

A photograph showing the lower bodies and legs of several indigenous people. They are wearing bright red skirts and have their legs painted with red body paint. Some have white and green paint designs on their thighs. They are standing on a sandy, dry ground. The image is cropped to focus on the lower half of the individuals.

Indigenous Lands in the Brazilian Amazon:

carbon stocks and barriers to deforestation

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INDIGENOUS LANDS IN THE BRAZILIAN AMAZON: CARBON STOCKS AND BARRIERS TO DEFORESTATION

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Introduction

Indigenous Lands (ILs) in the Brazilian Amazon cover a significant portion of the region (27% of forest area¹) and are home to 173 ethnic groups (1). In addition to being critical for the physical and sociocultural survival of indigenous communities – 98% of Brazil's area of demarcated ILs lies in the Amazon –, they are also key areas for the conservation of regional and global biodiversity. Despite these obvious and touted benefits provided by indigenous territories to the Amazonian environment, their role in climate change mitigation and climate balance in the region is still underrecognized. Contributing to this recognition is therefore the primary purpose of this publication. We hope that the results outlined here can help protect indigenous territories and develop climate change adaptation strategies for indigenous peoples.

Barriers to deforestation advancement in the Amazon and carbon stores

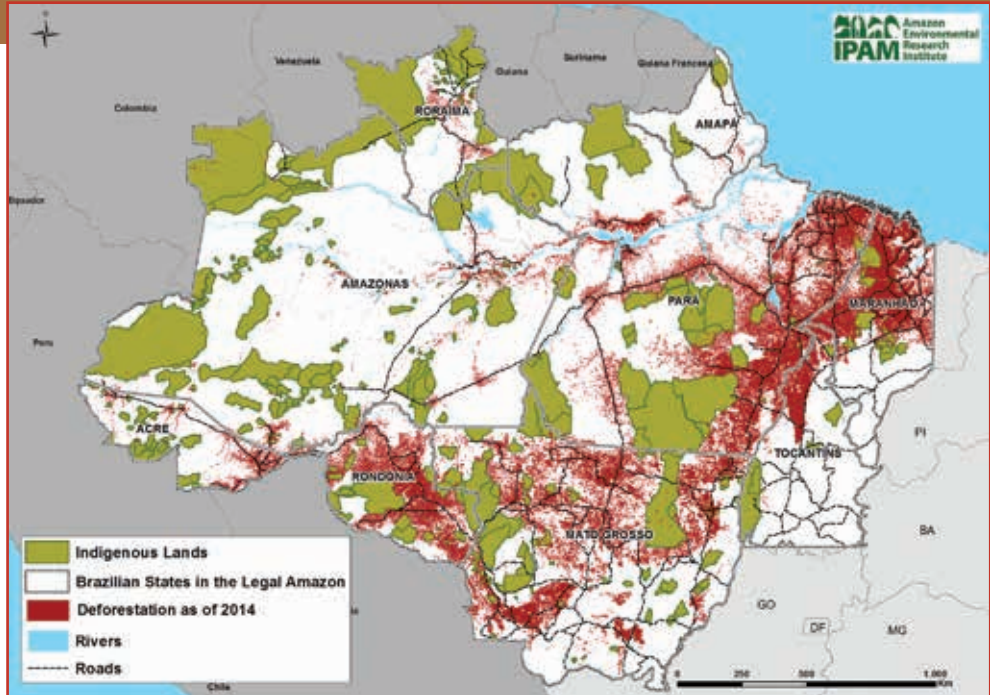
ILs, as well as other types of Protected Areas, play a key role in biodiversity conservation while acting as gigantic barriers to the encroachment of deforestation (2, 3, 4, 5) (Figure 1). The loss of forest within ILs was under 2% during the period of 2000-2014, whereas the rate of deforested area in the Amazon, referring to the same period, was of 19%² (Figure 2). This low rate is related to the traditional modes of land use by indigenous communities; their use of natural resources; customs and traditions that in most cases result in the preservation of the forests and biodiversity they contain (6). Deforestation occurring within these areas is usually associated with actions by non-indigenous, such as trespassers who engage in illegal logging, prospectors, as well as encroaching agriculture (1, 7, 8).

