Report to Basel Zoo
African wild ass (*Equus africanus)*:
Population dynamics, distribution and status in Eritrea
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Introduction

The African Wild Ass (*Equus africanus*) is the world's most endangered equid and its population size and range have decreased by over 90% in the last twenty years (Moehlman 2002, Moehlman et al 2008). It persists in one of the harshest climates and terrains in the world, the Horn of Africa. Historically, there were two subspecies, the Somali wild ass (*Equus africanus somaliensis*) and the Nubian wild ass (*Equus africanus africanus*).

In 1995, a small population of African wild ass (*Equus africanus somaliensis*) was documented in the Northern Red Sea Zone of Eritrea (Moehlman et al, 1998). A cooperative program between the Ministry of Agriculture, State of Eritrea and the IUCN/SSC Equid Specialist group started working towards the recovery of this important population.

The 1995 International Conference on the Environmental Mangement Plan for Eritrea designated the area between the Buri Peninsula and the Dalool Depression (Denkelia) as a high priority area for conservation protection as a nature reserve. This research program is providing the scientific information for the determination of what level of protection is needed to conserve endangered wildlife and fragile vegetation resources. Hence this project is critical to maintaining and improving the conservation status of the African wild ass in Eritrea.

The Eritrean/Ethiopian war and cease-fire affected the work schedule, but research continued to be conducted on a regular basis until mid 2007. From 2008 to 20011 there was a hiatus in regularly scheduled work. In 2011 with the assistance of the IUCN Regional Office, the IUCN/SSC Equid Specialist Group led a workshop on African Wild Ass Conservation Strategy in Asmara.

The Strategic Planning workshop identified threats and proposed actions. There was a clear need for more capacity building and continued research. The program had provided support for two MSc students, i.e. Hagos Yohannes and Redae Teclai but more training was needed.

The African wild ass research, training and conservation program was shifted to the Hamelmalo Agricultural College (HAC). Subsequently, HAC submitted a request for funding for the training of three MSc students in Wildlife Ecology. In January of 2012, a MOU was signed with Dean Semere of the Hamelmalo Agricultural College. This MOU was for a joint program between the IUCN/SSC Equid Specialist Group and the

Hamelmalo College of Agriculture which would provide training for wildlife personnel and would provide data for science based management of the African Wild Ass and the Denkelia ecosystem. The scientific information produced by this program will be useful for the formulation of a long-term management strategy for people, livestock and wildlife in the Northern and Southern Red Sea Regions.

The MSc programs would initially involve research on the following topics:

1. Population dynamics of the African wild ass in the Denkelia ecosystem
2. Distribution, feeding ecology and resource requirements of the African wild ass in the Denkelia ecosystem.
3. GIS based survey and ecosystems analysis of Denkelia
4. Survey and ecological research on the African wild ass population on the Hagar plateau.

The Program for Research and Conservation of the African Wild Ass (*Equus africanus)* will provide needed research, training, and education for the preservation of this critically endangered species and its arid ecosystem. The training program is scheduled for five years.

In 2012, the research and conservation program began to collect important data on African wild ass population dynamics, distribution and genetics. Futsum Hagos who had worked with the program for many years was chosen to start his MSc on African wild ass population dynamics. He was accepted by the Conservation Biology program at the University of Nairobi, Kenya. However, Mr. Hagos Yohannes was very ill with colon cancer and Futsum was needed by the Wildlife Unit in Eritrea. There is a shortage of trained wildlife biologists and only Hagos Yohannes and Redae Teclai have MSc's in wildlife biology. Futsum continued to do field research on the African wild ass and was joined by Michael Kahsay who was chosen to be the second MSc student. Futsum postponed the start of his MSc program until September 2013. The University of Nairobi Conservation Biology is a two year course. The first year is course work and the preparation of a research proposal. Futsum did well with his course work (Community ecology, Conservation of Biodiversity, Ecological statistics, Research Methodology, Ecosystems of East Africa, GIS, Population Ecology, Evolution & Behavioral ecology, Ecological Techniques, Physical environment and climate, General Vertebrate zoology) and achieved a B+ average. He is now finalizing his research proposal on the Population dynamics, distribution and genetics of the African wild ass in the Denkelia Desert of Eritrea and the attitudes of local people.

The population genetics work has moved forward with Dr. Albano Beja-Pereira of Portugal. The Mitochondrial DNA and Microsatellite DNA analyses have confirmed that there is no introgression by domestic donkeys into the African wild ass population. A paper on this information will soon be submitted for publication.

Mr. Michael Kahsay has been accepted to the same Conservation Biology program at the University of Nairobi. He will start his course work in September 2014. His research will

start in 2015 and will be focused on Distribution, feeding ecology and resource requirements of the African wild ass in the Denkelia ecosystem. The plan is for him to do a Maxent model analysis of suitable habitat for the African wild ass in Denkelia. Redae Teclai's MSc thesis identified an area of approximately 11,000 sq km a as the African wild ass range in Denkelia. Michael's research will identify what portion of that area is 'suitable' habitat.

The Basel Zoo has played a critical role in funding the African wild ass research, training, and conservation program in Eritrea.

The Future

The plan for the future is to continue the cooperative work between the IUCN/SSC Equid Specialist, Hamelmalo Agricultural College, the Wildlife Conservation Unit (Ministry of Natural Resources) and the local pastoralists for the development of a management plan for the Denkelia that will maintain ecosystem integrity, conserve the endangered species, and provide long-term food security for the local residents.

Research will continue to focus on collecting the data needed to assess available resources given the variable rainfall in this ecosystem. Pastoralists and wildlife have co-existed in African rangelands for thousands of years, but if human, livestock and wildlife populations increase then the potential for competition also increases. There is a growing need for studies at the landscape level on interactions among pastoralists, livestock, wildlife and the environment. It is widely recognized that individual species like the African wild ass cannot be conserved without also conserving the critical habitats with in ecosystems. Hence, species conservation requires a sound ecosystem management plan.

The Messir Plateau study area is being expanded to include the Irori Plains and the Dalool Depression. Surveys have shown that the African wild ass occurs in these areas. The vegetation and soil maps indicate that there is an area of about 11,000 square kilometers with potentially suitable habitat and available water sources. We need to determine primary productivity and water source availability in these areas and quantify the utilization of these resources by both the African wild ass and domestic livestock in both wet and dry season. We need to identify potential limiting factors to African wild ass population recovery.

This project will provide post-graduate training for Eritrean nationals and secure the scientific information that is needed to understand and conserve the critically endangered African wild ass. It will also help produce a management plan that will maintain ecosystem integrity and sustainable use of resources. Such a management plan is critical to both the long-term food security of the local residents and the long-term viability of the critically endangered African wild ass.