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IS ILLEGAL TAKE AFFECTING THE PEREGRINE FALCON POPULATION IN CENTRAL PERU: WHY AND HOW?

Oscar Beingolea Maseveu[1]

Calle la Venturosa 114, Urb. Los Rosales 1. etapa, Surco, Lima 33, Peru

Abstract. Illegal take of Peregrine Falcon (*Falco peregrinus*) and other wild raptors is reaching unprecedented levels in Peru. Illegal take of falcons occurs both for recreational falconry and for the use of falcons as a biological control of avian crop pests. In this paper, I review the status of migratory and resident populations of Peregrine Falcon occupying the central coast of Peru, specifically examining its habitat preference and occurrence along the northwest coast of South America and the consequences of illegal, local removal of falcons for falconry and other purposes on the central coast of Peru. Using banding data I collected during surveys of wintering Peregrines, I provide evidence of fidelity by migrants towards wintering sites and the effects of the constant trapping and removing peregrines from these areas. During the first three years of my surveys and up to the mid-1990s, irresponsible trapping activities were carried on by young falconers. More recently, illegal trapping is encouraged by the growing demand for raptors to control avian pests. I discuss these activities and their effects on the Peregrine Falcon population occurring in Lima, Peru, as well as the lack of action by government agencies.

Key Words: falconry, *Falco peregrinus*, illegal take, illegal trade, migration, Peregrine Falcon, wintering.

¿ESTÁ LA CAPTURA ILEGAL AFECTANDO LA POBLACIÓN DE HALCONES PEREGRINOS EN EL CENTRO DEL PERÚ: PORQUÉ Y COMO?

Resumen. La captura ilegal de Halcones Peregrinos (*Falco peregrinus*) y otras aves de presa silvestres está alcanzando niveles nunca antes vistos en el Perú. La captura ilegal de halcones ocurre tanto para su uso en cetrería como para su utilización como controladores biológicos de aves consideradas plagas en los cultivos. En este artículo yo reviso el status de las poblaciones migratorias y residentes de Halcón Peregrino en la costa central de Perú, especialmente examinando la preferencia de hábitat y ocurrencia en la costa noroeste de Sudamérica y las consecuencias de la ilegal, localizada remoción de halcones para cetrería y otros propósitos en la costa central de Perú. Usando los datos de halcones Peregrinos anillados durante estudios en halcones invernantes, yo proporciono evidencias de fidelidad de halcones migratorios hacia el territorio de invierno y los efectos de la constante captura y remoción de Peregrinos de estas áreas. Durante los primeros tres años de mi estudio y hasta mediados de la década de los noventa las irresponsables actividades de captura fueron llevadas a cabo por halconeros muy jóvenes. En la actualidad, la captura ilegal ha sido impulsada por la creciente demanda de aves de presa para el control de aves consideradas plaga. Yo discuto estas actividades y sus efectos en la población de Halcón Peregrino en Lima, Perú, así como también la falta de acción por parte de las agencias gubernamentales.

INTRODUCTION

The genus *Falco* has been sparsely treated in the literature for Latin American countries. Ornithologists know which species occur and their general distributions in Latin America; however, we can not say the same about existing knowledge regarding population size and trends. Neither do we know the threats affecting species in this genus, among them the Peregrine Falcon (*Falco peregrinus*), nor do we understand how some human activities are affecting them. Peregrine Falcon subspecies have been extensively studied in North America. But, in South America little is known about its life other than an effort to study peregrines in certain areas where a large number of Nearctic migrants occur.

Three of the four American subspecies of peregrine occur in South America. Two of these subspecies are wintering Nearctic migrants—*F. p. tundrius*, which breeds in the Arctic, and *F. p. anatum*, which breeds from the forests of interior Alaska and Canada into Central Mexico.

[1] E-mail: bicolored@yahoo.com

FIGURE 1. A newly banded Peregrine Falcon. Chimbote Bay, Ancash, Peru. 3 December 2006.

