donated old hydro poles to be reused for the structures.

Lastly, thank you to the volunteers, friends, family, and Assiniboine Community College for the continued support and opportunities.

This project would not have not been possible without every one of these individuals and organizations. Thank you again and enjoy becoming a Ferruginous Hawk expert!

Breanna Mae Sheppard

April 10, 2020

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The Alberta Ferruginous Hawk Recovery Program 2009-2014

This was proven a successful plan after implemented in 2008 when the Ferruginous Hawk breeding populations started to increase again. They hold home to most of the 10% breeding population that still comes to Canada in the spring. They implemented seven best management or action strategies in their plan for recovery of Ferruginous Hawks. That included to reduce human disturbance at nest sites, maintain existing native grasslands and pasture lands on both public and private land, ensure adequate number of nest structures are available in suitable habitat, maintain and enhance prey populations for ferruginous hawks, reduce human-caused mortality of ferruginous hawks in Alberta, limit the impacts of predators and competing bird species, and conservation of ferruginous hawks during migration and on their wintering grounds. The population of breeding pairs in Alberta has stabilized at 600. Similar flat platform designs were implemented in southwestern Manitoba but were later deemed unsuitable for the provinces conditions where Ferruginous Hawks did not return to breed, decreasing their population.

The National Recovery Plan for Ferruginous Hawks 1994

This recovery plan had an objective of increasing and stabilizing the population in Manitoba to at least 50 breeding pairs within five years. Their priority actions to make this happen were maintaining prairie grassland, maintaining an adequate prey base, managing nesting sites, perpetuating adequate winter range, and preventing human disturbances at their nesting sites. There were 400 structures installed by the year 2000, but after

research, the suggestion was made to the basket-structure because the Ferruginous Hawk populations continued to decline. They made great advances in the understanding of the needs of this species all over.



Figure 1 - Ferruginous Hawk perched on a fence post while giving out a screech. You can see their bright yellow cere in this picture (Wikimedia Commons, 2010)

Why Protect Ferruginous Hawks?

The Ferruginous Hawk (*Buteo regalis*) has been listed as endangered for over 40 years. They are listed by the Committee on Endangered Wildlife in Canada (COSEWIC) as threatened and their status in the *Species at Risk Act* (SARA) is listed under Schedule 1, Threatened. Their breeding range in Canada has decreased by 50% and only 10% of their total population remains in Canada, most of which is in Alberta. The large-scale farming and industrial development today has produced a severe impact on the habitat range of the Ferruginous Hawk throughout Manitoba and most of Canada, as the hawks is very sensitive to habitat disturbances during their breeding season.

Having Ferruginous Hawks breeding on your land will provide many different benefits for landowners land and livestock, and save time and money. A Ferruginous Hawk breeding pair is able to consume up to **500 Richardson's Ground Squirrels** (gophers) in **one** breeding season! They will act as a bio-control to eliminate the unwanted rodents and prevent them from tearing up land and making big hills and holes for cattle to injure themselves on. It also contributes to biodiversity, or species diversity, which provides many ecosystem benefits to other wildlife and humans. It will target areas that have livestock as the hawks will use their bones and dung as supplies in their nests, as they used to have a historic reliance on North American Bison (*Bison Bison*) for their remnants (Alberta Conservation Association, n.d).

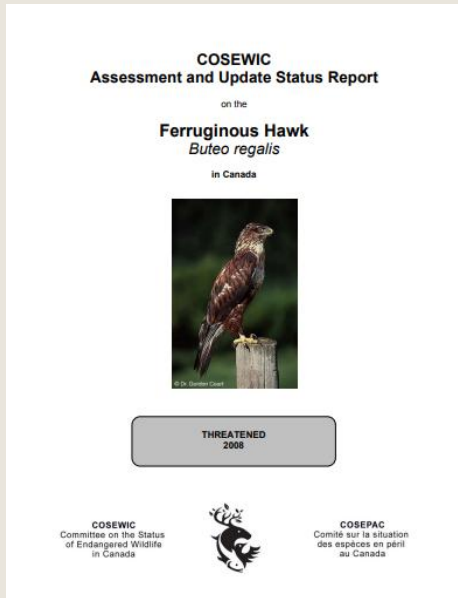


Figure 2 - A 2008 report by the Committee on the Status of Endangered Wildlife of Canada listing Ferruginous Hawks status as threatened (*Species at Risk Registry, 2008*)

Background Information

The Ferruginous Hawk is a truly royal bird being the largest and most powerful bird in the raptor family. They once dominated in Canada as they thrive in open countries and their main prey; the Richardson's Ground Squirrel (*Urocyon richardsonii*), was in extended amounts of them among the prairies. With the farming and industrial development that has been happening over the decades, this has destroyed hawk habitat, such as shelterbelts and large rocky areas. It has also reduced the amount of prey in suitable habitat areas. Gopher habitat and food sources have also suffered due to fragmentation, and wetter years flooding out possible habitat for the gophers (Atlas of the Breeding Birds of Manitoba, 2020). They are also believed to be materialistic when it comes to nesting sites as they choose the most protected areas (such as a row of trees or shelterbelt) and will rarely nest on the ground if trees, large rocks, or eroded banks are absent (Schmutz, J.K. et al., 1994-a, pg. 13).

Historical Distribution

Ferruginous Hawks once dominated in the prairies, as their species is considered a "grassland specialist". Before the slaughter of the North American Bison (*Bison bison*) in the late 19th century immense conversion of prairies into farm land, the native grass prairie in Manitoba was the perfect habitat for the hawks (All About Birds, n.d.-a). They roamed up into the Dauphin and Roblin area, and east almost into Winnipeg. Now they occupy just the extreme southwest corner of Manitoba (figure 3).

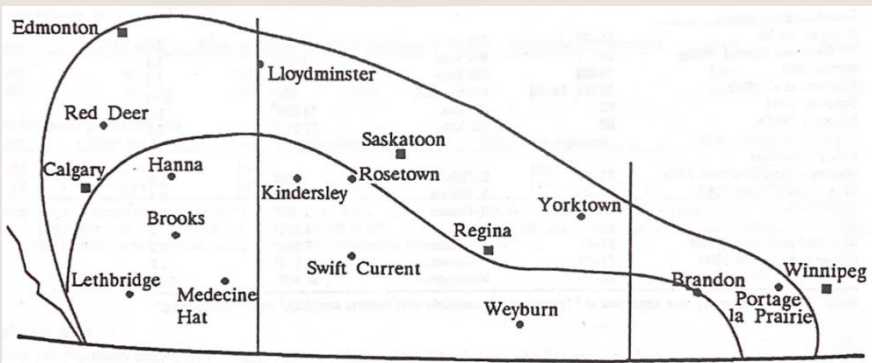


Figure 3 - Upper line is historic breeding range compared to current breeding range which is a lot more limited towards the U.S border (Schmutz J.K et al. 1994, pg 17)

Before the year 2000, there were 400 artificial nesting structures put up in southwestern Manitoba for Ferruginous Hawks. They were flat platforms that are a bit bigger than what you would find for a Red-Tailed Hawk. They were concentrated on the southwestern portion of the province as that is where the observations of the Ferruginous Hawks were most frequent at that time, since the decrease in their breeding population was noticed. These nests did not offer the protection they needed

for their large bulky nests and sensitive personalities (Atlas of the Breeding Birds of Manitoba, 2020).