¹ This computation derives from the forest area data and total area for ILs in the Brazilian Amazon published in REDD no Brasil: um enfoque amazônico, available at http://bit.ly/IPAM_REDD_no_Brasil

² This analysis was obtained by IPAM based on the data of PRODES/INPE. Data referring to the Brazilian Amazon deforestation and in Indigenous Lands are available at the SOMAI platform – <http://soma.org/>

Indigenous Lands and deforested area in the Brazilian Amazon as of 2014.

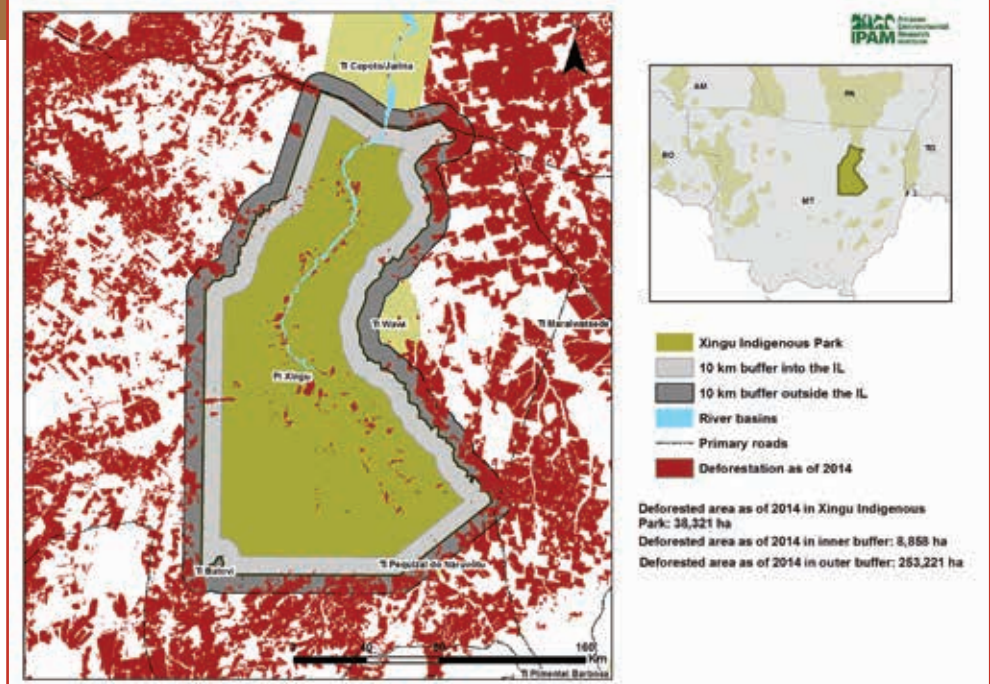
Figure 1



Source: IPAM, 2015

Example of deforestation by 2014 in and around the Xingu Indigenous Park – PIX. Tracks in dark and light gray denote the buffer zones (10 km) outside and inside the Park boundaries.

Figure 2



Source: IPAM, 2015

In addition to the low deforestation rates within the ILs, an inhibitory effect of forest destruction takes place in the landscape where these territories are. For example, this inhibition can reach beyond 10 km from the borders of the territories (3, 9): in a radius of 10 km of distance from the ILs, 7% of the forested area was deforested; in a radius of 25 km of distance from the ILs, the proportion of forested area which was deforested is of almost 12%³. This effect plays an important role in the conservation of regional biodiversity (10). In the Brazilian Amazon, large forest remnants located in areas with ILs help conserve the Amazon fauna, including rare and large mammals (11, 12) and hydrological systems in the region (13).

