Pacific and American Golden-Plovers: reflections on conservation needs

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Much has been learned about the biology of Pacific and American Golden-Plovers (*Pluvialis fulva* and *P. dominica*) in recent years. However, most of this information does not address conservation-related questions affecting the future of these birds. We lack accurate demographic figures (guesstimates of world population vary more than 30-fold in each species), and population trends are uncertain. Reports of large spring aggregations (*fulva* in northeastern Mongolia and *dominica* in west-central Indiana) suggest stopover sites of hemispheric importance that urgently need further evaluation and possible protection. Little is known concerning various anthropogenic threats including contaminants, loss of habitat, and hunting. In contrast to *fulva, dominica* do not readily co-exist with humans during the nonbreeding season; also much of their South American winter range has been converted to croplands. Thus, of the two species, *dominica* appears to be the most at risk.

INTRODUCTION

Studying long-distance migrant shorebirds offers many satisfactions and rewards. Not the least of these is that such projects often require the researchers to be migratory as well and follow their subjects to interesting places. For the past couple of decades, my colleagues and I have marked, with unique band combinations, Pacific Golden-Plovers *Pluvialis fulva* in Hawaii and Alaska, and American Golden-Plovers *P. dominica* in Alaska. Long-term cooperation from the birds (they are very site-faithful from year-to-year), together with similar data gathered by investigators elsewhere, have enabled us to shed light on various basics including site-fidelity, territorial behaviours, nesting, and longevity (Johnson *et al.* 2001a,b; Plate 1). While this is valuable information, there are also more far-reaching and difficult questions in the realm of conservation that need investigation. As wader biologists well know, the future of all long-distance migrants rests on such factors as habitat preservation and improved knowledge of population trends. In the following commentary, my intent is to call attention to conservation-related matters that bear on the well-being of Pacific and American Golden-Plovers – especially voids in knowledge and threats of anthropogenic origin.

WORLD POPULATIONS AND TRENDS

At present we have nothing better than educated guesses as to how many of these plovers actually exist, and almost no information on population trends. Estimates of population size are far from consensus: *fulva*, 125,000 (including 16,000 breeding in North America where the species nests only in Alaska) to 2.6 million breeding pairs; *dominica*, 150,000+ to 2.5 million breeding pairs. The lower estimates were made by Morrison *et al.* (2001b), the higher by Byrkjedal & Thompson (1998). Morrison *et al.* consider their figures to be of low accuracy, but probably "in the right order of magnitude"; the high-end estimates are likely too optimistic. Monitoring trials in Alaska during the 2002 breeding season suggest that the actual statewide population of *fulva* exceeds the estimated 16,000 birds (C. Wightman, pers. comm.). The most recent estimate for *fulva* incorporates the Morrison *et al.* figure of 16,000 nesting in Alaska and places world population at 166,000–216,000 (Delany & Scott 2002). Given the difficulties inherent in counting migrants that range over vast areas of the world, our lack of knowledge concerning their numbers is understandable. Securing the data for improved estimates of global *fulva* and *dominica* populations remains an ongoing challenge.

Hawaii contains some of the most important *fulva* wintering grounds in the world, and assessment of plover numbers there should be of high priority as a baseline for gauging future trends in the mid-Pacific flyway. The most recent figures are 74,000 birds for the main Hawaiian Islands in 1949, and 15,173 for Oahu in 1968 (see Johnson & Connors 1996). Over the ensuing years, urbanization has produced much additional grassland and the state may host more wintering birds now than ever before. We have no meaningful trend information for the species anywhere in the world. Although reports suggest that numbers have declined at the southern end of the winter range in Australia and New Zealand (Wilson 2001), it is uncertain whether this actually indicates fewer birds or merely reflects short-stopping elsewhere in favourable places such as Hawaii.

Limited trend data for *dominica* are in some cases conflicting, but overall suggest that the species is in decline (Johnson & Connors 1996, Gratto-Trevor 1998, Morrison *et al.* 2001a). From 1996 to 2000, J.P. Isacch (*in litt.*) made counts of plovers at Medaland Ranch, which is one of the primary remaining wintering grounds in Argentina. His results were encouraging in that the number of birds found was similar to what Myers and Myers (1979) reported in the same area nearly a quarter of a century ago. However, because Medaland contains well-preserved habitat in a key wintering

Plate 1. In our studies of Pacific Golden-Plovers on Oahu wintering grounds (Johnson *et al.* 2001b), the life expectancy of most birds after banding was around 5 years, but there were exceptional individuals. This "participant" in the research lived to a minimum age of 21 years 3 months, a new world record for the species (for details, see Johnson *et al.* 2003).