Some studies suggest climate change as a factor that has driven out the Ferruginous Hawk, much like many other endangered species, but has not yet been completely proven to be a factor. This is why the suggestion of the basket-type nest was mentioned; to offer more protection to Manitoba conditions by providing more shaded shelter, especially and specifically for the young (Alberta Biodiversity Monitoring Institute, 2015). Audubon states that Ferruginous Hawks will move more towards the North for permanent breeding grounds as it continues to get warmer, approximately a 29% range gain in Canada (figure 4). This is why it is important to build artificial nesting structures, to ensure enough suitable habitats are here for when they arrive. (Kauffman. K, n.d-a). Both maps are displayed larger in *Appendix D*.

Overall species
vulnerability status:

Moderate

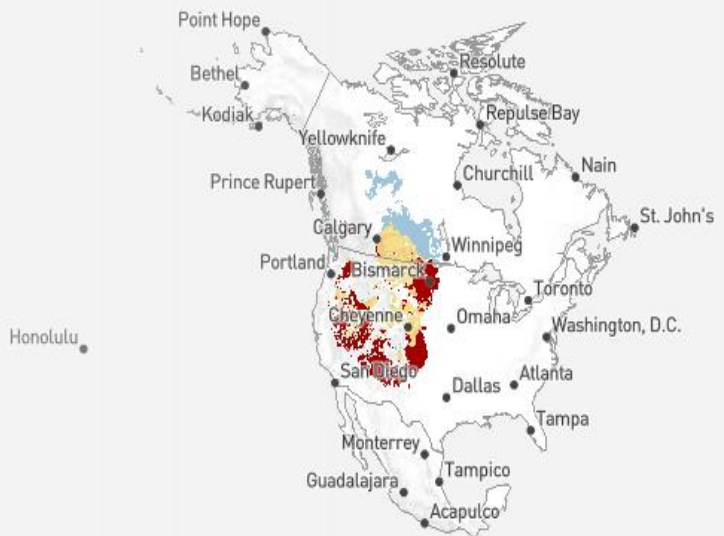
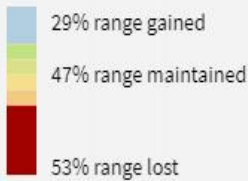


Figure 4 - Graph of how the Ferruginous Hawk breeding population will move with a 3 degree temperature increase (Kaufman. K, n.d)

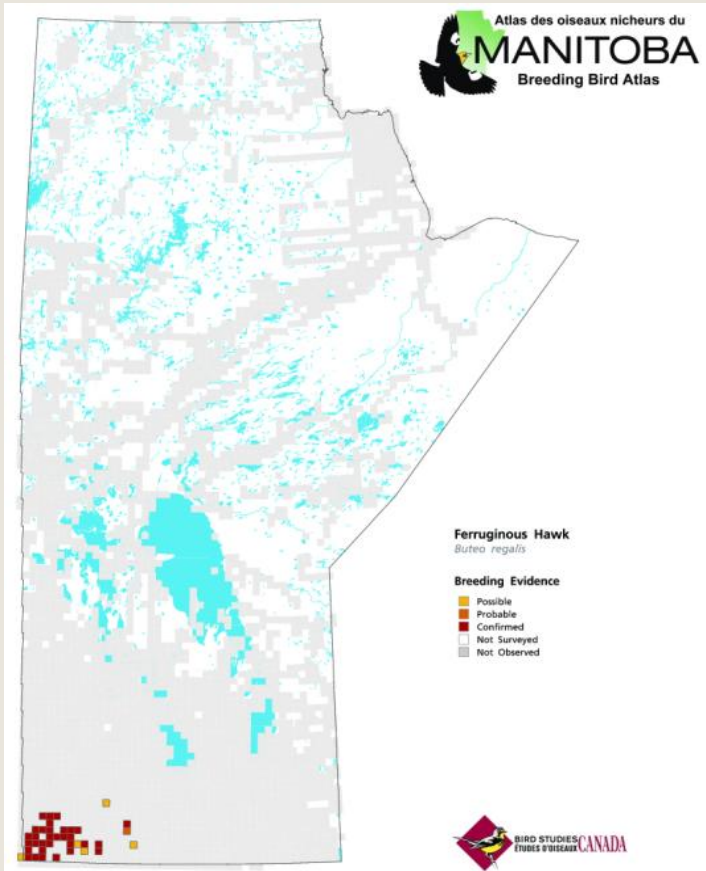


Figure 5 - Probable areas of Ferruginous Hawk observations in Manitoba (Atlas of the Breeding Birds of Manitoba, 2020-b)

Current Distribution

In Manitoba alone, Ferruginous Hawks have suffered an 82% decrease in their breeding populations over the last 24 years. This is due to the farming and industrial development that reduces their prey populations and destroys the natural, and sometimes artificial, nests of Ferruginous Hawks. Less than 10 breeding pairs were observed (personal observation) in 2017 in Manitoba (Atlas of the Breeding Birds of Manitoba, 2020-a). Atlas of the Breeding Birds holds the most

public, up-to date information on breeding birds in different provinces.

In Manitoba, Ferruginous Hawks were observed in the extreme southwest part of the province (figure 5), north to Pipestone and east to Boissevain. They were observed nesting in a total of 35 different squares and two other potential nesting squares south of Glenboro in 2012 and 2013. Five other observations were spotted north and east of Brandon and Rock Lake. There was one sighting near Whitewater Lake in 2014, but no Ferruginous Hawks have been observed breeding there since that year (Atlas of the Breeding Birds of Manitoba, 2020-a).

Family Characteristics

This species comes from the *buteo* family. This family has distinct characteristics that tell them apart from the other raptor family, *accipiter*. *Buteo* species are relatively large and robust in size and would likely resemble what some may describe as a “normal hawk shape”. They prefer to fly high over open country and fly with their wings and head held flat. Their wings are broad at a medium length and a large, fanned tail. Their key identifying factors can be observing any bands on the tail or rump as well as “wing-flashes” and body streaking, which is shown in figure 6 (Dodder. M, n.d).

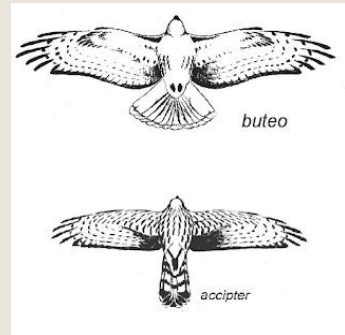


Figure 6 - Silhouette of *buteo* and *accipiter* hawk species (Rocky Mountain Raptor Program, 2012)

A key characteristic for this family is the large yellow gape that extends from the corner of their mouth to about the side of their nose, but can also reach beneath the eye (figure 7). This feature helps the hawk, especially the young; to regulate their body temperature during hotter seasons (Schmutz, J.K et al., 1994, pg. 13).



© Terry Sohl

Figure 7 - Ferruginous Hawk showing off its underparts, large yellow gape, and cere (Sohl. T, 2013)

Diet and Foraging

The worst thing for a Richardson's ground squirrel (*Spermophilus richardsonii*) aka gophers, and Jackrabbit (*Lepus townsendii*) is the Ferruginous Hawk. In Manitoba, they tend to specifically eat gophers (figure 8) but once you get to the western part of the country (West past the Rockies), they prey more specifically on Jack Rabbits. The success of Ferruginous Hawks, in provinces such as Alberta, has a positive correlation with ground squirrel abundance (Downey. B et. al., 2018, pg.10).



