GIANT ARMADILLO
Priodontes maximus (Kerr, 1792)

FIGURE 1 - (FPMAM92PH) Adult, near Fuerte Olimpo, Departamento Alto Paraguay (Arne Lesterhuis August 2004).

TAXONOMY: Class Mammalia; Subclass Theria; Infraclass Eutheria; Order Cingulata; Family Dasypodidae; Subfamily Tolypeutinae, Tribe Priodontini (Myers et al 2006, Möller-Krull et al 2007). The genus *Priodontes* was described by F. Cuvier (1825). Formerly placed in its own subfamily Priodontinae, Möller-Krull et al (2007) provided DNA evidence that demonstrated their position within the Tolypeutinae. E.Geoffroy St-Hilaire´s (1803) description was based on specimen "N° CCCCXIV" with reference to de Azara´s (1801) "Le Grand Tatou". G.Cuvier´s (1817) description was based on an illustration of "Le Kabassou" in Buffon (1763), who wrote that it was the largest tatou and came from Cayenne, the type locality. Larrañaga´s (1923) description was based on de Azara´s "Maximo". Synonyms adapted from Gardner (2007):
Dasypus maximus Kerr 1792:112. Type locality "Cayenne", French Guiana.

Dasypus giganteus É. Geoffroy St-Hilaire 1803:207. Type locality "Le Paraguay" referenced to de Azara (1801). Restricted to Pirayú, Departamento Paraguarí by Cabrera (1958).
Dasypus gigas G.Cuvier 1817:221. Based on Buffon (1763).
D[*asypus*]. *gigans* Schmid 1818:164. No type locality.
T[*atus*] *grandis* Olfers 1818:219. Type locality "Paraguay".
Priodontes giganteus Lesson 1827:309. Name combination.
D[*asypus*]. (*P*[*riodontes*].) *Gigas* Voigt 1831:261. Name combination.
Priodonta gigas Gray 1843:120. Name combination.
Priodon gigas Owen 1845:21. Name combination.
Prionodontes gigas Schinz 1845:316. Name combination.
Prionodos gigas Gray 1865:374. Name combination.
Prionodon gigas Gray 1869:380. Name combination.
Cheloniscus gigas Fitzinger 1871:227. Name combination.
Priodontes maximus O.Thomas 1880:402. First use of current name.
Priodon maximus JA Allen 1895:187. Name combination.
D[*asypus*]. *maximus* Larrañaga 1923:343. Type locality "Nemoribus septentrionalibus paraquarensibus". Based on de Azara (1802).
Periodontes maximus Altrichter 2006: 2729. Incorrect spelling.

ENGLISH COMMON NAMES: Giant Armadillo (Wilson & Cole 2000, Gardner 2007), Giant South American Armadillo (Affanni et al 1972).

SPANISH COMMON NAMES: Tatú gigante (Emmons 1999), Armadillo gigante (Esquivel 2001), Carachupa maman (Abba & Superina 2010), Cuspón (Abba & Superina 2010), Pejichi (Cuéllar & Noss 2004), Tatu grande (Anderson 1997), Pejiche (Anderson 1997).

GUARANÍ COMMON NAMES: Tatu carreta (Neris et al 2002, Villalba & Yanosky 2000), Kry´y pura vachu **Ac** (Esquivel 2001), Krypuravachú **Ac** (Villalba & Yanosky 2000), Tatu guazu **MA** (Emmons 1999, Villalba & Yanosky 2000), Nambirope **A** (Villalba & Yanosky 2000), Jautare **P** (Villalba & Yanosky 2000), Tatú-wasu (Chebez 1996), Tatu-carrera (Redford & Eisenberg 1992 - transcription error??), Tatumborevi (Cuéllar & Noss 2004), Jochacai **Ay** (Cuéllar & Noss 2004). Tatú carreta is the most commonly-used named for the species in Paraguay and is used in preference to the Spanish names.

