

The Late Pleistocene Continental Avian extinction – an evaluation of the fossil evidence

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ABSTRACT: This paper is a review of the characteristics, including timing, geographic distribution and severity, of the Late Pleistocene extinction among continental birds, and an evaluation of the suggested reasons for it. The analysis shows that the Late Pleistocene avian extinctions correlate well with the mammalian megafaunal extinction with respect to severity and timing, and that many of the extinct birds were probably directly or indirectly dependent on the mammalian megafauna. A large proportion of the extinct bird species had life history traits that would have made them vulnerable to human predation.

Key Words: *Late Pleistocene, extinction, Aves, continental avifaunas, Pleistocene megafauna*

L'extinction avienne continentale du Pléistocène supérieur - un examen des données fossiles. Cet article examine les caractéristiques, y compris la chronologie, la distribution géographique et la sévérité, des extinctions du Pléistocène supérieur parmi les oiseaux continentaux, et évalue les causes qui ont été suggérées pour les expliquer. L'analyse montre que ces extinctions sont bien corrélées avec les extinctions de la mégafaune mammalienne en ce qui concerne la sévérité et la chronologie, et que beaucoup des oiseaux éteints étaient probablement directement ou indirectement dépendants de cette mégafaune. Une forte proportion des espèces éteintes d'oiseaux avaient dans leur mode de vie des caractères qui les auraient rendus vulnérables à la prédation humaine.

Mots clés: *Pléistocène supérieur, extinction, oiseaux, avifaunes continentales, mégafaune*

INTRODUCTION

The Late Pleistocene wave of faunal extinctions has been the object of a great deal of dispute and controversy, mostly with regards to the causes of the extinction. The Late Pleistocene extinction affected mostly large continental mammals, but a number of birds also became extinct.

Suggested “kill mechanisms” have ranged from hunting by humans (e. g. Martin 1967, 1984), through climatic change (either directly or by the effect on vegetation) (e. g. Graham & Lundelius 1984, Guthrie 1984) to super diseases (MacPhee & Marx 1997).

The Late Pleistocene avian extinctions, while less severe than those that affected mammalian megafaunas were nevertheless of considerable magnitude at least in North and South America and Australasia. The fact that avian extinctions *did* occur in the Late Pleistocene has as a matter of fact been used as an argument against the hypothesis that predation by humans caused the megafaunal extinction, e. g. by Grayson (1977).

The question of how and to what extent the Late Pleistocene wave of extinctions affected birds is therefore

of some relevance to the debate on the causes and consequences of the extinctions.

Since the data on Late Pleistocene avian extinctions are widely scattered and neither easy to access or evaluate I have endeavoured to collect and review them in this paper.

SCOPE AND METHOD

The focus of this review is on the avifaunas of the five main continental landmasses with Pleistocene bird records (excluding Antarctica). No insular avifaunas have been included, except for those from continental shelf islands that were parts of continents during glacial low-water stands, such as New Guinea and Java.

The reason for this is that it is by now amply clear that the recent, mostly Holocene, extinction of island birds (summarized in e. g. Milberg & Tyrberg 1992) is linked with the arrival of humans and associated animals on the respective islands. Indeed in the case of New Zealand with a good Late Pleistocene fossil record and an exceptionally good Holocene fossil record there was no Late Pleistocene peak in avian extinctions, all known Quaternary extinctions ex-

cept one (the rail *Pleistorallus flemingi* which is only known from the Middle Pleistocene (Worthy 1997)) apparently having taken place during the Late Holocene (e. g. Worthy & Holdaway 2002). A similar pattern can be discerned in other oceanic islands with an avian record extending back into the Pleistocene (e. g. Oahu (Hearty, James & Olson 2005, James 1987)).

All extinct Pleistocene continental species and subspecies proposed in the literature (c. 340) were reviewed. Of these, 97 species (28 %) which became, or probably became, extinct during the Late Pleistocene, were selected for further analysis (Tabl. 1-6, 12). The c. 245 taxa excluded (72 %) and the reason for the exclusion listed in coded form (Tabl. 7-12). The coding is as follows:

1 = Known from the Early and/or Middle Pleistocene but probably extinct before the Late Pleistocene (107 species)

2 = A valid species, but probably ancestral to an extant species and consequently not extinct (14 species).

3 = An invalid, or probably invalid, taxon (83 species)

4 = *Nomina nuda* (4 species)

5 = Probably a (chrono)subspecies of an extant species (38 species)

Several of the taxa coded '5' are distinctly larger than their extant descendants (e. g. *Gymnogyps californianus amplus* or *Geococcyx californianus conklingi*). A similar tendency for Holocene forms to be smaller than their Pleistocene ancestors is well documented among mammals.

In many cases more than one reason for rejection could have been cited, in particular many of the species coded as "1" might also have been rejected as being of dubious validity. However even including these doubtful cases only 107 species are known to have become extinct during the approximately 1,6 Ma of the Early and Middle Pleistocene compared to 97 species during the Late Pleistocene.

Since the late Pleistocene lasted c. 116,000 calendar years from the base of Oxygen Isotope Stage 5e to the beginning of the Holocene (OIS 5e through OIS 2, c. 127,000 – 11,000 calendar years BP), these figures suggest a considerably higher extinction rate during the late Pleistocene, even though the avian fossil record becomes less complete with increasing age

The quality of the data available is very different for the various continental areas. The record is fairly good for the West Palearctic and parts of North America, less satisfactory for the East Palearctic, Australia and southern South America and almost nonexistent for Africa, Southern and Southeast Asia, northern South America and Central America.

RESULTS BY AREA

Nearctic region (Tabl. 1, 7 and 12)

Good fossil record. Severe extinction, >40 species, especially large raptors and scavengers, but also a number of other large birds (turkeys, flamingos, storks...). Relatively few passerines were affected, and most of these were of medium to large size

The timing of the extinction is better constrained than in any other area. The data are consistent with the avian extinctions being contemporary with the mammalian extinctions at the very end of the Late Pleistocene and most extinctions definitely occurred after the Late Glacial Maximum (data in Tabl. 12). There seems to be a tendency that passerine extinctions occurred earlier, based on the latest record for each species in Tabl. 12. However the fossil record of small passerines is much less complete than for large birds, so this might simply be an example of the Signor-Lipps effect (i. e. that the stratigraphic gap between the last known fossil occurrence and the true extinction date is likely to be larger for a taxon that is rare in the fossil record).

The list of species that became extinct in the Late Pleistocene of North America is probably somewhat inflated. The reason for this is that when new and presumably extinct taxa were described comparisons were made with extant North American birds, but often not with Central American and South American species. Since a number of presumed extinct taxa have subsequently proven to be identical with extant neotropical forms (e. g. *Milvago chimachima* and *Vanellus chilensis* (Emslie 1998)), further comparisons seem likely to uncover more such cases. Interestingly this reflects a pattern found in mammals where a number of taxa that became extinct in North America survived in South America (e. g. *Hydrochoerus*, *Tremarctos*, *Tapirus*).

On the other hand further extinct but as yet undescribed taxa are known to exist, among others a very large owl (Olson 1984) and probably an *Aquila* eagle (A. Louchart and K. Campbell pers. comm.).

