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**Thomas S. Schulenberg, Douglas F. Stotz, Daniel F. Lane, John P. O'Neill
& Theodore A. Parker III: Birds of Peru**

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INTRODUCTION

Peru is one of the richest countries in the world for birds, with 1,800 species. This book is a guide to the field identification of all birds recorded in Peru and in offshore waters within 200 nautical miles of the Peruvian coast.

A field guide can take many forms. We have endeavored to “stick to the basics” and include only information directly relevant to identification. Our intention was to produce a guide that was complete and accurate, yet sufficiently small and portable to be carried close at hand during long days afield. Consequently we have had to jettison, often with great reluctance, much additional information on the distribution and natural history of each species. Additional material on the birds of Peru that did not fit within the covers of this field guide will be incorporated into future publications.

This book includes all species reported from Peru through May 2004, based on specimens in natural history museums, literature records, and unpublished sight records, tape recordings, and photographs. We exclude a few species, often attributed in the literature to Peru, for which we have been unable to confirm a valid record for the country. We have been relatively generous in including species reported from Peru only from sight records, including some species on the basis of records that have not been published previously. We encourage anyone who observes a species not previously known from Peru, or known from Peru only on the basis of sight records, to document such records as thoroughly as possible with specimens (with Peruvian governmental authorization), or with photographs, tape recordings, and field sketches and notes, and to publish these records and the supporting evidence.

The classification and nomenclature of birds is under constant review. This affects how many species to recognize for Peru (in other words, whether to “split” or to “lump” geographic varieties into more or fewer species, respectively), the families to which various genera belong, and the sequence of families. We largely follow the classification and nomenclature of the South American Classification Committee (SACC) of the American Ornithologists’ Union (<http://www.museum.lsu.edu/~Remsen/SACCBaseline.html>).

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For each species, we present color figures, species accounts, and with few exceptions a distribution map. We include brief introductions to many (but not all) families, and to some genera or species groups. We use these short accounts to introduce species-rich families, or to summarize information that is similar across a group of related species. It often may be helpful to peruse this material, when present, as an aid to field identification.

Species Accounts

Each species account begins with English and scientific names of the species. A name is enclosed in brackets ([]) if the species is known in Peru only from sight records, tape recordings, or photographs, but not from a specimen from Peru.

LENGTH The length of each species is given in centimeters and in inches. These measurements, representing the length from the tip of the bill to the tip of the tail, are taken from museum specimens and therefore are only an approximation of the size of a live bird. Nonetheless, they provide a useful index to the size of each species and are useful especially for comparing species that are similar in appearance but differ in size. Note that the length will be influenced both by bill length and by tail length; two species can be of similar length but differ in mass (for example, if much of the length measurement of one species is taken up by lightweight feathers from a particularly long tail). For some species we provide additional measurements, such as wingspan (ws) estimates of species more frequently observed in flight (seabirds, raptors) or bill length in hummingbirds.

GEOGRAPHIC VARIATION An asterisk (*) identifies polytypic species, that is, species with recognized geographic variation (two or more subspecies, across the entire distribution of the species). We do not discuss geographic variation in any detail in this guide, except for instances when subspecies are sufficiently different in appearance or in voice that they might be recognizable in the field.

SPECIES ACCOUNT The bulk of each species account is taken up with notes on the relative abundance, habitat, elevational range, and behavior of each species, and with a description of its voice. Unless noted

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otherwise, all of our comments refer specifically to that species in Peru. Due to the constraints of the plate-facing format, the text often is terse. We employ a small number of abbreviations:

ca.	for “approximately”
cf.	for “compare to”
sec	for “seconds”
ws	for “wingspan”

We also abbreviate the names of months. For some species, especially those with distinctive plumages, we say little or nothing about the bird’s appearance. In other cases, we comment on particular features (“field marks”) that may be important for identification. We may call attention to similar species, with notes on how these differ or a suggestion to read the account of that species. We usually do not repeat distinguishing characters; these will be discussed under one species or the other, but not under both.

A familiarity with standard ornithological terminology for the parts of a bird is helpful in understanding the species accounts. Please consult the diagrams in figure 5 and accompanying glossary of bird topography.

RELATIVE ABUNDANCE Relative abundance is a subjective assessment and can vary geographically, but we have tried to present an “average” assessment. Our assessments are based on our experiences with average encounter rates of free-flying birds, within the species-appropriate habitat, elevation, and range. Relative abundances of some species may differ, for a variety of factors, based on other methods of sampling (such as with mist-net capture rates). We use the following terms in ranking relative abundance:

Common: Encountered daily, or almost daily, in moderate numbers.

Fairly common: Encountered daily or nearly daily in small numbers.

Uncommon: Easily can be missed at a site, even during several days of observation, but should be encountered during longer stays of a week or more.

Rare: Residents that are present in such low numbers, or, in the case of migrants, present at such irregular intervals, that they can be missed even in a stay of multiple weeks.

Vagrant: Nonresident; has been recorded once or on only a few occasions beyond the “normal” range; might be expected to occur again, but not with regularity.

Statements such as “poorly known” or “rare and local” should be interpreted as referring specifically to the status in Peru. The species may be better known, or more common, elsewhere in its distribution.

HABITATS Habitat often is an important clue in bird identification. Most species are restricted to a particular habitat or a suite of similar habitats and are not expected to be encountered in other situations. We use relatively few specialized terms to describe habitats; these are described in the section Habitats of Peru.

BEHAVIOR Our notes on behavior are focused on field identification. We pay particular attention to the foraging level in the habitat (ground, understory, midstory, canopy), since such behavior often is “fixed” within a species (although some species may forage at one level but sing or nest at another). We may comment on foraging behavior, especially where differences in such behavior may help to distinguish between species of similar appearance.

ELEVATIONAL DISTRIBUTION Our notes on the elevational distribution of each species reflect both museum specimens and sight observations within Peru. Elevational distributions may vary locally, depending upon a variety of factors, and so occasional deviations may be encountered from the elevational data that we present. Generally, however, the elevational distribution of a species is an important aspect of its biology; learn to pay attention to elevation when in the field.

VOICE Many more birds are heard than are seen. Additionally, there are many instances of birds with similar appearance that are identified more easily by differences in their vocalizations. The way to learn bird vocalizations is through hearing them in the field, or through study of the increasing library of tropical bird song collections (on cassette tapes, compact disks, or DVDs). Our descriptions of the vocalizations of Peruvian birds are “the next best thing.”

The vocal descriptions presented here, almost all of which were prepared by Lane, are intended to cover the most frequently heard vocalizations produced by each species. Voices are described using qualitative modifiers and,

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when possible, phonetic descriptions (based on contemporary American English usage). In the phonetic descriptions, stressed syllables are written in capital letters (e.g., “CHEW”). Notes that are very stressed or abruptly given are followed by an exclamation point (“!”). Sounds that resemble a question in human speech are followed by a question mark (“?”). The relative length of pauses between notes or phrases is indicated as follows: notes that are produced with almost no discernable pause are run together (e.g., “tututu”); a very short pause is marked by an apostrophe (e.g., “tu'tu'tu”); short pauses are denoted with a hyphen (e.g., “tu-tu-tu”); moderate pauses are indicated with a space (e.g., “tu tu tu”); and the longest pauses are denoted by “...” The same punctuation (“...”) also is used at the end of a phonetic description if the voice continues in a similar manner for an extended period. Usually we describe the song first, followed by the call; but we reverse this order in some cases, when calls are heard much more frequently or are more characteristic of the species. We use the terms “song” and “call” frequently, although there are many species for which it is difficult to label a particular vocalization as one or the other. Generally, we classify vocalizations that are produced in territorial defense, mate attraction, and pair bond maintenance as “songs.” In some cases, the “song” of a bird is not vocal at all, but rather is produced mechanically: guans rattle wing quills during short predawn flights, for example, and woodpeckers drum on resonant substrates. Some species also combine mechanical sounds with vocal sounds in elaborate displays (especially among the cotingas and manakins, as well as other groups). “Calls,” on the other hand, are a class of vocalizations containing sounds with many different functions, such as to maintain contact among members of a pair, family, or flock; to warn others of danger; to mob predators; and sometimes in territorial defense. Most species have a wide repertoire of calls, many of which are seldom used.