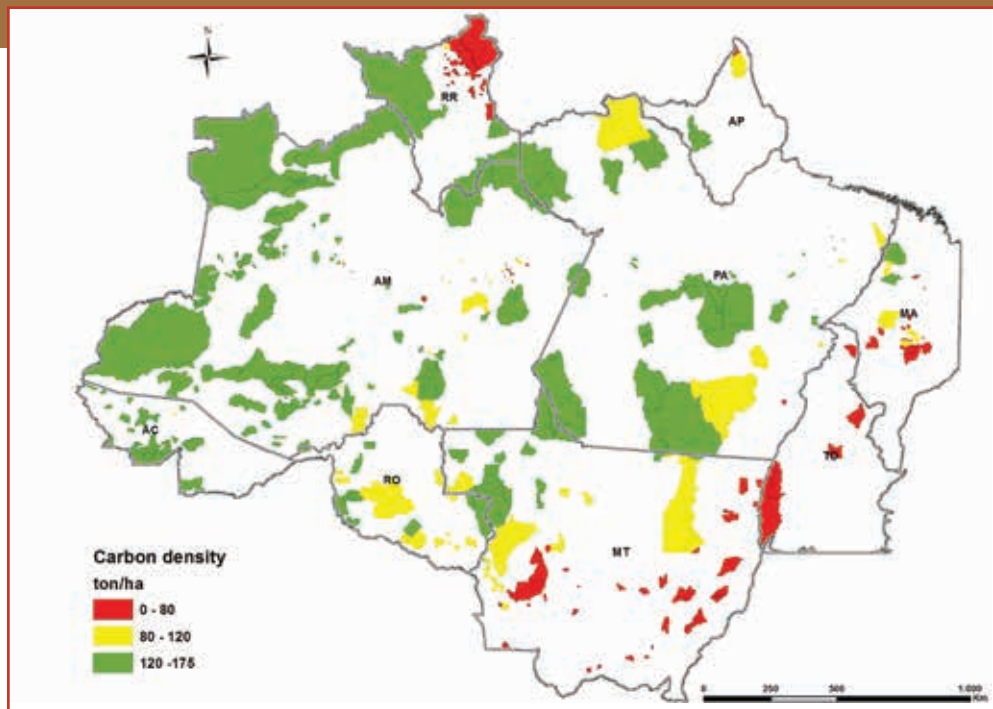
The deforestation inhibiting effect related to the existing and new Protected Areas, including ILs, is reflected by the declining rates of forest destruction in 2004-2008. During this period, 10 million hectares of the Brazilian Amazon were demarcated as ILs, and another 20 million became Protected Areas under the Action Plan for the Prevention and Control of Deforestation in the Amazon - PPCDAm (14). This action alone caused a 37% decrease in the rate for those years (3).

From the perspective of climate balance, the forest protection afforded by indigenous people and their Lands is vitally important to many aspects. The deforestation prevention and, as a result, the avoided emissions of carbon dioxide, the main greenhouse gas (GHG) – is certainly a relevant factor. Forests under the stewardship of indigenous communities in the Brazilian Amazon represent a huge store of carbon – approximately 13 billion tons (15) (Figure 3). Conversion of these areas into pasture or farmland, in addition to releasing GHG, it also has a direct local impact on changing the temperature and the regional rainfall (16, 17). The reduction on the evapotranspiration resulting from forest loss, as an example, can cause the increasing of the heating flux, which can potentially help further compound climate change at a global level (16, 17, 18).

³ This analysis was calculated by IPAM based on the data of PRODES/INPE, for the period of 2000 – 2014.

Carbon density (tons per hectare) in Indigenous Lands in the Brazilian Amazon.

