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Threats assessment and management of the Baua-Wangag Watershed Forest Reserve in Gonzaga, Cagayan Province, Philippines

JOSEFINA T. DIZON[1] and MANUEL L. CASTILLO[2]

The Baua-Wangag Watershed was proclaimed as Watershed Forest Reserve by virtue of Presidential Proclamation Nos. 107 and 108 on May 13, 1987 to protect the area from deforestation and degradation. The proclaimed Watershed Forest Reserve is composed of the watershed areas of two major river systems in the municipality of Gonzaga, Cagayan, Province, Philippines. The Baua watershed reserve covers a total area of 15,947 hectares while the Wangag watershed reserve covers a total land area of 6,992 hectares. Based from the Protected Area Occupants Survey of the DENR, there are 232 individuals occupying a portion of the Protected Area. Using the Management Effectiveness Tracking Tool (METT), an assessment of the threats confronting the protected area was done through the participation of 24 Protected Area Management Board (PAMB) members and representatives of the different stakeholders of Baua-Wangag Watershed Forest Reserve (BWWFR). The results of the assessment show that the participants gave the overall management a total score of 47.79 out of 105 points, which is equivalent to a 46% average score. The participants rated the management of the BWWFR highly in Context (75%), Outcomes (70%), and Planning (59%). Meanwhile, the lowest three in the assessment ranking were Process (40%), Input (35%) and Output (10%). Based on these findings, recommendations for effective management were provided.

Keywords: protected area, threats assessment, Management Effectiveness Tracking Tool, Baua-Wangag Watershed, Gonzaga, Cagayan Province, Philippines

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INTRODUCTION

The Department of Environment and Natural Resources (DENR) is currently undertaking the Protected Area Management Enhancement (PAME) in the Philippines which stared in October 2012 and will run until March 2017. The overall project goal is to improve the protection and management of Key Biodiversity Areas (KBAs) in the Philippines and covers 62 National Integrated Protected Areas System (NIPAS) within KBAs as project sites. In 2012, all the 62 project sites were subjected to a management effectiveness assessment using the Management Enhancement Tracking Tool (METT).

One of these 62 sites is the Baua-Wangag Watershed Forest Reserve (BWWFR). The watershed is located at the heart of the Municipality of Gonzaga in Cagayan Province but Wangag Watershed extends to the Municipality of Lal-lo in the southern tip of the watershed (Figure 1).

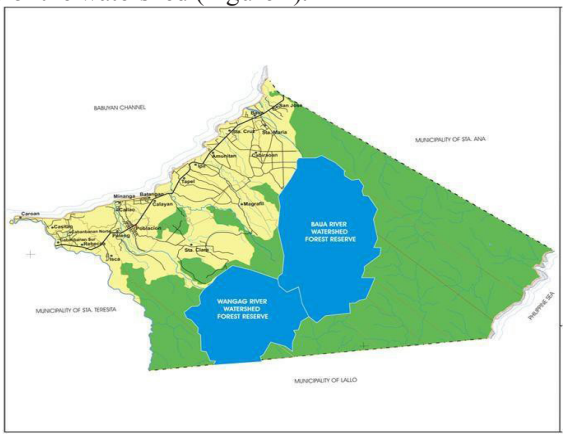

Figure 1. Location map of the Baua-Wangag Watershed Forest Reserve (BWWFR), Gonzaga, Cagayan Province, Philippines (see text for details)

The Baua and Wangag watersheds were proclaimed as Watershed Forest Reserve by virtue of Presidential Proclamation No. 107 and No. 108, respectively, on May 13, 1987 to protect the area from deforestation and degradation. In 1992, with the passage of the NIPAS law, both watersheds were placed under the Protected Areas Systems as mandated by Republic Act 7586.

Using the METT, this paper presents the results of the assessment of the management effectiveness of the BWWFR as managed by the DENR.

METHODS

Several steps were undertaken in implementing the research. These are as follows:

Collection of relevant documents. Secondary data which were important inputs into the assessment were gathered at the national and regional DENR offices. These include Presidential Proclamation (PP) of BWWFR, protected areas

suitability assessment, biological and socio-economic assessments and monitoring, management plan, related legislations and policies, financial reports, among others.