Some species typically sing in duets. Duets are of two types, antiphonal and asynchronous. An antiphonal duet is one in which the members of the pair produce their respective vocalization in a very orderly manner, many times one answering the other with perfect timing. Often the duetted song sounds like only one individual is singing (particularly with wood-quail and *Thryothorus* wrens). In contrast, in an asynchronous duet (such as are given by wood-rails, many furnariids, and a few other species) the members of a pair sing in a haphazard fashion, with their vocalizations overlapping in a manner seemingly without order.

Voices frequently vary, due to such factors as geographic variation, dialects, individual variation (differences between individuals present at any given site), repertoires (variation between the songs of any particular individual), age- or sex-related differences in song, and the emotional state of the individual bird. Generally, calls are less stereotyped than are songs; and the vocalizations of nonpasserines and of suboscines are more stereotyped than are those of oscines. We often describe discernable geographic variation, although much remains to be learned about variation in the vocalizations of the birds of Peru.

The majority of our vocal descriptions are taken directly from field recordings; only very rarely do we rely on a literature source for a vocal description. We have preferred to use recordings made in or near Peru; we provide brief locality data for recordings that were made outside of Peru and if these voices differ from those of Peruvian populations of that species. The majority of these descriptions are based on recordings by the authors, supplemented by published sound recordings (see Vocal References). Unpublished vocalizations from other recordists are credited in Vocal Credits.

REGIONAL DISTRIBUTION Each species account ends with a note as to whether that species is entirely restricted to Peru (“**ENDEMIC**”) or is known from any of the countries that border Peru (Co, Colombia; E, Ecuador; Br, Brazil; Bo, Bolivia; and Ch, Chile).

Distribution Maps

We map the distribution of the majority of the species reported from Peru. Species whose distributions are not mapped include those reported only from far off the coast, vagrants known from only a few records, and some extremely local species. For widespread species we show all of Peru, including the 24 political departments (fig. 1) and the major rivers (see also fig. 2). Some species are restricted to only a small portion of Peru; when possible we use larger-scale regional maps to show these distributions in greater detail.

We use shading to connect areas within which we expect a species will be found, even if there are some apparent gaps in the distribution. The maps are color coded to reflect the seasonal status of each species in Peru (fig. 3). Because some species may contain populations that are both resident and migratory, this can lead to some complicated distribution maps. Although migration is an important part of the life history of many of Peru's birds, migration in Peru has not been well studied. Questions remain about the seasonality of some species. In some cases the seasonal pattern of occurrence for a species was unclear, and there is the possibility that some of our assessments may be shown to be incorrect, as Peru's avifauna becomes better known.

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FIG. 1. POLITICAL MAP OF PERU, SHOWING THE 24 DEPARTMENTS AND THE DEPARTMENTAL CAPITALS

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FIG. 2. MAJOR RIVERS OF PERU

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The vast majority of birds in Peru are *permanent residents*, in part or of all of Peru. In such cases a species remains throughout the year in the same areas where it breeds (although there may be very local movements in the nonbreeding season). Areas where a species is resident are shown in *light blue*.

A handful of species are *breeding residents*. They breed in Peru but then depart, either leaving Peru completely (Gray-capped Cuckoo, Snowy-throated Kingbird) or vacating the breeding area and migrating to another part of Peru (White-crested Elaenia in part, Slaty Thrush, Black-and-white Tanager). The areas where these species are breeding-season residents are shown in *dark blue*. The movements away from the breeding grounds represent intratropical migrations, which are discussed below.

Austral migrants are species that breed in temperate latitudes in the Southern Hemisphere from December to February and migrate north during the austral winter. Most such species spend the entire austral winter in Peru, roughly March–October. Arrival and departure periods vary among species and are poorly documented for most species (especially among landbirds). A small number of species (such as Slaty Elaenia) migrate through Peru en route to wintering areas farther north and so are present only for a few weeks each year. There also are species that are known to occur in Peru as austral migrants, but we do not yet know whether they remain through the nonbreeding season or occur only during migration. Species that occur in Peru strictly as austral migrants are mapped in *red*. We also show in red areas of Peru that are occupied by an austral migrant population, although the same species may be resident elsewhere in the country (e.g., Swainson's Flycatcher, Bran-colored Flycatcher, Tropical Pewee).

In a few cases, such as Tropical Kingbird and Southern Rough-winged Swallow, a resident population is augmented by migrants from farther south. If these migrants are similar (or identical) to the resident population, then migrants can be impossible to recognize as such in the field (except during those rare occasions when a flock is seen clearly in the act of migrating). Therefore, since migrants usually cannot be distinguished from residents, we do not indicate on the map where these austral migrants occur.

We also count as austral migrants some seabirds that breed in southern South America or near Australia and New Zealand. Many of the austral breeding seabirds may occur in Peru year round, in part because many of the individuals that occur in Peru are nonbreeding immatures; however, numbers may noticeably increase during the austral winter.

Overlap of residents and austral migrants becomes more interesting in cases in which the resident and migrant populations belong to different subspecies and can be identified as such in the field. An example of this is White-winged Becard in southeastern Peru, where resident males are black and males of a migrant subspecies are largely gray, facilitating recognition in the field. *Areas of overlap* between identifiably different *resident and austral migrant* populations are mapped in *pink*.

Boreal or northern migrants are species that breed in North America and migrate to Peru during the nonbreeding season. Most boreal migrants are present September–April, although some may arrive earlier or depart later. The majority of species spend the entire northern winter in Peru, but a few (e.g., Swainson's Hawk) may occur primarily as passage migrants that winter farther south. Boreal migrants are mapped in *ochre*. Very rarely (Red-eyed Vireo) there is *seasonal overlap* between *resident and boreal migrant* populations that can be distinguished in the field; this overlap is mapped in *green*.

Finally, there is an unusual situation in one species (Red-eyed Vireo) where much of Peru is occupied by two different migratory populations: boreal migrants from North America and austral migrants from southern South America. So, although the species may be present year round, it does not breed in most of this region. This unusual seasonal pattern is mapped in *orange*.

Certain species engage in *intratropical migrations*. These may be movements east/west across the Andes (e.g., the *modesta* subspecies of White-crested Elaenia), elevational movements (e.g., Black-and-white Seed eater), migrations from one region of the tropics into another (e.g., the movements into Peru, from northeastern South America, of Lesson's Seed eater), or postbreeding dispersal by seabirds southward (e.g., Waved Albatross, Galapagos Petrel) or northward (e.g., Peruvian Booby, South American Tern) from breeding areas at tropical latitudes. We map most of these nonbreeding distributions with *red* (the same color as is used for austral migrants) because the basic timing of these movements resembles that of the austral migrants. The few seabirds (including some coastal gulls and terns) that visit Peru from breeding areas to the north are mapped as northern migrants (with *ochre*). These birds are typically in Peru mostly during the period September to April.

