Brown-headed Cowbird

Villain or Scapegoat?

Stephen I. Rothstein
Department of Ecology, Evolution,
and Marine Biology
University of California
Santa Barbara CA 93106
rothstei@lifesci.ucsb.edu

Introduction

In the dim light shortly before sunrise a dull brownish bird sneaks purposefully through some low branches and alights on a nest so small that it can barely contain her. In less than a minute she flies off, but not before laying an egg that dwarfs the much smaller eggs of the birds that built the nest. Later that morning, the interloping bird flies to a herd of large mammals and feeds greedily on the insects they flush. Two weeks later the nest contains only a single nestling—the offspring of the interloper. I suspect that anyone reading this account would guess that the interloper is a female Brown-headed Cowbird, the world's most intensely studied brood parasitic bird, i.e., a bird that deposits its eggs in the nests of other birds (its "hosts"), which then raise the parasitic offspring.

If I mentioned that the parasitized host in the event I have described was a Least Bell's Vireo, most readers would guess that the event took place in California or Baja California and that it had to occur sometime in the past 100 years, because there were no cowbirds in this vireo's range until the early 1900s. They would be correct about the region but wrong about the timing because the event I have described happened 15,000 years ago, at a time when North America was very different and when the large mammals the interloper fed with were Columbian mammoths. The cowbird is thought to have undergone a greater natural range extension during the time of recorded history than any other native North American bird (Rothstein 1994). However, as I will explain below, the cowbird was once much more widely distributed across the continent than it was at the time Europeans first began to describe North America's flora and fauna.

In this article, I will provide some background on cowbirds that may cast them in a different light for most readers. The "cowbird debate" has been argued in the pages of *Birding* in the past (Schram 1994, Grzybowski and Pease 1999,

Ortega 2000), and I will not dwell on the main points that have already been discussed in this magazine. Instead, my primary objective will be to address a question that many people automatically assume has an answer in the affirmative: Has Brown-headed Cowbird parasitism resulted in widespread population declines of multiple North American host species, especially endangered species? As it turns out, the surprising answer is that cowbird parasitism has *not* been demonstrated to have the widespread negative effects that it is widely believed to have had. A crucial corollary that I will examine in some detail is that unnecessary cowbird-control programs have diverted our attention and resources from a much graver threat facing many host species—habitat loss.

Besides being the world's best-studied parasitic bird, the Brown-headed Cowbird is also North America's most reviled native bird. Female cowbirds typically remove a host egg from nests they parasitize, and cowbird nestlings usually cause the death of some or all of the host's remaining young. Because of their short (11-day) incubation period, cowbird nestlings usually hatch before the host young. Even without a hatching advantage, cowbird nestlings are usually larger than host nestlings because most host species are smaller than cowbirds. These advantages usually enable cowbird nestlings to outcompete host nestlings, and some hosts such as small vireos and small flycatchers typically lose all of their young if a cowbird egg hatches.

The cowbird's recent range expansions have coincided with a number of declines in other native birds, and these declines have often been attributed to the effects of cowbird parasitism. As a result there are active control programs that kill thousands of cowbirds per year in efforts to save several federally endangered passerine species. Part of the different light I would like to cast on cowbirds is the suggestion that while some of this management effort has

Perhaps the most hated bird in America, the Brown-headed Cowbird is a native species and one of the most fascinating vertebrates on the continent. This article looks at the surprisingly weak "case" against the Brown-headed Cowbird and raises serious questions about the effectiveness of some cowbird-control programs. *Freeville, New York; May 2001. © Marie Read.*

It is a truism that cowbird parasitism is deleterious to the "fitness" of a host individual or individuals—such as this family of Eastern Phoebes (with cowbird adoptee; center, big mouth). That does not mean, however, that cowbird parasitism has *population-level* effects. *Ithaca, New York; May 2001. © Marie Read.*

been appropriate, it is not always based on good science, and much of it may be a waste of taxpayers' money.

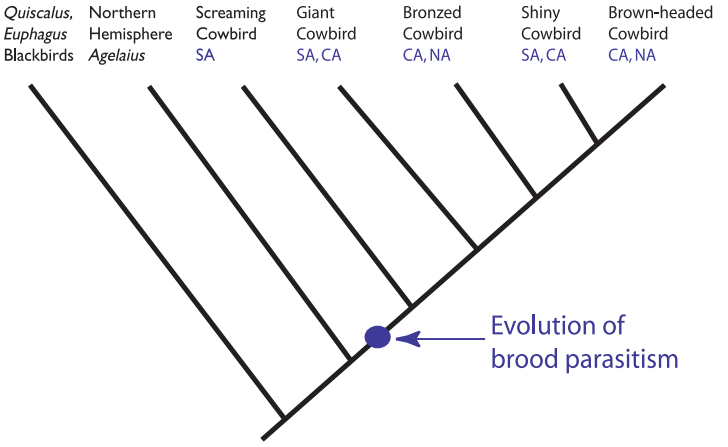
Before looking in detail at cowbird parasitism in North America (both at the present time and thousands of years ago), some basic background information on brood parasitism is in order. About 1% of the world's roughly 10,000 bird species are obligate brood parasites, meaning they never care for their own young. A larger number of bird species are facultative brood parasites, which means they sometimes care for their own young but also lay their eggs in the nests of other individuals, usually members of their own species. Facultative brood parasitism is widespread in ducks and gallinaceous birds and in some passerines such as Cliff Swallows. Besides cowbirds, obligate brood parasitism occurs in certain finches, in honeyguides, in one duck species, and most famously in cuckoos, which make up more than half of the known parasitic bird species.