Orientation of the RED, RTD, PASu and staff. Before the research process, those who will be involved in the assessment were oriented as to the activities that will be undertaken in relation to assessment of the management of the BWWFR. These included the DENR Regional Executive Director (RED), Regional Technical Director (RTD), Protected Area Superintendent (PASu) and project staff.

Key Informant Interviews. In the PA site, key informant interviews (KIIs) were conducted with the two BWWFR staff, and three PAMB representatives from the Environment Natural Resource Office (ENRO), barangay LGU, and NGO.

Facilitated METT Scoring. A total of 24 Protected Area Management Board (PAMB) members were oriented and participated in the facilitated Management Effectiveness Tracking Tool (METT) scoring which was done in the Liga ng Barangay Hall in the municipality of Gonzaga. The tool consists of six criteria, namely, Context, Planning, Input, Process, Output, and Outcome. Each of these criteria has indicators with a maximum of 3 points per indicator (range of score is 0-3). All in all, the total possible score is 105.

The facilitated scoring activity using the assessment forms of the METT (World Bank 2007) was conducted to identify emerging threats and issues in the management of the protected area. It was also the main tool to assess the effectiveness of the management of the BWWFR. Each member individually scored BWWFR after the METT indicator was fully explained and understood by the participants. It was important that the scoring and basis of scoring were clear and commonly understood by the participants. This was done through a simultaneous slide presentation while the participants were answering the METT questionnaire. The scoring was done by the participants assessing the whole BWWFR and not portions of it only.

The METT scores were encoded and processed. The mean scores were taken for each of the issue and collated. For each set of respondent's answer, the percent and mean score were also computed to derive the METT score for individual respondents. Some of the variables like input, process and plan have bonus items with a maximum of one (1) point each. The additional points were added to the total score for each variable. The following equations were used:

Total Score = Sum of all scores for each variable (including additional issues)
Maximum Score = (Number of applicable issues*3)+Number of additional issues for the variable
Percent Score Respondent = {(Total score)/(Maximum Score)}*100
Percent Score Variable = Average of individual respondent's score

The threat scores given by the respondents were counted as high, medium, low, not applicable and no data available. To ensure homogeneity of data and to arrive at the top threats, the percent score was computed taking into account items that were not answered by respondents, tagging it as no response.

RESULTS AND ANALYSIS

Context. Of the six management elements assessed, BWWFR got the highest rating on context (Figure 2). Overall, the context score given for the PA is 75%. As shown in Figure 2, only six participants gave this variable a perfect score of 3, implying that there is already a law (Republic Act) which declares it as protected area. Majority gave it a score of 2 because there is already Presidential Proclamation No. 107 and No.108 dated May 3, 1978 to protect the area from deforestation and degradation. As indicated in the BWWFR Management Plan (p.11) the Baua-Wangag watershed was placed under the NIPAS Law as mandated by RA7586 in 1992. However, this information is generally not known by the PAMB members.

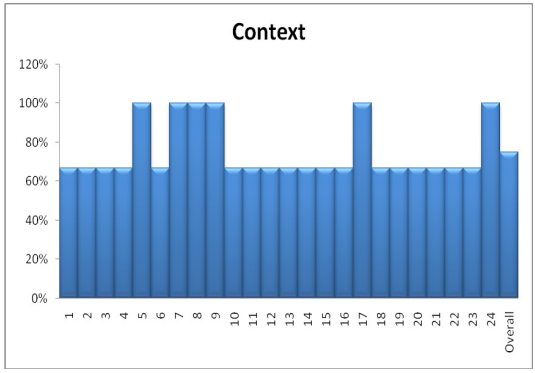

Figure 2. Context score of each respondent.

Planning. There were several indicators of planning and these include the presence of the following: PA regulations, PA objectives, PA design, management plan, regular work plan and planning for adjacent land and water use. Of the 26 total possible points, BWWFR garnered only an average of 15.25, equivalent to a score of 59% (Figure 3). The PAMB members gave a general average of 2 for the indicators, except for the presence of regular workplan to which they gave a score of 1.

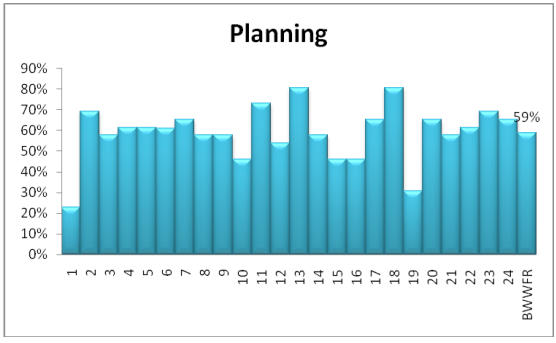

Figure 3. Planning score of each respondent.