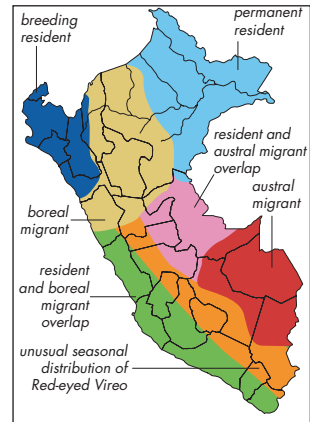


FIG. 3. KEY TO SEASONAL STATUS COLORS ON THE SPECIES DISTRIBUTION MAPS

Plates

We endeavored to illustrate all plumages that can be identified in the field, including examples of recognizable geographic variation, seasonal plumages, sexual dimorphism, and various subadult plumages. Inevitably we fell just short of our goal, but nonetheless the vast majority of the plumages shown by birds in Peru are represented. Typically all figures on a given plate are to the same scale, although the scale may vary from one plate to the next. In some cases we employ supplemental figures, at smaller scales, to illustrate additional features (such as the appearance of the bird in flight). We assume that the smaller scale used for such images is evident as such.

Abbreviations used on the plates include:

ad.	adult	juv.	juvenile	s-c	south central
alt.	alternate	nonbr.	nonbreeding	se	southeast
Amaz.	Amazonia	n	north	subad.	subadult
br.	breeding	ne	northeast	subsp.	subspecies
e	east	nw	northwest	var.	variation
imm.	immature	pops.	populations	w	west
intermed.	intermediate	s	south		

TOPOGRAPHY OF PERU

The topography of Peru is very complex, resulting in a delightful variety of habitats and bird species (fig. 4). A dominant feature of Peru is the Andean cordillera, which runs north/south down the length of country. The Andes interrupt the westward flow of air across the Amazon Basin of South America. As a result the east-facing slopes of the Andes, and Amazonian lowlands to the east, are very humid. Typically the Amazon Basin and the humid forests of the east slopes of the Andes are covered in humid evergreen forest, rich in species. Local soil differences, perhaps coupled with a history of fire, can produce less diverse forests or even scrub and savanna.

Most of Amazonian Peru is flat and low. Much of eastern Peru is little more than 300 m above sea level, despite being some 2500 km from the Atlantic Ocean. The large floodplains of the Amazon and its major tributaries (including the Napo, Marañón, Huallaga, Ucayali, Yavarí, and Madre de Dios) are wide and flat. Within these floodplains the rivers are constantly scouring out new channels, periodically leaving behind detached old bends (oxbow lakes) and forming or consuming islands. The action of the rivers contributes a variety of additional habitats that are important for birds, such as different types of river-edge forest and scrub, marshes at the edges of oxbow lakes, and the secondary vegetation that develops as older oxbow lakes slowly fill in with sediment and are reclaimed. The largest Amazonian rivers often are important barriers to bird species distribution; frequently the edge of a species' range will coincide with one bank of a river, and there is no sign of that species on the opposite bank only a short distance away.

Portions of the Amazon Basin, although still quite low in elevation, have somewhat greater relief, with series of very low hills or ridges, even far from the Andes (such as along the upper Río Purús). Areas with substantial relief are quite rare in eastern Amazonian Peru, the most notable exception being the Sierra del Divisor on the Brazilian border in central Peru, but ridges become more frequent, and increasingly higher, near the base of the Andes. The tops of these *outlying ridges* often harbor bird species that are not found in adjacent lower elevations, and that are scarce or absent at comparable elevations farther west on main slopes of the Andes.

The eastern slope of the Andes is especially humid and often exceedingly steep. Landslides are frequent. In contrast to the relatively lazy, looping courses of rivers and streams in the Amazon, Andean streams and rivers typically flow very fast. These east-facing slopes typically are forested up to 3000+ m, eventually giving way to shrub zones and grasslands, the most humid of which are termed "paramo" or "jalca." Treeline varies across Peru from about 3200 m to 3600 m. Above treeline isolated groves of *Polylepis* trees can be found, growing up to about 4500 m.

Intermontane valleys of the Andes are drier than the eastern slopes, due to rainsadow effects. The upper portions of these valleys, although less humid than east-facing slopes, still may be wet enough to support evergreen forest. Often the lower elevations in these valleys are much more arid and can be covered in deciduous forest, dry scrub, and columnar cacti. The larger dry intermontane valleys, such as the broad valley of the Río Marañón, often are barriers to the distributions of birds in humid forest. The majority of the human population of the Andes lives in intermontane valleys, however, and now much of the original vegetation in these regions is degraded or lost completely.

TOPOGRAPHY OF PERU

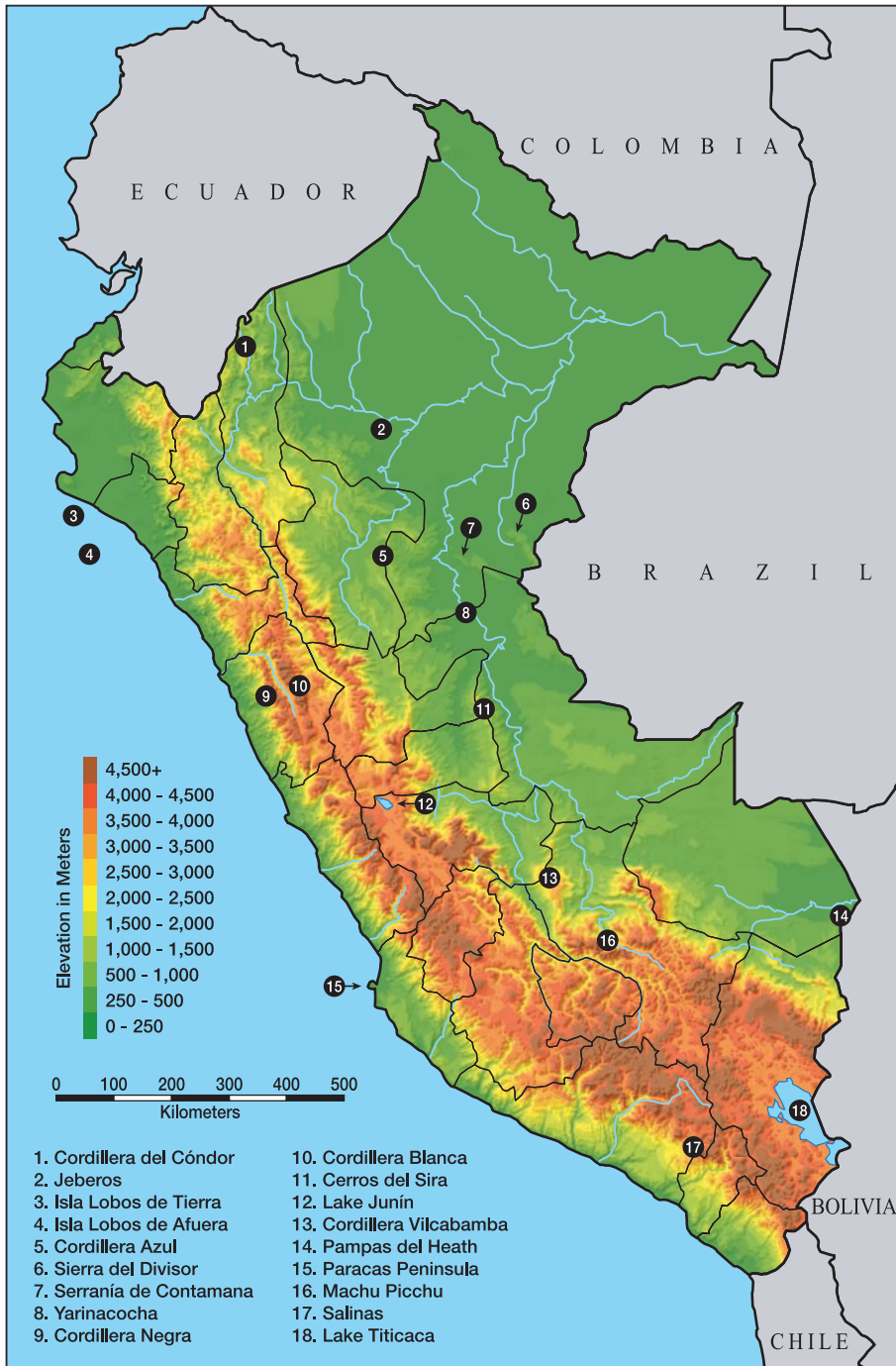


FIG. 4. RELIEF MAP OF PERU, ALSO SHOWING THE LOCATIONS OF IMPORTANT SITES MENTIONED IN THE TEXT

HABITATS OF PERU

The highest parts of the Andes, the puna, are above treeline and are covered in dry grassland up to about 5000 m, variably laced with wet meadows, bogs, lakes, and streams. Above 5000 m, most land is unvegetated rock and snow.