Migrant Peregrines are found in Peru between mid-October and mid-April. The third subspecies occurring in South America, *F. p. cassini*, is resident. It breeds along the Cordillera of the Andes, from Ecuador and Peru to southern Chile and Argentina. The breeding season for this subspecies is longer at equatorial latitudes and shorter at the southern ones. Clutches are produced between mid-April to mid-September in central Peru (Beingolea and White 2003). The Peregrine Falcon pairs breeding in Argentina and Chile lay eggs starting in October.

Wintering Peregrine falcons largely depend on concentrations of avian prey species. Avian prey concentrations occur in many parts of Peru and other South American countries. Along the Peruvian coast bird concentrations are found in river valleys, farmlands, in cities, at grain storage facilities and where there are poultry activities of any kind. Peregrines naturally exploit these resources so that the two North American subspecies become established as wintering residents around these bird concentrations. Local *cassini* pairs, breeding on inland cliffs and on some buildings ledges inside the city of Lima (Beingolea and White 20033), also become established near these spots. Floating, non-mated individuals, and young-of-the-year frequent the same areas when following parents and after becoming independent.

Wintering Peregrines, rather than local *cassini* pairs and individuals, also become established around coastal habitats—primarily bays and beaches whose particular sediments favors development of small crustaceans and fish. These attract seabirds such as terns and gulls in large numbers. The peregrine and its prey are also found around some fishing ports. Finally, they often occur on small and large islands, and to a lesser degree over the seasonal marshes of the Peruvian coast where they hunt shorebirds and waterfowl. Because of the seasonal nature of the Peruvian marshes, which are largely dry in December through mid-May, many peregrines show less interest in these environments (Beingolea, unpubl. data).

A satellite tracking study performed on the coast of Tamaulipas, Mexico, found that adult peregrines displayed a strong fidelity towards wintering areas but not to a particular home site (McGrady et al. 2002). Territorial adults ranged many kilometers north and south, perhaps

when soaring, patrolling territories, and hunting. This wandering behavior makes both territorial adults and floating individuals vulnerable to trapping, particularly when trapping activities take place over the critical areas favored by hunting Peregrine Falcons.

METHODS

Between 1988 and 1995, I conducted a banding study of Peregrine Falcons along the Peruvian coast (Fig. 1). Starting in November 1988, I surveyed two transects 100 km each, north and south of Lima (central coast of Peru) to look for migrating peregrines to trap for banding. Trapped birds were either banded (if first encountered) or the band number recorded (if banded previously), reporting all band numbers to the Bird Banding Laboratory. Each captured bird was codified, P. (=Peru) fallowed by the number of sample; if banded in NA they were recorded as R. (return). Captured falcons were also dyed after banding in order to help avoid recaptures. Each adult received a unique dye mark using a rodamine base to allow individuals to be distinguished. Immatures were dyed uniformly. Despite efforts to avoid recapture of immatures, some birds were retrapped, indicating some had remained in the same location up to one month after banding.

Surveys which occurred between late spring and early summer (late December to mid-January) resulted in daily sightings of 10 to 11 different peregrines. Because most of the resident, wintering adults and some immatures had been captured and banded by that time, more than half of the sightings during every outing were banded birds with remaining birds most likely being newly arrived falcons.

RESULTS AND DISCUSSION

A Peregrine Falcon Banding survey had been previously carried out by the North American researchers, Thomas L. Maechtle and Clifford Anderson in Central and southern Peru. From December 1987 to October 1988 they had captured 34 different birds. Starting in November 1988, I continue conducting the banding activities resulting in the total capture of 216 different Peregrine Falcons.