Figure 3



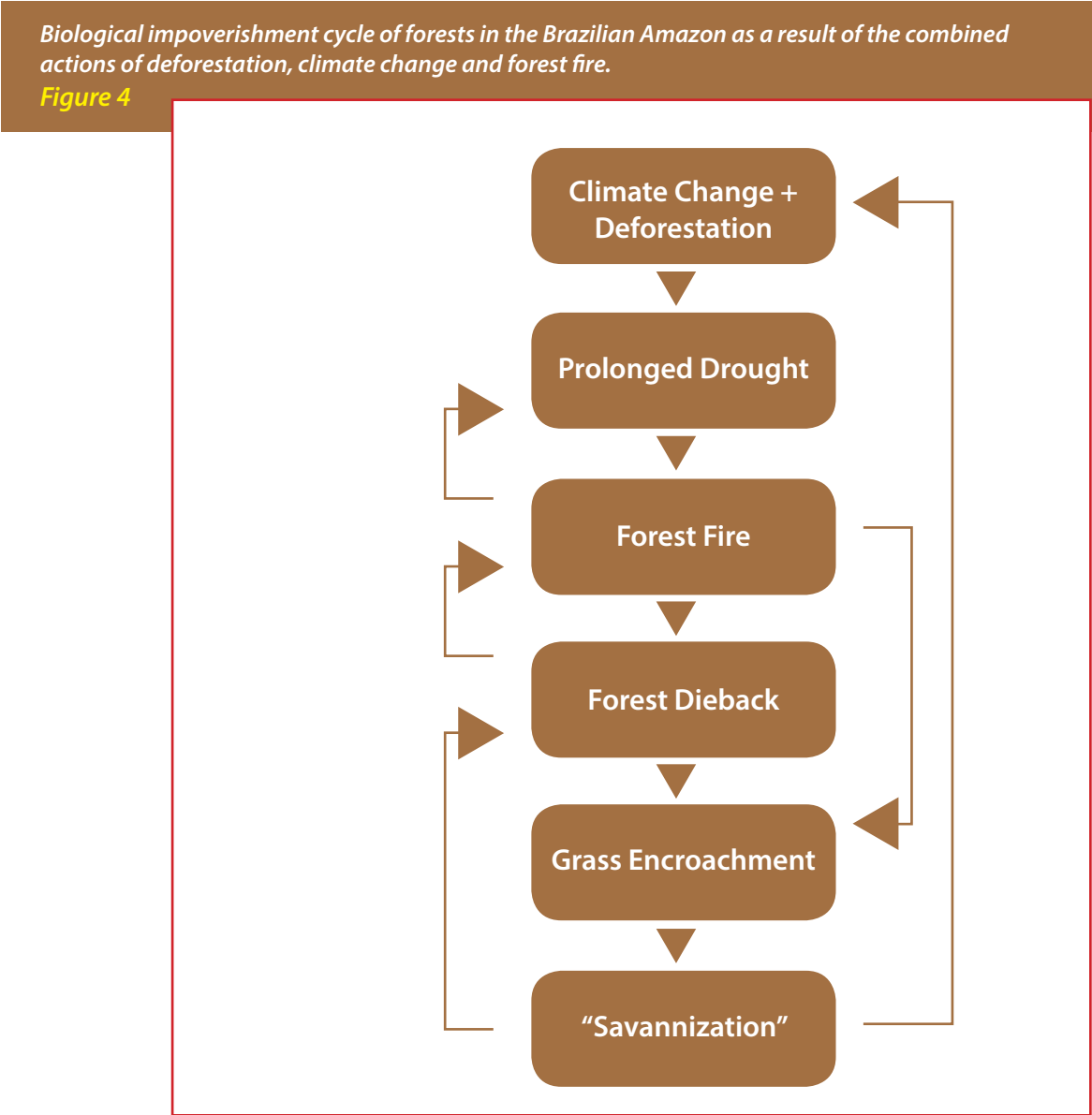
Source: Adapted from Baccini et al. (2012). (19)

As a result of the blocking role played by deforestation and forest carbon storage, ILs are crucial areas for compliance with GHG emissions reduction targets undertaken by Brazil. Based on the National Policy on Climate Change (Law 12.187/2009) and its corresponding decree (Decree 7.390/2010), the Brazilian government made a commitment to reduce national emissions expected for 2020 by 36.1-38.9%, including a reduction of 80%⁴ in the Amazon deforestation rate by 2020. This target has been largely achieved in recent years, and Brazil has reduced its emissions by 77% over the last seven years compared to the rates reported in the beginning of the previous decade. However, the battle against deforestation is not yet over. The increased deforestation rates observed in 2013 (20) shows that there is still a high pressure for opening new fields. About 40% of the deforestation in 2012 occurred in vacant or non-designated lands, which reflects the speculative nature of this deforestation (21). As before, the quickest way to stop this deforestation is through a robust policy that creates new Protected Areas in the Amazon, in particular the demarcation of Indigenous Lands. And there is room for the expansion of Protected Areas in the region. About 64 million hectares of forests on public lands have yet to be earmarked for a specific purpose by the federal and state governments (22)⁵. There is therefore room for expansion of ILs and other types of Protected Areas.

