



Global Re-introduction Perspectives: 2010

Additional case-studies from around the globe
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IUCN/SSC Re-introduction Specialist Group (RSG)





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Conservation breeding and re-introduction of the pygmy hog in N.W. Assam, India

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Introduction

The pygmy hog (*Porcula salvania*) is the smallest, most highly specialized and most endangered of the world's wild suids. It was formerly known or presumed to occur across a narrow strip of early successional tall grassland plains along the southern Himalayan foothills, extending from N.E. Uttar Pradesh and S.W. Nepal in the west, to northern West Bengal and N.W. Assam in the east. However, all confirmed reports and most anecdotal accounts dating back to its description in 1847 refer only to the latter areas; and, most recently, only to N.W. Assam, where the species was 'rediscovered' in 1971 after it was long suspected to have become extinct (Oliver, 1980). By the early/mid-1980s the species was reduced to a single, fragmented population in the Manas National Park, possibly still extending into a neighbouring reserve forest when the Pygmy Hog Conservation Program (PHCP) was formally launched 1995. IUCN has long categorized the pygmy hog as Critically Endangered – Red List Category C2a(ii) – putting it among the most threatened of all mammals. It is listed on Appendix One of CITES and Schedule One of the Indian Wildlife (Protection) Act 1972. The species was formerly referred to as *Sus salvanius* as it was believed to be closely related to the Eurasian wild pig (*S. scrofa*). However, recent mtDNA studies have

revealed that it belongs to a separate monotypic genus *Porcula*.

Goals

The primary goal of the PHCP was to promote recovery of pygmy hog and to reduce further population decline, to ensure survival of pygmy hog into perpetuity. The specific goals were:

- Goal 1: To establish a captive population with aims to re-introduce the species to selected sites, and as an insurance against the



Pygmy hog female near nest © Goutam Narayan

possible early extinction of the species in the wild; to breed the animals at two or three different sites in order to reduce risks from any catastrophe at one site.

- **Goal 2:** To select unrelated hogs to form compatible social groups, and to prepare these groups for unassisted survival in the wild using a 'soft-release' protocol.
- **Goal 3:** To re-introduce viable number of pygmy hogs in properly restored and protected habitat managed on scientific principles based on recommendations of the project. Initially, the plan is to release the species to two or three different sites in Assam, and later to other areas of its former distribution.
- **Goal 4:** To monitor the re-introduced population and, if necessary, modify the re-introduction protocol to promote long-term survival of released hogs as well as all original inhabitants of the habitat.

Success Indicators

- **Indicator 1:** The captive hogs multiply under a well structured and planned breeding project in order to supply 10-20 hogs every year for release. Hogs are bred at two or more sites.
- **Indicator 2:** The selected social groups of captive hogs are genetically heterozygous, physically healthy and behaviorally secure, and are able to survive in simulated grasslands at a 'pre-release' facility under the 'soft-release' protocol without human assistance.
- **Indicator 3:** The selected release sites are protected and managed scientifically for proper restoration of the habitat. The major factors that were likely to have caused the disappearance of the species from the place have been addressed. Ten to fifteen hogs in three or four social groups are released once every year for at least three consecutive years at the selected site using 'soft-release' protocol.
- **Indicator 4:** The released hogs survive and adapt to the wild conditions, begin to breed and disperse. Monitoring, using direct and indirect methods, indicate survival of a large proportion of the released hogs, and provide evidence of increase in their population and dispersal to available habitat.

Project Summary

Feasibility: Wide-ranging distribution and status surveys conducted after the 'rediscovery' and in later years confirmed the continuing occurrence of this species in Manas and documented the occurrence of a number of other small, and highly fragmented populations in the reserve forest belt of north-western Assam, east of Manas, but all of these smaller populations were confirmed or feared extinct by the early to mid-1980's. Attempts to trace any other possibly surviving remnant populations elsewhere within their known or presumed former range in southern Nepal and north-eastern India, extending into extreme south Bhutan, south-western Arunachal Pradesh, were also unsuccessful (Oliver, 1980; Oliver & Deb Roy, 1993 & Narayan *et al.*, 2008). Unfortunately its last natural abode, Manas, is also threatened by political instability and other problems.