Figure 8 - Ferruginous Hawk attacking a Richardson's Ground Squirrel for its next meal (Caters News Agency, 2017)

Ferruginous Hawks fly in medium to strong dihedral flying patterns, being built to glide effortlessly on air currents without flapping their wings for long periods of time (figure 9). This means their wingtips are slightly raised while their wings remain flat in flight, which is shown in *Appendix C*. creating a slight V-shape. There is also a good video at All About Birds website of their form while in flight. Their soaring ability lets them hunt for prey while circling over open areas and perching from trees and utility poles to strike their prey below. Sometimes, in safe areas, they will stalk their prey by waiting outside their burrows and striking them from the ground (All About Birds, n.d.-a, Schmutz J.K. et al., 1994, pg. 13).

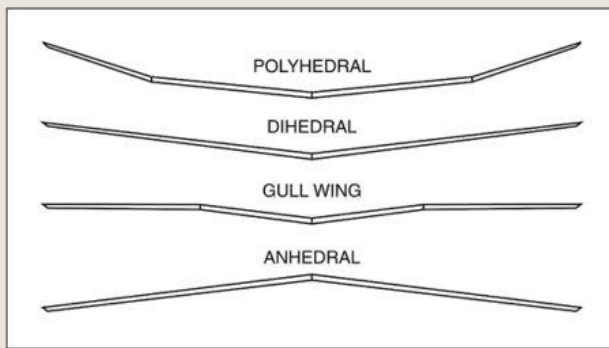


Figure 9 - Different types of flying patterns displayed by birds (Aerosente, n.d)

Behaviour and Reproduction

They reach maturity at about two years of age and can then start reproducing. A typical clutch size is 2-4 young but can range up to eight. The eggs (figure 10) are pale creamy white to pale blue with buff or brown spots (All About Birds, n.d). They start breeding in early

March and incubate for about 30-35 days. Hatchlings spend approximately five to six weeks in the nest directly under the mothers care, and then they learn to fly and survive for a couple weeks before branching off on their own. (American Bird Conservancy, n.d).



Figure 10 - Two Ferruginous Hawk eggs that will hatch in about a month from April 9th! (Alberta Conservation Association, 2020)

They are a monogamous species, meaning a breeding pair of hawks will typically remain together their entire lives. They typically return to the same nest every year and continue to build on top of their old nests, which is why their nests get to be so bulky. The male will bring food to the female during the incubation period. Their mating is described as “builders not dancers” as they have a fetish with building their nests with large twigs and cow dung (historically used bison dung and bones), and often pairs will refurbish multiple nests together throughout the year. You may witness a Ferruginous

Hawk romance while the breeding pair is circling in the sky, while the male dives around the female. Then they will grasp talons and beaks and spiral towards the ground (American Bird Conservancy, n.d).

Habitat and Predators

Ferruginous Hawk habitats are ideally suited for the perch-poor prairies. Historically, Ferruginous Hawks did not mind being on flat ground and have been known to prefer nesting on the ground; driving out even the biggest of their predators, coyotes (*Canis latrans*). Since nest predation has become common with this low-lying species over the years, it has adapted to seeking elevated nests to protect their eggs and young, in shelterbelts and artificial nesting poles. Other predators include Great Horned Owls (*Bubo virginianus*) and raccoons (*Procyon lotor*). Poisoning from consuming poisoned ground squirrels also occurs with this species. Planted shelterbelts are also a habitat that this species can use and will build on top of old Crow (*Corvus brachyrhynchos*), or Black-billed Magpie (*Pica hudsonia*) nests if available. Sometimes they will get territorial with Golden Eagles (*Aquila chrysaetos*) during breeding season.

Appearance and Lifespan

The Ferruginous Hawks name is derived from the Latin word ferrum which translates to iron, because of their iron-rust coloured appearance. They have a very robust chest, legs feathered down to their toes, long tapered wings, and a large pale grey-white head. Their cere, which is the waxy flesh behind the base of their beak, is also all bright yellow. They experience a light and dark morph throughout their life (figure 11), but it is said that approximately 90-99% of Ferruginous Hawks are observed in their light morph stages, whereas their dark morph is rarely ever seen (Schmutz J.K. et al., 1994, pg. 13, Atlas of the Breeding Birds of Manitoba, 2020). More pictures and descriptions are included in the next section, Identifying a Ferruginous Hawk.

The oldest Ferruginous Hawk on record was 23 years, 8 months old when it was found in Nevada in 2006. It had been banded in the same state in 1982 (All



Figure 11 - Light morphs of Ferruginous Hawk, juvenile on bottom and mature on top (Robinson, B.W. 2018)

About Birds, n.d.-a).

Physical Characteristics

The females are noticeably larger than the males; though sexes are alike in plumage.

Wingspan: Up to 1.5 meters

Body Length: 56-69cm head-to-talon (toes)

Weight: 2.2 to 4.5 pounds

Source: Nature Canada, n.d.

Physical Description Terminology

This section will help you with completing the Annual Survey and will also help throughout the guide, as these words are used in some sections. These words are used to describe and identify raptor species that are potentially using the nesting structure, or in the general area. The next two photos are the topside and underside of a hawk and what their body parts are to help get your familiar with their anatomy. Song birds have slightly different terminology but they are easy to differentiate from raptors. Full size parts of the raptor pictures can be found in *Appendix A and B*.

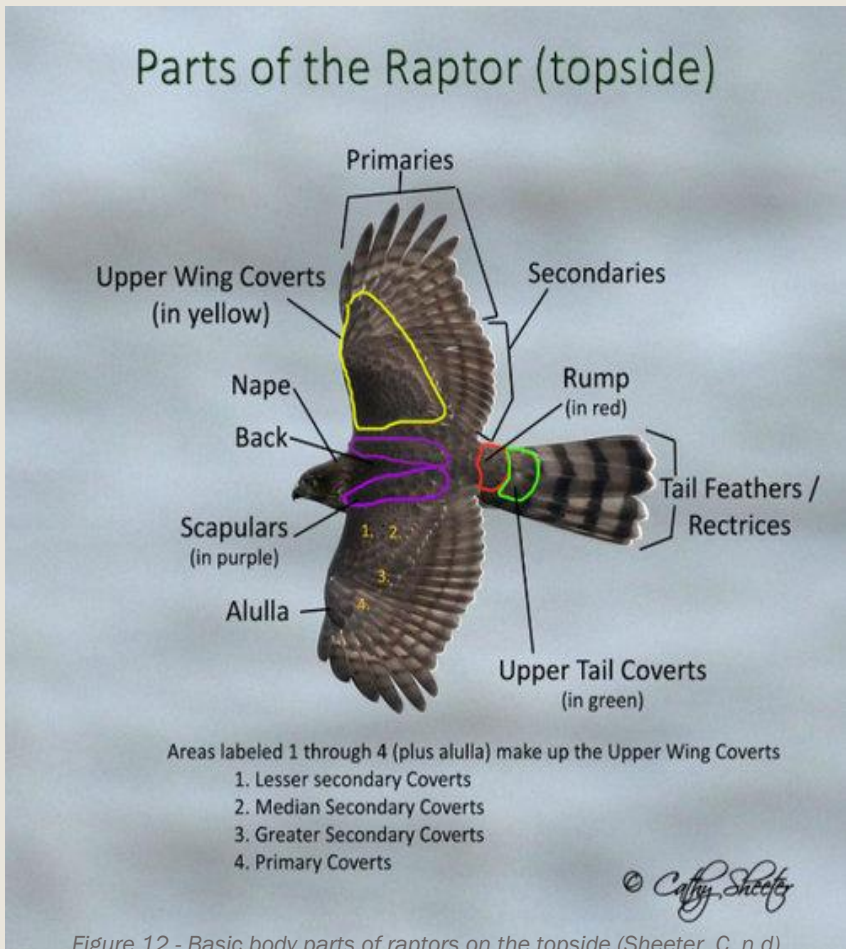
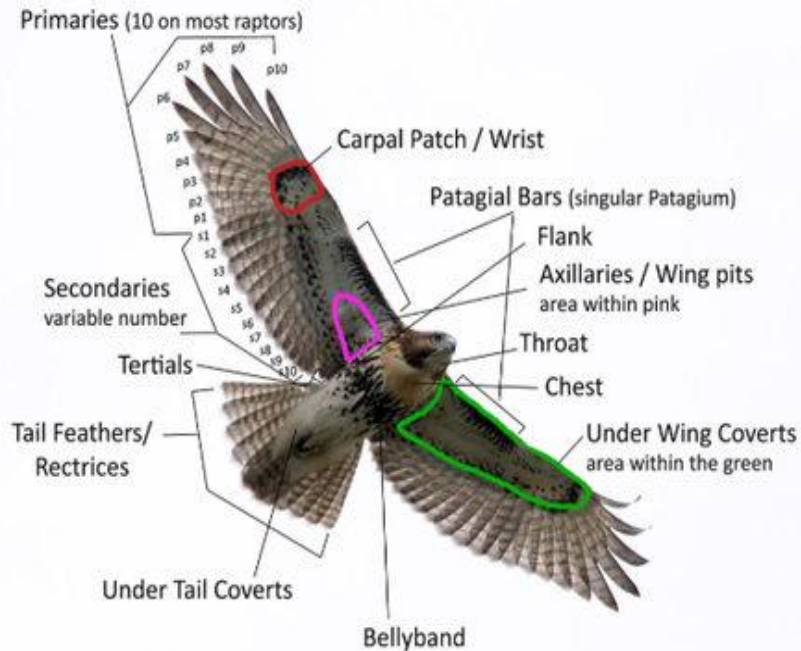