DESCRIPTION: A huge armadillo, most easily recognised by its size and flat carapace which does not cover the sides of the body. Carapace flattened and largely hairless, with rectangular scales aligned in rows. Colouration dark greyish centrally with pale, buffy border - though pattern sometimes obscured by earth from excavations. There are 11 to 13 movable dorsal bands on the carapace, making it extremely flexible and 3 to 4 movable neck bands. The head is relatively small. and pale-coloured, with well-separated ears split by armoured scales. The head shield is oval-shaped and not expanded between the eyes. Muzzle rounded and somewhat conical, blunt at the end with a small mouth opening. Tail long, covered with small, pale, pentagonal scales and narrowing towards the tip. Underside naked, lacking either armour or hair, and with a pinkish-brown colouration. Feet are large, especially the hind feet and the X toes of the forefeet each bear a large, scimitar-shaped claw, the third being particularly long (up to 20.3cm). Females have two teats. Individuals can be distinguished by scale patterm, particularly the dividing line between the dark and light scales on the carapace and hind legs and the number of light scales per row from the lower edge of the carapace up to the dividing line (Noss et al 2004).

SKELETAL CHARACTERISTICS: Vizcaino et al (1999) give the following ulnar dimensions (n=10): Ulnar Length 132.6mm (+/-4); Olecranon Length 62.8mm (+/-6.8). The trend towards fossoriality is correlated with relative development of the olecranon process, and the ratio of the ulnar length to olecranon length is the Index of Fossorial Ability. An IFE above 0.70 is considered indicative of a highly fossorial species and one below 0.55 of a cursorial species. This species has an IFE of 0.91 (+/-0.15).

DENTAL CHARACTERISTICS: Armadillos lack true teeth, but possess a series of "molariform" teeth that do not follow the standard mammal dental formula. Dentition in this species is abundant but poorly differentiated and teeth are shed with age. As a result the number of teeth reported is highly variable. An individual captured in Argentina for example had 65 teeth. 20-25/20-25 = 80-100.

GENETIC CHARACTERISTICS: 2n=50. Redi et al (2005) gives the genome size as 4.47pg (+/-0.34) or 4372 Mbp.

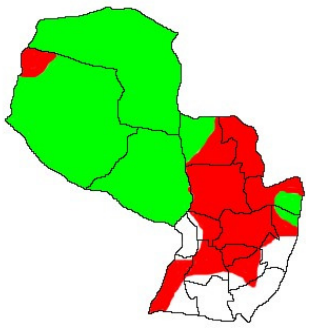
TRACKS AND SIGNS: Distinctive foreprint like a broken scythe-shape with a broad, long "comma" situated towards the outer part of the print separated from an oval-shaped impression on the inner part of the print. Hind print with four well-formed, round-tipped toes, the outer two toes somewhat smaller than the inner two, and the innermost slightly separated from the rest. With the exception of the long third toe, the print is notably wider than it is long. A large oval pad leaves an impression below toe 3. The heavy tail leaves a zigzag shaped scratch mark between the prints, formed by the rolling gait of the animal. **FP:** 5.5 x 3.4cm **HP:** 4.9 x 3.8cm. (Villalba & Yanosky 2000). Faeces typically have a flat surface and measure 14.7 (+/-1.7mm) x 22.7mm (+/-3mm). They are of firm consistency and have a weak acrid odour, containing up to 85% soil and almost no plant material (0.1%). Remains of ants and termites prominent. Weight 2.3g (+/-0.8mm). Typically found near areas of excavation and at burrow entrances (Anacleto 2007).

Vynne et al (2009) used scat-detections dogs to record this species with positive results in PN Emas, Goiás, Brazil.

EXTERNAL MEASUREMENTS: Much the largest armadillo in Paraguay, more than twice the size and five times the weight of the next largest species *Euphractus sexcinctus*. **TL:** (147-160cm); **HB:** 89.5cm (75-100cm); **TA:** 52.82cm (48-60cm); **FT:** 19.1cm (18-20cm); **EA:** 5.38cm (4.5-6cm); **WT:** 26.8kg (18.7-45kg) Captive individuals may reach 80kg in weight; **WN:** 113g. (Parera 2002, Nowak 2001, Ceresoli et al 2003, Emmons 1999, Redford & Eisenberg 1992).