The main threats to survival of pygmy hogs are loss and degradation of habitat due to the expansion of human settlements, agricultural encroachments, flood

control schemes and injudicious grassland management practices, especially extensive and indiscriminate burning of tall grasslands during the dry-season and replacement of these grasslands with commercial tree plantations. Pygmy hogs are clearly dependant on the continuing existence of these grasslands, which are likewise crucial to the survival of a number endangered species such as the one-horned rhinoceros (*Rhinoceros unicornis*), barasingha (*Rucervus duvaucellii ranjitsinhi*), water buffalo (*Bubalus arnee*), hispid hare (*Caprolagus hispidus*) and Bengal florican (*Houbaropsis bengalensis*). However, none of these other species appear to be as crucially dependant on the continued availability of the successional grasslands most prone to widespread and too-frequent burning and other disturbances, and are thus one of the first species to disappear from such habitats which may continue to support these other species (Oliver, 1980; Bell & Oliver, 1990 & Oliver & Deb Roy, 1993).

Pygmy hogs are dependent on, and specifically adapted to, undisturbed patches of grassland dominated by early successional riverine communities, typically comprising dense tall grass sward intermixed with a wide variety of herbaceous plants and early colonizing shrubs and young trees. most important of these communities for pygmy hogs are the grass associations dominated by *Narenga porphyrocoma*, *Saccharum spontaneum*, *S. bengalensis* and *Themeda villosa*, which form characteristic associations of 2 to 3 m height during secondary stages of the succession on well drained ground. Historically, these grasslands were probably maintained by changing river courses as well as by grazing and trampling pressures from large wild herbivores such as rhinos, elephants, buffaloes and deer. With extermination or sharp decline in large wild herbivore populations this control mechanism has become insignificant. Changes in river courses contribute towards emergence of new areas that get colonized by grass and shrubs, whilst older grasslands, grassy woodlands or riverine forests are eroded or submerged. Unfortunately, if the newly emerged areas fall outside protected areas they are quickly brought under human use, thereby preventing colonization by grassland flora and fauna. Grasslands in low-lying areas are still maintained by prolonged inundation, whereas those in well-drained areas are brought under periodic burning. However, as the remaining grasslands include various, commercially important thatch grasses, most of are subject to annual harvesting (even in protected areas) and virtually all of them are subject to wide-scale annual (in some areas, biannual) burning.

Most of this burning is conducted at the beginning of the dry season (i.e. in December, January or early February), in order to preclude the possibility of later, uncontrolled 'hot' burns, which are even more destructive. As a result, the regularly burnt grasslands are characterized by relatively uniform growth of a few, fire-resistant species and, hence, a chronic reduction in species' diversity and the quality and carrying capacity of this habitat for dependant animal species. Too frequent burning also destroys the surface litter in which the hogs forage, along with the ground fauna (e.g. insects, annelids) that is an important part of the diet of pygmy hog as well as many other animals and birds. It also exposes the surface substrate that becomes hard and desiccated prior to the rains, making rooting more difficult and less profitable.

Implementation: The main aim of Pygmy Hog Conservation Program is conservation of the pygmy hogs and other endangered species of tall grasslands of the region through field research, captive breeding and re-introduction of the hog after adequate restoration of degraded former habitats.

Conservation Breeding: In 1996, six wild hogs (2:4) were caught from Manas National Park and transferred to a custom built research and breeding centre built at Basistha near Guwahati. The 3 adult females, which were pregnant from wild, produced healthy litters and the captive population increased to 18. Seven more litters were born in the following year and the captive hog population almost doubled to 35 in 1997. Similar success in captive breeding in subsequent years saw the captive population at Basistha rise to 77 in 2001, which constituted a 13-fold increase in the stock in 6 years. This unanticipated and rapid increase in the captive population required imposition of rigorous curbs on their reproduction. A population of around 70 hogs was maintained in captivity till 2007, and the first releases were conducted in 2008.