Neotropical region (Tabl. 2 and 8)

Uneven fossil record, fairly good for Argentina, but very patchy for the rest of South America and virtually zero for Central America. Probably severe extinction, >25 extinct species are known, especially large raptors and scavengers but also several ducks and a fairly wide variety of other birds. The total number of extinctions is almost certain to grow with more research. Only one extinct passerine is known from the Late Pleistocene, but Pleistocene passerines have been very little studied so their relative rarity may only be apparent.

The timing of the extinctions is not well constrained, but in most cases they occurred in the very late Pleistocene or possibly even later.

West Palearctic subregion (Tabl. 3 and 9)

Excellent fossil record. Very moderate extinction, 2 species, both large scavengers. It is unlikely that the number of extinctions will increase much, except possibly for passerines.

The extinctions apparently occurred in the latest Pleistocene.

East Palearctic subregion (Tabl. 4 and 9)

Very uneven fossil record, reasonably good for parts of Northern China and Japan, very limited elsewhere.

Probably moderate extinction, 5 species known. A wide variety of birds (ostriches, galliforms, raptors) affected. The number of extinctions seems likely to increase with more research.

The timing of the extinction is not well constrained, and some of the extinctions may actually have occurred in the Holocene.

Afrotropic region (Tabl. 10)

Very poor fossil record. Some data from South Africa and Tanzania but practically nothing from other areas. No late Pleistocene extinctions known. The fossil record being as poor as it is it is quite impossible to say whether this apparent absence of Late Pleistocene avian extinctions in Africa south of the Sahara is real or not.

Indomalayan region (Tabl. 5)

Very poor fossil record, this being the part of the world where there has been least research on Pleistocene avifaunas.

Two late Pleistocene extinctions (a raptor and a large stork) are known. As for the Afrotropic region it is impossible to judge the true extent of avian extinction at this time.

Australasian region (Tabl. 6 and 11)

Fairly good fossil record from Australia, almost no data for New Guinea.

Moderate extinction, >10 species. More undescribed Late Pleistocene extinct species are known to exist (W. E. Boles pers. comm.).

The timing of the extinction is quite uncertain except for *Genyornis*, which probably became extinct in the mid-Weichselian (ca 40 KA BP), i. e. apparently simultaneously with the megafaunal extinction (e. g. Miller et al. 1999).

A special problem in Australia is the large number of supposedly extinct Pleistocene species that were described by De Vis (1888a-b, 1889, 1891, 1892, 1906, 1911). De Vis apparently had limited access to modern comparative material and seems to have considered fossil species as being more or less extinct by definition. Most of the species he described have proven to be junior synonyms of extant species, and I have therefore chosen to exclude all of De Vis' species except those that have been re-studied and found to be valid.

CONCLUSIONS

The severity of the avian extinctions seems to be correlated with the corresponding megafaunal extinctions which were particularly severe in North America (33 genera), South America (50 genera) and Australia (21 genera) but less so in Europe (9 genera) and Africa (8 genera) (numbers from Barnosky et al. (2004)).

In North America, the only area where there is a reasonable amount of dating information associated with the extinct taxa, the extinctions seem to be concentrated at the very end of the Pleistocene (Tabl. 12). A similar pattern is seen for the mammalian extinctions.

Another similarity is that while a number of megafaunal taxa (at both generic and species level) that became extinct in North America or Eurasia at the end of the Pleistocene survived in South America and Africa and/or Southeast Asia no example of the opposite pattern seems to exist. Examples of this pattern in the Old World includes e.g. *Panthera*, *Hippopotamus* and *Crocota* and in the Americas e. g. *Hydrochoerus*, *Tremarctos* and *Tapirus*.

The same applies to birds where *Phoenicopterus*, *Ciconia* and *Spizaetus* and species like *Milvago chimachima* and *Vanellus chilensis* became extinct in North America but survived in Central/South America. In Eurasia there is admittedly only one such case, *Struthio*, which moreover only disappeared from Central and Eastern Asia and India in the Late Pleistocene but survived in Southwest Asia until quite recently.

The characteristics of the extinct species were analyzed with respect to characteristics and life-history traits that might be significant when evaluating the possible reasons for the extinctions (data in Tabl. 1-6). Traits that are not normally derivable from fossils, e. g. colonial breeding, were judged based on extant closely related species

The result of this analysis shows that the extinct birds were a far from random sample of the affected avifaunas. The following characters were found to be present in significantly higher proportions of the extinct taxa than among extant birds (Tabl. 13)

- flightlessness
- large size
- scavengers

raptors
colonial breeding

In all 52 of the 97 species (i. e. 54 %) had one or more of these characteristics compared to only about 10 % of extant birds.

Some species, particularly the larger scavengers, were presumably directly dependent on large mammals for food so their extinction was probably a direct result of the disappearance of the megafauna. This may also apply to the extinct storks since some storks (particularly *Leptoptilos*) are scavengers.

Of the characteristics above at least flightlessness, large size and colonial breeding are well documented as factors that increase the vulnerability of a bird species to hunting by humans.

It should be noted that for mammals it has been argued that the factor that predisposed the megafauna for extinction was not large size *per se*, but rather slow rate of reproduction (Johnson 2002), which is often, but not always, linked with large size.

As pointed out by Steadman & Martin (1984) many of the extinct species, while not as obviously dependent on megafauna as scavengers are, nevertheless belong to groups (lapwings, corvids, icterids) where at least some extant species have a close commensal relationship to large mammals.

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Taxon	Scavenger	Raptor	Flightless	Large	Colonial
Podicipedidae					
<i>Podilymbus wetmorei</i> STORER 1976					
Anhingidae					
<i>Anhinga beckeri</i> EMSLIE 1998				X	
Sulidae					
<i>Morus reyana</i> HOWARD 1936				X	X
Phoenicopteridae					
<i>Phoenicopus copei</i> SHUFELDT 1891				X	X
Ciconiidae					
<i>Ciconia maltha</i> MILLER 1910	?			X	?
<i>Mycteria wetmorei</i> HOWARD 1935				X	X
Cathartidae					
<i>Breagyps clarki</i> (MILLER 1910)	X			X	
Teratornithidae					
<i>Teratornis incredibilis</i> HOWARD 1952	X			X	
<i>Teratornis merriami</i> MILLER 1909	X			X	
<i>Teratornis woodburnensis</i> CAMPBELL & STENGER 2002	X			X	
<i>Cathartornis gracilis</i> MILLER 1910	X			X	
Anatidae					
<i>Branta dickeyi</i> MILLER 1924				X	
<i>Anabernicula gracilentata</i> ROSS 1935					
<i>Anas schneideri</i> EMSLIE 1985					
<i>Anas itchtucknee</i> MC COY 1963					
Accipitridae					
<i>Neophrontops americanus</i> MILLER 1916	X				
<i>Spizaetus grinnelli</i> (MILLER 1911)		X			
<i>Buteogallus fragilis</i> (MILLER 1911)		X			
<i>Buteogallus milleri</i> (HOWARD 1932)		X			
<i>Amplibuteo woodwardi</i> (MILLER 1911)		X		X	
<i>Wetmoregyps daggetti</i> (MILLER 1915)		X			
<i>Spizaetus willetti</i> HOWARD 1935		X			
<i>Neogyps errans</i> MILLER 1916	X				
Tetraonidae					
<i>Dendragapus gilli milleri</i> JEHL 1969					
<i>Tympanuchus ceres</i> (SHUFELDT 1913)					
Odontophoridae					
<i>Neortyx peninsularis</i> HOLMAN 1961					
Meleagrididae					
<i>Meleagris crassipes</i> MILLER 1940				X	
<i>Meleagris californicus</i> (MILLER 1909)				X	
Gruidae					
<i>Grus pagei</i> CAMPBELL 1995				X	
Rallidae					
<i>Rallus natator</i> (MILLER 1942)					
Charadriidae					
<i>Belonopterus downsi</i> CAMPBELL 2002					
Scolopacidae					
<i>Numenius victima</i> (MILLER 1942)					
Alcidae					
<i>Fratercula dowi</i> GUTHRIE, THOMAS & KENNEDY 2002					X
Strigidae					
<i>Bubo sinclairi</i> MILLER 1911					
<i>Asio priscus</i> HOWARD 1964					
<i>Strix brea</i> HOWARD 1933					
Hirundinidae					
<i>Tachycineta speleodytes</i> BRODKORB 1957					X
Troglodytidae					
<i>Cistothorus brevis</i> BRODKORB 1957					
Corvidae					
<i>Henocitta brodkorbii</i> HOLMAN 1959					
<i>Corvus neomexicanus</i> MAGISH & HARRIS 1976					
Icteridae					
<i>Pandanaris convexa</i> MILLER A H 1947					
<i>Pandanaris floridana</i> BRODKORB 1957					
<i>Pyelorchampus molothroides</i> A H MILLER 1932					
<i>Cremaster tyththus</i> BRODKORB 1959					
<i>Euphagus magnirostris</i> A H MILLER 1929					
Emberizidae					
<i>Pipilo angelensis</i> DAWSON 1948					
Total: 46 species	7	6	0	15	5
Percentage:	(15 %)	(13 %)		(32 %)	(10%)