Cowbird Phylogeny and Diversity

There are five species of obligately parasitic cowbirds, whose likely phylogeny is shown in the figure, opposite. As can be seen from the figure, the parasitic cowbirds seem to have arisen in South America with progressive speciation events involving movements northward into North America. The parasitic cowbirds are not particularly diverse in appearance. Males are completely black in all species except the Brown-headed Cowbird, and females are dull brownish birds except in the Screaming Cowbird, which has black, male-like plumage in females. All are medium-sized songbirds except for the Giant Cowbird, which is nearly the size of the American Crow. All of the species live up to their name and forage with cattle and other livestock in grassy areas. None of the species is found exclusively in forests, but some make daily forays of several kilometers and in some cases 15 or so kilometers into forests to find host nests.

The details of cowbird phylogeny are of interest for two reasons. First, as many birders will attest, there is the basic desire to understand evolutionary relationships among today's bird species; this particular aspect of cowbird phylogeny is beyond the scope of this article, but the interested reader can consult Lanyon (1992), Lanyon and Omland (1999), and Rothstein et al. (2002). Second, phylogenies enable us to understand the timing of branching events, which is essential to understanding cowbird effects on other species. As it turns out, application of a so-called "molecular clock" approach to the DNA sequence data used to indicate the phylogeny shown below indicates that the split between the Brown-headed and Shiny Cowbirds occurred about a million years ago, which suggests that cowbirds have been in North America for at least this long. This conclusion is backed up by Pleistocene cowbird fossils, which date to 10,000 to 500,000 years ago and which have been found across North America, in California, Oregon, New Mexico, Texas, Kansas, Florida, and Virginia (Lowther 1993).

There are also Pleistocene fossils of two extinct blackbirds that are thought to be cowbirds (Pielou 1991). So North America's parasitic bird fauna may be less diverse today than in the recent geological past. But are cowbirds more common today than they were in the past before



Relationships among bird species can be shown graphically via a phylogeny, or "family tree". And by applying a "molecular clock" approach to the genetic data used to generate the phylogeny, ornithologists have determined that parasitic cowbirds have occurred in North America for at least one million years. Current ranges: SA=South America; CA=Central America; NA=North America. *Based on data from Lanyon and Omland 1999.*

Europeans altered North America? The inescapable answer is no. Cowbirds must have been more common during the Pleistocene than they are today. North America had perhaps the world's greatest diversity of large mammals only 15,000–20,000 years ago. There were bison, oxen, horses, llamas, and camels—not to mention mammoths and mastodons. With all these large mammals browsing and grazing their way across the continent, much of North America must have been a cowbird's version of heaven. This mammalian megafauna has been especially well documented from present-day California, and it is in or near this general region where the bird that would eventually be called Bell's Vireo evolved a distinctive race we call the Least Bell's Vireo.

Some Insights from the History of Cowbirds

So what does this overview of cowbird phylogeny and our brief sojourn back to the Pleistocene tell us about how we should view cowbirds in the present? First, cowbirds have been present in North America for a long time and have had a dynamic geographic range, as is true of all of North America's flora and fauna (Pielou 1991); therefore, all or nearly all threats that cowbirds currently pose to host species are due ultimately to the actions of man. Any extinctions caused by cowbird parasitism alone would have occurred many thousands of years ago. Keep in mind that recorded history relevant to North American birds goes back no more than 300 years and that this period covers only 0.3% of the million years or more that cowbirds have been present.

An important distinction has to be made between brood parasitism's effects on individual host nests vs. entire host populations. Cowbird parasitism virtually always depresses the reproductive output of parasitized nests, but many factors—such as nest predation and starvation of young—limit reproductive success; and even with these limits, bird populations often produce more young than are needed to maintain a stable population. So a loss of reproductive output due to parasitism does not necessarily endanger a bird population unless the losses affect a very large proportion of the population. As would be expected, those species or subspecies of birds that appear to be threatened by cowbirds tend to be ones that were reduced to small populations due to massive alterations of habitat, in turn leading to a heightened threat from cowbird parasitism. The Least Bell's Vireo and another high-profile endangered subspecies for which there is extensive cowbird control, the Southwestern Willow Flycatcher, depend on riparian habitat in the southwestern U.S., a region that humans find appealing. To meet the water needs of people, we have dammed and diverted rivers and taken other actions that have destroyed at least 90% of the riparian habitat once available to these birds. Because cowbirds in the West prefer riparian habitat, they concentrate in the remaining patches of this habitat and sometimes inflict unusually high rates of parasitism on the remnant populations of these two hosts. In such situations, cowbirds may have to be controlled until the ultimate fix is achieved, namely restoration of large amounts of habitat. But regulators and land managers often go overboard with cowbird control and don't consider stopping it even when it may no longer be needed.

It has been suggested that some bird populations and possibly even entire species have never evolved defenses to parasitism (Mayfield 1963, Mayfield 1977, Reed 1999, Griffith and Griffith 2000). These suggestions are then used to argue that such "new" hosts will require protection from cowbirds for the indefinite future. Indeed, the U.S. Fish and Wildlife Service draft recovery plan (USF&WS 1998) for the Least Bell's Vireo calls for cowbird control in "perpetuity". The Pleistocene perspective is insightful here. Because of shifts in ranges during the Pleistocene, populations that we consider to be new hosts (from the limited perspective of recorded history) are likely to have experienced cowbird parasitism in the past if their habitat preferences overlap those of cowbirds. Host defenses evolved during a lineage's past exposures to parasitism may be retained for thousands of years in the absence of parasitism (Bolen et al. 2000, Hosoi and Rothstein 2000, Rothstein 2001).