Figure 12 - Basic body parts of raptors on the topside (Sheeter, C, n.d)

Parts of the Raptor (underside)



Remiges: the flight feathers of the wing, including the primaries and secondaries

Flight Feathers: Includes all long feathers of the wing and tail

© *Cathy Sheeter*

Figure 13 - Basic body parts of raptors on the underside (Sheeter, C, n.d)

Identifying a Ferruginous Hawk

Identifying a Ferruginous Hawk can sometimes be tricky due to the number of species that look strikingly similar to them. This part of the guide will help you successfully identify a Ferruginous Hawk and differentiate from other similar species that may be occupying the nest intended for them (which is totally fine).

To help with some terminology used throughout the guide, a *Physical Description Terminology* section has been created to help learn these definitions, along with pictures of different hawk body parts.

Light Morph (Young)

- White under parts with varying amounts of chestnut spotting on belly and legs
- Patagial markings absent
- Slight rufous colouring on upper parts

Light Morph (Mature)

Most Common

- Strikingly white under parts
- Rusty shoulder patches and back but pale head
- Rufous V-shape is formed by legs when in flight
- Patagial bars present



Figure 14 - Juvenile Ferruginous Hawk - identifying the missing patagial mark and rufous V-shape (Sullivan. B, 2015)

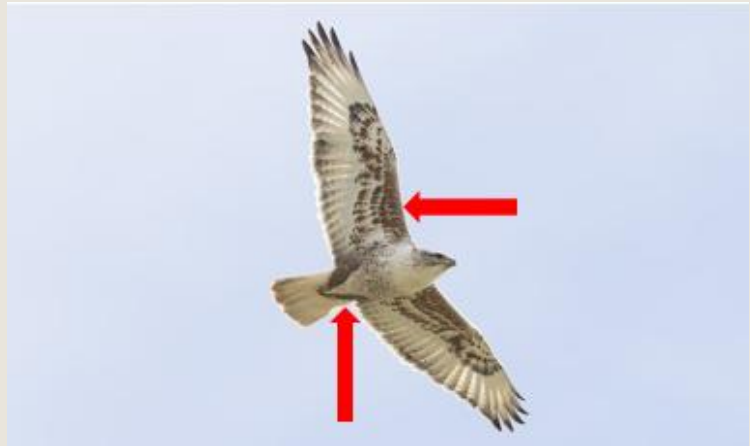


Figure 15 - Mature Ferruginous Hawk with the patagial marks and the rufous V-shape formed by legs (Sullivan. B, 2017)

- Rufous on under tail coverts, and variable everywhere else on under parts
 - Variable rufous feathering in under wing coverts
- Source: Dunn & Alderfer, n.d.

Dark Morph (Young & Mature)

- Upper and under parts are dark brown to chestnut
- White primary and secondary feathers seen while in flight
- White tail
- Dark under tail coverts

Source: All About Birds, n.d-b.



Figure 16 - Dark morph of Ferruginous Hawk (O'Brien, M, n.d)

Similar Species

Ferruginous Hawks are known for their striking similarities to Golden Eagles (*Aquila chrysaetos*). Not only for their appearances, but also their behaviours and voices are very much alike. Though you may mistake one for another, the Golden Eagle is much larger than the Ferruginous Hawk, even the female (All About Birds, n.d-d).

They are very fairly similar to the Rough-legged Hawk (*Buteo lagopus*), as their original name was Rough-legged Ferruginous Hawk. Their light-morph and dark-morph immature are nearly identical and both species have their legs feathered to their toes and are the only two hawk species that do (Schmutz, J.K. et al., 1994, pg. 13).

Swainson's hawk (*Buteo swainsoni*) and Red-tailed Hawk (*Buteo jamaicensis*) are two other species that can be easily confused with Ferruginous Hawks, especially to non-birders. These two species have really similar body types, but ultimately their color pattern sets them apart.

How to Tell Them Apart from Similar Species

Golden Eagle: There are a couple key characteristics that will help you differentiate a Golden Eagle from a dark morph Ferruginous Hawk. The Ferruginous Hawk has two white notches (figure 17), often referred to as commas, and located at the wrist/carpal patch, while the Golden Eagle does not. When the Ferruginous Hawk is perched, their coat will have rusty colored tones in the breast and wing coverts; while the Golden Eagle will be a solid brown. Lastly, the Golden Eagles nape, near the back of the neck, will have a golden colour that can be seen from some angles (All About Birds, n.d.-d).

Red-tailed Hawk: This species and the Swainson's hawk are undoubtedly the easiest of the four to differentiate from Ferruginous Hawks. As the name proposes, "Red-tailed" Hawk.

They will have a warm, cinnamon-red tail compared to a greyish-white banded tail on the Ferruginous Hawk (figure 18 & 19). They also have a black-streaked bellyband compared to a white-chestnut coloured one on the Ferruginous Hawk (All About Birds, n.d.-f).