⁴ Reference value refers to the average deforestation rate for 1996-2005, which corresponds to 19,535 km².

⁵ Updated figures in Azevedo-Ramos et al., 2013 (submitted) indicate approximately 80 million hectares of non-designated areas.

In addition to the relevance of ILs as barriers to deforestation, it is fundamental to recognize their relevance in terms of climate issues. The Xingu Indigenous Park is an example of the role of the ILs. The substitution of native forests to pastureland and agriculture resulted at regional temperature increase at an average of 6,4°C, considering the transition forest-agriculture, and of 4,26°C for the transition forest-pasture (23). As a result, there were significant variations in the regional hydrological cycle, thus endangering the ecological functioning of forests in the region (24, 25, 26) and the welfare of the peoples who inhabit them. This would also affect agricultural production. Forest fires are a threat to forests today, and they would become an ongoing issue in the region, causing forest impoverishment that would culminate in what scientists have been describing as “savannization” of the Amazon (Figure 4) (27, 28, 29, 30, 31, 32, 33).



Source: Adapted from Nepstad et al., 2013. (33)

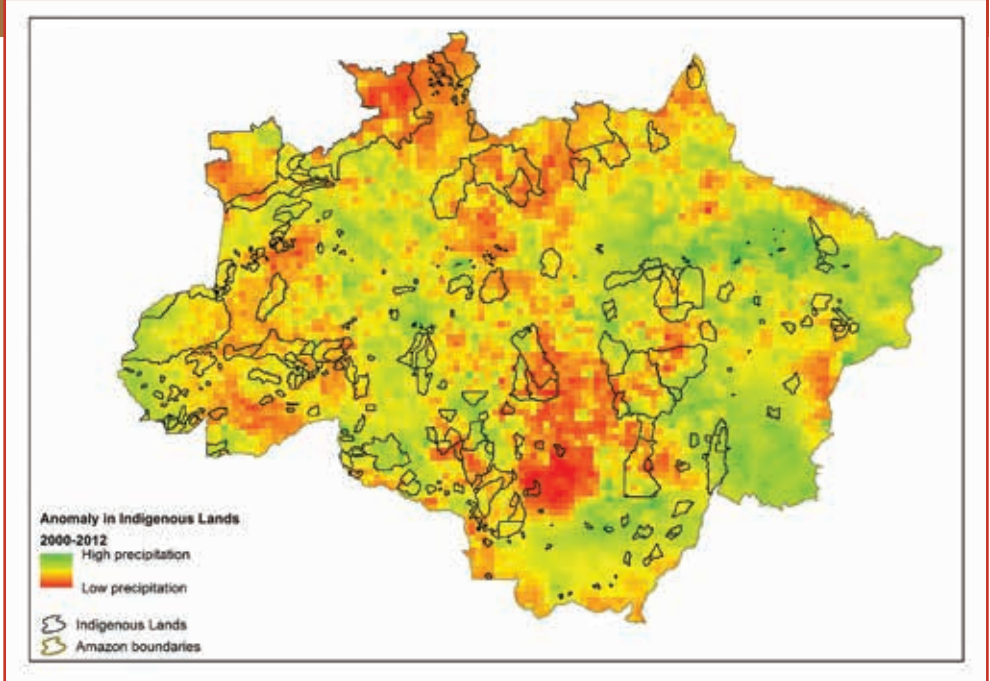
Changes in rainfall patterns and occurrence of extreme droughts

As mentioned earlier, rainfall rates are expected to drop in the Amazon due to the combined effects of deforestation and global warming (27, 34). This could have serious consequences for indigenous communities and territories. On the one hand, indigenous communities help uphold regional climate balance, on the other, they are the ones most at risk. The occurrence of extreme droughts, for example, could alter forest vegetation restricting the availability of protein sources, changing farming land suitability, affecting indigenous food security, and thus changing the availability of forest products used for cultural development of such peoples.

A range of factors lead us to believe that climate change will enhance the natural droughts cycles in the region. This is the case of the analysis of the severe droughts in the region. Based on monthly precipitation data provided by the Tropical Rainfall Measuring Mission (TRMM) satellite – a major source of consistent data in time and space to identify rainfall distribution –, maps were developed for those regions that are already being impacted by abnormal droughts. The intensity of this anomaly was calculated according to the average rainfall deviation for the region in 2000-2012 (Figure 5).