Consider the example of the Least Bell's Vireo, which deserts parasitized nests at a moderate rate and then renests (Kus 2001), even though, in modern times, the species was not parasitized until the early 1900s. While data collected in the Great Plains, where nominate Bell's Vireos are "old hosts", show higher desertion rates (Budnik et al. 2001), it is unclear if this difference is due to intrinsic genetic variation between the vireo populations or to different study methodologies. Nevertheless, the California vireos do show a defense, which could rapidly increase in frequency in response to the selection pressures exerted by cowbird parasitism. In the case of Southwestern Willow Flycatchers, a California population newly exposed to cowbird parasitism in the 1900s actually had a higher rate of nest desertion than a New Mexico population with a longer modern history of parasitism (Rothstein et al. 2003).

Dealing with Cowbirds in Today's World

Regardless of whether host declines are due ultimately to people and whether new host populations have anti-parasite defenses, some host populations may currently be so endangered that cowbird control is needed to keep them from going extinct before we can remedy their habitat problems. Cowbird control is a major part of the management efforts currently underway for four federally listed taxa. But before discussing these species, what about common species? Do cowbirds harm entire avifaunas, not just endangered species? There is little support for this viewpoint.

Because cowbirds outnumber many of their host species, they could increase in numbers due to success with a few common hosts while at the same time causing declines in less-common host species. But extensive studies that used Breeding Bird Survey data to assess regional population trends of cowbirds and of many host species found no patterns (Peterjohn et al. 2000, Wiedenfeld 2000). Cowbirds were no more likely to be increasing when hosts were decreasing than when hosts were increasing. Another study (DeGroot et al. 1999) used a more direct approach and compared the makeup of bird communities at sites where cowbirds were being trapped and removed to protect Kirtland's Warblers with data from sites 5–10 kilometers or more than 10 kilometers from cowbird traps. Species that are suitable hosts contributed 4–9% more of the total passerine numbers at cowbird-removal sites than at sites with cowbirds, suggesting that cowbirds do affect local bird communities. The authors also noted that differences in community composition (as opposed to sheer numbers) were due to small increases in the abundance of suitable host species at cowbird-removal sites; however, no abundance data were presented.

Even if cowbirds have population-level effects on common species, this result would not by itself be a source for concern. Basic ecology tells us that every species is limited by something, and because cowbirds have been in North America for a long time, from the perspective of ecological time scales, it would be perfectly "natural" for cowbirds to limit the numbers or distribution of entire common species. Consider the example of the widespread Song Sparrow, whose populations may be limited by cowbird parasitism (Smith et al. 2002). It is one thing to state that cowbirds contribute to population regulation in the Song Sparrow, but it would be quite another thing—and quite a leap of logic—to conclude that cowbirds are somehow "bad for Song Sparrows" or "bad for the environment".

Cowbirds and Endangered Species

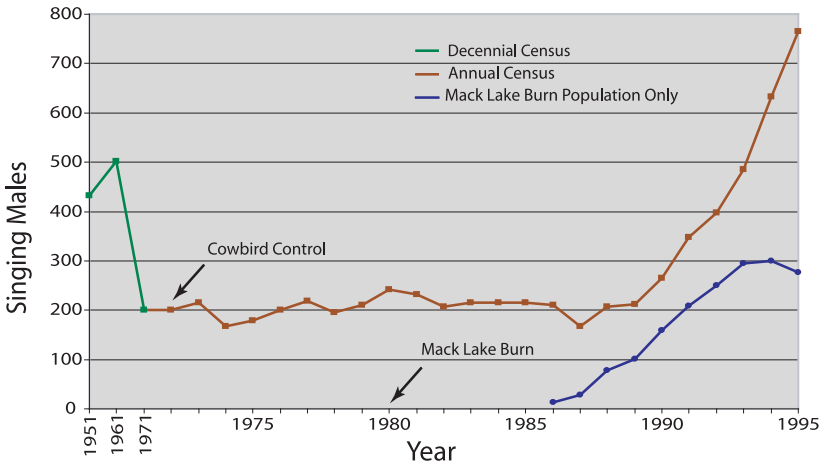
The evidence for cowbird impacts on common species is minimal, and even if there were evidence of widespread effects, it might not be worth worrying about. However, cowbirds undoubtedly pose a potentially serious threat to four federally endangered species that have lost much of their North American habitat over the past century. Cowbird control is currently a major component of the recovery efforts for these endangered passerines and was certainly a wise management action when it was first instituted. However, I suggest that in each case, cowbird control has gotten out of hand and creates potentially deleterious consequences in addition to the ethical problems that arise from killing off thousands of individuals of a native songbird species every year.

Cowbird control in the northern Lower Peninsula of Michigan is widely believed to have saved the Kirtland's Warbler from extinction and to have played a key role in population increases in the past 15 years. However, there was no growth in the warbler's population for the first 17 years of cowbird control, and a large fire that preceded the recent population increase may instead have been the primary benefactor of the Kirtland's Warbler. *Schoolcraft County, Michigan; May 2003. © Robert Royse.*

Kirtland's Warbler

The first and best-known cowbird-control program (DeCapita 2000) involves the Kirtland's Warbler, a species whose rarity led to a decision in the 1940s to conduct a complete census in its lower Michigan breeding grounds every 10 years. There were 432 and 502 singing males in 1951 and 1961, respectively, but only 201 in 1971. The apparent population crash and data on increased cowbird parasitism in the late 1960s led, in 1972, to the first cowbird-control program. Because cowbirds are very social, traps that use food and live cowbirds as attractants are highly successful at capturing many cowbirds over large areas. Cowbirds on the Kirtland's Warbler's breeding grounds have been trapped every year since 1972, with a total of 124,810 killed through 2002. There were immediate and dramatic changes after cowbird control began. The parasitism rate of warbler nests went from 70% from 1966 to 1971 to only 6% from 1972 to 1977 and has remained low in recent years (Bocetti 1994). There was an increase in the mean number of warbler young fledged per female from 0.80 to 3.11. Because the warblers breed at one year of age, this huge increase in warbler production should have resulted in a rapid increase in breeding warblers within a year or two. Instead, the warbler breeding population remained at around 200 pairs for the next 18 years. It began to increase sharply in 1990 and numbered 1,050 pairs in 2002. Why was the increase so delayed?