Figure 17 - White comma marks at the wrist of the Ferruginous Hawk to differentiate the Golden Eagle does not have them (Chappell, 2014)

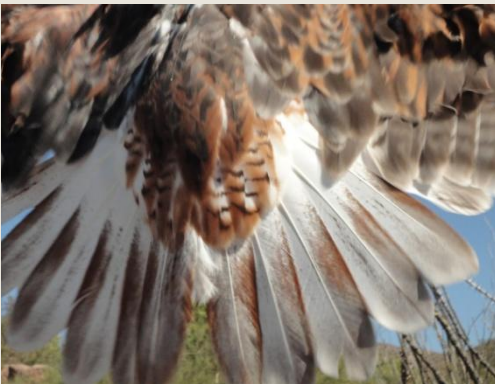


Figure 18 - Banded Ferruginous Hawk tail (Project Noah, n.d)



Figure 19 - Warm-cinnamon tail on Red-tailed Hawk (Harrison, L.J. n.d)

Rough-legged Hawk: This species is probably the hardest to differentiate from the Ferruginous Hawk, as they are very similar in size, shape, and appearance. As mentioned before, they are the only two hawk species who have legs that are feathered down to their toes. Rough-legged Hawks have many more markings on their underside than the Ferruginous, which is shown in figure 20. They also have large black patch on their wrists and belly, whereas the Ferruginous Hawk has snowy white under parts, with slight chestnut-coloured spotting (All About Birds, n.d.-e).



Figure 20 - Rough-legged Hawk in flight showing its under parts (USFW Mountain-Prairie, 2015)

Swainson's Hawk: Swainson's Hawks have a brown chest and the wings on their underside will be two-toned. Their under wing coverts are white and their primary and secondary feathers are black (All About Birds, n.d.-c). An example is shown in figure 21.



Figure 21 - Swainson's Hawk in flight showing its under parts (All About Birds, 2020-h)

Endangered Bird Species in the Southwestern Region

Unfortunately, southwestern Manitoba is the area with the most at-risk species in the province. There are many factors believed to play a role in this but a huge one is the farming development in this area, which removes critical habitat for a lot of vulnerable species (Manitoba Habitat Heritage Corporation, n.d, pg. 5). Bird species at risk in southwest Manitoba include:

- Loggerhead Shrike
- Chestnut-collared Longspur
- Common Nighthawk
- Red-head Woodpecker (figure 22)
- Short-eared Owl
- Sprague's Pipit
- Bard's Sparrow
- Least Bittern



Figure 22 - One of the eight endangered bird species in the southwestern region of Manitoba (Johnston. L, n.d)

They are all quite distinctive birds and do not all nest in the same area as the Ferruginous Hawk. A picture with their population status and where their habitat preferences can be found by visiting https://www.mhhc.mb.ca/wp-content/uploads/2019/04/SAR_Booklet_LandownersGuide.pdf and can then can be printed off take in the field when doing the *Annual Survey*!

Source: Manitoba Habitat Heritage Corporation, n.d, pg 6

Key Habitat Characteristics for Ferruginous Hawks

Ferruginous Hawks have unfortunately been subjected to high nest disturbance resulting in their population disappearance. With the development of urban and farming areas, these species have less and less places to safely breed every day, which causes them to leave breeding areas and never return. The following suggestions are tips for attracting Ferruginous Hawks to a nesting site or structure so that they want to stay and breed, and is essential to a productive breeding site.

1. Maintaining native grass prairie – Ferruginous Hawks prefer areas of greater than 50% native grass prairie.
2. Placing nests in minimal disturbance areas and with high gopher populations
3. Cattle pastures – Cattle can partially replace the historical significance of the *North American Bison (Bison bison)* to the hawks successful breeding

4. A ½ mile (800 meters) from other possible nesting sites, such as a planted shelterbelt. This ensures they have somewhere else to go if needed, but also is a far enough distance from other possible breeding and nesting birds
5. Harvesting/haying as late as possible (Ideally mid to late August the earliest) – Ferruginous Hawks are very sensitive to habitat disturbances during breeding season and they will leave their eggs or young behind if they feel threatened or unsafe
6. Keeping nest height around 2.5-3 meters from ground level – this gives them a good view and protection of potential predators and a perch to eye out prey

Sources: J.K. Schmutz et al., 1994; Bird, Varland & Negro, 1996; Alberta Conservation Association, n.d.

About the Project

The original or model project is to construct two hanging-basket designed nesting platforms at Manitoba Beef & Forage Initiatives (MBFI). It will replicate a design that was successful in Alberta (figure), but changes to the flat platform were suggested by a retired wildlife species-at-risk biologist (pers. observation by Ken De Smet) for Manitoba (figure) conditions. It will be included as a part of MBFI's research program and can serve as a model to others who are interested in becoming a Ferruginous Hawk landlord. After seven years of observation, the overall goal of the project will be to have Ferruginous Hawks that breed in multiple areas in the province with the help of landowners building these nesting platforms on their land. The creation of the guide will provide private landowners, conservation districts, and others, with the proper information and resource outlets to assist in providing this endangered species with suitable habitat. The plan will be completed by April 2020 with on-going project work, mainly site observation and gathering data, continuing after this date.

Manitoba Beef & Forage Initiatives

Who is Manitoba Beef & Forage Initiatives and why are they perfect to showcase this project?

“Supporting the development of a community of stakeholders that includes producers, scientists, extension providers, non-government organisations, policymakers, and the public, collaborating for the advancement of the industry and filling gaps in the support network for Manitoba's forage and beef sectors”

“Develop tools / methodologies for producers to build sustainable farm management strategies that improve their ability to remain profitable in tandem with environmental requirements (e.g. water quality, nutrient management), and/or to remain profitable when faced with adverse environmental conditions (e.g. flood, drought)”

Manitoba Beef & Forage Initiatives

The Johnson Farm Site just north of Brandon, Manitoba (figure 23) will incorporate two nesting structures onto their land. The best locations have been picked determined on the hawk’s preference of habitat, referring to the subsection Key Habitat Characteristics for Ferruginous Hawks, and what attracts them to a breeding location. Maintaining native prairie grassland and pastures on public and private land while ensuring there is suitable habitat with adequate prey base with minimal disturbances is really key to rehabilitating this species.

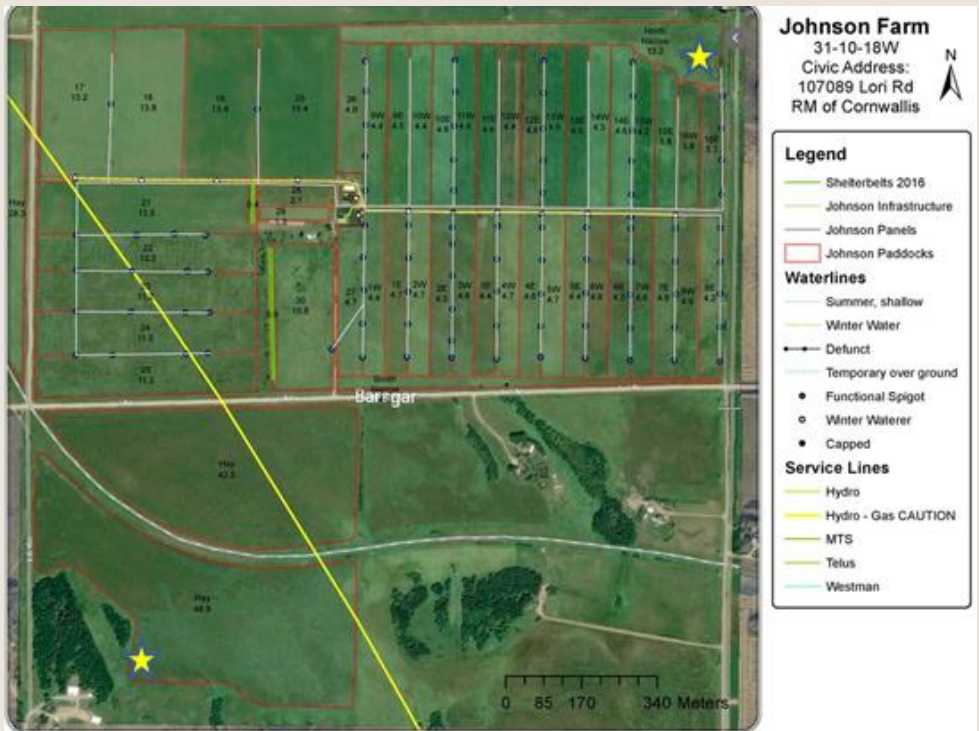


Figure 23 - The Johnson Farm Site where the artificial nests will be built, displayed by the star shapes (Manitoba Beef & Forage Initiatives, n.d)