The western (Pacific) coast of Peru is very dry. Most of the coast of central and southern Peru is bare desert, with little or no vegetation other than on *lomas* and in river valleys. Lomas are hills near the coast that are high enough to intercept the low clouds coming in off the cold ocean and to capture, seasonally, sufficient humidity to support more vegetation than the lower, surrounding desert. Originally rivers crossing the coast would have supported riparian forest. The coastal valleys now are heavily populated, however, and are dominated by agriculture and by cities and towns. The north coast of Peru is more humid than are the central and southern sectors. Remnant deciduous forest is found at lower elevations along the coast and in the Andean foothills, south to Lambayeque; at higher elevations humid montane forest, similar to that found on the east slopes of the Andes, occurs patchily south to Cajamarca. These forested areas on the western slope always were patchy distributed, but habitat destruction has reduced their extent dramatically, and little intact forest remains.

East of the Andes there is a pronounced dry season (variable, but typically May–October) in central and southern Peru. Seasonality is much reduced in the northern portion of the Peruvian Amazon. On the coast, the winter months (May–October) are cool, and skies often are overcast; however, typically there is little or no rain in central and southern Peru, although fog may “mist” the ground (especially on lomas). Rainfall is more frequent in the northwest and tends to occur December–March.

HABITATS OF PERU

More detailed descriptions of bird habitats can be found elsewhere. Many of our habitat descriptions are based on Stotz et al. (1996); habitat names presented here in italics correspond to terms used by that source.

FOREST As used here, “forest” refers to humid lowland forests, including both *tropical lowland evergreen forests* and *flooded tropical evergreen forests*. Most of the Amazon Basin is covered by these two tropical evergreen forests. These forests typically are tall (25–40 m, with scattered emergents that can reach 50–60 m). Forests may be found on upland terraces that never flood (*terra firme*) or occupy low-lying areas that are flooded for at least a portion of the year. These seasonally flooded forests include *varzea*, transitional forests, and swamp forests, depending upon the duration of flooding. In the species accounts we refer to these habitats as “forest,” with the understanding that, in the context of a species with an Amazonian distribution, the habitat will include the full spectrum of tropical evergreen forests. We use terms such as “terra firme” or “varzea” for species that are restricted to, or particularly associated with, these types of forest.

Tropical lowland evergreen forests of much lower stature are found locally in extreme northwestern Peru, in Tumbes and perhaps in northernmost Piura.

RIVER-EDGE FOREST Amazonian rivers are bordered by a variety of lower-stature, successional vegetation, which may include grasses and other herbs or a mix of herbs and tall shrubs, such as cane (*Gynerium*), willow (*Salix*), and *Tessaria*, and low-stature forests (10–25 m tall) that form a narrow band between the river and taller forest in the interior. These forests often grow in even-aged stands and are dominated by genera such as *Cecropia* and *Ochroma*. The understory of these river-edge forests often is quite dense. Similar habitats are found on islands in the larger Amazonian rivers, especially in northern and central Amazonian Peru.

MONTANE FOREST We use *montane evergreen forest*, or humid montane forest, for the forests that cover the eastern slopes of the Andes and outlying ridges from about 500 m up to treeline. It is lower in stature than tropical evergreen forests, rarely exceeding 30 m in height; forest stature also tends to decrease with increasing elevation or steepness of terrain. The canopy often is broken, and branches and trunks of many trees are covered in moss, bromeliads, orchids, ferns, and other epiphytes. Tree species composition of montane evergreen forests usually changes significantly above 1500–1800 m, above which point epiphytes, including bryophytes, and lichens also become more prevalent. Below this elevation the montane forest contains significant elements of the lowland flora and is transitional between lowland terra firme forest and true montane forest.

ELFIN FOREST At the highest elevations (and locally much lower, depending upon soil and wind conditions), forests are particularly low and dense. These forests, which usually are on ridgetops or at treeline, sometimes are referred to as *elfin forests*.

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POLYLEPIS FOREST *Polylepis* (Rosaceae) is a genus of low trees with rugged scaly bark. They grow in more or less open groves at high elevations, typically well above other forest, and so usually are surrounded by scrub or grass. A small set of bird species is restricted to these unique woodlands.

DRY FOREST Dry forests, or *tropical deciduous forests*, are of variable stature, but rarely exceed 20–25 m in height. Most species lose all of their leaves during the dry season, which usually is pronounced where dry forests are found, but these forests may contain some evergreen species, especially along river courses or at higher elevations. Transitions to more humid forests are referred to as semideciduous forests. In Peru dry forests primarily are found on the west slope in northwestern Peru, from Tumbes south to Cajamarca or to La Libertad, and in dry intermontane valleys (such as the Chinchipe, Marañón, Huallaga, Pampas, and Urubamba valleys).

WHITE-SAND FOREST Very locally in Amazonian Peru there are sites dominated by pure white sands, or a white-sand mixture. Forests growing on such substrates typically have reduced species richness (although they are rich in endemic or habitat-specific species) and often are low in stature as well. Some of these habitats have specific local names, such as *varillal* (a lower-stature forest type that occurs on sandy soil) and *chamizal* (the most stunted white-sand forests, located on sites with poor drainage or occasional natural fires). A related forest type, *irapayal* (an open-canopy forest on poor soils with a palm-dominated understory), may occur on very weathered clays or on soils with a sandy mixture. Streams that drain white-sand areas carry heavy tannin loads, and the water often is the color of dark tea; these are referred to as *blackwater streams*. Blackwater streams also form downstream from forested swamps, including palm swamps and *Ficus* swamps. Forests influenced by sandy soil are found in northern and central Amazonian Peru on both banks of the Amazon. White sands are most developed, however, on the north bank of the Amazon, especially in the drainages of the Río Tigre, Río Nanay (including the Zona Reservada Allpahuayo-Mishana), and the lower Río Morona. White-sand sites south of the Amazon are fewer but are located at Jeberos (between the lower ríos Marañón and Huallaga); on the east bank of the lower Río Ucayali; and on both sides of the Río Blanco (a tributary of the Río Tapiche). There is a set of bird species associated with these habitats that is most diverse in forests on pure white sands, but some portion of which also occurs in other nutrient-poor habitats.

MANGROVE FOREST Mangroves are salt-tolerant trees that form low, dense forests in warm-water coastal lagoons. In Peru they are restricted to Tumbes and to northwestern Piura.

SECOND GROWTH Second growth refers to regenerating forest. Most second growth is the result of human disturbance, but second growth also is a feature of naturally disturbed habitats, such as landslides. Second-growth forests differ in species composition from adjacent undisturbed forests and are dominated by a small number of rapidly growing species. We treat the successional habitats created by river dynamics as a separate habitat.