Of the 183 different individuals I captured, 51 were females and 132 (72.13%) were male Peregrines with an age distribution of 69 immatures, 14 subadults, and 49 adults. Little is know about the male's wintering habits and its occurrence. So far, they were known to arrive earlier than females to the main migratory points in NA but, adult males were rarely encountered. Despite the large trapping efforts performed at Assateague Island, Maryland/Virginia, only 7 of 1,082 individuals trapped there between 1970 and 1984 were adult males (Ward et al. 1985). The rarity of the adult male along migratory points in NA is perhaps related to its more skewed migration resulting from its less dependence over those ecologic zones favored by the female; resulting too in a pronounced spatial segregation of sexes at wintering sites. Additionally, banding data recovery suggest that the female Peregrine falcon breeding in Greenland over-winters in Central America and the Caribbean region, whereas the male does it in South America (Restani and Mattox 2000). I was aware of their high incidence along the Peruvian coast. In addition to discovering site, I also banded some individuals in Peru as first year migrants and during their second migration that were found in subsequent years at the same banding locations (Beingolea, unpubl. data). Evidence suggests this is one way the wintering population of resident adults is maintained over time in areas surveyed (see Table 2), and perhaps elsewhere. Satellite tracking studies performed elsewhere have found wintering individuals ranged several kilometers around their place of capture. Detailed aspects of their wintering behavior may have gone unnoticed if they had not been recaptured. Previously banded birds that I captured came from Padre Island, TX (n = 4; 3 females and 1 male), Cape May, NJ (n = 2; 1 female and 1 male). Birds banded at nesting areas came from Nunavut, Canada (n = 1), and Omaha, Nebraska (n = 1).

During the first banding season (November 1988 to April 1989), a total of 40 different individuals were captured and banded, over 85% of which were on the southern transect (see Table 1) (Beingolea, unpubl. data). At least 10 wintering adult males occurred between kilometers 8 and 73 south of Lima. Some of these yet were regularly sighted more than others within that transect. The fate of that falcon remains unknown as it was never relocated.

ILLEGAL TRAPPING

During the first three years of the survey (1988–1990), I found evidence that banded falcons were being trapped and removed from survey sites (Table 2). Illegal captures also included birds banded at Padre Island, TX and Greenland.

Some bands belonging to these birds were shown to Clifford Anderson and others were reported to me. Compared to my results, it is not hard to infer about the number of captured

TABLE 1. Peregrine Falcons captured along southern survey transect, south of Lima, Peru, November 1988 to April 1989 (*N* = 31) (* removed from transect).

HyM	SyM	AdM	HyF	HyF	AdF
P.36	P.42[a]	P.35	P.41	R.01*	P.34
P.39	P.47	P.37	P.43		
R.02	P.51	P.38	P.45		
P.44	P.66	P.40	P.68		
P.49		P.46			
P.50		P.48			
P.57		P.54			
P.67		P.56			
P.69		P.59			
		P.65			

([a]) Captured and (*) band removed.
p. 98 banded as an adult male along the northern transect was also captured and its band removed.

TABLE 2. Recorded evidence of adult wintering population built up by birds banded during hatch year, second year (second migration), and found as adults.

Hatch year	Second year (second migration)	Found as adults
Males		
01. P. 04 (Jan 88)	Oct.88 & Mar 89	Jan.95
02. P. 36 (Nov 88) Nov.8		
03. P.42	(Dec.88)	Mar.91 (recovered from the illegal market and released)
04.	P. 58 (Mar 89)	Jan. 93
05. P. 75 (Dec.89)	Dec 90	
06. P. 93 (Jan.90)		Dec. 91
07. P. 153 (Dec.92)	Nov. 93	
08. P. 159 (Mar.93)	Nov. 93	
Females		
1.	P.28 (Oct 88)	Feb 95
2. P.140 (Dec 91)	Jan 93	

falcons to obtain those banded falcons. Illegal trapping was being carried out by a small number of young falconers. No doubt, the illegal removal of falcons interfered with attempts to gather more data on the wintering population of adults. In the late 1990s, falcons began to be captured for sale by a growing number of young falconers. This continues up to the present.

An illegal source of raptors is the old market, also located in downtown Lima. To my knowledge, the presence of this illegal market can be traced back at least to the mid-1970s. An unknown number of birds have been traded in this market, including raptors and other birds (Table 3). There is a connection between Peregrine Falcon trappers, the market in downtown Lima, and other places where wild fauna are regularly sold.

BIOLOGICAL CONTROL OF AVIAN CROP PESTS

With the recent development of agriculture along the coast of Peru, crops such as paprika, chili pepper and grape are seasonally consumed by wild birds. The damage these birds cause to the crops has created a job opportunity for falconers who use raptors to flush birds as a biological control.