Project Schematics

The Alberta Species at Risk Program implemented the triangle pole (figure 24) in Alberta where it was successful in attracting breeding pairs of Ferruginous Hawks. They were implemented in Manitoba but after years of research, the modifications were suggested for Manitoba artificial nesting structures and it will look more similar to a “basket” nest to offer more protection for eggs and the young during breeding season (figure 25).

More information will be uploaded when available on to MBFI’s website.

Triangle Pole:

Most common design found in Alberta. Design adapted from the North American Waterfowl Management Plan, Schematic by Kristen Rumbolt.

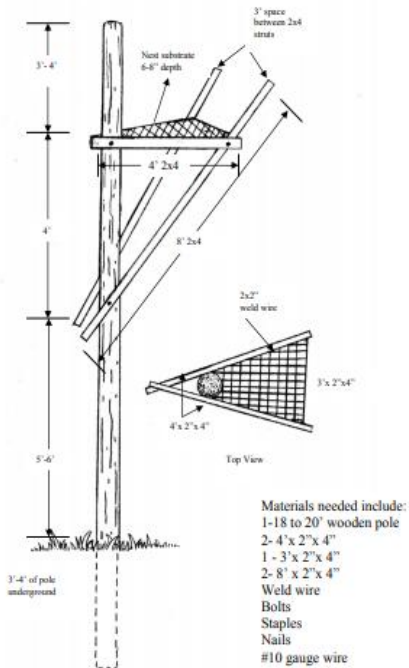


Figure 24 - Alberta's Species at Risk Programs "Triangle Pole" Design that helped house Ferruginous hawks in their province (Alberta's Species at Risk Program, 2011)

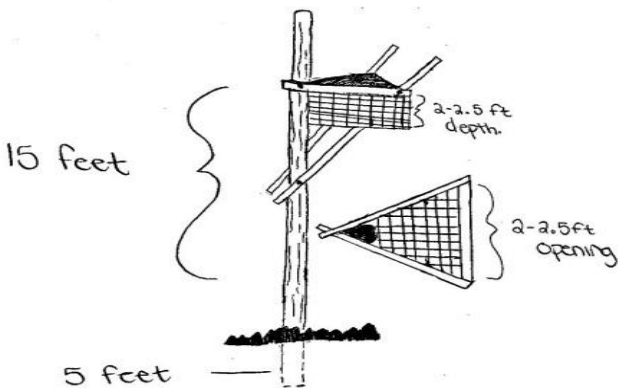


Figure 25 - New basket-like nests to suit Manitoba conditions and boost Ferruginous Hawk populations (Sheppard, B. 2019)

Building Artificial Nesting Structures

Artificial nesting poles are great for areas that have limited suitable trees and tree habitats where they are not in ideal locations (i.e. near the highway). They are fairly simple to build and the following steps and materials are adapted from the National Recovery Plan for the Ferruginous Hawk 1994 and Alberta's Species at Risk Program, with the necessary modifications made for Manitoba conditions. An example of Alberta's nesting pole is shown in figure ___ and a drawn schematic of the modified one for this project is shown in figure _____. More information and pictures will be uploaded to MBFI's website when available.

Supplies

- 1- 18' – 20' treated wooden pole
- 2 - 4' x 2" x 4" supporting wooden beam
- 2 - 8' x 2" x 4" supporting wooden beam
- 1 - 3' x 2" x 4" supporting wooden beam
- 1/4" x 2-1/2" 18.8 Stainless Steel Carriage Bolt
- 1000 pack 3/4" Wide-Crown Staples
- Galvanized nails
- Weld wire (2 ft. x 25 ft. 16-Gauge Green PVC Coated Welded Wire Fence with Mesh Size 3 inch x 2 inch

Equipment

- Hammer
- Staple gun
- Auger/Post Pounder
- Wire Cutters
- Wrenches

Assembling the Nest

1. **Before assembling the nesting structure, refer to *Finding the Right Nesting Materials* sub-section below to get started. An old crow or magpie nest and other materials, such as twigs and hay, will need to be collected to put into the nest before putting it up.**
2. Start by assembling the basket of the artificial nesting structure for faster assembly in the field. Start by cutting out the *Weld wire (2 ft. x 25 ft. 16-Gauge Green PVC Coated Welded Wire Fence with Mesh Size 3 inch x 2 inch* into a basket-shape.
3. Cut the wire into a triangle shape 90cm x 90cm x 120cm for the base of the basket. Three other pieces of the wire will need to be cut for the sides of the basket.

4. Two pieces need to be cut 90cm x 90cm and another piece will be cut 120cm x 90cm for the longer side of the base.
5. To attach the smaller pieces cut in step 4; use upholstery clips or bend the wire to attach them to the base of the basket.
6. Attach the smaller 4' x 2" x 4" beams to each side of the top of the nest using staples.
7. 2 other 4' x 2" x 4" may be placed on base of the nest to attach to pole for more support

Assembling the Pole

1. Use an auger (or some sort of digging tool) to make a hole in the ground wide enough for the pole to fit through, depending on the diameter of the pole being used. You want the pole to be at least 5 feet in the ground.
2. The prepared nest that is already assembled will be attached in three spots on the nesting pole using bolts. The 4' x 2" x 4" beams already attached to the nest will be attached on the upper half of the pole.
3. The 2 - 8' x 2" x 4" beams will be attached on each side to the 4' x 2" x 4" and slant down, leaving a Y-space, and are attached on the bottom half of the pole, to support the nest further.
4. A couple galvanized nails can be used to really secure the nest to the pole, if wanted.
5. Voila! Nest is up and ready to go.
6. **Pictures can be found in the *Project Schematics* section at the beginning of the guide until the live photos get put in**

Finding the Right Nesting Materials

Ferruginous Hawks love to build on top of nests year after year, which can lead them to build quite large and bulky structures. This is why the basket is crucial to support the weight and size of the nest as they typically measure three feet high and three feet across. They use an array of objects in their nests such as hay, bones, sagebrush stems, hair, large



30
 Figure 26 - Young Ferruginous Hawks observing things from the bulky nest structure (Dudley, R, 2013)

twigs, and is lined on the inside with mud, bark, sod, and cow dung. Don't be surprised if you find random materials like barbed wire and plastic in the nest, as the hawks will use a bit of everything that they can find. The male will gather the supplies while the female builds the nest which takes about a week. Their construction stage is the most sensitive time as they will flee if they are interrupted or feel at all unsafe. By providing an old Magpie or Crow's nest in the structure, it can reduce the amount of time the breeding pair must spend building the nest. If a nest cannot be found, the materials can be gathered and put into the nest and the pair will refurbish it together (All About Birds, n.d-f).