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region, counts there might remain relatively stable despite losses elsewhere. Additional systematic monitoring of *dominica* in South America is an urgent conservation need.

MIGRATORY ROUTES AND STOPOVERS

The routes followed by these plovers (among the longest flights of all shorebirds) are generally understood, but we lack insight concerning movements across remote regions such as *fulva* on trans-Asian, and southwest Pacific routes, or *dominica* on trans-Amazonian pathways. Although stopovers by these birds often appear to be opportunistic, there are indications of important re-fueling sites of which we have only partial knowledge.

Very few *fulva* occur in the large spring aggregations of shorebirds found along the Asian coast (Barter *et al.* 1998, 2000, 2002; Moores 1999). Presumably, the birds are overflying the coast in favour of one or more inland routes to breeding grounds in Siberia (Johnson & Connors 1996, Ming & Kraaijeveld 2000). This raises important questions about stopovers during trans-Asian passage. In this regard, Oleg Goroshko's 1993–1996 spring observations (*in litt.*) of about 50,000 *fulva* in the Torey Depression of NE Mongolia and adjacent Russia (see www.wetlands.org/RDB/Ramsar_Dir/RussianFed/RU019D02.htm) are of great interest. Goroshko's numbers suggest a site of hemispheric importance for the species, and emphasize the need for further study of *fulva* in the Torey steppe/lake region.

American Golden-Plovers are well known for their annual migratory pattern, which involves a mid-continent route through North America in the spring and an offshore trans-Atlantic flight in fall (Johnson & Connors 1996). Stopovers by spring migrants are somewhat unpredictable, though major gatherings occur in Indiana and Illinois (Johnson & Connors 1996) where the birds feed on earthworms and insects in agricultural fields. In Indiana, they find untilled soybean fields harvested the previous fall especially attractive (Braile 1999). West-central Indiana (Benton County and parts of White County) appears to be particularly important for the species. In this relatively small area, Braile (1999) estimated that the number of migrant *dominica* foraging during stopovers ranged from 42,000 to 84,000 – a substantial fraction of the world's total population. Clearly, this locale is of major significance as a possible WHSRN (Western Hemisphere Shorebird Reserve Network) site, and it is imperative that its use by *dominica* be evaluated further. In a region like Indiana, bird habitat is dependent on agricultural practices that vary with market demands and economic factors. Despite this uncertainty, there may be long-term strategies for managing the land in ways beneficial to farmers and plovers alike.

CONTAMINANTS

P. fulva wintering at various insular Pacific sites demonstrate a remarkable ability to co-exist with humans in urban environments (Johnson & Connors 1996, Stinson *et al.* 1997, Johnson *et al.* 2001b, Beichle 2001). The removal of forest and brush on Pacific islands and atolls tends to produce grassy habitats that support large numbers of wintering plovers. While this initially seems favourable, there may be undesirable trade-offs of which we are unaware. Various pesticides are commonly used in the Pacific region often in situations where there are numerous plovers (golf courses in Hawaii, for example), and the effects of these chemicals on winter-resident *fulva* have yet to be determined. Inter-year plover survival rates at our Oahu study sites are relatively high at about 80% (Johnson *et al.* 2001b, O.W. Johnson

unpubl.), but this might be misleading since contamination at these sites is probably minimal. Thus, our survival findings may not be broadly applicable either in Hawaii or elsewhere across the insular Pacific.

It seems likely that both species are carrying pesticides, but whether at harmful levels is uncertain. Also, there may be variations from one flyway to another. One of the most hazardous routes might be the corridor traversing mid-continent North American farmlands. Spring sightings indicate that *dominica* spend several weeks in gradual northward passage (Johnson & Connors 1996), and probably are exposed to numerous agrochemicals at feeding stops along the way. Because of the immense geographic areas over which both species move annually, substantial reduction in hazards from contaminants may be impossible. There are situations, however, in which at least modest improvement might be achieved. For example, I have observed insecticides being applied on wintering grounds (government owned property on Oahu) in April when birds are fattening for spring migration. Since plover departure from Hawaii is predictable in late April, it should be feasible to modify spraying schedules and defer chemical use until a post-departure date in May. Possibly, such a regulation could be mandated by federal and/or state agencies.