Silveira et al (2009) found significant sexual size differences in 7 of 14 measurements taken in a sample of 5 males and 2 females in Emas NP, Goiás, Brazil - weight, circumference of head, neck and thorax, total length, head and body length and tail length. In all cases males are larger than females. They gave the following measurements: **TL** males 155.90cm (+/-4.46) females 137.75.88cm (+/-4.01); **HB** males 100.20cm (+/-3.85) females 89.88cm (+/-3.33); **TA** males 55.2cm (+/-3.85) females 89.88cm (+/-3.33); **EA** males 5.60cm (+/-0.42) females 6.00cm (+/-0); ***Ear Width*** males 2.64cm (+/-0.59) females 2.75cm (+/-0.29); ***Head length*** males 20.90cm (+/-0.74) females 20.70cm (+/-0.24); ***Head circumference*** males 31.70cm (+/-0.45) females 28.75cm (+/-0.87); ***Neck circumference*** males 35.10cm (+/-1.02) females 31.75cm (+/-0.50); ***Thorax circumference*** males 86.60cm (+/-5.94) females 73.13cm (+/-3.92); ***Shoulder height*** males 49cm (+/-5.67) females 46.50cm (+/-0.87); ***Hind leg length*** males 18.50cm (+/-1.32) females 17.13cm (+/-0.25); ***Carapace length*** males 80.40cm (+/-3.45) females 76cm (+/-6.20); ***Carapace width*** males 63.75cm (+/-2.63) females 69.83cm (+/-12.55); **WT** males 44.4kg (+/-4.10) females 28kg (+/-2.71).

SIMILAR SPECIES: Identifiable by size alone, adults are unmistakable on account of their great bulk. Juveniles potentially confusable with Naked-tailed Armadillos of the genus *Cabassous,* which share the greatly developed claws on the forefeet, but even adults of that genus are notably smaller than juvenile Giant Armadillos. Note also that the carapace of the Giant Armadillo seems to rest on the back, whereas that of other armadillos covers the sides and flanks. Furthermore Naked-tailed Armadillos have, as the name suggests, greatly-reduced scaling on the tail.



DISTRIBUTION: Widely distributed at low density in South America east of the Andes. Occurs from southeast Venezuela south through the Amazon Basin of Colombia, Ecuador, Brazil, Peru and Bolivia through Paraguay to northern Argentina. It is absent from eastern Brazil and there are no records from Uruguay or Chile. Occasional reports from Uruguay, including a supposed specimen killed during November 2011, invariably turn out to be *Cabassous tatouay* (González & Hernández press release 2011).

Historically probably occurred to about 31ºS in Argentina (corresponding to Provincia Córdoba and Santa Fé) but today it is confined to Formosa, Chaco, Salta and northern Santiago del Estero (Parera 2002). Records from Misiones and Corrientes are considered

doubtful as the name "Tatu carreta" is also applied to *Cabassous tatouay* there (Chebez 1996) and there are no specimens from either province.

In Brazil museum specimens are restricted to the states of Acre, Amazonia, Amapá, Pará, Roraima, Rondônia, Mato Grosso, Mato Grosso do Sul, Maranhão, Goiás, Espiríto Santo and Rio Grande do Sul (where it may already be extinct) with recent records also reported for Bahía and Minas Gerais, but apparently none from Rio de Janeiro or São Paulo where the species may have disappeared. (Vaz 2003, Lorenzutti & Almeida 2006, Srbek-Araujo et al 2009). In Bolivia there are records from Departamentos La Paz, Beni and Santa Cruz (Anderson 1997).

In Paraguay it has disappeared over much of its former range and is extinct over vast swathes of the Orient. Small and possibly unsustainable populations remain in the larger Itaipú Reserves in Departamento Alto Paraná, in the Mbaracayú Forest Reserve in Departamento Candindeyú (though there are no recent records) and in more remote areas of Departamento Concepción. There are no records from Departamento Misiones or Central (though the species probably occurred historically at least in the latter) and only a single record in Itapúa and the species is now extinct there as in much of the rest of eastern Paraguay.