These two activities—recreational falconry and falconry as biological control—have produced increased demand for birds of prey. The capture and trade of wild raptors is reaching unprecedented levels. Some of those who trap or use falcons work for an employer for only one season and then go to work independently. They are typically poorly qualified and show little knowledge or respect for raptors and other birds. This is steadily worsening the problems for Peregrine Falcons and other birds of prey (Figs. 2 and 3).

Migrant Peregrine Falcons display a strong fidelity towards flyway paths and wintering areas, with many returning yearly to their favorite wintering locations. Increasing number of farmers requesting bird pest control are placing a growing demand on wild populations of birds of prey in a country that lacks adequate regulation and law enforcement regarding the practice of falconry.

TABLE 3. LIST OF OTHER RAPTOR SPECIES FOUND FOR SALE IN THE ILLEGAL MARKET IN LIMA (N = 24). * DENOTES FREQUENTLY FOUND.

American Kestrel (*Falco sparverius*)	*
Aplomado Falcon (*Falco femoralis*)	*
Merlin (*Falco columbarius*)	
Mountain Caracara (*Phalcoboenus megalopterus*)	
Southern Caracara (*Caracara cheriway*)	
Pearl Kite (*Gampsonyx swainsonnii*)	
White Hawk (*Leucopternis albicollis*)	
Red-backed Hawk (*Buteo polyosoma*)	*
Puna Hawk (*Buteo poecilochrous*)	*
White-tailed Hawk (*Buteo albicaudatus*)	
Harris' Hawk (*Parabuteo unicinctus*)	*
Black-chested Buzzard-Eagle (*Geranoetus melanoleucus*)	
Bicolored Hawk (*Accipiter bicolor*)	
Black-and-Chesnut Eagle (*Spizaetus isidori*)	
Ornate Hawk-Eagle (*Spizaetus ornatus*)	
Black-and-White Hawk-Eagle (*Spizaetus melanoleucus*)	
Black Hawk-Eagle (*Spizaetus tyrannus*)	
Orange-breasted Falcon (*Falco deiroleucus*)	
Bat Falcon (*Falco rufigularis*)	
Barn Owl (*Tito alba*)	
Great-horned Owl (*Bubo virginianus*)	
Burrowing Owl (*Athene cunicularia*)	*
Pygmy Owl (*Glaucidium* sp.)	
Spectacled Owl (*Pulsatrix perspicillata*)	

During the last few years, a large number of trappers have illegally taken about 30 Peregrine Falcons from areas around my southern transect survey area. Every year, an individual trapper retains up to 15 different peregrines at a time while waiting for falconers to buy them. Prices range between $20 and $100 per falcon, depending upon urgency, size and color. Sometimes the same illegal trader may try to make a greater profit by transferring trapped falcons to a larger, more diversified illegal wildlife markets in downtown Lima and other places.

Recently, the raptor trade has been encouraged by some falconers and by a wide range of less experienced people attempting to do biological control on bird pests. Although there are only a few people offering this service, many of them use the illegal market as a main source for acquiring their raptors. On the other hand, the practice of biological control with falcons has helped farmers to learn about the importance of having raptors on their lands, instilling in them a higher degree of respect towards raptors. Some of them have found that there is a source of legal raptors in Peru produced in captivity, including *cassini*, Peregrine Falcons and Aplomado Falcons (*Falco femoralis pichinchae*). These farmers are acting according to the law and are buying raptors bred in captivity.

FIGURE 2. Poorly-cared for Peregrine Falcon. Over exposure to sun, incorrect perches and other forms of mistreatment are evident in the plumage of the birds.

Whereas such facts relating to the farmers are encouraging, one must consider another aspect of the situation. Some of them prefer to use their own unprofessional personnel to handle the raptors, which results in lower costs for the farmers. However, as stated above, there is a risk that such opportunistic falcon handlers may want to offer their own services in the future. This is a situation that will increase the demand for more illegal capture of raptors. We have no data or information on the fate of raptors handled by untrained people.

