



The Conservation Measures of Noguchigera on Taiho Dam Project in Okinawa Island, Japan

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ABSTRACT:

The report on the “artificial nesting tree”, which was developed to preserve “Okinawa Woodpeckers” that inhabit along the Taiho rivers, where Taiho dam is located.

Keywords: Okinawa Woodpeckers (Sapheopipo Noguchi), Conservation measures, Artificial nesting trees, Taiho Dam.

1. INSTRUCTION

Taiho Dam is located in the north area of Okinawa called “Yanbaru”, that has very good environment of nature. The Dam is a multipurpose dam to control flood, keep the normal function of the surface water of the Taiho river and develop the city water of the south area of Okinawa. It was completed April 2011.



Figure 1. Location of the Taiho Dam

The Taiho River flows through mountainous areas. The construction site is located at the south end of the ‘Yanbaru (mountain areas)’ area featuring abundant evergreen broadleaf forests. Okinawa Island is home to a large number of endemic species, and ‘Yanbaru’ area is the only home to Okinawa Woodpeckers (Designated as national endangered species, special natural treasure of Japan and prefectural bird of Okinawa prefecture. Classified as endangered species IA in the Okinawa Prefecture version of the red data book compiled by Ministry of the Environment), which belong to the woodpecker family. Conservation measures, based on

results of surveys and research on Okinawa Woodpeckers, are explained below.



Figure 2. Green ‘Yanbaru’ forests

2. OKINAWA WOODPECKERS

Okinawa Woodpeckers (Sapheopipo Noguchi) are woodpeckers that inhabit the northern part of Okinawa Main Island only. They feature a total length of about 31cm and dark brown body with light brown face and reddish back, wing bows, rump and lower vent. The wings are also dark brown and primaries have white dots, which are visible while the birds are flying. The area from the crown to nape is red in male birds, while the area is brown in female birds. As for chicks, the crowns are dark red in both males and females, while the beaks are blue-gray (See Fig.3).

Habitats of Okinawa Woodpeckers are limited to mature forests with *C. cuspidate* var. *Sieboldii* order than about

40 years and the surrounding areas. Humid forests with abundant animals and plenty of dead trees and fallen trees inhabited by boring insects are essential for the woodpeckers because they primarily feed on arthropod that live on the surface or in the ground (Revised version of Endangered Wildlife in Okinawa Prefecture, Department of Culture and Environment, Okinawa Prefecture, March 2005).

The region of Okinawa Woodpeckers is limited to a certain area in the northern part of Okinawa Main Island and the distribution range is believed to be the smallest among all species of currently observed woodpeckers. According to the analysis results of information obtained by investigations on planned dams and wide area surveys, which were performed during the period from 1987 to 1996, the area along the Taiho River is the southern limit of the distribution range of Okinawa Woodpeckers. Distribution quantity in the area along the Taiho Dam is estimated at about 10% of the total distribution.



Figure 3. A male Okinawa Woodpecker and chick looking out of the nest. (Nesting was confirmed on an artificial nesting tree along the Taiho Dam in 2006.

3. SURVEYS AND RESEARCH THAT HAVE BEEN PERFORMED

To develop measures for conservation of Okinawa Woodpeckers, it was necessary to understand the situation in the area along the Taiho Dam. Therefore, we have been doing surveys and research since FY1996, in respect to the ecology of Okinawa Woodpeckers and forests where they live. The surveys results are reported to the “Rare Bird Panel of the North Dam Ecosystem Conservation Review Committee” consisting of academic experts for discussion on the method of survey, research and conservation.

- 1) Forest environment survey
Forest vegetation survey, breast-height diameter survey, survey on ages of cut trees.
- 2) Survey on the habitat of Okinawa Woodpecker
Distribution survey, breeding ecology survey, breeding environment survey.
- 3) Feeding environment survey
Feed environment survey, survey on amount of dead and

fallen trees.

4. MEASURES FOR CONSERVATION OF OKINAWA WOODPECKERS

We decided to take conservation measures to maintain the population of Okinawa woodpeckers.

- (1) Conservation of forests.
- (2) Restoration of forests.
- (3) Install the “artificial nesting trees” as “emergency evacuation measures” to protect Okinawa Woodpeckers until the surrounding forests recover to the condition suitable for their nesting (See Figure 2).

In addition, we perform environmental monitoring, take measures against noise and vibration, control the time of cutting trees, discuss tree cutting procedures and keep every construction workers informed about the rules.