Drought anomalies for 2000-2012 in the Brazilian Legal Amazon. The red color denotes areas that were impacted by droughts for more years (10-12) over the period under analysis.

Figure 5



Source: IPAM, 2013.

The map shows that ILs were severely hit by a drought anomaly in 2000-2012. About 58% of the total area of the ILs under analysis⁶ were adversely affected by the abnormal droughts, in a total of 659,527 km². Out of the total 385 ILs covered in the analysis, 261 (67%) were extremely affected, with at least 67% of their area affected by an abnormal drought, which goes to show the severity of impacts that ILs have been subject to as a result of climate change. This scenario of drought anomalies with higher incidence of forest fires (27) could worsen in the future. The consequences of this change are numerous and worrying, and are already affecting the indigenous communities. In 2012, members from more than 40 ethnic groups in the Amazon reported unusual increases in average temperature in their villages, floods and forest fires in their territories (36)⁷. Many have reported how these changes to the climate are directly affecting their traditional practices, not only in terms of land use but also in the performance of rituals that rely on the supply of plants and animals that are undergoing changes in their biological cycles. There is evidence that these climate anomalies are changing the indigenous farming calendar, thus causing changes in food supply and, in turn, increasing the consumption of processed foods, health problems and migration to urban areas (37).

⁶ The analysis covered 385 ILs in the database made available to the IPAM in 2013.

⁷ In 2012, three seminars were held by IPAM in states located in the Amazon, with support from the Embassy of Norway.

In this regard, some indigenous initiatives that seek for adaptation strategies are already being drawn up, including rearrangements in working regimes in crop areas and sustainable and environmental management initiatives for ILs (36). Beyond the indigenous protagonism, federal and state public policies that prevent uncontrolled fire and are effective to restrict its spread through adjacent forest areas are fundamental. These policies, together with those of deforestation control and prevention, also seeking for a better use of the ILs' neighboring areas, have a fundamental role on minimizing the climate change effects which can affect the indigenous people and their territories at a regional level.

Recommendations

Whereas global climate change is a particular future threat to the indigenous territories and communities of the Amazon; and whereas their territories play a role in regional climate balance, the following actions will be critical:

1. Indigenous territorial rights are guaranteed through the demarcation of lands traditionally occupied by these peoples as a strategy to keep up with the downward trend in deforestation rates in the region and in the risk of resumption of deforestation in later years;
2. Urgent implementation of the National Policy on Environmental and Territorial Management of Indigenous Lands (PNGATI)⁸ in order to ensure their territories and populations are protected and the role they play in the balance of regional climate and biodiversity conservation;
3. Beginning discussions on an Indigenous Plan for Climate Change Adaptation in the Amazon to prevent communities and their territories from being vulnerable to future climate change;
4. Indigenous issues are mainstreamed into the development and implementation of the Country's public policies, especially into the National Policy on Climate Change (PNMC), the National REDD+ Strategy, as well as into policies for funding and supporting territorial management;
5. There is integration between indigenous policies and other official policies. Mainstreaming of IL demarcation into the PPCDAm strategy is an example of integration policy that can yield positive outcomes for the protection of the livelihoods of indigenous communities and, as a result, to reduce deforestation in the Brazilian Amazon;

⁸ http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2012/decreto/d7747.htm.

6. FUNAI is institutionally strengthened so that it can cope with future conditions imposed by climate change on the indigenous territories and communities by developing economic alternatives that are consistent with indigenous cultural practices and actions to protect their territories;
7. Developing a Training Plan for Indigenous Peoples on issues related to climate change as a crucial element so that their own proposals for strengthening governance can be based on their territories and adaptation to future climate change;
8. Raising awareness of policy-makers against proposed amendments to indigenous-related legislation dealing with demarcation processes or regulation of economic activities in indigenous territories (for example, mining and agricultural arrangements also by changing the competences on the ILs demarcation process, bill PL 1610 and draft constitutional amendment PEC 237, respectively).

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