SCRUB Scrub is a variety of plant communities that are dominated by shrubs, scattered low trees, and, in some areas, cactus or terrestrial bromeliads. Dry scrub (*arid lowland scrub*) is widespread in northwestern Peru, and dry or semihumid scrub (*arid montane scrubs* and *semihumid/humid montane scrubs*) also is characteristic of the west slopes of the Andes and of intermontane valleys. In some areas in the Andes, semihumid or humid scrub may persist in areas where the soil and climate would support montane forest in the absence of human disturbance (for example, around Cuzco).

Scrub is present very locally in Amazonia as well. The largest such site is at Jeberos, in northern Amazonia between the lower ríos Marañón and Huallaga, where habitats are a mosaic of small patches of grassland bordered by a semidry scrub, varillal forest, and taller terra firme forest. This habitat may be maintained in part by human activity. Similar scrub is found along the upper Río Mayo, a tributary of the Huallaga.

SAVANNA Savanna in Peru is found only on the Pampas del Heath, an open grassland with scattered patches of trees, shrubs, or groves of *Mauritia* palms, and penetrated along streams by tongues (*gallery forest*) of the surrounding evergreen forest. These pampas are the terminal extension of a much more extensive savanna found in adjoining Bolivia. They are maintained by fire, including fires set by humans.

PUNA Dry or semidry grasslands often cover high elevations in the Andes and are known as puna. Also characteristic of many puna sites are cushion plants, which may form broad mats. Woody vegetation is scarce in puna, apart from (local) patches of *Polylepis* (see discussion above).

GLOSSARY OF BIRD TOPOGRAPHY

PARAMO Paramos, also known in Peru as *jalcas*, are humid montane grasslands. We use this term for humid grasslands that occupy a narrow strip along the crest of the east slope of the Andes, at and just above treeline. Paramo often consists of a mosaic of grasslands with scattered shrubs and small patches of trees.

MARSH Marshes are areas with standing or very slow-moving water, filled with aquatic vegetation such as grasses, sedges, and cattails. Marshes may be freshwater or brackish. They are most common in coastal lagoons, at high elevations in the Andes, and along the edges of oxbow lakes and river channels in Amazonia.

BEACH Coastal beaches and mudflats are an important habitat for waterbirds, especially for boreal migrants from North America. Sandy beaches predominate along the coast south to central Peru, but in southern Peru rocky beaches become more common. Sandbars and the sandy margins of rivers are similar habitats in Amazonia.

LAKES AND PONDS Freshwater lakes and ponds may be found throughout Peru, including oxbow lakes in Amazonia, and lakes (sometimes quite large, such as lakes Junín and Titicaca) in the Andes. Natural lakes and ponds are scarce in western Peru, although reservoirs approximate this habitat.

ALKALINE LAKES Locally in the southern Andes are shallow (seasonally dry), brackish lakes. The most important such site in Peru is Salinas, in Arequipa.

BOGS Bogs are poorly drained, perpetually damp sites that in Peru are found only in the high Andes.

In addition to the major habitats, several “microhabitats” are mentioned in the species accounts:

BAMBOO Several bird species are largely or entirely restricted to bamboo, which is found locally in the understory of humid montane and tropical evergreen forests or (less commonly) forms large, dominant stands. Bamboo typically goes to seed at long intervals (from several years to up to 20 or so years), after which the bamboo dies (and may or may not be replaced by a new generation). Consequently at least some birds associated with bamboo are nomadic. Bamboo (primarily *Chusquea*) is widespread in montane forest along the entire length of the Andes, especially at disturbed sites, although it may be absent from some localities. Tall *Guadua* bamboo is relatively common in southern Amazonian Peru, but is very rare in central and northern Peru.

TREEFALL GAPS Treefalls in continuous forest create gaps in the forest canopy; these small forest openings facilitate the growth of dense, low vegetation, often including many vines.

ARMY ANTS Army ants (primarily *Eciton burchellii* and *Labidus praedator*) form large swarms on the floor and lower vegetation of tropical forests. Several species of birds are “professional” or “obligate” army ant followers: these birds follow columns of army ants and capture arthropods and small vertebrates that attempt to flee the ants. Many other species of birds display similar foraging behavior opportunistically but do not follow army ants on a regular basis. Other species of ants, including some that occur in the Andes, also swarm, but species other than *Eciton burchellii* and *Labidus praedator* are smaller-bodied, form smaller swarms, or are active at night, and usually do not attract ant-following birds.

GLOSSARY OF BIRD TOPOGRAPHY

Alula: Small group of feathers attached to the “thumb.”

Auricular: The feather tract covering the ear opening (a contrasting color pattern on the auriculars sometimes is called an “ear patch”). On owls and harriers, see “facial disk.”

Axillars: Feathers at the base of the underside of the wing; normally lie in the wing’s “armpit” and usually are concealed when the wing is closed.

Carpal: Refers to the “wrist” portion of the wing.

Cere: Fleshy, exposed skin surrounding the nares or the bill base, or connecting the bill to the eye.

Covert: A group of feathers that cover the bases of flight feathers (remiges and rectrices).

Culmen: The central (dorsal) ridge along the length of the maxilla.

Facial disk: The flat, semicircular auriculars of most owls and harriers.

GLOSSARY OF BIRD TOPOGRAPHY

- Gorget:** A contrasting, usually iridescent, patch of feathers on the throat of some hummingbirds.
- Graduated tail:** A tail that has progressively shorter rectrices from the central pair outward. Thus, the tip of the spread tail is wedge-shaped.
- Interscapular:** A contrasting patch of plumage on the mantle between the scapulars. Usually composed of the bases of mantle feathers, the interscapular patch may be concealed or flashed at will by a bird. Most frequently exhibited by understory antbirds.
- Lores:** The region immediately between the eye and the rictus.
- Malar:** A feather tract starting at the base of the mandible and separating the auricular and throat feather tracts.
- Mandible:** The “lower mandible” of the bill.
- Mantle:** The center of the back between the scapulars (loosely used, may include the scapulars as well).
- Maxilla:** The “upper mandible” of the bill.
- Moustache:** A stripe along the border of the auricular and malar feather tract, leading back from the rictus.
- Nares:** A bird’s nostrils.
- Orbit:** The ring of feathers or skin immediately around the eye. Orbital feathers may contrast with other face plumage as an eyering or orbital ring (when forming a complete circle) or as eye crescents or broken eyering (when only broken portions of the orbit contrast). Orbital skin also may be brightly or contrastingly colored.
- Patagium/patagial:** The portion of the wing between the “wrist” and the “elbow” (the latter is usually hidden by body plumage). Usually used in reference to the underside of the leading edge of the wing.
- Primary/primaries:** The remiges that originate at the “hand” portion of the wing. The inner primaries abut the secondaries; the outer primaries are those at the leading edge of the wing when open. Most birds have ten primaries, but some oscine passerines have only nine.
- Primary extension:** When the wing is closed, the portion of the primaries that extends beyond the end of the tertials. Short primary extension often translates to a rounded wing when opened. Long primary extension often translates to a pointed wing when opened.
- Rectrix/rectrices:** The feathers that compose the tail. The “outer rectrices” are those farthest from the center of the tail when open and are usually the rectrices visible from below when the tail is folded. The “inner” or “central rectrices” are those at the center of the tail when open and usually are those most easily visible from above when the tail is folded. Most birds have 10 or 12 rectrices (depending on the species).
- Remex/remiges:** The flight feathers of the wing. These strictly include the primaries, secondaries, and tertials, but not the wing coverts.
- Rictal bristles:** Hairlike feathers that originate by the rictus. Most prominent in insectivores.
- Rictus:** The corner of the mouth; may be fleshy and/or contrastingly colored (especially in young fledglings).
- Secondary/secondaries:** The remiges that originate from the “arm” of the wing, more basal than the primaries. The inner secondaries are those closest to the body when the wing is open; the outer secondaries are those closest to the primaries when the wing is open.
- Shaft:** A feather’s main support structure. Most streaked plumage comprises contrasting pigments along the shaft, and adjacent portions, of feathers.
- Speculum:** A contrastingly colored patch (often pale or iridescent) on the wing. Many passerines have a primary speculum, a contrasting color patch at the base of the primaries visible even when the wing is closed. Many ducks have a colored (often iridescent) speculum crossing their secondaries.
- Superciliary:** Linear feather tract from base of the bill over the eye to rear of the head; often contrastingly colored.
- Tarsus:** Lower portion of the “leg” (anatomically, composed of fused foot bones), bearing the toes.
- Tertial/tertials:** The innermost secondaries, often slightly different from the remaining secondaries in shape, in color pattern, or in both. Most bird species have only three tertials.
- Vent:** The feathering around the cloaca (loosely used, may also include the undertail coverts and/or the lower belly). Also called “crissum.”
- Web:** The broad, flat portions of a feather that grow from the feather shaft. On many remiges and rectrices, the outer web is narrower than the inner; the outermost remex and rectrix are the most asymmetric.
- Wing bars:** Contrasting tips to the wing coverts (most often the greater and median secondary coverts) that line up as a bar across the wings.
- Wing coverts:** The feathers along the leading edge of the wings that cover the remiges. Unless “primary coverts” is used, it is implied that we are referring to the secondary wing coverts.
- Lesser coverts:* The coverts closest to the leading edge of the wing.
- Median coverts:* The coverts between the lesser and greater coverts.
- Greater coverts:* The coverts farthest from the leading edge of the wing, and touching the remiges.