With regard to PA regulations, according to the participants there are regulations and policies existing; however, equipment and facilities are lacking. One of the respondents commented that the regulations are not enough and those existing are not strictly implemented.

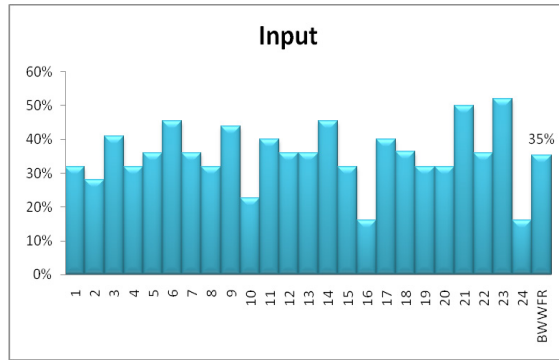

Figure 4. Input score of each respondent.

Inputs. The input indicators include law enforcement, resource inventory, staff numbers, staff training, current budget, security of budget, equipment, and fees. Out of the 25 total points for this variable, BWWFR got an average score of 8.54 or an equivalent score of 35% (Figure 4). Among the aforementioned indicators, only staff training got a score of 2 while equipment got a score of 0. The rest of the indicators got a score of 1.

The main issue with regard to input is the inadequate number of staff assigned to the BWWFR. Based on the KII, the only PA staffs in the BWWFR are the PASUs assigned to each watershed. According to the Philippine Agenda 21, there should be one forest guard for every 300 hectares of forest to be protected. The total area of BWWFR is 15,987 ha (Baua = 8,995 ha + Wangag = 6,992 ha), ideally it should have 76 forest guards. But as the two PASUs lamented, they do not have any staff dedicated to the BWWFR.

The budget for the BWWFR is still another issue. BWWFR is under the jurisdiction of the CENRO Aparri in Cagayan. According to the BWWFR PASu, the budget given to the CENRO is shared among the three PAs, namely: Magapit Protected Landscape, Baua and Wangag Watershed Forest Reserves and the Palaui Island Protected Landscape and Seascape. Each of these PAs does not have a permanent budget allocation. It is also due to the lack of budget that the BWWFR does not have any facilities and equipment.

Process. There were 11 indicators to measure the process variable. Out of the 36 maximum total points possible, BWWFR garnered an average point of 15.17 equivalent to a score of 40% (Figure 5). Nine of the indicators got a score of 1, one indicator got a score of 2, and two got a score of 0.The indicator "maintenance

of equipment" is not applicable because the BWWFR has no equipment at all. In addition, there are no commercial tourist operators in the BWWFR.

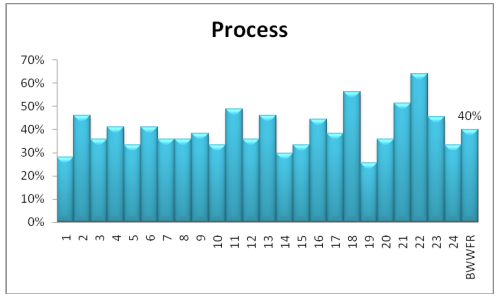

Figure 5. Process score of each respondent.

From the process assessment some concerns can be highlighted: (1) not all the boundaries of the PA are marked; (2) manpower and logistics are inadequate to implement protection system; (3) inadequate survey/research results are presented to the PAMB and (4) commercial tourism is untapped. As early as 2008 (Annual Accomplishment Report 2008), potential ecotourism destinations in the BWWFR have been identified which include the Bagsang Falls and Matagray Falls, among others.

Output. The lone indicator for output is visitor facilities; hence, the total score is 3. BWWFR got the lowest rating on this variable with an average point of 0.29, equivalent to a score of 10% (Figure 6). As brought out during the KII with the PASUs, there are no visitor facilities in the BWFFR.