Pygmy hogs escaping from release enclosure at Sonai Rupai (see red circle) © Goutam Narayan

Site Selection and Habitat Restoration for Re-introduction: After extensive surveys and detailed consultations with the relevant authorities two sites were selected as being potentially suitable for re-introduction purposes, i.e. Sonai Rupai Wildlife Sanctuary and Nameri National Park. A third site, Orang National Park, was kept under observation to assess flood water levels in the rainy season, and later it was concluded that the grasslands in the northern part of the Park are suitable for releasing the hogs. These three sites fall within the species known or presumed recent range in north-western Assam, though no evidence could be found of the species continuing occurrence in these areas, despite the presence of suitable habitats. Of the first two sites, Sonai Rupai was selected for the first such releases on the basis that it contained considerably more tall grasslands than Nameri, but that this area had been generally neglected and that any such reintroduction attempt might also generate increased interest and resources to effect the enhanced future protection and management of the entire area. To these ends, the PHCP continues to work with the Sanctuary authorities and staff to improve protection and management and to control annual dry season burning of grass. Sanctuary staff was also trained in wildlife monitoring and habitat management to help in restoration of the grassland habitat and monitoring of released hogs.

Pre-release Protocol: Social groups of unrelated and mostly young hogs were integrated at Basistha breeding centre before being transferred to a specially constructed 'pre-release' facility in Potasali, on the outskirts of Nameri National Park, east of Sonai Rupai Wildlife Sanctuary. Every effort was made to 'pre-condition' the animals for eventual release by maintaining them in three separate social groups, in simulated natural habitats intended to encouraging natural foraging, nest-building and other behaviors; whilst also minimizing human contacts to mitigate tameness and other behavioral characteristics consequent upon their captive management. Radio-harnesses designed for post-release monitoring studies were also field-tested by trial attachments to two individuals in each group, but unexpected problems arose in the long-term use of these harnesses, if they were fitted too tightly they were prone to causing serious skin lesions and if too loose the hogs were able to escape from the harnesses. It is therefore proposed to secure radio implants for future trials. In the interim, alternative means of monitoring include have included camera trapping, training the animals to visit random bait sites and screening for field 'sign', such as forage marks, tracks, faeces and nests.

Re-introduction and Post-release monitoring: After five months tenure in the 'pre-release' enclosures at Potasali these hogs were transferred in early May to temporary 'soft-release' enclosures constructed for this purposes in a relatively secluded, but easily accessible area of natural habitat in the far interior of the Sonai Rupai Wildlife Sanctuary. These enclosures were also rigged with two lines of electric fencing and kept under continual surveillance as a precaution against potential predators and to deter incursion by wild elephants. The animals were maintained for a further three days in these enclosure before being released, by the simple expedient of removing sections of fence and allowing the animals to find their own way out. Sixteen pygmy hogs (7 males:9 females) were released in Gelgeli grasslands of Sonai Rupai in May 2008 and indirect evidences suggested that at least 10 - 12 continued to survive several months after release. Footprints of newborn hogs too were seen indicating successful farrowing in the wild by a released female. A video camera trap was also used carefully deployed near active nests and the hogs caught in camera appeared healthy and had shiny coats, unlike the somewhat emaciated hogs captured from the wild in Manas in 1996. Some of these individuals were identified by hair-clipping marks shaved before release. That the released hogs appeared to be in good health despite harsh weather and sometimes difficult foraging conditions up to nine months after their release was most encouraging in that it not only confirmed their survival, but suggested their successful adaptation to the wild after at least one or (in most cases) two generations of captive management. Following similar protocol, nine hogs were released in May 2009 and ten more in May 2010, thereby releasing a total of 35 hogs in different locations of Gelgeli grasslands in Sonai Rupai. Besides numerous signs of hog activity around the release locations there were a few direct sightings of the released adult and young hogs that had been born in the wild. However, to get a better idea about survival, breeding and dispersal of released hogs it may be necessary to recapture some of the hogs in Sonai Rupai and possibly insert radio implants in some for more accurate monitoring.