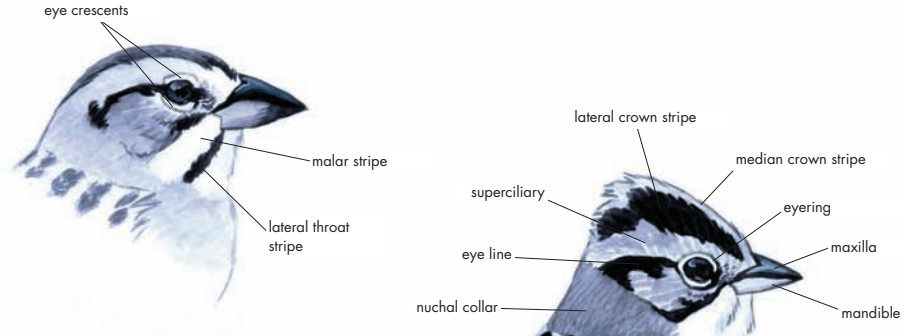
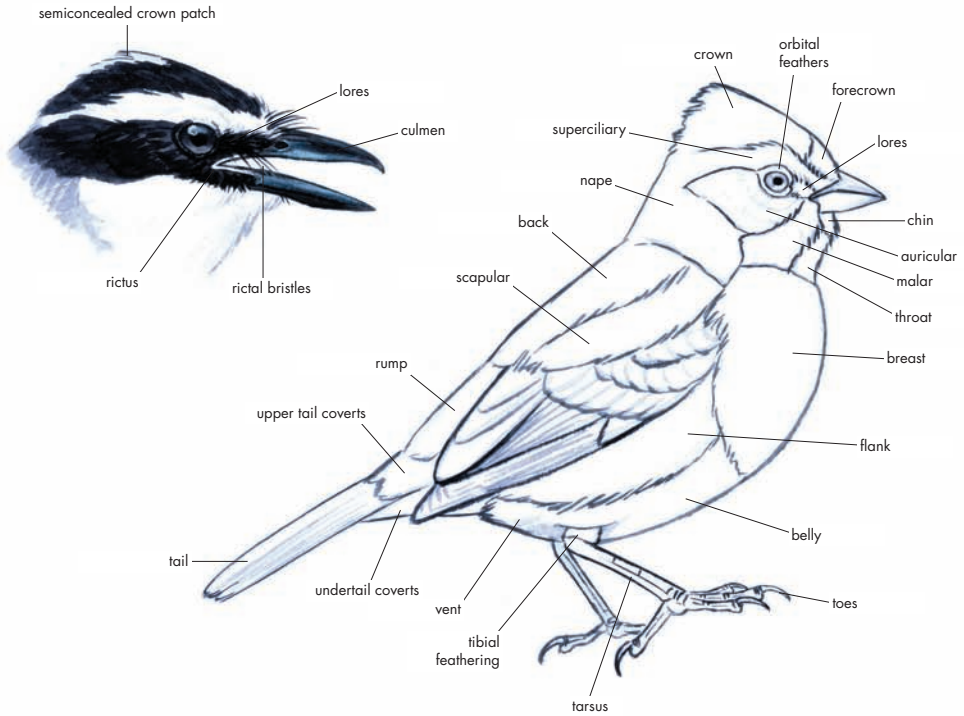