MORTALITY

Unknown numbers of *fulva* are being lost annually to human exploitation (i.e., commercial and subsistence hunting) particularly in SE Asia, the Philippines, and Indonesia (Alonzo-Pasicolan 1990, Tang & Wang 1995, Johnson & Connors 1996, Ma *et al*. 1998). It appears that American Golden-Plovers are still being hunted in Barbados and parts of South America (Johnson & Connors 1996). During a visit to Barbados in fall 2001, S. Gillings (*in litt.*) observed shooting ponds "full of wooden wader decoys" and "aviaries containing live decoys including two American Golden-Plovers". Though the take of *dominica* may not be excessive (Rappole 1995), we have no clear record of the overall numbers being killed.

A potential mortality factor that could become significant in the future has to do with *fulva* at airports. The latter often contain grassy areas occupied by wintering territorial plovers, and their runways attract passing migrants. Collisions with commercial aircraft have occurred in Hawaii usually in the fall, and these typically involve naive juvenile birds on their first southward migration (Linnell *et al.* 1996, Johnson & Connors 1996). Thus far, the problem has been relatively minor (i.e., small numbers of birds killed and no aircraft accidents), but new quieter jets now coming on line are more apt to take inexperienced birds by surprise. Resident territorial plovers (mostly adults) are habituated to aircraft and skilled at avoiding them; also these birds tend not to frequent runways. By contrast, inexperienced juveniles often travel in flocks likely to alight on runways. It would be unfortunate if officials unfamiliar with these features of *fulva* were to institute systematic control programs in and around airfields. Predictably, such efforts will produce vacant habitats (i.e., by removal of territorial individuals) attractive to other plovers from nearby areas, thereby resulting in a lethal sink. The most effective and acceptable management tools at airports are deterrent measures designed to keep fall juveniles away from runways (in some situations, deterring spring migratory aggregations might also be necessary) along with habitat management (Johnson & Connors 1996). Innovative deterrent techniques involving dogs and possibly falcons are likely to be more successful than harassing birds with a vehicle or loud sounds. Habitat management may involve removal or reduction of grassland on some portions of the airport combined with habitat enhancement on others. Although the data might be difficult to obtain, it would be useful to determine what airport policies are in effect in other regions of the *fulva* winter range. While there are no lethal control programs in Hawaii, such measures at airfields elsewhere could be causing significant plover mortality of which we are unaware.

OTHER COMMENTS

During the nonbreeding season, *dominica* have an altogether different "personality" than *fulva*. In contrast to the adaptable nature of *fulva* in which foraging on residential lawns, roosting on roof-tops, and even accepting hand-outs of food are routine wintering behaviours, *dominica* remain wary and require pasturelands and coastal wetland habitats in winter (Johnson & Connors 1996, Johnson *et al*. 2001b, Beichle 2001). The combination of intolerance toward humans plus loss of habitat (much of the pampas region has been converted to cropland unsuitable for *dominica*), does not bode well for the species. Given their need to forage in short vegetation, any attempts to manage winter range grasslands for the benefit of *dominica* should incorporate relatively heavy grazing by livestock (see Lanctot *et al.* 2002). American Golden-Plovers are known to defend territories on wintering grounds in Argentina (Myers & Myers 1979), but how this relates to intra- and inter-year site-faithfulness is uncertain because these observations did not involve banded individuals. To my knowledge, there have never been studies of marked *dominica* during the nonbreeding season, and this is a major gap in our understanding of the species.

Fortunately, there are various national and international conservation efforts (familiar to most readers) currently focussed on the preservation of shorebirds. Harrington *et al.* (2002) provide an informative discussion of the new "Program for Regional and International Shorebird Monitoring" (PRISM – see also Skagen *et al.*, this volume), and the "Western Hemisphere Shorebird Reserve Network" (WHSRN) founded in 1986. Collaborative programs like these are vital to the well-being of many shorebird species including *fulva* and *dominica*. New findings on population trends, annual breeding success, and threats to habitats (including the potential effects of climate change – see Rehfisch & Crick, this volume) will be especially valuable if they translate into the means necessary to ensure the future of these remarkable birds.

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