It remains widespread in the Chaco but local extinctions occur where human populations are established and it has apparently disappeared from the Nueva Asunción and PN Tte Enciso area, northern Departamento Boquerón (Neris et al 2002). Recent records of the species in Paraguay are all from the Chaco near Fuerte Olimpo, Departamento Alto Paraguay (Arne Lesterhuis photograph FPMAM92PH August 2004); Estancia Morocha, Departamento Alto Paraguay (Hugo del Castillo photograph FPMAM93PH July 2002) and recent burrows at Tunokojai Indigenous Reserve, Departamento Boquerón (Paul Smith pers.obs. in 2009/2010). There is a poorly prepared specimen on display in the Museo Jakob Unger, Filadelfia, Departamento Boquerón that has no specimen details but was presumably collected in the Central Chaco area.

Abba & Vizcaíno (2008) list 9 specimens from Paraguay in the Museo Argentino de Ciencia Naturales "Bernadino Rivadavia" most without locality data (MACN10.21 skull, 1910; MACN11.14 skeleton, Zoo Buenos Aires, 1911; MACN11.41 skull, 1911; MACN13.22 carapace, 1913; MACN13.23 carapace, 1913; MACN13.80 conserved, 1913; MACN45.029 skull, Puerto Casado 1944; MACN9.1 carapace, 1909; MACN13.68 skin and skull, Zoo Buenos Aires 1913).

HABITAT: Found mainly in undisturbed forest, scrub and grassland, it rapidly disappears from inhabited areas. It appears to be pretty Catholic in its habitat tastes, but always occurring at low density, being found in cerrado (Anacleto 2001), chaco/chiquitania (Noss et al 2004) and Atlantic Forest (Srbek-Araujo et al 2009). Merritt (2008) encountered the species in the Central Chaco area in xeric habitats with clay soil, loamy soils close to seasonal rivers and streams and undisturbed forest with sandy soils.

Anacleto et al (2006) used the genetic algorithm program GARP to predict the species distribution in Brazil, with results suggesting this species would occur in Amazonia, Cerrado, Pampas and Atlantic Forest biomes in that country. Santos-Filho & da Silva (2002) found the species cerrado *sensu strictu* but absent from gallery forest and palm forest dominated by *Orbignia martiniana* in Mato Grosso, Brazil.

During a camera-trapping survey it was not recorded in the dry Chaco alluvial plains of Santa Cruz Bolivia, though it was present where there is forest cover, however the authors noted that animals occurring at very low density could easily escape attention (Noss et al 2004). Silveira et al (2009) showed that animals in PN Emas, Brazil had a strong preference for open habitats, with open cerrado, grassland and marsh edges being the preferred habitat. Some evidence existed of individuals using altered landscapes, but evidence of burrow digging or scat samples were not encountered more than 100m from native habitat.

In the Central Chaco it most often encountered in areas xerophytic and semi-xerophytic areas vegetated with Lapacho (*Tabebuia* sp) and Palo Santo (*Bulnesia sarmientoi*) trees, but also occurs in deciduous forest in the Pantanal area and more open, seasonally-flooded palm savanna in the Humid Chaco. In eastern Paraguay it formerly occurred at the edge of humid forest and cerrado savanna, but has disappeared from the vast majority of its former range and is in decline wherever it remains. Merritt (2006) noted the preferred habitat of the species in the Paraguayan Chaco to be riparian areas or areas with loose,

sandy-loam soil. The presence of substantial food reserves appears to be vital for the existence of the species and affinity for areas near water has also been noted (Nowak 1991).

Habitat choice is apparently unaffected by fire, a study in the cerrado of Mato Grosso, Brazil finding that they utilised burnt areas as frequently as they do unburnt areas when foraging (Prada & Marinho-Filho 2004). Burning is of course a natural occurrence in the cerrado biome and does not directly affect the species main prey items.

ALIMENTATION: Almost entirely myrmecophagous, feeding for the most part on ants (especially *Atta* sp) and *termites* with the addition of other subterranean invertebrates found in their colonies. Giant Armadillo foraging strategy is very similar to that of *anteaters* in that it uses the massive claws of the forefeet to break open nests and then feeds on the occupants. However one major difference is that the armadillo occasionally destroys the colony at a single feeding necessitating a roaming rather than a territorial existence.

