

## NOTES ON A WINTERING MIXED SPARROW FLOCK

By Matthew L. Pelikan

Becoming common is a rare trick for a species, far more unusual than going extinct, which is what most species in earth's history have done. How do common birds get that way? A simple answer is that many individuals of a species reproduce successfully. But in order for that to happen, many individuals must survive from one breeding season to the next in good enough condition to reproduce. Seen from this perspective, abundance demands year-round adaptability on the part of a species.

The rapidly changing, often harsh conditions of a Massachusetts winter pose a particular challenge for birds. In order to survive the winter with adequate breeding stock intact, a species needs efficient ways to forage, keep from freezing, and avoid predators. I've always had a fascination with common birds, especially with how they overcome adverse conditions. From late December 1996 to April 1997, I spent much of my birding time watching a flock of Song (*Melospiza melodia*) and Tree (*Spizella arborea*) sparrows confront the rigors of winter in Lexington, Massachusetts. Since the Song Sparrows in this flock were residents, I was also able to watch as this species made its gradual transition into the breeding season.

My methods were those of a curious birder, not a scientist. I visited the flock about twenty times during a three-month period. Visits ranged from no more than a few minutes in length to an hour and a half; on some, I merely gave a quick listen to hear who was singing, while on others, I birded the area thoroughly, counting the flock members and spending considerable time watching their behavior. I visited at various times of day, in various weather, whenever I had an opportunity; I managed to visit at least once each week during the three-month period.

I first encountered this sparrow flock on December 29, 1996, near the west end of the Arlington Reservoir on the border of Arlington and Lexington, Massachusetts. Warm, damp, overcast conditions and strong southerly winds sent all right-thinking birders into the field to look for vagrants or confused migrants. Around midmorning I encountered an astonishing concentration of bird activity centered on a weedy margin between woods and a stream on one side, and agricultural fields on the other. Over 200 individuals representing more than twenty species were present, among them an outstanding mixed sparrow flock: I counted about forty Tree, ten Song, three White-throated (*Zonotrichia albicollis*), and single Clay-colored (*S. pallida*) and Field (*S. pusilla*) sparrows. My next few visits to the area were made mainly in the hope of finding the Clay-colored Sparrow again, or perhaps discovering something even more unusual,

but my curiosity was rapidly drawn to the behavior of the "ordinary" birds in the flock.

### Overview

By the time of my second visit, on January 3, a strong cold front had swept through the area, dropping temperatures to near 0° F and depositing an inch or two of dry snow. Predictably, numbers and diversity had decreased at this location. After this initial drop, however, numbers in the sparrow flock remained quite constant for much of the rest of the winter, with about thirty Tree Sparrows and five or six Song Sparrows present each time I visited. Based on the consistent numbers I observed, it seemed reasonable to suppose that the flock comprised a stable roster of individuals. The flock was not totally reliable, however, disappearing for almost three weeks of sustained cold weather during late January and early February. The sparrows may have withdrawn southward, dispersed into the surrounding neighborhood, or retreated into a dense tangle along a stream that runs through the adjoining woods. Reasoning that if the birds were hard to find, they probably didn't want to be disturbed, I elected not to bird the area with any intensity. But when the weather moderated in late February, the birds promptly reappeared in numbers and proportions indistinguishable from what I had last observed, suggesting that they had been entrenched nearby.

As March began, the flock I was following began to lose its cohesiveness. The numbers of Tree Sparrows steadily declined, while the Song Sparrows were often spread out along the entire margin, and sometimes elsewhere in the area, some of them singing. More Song Sparrows arrived: on March 9, at least nine were present, and at least seven were singing. But in the second half of March, either the numbers or the detectability of this species decreased markedly at the Arlington Reservoir. By the end of the month, there was essentially no sparrow flock left: just some lingering Tree Sparrows and a few Song Sparrows widely spaced around the area. This flock's dispersal, then, was finished prior to the arrival in eastern Massachusetts of what appeared to be the main wave of migrant Song Sparrows: on the morning of March 31, I noted "amazing densities in [the] Sudbury [River] Valley: hard to find a spot where you couldn't hear 3 or 4." Such an influx of migrant Song Sparrows at this time appears to be entirely typical (Veit and Petersen 1993), but whether because the movement of migrants was limited to river valleys, or because "my" sparrows had already established territories and were excluding newcomers, this wave produced no apparent effect at the Arlington Reservoir.

