

Potential Impacts of Climate Change on the  
Governance of Bladen Nature Reserve in Belize

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### Abstract

Bladen Nature Reserve, located in the south central part of Belize, is a pristine protected area rich in biodiversity. It is co-managed by the Belize Forest Department and the Ya'axché Conservation Trust under the strictest of guidelines set forth by the International Union for Conservation of Nature (IUCN). Bladen Nature Reserve is categorized as Category 1 under the guidelines, which allow only educational and research activities within reserve boundaries. As climate change impacts the region, bringing hotter temperatures, lower amounts of rainfall and rising sea levels to coastal regions of Belize, the governance of Bladen Nature Reserve must be adapted to accommodate not only the reserve, but the stakeholders and nearby human inhabitants. This paper looks at the Bladen Nature Reserve Management Plan Final Draft (2006), as well as other reports and research articles to determine possible governance changes for Bladen as climate change impacts Belize.

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Introduction

Bladen Nature Reserve occupies nearly 100,000 acres in the south central part of Belize on the eastern coast of Mesoamerica. It is one of three protected areas in the country and is considered to be a biodiverse hotspot, with over 250 species of birds, 93 species of mammals, and 92 species of reptiles and amphibians (Bladen Nature Reserve Management Plan, 2006). The reserve features old growth rainforest and tributaries to the Monkey River watershed which provides freshwater for inhabitants downstream, eventually emptying into the Caribbean Sea and helping to preserve the Belize Barrier Reef, the second largest barrier reef in the world. The reserve is currently co-managed by the Belize Forest Department and the Ya'axché Conservation Trust. The Ya'axché Conservation Trust makes decisions about the day to day operations of the reserve and has members of the local community on its board of directors as well as experts in the area of protected area management (Ya'axché Conservation Trust, Who We Are).

Bladen Nature Reserve is currently listed as Category 1a under IUCN guidelines for protected areas (IUCN, 2016). Protected areas under Category 1a are:

Protected areas that are strictly set aside to protect biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such protected areas can serve as indispensable reference areas for scientific research and monitoring.

Stakeholders

The IUCN 1a designation has been met with some resistance from local inhabitants who have not seen immediate or tangible benefits from the designation. Areas surrounding the reserve are used for agriculture and there is continuing pressure to convert some of the reserve for agricultural purposes (Bladen Nature Reserve Management Plan, 2006). With the strict protection in place, local inhabitants are unable to harvest from the area or to hunt, and many of the indigenous people perceive the impact of the park to be largely negative. Efforts continue to be made to educate local people as to the long-term benefits of the protected area designation. Many protected areas have designations which allow for monitored hunting activities or even agriculture, but Bladen Nature Reserve allows neither, nor does it allow for tourism. The only humans who are allowed in the park are rangers and researchers, which helps to feed resentment of the local population and negative perceptions for the reserve (Bladen Nature Reserve Management Plan, 2006). However, with the involvement of some local people on the board of directors of the Ya'axché Conservation Trust, the perceptions of benefits from the park may be slowly changing to positive.

### Climate Change and its Impacts

Anthropogenic climate change is bringing problems to areas all over the world. Sea level is projected to rise by as much as 1-3 meters by the end of this century due to melting arctic ice; global mean temperatures are expected to rise by as much as 3 degrees Celsius, and precipitation will either drop dramatically or increase, depending on the location (Richardson, 2009). In short, climate change will change the world, and not for the better.

Belize is a coastal country, which means that rising sea levels will negatively impact the region. As the coast is eroded, and salinization of agricultural areas grows, people and cities will be pushed inland toward higher ground and there will be even more pressure on Bladen Nature

Reserve to be converted to agriculture, as previously mentioned. With less land available to grow food, people may want to take the land that is protected by the reserve and use it for agriculture. As temperatures rise in the area and rainfall decreases, this will have a negative impact on existing agriculture in the buffer communities of Bladen Nature Reserve and all of Belize (Richardson, 2009).

There will also be increased demands for energy due to climate change, as people will need more electricity to keep themselves cool in rising temperatures. As the heat rises, so does the need for air conditioning and refrigeration for food. Bladen Nature Reserve is bordered by the Central River, which has already been scouted by a hydroelectric company. Although the activity was halted, this instance made it clear that the reserve might not be safe from this type of activity in the future.

It is important to note that rainforests such as the one in Bladen Nature Reserve help to mitigate climate change by means of carbon sequestration. The Rio Bravo Climate Action Project was begun in 1996 by The Nature Conservancy and the Program for Belize in the Orange Walk district in northwest Belize with an aim of halting deforestation in the area. From the Verified Carbon Standard Project Description (Version 3) for the Rio Bravo Climate Action Project (p 16-17):

The Belizean Government is fully committed to protecting its natural resource base and the environment, while providing sustainable economic development opportunities for our people, and believes that the contemplated RBCMA joint implementation pilot project would be a significant step in this direction. The RBCMA pilot project would seek to protect a critically endangered forest region of our country, and to demonstrate the successful use of sustainable forestry practices. The proposed pilot could, thus, be expected to result in measurable carbon sequestration and also advance the environmental

and economic development interests of Belize. It is, indeed, our hope that the project would serve as a model to be applied elsewhere.

This is good news for Bladen, as it is already well-protected by its classification and good news for Belize, as the country makes provisions for climate change impacts by increasing carbon sequestration capability with the protection of its rainforests.