Project Costs

In the future, this project will hopefully be incorporated into Manitoba's watershed districts programs. Until then, landowners can expect to pay the cost of materials (table 1) and equipment, any potential labour to build the structures, and of course any after-care or maintenance issues, if any (very minimal). The average landowner costs are listed below. Costs will change slightly from vendor to vendor and some supplies have been donated to the project on behalf of local companies, which is outlined in the next sub-section, Project Funding.

Quick Reference Table

Table 1 – Costs that landowners may be subjected to for building two artificial nesting structures

<u>Project Phases/Deliverables</u>	<u>Total Cash Cost for Project (LANDOWNER COST)</u>
<u>1. Constructing Artificial Platforms (2)</u>	
<u>Supplies</u>	
18' to 20' treated wooden pole @ \$100/each	\$200.00
4' x 2" x 4" Supporting Beams @ \$4.50/each	\$18.00
8' x 2" x 4" Supporting Beams @ \$5.00/each	\$20.00
3' x 2" x 4" Supporting Beams @ \$4.00/each	\$8.00
1/4" x 2-1/2" 18.8 Stainless Steel Carriage Bolt @ \$1.79/each	\$21.50
1" 18 Gauge Brad Nails @ 20¢/each	\$4.00
1000 pack 1/2" Wide-Crown Staples, for #800X Stapler	\$5.79
Weld wire (2 ft. x 25 ft. 16-Gauge Green PVC Coated Welded Wire Fence with Mesh Size 3 inch x 2 inch	\$20.00
<u>Labour</u>	
Assembling parts of nesting structures - Approximately 3 hours @ 15/hr (own)	\$45.00
Putting up nesting structures - Approximately 3 hours @ \$30/hr	\$90.00
Assembling and putting up nesting structures - Approximately 3 hours @ \$15/hr (volunteer)	\$45.00
GRAND TOTAL (GST 5%, PST 7%)	\$534.56

Project Funding

With the funding from Manitoba Beef & Forage Initiatives, the money will be used to supply the building materials for the nesting structures for this project, and to promote the awareness and public outreach about the Ferruginous Hawks and their rehabilitation. This will be done by developing 10 user-friendly guides and 25 educational brochures. The brochures will be distributed to private landowners and any potential tradeshows, and the guides will be mailed out to local conservation districts in Manitoba.

Hawks Migration Association of North America (HMANA) is an association that supports the conservation of raptors through the scientific study, enjoyment, and appreciation of raptor migration. They have a research program award of \$1000 that can be used towards activities such as furthering this project and continuing to build more nests in the future. It will also be used to cover costs of educating the public and watershed districts. It will be applied for before October, 2020 and the announcement date is November 1, 2020.

Another funding source for this project is Manitoba Hydro. The treated hydro poles are the perfect material for the nesting structures as they are tolerant of Manitoba's varying weather patterns. Contact ferruginoushawk2@outlook.com or information@mbfi.ca for more information on the pole donations, poles themselves, or if you are in need of one for your project.

Ferruginous Hawk Nesting Surveys

The following information in the New Installation and Annual Survey are being collected to monitor the effectiveness of the new hanging basket nesting structures for breeding Ferruginous Hawks in Manitoba. All information collected should be sent to Manitoba Beef & Forage Initiatives to be stored in their records with a copy kept by the landowner(s). All the following information and surveys are adapted from Alberta's Species at Risk Program - Inventory and Construction Protocol.

New Installation of Nesting Structure Survey

- This section of the guide will be used directly after the nest is set up and the information should be sent to MBFI to register the nesting sites. Please include pictures of the nesting structure and its location along with the survey.
- Nests need to be built and setup before March 15th as this is when their breeding season starts. *Interruptions to their nest after this date to May 1st can cause abandonment or resentment towards that nesting site.*

Date of installation	
Location of nesting site (coordinates)	Easting: _____ Northing: _____
Name of pole (optional)	
Name of responsible person/agency/company	
Contact information	Phone: _____ Email: _____ Mailing address: _____ _____
Name of landowner	
Reason for Installation	<input type="checkbox"/> Replacement of an old nesting pole <input type="checkbox"/> Loss of natural nest site (i.e. blown down) <input type="checkbox"/> Habitat enhancement <input type="checkbox"/> Other: _____
Additional Features and Distance from Nesting Site	<input type="checkbox"/> Barbed Wire Fence _____ <input type="checkbox"/> Roads (Gravel, paved, or trail) _____ <input type="checkbox"/> Power lines _____ <input type="checkbox"/> Buildings (Active or abandoned) _____ <input type="checkbox"/> Other: _____

Surveying Protocol

- Surveying should not be done during rain and snow periods, and during heavy wind periods (more than 40km/h). *Please confirm weather conditions with your closest weather station.*
- Only one survey should be done annually between May 1st and June 30th.
- Surveying should be done at least 200m away from the nesting site and finished within fifteen minutes to avoid major disturbances.
- Checking the close-up condition of the nesting structure should be done during non-breeding season at least once every five years.

Annual Survey

Record of Nesting Activity/Record of Occupation

Date of Survey (between May 1st and June 30th)	
Name of Surveyor	
Temperature	
Wind Speed (no more than 40 km/h)	
Location of Nesting Site	Easting: _____ Northing: _____
Location of Observation	Easting: _____ Northing: _____
Equipment Used	<input type="checkbox"/> GPS Unit <input type="checkbox"/> Binocular <input type="checkbox"/> Spotting Scope <input type="checkbox"/> Bird Guide <input type="checkbox"/> Others:

Is there any damage to the nesting structure?	<input type="checkbox"/> No <input type="checkbox"/> Yes (What kind of damage?)
Ground squirrels present?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is this nest active?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If so, how do you know this site is active?	<input type="checkbox"/> Observed bird species (any) <input type="checkbox"/> Young of the year, alive or dead (if so, how many?) _____ <input type="checkbox"/> Egg shell pieces <input type="checkbox"/> Eggs (if so, how many?) _____ <input type="checkbox"/> Significant downing of nest <input type="checkbox"/> Feathers in or around nest <input type="checkbox"/> Prey carcasses
Species Physical Description (refer to descriptive word bank, page)	
Does it resemble any of the following species?	<input type="checkbox"/> Ferruginous Hawk <input type="checkbox"/> Rough-legged Hawk <input type="checkbox"/> Golden Eagle <input type="checkbox"/> Swainson's Hawk <input type="checkbox"/> N/A
Are there any bird species at risk	<input type="checkbox"/> N/A

<p>that are observed in the nesting area?</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Chestnut-Collared Longspur <input type="checkbox"/> Common Nighthawk <input type="checkbox"/> Least Bittern <input type="checkbox"/> Loggerhead Shrike <input type="checkbox"/> Redheaded Woodpecker <input type="checkbox"/> Short-eared owl <input type="checkbox"/> Sprague's Pipit <input type="checkbox"/> Yellow Rail <input type="checkbox"/> Other: _____
<p>Other things observed to be noted</p>	

External Resources/Contacts

If you are interested in becoming a Ferruginous Hawk landlord and have any questions regarding the guide, the structures, or any general information you can contact the following to get started.

Manitoba Beef & Forage Initiatives
 Box 81 Site 520 RR5
 Brandon, Manitoba, R7A 5Y5
 204-761-3300
information@mbfi.ca

OR

Project Coordinator, Breanna Sheppard
ferruginoushawk2@outlook.com

OR

Your local watershed district!