Throughout the period of my observations, both Tree and Song sparrows appeared to forage entirely on the ground, and it seemed likely that their presence in such numbers during this winter was made possible by the season's very light snowfall. (In some winters, Song Sparrows are absent at this location, and Tree Sparrows very scarce.) I occasionally observed Tree Sparrows in the

adjacent woods, using a double-footed kick, like a towhee, to turn over leaves. Tree Sparrows would sometimes perch in berry-laden multiflora rosebushes, which are common at this location; it is possible that they fed on the berries, but I never observed this.

### Benefits of flocking

For the whole time that they were present, the Tree and Song sparrows in the Arlington Reservoir flock were invariably to be found in a single mixed flock, usually feeding in the weeds or on the edges of the fields but sometimes just roosting in weeds and bushes along the margin. Two advantages that individual birds are believed to gain from belonging to a flock are improved foraging opportunities and protection from predators. In the case of the Arlington Reservoir flock, I don't think that the first of these advantages could have figured strongly in the birds' behavior. Weeds, and presumably their seeds, were distributed densely all along the field edges (several hundred yards), so the richness of this location seems to rule out either species relying on the other to locate concentrations of food.

The behavior of the birds when disturbed, however, suggested that safety from predators may have been a factor that encouraged the birds to flock. If, in birding the margin, I flushed the entire sparrow flock, the birds often ended up segregated by species (or nearly so). Tree Sparrows were much more sensitive to disturbance, rarely allowing me to approach within about forty feet (even if I did my best "browsing herbivore" impersonation). Song Sparrows routinely allowed me to get within thirty feet, and sometimes as close as ten or twelve feet. As I approached, the Tree Sparrows would grow increasingly attentive and begin to curtail their foraging; when flushed, they scattered into the tree line or the larger bushes near the woods, with a good percentage of the flock usually ending up fairly high (15 to more than 30 feet), watching me from a commanding perch and, often, calling. The Song Sparrows, in contrast, seemed to ignore me until I was quite close, continuing to feed until they abruptly flipped farther back into the weeds and disappeared.

Reducing losses due to predation has been well documented as an advantage of flocking (e.g., Cresswell 1994, who found a close relationship between larger flock size and lower rates of predation in Redshanks, [*Tringa totanus*]), and the threat of predation was surely a real one for the Arlington Reservoir flock: Sharp-shinned (*Accipiter striatus*) and Cooper's (*A. cooperii*) hawks were occasionally observed here during my study, and over the years I have witnessed several raptor kills at this location (and found the remains of many more). Perhaps an even more dangerous threat to these sparrows came from the domestic cat. Though I observed a cat here only once during this study, cat tracks were invariably evident when light snow created good tracking

conditions, and the proximity of residential neighborhoods makes it likely that the area was routinely patrolled by one or more of these efficient hunters.

Rates of predation may be reduced for birds belonging to a flock either because more sets of eyes allow for earlier warning, or because the chaos of a large flock flushing confuses the predator (overall rate of predation and the success ratio of attacks are the easiest things to quantify in studying the subject, and these statistics say little about the mechanisms involved). The consistent size of the Arlington Reservoir flock suggests that this group of birds suffered few losses to predators (or, indeed, to any other cause), and it seems likely that the sheer size of the flock contributed to this outcome.

