Raptor Ecology in the Thunder Basin of Northeast Wyoming

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My presentation today will hopefully provide a fairly general overview of the taxonomy and natural history of the raptor community that inhabits the Thunder Basin region. I will include some biological data, but only to illustrate a few general concepts.

Eagles, hawks, falcons and owls, collectively referred to as raptors, are a prominent component of the Thunder Basin ecosystem. These birds are both abundant and diverse in the area. In total, 18 species regularly occur in the region at various times throughout the year.

These species listed below represent 2 taxonomic orders, 4 families, and 11 genera. Those birds range in size from the 3 oz American Kestrel to the 12 lb. Golden Eagle. Their home range consists of 50 acres to 20 square miles. They eat a diversity of prey, beetles, grasshoppers, frogs, salamanders, snakes, mice, ground squirrels, rabbits, ungulate fawns, songbirds, grouse and waterfowl. Among them they utilize a wide variety of nest sites, cavities in trees, burrows, ledges, on the ground and in trees.

As I said not all 18 species occur year round in the region. In fact the only year-round resident is the golden eagle. Ten other species nest in the area, 2 species winter here, and 5 other species migrate through occasionally or spend certain portions of the year here.

To give us some insight into the biology of raptors in the Thunder Basin, lets look at some of the data that were collected as part of the annual wildlife monitoring programs of several local coalmines. In particular, the relative nesting density of five common

species over 11 years on about a 200 square mile study area. The golden eagle and the ferruginous hawk are the most abundant nesting raptors. The red-tailed hawk slightly less so, the great horned owl and Swainson's hawk are the least abundant of these five species. Also note the variation in nesting activity over the years, highest in the late 1990's, low through the mid 1990's, and higher at the end of the decade.

Now let's compare the nesting densities of four species to those in other parts of North America. The golden eagle and ferruginous hawk densities in the Thunder Basin are generally higher than those reported anywhere else. The abundance of golden eagles and ferruginous hawk is largely a function of our relatively undeveloped landscape, abundant prey base, and appropriate topography for nest sites and foraging. Both the red-tailed hawk and Swainson's hawk are tree nesting species, and are probably limited by the obvious paucity of trees. The Swainson's hawk in particular is most abundant in slightly fragmented agricultural landscapes, and farming country.

With that overview, I now want to highlight four species that for various reasons, are of particular significance in the Thunder Basin landscape. Several of these birds are small in stature, uncommon, and relatively obscure, but collectively I think these four species of raptors represent the cornerstones of conservation in the Thunder Basin region.

Golden Eagle

The golden eagle is clearly one of the most prominent, abundant, and familiar birds in the region. Eagle pairs that nest in the area, remain on their territory year round. This is one of the few species of birds that braves our Wyoming winters. In addition to the resident birds, many eagles migrate through and winter in Wyoming. The golden

eagle is a very adaptable nester, using large pines and cottonwoods, creek embankments, on the ground, and even prominent scoria hills.

As we all know golden eagles can and do subdue large prey such as pronghorn and sheep. However, smaller mammals such as jackrabbits, cottontails, prairie dogs, ungulate fawns, dominate their diet and (sometimes) even lambs are consumed regularly. Golden eagles are more abundant in the Thunder Basin and Wyoming in general, during both summer and winter, than in most other parts of their North American range.

Ferruginous Hawk

The ferruginous hawk is endemic to western North America, and is well adapted for life in grassland and sage-steppe ecosystems. They generally inhabit the Thunder Basin for about seven months each year. They typically build their nests out of dead sagebrush and they usually build them on the ground and in such as embankments, buttes, hilltops, rock outcrops and slopes. Less often they build their nests in small trees and shelterbelts. The ferruginous hawk is very reliant on jackrabbits and cottontails, they also eat prairie dogs and ground squirrels quite regularly. Of all the raptors that nest in the Thunder Basin the ferruginous hawk is the one most sensitive to human disturbance. They are the most likely to either desert their nests or be less attentive to their eggs or young, thus reducing their overall productivity. With that said, they can be very tolerant of certain forms of human activity, such as vehicular traffic. In general, ferruginous hawks need a little more space (~1/4 mile buffer) than most other raptors.

Population declines have been documented and breeding range has been documented in many areas, especially in southern Canada. The ferruginous hawk is fairly abundant in the Thunder Basin and no long-term declines have been recognized.