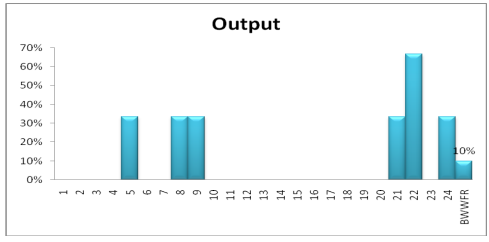

Figure 6. Output score of each respondent.

Outcome. BWWFR got the second highest score (70%) on this variable (Figure 7). In general, the participants gave a score of 3 on the economic benefit and 2 on the condition of values. There were no comments provided but this score implies that there is a major flow of economic benefits to the local communities.

THREATS TO BWWFR

Assessment of threats was done through the participation of 24 PAMB members and representatives of the different BWWFR stakeholders during the

METT facilitated scoring. Table 1 summarizes the top threats identified by the respondents.

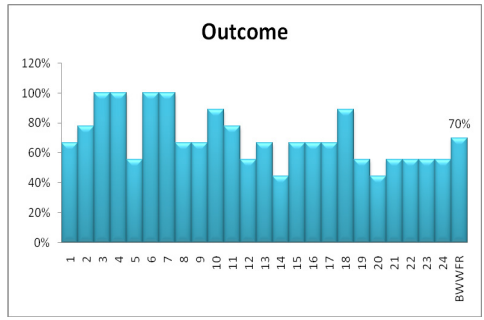

Figure 7. Outcome score of each respondent.

Table 1. Top threats (%) in the Baua-Wangag Watershed Forest Reserve (BWWFR, Gonzaga, Cagayan Provinve, Philippines) as rated by the 24 respondents.

Threats	High	Medium	Low
Logging and wood harvesting	13	8	17
Fishing, killing and harvesting aquatic resources	8	13	21
Hunting, killing and collecting terrestrial animals (including killing of animals as a result of human/ wildlife conflict)	8	8	13
Mining/quarrying	4	0	4
Deliberate vandalism, destructive activities or threats to protected area staff and visitors	4	0	8
Housing and settlement	0	17	4
Roads and railroads, include road-kill	0	17	4
Storms and flooding	0	17	29
Gathering terrestrial plants	0	13	17
Annual and perennial non-timber crop production	0	8	29

Wood harvesting by illegal cutting is considered the highest threat in the BWWFR. Most of the respondents stated that several groups are sited inside the PA engaging in illegal tree cutting. The proclamation of the Baua-Wangag Forest Reserve indelibly helped much as it was instrumental in stopping commercial logging activities within the critical watershed areas in the municipality. This in turn prevented the further degradation and deforestation of the watershed area which sustains the water supply needed by the irrigation systems to irrigate hectares of ricelands in downstream areas.

Storms and flooding as well as housing and settlement are rated by a few members as medium threat in the PA. The Province of Cagayan lies in the path of typhoon passing through the Island of Luzon causing flooding in the floodplain of the BWWFR. Problems on soil erosion and the resultant siltation and sedimentation of the river system are causing flooding of the fertile fields in downstream areas. There are some PAMB members who considered storms and flooding as low threat because of the adequate forest cover of the watershed. Annual and perennial crop production is also considered as a low threat to the PA. This implies that the watershed is able to control soil erosion and the water holding capability is high.

During the data validation, the following were confirmed: (1) High threat from the following: illegal cutting and wood harvesting; hunting, killing and collecting terrestrial animals; (2) Medium threat from: annual and perennial non-timber crop production; habitat shifting and alteration particularly in Sitio Bagsang due to slash and burn cultivation; (3) Low threat from: fishing, killing and harvesting of aquatic resources; housing and settlement since this is confined only in Sitio Bagsang where there are 50 households of Igorots practicing upland farming; gathering non-timber products since there are Agtas who gather rattan, bird nests and orchids and sell them in the market; utilization of portions of PA to upland vegetables and other agricultural crops by Agtas and Igorots for household consumption only; livestock farming and grazing; fire which may arise from burning done in summer prior to land preparation; fragmentation within the PA; introduced genetic material (e.g. GMOs; it was mentioned that some farmers are planting Bt corn); and erosion and siltation/deposition especially during heavy rains.

SUMMARY AND CONCLUSION

The BWWFR got an overall management effectiveness score of 47.79 out of 105 points, which is equivalent to a 46% average score. The participants rated the management of the BWWFR highly in context (75%), outcomes (70%) and planning (59%) as shown in Table 2 and Figure 8.