FIG. 5A. TOPOGRAPHY AND FIELD MARKS OF A BIRD: BODY AND HEAD



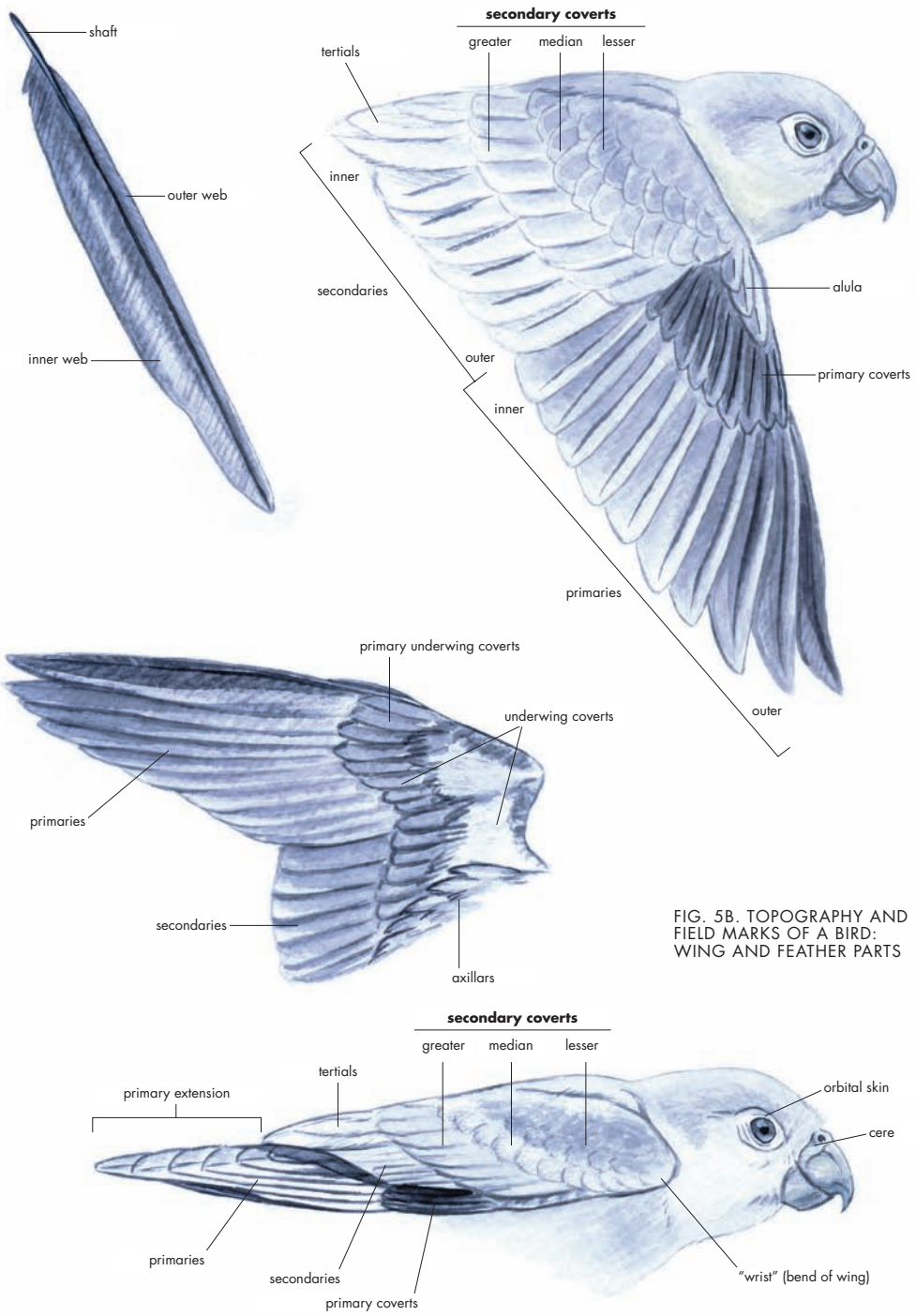


FIG. 5B. TOPOGRAPHY AND FIELD MARKS OF A BIRD: WING AND FEATHER PARTS

MOLTS AND PLUMAGES

Birds undergo a series of molts throughout their lives. In most species all feathers are replaced once a year; in many species, there also is a second, incomplete molt in which part of the plumage (typically that of the body) is replaced again. Consequently, in many species there is a period (immediately following a complete molt) when all feathers of the body are fresh; feathers in fresh condition typically are at their brightest colors and are more intact, and the plumage overall will look “even.” Note that because, in many species, some feathers may be molted twice a year (body) and others only once per year (wing and tail feathers), many birds wear two (or more) “generations” of feathers at any given time for at least part of the year.

The pattern and schedules of molts vary considerably, however. In large-bodied, long-lived species (e.g., larger seabirds and raptors), molt is more continuous. The color and pattern of the plumage of many species does not change throughout the year, at least once a bird has become an adult. In other species, however, the appearance of a bird may change significantly during the course of a year, either because the color or patterns of the plumage may change as a result of a molt, or because older feathers (i.e., those that have been worn a long time since the last molt) may become increasingly worn and faded, which sometimes can be noticeable in the field.

Plumages can be named based, in part, on the molt by which that plumage is attained. For adult birds such distinctions may be useful for species that have distinct plumages at different times of the year. This situation does not apply to the vast majority of resident birds of Peru, for which the plumage color and pattern changes little, if at all, once the bird reaches maturity. For many boreal migrants, however, and for some resident species (e.g., Black-and-white Seedeater), the plumages of adults vary throughout the year. The two fundamental plumages are the *basic plumage*, which usually is attained by a complete prebasic molt, and the *alternate plumage*, which usually is acquired during a partial prealternate molt. Molt is energetically very “costly” to a bird. Usually molting does not occur at the same time as other energetically “costly” activities, such as breeding or migrating. Typically the prebasic molt occurs following breeding; in some long-distance migrants this molt may be delayed, at least in part, until arrival on the wintering grounds. The prealternate molt typically precedes breeding. The timing of molts in resident birds at tropical latitudes is not well known, but in at least some species (or some individuals within these species?), there may be at least limited overlap of molt and breeding.

The first plumage that a bird acquires, after the short-lived downy stage, is the *juvenile plumage*; properly, the term “juvenile” refers to a bird that wears this first set of feathers, which may be retained, in whole or in part, for some time.

The molt schedules of most Peruvian birds have not been studied. In many cases we are not certain whether a particular plumage represents the juvenile plumage or instead is a distinct plumage acquired by a subsequent molt. Therefore, we frequently refer to birds as “immatures,” which is a generalized term for a bird that is not fully adult. Also, be aware that some species take several years to attain a full adult (*definitive*) plumage. This is particularly true of large-bodied species, but some small birds (e.g., some *Sporophila* seedeaters) also may take two or more years, and several molt cycles, before reaching a definitive plumage. In at least some such species, however, birds may breed before obtaining the definitive plumages. In such cases we may refer to “subadult” plumages, which is a generalized term for birds that are older than one year old but are not fully adult.

A bird in molt may show a confusing mosaic of plumages. We rarely illustrate such intermediate plumages; but for some examples of them, see the figures of Scarlet, Summer, and Hepatic tanagers.

We realize that our terminology for the plumages of many species is imprecise, but in many cases, again, this is because the understanding of the molts and plumages of Peruvian birds is incomplete. We encourage field workers and museum scientists to pay more attention to molts and plumages of Peruvian birds, and to help advance our understanding of this important aspect of bird biology.

CAUTIONARY NOTE REGARDING SEABIRD IDENTIFICATION

Knowledge of the distribution and seasonal occurrence of seabirds in Peru is very incomplete. A number of species not yet reported from Peru, most of which are not discussed in this volume, may well occur, especially far at sea near the limits of Peru's territorial waters. Be aware that the identification of many seabirds is difficult, due both to the nature of seabird plumages (typically dull in color, with relatively few strong identifying features) and to the challenging nature of seabird observation (the birds often are distant and obscured by waves, and, if they are viewed from a boat, the observer is in constant motion as well). Finally, identification criteria for many seabirds still are being developed. Identification of seabirds, especially those that typically occur far at sea, best is attempted only by experienced observers, in consultation with specialized seabird literature, and with a healthy willingness to let some birds pass unidentified.

CONSERVATION

Humans and birds have coexisted in Peru, the site of several great pre-Columbian civilizations, for millennia; throughout that time humans have been modifying the landscape to better suit their needs. In modern times, however, the natural habitats of Peru, and the birds and other species that depend upon them, face unprecedented levels of threat.

These threats primarily stem from habitat destruction, but direct persecution also poses grave risks to some species. Habitat destruction is driven not only by expanding urbanization and agriculture, such as that along rivers in the lowlands and along roads throughout Peru, but also by extractive industries such as logging, mining, and fishing. Habitat loss is a particular threat for the many species in Peru that have geographically restricted distributions and so are most vulnerable to habitat degradation or loss. We recognize 101 species as endemic to Peru, for example, and there are many others whose distributions are centered on Peru but that also narrowly spill over into adjacent countries. Many of these species, such as those found in Andean intermontane valleys, long have survived human-mediated habitat modifications, but these may become threatened if future trends of habitat loss continue unabated.

Hunting is a threat primarily to select groups of birds that are favored for food, such as waterfowl, guans, and curassows. A depressingly large variety of birds are captured and sold for the pet trade in Peru, but parrots bear the brunt of the pressure from the captive bird trade, and populations of some species now are greatly reduced from what they were only a few years ago.