Kirtland's Warbler is an extreme habitat specialist and nests only in jack pine forests 6–24 years after fires. In 1980, a large fire near Mack Lake burned 10,500 hectares. The burn area became suitable warbler habitat in 1986, which is when warblers first bred there. The species' total breeding population increased rapidly over the next 8 years, and all of the increase was due to individuals breeding on the Mack Lake Burn. The warbler's dependence on fire had been well known for years, but the consensus in the early 1970s (Mayfield 1978, 1983)



Based on data from DeCapita 2000.

Population size of the Kirtland's Warbler did not increase following the implementation of cowbird control in 1972. Several years after the Mack Lake Burn (1980), however, cowbird numbers began to increase sharply.

was that cowbirds, rather than a shortage of breeding habitat, were limiting warbler numbers. Clearly, habitat that researchers thought to be suitable was not suitable from the warblers' perspective. It is unfortunate that the Mack Lake Burn was intended to be a controlled burn but went out of control and resulted in one human fatality and the destruction of 44 buildings. Because of the political fallout from this disaster, the use of controlled burns declined for many years (Kepler et al. 1996), with the result that managers could not repeat the single most beneficial change the species experienced since cowbird control began—namely, a large burn. The Mack Lake Burn is now too old to be suitable for warblers, and new habitat has been generated by small burns and improved methods of planting young pines that mimic the results produced by fire.

Although the warblers were limited by breeding habitat after cowbird control began, it is widely assumed that the near elimination of cowbirds kept the species from going extinct until new habitat became available (Terborgh 1989, Trail 1992, Kepler et al. 1996). This is certainly a tempting conclusion given the crash in warbler numbers after 1961 and then the stable numbers after cowbird control began in 1972. Furthermore, demographic models in the early 1970s indicated that the population was not self-sustaining. Nevertheless, I consider the evidence that cowbird control saved the warbler from extinction in the early 1970s to be weak. First, demographic projections are heavily dependent on estimates of mortality for young and old birds, which are poorly known. If the true mortality rates were lower than the estimates, then those 200 pairs of Kirtland's Warbler could have been self-sustaining even with cowbird parasitism. Secondly, the evidence for increased cowbird parasitism in the 1960s is based mostly on a relatively small sample of 52 nests (M.E. DeCapita, personal communication), which may not have been representative of the entire species.

Third, if one argues that Kirtland's Warbler was declining in the early 1970s and saved from extinction by cowbird control, then it is necessary to assume that control just happened to start at the time the warbler's ongoing decline was at the carrying capacity that it would have for almost the next 20 years, about 200 pairs. Assuming that the warbler population was already stabilized at about 200 breeding pairs in the early 1970s does not necessitate such an unlikely coincidence. For one thing, the data show only that a decrease occurred between 1961 and 1971, not that the warblers were decreasing in 1971. If the warblers were declining in the early 1970s, then there should have been a decline between 1971 and 1972, when cowbird control first began. But the warbler population was essentially constant from 1971 and 1972 (201 versus 200 singing males; Mayfield 1978). So one can't conclude that cowbird control saved the Kirtland's Warbler from extinction. The story has become even more complicated in recent years, with the controversial suggestion that the warbler's wintering habitat in the Bahamas was also limiting in the 1970s (Haney et al. 1998, Sykes and Clench 1998).

Despite my skepticism about the benefits ascribed to cowbird control, this management approach was clearly the right thing to do in 1971 because it did seem at that time that the warbler might go extinct. It was also prudent to continue to control cowbirds while the warbler population remained near 200 pairs. But do we still need to spend roughly a hundred thousand dollars every year to kill cowbirds to protect Kirtland's Warblers? Managers overseeing the warbler recovery effort believe that the answer is yes. But I suspect that it is no. Recall that the warblers have increased fivefold since the early 1970s. Would cowbird numbers increase proportionately if there were no control? Would cowbird parasitism rates decline in response to the greater availability of host nests? Regardless of whether the answers to my questions are yes or no, managers should certainly end cowbird control for several years to find out the answers. The option being pursued now is simply to kill cowbirds ad infinitum, with no effort to determine whether this is necessary. By contrast, it is possible that the population-level effects of cowbirds would be so diluted by the increased numbers of warblers that cowbird parasitism would constitute a minimal demographic impact that does not endanger Kirtland's Warbler.

Least Bell's Vireo

The Least Bell's Vireo (*Vireo bellii pusillus*) was originally common over most of California, with 60–80% of its population in the Central Valley (Franzreb 1989). Declines in

vireo numbers were first noted in the 1930s (Grinnell and Miller 1944), and by 1978 there were only about 140 singing males, all located in southern California. Cowbirds colonized the vireo's entire range between about 1900 and the late 1930s (Rothstein 1994), and the vireo's decline has been attributed to cowbird parasitism and to the destruction of most of its essential riparian habitat. For example, the Central Valley lost 95% of its riparian habitat in the 1900s (Smith 1977).