With respect to the threat posed by predators, there is a second, less direct advantage to belonging to a flock. Because the task of watching for predators can be divided up among many individuals, flock members can afford to be less vigilant than if they were alone. Because they can spend less time being alert, flock members can devote more time to other behavior such as foraging or maintaining their feathers by preening (important for the retention of body heat). Recent studies have demonstrated some degree of connection between flock size and decreased individual vigilance in species such as Tufted Titmouse (*Parus bicolor*) (Pravosudov and Grubb, Jr. 1995), Northern Cardinals (*Cardinalis cardinalis*), and Harris's Sparrow (*Zonotrichia querula*) (Shuman, Robel, and Zimmerman 1992). Small birds in cold weather necessarily operate on a precarious energy budget, and this benefit of flocking may have been important for the members of the Arlington Reservoir flock.

The interspecific nature of the flock may have magnified the benefits of flocking for these birds. In the simplest sense, the combined numbers of the two species allowed for a larger flock, presumably increasing whatever benefits derived from flocking in the first place. The presence of two species may have offered a particular benefit to the Song Sparrows: since the bulk of the early-warning duties seemed to be performed by the less tame Tree Sparrows, the Song Sparrows may have been able to gain a small amount of additional foraging time each time the flock was disturbed.

### Relations in the flock

Surprisingly, I noticed virtually no interactions between members of the flock, either between or within species. Though certain behaviors, such as flushing or relocating along the margin, were synchronized, the birds appeared to behave as if they were unaware of the presence of other birds (this may, of course, simply reflect the obtuse sensibilities of a human observer). However, the distribution of species within the flock was not uniform. Generally, the Tree Sparrows fed in a fairly compact group, concentrated in perhaps fifty linear feet of margin habitat, while the Song Sparrows were almost invariably at one or both ends of the Tree Sparrows, on the edge of the flock. This distribution was

so consistent that it must have been in some sense deliberate, suggesting that the birds were aware that more than one species was present. It is likely that the middle of the flock is the "best" position, most insulated from predators and, if the flock centers on locally or temporarily abundant food, perhaps offering the best foraging. From this it would follow that the Tree Sparrows were socially dominant over the Song Sparrows, but if this was the case, such dominance had probably been established before I began watching the flock.

It is possible that the mixed nature of the flock may have contributed to the apparent lack of aggression that I observed among its members. Sasavi (1992) found such an effect in a study comparing Great Tits (*Parus major*) in mixed and single-species flocks. Sasavi postulates that interspecific hierarchies are more clearly defined than intraspecific ones; in a mixed flock, then, a certain percentage of interactions involve individuals between whom dominance is so well established as to preclude the need for aggressive behavior. But in any event, birds in the flock appeared to have worked out a social arrangement that minimized the amount of time and energy that was devoted to aggressive behavior.

### Vocalizations

The Tree Sparrows, particularly, were quite vocal during the winter, almost always easily detectable by their *tsip* or *tsi-dip* notes. I never heard this species sing at this location, however. In 1997, I first heard Tree Sparrow songs (in Wayland, Massachusetts) on March 31, by which time the Arlington Reservoir flock had largely dispersed. By far the most common Song Sparrow vocalization during the winter was a thin *tsee* note, suggestive of, but weaker than, a White-throated Sparrow's *tseep*. The louder and more distinctive *churk* or *chimp* call of this species was absent until around the time Song Sparrows started singing, during the second half of February.

During the period of this study, I was bicycling to work, which in effect meant that I rode a five-mile "birding by ear" survey route through parts of Arlington, Winchester, and Woburn twice a day, five days a week. I heard incomplete song attempts by Song Sparrows — brief and structurally simple, given in a peculiar muted tone — for the first time in the middle of February, despite early morning temperatures around 10° F, and I first heard complete songs a few days later, on the morning of February 19, in Winchester, as warmer air began to flow into the region. A little bike-birding that afternoon turned up several other singing Song Sparrows, including one in the Arlington Reservoir flock. My field notes describe the conditions on the 19th: "Warm — around 60 — with a pretty strong S[outh] wind, thin overcast. Yesterday was also pretty warm, and sunnier. Considerable melting, but the ground was mostly frozen just an inch or two down." On February 22, a day warm enough to bring out a Mourning Cloak (*Nymphalis antiopa*) butterfly at the Arlington Reservoir, a

bike-birding trip along the Minuteman Bikeway through Arlington and East Lexington turned up at least ten Song Sparrows singing, including at least two in the Arlington Reservoir flock.