Major difficulties faced

- The main difficulties in implementation of this project largely related to serious shortage of remaining suitable habitat for re-introduction. Although most of the remaining former pygmy hog habitats were inside Protected Areas, unscientific management of grasslands and lack of adequate protection were responsible for their degradation.
- Indiscriminate and often uncontrolled dry season burning of grass.
- Unsustainable and often ineffectively controlled livestock grazing.
- Unsustainable thatch grass and minor forest produce collection.
- Flash floods caused by natural or artificial dams.
- Failure of radio telemetry experiment on the hogs due to injuries caused by the harness.
- Poor economic condition of the communities living in the fringe areas of the concerned PAs resulting in their dependence on grassland resources for livelihood and their suffering due to human-animal conflict.



Searching for pygmy hog signs in Sonai Rupai grasslands © Goutam Narayan

Major lessons learned

- If the recommendations made by research projects on sensitive/indicator species of the habitat are implemented, the chances of success increase. Besides studies on pygmy hog and its habitat (Oliver, 1980 & Oliver and Deb Roy, 1993), recommendations made for conservation of Bengal florican (Narayan & Rahmani, 1990) and hispid hare (Bell & Oliver, 1990) contributed significantly to the success.
- The most important recommendations suggested controlling the indiscriminate dry season burning that were put deliberately by forest staff as an age old management practice, as well as by local inhabitants of fringe area villages and illegal intruders as this undoubtedly, and catastrophically, impacted on the survival of many smaller species including the pygmy hog.
- A well planned conservation breeding project capable of supplying adequate number of healthy individuals for re-introduction could be an important factor.
- It takes years, if not decades, of persistent efforts to implement a successful recovery program.

Success of project

Highly Successful	Successful	Partially Successful	Failure
	√		

Reason(s) for success/failure:

- Highly successful conservation breeding project.
- Long-term commitment and dedication of all salient personnel and supporting agencies, both locally and internationally.
- The resilience of the grassland habitat which improves rapidly when managed and protected properly.
- The ability of the species to adapt to the wild if the grassland habitat is restored adequately.

Acknowledgments

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References

- Bell, D. J. and Oliver, W. L. R. 1990. Northern Indian tall grasslands: management and species conservation with special reference to fire. In: K. P. Singh and J. S. Singh (eds.) Tropical Ecosystems: Ecology and Management. Wiley Eastern Ltd., New Delhi: pp. 109-123.
- Narayan, G., Oliver W. L. R. & Deka P. J. 2008. First captive bred pygmy hogs (*Porcula salvania*) reintroduced to Sonai Rupai Wildlife Sanctuary, Assam, India. *Suiform Soundings* 8(1): 16-26.
- Narayan, G. & Rahmani, A. R. 1990. Recommendations for Bengal Florican Conservation in BNHS Report on Status and Ecology of the Lesser and Bengal Floricans. Bombay Natural History Society, Bombay.
- Oliver, W. L. R. 1980. The Pigmy Hog - the Biology and Conservation of the Pigmy Hog, *Sus salvanius*, and the Hispid Hare, *Caprolagus hispidus*. Special Scientific Rep. No. 1, Jersey Wildl. Preserv. Trust: 120 pp.
- Oliver, W. L. R. & Deb Roy, S. 1993. The pygmy hog (*Sus salvanius*). In: W. L. R. Oliver (ed.): Pigs, Peccaries and Hippos: Status Survey and Conservation Action Plan. IUCN, Gland: 121-129.