Table 1 - Avian extinctions during the Late Pleistocene in continental North America and numbers and percentages of the extinct species sharing some observed and conjectural characters.

Taxon	Scavenger	Raptor	Flightless	Large	Colonial
Rheidae					
<i>Rhea fossilis</i> AMEGHINO 1882			X	X	
Ciconiidae					
<i>Procionia lydekkeri</i> AMEGHINO 1891				X	X?
Cathartidae					
<i>Sarcoramphus? fisheri</i> CAMPBELL 1979	X			X	
<i>Geronogyys reliquus</i> CAMPBELL 1979	X			X	
<i>Gymnogyys howardae</i> CAMPBELL 1979	X			X	
<i>Wingegyys cartellei</i> ALVARENGA & OLSON 2004	X				
Ardeidae					
<i>Syrigma sanctimartini</i> CAMPBELL 1979					X
Threskiornithidae					
<i>Theristicus wetmorei</i> CAMPBELL 1979					X
<i>Eudocimus peruvianus</i> CAMPBELL 1979					X
Anatidae					
<i>Anas amotape</i> CAMPBELL 1979					
<i>Anas sanctahelenae</i> CAMPBELL 1979					
<i>Anas talarae</i> CAMPBELL 1979					
<i>Nannonetta invisitata</i> CAMPBELL 1979					
<i>Neochen debilis</i> AMEGHINO 1891					
<i>Neochen pugil</i> WINGE 1888					
Accipitridae					
<i>Buteo hoffstetteri</i> CAMPBELL 1976		X			
<i>Amplibuteo hibbaridi</i> CAMPBELL 1979		X		X	
<i>Miraquila terrestris</i> CAMPBELL 1979		X		X	
Falconidae					
<i>Milvago brodkorbi</i> CAMPBELL 1979	X	X			
Charadriidae					
<i>Oreopholus orcesi</i> CAMPBELL 1976					
<i>Viator picis</i> CAMPBELL 1979					
<i>Belonopterus edmundi</i> (CAMPBELL 1979)					
Scolopacidae					
<i>Tringa ameghini</i> CAMPBELL 1979					
<i>Micropalama chapmani</i> CAMPBELL 1979					
<i>Nuntius solitarius</i> CAMPBELL 1979					
Phalaropidae					
<i>Steganopus graui</i> CAMPBELL 1979					
Thinocoridae					
<i>Thinocorus koepckeae</i> CAMPBELL 1979					
Caprimulgidae					
<i>Caprimulgus piurensis</i> CAMPBELL 1979					
Furnariidae					
<i>Pseudoseisuropsis cuelloi</i> CLARAMUNT & RINDERKNECHT 2005					
Total: 29 species	5 (18 %)	4 (14 %)	1 (3 %)	7 (24 %)	4 (14 %)

Table 2 - Avian extinctions during the Late Pleistocene in continental South America and numbers and percentages of the extinct species sharing some observed and conjectural characters.

Taxon	Scavenger	Raptor	Flightless	Large	Colonial
Accipitridae					
<i>Gyps melitensis</i> LYDEKKER 1890	X			X	
<i>Aegyptius prepyrenaicus</i> HERNANDEZ 2001	X			X	
Total: 2 species	2 (100 %)			2 (100 %)	

Table 3 - Avian extinctions during the Late Pleistocene in the continental West Palearctic and numbers and percentages of the extinct species sharing some observed and conjectural characters.

Taxon	Scavenger	Raptor	Flightless	Large	Colonial
Struthionidae					
<i>Struthio anderssoni</i> LOWE & BATE 1931			X	X	
Falconidae					
<i>Falco chowi</i> HOU 1982					
Phasianidae					
<i>Phasianus yanshansis</i> HUANG & HOU 1984					
<i>Tetrastes daliannsis</i> (HOU 1992)					
Corvidae					
<i>Corvus fangshannus</i> HOU 1993					
Total: 5 species			1 (20 %)	1 (20 %)	

Table 4 - Avian extinctions during the Late Pleistocene in the continental East Palearctic and numbers and percentages of the extinct species sharing some observed and conjectural characters.

Taxon	Scavenger	Raptor	Flightless	Large	Colonial
Ciconiidae					
<i>Leptoptilos titan</i> WETMORE 1940	X?			X	X?
Accipitridae					
<i>Buteo sanya</i> HOU 1998		X			
Total: 2 species	1 (50%)	1 (50 %)		1 (50 %)	1 (50 %)

Table 5 - Avian extinctions during the Late Pleistocene in the Indomalayan region and numbers and percentages of the extinct species sharing some observed and conjectural characters.

Taxon	Scavenger	Raptor	Flightless	Large	Colonial
Casuaridae					
<i>Casuarus lydekkeri</i> ROTHSCHILD 1911			X	X	
Pelecanidae					
<i>Pelecanus cadimurka</i> RICH & VAN TETS 1981				X	X
Phoenicopteridae					
<i>Xenorhynchopsis minor</i> DE VIS 1906				X	X
<i>Xenorhynchopsis tibialis</i> DE VIS 1906				X	X
<i>Ocyplanus proeses</i> DE VIS 1906				X	X
<i>Palaelodus wilsoni</i> BAIRD & RICH 1998				X	X?
Dromornithidae					
<i>Genyornis newtoni</i> STIRLING & ZIETZ 1896			X	X	X?
Accipitridae					
<i>Necrastur alacer</i> DE VIS 1892	?	X		X?	
<i>Taphaetus brachialis</i> (HURST 1891)	?	X		X?	
Cuculidae					
<i>Centropus colossus</i> BAIRD 1985				X	
Orthonychidae					
<i>Orthonyx hypsilophus</i> BAIRD 1985					
<i>Orthonyx wakefieldi</i> BAIRD 1993					
Acanthizidae					
<i>Pycnoptilus fordi</i> BAIRD 1993					
Total: 13 species	0	2 (15%)	2 (15 %)	10 (77 %)	6 (54 %)

Table 6 - Avian extinctions during the Late Pleistocene in the Australian region and numbers and percentages of the extinct species sharing some observed and conjectural characters.