Most populations of the Least Bell's Vireo, which is endemic to riparian habitats of California and Baja, have rebounded sharply following the initiation of cowbird control programs in the early 1980s. Habitat restoration has likely benefited the Least Bell's Vireo, too, but researchers haven't determined the relative contributions of cowbird control vs. habitat improvement to population health of this still-endangered subspecies. *San Diego County, California; May 2002. © Brian E. Small.*

The Marine Corps Base at Camp Pendleton in San Diego County has some of the most extensive remaining riparian habitat left in southern California. About 62 singing males were located there in 1983, and it is at this site where the second cowbird control program for endangered species began, with 5,349 cowbirds having been removed from Camp Pendleton by 1995. Vireos experienced a parasitism rate of about 50% in the early 1980s (Griffith and Griffith 2000). With cowbird-control, the parasitism rate was about 4–20% from 1983–1987 and 1% or less since 1988. The number of young produced per vireo female went from 1.33 before control to 2.79 afterwards. Unlike Kirtland's Warbler, the vireos increased rapidly after control began and showed more than a tenfold increase to 696 singing males by 1996 (Griffith and Griffith 2000). Cowbird control is now extensive in southern California, and the rangewide vireo population is now more than eight times larger than in the early 1980s.

The Least Bell's Vireo story is one of the most dramatic successes in bird conservation. Although controlled experiments cannot be done with an endangered species in dire straits, it seems likely that cowbird control has had a major beneficial effect on the vireo. However, too much of the credit may be given to cowbird control because restoration of riparian habitat is also a focus of management efforts, and no one has determined how much of the increase in vireo numbers has taken place in riparian habitat that didn't exist in the early 1980s. Furthermore, cowbird control has not been an unqualified success. In the late 1970s, the largest vireo population occurred in Santa Barbara County, where about 50 singing males made up over a third of the known population in California (Goldwasser et al. 1980, Greaves 1987). This population began to decline in the late 1980s—despite cowbird control—possibly because the riparian vegetation became too mature. This population now numbers fewer than 20 pairs.

Black-capped Vireo

The recent history of the Black-capped Vireo (see Eckrich et al. 1999) is somewhat similar to that of the Least Bell's Vireo. It too now occupies only a small part of its former range and has shown a dramatic increase following cowbird control at a military base, Fort Hood in Texas. But one major difference is that this vireo's entire geographic range is within the region that has been the cowbird's modern center of abundance. So, clearly, this species can coexist with cowbirds. Unfortunately, it has lost extensive amounts of habitat due to agriculture, urbanization, and fire suppression, as it prefers shrub habitats that exist for 3–25 years after disturbances. Cowbird control may be needed for the indefinite future to keep the remnant populations from going extinct. Or it may not be because both species of vireos might experience the potential dilution factor I have discussed for the Kirtland's Warbler. If cowbird control were relaxed, the cowbird impacts might be much lower than they were when these birds were on the cusp of extinction.

Like other "beneficiaries" of cowbird control, the endangered Black-capped Vireo is perhaps more in need of habitat protection than anything else. Much of its habitat has been lost to agriculture, urbanization, and fire suppression. *Concan, Texas; April 2001. © Alan Murphy.*

Southwestern Willow Flycatcher

Unlike the Kirtland's Warbler and the two vireos, it is hard to identify any population benefits the endangered Southwestern Willow Flycatcher (*Empidonax traillii extimus*) has experienced after cowbird control began in California, Arizona, and New Mexico. In most cases, cowbird control has resulted in large increases in the production of young but no clear increases in the numbers of breeding birds

(Rothstein et al. 2003). Like the Least Bell's Vireo, the Southwestern Willow Flycatcher is a riparian obligate that lost most (about 95%) of its habitat in the past century. Possibly, cowbird control is needed to maintain some populations, but cowbird parasitism levels vary greatly, and some populations experience very little parasitism. The Southwestern Willow Flycatcher is one of the most enigmatic of all endangered birds in North America because it is not clear what limits it in a global sense. Habitat clearly limits the species in some locales, as shown by a huge increase in flycatchers at Roosevelt Lake in Arizona after receding waters left an increasing ring of suitable riparian habitat. Fortunately, this bird is the object of one of the most comprehensive endangered-species recovery plans ever written for the U.S. Fish and Wildlife Service. This extensive recovery plan was in part mitigation for a decision in the 1990s to allow the dam at Roosevelt Lake to be raised and to therefore inundate a large area of flycatcher habitat. Ironically, the lake has fallen since the dam was raised, and there are now far more flycatchers at Roosevelt Lake than when the dam plan was approved. One can only imagine the litigation chaos that will ensue if the rains ever return to Arizona and rising waters threaten this growing population.

Despite intensive study and aggressive management on its behalf, the Southwestern Willow Flycatcher remains something of an enigma to wildlife biologists. Habitat preservation and restoration is clearly essential to large-scale population health of this bird, and cowbird parasitism may have a serious impact on some flycatcher populations. However, some seemingly suitable habitat remains unoccupied, and flycatcher populations have not shown increases following cowbird control. *Kern County, California; June 2003. © Bob Steele.*

Summary

Recovery efforts for each of these four endangered taxa have presented similar challenges. Declines have been largely attributable to fragmentation, degradation, or loss of habitat and to cowbird parasitism. Control of brood parasitism became the most immediate remedy because habitat loss is a much tougher and more expensive issue to address. I saw a similar reluctance to address habitat issues when I served on the Southwestern Willow Flycatcher Recovery Team. We met with many groups and constituencies throughout the Southwest. Many local people were convinced that the problem was due to cowbirds or to deterioration of the flycatchers' wintering habitat in the Neotropics, not to loss of breeding habitat in their local area.