Anacleto (2001) examined 65 excavated nests of Isoptera and Hymenoptera. Genera of termite identified in order of prevalence were *Syntermes* (43.1%), *Nasutitermes* (21.5%), *Velocitermes* (20%), *Armitermes* (6.2%) *Cornitermes* (4.6%), *Labiotermes* (3.1%) and *Heterotermes* (3.1%). Ant genera identified in order of prevalence where *Camponotus* 9.2%, *Pheidole* 6.2%, *Conomyrma* (3.1%) and *Atta* (3.1%).

A further study by Anacleto (2007) found only Hymenoptera and Isoptera in the faeces. Ants made up 27.5% of the biomass of the faeces, with the termite *Cornitermes* accounting for 60.6%. Other termite species including *Velocitermes, Nasutitermes* and *Coptotermes* made up just 0.9% of the biomass. The nest of *Cornitermes* is the most resistant to opening, requiring considerable force to break it open, but termites with more resistant nests have weaker chemical defences.

Neris et al (2002) states that animals in the Paraguayan Chaco feed mainly on the larvae and honey of ground nesting bees. Carrion and vertebrates such as snakes have also been reported in the diet of the species, but these would seem to be unusual occurrences (Parera 2002). Captive individuals have been maintained on meat and meat-based formulas (Merritt 2006).

REPRODUCTIVE BIOLOGY: Litter size is one or two (usually one), born after a gestation period of four months in a burrow dug by the mother (Redford & Eisenberg 1992, Neris et al 2002). Young have tough, leathery skin and are weaned at 4 to 6 months. Sexual maturity is reached at 10 to 12 months (Neris et al 2002, Parera 2002, Nowak 1991).

GENERAL BEHAVIOUR: Solitary, nocturnal or crepuscular and highly fossorial and so rarely observed. Noss et al (2004) found the species to be most active between 10pm and 6am in Santa Cruz, Bolivia. Using time-recording camera traps, Silveira et al (2009) found peak activity from 2:01am to 4am in Brazil and found no records for the day time period 10am-6pm. Two sight observations of specimens active during the day were of an individual walking on a road at 10.15am in April 2007 and another digging a burrow at 12.30pm in June 2007. Srbek-Araujo et al (2009) similarly found most of their camera-trap records from 10pm-3.30am in the Atlantic Forest of Brazil.

Densities are clearly low with the camera-trapping data having a success rate of 0.19 pictures per 100 camera-trap nights in Bolivia (Noss et al 2004) and 0.14 pictures per 100 camera-trap nights (Srbek-Araujo et al 2009) in Brazil in areas where the species was known to occur.

Refuges Individuals pass the daylight hours in large burrows (40-45cm wide x 30-31cm high) dug with their powerful front claws and often built into sandbanks, or occasionally active or dead termite mounds. Silveira (1997) reported burrows to be a mean of 46.7cm (+/-5.2) wide x 38cm (+/-9.3) high in the Brazilian cerrado. Carter & Encarnação (1983) found the mean dimensions of burrows to be 45cm wide x 32cm high at ground level, increasing to 47 x 34cm, 10cm inside the burrow, much larger than any other armadillo species and instantly recognisable by size alone. Typically the upper part of the burrow entrance is pointed rather than rounded (Emmons 1999), the mean burrow slope is 34.4º and they are dug in a direction so that the prevailing wind blows away from the entrance (Carter & Encarnação 1983).

Arteaga & Venticinque (2010) urged caution in the use of size alone to identify this species, noting that only burrows of adults are likely to be notably larger than those of other armadillos. Additionally in forested areas burrows are often built against tree roots or other inanimate objects, obscuring their shape, whilst the use of burrows by other species and even soil texture can all contribute towards a change in burrow aspect.

When digging the adult may pose on its hind legs and tail and throw the whole wait of its body behind violent strikes with the forelegs, the massive claws able to inflict considerable damage onto even hard-baked soil and termite nests. After the initial "attack" the loosened soil is scraped using the forefeet towards the hind feet where it is then kicked behind the body. (Emmons 1999).