Taxon	Reason for rejection	References/Notes
Gaviidae		
<i>Gavia concinna</i> WETMORE 1940	1	Described from the Pliocene but occurs in the Early Pleistocene in Florida (e. g. Emslie 1998)
Podicipedidae		
<i>Aechmophorus lucasi</i> MILLER 1910	5	= <i>Aechmophorus occidentalis lucasi</i> (Brodkorb 1963)
<i>Podiceps parvus</i> (SHUFELDT 1913)	1	
<i>Podiceps dixi</i> BRODKORB 1963	5	<i>Podiceps auritus dixi</i> (Steadman 1984, Emslie 1995, 1998)
<i>Podilymbus magnus</i> (SHUFELDT 1913)	3	= <i>Podilymbus podiceps</i> (Storer 1976)
Ardeidae		
<i>Palaeophoxycolumbiana</i> MC COY 1963	3	This was shown to be a composite of <i>Botaurus lentiginosus</i> and <i>Tyto alba</i> by Olson (1974).
<i>Butorides validipes</i> CAMPBELL 1976	1	
<i>Ardea paloccidentalis</i> SHUFELDT 1891	1	Only known from Fossil Lake, Ore. where the fossils are of very variable age, from Late Pleistocene to Blancan (only noted as "Fossil Lake" below) (cf. McCarville 2003)
<i>Ardea sellardsi</i> SHUFELDT 1916	3	Actually <i>Meleagris gallopavo</i> (Wetmore 1931)
Phalacrocoracidae		
<i>Phalacrocorax idahensis</i> (MARSH 1870)	1	Described from the Pliocene but occurs in the Early Pleistocene in Florida (Emslie 1998)
<i>Phalacrocorax chapalensis</i> ALVAREZ 1977	1	Alvarez 1977
<i>Phalacrocorax macropus</i> (COPE 1878)	1	"Fossil Lake"
Threskiornithidae		
<i>Ajaia chione</i> EMSLIE 1995	1	
<i>Eudocimus leiseyi</i> EMSLIE 1995	1	
Phoenicopteridae		
<i>Phoenicopterus minutus</i> HOWARD 1955	1	
Ciconiidae		
<i>Jabiru? weillisi</i> SELLARDS 1916	3	= <i>Ciconia maltha</i> (Brodkorb 1963)
Cathartidae		
<i>Gymnogyps amplus</i> MILLER 1911	5	= <i>Gymnogyps californianus amplus</i>
<i>Gymnogyps kofordi</i> EMSLIE 1988	1	
<i>Coragyps shastensis</i> (MILLER 1911)	3	= <i>Coragyps atratus occidentalis</i> (ref. Miller 1941)
<i>Coragyps occidentalis</i> MILLER 1909	2	= <i>Coragyps atratus occidentalis</i>
Teratornithidae		
<i>Pleistogyps rex</i> MILLER 1910	3	= <i>Teratornis merriami</i>
Anatidae		
<i>Cygnus matthewi</i> (SHUFELDT 1913)	1	"Fossil Lake", = <i>Cygnus paloregonus</i>
<i>Cygnus paloregonus</i> COPE 1878	1	"Fossil Lake"
<i>Anser hypsibatus</i> COPE 1878	1	"Fossil Lake"
<i>Anser condoni</i> SHUFELDT 1891	1	"Fossil Lake", = <i>Cygnus paloregonus</i>
<i>Branta propinqua</i> SHUFELDT 1891	1	"Fossil Lake"
<i>Anabernicula oregonensis</i> HOWARD 1964	1	"Fossil Lake". A Late Pleistocene record from New Mexico is uncertain (Howard 1970)
<i>Anabernicula robusta</i> SHORT 1970	1	
<i>Querquedula floridana</i> SHUFELDT 1916	3	
<i>Chendytes milleri</i> HOWARD 1955	1	
<i>Oxyura bessomi</i> Howard 1963	1	Described from the Pliocene but occurs in the Pleistocene in Texas (Brodkorb 1963)
Accipitridae		
<i>Neophrontops slaughteri</i> FEDUCCIA 1974	1	Described from the Pliocene but occurs in the Early Pleistocene in Florida (Emslie 1998)
<i>Neophrontops vallecitoensis</i> HOWARD 1963	1	
<i>Amplibuteo concordatus</i> EMSLIE & CZAPLEWSKI 1999	1	Emslie 1998, Emslie & Czaplewski 1999
<i>Aquila sodalis</i> SHUFELDT 1891	1	"Fossil Lake"
<i>Aquila bivia</i> EMSLIE & CZAPLEWSKI 1999	1	Emslie 1998, Emslie & Czaplewski 1999
<i>Spizaetus plioagryps</i> (SHUFELDT 1891)	1	"Fossil Lake"
<i>Spizaetus tanneri</i> MARTIN 1971	1	
Falconidae		
<i>Falco oregonus</i> HOWARD 1946	1	"Fossil Lake"
<i>Falco readei</i> BRODKORB 1959	5	Restudied by Campbell (1980) who moved it to the genus <i>Milvago</i> as <i>Milvago readei</i> . Emslie (1998) compared <i>Milvago readei</i> with a larger material of <i>Milvago chimachima</i> and found most of the characters used by Campbell to be within the range of variation of <i>Milvago chimachima</i> . The Pleistocene form is however slightly larger and more robust which probably qualifies it as a temporal subspecies <i>Milvago chimachima readei</i> .