The Downsides of Cowbird Control

Even though cowbird control doesn't always produce increases in host populations, it seems to be helpful in some cases. So you may wonder why we should worry about continuing cowbird control and whether it is really beneficial or necessary. We should worry about it because there are lots of downsides to the current use of cowbird control as a management tool. First, control projects have shown that cowbirds must be killed off every year because control has little or no effect on cowbird numbers the next year due to the high dispersal rates of cowbirds. So this is a management tool that needs to be applied continuously, whereas habitat improvement has longer-lasting effects. Moreover, there are other reasons control can be and often is counterproductive. It diverts attention from the loss and degradation of breeding habitat—which is the *real* problem for endangered birds. The money spent to kill cowbirds every year may total more than one million dollars. That's not a lot of money as governmental spending goes, but it is huge sum compared to the money available for endangered-species work. The money spent on cowbird control might produce greater benefits if it were spent on other management options.

Cowbird control does nothing to help most endangered species affected by habitat loss. For example, the Least Bell's Vireo is the only one of the 40 threatened or endangered vertebrate species that uses the same ecosystems as Southwestern Willow Flycatchers and that also would be helped by cowbird control. However, *all* 40 species would be helped by increased habitat. All the money spent on cowbird control and the resulting profit incentives have created a control lobby, because much of the control is done by private contractors who, not surprisingly, argue that cowbird control is the best thing we can do for songbirds. Cowbird control results in the capture of many non-target species. Some of these non-target birds die and many are kept from their nests for long periods, so it is likely that they experience nesting failures. In one recent year 1,263 non-target birds, representing 14 species, were trapped at Fort Hood (Summers and Norman 2003).

A major downside to cowbird control comes from the fact that developers or governmental agencies use it to satisfy legally mandated mitigation necessitated by habitat destruction. In some cases, the control is funded for only several years; thus, any beneficial effects are not long lasting, whereas the habitat loss may be permanent. The problem is made worse by the fact that cowbird control is often initiated without sufficient baseline data to demonstrate that cowbirds are even a problem at sites under consideration. This is an especially big problem with the Southwestern Willow Flycatcher, which experiences highly variable rates of parasitism. If cowbird control is mandated as mitigation at a site

where cowbird parasitism was low, there may in fact be no mitigation—even though mitigation is required by law.

A serious concern about cowbird control revolves around ethics. When there is reason to believe that cowbird control will have beneficial effects on a threatened or endangered species, only extreme animal-rights advocates are likely to oppose it. When managers initiate cowbird control in a knee-jerk fashion, without determining whether it is really needed, then ethics come into question. When control programs are continued without any effort devoted to determining whether they are still needed, ethics again come into question. I recognize that defining ethics is a slippery slope, but I believe the lack of careful consideration of the killing of cowbirds is due to the anthropomorphic view that many people have of a "bird that doesn't care for its young" and that in so doing "kills someone else's babies". Cowbirds are perfect scapegoats. The state of Texas has even assumed something of a Wild West approach to killing cowbirds. Residents are encouraged to set up cowbird traps on their own property, and one home trapper was observed "euthanizing" cowbirds by swatting them with a tennis racket. The level of cowbird hysteria is only slightly less extreme in California. In both states, there is little discussion about the basic facts: Cowbirds are native birds and have become a problem only because of what people have done to the environment.

If you need more evidence or perspective on killing cowbirds, then consider the following. The animal-rights extremists out there oppose any killing of animals regardless of benefits. Near my hometown of Santa Barbara, animal-rights people fought against a program to kill non-native black rats that were threatening Xantus's Murrelet on one of the Channel Islands. One protester was arrested for trying to negate the rat poison by spreading an antidote on the island. The program is well justified by good science and has been very successful. Think what animal-rights extremists might do if they focus on cowbird-control programs that have poor justification and that may be driven by profit motives. Overuse of cowbird control may so discredit control programs from scientific and ethical perspectives that it might become politically difficult to carry out those programs that are justified. Some programs clearly are worthwhile, and we need to ensure that managers will be able to carry out cowbird control in such cases.

Lastly, the use of decoy traps may exert strong selection pressure on cowbirds. Any genetic tendency to avoid decoy traps or to escape from them is going to increase rapidly in control areas. Such tendencies might even be learned and might be expected to increase in frequency. After our research group used Potter traps for many years in the Sierra Nevada, we found that cowbirds developed a fear of these traps and would actually fly off when they saw a person unloading the traps from a vehicle. We need to be careful about overusing cowbird control. If cowbirds are able to defeat decoy traps though learned or genetic changes, we may find that improving habitat is easier than controlling cowbirds. Strangely enough, that outcome could actually be the best thing for endangered hosts because then people wouldn't be able to do much about cowbirds, and we would be forced to tackle the real problem these species face, namely the devastating effects we have had on their habitat.