Table 2. Average points garnered and percent score of the Baua-Wangag Watershed Forest Reserve (BWWFR, Gonzaga, Cagayan Provinve, Philippines) in the various management components.

Management Element Scored/Assessed	Maximum Total Points Possible	Actual Average Maximum Points	Average Points	% Score
CONTEXT	3.00	3.00	2.25	75
PLANNING	26.00	25.88	15.25	59
INPUTS	25.00	24.25	8.54	35
PROCESS	39.00	37.88	15.17	40
OUTPUTS	3.00	3.00	0.29	10
OUTCOMES	9.00	9.00	6.29	70
Total	***105.00***	***103.00***	***47.79***	***46***

With regard to context, majority of the participants were aware of Presidential Proclamation No.107 and No. 108 dated May 3,1978 which covers the BWWFR. The PA was placed under the NIPAS Law as mandated by RA 7586 in 1992. As regards the Outcomes, the general feeling of the participants was there was a major flow of economic benefits to the local communities.

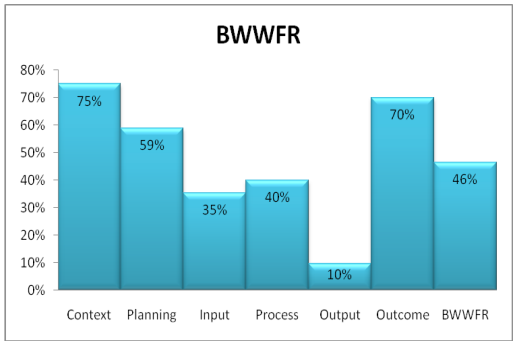

Figure 8. Overall METT Score for each variable.

Next to outcome is planning (59%). The PA has regulations, objectives, design, and regular work plan but all these are not fully utilized in the management of the BWWFR due to funding constraints. As borne out in the interview with the PASUs the PA has no permanent allocation.

Meanwhile, the lowest three in the assessment ranking were process (40%), input (35%) and output (10%). As regards Process, there is a need to do the following: mark the PA boundaries so that the local users will know them, provide additional budget for the PA so that it can acquire equipment and facilities and hire more staff to implement forest protection. Given these logistics and personnel, the BWWFR Management Plan can be fully implemented and adequate monitoring and evaluation can be done. There is also a need to improve the local people's participation in the PA management, particularly the local communities including the indigenous people.

The issues on Input, namely, inadequate staff, lack of equipment and facilities and security of budget all boil down to the inadequacy of budget allocation for the BWWFR. The same reason accounts for the very low score on Output. Despite that several potential ecotourism sites were already identified in 2008, up to the present there are no visitor facilities in the PA yet.

Based on the validation, there is high threat from illegal cutting and wood harvesting; and hunting, killing and collecting terrestrial animals in the BWWFR. The medium threats include annual and perennial non-timber crop production; and habitat shifting and alteration particularly in Sitio Bagsang due to slash and burn cultivation. Others were considered low threats, namely, fishing, killing and harvesting of aquatic resources; housing and settlement; gathering of non-timber

products; utilization of portions of PA to upland vegetables and other agricultural crops; livestock farming and grazing; fire; introduced genetic material; and erosion and siltation/deposition especially during heavy rains.

RECOMMENDATIONS

Context. The BWWFR should lobby for regular funding for the implementation of the management plan to insure the success of the advocacy factors identified in the plan for adapting the conservation, management and development strategies. Endorsement and full support from the local executives from the Congressman down to Mayor should be pushed to fund the plan through a legislation proposal. As stated during the KII, there exist strong collaborative efforts and partnership between the Municipal and Barangay LGUs, and PASU of DENR. A review of all existing documents for consolidation and the determination of all requirements is needed to draft for another sponsorship. DENR and PAMB should work hand in hand in securing and preparing all documents for RA drafting.

Planning. There are regulations and policies existing however equipment and facilities are lacking. One of the respondents commented that the regulations are not enough and those existing are not strictly implemented. Aside from funding, there is a need for additional staff for the PASU to be complemented by an office and the necessary/appropriate equipment and mobility vehicle or even horses for patrolling the area. To institutionalize effective multi-sectoral Forest Protection with the leadership of DENR PASU there is an urgent need to strengthen the PASU capabilities in forest protection in terms of manpower and logistics support and to shift forest protection strategy from purely police work to extension/education/community organizing. Furthermore, as stated in the Philippine Agenda 21 on Forest Ecosystem Section a ratio of one forest guard per 300 ha to ensure adequate protection of the PA is deemed necessary.