<i>Falco swarthi</i> MILLER 1927	3	= <i>Falco rusticolus</i> (Emslie 1985)
<i>Caracara prelutosa</i> HOWARD 1938	5	= <i>Polyborus plancus prelutosus</i>
Tetraonidae		
<i>Dendragapus gilli</i> (SHUFELDT 1891)	1	"Fossil Lake". However see <i>Dendragapus gilli milleri</i> in Table 1.
<i>Dendragapus lucasi</i> (SHUFELDT 1891)	1	"Fossil lake"
<i>Dendragapus nanus</i> (SHUFELDT 1891)	1	"Fossil lake"
Odontophoridae		
<i>Colinus suilium</i> BRODKORB 1959	5	= <i>Colinus virginianus suilium</i>
Meleagrididae		
<i>Meleagris altus</i> MARSH 1870	3	= <i>Meleagris gallopavo</i> (cf Steadman 1980)
<i>Meleagris tridens</i> WETMORE 1931	3	= <i>Meleagris gallopavo</i> (Steadman 1980)
<i>Meleagris anza</i> (HOWARD 1963)	1	
<i>Meleagris leopoldi</i> (A H MILLER & BOWMAN 1956)	1	
<i>Meleagris oklahomensis</i> (SANDOZ & STOVALL 1936)	4	
<i>Meleagris superbus</i> COPE 1870	3	= <i>Meleagris gallopavo</i> (cf Steadman 1980)
<i>Meleagris celer</i> MARSH 1872	3	= <i>Meleagris gallopavo</i> (cf Steadman 1980)
<i>Meleagris richmondi</i> SHUFELDT 1915	3	= <i>Meleagris californicus</i> (Steadman 1980)
Gruidae		
<i>Grus minor</i> MILLER 1910	3	= <i>Grus canadensis</i> (Miller 1925)
Phorusrhacidae		
<i>Titanis walleri</i> BRODKORB 1963	1	A record from southern Texas (Baskin 1995) may be Late Pleistocene, but the dating is uncertain
Rallidae		
<i>Fulica minor</i> SHUFELDT 1891	5	This was renamed <i>Fulica shufeldti</i> by Brodkorb (1964), since <i>Fulica minor</i> was preoccupied. It is however only a chronosubspecies <i>Fulica americana shufeldti</i>
<i>Gallinula brodkorbi</i> MC COY 1963	5	= <i>Gallinula chloropus brodkorbi</i>
<i>Porzana auffenbergi</i> BRODKORB 1954	5	= <i>Porzana limicola auffenbergi</i>
<i>Laterallus guti</i> (BRODKORB 1952)	1	
Charadriidae		
<i>Dorypaltus phosphatus</i> BRODKORB 1959	3	Synonymized with <i>Vanellus chilensis</i> (Emslie 1998), which is however slightly larger.
<i>Burhinus aquilonaris</i> FEDUCCIA 1980	1?	The age and status of this form needs further study. <i>Burhinus</i> of uncertain taxonomic status have been reported from the Late Pleistocene of New Mexico (Howard 1971)
Scolopacidae		
<i>Scolopax hutchensi</i> EMSLIE 1998	1	
Stercorariidae		
<i>Stercorarius shufeldti</i> HOWARD 1946	1	"Fossil lake"
Laridae		
<i>Larus oregonus</i> SHUFELDT 1891	1	"Fossil lake"
<i>Larus robustus</i> SHUFELDT 1891	1	"Fossil lake"
<i>Larus vero</i> SHUFELDT 1916	3	
Alcidae		
<i>Uria affinis</i> MARSH 1872	3	
Cuculidae		
<i>Geococcyx conklingi</i> HOWARD 1931	5	= <i>Geococcyx californianus conklingi</i>
Strigidae		
<i>Otus guildayi</i> BRODKORB & MOURER-CHAUVIRE 1984	1	
<i>Glaucidium explorator</i> EMSLIE 1998	1	
Corvidae		
<i>Protocitta dixi</i> BRODKORB 1957	3	= <i>Pica pica</i> (Emslie 1998)
<i>Protocitta ajax</i> BRODKORB 1972	1	<i>Protocitta</i> doubtfully separate from <i>Calocitta/Psilorhinus</i> (Steadman & Martin 1985)
<i>Corvus shufeldti</i> SHARPE 1909	1	"Fossil lake". Originally described as <i>Corvus annectens</i> by SHUFELDT (1891), which is however preoccupied. Probably indeterminate.
Icteridae		
<i>Scolecophagus affinis</i> SHUFELDT 1891	1	"Fossil lake"

Table 7 - Taxa described as extinct from the Pleistocene of North America but not included among Late Pleistocene extinctions (total 75 taxa).

Taxon	Reason for rejection	References/Notes
Rheidae		
<i>Rhea azarae</i> MORENO & MERCERAT 1891	3	Undeterminable at species level (Tonni 1980)
<i>Rhea pampeana</i> MORENO & MERCERAT 1891	3	= <i>Rhea fossilis</i> (cf Table 2)
<i>Rhea anchorensis</i> AMEGHINO & RUSCONI 1932	1	Ensenadan (=Early/Middle Pleistocene) age
Tinamidae		
<i>Nothura paludosa</i> MERCERAT 1897	3	Unillustrated and probably undeterminable
<i>Querandornis romani</i> RUSCONI 1958	1	Ensenadan age. Position in Tinamidae questionable (Tonni 1980).
Anhingidae		
<i>Gigahinga kiyuensis</i> RINDERKNECHT & NORIEGA 2002	1	
Anatidae		
<i>Archeoquerquedula lambrechtii</i> SPILLMAN 1942	3	= <i>Anas bahamensis</i> (Campbell 1979)
Accipitridae		
<i>Lagopterus minutus</i> MORENO & MERCERAT 1891	3	Holotype lost. Perhaps a <i>Polyborus</i> (Tonni 1980).
Phorusrhacidae		
<i>Andalgalornis deautieri</i> (KRAGLIEVICH 1931)	1	Ensenadan age
Rallidae		
<i>Euryonotus argentinus</i> MERCERAT 1897	3	Unillustrated and probably undeterminable
<i>Euryonotus brachypterus</i> MERCERAT 1897	3	Unillustrated and probably undeterminable
Psittacidae		
<i>Aratinga roosevelti</i> (SPILLMAN 1942)	3	Doubtfully separate from extant <i>Aratinga</i> species (Campbell 1976)
<i>Pionus ensenadensis</i> CATTOI 1957	1	Ensenadan age
Laridae		
<i>Pseudosterna degenei</i> MERCERAT 1897	3	Unillustrated and probably undeterminable
<i>Pseudosterna pampeana</i> MERCERAT 1897	3	Unillustrated and probably undeterminable
Furnariidae		
<i>Cinclodes major</i> TONNI 1977	1	Ensenadan age
<i>Pseudoseisura cursor</i> TONNI & NORIEGA 2001	1	Ensenadan age
<i>Pseudoseisuropsis nehuen</i> NORIEGA 1991	1	Ensenadan age
Emberizidae		
<i>Zonotrichia robusta</i> TONNI 1970	1	Ensenadan age

Table 8 - Taxa described as extinct from the Pleistocene of South America but not included among Late Pleistocene extinctions (total 19 taxa).

Taxon	Reason for rejection	References/Notes
Struthionidae		
<i>Struthio pannonicus</i> (KRETZOI 1954)	1	
<i>Struthio dmanisensis</i> BURCHAK-ABRAMOVICH & VEKUA 1990	1	
<i>Psammornis lybicus</i> MOLTONI 1928	3	= <i>Struthio camelus</i>
Pelecanidae		
<i>Pelecanus crispus palaeocrispus</i> SEREBROVSKII 1940	5	
Ciconiidae		
<i>Ciconia stehlini</i> JANOSSY 1992	1	
<i>Pelargosteon tothi</i> KRETZOI 1962	1	
Anatidae		
<i>Cygnus olor bergmani</i> SEREBROVSKII 1940	5	
<i>Anser subanser</i> JANOSSY 1983	2	Probably ancestral to <i>Anser anser</i>
<i>Anser azerbaijanicus</i> SEREBROVSKII 1940	1	
<i>Anas arcensis</i> KRETZOI 1962	4	