We are aware of only a single species, Southern Pochard, that has been extirpated (or nearly so) from Peru during the modern era; this species, fortunately, is more widely distributed elsewhere in South America (although it is in decline throughout the continent) and in Africa. Apparently the White-faced Whistling-Duck, if it truly occurred in Peru, also has disappeared. Currently the Wattled Curassow is particularly vulnerable to extirpation within Peru, and the Orinoco Goose also is in sharp decline. Two species endemic to Peru are particularly vulnerable: the White-winged Guan, long thought to have been extinct, was rediscovered in the late 1970s, but the total population of this Peruvian endemic remains very small and threatened; and the Junin Grebe, restricted entirely to Lake Junín, has suffered drastic declines in recent decades. Many of the breeding seabirds of Peru, including Humboldt Penguin and Peruvian Diving-Petrel, also have experienced serious population declines. The populations of many other species, too numerous to list here, also show signs of decline, or at least are potentially vulnerable and bear monitoring. Further information on the conservation status of birds in Peru may be found in the following sources:

- Collar, N. J., L. P. Gonzaga, N. Krabbe, A. Madroño Nieto, L. G. Naranjo, T. A. Parker III, and D. Wege. 1992. *Threatened birds of the Americas. The ICBP/IUCN Red Data book*. 3d ed., part 2. Cambridge: International Council for Bird Preservation.
- Stotz, D. F., J. W. Fitzpatrick, T. A. Parker III, and D. K. Moskovits. 1996. *Neotropical birds: ecology and conservation*. Chicago: University of Chicago Press.
- <http://www.birdlife.org/datazone/index.html>

CONSERVATION

The government of Peru has a protected areas program that administers a nationwide system that encompasses a variety of units, including national parks (*parques nacionales*), sanctuaries (*santuarios*), reserved zones (*zonas reservadas*), and national reserves (*reservas nacionales*). The more important, for birds, of these protected areas are shown in figure 6.

Key to Fig 6.

1. Zona Reservada Güepfí
2. Zona Reservada Pucacuro
3. Zona Reservada Santiago-Comaina
4. Santuario Nacional Manglares de Tumbes
5. Parque Nacional Cerros de Amotape, Reserva Nacional Tumbes
6. Reserva Nacional Allpahuayo-Mishana
7. Reserva Nacional Pacaya-Samiria
8. Santuario Nacional Tabaconas-Namballe
9. Zona Reservada Cordillera de Colán
10. Bosque de Protección Alto Mayo
11. Refugio de Vida Silvestre Laquipampa
12. Bosque de Protección Pagaibamba (w), Parque Nacional Cutervo (n), Zona Reservada Chancaybaños (s)
13. Zona Reservada Sierra del Divisor
14. Parque Nacional Cordillera Azul
15. Parque Nacional Río Abiseo
16. Bosque de Protección Puquio Santa Rosa
17. Santuario Nacional Calipuy (n), Reserva Nacional Calipuy (s)
18. Parque Nacional Huascarán
19. Parque Nacional Tingo María
20. Reserva Comunal El Sira
21. Parque Nacional Yanachaga-Chemillén, Reserva Comunal Yanesha
22. Reserva Comunal Alto Purús
23. Parque Nacional Alto Purús
24. Zona Reservada Cordillera Huayhuash
25. Bosque de Protección San Matías-San Carlos
26. Reserva Nacional de Lachay
27. Santuario Nacional Huayllay
28. Reserva Nacional Junín
29. Zona Reservada Pampa Hermosa
30. Refugio de Vida Silvestre Pantanos de Villa
31. Bosque de Protección Pui Pui
32. Parque Nacional Otishi, Reserva Comunal Ashaninka, Reserva Comunal Machiguenga
33. Santuario Nacional Megantoni
34. Parque Nacional Manu
35. Reserva Comunal Amarakaeri
36. Reserva Nacional Tambopata
37. Parque Nacional Bahuaja-Sonene
38. Bosque de Protección A.B. Canal Nuevo Imperial
39. Reserva Nacional de Paracas
40. Santuario Nacional de Ampay
41. Reserva Nacional Pampa Galeras Barbara D'Achille
42. Reserva Nacional Titicaca
43. Reserva Nacional Salinas y Aguada Blanca
44. Santuario Nacional Lagunas de Mejía
45. Zona Reservada Aymara Lupaca

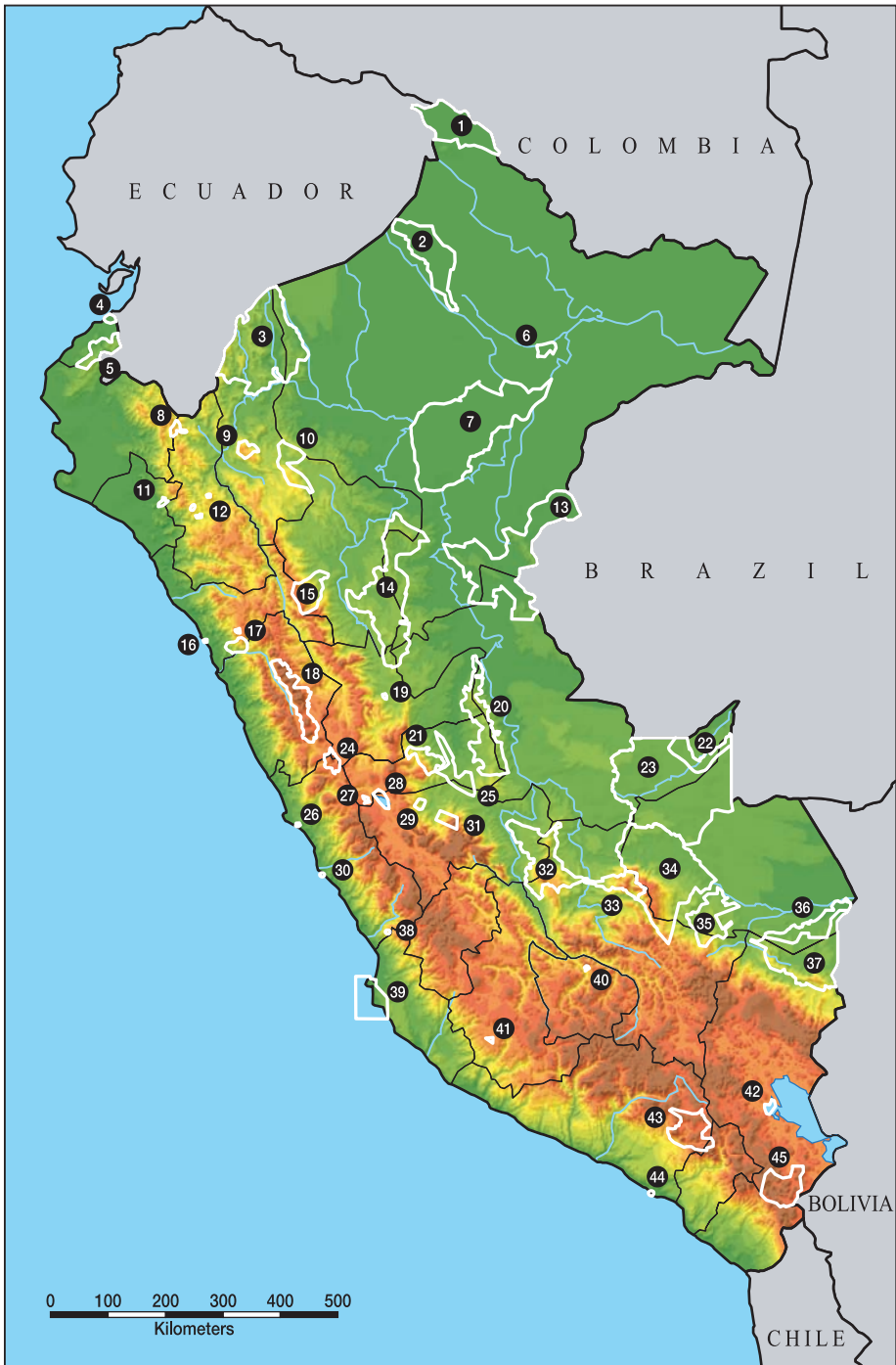


FIG. 6. THE PERUVIAN NATIONAL SYSTEM OF PROTECTED AREAS