The main functions of song in birds are generally considered to be advertising for a mate and marking territory, so the onset of singing suggests that relations within the flock underwent a qualitative change around this time, despite the fact that actual nesting and egg production were still at least five weeks away (Veit and Petersen 1993). The fact that members of the Arlington Reservoir flock were among the first Song Sparrows in the area to commence singing activity suggests that they emerged from winter in good condition, ready to begin the transition to the breeding season.

Early-season singing by members of the Reservoir flock was interesting to observe. Often, two or more birds would alternate singing what sounded to me like very similar songs:

March 1, 1997: One bird was singing from along the road that passes by the [Arlington Reservoir]; a second was singing from the edge of the field, and matched the first song. The pattern sounded virtually identical to my ears, except it was slightly accelerated [in the second bird] and finished with a short flourish that was lacking in the first song, or at least inaudible to me. When I was returning to the car, the first bird was silent and the second bird was singing an entirely different song.

On other visits, I noticed even closer matches between the songs of different birds. Such song matching proves to be a well-documented behavior (e.g., Beecher 1996) that is integral to the social patterns of Song Sparrows (and perhaps to many other species, as well), and it is a behavior that will be readily noticed by the alert listener in areas where Song Sparrows are common. Field studies by Beecher (1996) revealed that young Song Sparrows acquire their repertoire of eight or nine songs by mimicking three or more adult males singing from nearby territories during the young bird's first summer, preferentially learning songs that are already shared by several "tutors." Songs are generally adopted intact, and intermixing elements from several songs to form "hybrid" songs is apparently quite rare. The result of this song-learning strategy is that males in adjoining territories share much of their vocal repertoires. Though the precise functions of this behavior are not known, it seems likely that song sharing allows Song Sparrows to distinguish familiar neighbors from transients (that is, potential interlopers), perhaps minimizing the energy that needs to be put into territorial defense. By early March, then, it seems that my Arlington Reservoir flock was already engaged in working out (or reestablishing) social relations for the upcoming breeding season.

A more unusual example of singing behavior took place on March 9. I heard what at first sounded like a bird singing a song composed of two iterations of the same "songlet," itself a song that sounded complete to me. As I started to zero in on the source of the vocalizations, it became clear that the second iteration of the song, which followed immediately on the heels of the first, was characterized by the thin tone that is typical of the the season's earliest song attempts (and of the incomplete songs given by juvenile birds during autumn). The vocalizations proved to be coming from two birds, one following another around, often perching within a few inches of the other; one bird was singing, and the bird with the weaker tone was instantly repeating the song, note for note. The two birds ranged around low weeds and bushes along a tree line, staying in a perhaps a ten-yard square. This behavior continued for at least fifteen minutes without cessation, and was still ongoing when I left the area. As nearly as I could tell, the song remained constant in structure during this entire period. There was no aggression evident between the birds, but the one singing first moved a yard or so away from the other bird after every few repetitions of the song, after which the following bird would flit back to within a few inches.

The following bird showed the muted streaking on the upperparts, weak malar stripe, and fine streaking with a weak central spot on the breast that I associate with juvenile and partially-molted first-year birds. Aging this species in the field can be problematic: Pyle et al. (1987) characterize the first post-breeding molt in this species as "highly variable and dependent on the race and brood sequence," while Byers et al. (1995) suggest that this molt is "generally incomplete, usually including the rectrices and tertials, plus a variable number of remiges" in "northern and migratory races," presumably including our local race, *M. m. melodia*. So it seems possible that the plumage characteristics I observed on this individual indicate a first-year bird, perhaps the result of an especially late clutch, though I can't rule out the possibility that I was seeing worn, perhaps parasite-damaged adult plumage. The leading bird, in any case, was a fine-looking specimen of what I consider the definitive plumage of the local race of this species: rich brown and gray above, with strong breast streaking, a well-defined central spot, and a bold malar stripe.