<i>Anas crecca percrecca</i> JANOSSY 1992	5	
<i>Anas platyrhynchos palaeoboschas</i> SEREBROVSKII 1940	5	
<i>Aythya aretina</i> (PORTIS 1889)	1	
<i>Aythya sepulta</i> (PORTIS 1889)	1	
<i>Aythya marila asphaltica</i> SEREBROVSKII 1940	5	
<i>Bucephala angustipes</i> JANOSSY 1965	1	
<i>Somateria gravipes</i> HARRISON 1979	1	
<i>Mergus connectens</i> JANOSSY 1972	1	
Accipitridae		
<i>Milvus pygmaeus</i> TCHERNOV 1980	1	
<i>Haliaeetus angustipes</i> JANOSSY 1983	1	
<i>Gypaetus osseticus</i> BURCHAK-ABRAMOVICH 1971	1	
<i>Gyps melitensis aegyptoides</i> JANOSSY 1983	1	
<i>Gyps fulvus spelaeus</i> FRIANT 1950	3	
<i>Torgus tracheliotus todei</i> KLEINSCHMIDT 1953	3	
<i>Vultur fossilis</i> GERMAR 1826	3	
<i>Accipiter gentilis breviodactylus</i> MOURER-CHAUVIRE 1975	5	
<i>Buteo rufinus jansoni</i> MOURER-CHAUVIRE 1975	5	
<i>Aquila chrysaetos bonifaci</i> MOURER-CHAUVIRE 1975	5	
<i>Buthierax pouliani</i> KRETZOI 1977	3	= <i>Buteo rufinus jansoni</i> (Louchart, Bedetti & Pavia 2005)
Falconidae		
<i>Falco tinnunculus atavus</i> JANOSSY 1972	5	
<i>Falco antiquus</i> MOURER-CHAUVIRE 1975	2	Probably ancestral to <i>Falco rusticolus</i> and <i>Falco cherrug</i>
Phasianidae		
<i>Alectoris baryosefi</i> TCHERNOV 1980	1	
<i>Alectoris graeca martelensis</i> MOURER-CHAUVIRE 1975	5	
<i>Alectoris graeca mediterranea</i> MOURER-CHAUVIRE 1975	5	
<i>Alectoris peii</i> HOU 1982	1	
<i>Alectoris sutcliffei</i> HARRISON 1980	3	= <i>Perdix perdix</i> (Stewart 1996)
<i>Francolinus subfrancolinus</i> JANOSSY 1977	1	
<i>Francolinus minor</i> JANOSSY 1974	1	
<i>Francolinus capeki</i> LAMBRECHT 1933	1	
<i>Perdix jurcsaki</i> KRETZOI 1962	3	
<i>Perdix palaeoperdix</i> MOURER-CHAUVIRE 1975	2	Probably ancestral to <i>Perdix perdix</i>
<i>Palaeocryptonyx donnezani</i> DEPERET 1892	1	Described from the Pliocene but occurs in the Pleistocene in Czechia (Mlikovsky 1996b)
<i>Gallus europaeus</i> HARRISON 1978	3	
<i>Gallus gallus levantinus</i> PICHON & TCHERNOV 1987	5	
<i>Gallus karabachensis</i> BURCHAK-ABRAMOVICH & ALIEV 1989	1	
<i>Gallus kudarensis</i> GANYA & BURCHAK-ABRAMOVICH 1992	4	
<i>Pavo bravardi</i> (GERVAIS 1849)	1	
<i>Crossoptilon jiai</i> HOU 1982	1	
<i>Phasianus hermoni</i> BATE 1927	1	
<i>Phasianus nicheti</i> BASTIN 1933	3	Very nearly a <i>nomen nudum</i> .
Tetraonidae		
<i>Tetrastes praebonasia</i> JANOSSY 1974	2	Probably ancestral to <i>Tetrastes bonasia</i>
<i>Lagopus lagopus noailensis</i> MOURER-CHAUVIRE 1975	5	
<i>Lagopus mutus corzezensis</i> MOURER-CHAUVIRE 1975	5	
<i>Lagopus voinstvenskii</i> GANYA 1972	3	= <i>Lagopus lagopus</i> (Olga Potapova pers. comm.)
<i>Tetrao tetrax longipes</i> MOURER-CHAUVIRE 1975	5	
<i>Tetrao partium</i> (KRETZOI 1962)	2	Probably ancestral to <i>Tetrao tetrax</i>
<i>Tetrao praeurogallus</i> JANOSSY 1969	2	Probably ancestral to <i>Tetrao urogallus</i>
Rallidae		
<i>Gallinula gigantea</i> TCHERNOV 1980	1	
<i>Fulica stekelesi</i> TCHERNOV 1968	1	
Gruidae		

<i>Grus bohatshevi</i> (SEREBROVSKII 1940)	1	
Otididae		
<i>Otis kalmanni</i> JANOSSY 1972	1	
<i>Otis lambrechtii</i> KRETZOI 1941	1	
<i>Pleotis liui</i> HOU 1982	1	
Scolopacidae		
<i>Philomachus binagadensis</i> SEREBROVSKII 1940	1	
<i>Philomachus pugnax rhyphaeicus</i> POTAPOVA 1990	5	
<i>Scolopax rusticola magnus</i> POTAPOVA 1990	5	
Stercorariidae		
<i>Stercorarius pomarinus philippi</i> MOURER-CHAUVIRE 1975	5	
Columbidae		
<i>Columba livia lazaretensis</i> MOURER-CHAUVIRE 1975	5	
<i>Columba livia minuta</i> MOURER-CHAUVIRE 1975	5	
<i>Columba livia occitanica</i> MOURER-CHAUVIRE 1975	5	
<i>Columba congi</i> HOU 1982	1	
Tytonidae		
<i>Tyto jinniushanensis</i> HOU 1989	4	
Strigidae		
<i>Bubo binagadensis</i> BURCHAK-ABRAMOVICH 1965	1	
<i>Bubo bubo davidi</i> MOURER-CHAUVIRE 1975	5	
<i>Nyctea scandiaca gallica</i> MOURER-CHAUVIRE 1975	5	
<i>Surnia caepki</i> JANOSSY 1972	1	
<i>Surnia robusta</i> JANOSSY 1978	1	
<i>Athene veta</i> JANOSSY 1974	1	
<i>Athene noctua lunellensis</i> MOURER-CHAUVIRE 1975	5	
<i>Strix intermedia</i> JANOSSY 1972	2	Probably ancestral to <i>Strix aluco</i> and <i>Strix uralensis</i>
Apodidae		
<i>Apus apus palapus</i> JANOSSY 1974	5	
<i>Apus submelba</i> JANOSSY 1969	2	Probably ancestral to <i>Apus melba</i>
Caprimulgidae		
<i>Caprimulgus fossilis</i> CAPEK 1917	3	
Upupidae		
<i>Upupa phoeniculoides</i> JANOSSY 1974	1	
Picidae		
<i>Dendrocopos praemedius</i> JANOSSY 1972	2	Probably ancestral to <i>Dendrocopus medius</i>
<i>Dendrocopos submajor</i> JANOSSY 1974	2	Probably ancestral to <i>Dendrocopus major</i>
Alaudidae		
<i>Alauda jordanica</i> TCHERNOV 1968	1	
<i>Melanocorypha gracilis</i> TCHERNOV 1968	1	
Troglodytidae		
<i>Troglodytes gracilis</i> BRUNNER 1958	3	Only determinable as a small passerine from the figure in Brunner (1958)
Corvidae		
<i>Garrulus glandarius assiduus</i> PANTELEYEV & BURCHAK-ABRAMOVICH 2000	5	
<i>Pica pica major</i> JANOSSY 1972	2	Probably ancestral to <i>Pica pica</i>
<i>Pyrrhocorax graculus vetus</i> KRETZOI 1962	5	
<i>Pyrrhocorax pyrrhocorax primigenius</i> MILNE-EDWARDS 1875	5	
<i>Corvus antecorax</i> MOURER-CHAUVIRE 1975	2	Probably ancestral to <i>Corvus corax</i>
<i>Corvus betfianus</i> KRETZOI 1962	1	
<i>Corvus crassipennis</i> GIEBEL 1847	3	
<i>Corvus fossilis</i> GIEBEL 1847	3	
<i>Corvus hungaricus</i> LAMBRECHT 1915	1	
<i>Corvus moravicus</i> MLIKOVSKY 1996	3	= <i>Corvus monedula</i> . Cf Mlikovsky 2002
<i>Corvus pliocaenus</i> REGALIA 1902	1	
<i>Corvus pliocaenus janossyi</i> MOURER-CHAUVIRE 1975	1	
<i>Corvus praecorax</i> DEPERET 1892	1	