IMPACTS ON INDIVIDUALS AND POPULATIONS

We do have some information on the fate of falcons handled by falconers performing biological control. About one third of these falcons die, one third escapes, and the final third appear to survive the campaigns in captivity. Most handlers don't have the training and/or they lack the telemetry equipment to track their birds. This knowledge and technology deficit limits the chances of recovering lost birds, a situation which in turn creates a demand for more trapping for the next campaign and falconry season.

During the last few years, the removal of immature and adult Peregrine Falcons has been unrelenting around preferred sites in Lima, particularly near human settlements. This has reduced the number of regularly sighted falcons from 11 to 3. An exhaustive search seldom yields more than six individuals.

FIGURE 3. Eighteen abandoned live raptors in Lima, Peru, in 2007.

Due to farming activities spreading into parts of the desert, I would expect to see more Peregrines individuals in these areas, but I do not. Experimental efforts to capture the few adults found along my old transect result in their refusing my lures, suggesting that that lures for trapping have frequently been offered to these individuals.

It is unknown whether or not the higher selective pressures that affect these strongly territorial and highly migrant Peregrines represent a disadvantage for the return of escaped birds. Despite the large number of immature migrants yearly captured and that later escape, and in view of the fact that few immatures and even fewer adults of the subspecies are seen wearing jesses, I suspect they suffer a high mortality both in captivity and also after escaping.

Some individuals are released after feathers have been damaged or after developing health problems related to poor captive conditions (e.g., bumble-foot Fig. 2). Whether released after a short or long capture period, the birds' survival capability is compromised. Overall, mortality in captivity is downplayed. Instead, the main cause of missing birds is often attributed to unexpected escapes. Wild Peregrine Falcons have been seen wearing not only tied jesses but also leashes. Unless recaptured, most of these birds face certain death by becoming tangled in their leashes or jesses.

The number of historical nesting territories is probably between 5,000 and 8,000 for the Alaska–Canada portion of the Arctic (Kiff 1985). More than 400 individuals were banded annually at main migratory points in North America and more than 200 at nesting areas during the late 1980s. However, we have had a low recapture on our surveyed transects of individuals banded elsewhere.

Annual mortality in adult migrant females (breeders) from Alaska is estimated at 23% (Ambrose and Riddle 1985), and band recoveries of first year peregrines suggest a 63% mortality rate before completion of their first northward migration (Yates et al. 1985). Therefore, the whole North American population is probably not affected by the capture of 30–50 individuals per year. Furthermore, with such a large mortality rate it is unlikely to expect a high annual return by falcons to their banding and/or wintering locations in Peru. Nevertheless, when trapping is performed daily over the same spots year after year, we may attribute this illegal removal of falcons to the low incidence of wintering adults. I have not heard of similar trapping activities being carried in other countries of South America.

Another, less effect of these captures is the new occupation of some of these areas by local and year-round resident pairs and individuals of the *cassini* subspecies. With trapping, *cassini* birds may find lower intra-specific competition with migrants. I have noticed that inside Lima, the population of *cassini* has been expanding during the last 15 years, but these birds are also

subject to capture. In 2005, I found two birds wearing jesses. One was a mated male and one a female related to a different male, both among the seven known pairs inhabiting the same valley. In 2006, I found a new pair attempting to establish at one sandy cliff, of which both male and female wore jesses. Falcons wearing jesses between the winter months, May–September (during the time migrants are absent from wintering grounds), have been spotted all over Lima and as far as 150 km south.

Tamed and escaped local *cassini* Peregrines may become habituated to people and attempt to nest on unusual structures and in close proximity to human beings. The high incidence of immature individuals wearing jesses between May and September when migrants are gone indicates a high incidence of trapping. This affects local individuals, particularly from October to March, after the *cassini* young of the year become independent, at a time when a larger population of migrants offers a greater opportunity for trapping.

LACK OF LAW ENFORCEMENT

The protection of wild fauna is not a top priority in low-income countries, and Peru is no exception. Despite existing laws that restrict or limit the use of wildlife, adequate law enforcement and rules for the practice of falconry are lacking. Efforts for regulating falconry have been delayed, in part by the people involved. Regulations should ultimately consider the qualifications of individuals proposing to handle falcons, including the individuals' abilities, goals and experience. There should also be regulations governing which species that can be trapped and used.