In the BWWFR, numerous gaps still exist in terms of knowledge on the status of habitats and their associated biodiversity. As per record, very limited information is available on biological resources and other life forms inside the PA. The following are recommended for consideration and maybe added in their management plan to support the protection, conservation and awareness on biodiversity resources as enumerated in Philippine Agenda 21 on Forest Ecosystem.

- Conduct biodiversity assessment in selected forest areas;
- Conduct an inventory and identify plant and animal resources in biodiversity-rich area (s) of BWWFR;
- Expand and improve knowledge on characteristic uses and values of biological diversity;
- Document indigenous knowledge, techniques and practices on biodiversity conservation and sustainable development of the area;
- Restore/rehabilitate damaged critical habitats if ever exist;
- Establish *in-situ* conservation of wildlife and strengthen support to on-farm agricultural biodiversity conservation;
- Establish a Gene/Seed Bank for animals and for lesser known crops and under-utilized species, which is accessible to various stakeholders;

- Conduct a training on community organization and biodiversity conservation for local stakeholders;
- Increase biodiversity conservation awareness and establish and implement information program for local communities;
- Popularize educational materials on biodiversity conservation ethics and strategies;
- Implement a community- based biodiversity conservation education and research program;
- Identify overlaps and conflicts in current provisions on biodiversity and
- Formulate proposed legislations to fill in the existing gaps and resolve conflicts in current legislations, if any.

Process. To reduce the pressure from the people living within and around the BWWFR, there is also a need to strengthen local communities in the development and management of livelihood enterprises by giving technical assistance for the conduct of feasibility study on alternative sustainable livelihood schemes. The DENR-PASU in partnership with LGU and PO/NGO should advocate community-based resource management schemes that provide for alternative sustainable livelihoods along with effective incentives for resource protection or conservation.

With the natural features and uniqueness of the BWWFR after a comprehensive biodiversity studies and documentation, the area may now be evaluated to assess its potential for ecotourism. Community-based ecotourism with the participation of various stakeholders is one alternative livelihood for the communities and the corresponding payment for environmental services (PES) may augment the maintenance and operating expenses of the recommended management plan.

Input. To ensure the full implementation of the BWWFR Management Plan completed in 2012, the plan should be complemented with staff and allotment for the implementation of the protection and enforcement of the objectives of the plan. Basic necessary equipment like GPS, communication radio, computers, service vehicle and office supplies should be provided. This will enable the staff to patrol, monitor and protect the more than 15,000 ha forest reserve. The new equipment to be purchased should be complemented with short training on the operation/use of the said equipment. Hiring of a Community Development Officer/Extension Officer is a must in the organizational set-up to coordinate and develop IEC materials for the whole PA.

Outcome. The natural features of the BWWFR should be documented, mapped and assessed as potential ecotourism destination. The sites were already mentioned in the management plan, but there is a need to explore other areas deeper in the protected areas such as other natural formations, caves, unusual rock formations, natural trails, exceptional tree species and trekking and camping grounds. These areas would serve as additional source of livelihood and funds to support other activities. Payment for Environmental Services (PES) is also recommended to generate funds, if the stakeholders are willing to pay for water which is the main use of the watershed. A willingness-to-pay study on this concern can be conducted.

LITERATURE CITED

Baua-Wangag Watershed Forest Reserve Management Plan. 2012. Environment and Development Alternative Solutions Services, Department of Environment and Natural Resources, Republic of the Philippines, 30 January 2012.

Comprehensive Land Use Plan 2009, Gonzaga, Cagayan, Philippines.

Department of Environment and Natural Resources and Deutsche Gesellschaft Fur Internationale Zusammenarbeit (GIZ) GMBH. 2011. An In-depth Review of the NIPAS Law and Management of Protected Areas in the Philippines.

Gonzaga, Cagayan, January 15, 2009 http://www.psdn.org.ph/agenda21/action_forest.htm Downloaded on June 29, 2013.

World Bank. 2007. Management Effectiveness Tracking Tool. Reporting Progress at Protected Areas Sites.

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