Literature Cited

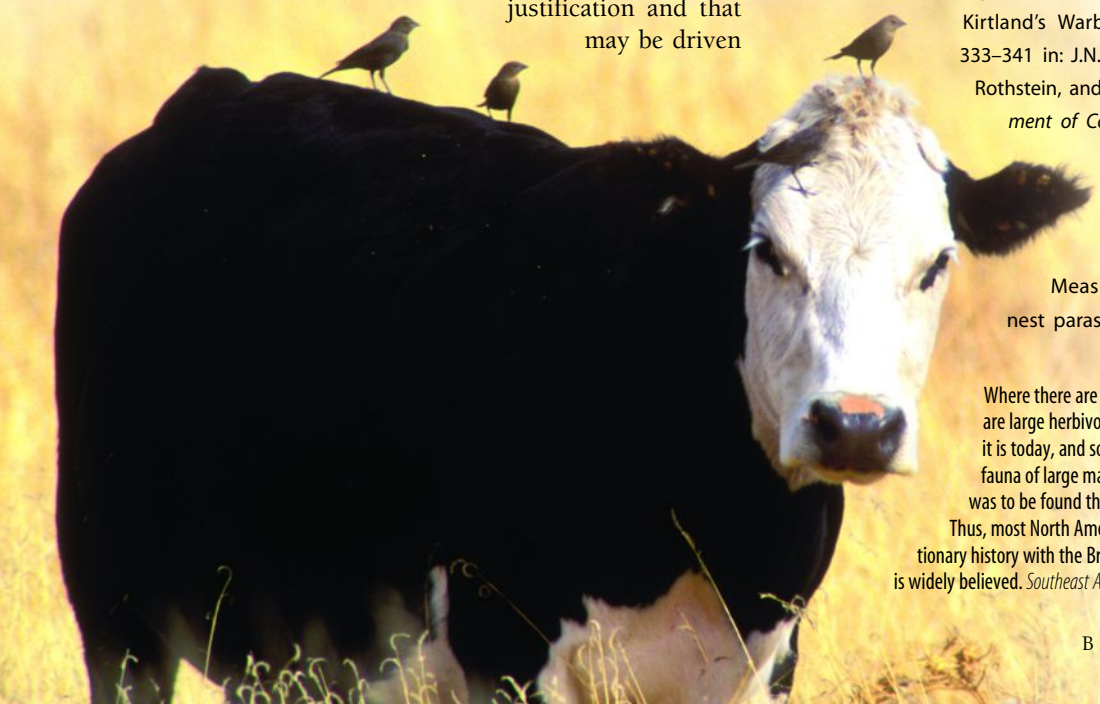
Bocetti, C.I. 1994. *Density, Demography, and Mating Success of Kirtland's Warblers in Managed Habitats*. Ph.D. thesis, Ohio State University, Columbus.

Bolen, G.M., S.I. Rothstein, and C. Trost. 2000. Egg recognition in the Yellow-billed and Black-billed Magpies in the absence of interspecific parasitism: Implications for parasite-host coevolution. *Condor* 102:432–438.

Budnik, J.M., D.E. Burhans, M.R. Ryan, and F.R. Thompson. 2001. Nest desertion and apparent nest protection behavior by Bell's Vireos in response to cowbird parasitism. *Condor* 103:639–643.

DeCapita, M.E. 2000. Brown-headed Cowbird control on Kirtland's Warbler nesting areas in Michigan, pp. 333–341 in: J.N.M. Smith, T.L. Cook, S.K. Robinson, S.I. Rothstein, and S.G. Sealy, eds. *Ecology and Management of Cowbirds and Their Hosts*. University of Texas Press, Austin.

DeGroot, K.L., J.M.N. Smith, and M.J. Tait. 1999. Cowbird removal programs as ecological experiments: Measuring community-wide impacts of nest parasitism and predation, pp. 229–234 in:



Where there are cows—or more generally, where there are large herbivorous mammals—there are cowbirds. So it is today, and so it was 15,000 years ago, when a diverse fauna of large mammals—and their attendant cowbirds—was to be found throughout the North American continent. Thus, most North American passerines have had some co-evolutionary history with the Brown-headed Cowbird, contrary to what is widely believed. *Southeast Arizona; July 2002. © Jim Burns.*

M.L. Morrison, L.S. Hall, S.K. Robinson, S.I. Rothstein, D.C. Hahn, and T. Rich, eds. *Research and Management of the Brown-headed Cowbird in Western Landscapes, Studies in Avian Biology* no. 18.

Eckrich, G.H., T.E. Koloszar, and M.D. Goering. 1999. Effective landscape management of Brown-headed Cowbirds at Fort Hood, Texas, pp. 267–274 in: M.L. Morrison, L.S. Hall, S.K. Robinson, S.I. Rothstein, D.C. Hahn, and T. Rich, eds. *Research and Management of the Brown-headed Cowbird in Western Landscapes, Studies in Avian Biology* no. 18.

Franzreb, K.E. 1989. An analysis of options for reintroducing a migratory, native passerine, the endangered Least Bell's Vireo *Vireo bellii pusillus* in the Central Valley, California. *Biological Conservation* 53:105–123.

Goldwasser, S., D.A. Gaines, and S.R. Wilbur. 1980. The Least Bell's Vireo in California: A de facto endangered race. *American Birds* 34:742–745.

Greaves, J.M. 1987. Nest-site tenacity of Least Bell's Vireo. *Western Birds* 18:50–54.

Griffith, J.T., and J.C. Griffith. 2000. Cowbird control and the endangered Least Bell's Vireo: A management success story, pp. 342–356 in: J.N.M. Smith, T.L. Cook, S.K. Robinson, S.I. Rothstein, and S.G. Sealy, eds. *Ecology and Management of Cowbirds and Their Hosts.* University of Texas Press, Austin.

Grinnell, J., and A.H. Miller. 1944. The distribution of the birds of California. *Pacific Coast Avifauna* no. 27. Cooper Ornithological Club, Berkeley.