Song learning in Song Sparrows has been extensively studied. In a laboratory study, Marler and Peters (1987) demonstrated that most song learning in this species occurs during a "sensitive period" early in life, with seventy-nine percent of song learning complete by the age of fifty days and ninety percent complete by the age of ninety days. Some individuals, however, were found by Marler and Peters to be capable of learning songs until about 200 days of age. Subsequent to that age, Song Sparrows were found to pass through a period of "recall and rehearsal" of songs learned early in life, and then a period of "song stabilization" during which their repertoire becomes fixed. Studying a sedentary Song Sparrow population in the field in Washington state, Beecher (1996)

concluded that "the data implicate the bird's hatching summer as the key time for song learning but do not rule out further learning the following year (at least up to about April, after which the bird's repertoire appears to be fixed for life)." However, I was unable to find any account of what song-learning in the field actually looks like. Unfortunately, since I had no way of marking individual birds or recording their repertoires, I couldn't determine what actually transpired in the episode I have described. It seems likely, though, that this peculiar behavior was in some way related to the complicated process of song learning in this species.

Mild weather may have stimulated singing in these Song Sparrows, but my records suggest that this species begins singing in the Arlington area in the second or third week of February regardless of conditions, except when extremely harsh winters drive Song Sparrows out of the area. Perhaps day length (determined by date and not by variations in weather) plays a role in the onset of song in this species. On February 10, 1996, I noted two "nearly complete" Song Sparrow songs at the Arlington Reservoir on a day I described as "Sunny, [in the] 30s." This month as a whole was "a month of wide temperature swings and excess snowfall" (Stymeist 1996). On February 18, 1995, I heard two "almost complete" songs in Medford, Massachusetts, on a day I considered "unseasonably warm"; this month as a whole, however, averaged 2.8 degrees below normal (Stymeist 1995). In 1994, I failed to record any Song Sparrows at all during the month of February, despite a fairly active birding schedule; this month, part of an exceptionally harsh winter in the region, was "[s]nowy and cold . . . 3.4 degrees below normal" (Rines 1994).

### Conclusion

One should be wary of overgeneralizing on the basis of the behavior of the sparrows in the Arlington Reservoir flock. Winter conditions in eastern Massachusetts vary hugely from year to year, as do the movements and numbers of birds present. Undoubtedly a complex web of feedbacks between food supply, day length, temperature, and social factors governs sparrow behavior during the winter. But the impression I had was of a seamless process with its own distinct logic. Through much of the winter, I was convinced, the flock functioned as a tight social unit, with the same individuals generally present, near each other, and behaving in ways likely to enhance their chances of survival. Midwinter social patterns among the Song Sparrows merged insensibly into breeding patterns, the transition occurring (felicitously enough) just as the main wave of migrants arrived in eastern Massachusetts, some of them perhaps seeking territories. And the shift from winter to summer vocalizations among Song Sparrows was clearly a highly social process, characterized by the exchange (whether aimed at competition, education, or cohesion) of "culture" in



the form of song. They may be ordinary birds, but Tree and Song sparrows are superbly adapted to the lives they lead.

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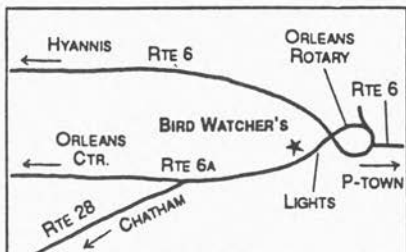
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