

# Effects of a Proposed Ex Situ Conservation Program on In Situ Conservation of the Babirusa, an Endangered Suid

L. M. CLAYTON,\*§ E. J. MILNER-GULLAND,\* D. W. SINAGA,† AND A. H. MUSTARI‡

\*Renewable Resources Assessment Group, T. H. Huxley School of Environment, Earth Sciences and Engineering, Imperial College London, 8 Princes Gardens, London SW7 1NA, United Kingdom

†Directorate General of Protection and Nature Conservation, Ministry of Forestry and Plantations, Republic of Indonesia, Jl. Ir. H. Juanda 100, Bogor, Indonesia

‡Department of Forest Resources Conservation, Faculty of Forestry, Bogor Agricultural University, P.O. Box 168, Bogor, Indonesia

---

**Abstract:** *Detailed data are rarely available to show how interventions such as captive breeding programs can create an uncontrolled demand for live specimens of endangered species. We present a case study of the effect of a planned, internationally recognized captive breeding program on trade in the endangered babirusa wild pig from July to December 1998. Although the program had not yet begun, international interest in the captive breeding of babirusas gave hunters and dealers the false impression that there was a potentially lucrative and officially sanctioned national and international demand for any live babirusas they might catch. Swift action by the Indonesian authorities halted this trade, but the study provides a warning about the damage that can be caused to the conservation of a species if management programs are instituted without a full understanding of the practicalities of its conservation, particularly interactions between the species and local people.*

Efectos de un Programa de Conservación Propuesto Ex Situ en la Conservación In Situ de la Babirusa, una Especie en Peligro de Extinción

**Resumen:** *En contadas ocasiones se puede acceder a datos detallados que muestren la forma en que intervenciones tales como los programas de reproducción en cautiverio pueden crear una demanda descontrolada de especímenes de especies en peligro. Presentamos un caso de estudio del efecto de un programa de reproducción en cautiverio planeado y reconocido internacionalmente para el comercio entre Julio y Diciembre de 1998 del puerco silvestre babirusa, especie en peligro de extinción. A pesar de que el programa no ha iniciado aún, el interés generado por la reproducción en cautiverio de babirusas en el ámbito internacional dio a cazadores y comerciantes la falsa impresión de que existía una demanda lucrativa y oficialmente aprobada en el ámbito internacional dio cazadores y comerciantes la falsa impresión de que existía una demanda lucrativa y oficialmente aprobada en el ámbito nacional e internacional por cualquier babirusa capturado vivo. Las rápidas acciones llevadas a cabo por autoridades de Indonesia detuvieron este comercio, sin embargo, nuestro estudio provee una alerta sobre el daño que puede ser causado a la conservación de las especies si los programas de manejo son establecidos sin el pleno entendimiento de la factibilidad de la conservación, particularmente de las interacciones entre las especies y la gente local involucrada.*

---

§Address correspondence to [dr\\_lynn@manado.wasantara.net.id](mailto:dr_lynn@manado.wasantara.net.id)  
Paper submitted March 3, 1999; manuscript accepted September 29, 1999.

An ongoing argument revolves around whether extinction risk can be reduced more, or most cost-effectively, by concentrating on measures to conserve existing populations and their habitats or by carrying out interventions such as captive breeding or translocations. Capture of individuals from the wild for captive breeding or translocation can have detrimental effects on the survival prospects of the species as a whole (Rabinowitz 1995; Struhsaker & Siex 1998). Similar concerns have been expressed about the conservation implications of international demand for live specimens of recently discovered species (Kemp et al. 1997). Nevertheless, detailed data on how an uncontrolled demand for live specimens of endangered species is created, and how it can be tackled, are rarely available. We report on the effects that a recent planned international captive breeding program had on the trade in wild babirusas in North Sulawesi between July and December 1998.

The babirusa (*Babyrousa babyrussa*) is an endangered suid endemic to Sulawesi, Indonesia. It is confined to rain-forest areas, and its population is estimated at a few thousand individuals. The species has full protection under Indonesian wildlife law, but illegal sale of its meat in local markets of North Sulawesi continues (Clayton et al. 1997; Clayton & Milner-Gulland, 2000). Our weekly monitoring of the main wild pig meat market (Langowan) over the last 5 years revealed fluctuations in the number of babirusas on sale there, with sharp declines following

visits to the market by law enforcement officials (Fig. 1). The market monitor, who could easily identify babirusa meat, was a local woman doing her weekly shopping; so she aroused no suspicion and was able to obtain accurate data.