Details of the “artificial nesting tree,” which is one of the characteristic measures of the Taiho Dam, are explained below.

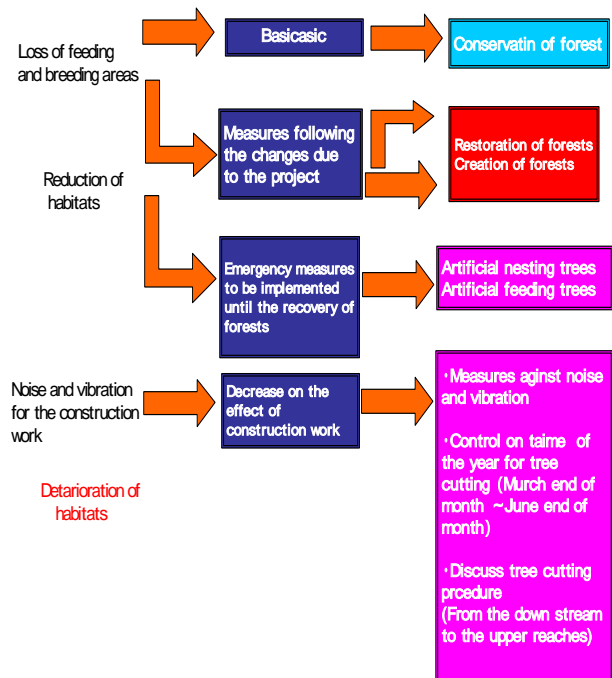


Figure 4. Details of conservation measures

4.1. “Artificial Nesting Trees” as “Emergency Evacuation Measures”

The forest habitats will be destroyed by cutting of trees for construction of the dam, but it is estimated that some of the young forests that exist currently will be mature enough for nesting of Okinawa Woodpeckers in several years after completion for the Taiho Dam. Therefore, we positioned the “artificial nesting trees” as “emergency evacuation measures” used before maturing of the forests.

4.2. Fabrication and Installation of “Artificial Nesting Trees”

Fabrication method of the “artificial nesting trees” is outline below. Wood of *C. cuspidate* var. *sieboldii*, which Okinawa Woodpeckers frequently select for breeding, is used. The timbers are produced from trees cut down at the construction sites. The logs are split lengthwise and followed out. The hollows are filled with sawdust and other materials solidified by using natural bond to create an environment suitable for nesting of Okinawa Woodpeckers (See Figs. 5 and 6).



Figure 5. An artificial nesting tree

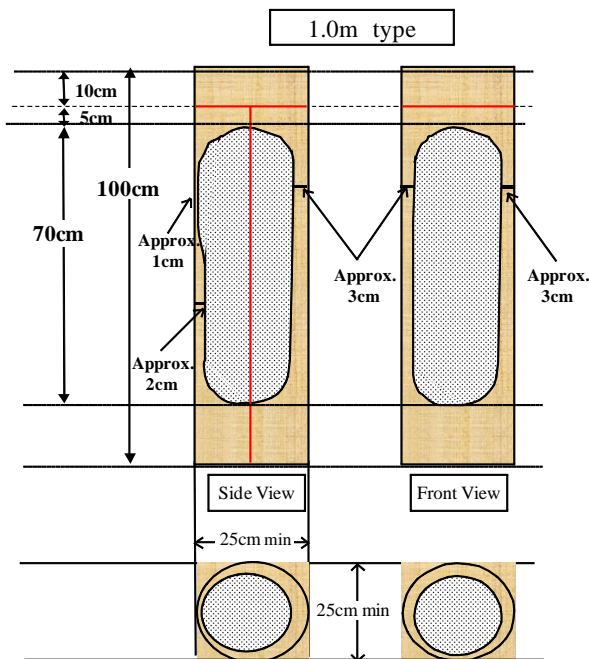


Figure 6. Parrern diagram of the artificial nesting tree

The “artificial nesting trees” have been used by a number of Okinawa Woodpeckers and they have been proved to be very useful. In the light of the instructions and advises of academic experts, North Dam Office decided that careful attention is required when the trees are used outside the areas along the Taiho Dam, for prevention of abuse of the development action. In respect to utilization of the “artificial nesting trees” by the third party, North

Dam Office and Okinawa Shimatate Association jointly applied for patent and received a patent (Patent No.3779934, Title of invention: Artificial nesting trees and its fabrication method). The application was made under instructions and advises of academic experts who have been performing surveys and research on the “artificial nesting trees” along the Taiho Dam with us, with an aim of limiting the usage to ensure careful handing of licensing.