Burrows are often clumped and inhabited for at least 24 hours, though frequently a single burrow may be occupied for several nights (Redford & Eisenberg 1992) and one female occupied the same hole for 17 consecutive days (Carter & Encarnação 1983). Silveira et al (2009) noted specimens spend as long as three consecutive days without leaving their burrows. Burrow density in PN Emas, Brazil was 1.47 per hectare (+/-1.07), with 45% dug into soil, 40% into termite mounds and 15% into anthills (n=723).

In Brazil 68% of burrows were located in open grassy habitats, 28% in areas prone to flooding and just 3% in forested habitats and almost half of these were in active termite mounds (Nowak 1991). The open country burrows were located an average of 192m from forest edge. Adults leave their burrow only to feed and to look for a mate.

Defensive Behaviour The species has a well-developed sense of smell but poor eyesight, and on the approach of a potential threat they rise up onto the hind legs, supported by the tail and begin to sniff from side to side. This position is similar to the defensive position adopted by *anteaters* and enables them to strike out with their sharply-hooked claws if suddenly attacked. For the most part their usual response to danger is to flee or to begin to dig rapidly into the substrate, digging in with the claws so that they cannot be dislodged.

Locomotion This species walks on the soles of the hindfeet and only the tips of the claws of the forefeet are in contact with the ground (Vizcaíno & Milne 2002). They are surprisingly capable swimmers.

Home Range Though the species is not territorial, the minimum home range has been estimated at an average of 452.5ha and individuals may cover 3km in a single night (mean 2,765m) (Parera 2002, Carter 1985). According to camera trap data home ranges of males overlap considerably (Noss et al 2004) and the maximum distance moved by a single individual was given as 7.5km.

Silveira et al (2009) found the mean distance to be travelled in single night to be 1.8km (+/-1.356km). They estimated home range of radiotracked animals to be 10.05km^2 (+/-4.64), with home range overlap of two individuals 1.56%. Their calculations led to minimum population density estimates of 1.27 to 5.55 individuals per 100km^2, with a mean minimum density of 3.36 individuals per 100km^2 for PN Emas in Brazil.

Longevity Published life spans of the species are between 12 to 15 years.

Mortality Besides man Giant Armadillos probably count on very few natural enemies. Their low density and large size means that they would not form a substantial part of the diet of any predator. However there are records of the species being attacked by Jaguar in Venezuela and Puma might also be expected to occasionally prey on the species.

Parasites Linardi & Guimarães (2000) report the Tungid flea *Tunga terasma* (Siphanaptera) on this species in Brazil.

Miranda et al (2010) report the Ixodid tick *Amblyomma cajennense* from the Pantanal of Brazil. Botelho et al (1989) report the Ixodid tick *Amblyomma pseudoconcolor* from this species in Minas Gerais, Brazil.

Vicente et al (1997) list the nematode *Aspidodera fasciata* (Schneider, 1866) Railliet & Henry, 1913 for this species from Brazil in their catalogue.

Physiology During slow wave sleep this species shows extensive tremors of the muscles of the body, most obvious in the limbs which disappear when the temperature is greater than 28ºC. No tremors were observed during REM sleep. Heart beat during wakefulness is regular with a frequency of 42/sec. (Affanni et al 1972).

VOCALISATIONS: No information.

HUMAN IMPACT: Attractive to hunters on account of its large size and eye-catching and often clumped burrows which are frequently re-used, allowing the occupant to be "staked out". The meat is considered "invigorating", whilst the fat is used for the treatment of asthma and bronchitis (Neris et al 2002). The rarity and large size of the species means that trophy hunting is as big a threat as hunting for the table (Villalba & Yanosky 2000). Five villages of the Waimiri Atroari Indians of central Amazonia

hunted a total of 6 animals in a year (Sep 1993-Oct 1994) in central Brazil (Souza-Mazurek et al 2000). In Acre, Brazil however the species is not hunted as to do so is considered to curse future hunting attempts (Calouro 1999).

The species has almost disappeared from eastern Paraguay and occurs at naturally low densities in the Chaco which means that it is not likely to be hunted in large numbers; however individuals unlucky enough to stray close to populated areas put themselves at great risk. In the Argentine Chaco there is a trade in this species for illegal hunting farms and zoos (Altrichter 2006).