In a global economy, where international funding sources abound and large sums of revenue can easily be gained from the illegal wildlife trade, Peregrine Falcons and other raptors are at great risk. Because the legal government authority (INRENA) closely controls the trade of wild animals and the harvesting of many species for "legal international trade" which is no longer allowed, I am unaware of any trapped Peregrines that have been illegally moved overseas, but the use of private planes for transport cannot be excluded. I believe that the government of Peru is now attempting to improve law enforcement against illegal poachers and traders and is encouraging laws regulating the practice of falconry and the keeping of raptors.

Falconers have a long history of defending and protecting the birds in which they are interested around the world. Many falconers have contributed substantially to wildlife conservation and, in addition, have successfully changed public attitudes towards the art and sport of falconry. They have accomplished this by organizing and regulating themselves responsibly in association with governmental agencies.

Falconry is spreading in Peru. It is now mostly undertaken by very young people who are only temporarily involved with the sport. They rarely take raptors seriously enough to know and respect them. For them, keeping raptors typically provides only camaraderie. In addition, pressure on other species of raptors has recently become worse due to greater demand for crop pest control. I recommend that if the harvest of wild individuals is allowed, that only immature Peregrine Falcons be taken, and that these will only be in the hands of people with enough expertise and time to properly handle and train the birds.

Lately the Peruvian Falconry Association for the Conservation of Birds of Prey (APCCAP) has closely worked with INRENA authorities to control and limit the use of raptors for different purposes. Peru is urging the close collaboration between APCCAP and INRENA authorities, with APCCAP either collaborating as a consultant office or requesting law enforcement.

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LITERATURE CITED

Ambrose, R. E., and K. E. Riddle. 1988. Population dispersal, turnover, and migration of Alaska peregrines, pp. 677–684. *In* T. J. Cade, J. H Enderson, C. G. Thelander, and C. M. White [eds.], Peregrine Falcon Populations: Their management and recovery. The Peregrine Fund, Ithaca, NY.

Beingolea, O. R., and T. C. White. 2003. First breeding record for *Falco peregrinus* in urban

Lima, Peru, with remarks on the Peruvian breeding population. Journal of Raptor Research 37:84–85.

CADE, T. J., J. H. ENDERSON, C. G. THELANDER, AND C. M. WHITE [EDS.]. 1988. Peregrine Falcon Populations: Their management and recovery. The Peregrine Fund, Ithaca, NY.

KIFF, L. F. 1988 Changes in the status of the Peregrine Falcon in North America: An overview, pp. 123–139. *In* T. J. Cade, J. H. Enderson, C. G. Thelander, and C. M. White [eds.], Peregrine Falcon Populations: Their management and recovery. The Peregrine Fund, Ithaca, NY.

MCGRADY, M. J., T. L. MAECHTLE, J. J. VARGAS, W. S. SEEGAR, AND M. C. PORRAS PEÑA. 2002. Migration and ranging of Peregrine Falcons wintering on the Gulf of Mexico Coast, Tamaulipas, Mexico. Condor 104:39–48.

RESTANI, M., AND W. G. MATTOX. 2000. Natal dispersal of Peregrine Falcons in Greenland. Auk 117:500–504.

WARD, F. P., K. TITUS, W. S. SEEGAR, M. A. YATES, AND M. FULLER. 1988. Autumn migration of Peregrine Falcons at Assateague Island, Maryland/Virginia, 1970–1984, pp. 485-495. *In* T. J. Cade, J. H. Enderson, C. G. Thelander, and C. M. White [eds.], Peregrine Falcon Populations: Their management and recovery. The Peregrine Fund, Ithaca, NY.

YATES, M. A., K. E. RIDDLE, AND P. F. WARD. 1988 Recoveries of Peregrine Falcons migrating throughmt the Eastern and Central United States, 1955–1985, pp. 471-483. *In* T. J. Cade, J. H. Enderson, C. G. Thelander, and C. M. White [eds.], Peregrine Falcon Populations: Their management and recovery. The Peregrine Fund, Ithaca, NY.