Influence of Prey Availability on Ferruginous Hawk and Golden Eagle

Before moving on to the other two species, I want to illustrate the influence of prey availability on the ferruginous hawk and golden eagle, and raptors in general. To do this we will look to an index of lagomorph abundance, specifically jackrabbits and cottontails. This index was developed from annual spotlight surveys conducted at five local coalmines. Lagomorph populations in the Thunder Basin were low coming out of the mid 1980's, increasing to a peak in 1992 and then crashed dramatically in 1993. Those populations remained suppressed through 1997, and then increased gradually from 1998 through 2000. The annual productivity of four large species of lagomorph-eating raptors (the golden eagle, ferruginous hawk, red-tailed hawk, and the great horned owl) appears to be correlated with lagomorph abundance. Interestingly, when lagomorph population was suppressed from 1993 through 1197, raptor productivity gradually increased. Although, this may seem paradoxical, it is consistent with alternate prey theory. Where in this case, when raptors became dependent on abundant lagomorph populations they responded negatively when these populations crashed. However, they were able to broaden their diet, essentially figuring out that there are other things to eat besides bunnies and thereby improved their reproductive success.

Owls

In general, the Thunder Basin is rather devoid of owls, hosting only a few of the 19 species that inhabit the United States and Canada. The burrowing owl is a summer resident in Wyoming that spends the other 1/2 of the year on the southern plains or in northern Mexico. These owls are so named because of their habit of nesting in burrows or holes excavated by mammals; in this area either badgers or prairie dogs. Prairie dogs

and burrowing owls have an interesting relationship. The availability of numerous appropriately sized burrows, low vegetation, and the increased vigilance offered by their noisy neighbors in the prairie dog colonies, makes black-tailed prairie dog colonies ideal nesting habitat for burrowing owls. Although burrowing owls do nest in isolated badger burrows in the Thunder Basin, most nests are in prairie dog colonies.

Like most owls, the burrowing owl's diet is dominated by small rodents, voles and mice in particular. Adult, and especially young burrowing owls, also consume large numbers of beetles and grasshoppers. They even take an occasional small bird, lizard, frog or salamander. In addition to providing nest sites for owls, prairie dog colonies also harbor substantial populations of mice and insects.

Range-wide declines have been documented in burrowing owl populations. Their distribution in Canada, where they are considered endangered, has contracted dramatically. Burrowing owls are not common in Wyoming, but the species does not face the same risks in this region that it does in other places. Grassland habitat has been destroyed, fragmented, and degraded over most of this continent, largely as a result of farming. In addition, burrowing owls are also quite susceptible to pesticides. The relatively high density of prairie dog colonies in the Thunder Basin makes this area particularly important for the burrowing owl.

Merlin

The merlin is not abundant in the Thunder Basin, but it depends on one of the most limited habitat types in the area, pine/juniper woodlands of the Rochelle Hills. Wyoming is at the southern end of the breeding range for the prairie subspecies, the

Richardson's merlin. They nest throughout the state, and also migrate through and occasionally winter in Wyoming.

In the Thunder Basin, and Wyoming in general, merlin's use old black-billed magpie nests in ponderosa pines or juniper trees. Although merlins nest in trees, they forage over the open prairie, subsisting mainly on small, open-country birds such as horned larks, cowbirds, longspurs, lark buntings, and grassland sparrows.

A recent review of existing observations and subsequent statewide survey conducted by the Wyoming Cooperative Fish & Wildlife Research Unit suggested that northeast Wyoming boasts some of the best merlin habitat in the state and supports the most nesting pairs.

Conclusion

What does the future hold for raptors in the Thunder Basin? Because this region is relatively undeveloped and hosts a sparse population, raptors do not face many of the habitat issues that limit populations in other areas; specifically, habitat loss to agriculture and urbanization. Human related factors with the greatest potential for impacting raptor populations in the Thunder Basin include developments which either destroy nest sites or create chronic disturbances in the vicinity of active nests. Existing land uses in the Thunder Basin, primarily livestock grazing, coal mining, oil and gas development, and recreation have little potential for eliminating foraging habitat or significantly affecting prey populations. In fact, these land uses, at least at past levels, have proven quite compatible with raptors; the high densities of golden eagles and ferruginous hawks are good evidence of that.

The coal mining companies of the Thunder Basin deserve special recognition for the wildlife and raptor monitoring they have supported over the years.