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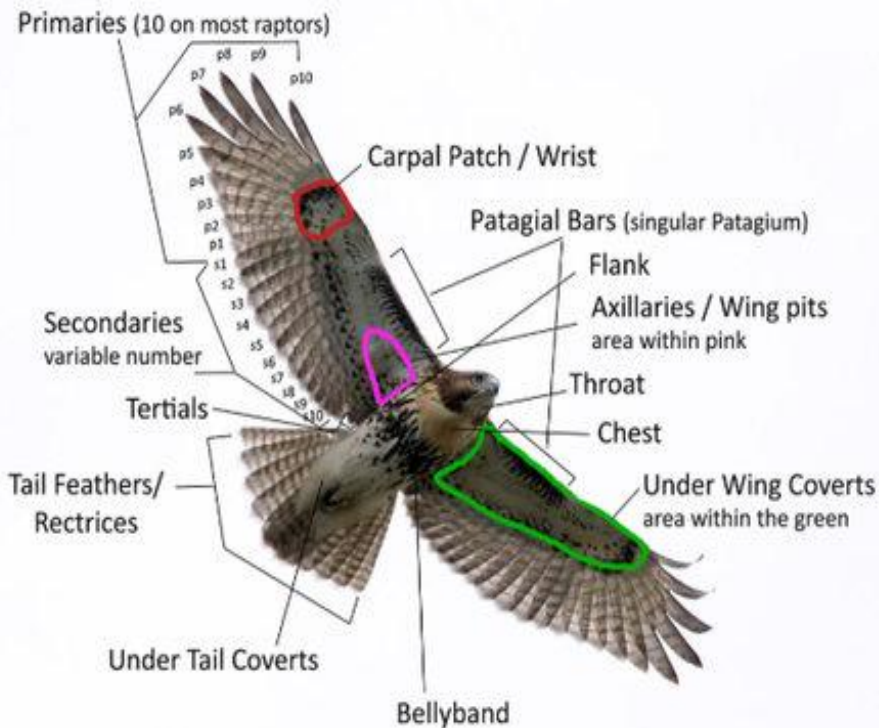
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https://commons.wikimedia.org/wiki/File:Ferruginous_Hawk_USFWS_PSW.jpg

Parts of the Raptor (underside)

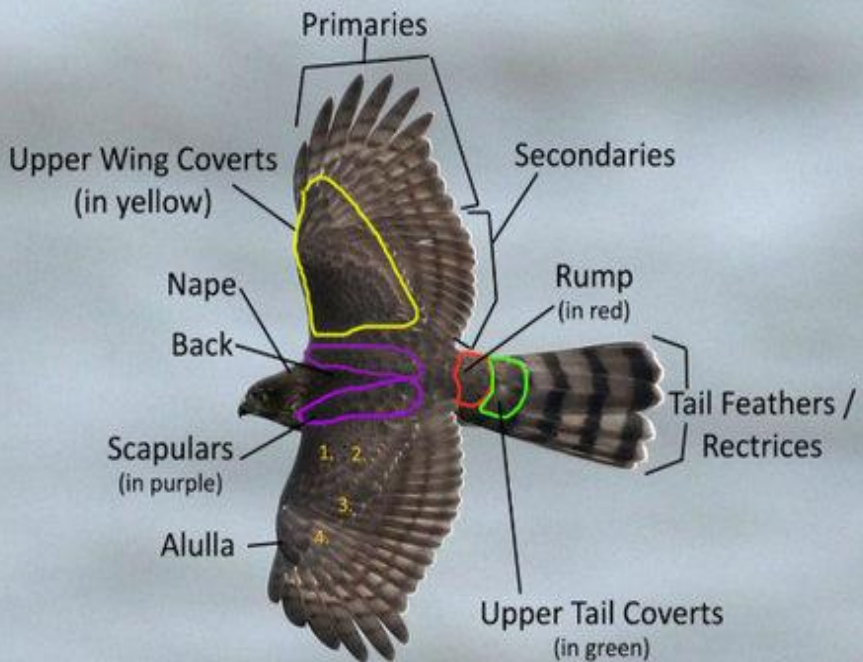


Remiges: the flight feathers of the wing, including the primaries and secondaries

Flight Feathers: Includes all long feathers of the wing and tail

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Parts of the Raptor (topside)

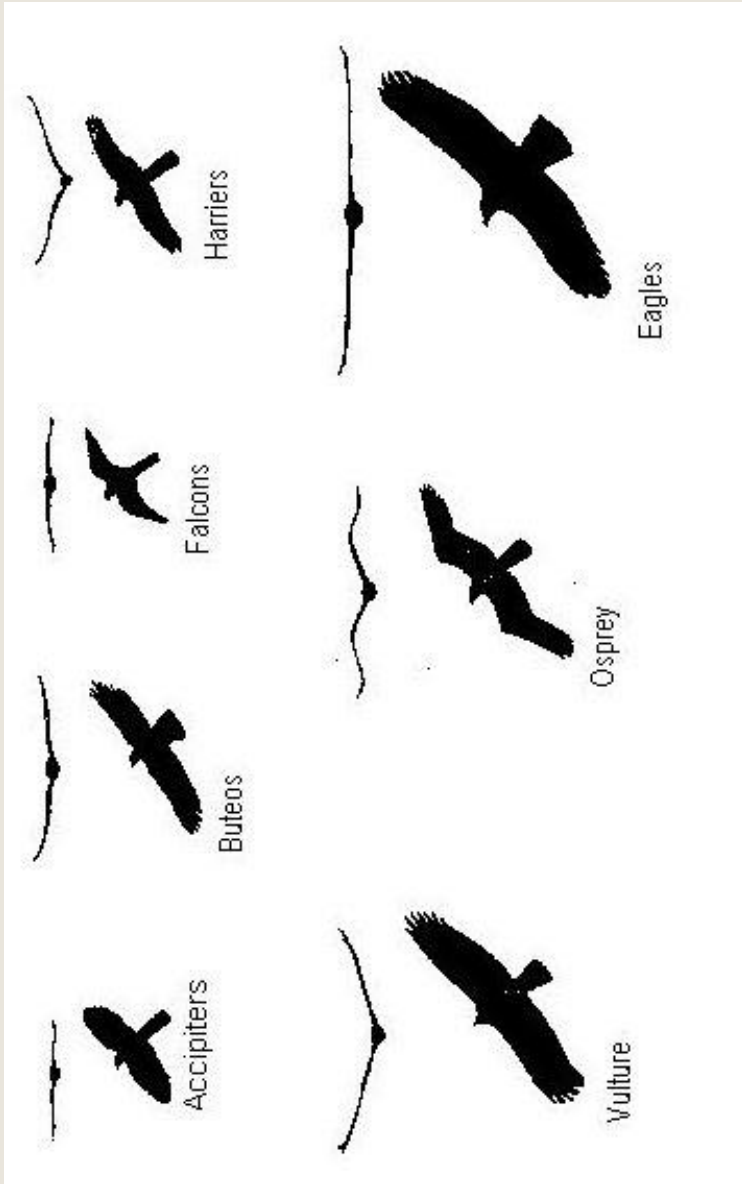


Areas labeled 1 through 4 (plus alulla) make up the Upper Wing Coverts

1. Lesser secondary Coverts
2. Median Secondary Coverts
3. Greater Secondary Coverts
4. Primary Coverts

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APPENDIX C – SILHOUETTES OF DIFFERENT RAPTOR FAMILIES



Source: Raptor Resource, 2019