Passeridae		
<i>Passer predomesticus</i> TCHERNOV 1962	1	
<i>Petronia brevirostris</i> TCHERNOV 1968	1	
Aves incertae sedis		
<i>Turdicus tenuis</i> KRETZOI 1962	3	

Table 9 - Taxa described as extinct from the Pleistocene of the Palearctic but not included among Late Pleistocene extinctions (total 105 taxa) .

Taxon	Reason for rejection	References/Notes
Struthionidae		
<i>Struthio oldawayi</i> LOWE 1933	1	
Phalacrocoracidae		
<i>Phalacrocorax owrei</i> BRODKORB & MOURER-CHAUVIRE 1984	1	
<i>Phalacrocorax tanzaniae</i> HARRISON & WALKER 1979	1	
Pelecanidae		
<i>Pelecanus aethiopicus</i> HARRISON & WALKER 1976	1	
Anhingidae		
<i>Anhinga hadarensis</i> BRODKORB & MOURER-CHAUVIRE 1982	1	
Strigidae		
<i>Bubo leakeyae</i> BRODKORB & MOURER-CHAUVIRE 1984	1	Possibly ancestral to <i>Bubo africanus</i>
Aves incertae sedis		
<i>Psammornis rothschildi</i> ANDREWS 1910	1	This ootaxon probably refers to a large extinct ostrich. Some of the egg remains are probably Pleistocene.

Table 10 - Taxa described as extinct from the Pleistocene of the Afrotropic region but not included among Late Pleistocene extinctions (total 7 taxa).

Taxon	Reason for rejection	References/Notes
Dromaididae		
<i>Dromaius australis</i> WOODS 1883	3	
<i>Dromaius gracilipes</i> DE VIS 1892	3	
<i>Dromaius patricius</i> DE VIS 1888	3	
Dinornithidae		
<i>Dinornis queenslandiae</i> DE VIS 1884	3	
Anhingidae		
<i>Anhinga latipes</i> (DE VIS 1906)	3	
<i>Anhinga parvus</i> (DE VIS 1888)	3	
Phalacrocoracidae		
<i>Phalacrocorax gregorii</i> DE VIS 1906	3	
<i>Phalacrocorax vetustus</i> DE VIS 1906	3	
Pelecanidae		
<i>Pelecanus grandiceps</i> DE VIS 1906	3	
<i>Pelecanus proavus</i> DE VIS 1892	3	Lost, indeterminable
Threskiornithidae		
<i>Ibis conditus</i> DE VIS 1906	3	Actually a flamingo
<i>Platalea subtenuis</i> DE VIS 1892	3	
Ciconiidae		
<i>Xenorhynchus nanus</i> DE VIS 1888	3	
Anatidae		
<i>Dendrocygna validipinnis</i> DE VIS 1888	3	
<i>Cygnus lacustris</i> (DE VIS 1906)	3	
<i>Cygnus nanus</i> (DE VIS 1906)	3	
<i>Anas strenua</i> DE VIS 1906	3	
<i>Anas elapsa</i> DE VIS 1888	3	
<i>Anas gracilipes</i> DE VIS 1906	3	
<i>Nettapus eyrensis</i> DE VIS 1906	3	
<i>Aythya effodiata</i> (DE VIS 1906)	3	
<i>Aythya reclusa</i> (DE VIS 1888)	3	
<i>Aythya robusta</i> (DE VIS 1888)	3	
<i>Oxyura exhumata</i> DE VIS 1889	3	
Accipitridae		

<i>Aviceda gracilis</i> DE VIS 1906	3	
<i>Taphaetus lacertosus</i> DE VIS 1906	3	
<i>Plioaetus furcillatus</i> DE VIS 1906	3	
Megapodidae		
<i>Chosornis praeteritus</i> DE VIS 1889	3	
<i>Progura gallinacea</i> DE VIS 1906	2	Ancestral to extant <i>Leipoa ocellata</i> (W. E. Boles pers. comm.)
<i>Progura naracoortensis</i> VAN TETS 1974	3	Female of <i>Progura gallinacea</i> , q. v.
Rallidae		
<i>Fulica prior</i> DE VIS 1888	3	
<i>Gallinula peralata</i> DE VIS 1892	3	
<i>Gallinula strenuipes</i> DE VIS 1888	3	
<i>Tribonyx effluxus</i> DE VIS 1892	3	
<i>Porphyrio mackintoshi</i> DE VIS 1892	3	
<i>Porphyrio reperta</i> DE VIS 1888	3	
Columbidae		
<i>Leucosarcia proevisa</i> DE VIS 1906	3	
<i>Litophaps ulnaris</i> DE VIS 1891		
Aves incertae sedis		
<i>Metapteryx bifrons</i> DE VIS 1892	3	Described as a kiwi but probably an immature emu (Brodkorb 1978)
<i>Palaeolestes gorei</i> DE VIS 1889	3	
<i>Palaeopelargus nobilis</i> DE VIS 1892	3	

Table 11 - Taxa described as extinct from the Pleistocene of the Australasian region but not included among Late Pleistocene extinctions (total 41 taxa).

