We established four kinds of prediction models were to predict the population development of Yangtze Finless Porpoise under ex situ protection and non-ex situ protection, and the advantages and disadvantages under the two circumstances were analyzed. On this basis, the following suggestions for the protection of Finless Porpoise were put forward to relevant departments.

About in situ conservation, we found the following findings from the Vortex model. Without ex situ conservation, the Finless Porpoise will be functionally and completely extinct in 55~71.3 years and 95.5 years. The predicted results are as follows:

(figure)

According to the Vortex model, this is due to two main reasons :(1) the mortality of Finless Porpoises increases due to the increased risk of catastrophe without ex situ conservation; (2) Under natural conditions, the mortality rate of male and female finless porpoises is obviously different, so the male-female ratio is usually higher than 1:1, which will not only lead to a decline in population size, but also damage genetic diversity. As a result, the population of Finless Porpoises slowly declines until they become extinct.

In view of the above analysis, we propose the following suggestions:

1. The disturbance caused by human activities to animals should be reduced and eliminated, such as limiting ship speed, eliminating pollutant discharge and banning illegal fishing. Strict enforcement of illegal fishing should be practiced and rectification of frequent and disorderly shipping should be controlled. Assess the subsequent impact of boundary marker waterway rectification works on the activities of the Yangtze Finless Porpoise. During the dry season, frequent and intense human activities are prohibited in nearshore waters, especially illegal fishing using rolling hooks, custom nets and camouflage.
2. The core protected areas must be strictly protected. In principle, all human interference, all forms of production and living activities, as well as any facilities and activities that affect or interfere with the natural environment are strictly prohibited. It can only carry out management activities such as management, patrol and law enforcement, operation and maintenance of infrastructure related to people's livelihood, or carry out important ecological restoration projects. Scientific research activities can be carried out with the permission of the competent authorities. In general, native residents are allowed to carry out necessary production activities and build necessary public facilities in order to ensure their livelihood, but all facilities and activities shall not damage the natural habitat of the Yangtze Finless Porpoise.
3. The state should adopt active financial policies to return lakes to nature with more than 10,000 acres of land along the Yangtze River, so as to restore the ecological role of flood storage and fish migration, and restore the integrity of the Yangtze River habitat. To achieve significant results, the ban on spring fishing on the Yangtze should be extended to important tributaries along the river, and large lakes along the river should be locked and connected to the River all year round.

(4) Replenish a certain number of suitable wild individuals as soon as possible, so that the population can grow rapidly and form a larger effective breeding population while strengthening the protection of genetic diversity.

(5) Ensure that the number of males and females in the same water area is around 6:4, through migration or artificial breeding and other methods, so as to ensure the genetic diversity.

(6) At present, the most important and effective conservation strategy is to introduce a certain number of wild individuals representing different genetic variation, especially females with reproductive potential, from the natural population. The implementation of this strategy not only increases the genetic diversity of ex situ conservation population, but also contributes to the rapid growth of the population to form a larger effective reproductive population, which is ultimately beneficial to the long-term conservation of genetic resources of the endangered population.

In terms of ex situ conservation, we found that the population of finless porpoises would eventually remain stable under ex situ conservation. Ex situ conservation is the most direct and effective measure to protect the Yangtze finless porpoises, but there are still some problems in ex situ conservation: Moved to reserve (1) the population is small, which leads to some ability to reproduce the strong male dolphins get the mating opportunities will be significantly more than the ability to reproduce relatively weak male dolphin, to produce more offspring, which could lead to an increased risk of inbreeding, lose more genetic diversity, offspring of climate change and disaster resistance ability to further reduce, form a vicious circle, This is obviously not good for the population; (2) Due to the limited area of ex-situ reserve, its environmental carrying capacity is also limited, and its development will be limited when the population number increases close to K value.

Therefore, we offer the following suggestions:

(1) The strategy of ex situ conservation is to make effective breeding plans to avoid inbreeding. Therefore, during the breeding season, the male dolphins with strong breeding ability should be properly separated so that the male dolphins with weak breeding ability can obtain mating opportunities. Of course, before such a step can be taken, it is necessary to make sure that the male involved in the breeding is physically mature, otherwise it will result in reproductive failure during a given mating season.

(2) when a move to reserve population reaches the K value, the should take the migration or expansion method of reserve area, always ensure that porpoises the increase of the number of species in a relatively stable state, the expanding population is beneficial to increase the genetic diversity of population can also further save dolphins endangered situation;

(3) Increase the number of ex situ conservation areas. In view of the importance of ex situ protection to increase the population number of finless porpoise, more ex situ conservation areas should be built and finless porpoise can be released into the Yangtze River after the ecosystem of the Yangtze River basin is restored to a better level.

In addition, we suggest that artificial breeding efforts can be intensified. Humans help finless porpoises reproduce to increase their numbers. For finless porpoise, its natural reproductive capacity is low, the survival rate of young is low, which is an important reason for the extinction of its species. We can copy the conservation methods of mammals such as giant pandas by breeding them in captivity and then releasing them back into nature reserves to survive. This is a good way to increase the population of finless porpoises.

The above suggestions are based on the analysis of existing models and combined with the actual situation. We hope to make relevant departments pay more attention to the protection of finless porpoise, and take effective measures to implement the protection of finless porpoise population, and keep the smiling angel of the Yangtze River together.