Measures such as market patrols and vehicle checks, targeting commercial traders, have been highly effective conservation tools. This is particularly true in North Sulawesi because dealers must travel along a single road and sell meat in only a few markets. In May 1993, a team of government inspectors visited the market, causing a dramatic drop in the number of babirusas on sale there for a period of several months. In September 1997 the plight of the babirusa was reported to the Minister of Forestry, who ordered that conservation measures be stepped up. This led to a virtual cessation of babirusa sales from September 1997 to March 1998. Sales in the main market then began to rise again, until renewed law enforcement was carried out in October 1998, including checkpoints and market inspections. The trigger for this latest law-enforcement effort was the Indonesian authorities' concern about the alarming effect that a planned captive breeding program was having on the babirusa trade. The meat arising from the live babirusa trade was not sold at Langowan but at other markets where previously babirusa meat was rarely recorded by the market monitor. Since October 1998, people had started selling

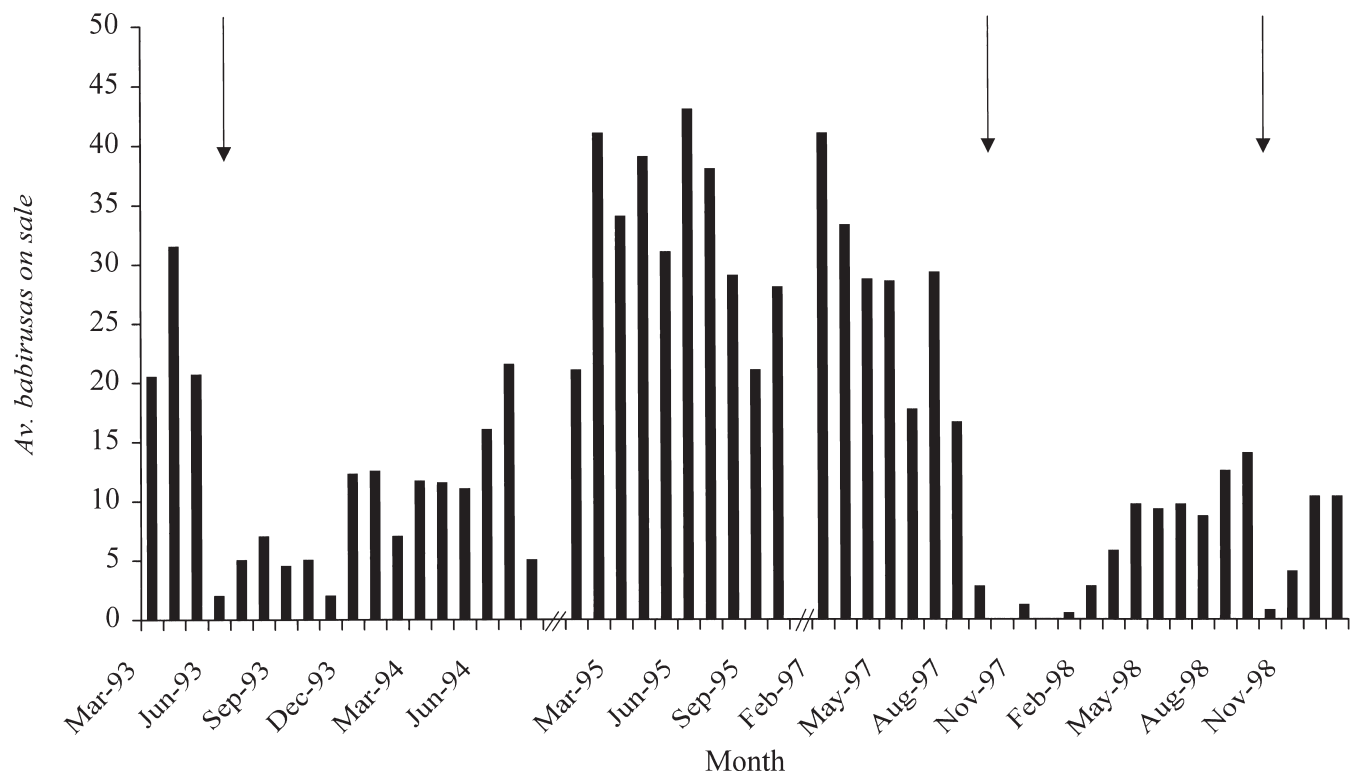


Figure 1. The average number of babirusas on sale at 0700 hours on a Saturday in Langowan market for each month from March 1993 to December 1998. Langowan is the major location for babirusa sales, and Saturday is the busiest market day of the week. The arrows show the dates of law enforcement interventions.

babirusa meat on market day on the streets outside the markets, so our figures are less reliable from that date.

A workshop on population and habitat viability analysis (PHVA) held in 1996 recommended, among other measures, that 40 wild babirusas should be collected for captive breeding (Manansang et al. 1996). In July 1998, an international meeting was held in Manado, North Sulawesi, to promote this captive breeding program (a chronology of events is presented in Table 1). The meeting triggered a large demand for live babirusas from the wild, a demand that was unprecedented in the previous 10 years of our involvement in market monitoring in North Sulawesi. The demand led to a substantially higher level of trade in babirusas, as the live animal trade occurred in addition to the underlying trade in dead babirusas for meat. Our long-standing relationships with wild meat dealers meant that we were given accurate details of this trade off the record, information that proved correct during subsequent investigations by the Indonesian authorities.