Grzybowski, J.A., and C.M. Pease. 1999. Cowbirds: Villains or scapegoats? *Birding* 31:448–451.

Haney, C.J., D.S. Lee, and M. Walsh-McGehee. 1998. A quantitative analysis of winter distribution and habitats of Kirtland's Warblers in the Bahamas. *Condor* 100:201–217.

Hosoi, A., and S.I. Rothstein. 2000. Nest desertion and cowbird parasitism: Evidence for evolved responses and evolutionary lag. *Animal Behaviour* 59:823–840.

Kepler, C., G. Irvine, M.E. DeCapita, and J. Weinrich. 1996. The conservation management of the Kirtland's Warbler *Dendroica kirtlandii*. *Bird Conservation International* 6:11–22.

Kus, B.E. 2002. Fitness consequences of nest desertion in an endangered host, the Least Bell's Vireo. *Condor* 104:795–802.

Lanyon, S.M. 1992. Interspecific brood parasitism in blackbirds (Icterinae): A phylogenetic perspective. *Science* 255:77–79.

Lanyon, S.M., and K.E. Omland. 1999. A molecular phylogeny of the blackbirds (Icteridae): Five lineages revealed by cytochrome-B sequence data. *Auk* 116:629–639.

Lowther, P.E. 1993. Brown-headed Cowbird (*Molothrus ater*), in: A. Poole and F. Gill, eds. *The Birds of North America* no. 47. American Ornithologists' Union, Washington.

Mayfield, H.F. 1965. The Brown-headed Cowbird with old and new hosts. *Living Bird* 4:13–28.

Mayfield, H.F. 1977. Brown-headed cowbird: Agent of extermination. *American Birds* 31:107–113.

Mayfield, H.F. 1978. Brood parasitism: Reducing interactions between Kirtland's Warblers and Brown-headed Cowbirds, pp. 85–91 in S.A. Temple, ed. *Endangered Birds: Management Techniques for Preserving Threatened Species.* University of Wisconsin Press, Madison.

Mayfield, H.F. 1983. Kirtland's Warbler: Victim of its own rarity? *Auk* 100:974–976.

Ortega, C.P. 2000. More on cowbirds: Broad-scale control targets the wrong birds. *Birding* 32:362–364.

Peterjohn, B., J. Sauer, and S. Schwarz. 2000. Temporal and geographic patterns in population trends of Brown-headed Cowbirds, pp. 21–34 in: J.N.M. Smith, T.L. Cook, S.K. Robinson, S.I. Rothstein, and S.G. Sealy, eds. *Ecology and Management of Cowbirds and Their Hosts*. University of Texas Press, Austin.

Pielou, E.C. 1991. *After the Ice Age: The Return of Life to Glaciated North America.* University of Chicago Press, Chicago.

Reed, J.M. 1999. The role of behavior in recent avian extinctions and endangerments. *Conservation Biology* 13:232–241.

Rothstein, S.I. 1994. The Brown-headed Cowbird's invasion of the Far West: History, causes, and consequences experienced by host species, pp. 301–315 in: J.R. Jehl and N.K. Johnson, eds. *A Century of Avifaunal Change in Western North America, Studies in Avian Biology* no. 15.

Rothstein, S.I. 2001. Relic behaviors, coevolution, and the retention versus loss of host defenses after episodes of avian brood parasitism. *Animal Behaviour* 61:95–107.

Rothstein, S.I., M.A. Patten, and R.C. Fleischer. 2002. Phylogeny, specialization, and brood parasite-host coevolution: Some possible pitfalls of parsimony. *Behavioral Ecology* 13:1–10.

Rothstein, S.I., B.E. Kus, M.J. Whitfield, and S.J. Sferra. 2003. Recommendations for cowbird management in recovery efforts for the Southwestern Willow Flycatcher. *Studies in Avian Biology* 26:157–167.

Schram, B.A. 1994. An open solicitation for cowbird recipes. *Birding* 26:254–257.

Smith, F. 1977. A short review of the status of riparian forests in California, pp. 1–7 in: A. Sands, ed. *Riparian Forests in California: Their Ecology and Conservation.* Institute for Ecology Publications no. 15.

Smith, J.N.M., M.J. Taitt, and L. Zanette. 2002. Removing Brown-headed Cowbirds increases seasonal fecundity and population growth in Song Sparrows. *Ecology* 83:3037–3047.

Summers, S.G., and G.L. Norman. 2003. Brown-headed Cowbird removal at Fort Hood, Texas, 2002–2003, in: The Nature Conservancy [TNC]. *Endangered Species Monitoring and Management at Fort Hood, Texas: 2003 Annual Report.* The Nature Conservancy, Fort Hood Project, Fort Hood.

Sykes, P.W., and M.H. Clench. 1998. Winter habitat of Kirtland's Warbler: An endangered Nearctic/Neotropical migrant. *Wilson Bulletin* 110:244–261.

Terborgh, J. 1989. *Where Have All the Birds Gone?* Princeton University Press, Princeton.

Trail, P. 1992. Nest invaders. *Pacific Discovery Summer* 1992:32–37.

U.S. Fish and Wildlife Service [USF&WS]. 1998. *Draft Recovery Plan for the Least Bell's Vireo.* U.S. Fish and Wildlife Service, Portland.

Wiedenfeld, D. 2000. Cowbird population changes and their relationship to changes in some host species, pp. 35–46 in: J.N.M. Smith, T.L. Cook, S.K. Robinson, S.I. Rothstein, and S.G. Sealy eds. *Ecology and Management of Cowbirds and Their Hosts.* University of Texas Press, Austin.