Taxon	Youngest known occurrence(s)	Date
Podicipedidae		
<i>Podilymbus wetmorei</i> STORER 1976	Itchtucknee River, Fla	Late Wisconsinan
Phoenicopteridae		
<i>Phoenicopterus copei</i> SHUFELDT 1891	Chimalhuacán, Mexico DF	Probably Late Wisconsinan
Ciconiidae		
<i>Ciconia maltha</i> MILLER 1910	Seminole Field, Fla	10,000 - 11,000 rcy BP
<i>Mycteria wetmorei</i> HOWARD 1935	Itchtucknee River, Fla	Late Wisconsinan
Anhingidae		
<i>Anhinga beckeri</i> EMSLIE 1998	Cutler Hammock, Fla	Wisconsinan
Sulidae		
<i>Morus reyana</i> HOWARD 1936	San Miguel Island, Cal	Wisconsinan
Cathartidae		
<i>Breagyps clarki</i> (MILLER 1910)	Smith Creek Cave, NV	11,660-13,340 rcy BP
Teratornithidae		
<i>Teratornis incredibilis</i> HOWARD 1952	Smith Creek Cave, NV	11,660-13,340 rcy BP
<i>Teratornis merriami</i> MILLER 1909	Seminole Field, Fla	10,000 - 11,000 rcy BP
<i>Teratornis woodburnensis</i> CAMPBELL & STENGER 2002	Woodburn, Ore	Late Wisconsinan, ca 12,000 BP
<i>Cathartornis gracilis</i> MILLER 1910	Rancho La Brea, Cal	Wisconsinan ca 10,000-40,000 BP
Anatidae		
<i>Branta dickeyi</i> MILLER 1924	McKittrick, Cal	Mid Wisconsinan, 38,000±2,500 rcy BP
<i>Anabernicula gracilentata</i> ROSS 1935	Smith Creek Cave, NV Howell's Ridge Cave, NM	11,660-13,340 rcy BP 10,720-13,460 rcy BP
<i>Anas schneideri</i> EMSLIE 1985	Little Box Elder Cave, Wyo	Late Wisconsinan, 10,500 ±250 rcy BP
<i>Anas itchtucknee</i> MC COY 1963	Itchtucknee River, Fla	Late Wisconsinan
Accipitridae		
<i>Neophrontops americanus</i> MILLER 1916	Dark Canyon Cave, NM	Late Wisconsinan/Early Holocene 9,580-12,180 rcy BP
<i>Spizaëtus grinnelli</i> (MILLER 1911)	La Brea, Pit 61-67, Cal Carpinteria, Cal	11,130-12,200 rcy BP Late Wisconsinan
<i>Buteogallus fragilis</i> (MILLER 1911)	Rancho La Brea, Pit 61-67, Cal	11,130-12,200 rcy BP
<i>Buteogallus milleri</i> (HOWARD 1932)	Hawver Cave, Cal	Wisconsinan
<i>Amplibuteo woodwardi</i> (MILLER 1911)	Itchtucknee River, Fla Rancho La Brea, Cal	Late Wisconsinan Wisconsinan ca 10,000-40,000 BP
<i>Wetmoregyps daggetti</i> (MILLER 1915)	Rancho La Brea, Cal Carpinteria, Cal	Wisconsinan ca 10,000-40,000 BP Late Wisconsinan
<i>Spizaetus willetti</i> HOWARD 1935	Smith Creek Cave, NV Howell's Ridge Cave, NM	11,660-13,340 rcy BP 10,720-13,460 rcy BP
<i>Neogyps errans</i> MILLER 1916	Chimney Rock Animal Trap, Col Smith Creek Cave, NV Rancho La Brea, Pit 61-67, Cal	11,980±180 rcy BP 11,660-13,340 rcy BP 11,130-12,200 rcy BP
Tetraonidae		
<i>Dendragapus gilli milleri</i> JEHL 1969	Samwel Cave, Cal	Late Wisconsinan

<i>Tympanuchus ceres</i> (SHUFELDT 1913)	Coppell, Tex	Sangamonian
Odontophoridae		
<i>Neortyx peninsularis</i> HOLMAN 1961	Haile, XIB, Fla	Sangamonian
Meleagrididae		
<i>Meleagris crassipes</i> MILLER 1940	Dark Canyon Cave, NM Howell's Ridge Cave, NM Burnet Cave, NM	Late Wisconsinan/Early Holocene C14 = 9,580-12,180 BP 10,720-13,460 rcy BP Late Wisconsinan/Holocene 12,180±130 rcy BP
<i>Meleagris californicus</i> (MILLER 1909)	La Mirada, Cal Rancho La Brea, Pit 61-67, Cal	Late Wisconsinan 10,690±360 rcy BP 11,130-12,200 rcy BP
Gruidae		
<i>Grus pagei</i> CAMPBELL 2000	Rancho La Brea, Pit 61-67, Cal Rancho La Brea, Pit 13, Cal	11,130-12,200 rcy BP 14,310-15,360 rcy BP
Rallidae		
<i>Rallus natator</i> (MILLER 1942)	San Josecito Cave, Nuevo Leon	Mid-Wisconsinan, 27,000± 1,000 - 44,600±2,500 rcy BP
Charadriidae		
<i>Belonopterus downsi</i> CAMPBELL 2002	Rancho La Brea, Cal	Wisconsinan ca 10,000-40,000 BP
Scolopacidae		
<i>Numenius victima</i> (MILLER 1942)	San Josecito Cave, Nuevo Leon	Mid-Wisconsinan, C14 = 27,000± 1,000 - 44,600±2,500 BP
Alcidae		
<i>Fratercula dowi</i> GUTHRIE 2000	San Miguel Island, Site V-4, Cal	Late Wisconsinan, C14=11,890±95 BP
Strigidae		
<i>Bubo sinclairi</i> MILLER 1911	Samwel Cave, Cal	Late Wisconsinan
<i>Asio priscus</i> HOWARD 1964	Santa Rosa Island, Cal San Miguel Island, Site V-10	Mid - Late Wisconsinan, 10,400 - >37,000 rcy BP 32,143±787 rcy BP
<i>Strix brea</i> HOWARD 1933	Rancho La Brea, Pit 61-67, Cal	11,130-12,200 rcy BP
Hirundinidae		
<i>Tachycineta speleodytes</i> BRODKORB 1957	Arredondo IIA, Fla	Late Sangamonian
Troglodytidae		
<i>Cistothorus brevis</i> BRODKORB 1957	Reddick IC, Fla	Sangamonian?
Corvidae		
<i>Henocitta brodkorbii</i> HOLMAN 1959	Williston IIIA, Fla	Sangamonian?
<i>Corvus neomexicanus</i> MAGISH & HARRIS 1976	Dry Cave, NM (loc. 2, 5)	Mid Wisconsinan, C14 = 25,160 ± 1,730 rcy BP
Icteridae		
<i>Pandanaris convexa</i> MILLER A H 1947	Rancho La Brea, Cal	Wisconsinan ca 10,000-40,000 BP
<i>Pandanaris floridana</i> BRODKORB 1959	Haile, XIB, Fla	Sangamonian
<i>Pyelorhamphus molothroides</i> A H MILLER 1932	Shelter Cave, NM	Mid/Late Wisconsinan, 11,330 - 31,250 rcy BP
<i>Cremaster tythus</i> BRODKORB 1959	Arredondo IIA, Fla	Late Sangamonian
<i>Euphagus magnirostris</i> A H MILLER 1929	Little Box Elder Cave, Wyo	Late Wisconsinan, 10,500 ±250 rcy BP
Emberizidae		
<i>Pipilo angelenis</i> DAWSON 1948	Rancho La Brea, Cal	Wisconsinan ca 10,000-40,000 BP

Table 12 - Dates of last records of birds affected by Late Pleistocene Avian extinctions in continental North America.

Characteristic	Proportion among Birds extinct in LP (n = 97)	Proportion among Extant birds (n = 9970)
Scavengers	15 %	0,5 %
Raptors	13 %	3 %
Flightless	4 %	0,5 %
Large	37 %	2 %
Colonial	16 %	8 %

Table 13 – Summary of characteristics of species extinct in the Late Pleistocene species compared with the extant world avifauna. Data on extant birds based on information in Larsson et al. (2002).