The PHVA recommendations concerning the acquisition of babirusas for the captive breeding program emphasized the importance of humane capture and transport methods and, to safeguard wild stocks of the species, the requirement that no animals should be caught in protected areas. The capture was carefully planned so as to maximize the genetic diversity of the captive population, and it involved trained veterinarians. It was not envisaged that commercial dealers would be involved in any way. The proposed, internationally recognized captive breeding program had not started, and permits had not yet been issued, when the unauthorized trade in live animals began.

The individual primarily responsible for driving this trade had no previous history of trading in wild pig meat but had been present at the international meeting in July. He issued an illegal letter authorizing wild meat dealers to carry babirusas alive, copies of which were given to numerous dealers. Some refrained from using this letter, but others made use of it to carry babirusas alive for subsequent sale in the markets. Using these letters to legitimize their activity, hunters captured babirusas in protected areas. They were trapped with leg snares, and, consequently, most were injured and many died following capture. They were transported on ordinary vehicles owned by the wild meat dealers, often packed among live dogs and in full view.

Following the international interest in the captive breeding of babirusas, hunters and dealers gained the false impression that there was a potentially lucrative and officially sanctioned national and international demand for any live babirusas they could catch. The chain of events was a completely unintentional result of a theoretical plan for babirusa conservation. This case study provides a warning about the considerable damage that can be caused to the conservation of a species if management programs are instituted without a full understanding of their practical implications, particularly the interactions between the species and local people. This case also illustrates the general problem that the actions of opportunistic individuals can pose for conservation.

The Indonesian government acted swiftly to halt the trade in live babirusas, so the damage caused was not as severe as it might have been. The fact that the commercial trade in babirusas can be controlled by checkpoints

**Table 1. Chronology of events related to babirusa trading, July to December 1998.**

<i>Date</i>	<i>Event</i>	<i>No. of babirusas</i>	<i>Comment</i>
Late July	meeting to plan captive breeding program	40 planned	individual X* present
End of July	X begins trading in live babirusas	—	X issues illegal letter authorizing dealers to carry live babirusas
From July to December	institutions express interest in acquiring live babirusas for captive breeding	70 planned	no. planned is additional to the 40 planned by the international program
September	2 checkpoints set up targeting illegal meat dealers	3 live, 1 dead	one released back into wild by checkpoint team members
Early October	X has live babirusas at his home	7	3 subsequently died
Early October	enforcement activities at Langowan market	—	temporary cessation of babirusa sales in Langowan
October	dealer working for X makes 2 trips per week into Bogani Nani Wartabone National Park	approximately 10 per trip	meat of those that died sold in Sonder and Tomohon markets
October	babirusas on sale at Tomohon Market	≥5 per week	previously babirusas rarely sold there
End of October	X's activities halted by Wildlife Department	—	officials strongly and actively opposed to the trade
November	number of babirusas reportedly surviving at X's home	15	7 transported to zoos in Java; rest presumed dead
December	dealer detained by authorities carrying dead babirusas	15	dealers still using X's letter to justify carrying babirusas

\* *Individual X is one of the people involved in the trade that developed in live babirusas for purposes of captive breeding.*

and market monitoring means that the prospects for in situ conservation of the species remain bright despite this disastrous episode, particularly because the Indonesian government is fully committed to the protection of this extraordinary endemic species.

### Literature Cited

- Clayton, L. M., M. Keeling, and E. J. Milner-Gulland. 1997. Bringing home the bacon: a spatial model of wild pig harvesting in Sulawesi, Indonesia. *Ecological Applications* 7:642-652.
- Clayton, L. M., and E. J. Milner-Gulland. 2000. The trade in wildlife in North Sulawesi, Indonesia. In press in E. L. Bennett and J. R. Robinson, editors. *Hunting for sustainability in tropical forests*. Columbia University Press, New York.
- Kemp, N., M. Dilger, N. Burgess, and C. V. Dung. 1997. The saola *Pseudoryx nghetinhensis* in Vietnam: new information on distribution and habitat preferences, and conservation needs. *Oryx* 31:37-44.
- Manansang, J., A. Macdonald, D. Siswomartono, P. Miller, and U. Seal, editors. 1996. *Babirusa population and habitat viability assessment*. World Conservation Union-Species Survival Commission Conservation Breeding Specialist Group, Apple Valley, Minnesota.
- Rabinowitz, A. 1995. Helping a species go extinct. *Conservation Biology* 9:482-488.
- Struhsaker, T. T., and K. S. Siex. 1998. Translocation and introduction of the Zanzibar red colobus monkey: success and failure with an endangered island endemic. *Oryx* 32:277-284.