4.3 Conditions of Artificial Nesting Trees

Conditions for installation of the “artificial nesting trees” in the forests were decided on the basis of survey results on ecology of Okinawa Woodpeckers. The trees are about 4 m in height and angled 20 to 29°. They are installed in comparatively spacious areas so that Okinawa Woodpeckers can fly without being obstructed.

The conditions were determined by reference to data obtained from the “Okinawa Woodpecker habitat survey” targeting natural nesting trees, which was conducted in the areas along the Taiho Dams.

4.3.1 Installation height

According to the data collected, the height of nest entrance in natural nesting trees* ranges from 2.0 to 7.9m. The percentage of giving up the nests is higher in the nests at the height of 2.0 to 3.9m and 5.0 to 5.9m (20 to 23 %, 22% respectively), while the percentage is low in the nests at the height of 6.0 to 6.9m (11%), although the risk if danger in installation work is high as this level of height. From these figures, we decided that that the heights of 4.0 to 4.9m will be appropriate (set at 4m in consideration for installation work). *155 trees out of the total 244 trees, excluding 89 trees that could not be measured because of the location.

4.3.2 Angle of trunk at nest entrance

According to data collected , the angle of trunk at nest entrance in natural nesting trees ranges from 10 to 39° . The percentage of giving up the nests is higher in trunks angled 10 to 19° and those angled 30 to 39° (32%, 14% respectively). From these figures, we decided that the angles of 20 to 29° (percentage of giving up: 8%) will be appropriate. *Same as above.

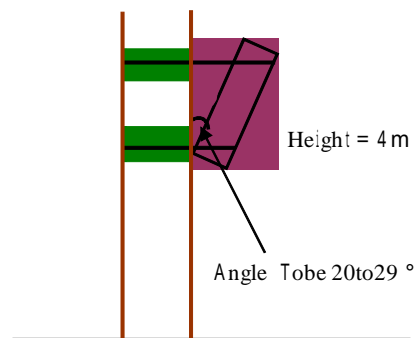


Figure. 7 Condition for installation of artificial nesting



Figure 8. An artificial nesting tree installed in the forest

4.4. Effect of artificial Nesting Trees

Operational sustainability tests of the “artificial nesting trees” have been performed since 1998 in the test areas along Taiho Dam. Nesting was first confirmed in 1999, and nesting was confirmed in three locations in 2000. The artificial nesting trees were introduced to the areas along Taiho Dam in 2001. A total of 11 chicks have left the nests, which indicates the effectiveness of the trees as conservation measures. (See Table1, Fig. 9)

Table 1 Frequency Actual number of Okinawa Woodpeckers that left the artificial nesting trees

Year	Length	Fillings	Start of observation	Date of fledging	Number of chicks	Remark
1999	1.5m	Styrofoam	23-Apr	-	-	Eggs were rescued because the mother bird neglected them in the process of brooding
2000	1.5m	Balsa	12-Apr	May 20, 21	2	Chicks were brooded only by female
2001	1.5m	Chips	26-Apr	June 7, 8	2	
2002	1.5m	Tiny chips	11-May	1-Jun	1	Observed from the initial stage of brooding
2003	1.0m	Balsa	13-Apr	23-May	2	
2004	1.5m	Balsa	16-Apr	May 24, 26	3	Nesting in the same area 2003~2006
2005	1.5m	Balsa	14-Apr	14-May	2	Nesting was confirmed of the same tree with 2003
2006	1.0m	Chips	18-Apr	May 23, 26	3	Enforcement of crow measures
2007	1.5m	Balsa	12-Apr	May 13, 15	3	Enforcement of crow measures
2008	1.0m	Balsa	14-Apr	May 13, 14	2	Enforcement of crow measures
Total					20	

5. CONCLUSION

The areas along Taiho Dam feature valuable and rich natural environment, and measures were taken to minimize the effect of dam construction on the natural

environment. We believe that the measures were effective for conservation of Okinawa Woodpecker, because the number of nesting trees and estimated population along Taiho Dam did not decline remarkably compared with those before construction of the dam and also because the population of the birds has been increasing slightly in recent years. The artificial nesting trees have been used since 2011. We will need to continue the monitoring of animals and trees including Okinawa Woodpecker for continuous evaluation of the effect of the trees.



Figure 9. An Okinawa Woodpecker marking the first flight from the artificial nest.(Video image shot in May 2000)

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