Locals state that it possesses an acute sense of hearing that enable it to detect the presence of predators from a considerable distance (Neris et al 2002). The species is frequently accused of digging up vegetables, but it is likely that this is a side-effect of digging for insects (Nowak 1991).

Toxoplasmosis is a widespread zoonosis that affects wild animals and man, caused by the protozoan *Toxoplasma gondii*. Sogorb et al (1977) recorded positive tests for *Toxoplasma* in this species in São Paulo State, Brazil. Infection of humans via the consumption of undercooked meat is a possibility.

CONSERVATION STATUS: The Giant Armadillo is considered Vulnerable by the IUCN (Abba & Superina 2010), see http://www.iucnredlist.org/search/details.php/18144/all for the latest assessment of the species. The Centro de Datos de Conservación in Paraguay consider the species to be in imminent danger of extinction in Paraguay and give it the code **N1**. The species is listed on CITES Appendix 1. The species occurs at naturally low density on account of its nomadic feeding behaviour, but does not tolerate the close presence of humans. The last conservation assessment of the species in Paraguay considered it endangered (Morales 2007), but Smith (in press) recommends that the species be considered critically endangered at the national level under IUCN criteria A3cd C2b.

Estimates of its decline vary widely and population figures for large areas of intact habitat do not exist. Over its entire range it is estimated to have declined by 30% over the last 20 to 30 years by the IUCN, whereas a decline of 50% in the last decade has also been noted. It has a low fecundity rate and populations rapidly fall victim to hunters. Adults require large home ranges with adequate food supplies and so local extinction has occurred over much of eastern Paraguay, though its secretive habits mean that it is undoubtedly under-recorded in the Chaco. Minimum home range has been estimated at an average of 452.5ha in Argentina (Parera 2002, Carter 1985), whilst crude estimates of 5-8 individuals per 100km^2 were made for the species in Santa Cruz, Bolivia from camera trap data. Assuming that all specimens remained in the area in which they were photographed they estimated a maximum of 14 individuals per 100km^2 for the Tucavaca region of Santa Cruz, Bolivia, though they noted that the majority of animals were photographed only once during the 28 month study (Noss et al 2004).

The population remains healthy and relatively well-protected in the Chaco as a result of the isolation of the habitat, but the massive increase in deforestation in the region since 2010 has resulted in the conversion of huge areas of natural habitat into ranch land and desertification in areas of extensive deforestation. This will undoubtedly bring the species into increased contact with humans and hence the species may be inferred to be on the threshold of a steep population decline in this region.

Though the species is officially protected in Paraguay, the enforcement of such protection measures are ineffective in the remote areas in which this species persists there is little knowledge of or respect for environmental legislation. In fact most recent records of the species in Paraguay are the result of hunters breaking this legislation and their infractions being reported in the national press. This was highlighted most recently during August 2010 when one hunter became the subject of investigation only after he had posted images of a hunted *Priodontes* on his Facebook account and these images reached the newspapers. (Smith in press).

Burning does not apparently affect the species choice of habitat, it being equally as frequent in burned areas as unburnt areas in the cerrado of Brazil (Prada & Marinho-Filho 2004). Burning can however have a severe impact on the species, with 2 individuals being found burnt to death in a 2000ha area following a fire in Emas National Park (Silveira et al 1999). Vulnerability to fire would seem to be correlated to the intensity of the blaze (in turn related to the combustability of the vegetation), and regular burning may in fact be less damaging to the species than infrequent but more severe fires.

Intensive pesticide use in agricultural areas actively eliminates their food source. Historically it has been considered a zoological "rarity" and was much sought after for zoological gardens and private

collections. Any conservation strategy should be accompanied an educational element in which local people are taught to admire and respect the species and myths about its supposed great value on the black market are dispelled (Porini 2001). A captive breeding programme is currently underway in Argentina with the aim to reintroduce the species and augment wild populations.

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FIGURE 2 - (FPMAM93PH) **Giant Armadillo** *Priodontes maximus.*
Adult found dead. Estancia Morocha, Departamento Alto Paraguay, July 2002.
Photo Hugo del Castillo.
FIGURE 3 - **Giant Armadillo** *Priodontes maximus.*
Skull lateral view. Image provided by www.skullsunlimited.com