### Protecting Bladen Nature Reserve

The geography of the reserve protects it from all but the worst of hurricanes, which may be increasing in both strength and frequency due to climate change, although some meteorologists disagree with this claim (UCAR, 2006). Hurricanes have been occurring more often and with more intensity in recent years, but Bladen Nature Reserve has remained largely untouched due to its inland location and protection by mountains. Although there is not consensus on the certainty of hurricane projection, recent years have shown a trend of stronger and more frequent storms. Despite hurricanes being a threat to many islands and countries of the Caribbean Sea, Bladen is safe from this type of danger but is under threat due to other effects of climate change.

With more pressure on the reserve from humans due to the effects of climate change, governance has to adapt to the change rather than resist. A lack of adaptation can and will have dire circumstances for Bladen Nature Reserve. The Bladen Nature Reserve Management Plan for 2007-2012 identified six Conservation Targets for the reserve:

- Tropical broadleaf forest
- Lowland Pine Forest
- Aquatic and Riparian Ecosystems

- Game Species
- Upper Elevation Species
- Cultural Heritage

Of these six targets, five were evaluated for viability, with the results indicating that the overall health of Bladen Nature Reserve at the time of evaluation was “Fair” to “Very Good” with the exception of Cultural Heritage, which was not evaluated. The six targets were then given goals to either improve or maintain the status of each, with the exception of Cultural Heritage. Cultural Heritage viability will be evaluated in regards to a lack of disturbance to sites and looting of artifacts (Bladen Nature Reserve Management Plan, 2006).

Threats to biodiversity were also evaluated, rating threat severity, urgency, relative area, recovery and probability. Threats such as fire, fishing, mining, seed harvesting, and hunting were evaluated using the formula of (Urgency + Recovery) x Severity x Area x Probability. The lowest score threat came from Agriculture and Logging, with the highest threats from Fire, Xate Palm Harvesting and Looting (Bladen Nature Reserve Management Plan, 2006).

Conservation actions were then prioritized using reserve using a hybrid of The Nature Conservancy’s Five-S Framework for Site Conservation along with the Wildlife Conservation Society Living Landscapes program and two additional factors of the national importance of a particular target and the social implications of prioritization. These four factors were then given calculated with the following formula to complete the prioritization process:

$$P = (1/V) \times N \times T$$

Where: P = Prioritization Score  
V = Viability Score

N = National Priority Weighting

T = Weighted ranked WCS Threat Score

The highest priority was ranked as Tropical Broadleaf Forest, with the highest threat coming from Xateros Palm harvesting. These palm leaves are used in Catholic Palm Sunday services the world over. The second on the list of priorities was Game Species, with the biggest threat to this target arising from hunting. The third and fourth priorities were given a medium level of priority and include Aquatic and Riparian Ecosystems and Lowland Pine Forest, with threats coming from fishing and fire, respectively. Rounding out the list of targets were the unranked targets of Cultural Heritage, with threats from looting, and Upper Elevation Species, with the threat from Chytridomycosis, which is an infectious disease of amphibians.

It is impossible to ignore the absence of any mention of climate change in all of the above-mentioned threats, conservation targets, or goals. To be certain, climate change will impact the first four conservation targets immeasurably. As Robert B. Richardson writes in *Belize and Climate Change: The Costs of Inaction* (2009, p. 41):

“Tourism in Belize is largely nature-based, and natural resources are the foundation of any of the country’s attractions. As such, the tourism sector in Belize is highly vulnerable to the impacts of climate change. Rising sea levels pose risks for flooding, inundation, saltwater intrusion, and erosion, which threaten water supplies, physical property, and coastal areas, all of which are critical for the sustainability of the tourism sector. Warmer sea water threatens the coral reefs along the coast of Belize that comprise the longest barrier reef in the western hemisphere and attract thousands of tourists for snorkeling and scuba diving activities. Also, warmer sea surface temperatures are associated with increasing frequency and intensity of tropical cyclones or hurricanes, which threaten coastal settlements and infrastructure.”

## Conclusion

Bladen Nature Reserve in Belize must make provisions climate change in its future management plan despite the fact that it is not currently a tourist destination, nor does it generate revenue for the country in the way that tourism does in other parts of the country. The current management plan does not mention climate change in any meaningful way, nor does there appear to be any new plans for adaptation on the park's informational website. Considerations will need to be included for the buffer communities of the reserve, as local human populations will feel the effects of climate change before the reserve itself suffers. In turn, the park will feel pressure as the local population turns instinctively toward the park in a quest for resources such as water for human consumption and hydroelectric power, land for agriculture, and game for hunting as food may become scarce.

The current classification of 1a under IUCN guidelines for protected areas appears to be a double-edged sword for Bladen Nature Reserve. Although the park is attempting to maintain its biodiversity and cultural integrity with this restriction, the classification does not address the very real issue of climate change and the potential effects on the reserve.

David Welch, author of *What Should Protected Areas Managers Do in the Face of Climate Change?* (2005, p. 84-85) has come up with a clever acronym with actions to help managers of protected areas face climate change with confidence. He writes:

“To provide some structure, and to help see linkages between complementary activities, they can be grouped under five categories that form the acronym **ALARM**.

- Awareness, including staff, stakeholder and general public awareness.

- Leading by example, or “house in order” actions such as reduction of greenhouse gas emissions.
- Active management, such as minimizing other stresses to facilitate autonomous adaptation.
- Research, such as assessment of values most at risk under a radically changed climate.
- Monitoring, such as reporting on indicators of the impacts of climate change.”

Bladen Nature Reserve has already undertaken some of these actions and can expand and build on them to protect the reserve from some of the worst effects of climate change. The final step is to legislate the necessary changes and make these steps a part of the official management plan. With their co-management by the Belize Forest Department and the Ya’axché Conservation Trust working together and keeping local stakeholders involved in the protection of the reserve, there is strong potential for the reserve to adapt to climate change.

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