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Review

Implementation of Access and Benefit Sharing in The Bahamas: A Precautionary Tale

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Abstract: Biodiversity is incredibly important for the myriad ecosystem services it provides, especially for coastal nations such as The Bahamas. However, the newly implemented access and benefit sharing (ABS) regime is undermining scientific research, which is essential to effectively manage and conserve the country's biodiversity. Key challenges include a poorly drafted legislation with punitive damages (financial and criminal), an overly bureaucratic and dysfunctional permitting process, and cost-prohibitive registration fees that are unsustainable for most researchers and organizations. As a result, the newly implemented ABS regime is driving the demise of academic and conservation research needed to protect the country's biodiversity, diverting funding away from The Bahamas, jeopardizing relationships with the international scientific community, reducing its capacity to advance science innovation, and impeding much needed experiential learning opportunities for Bahamian students and professionals. A critical solution under the current permitting regime is the need to distinguish between commercial and non-commercial research in the regulatory framework and provide separate accommodations for the same. Furthermore, countries that consider establishing national ABS frameworks are advised to thoroughly engage with all relevant stakeholders through a transparent and consultative process during ABS design and implementation. This will help to ensure that the resulting legislation and policies do not unnecessarily obstruct the research needed for biodiversity conservation and natural resource management.

Keywords: biodiversity; bioprospecting; environmental legislation; governance; Nagoya Protocol; permitting

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1. Introduction

Globally, preserving biodiversity has long been recognized as a fundamental principle of conservation. This is particularly crucial for biodiversity hotspots, primarily in the developing world, including small island developing states (SIDS) that depend heavily on natural resources for food security, revenue generation, and the support of a range of ecosystem services [1,2]. Science-based conservation is critical for the sustainable adaptive management of natural resources (i.e., biodiversity preservation), which allows for continued socioeconomic benefits. As such, the promotion of scientific research aimed at conservation and natural resource management is often prioritized at a national and international level. In 1992, the Convention on Biological Diversity (CBD) was established by the United Nations Environment Program (UNEP) to help mitigate global biodiversity

loss and currently has 168 signatories [3]. The CBD recognizes the urgent need for science to address information gaps to alleviate the reduction in biodiversity driven by human actions [3]. One of the principles of the CBD centers around access to genetic resources and the distribution of any benefits derived from utilizing these resources. In 2010, the Nagoya Protocol on Access and Benefit Sharing (ABS) was adopted [4] and came into effect in 2014. At the time of writing, it has 138 signatories. The Nagoya protocol was intended to allow for the establishment of appropriate legal frameworks "to ensure fair and equitable sharing of the benefits arising from the utilization of genetic resources" while safeguarding biodiversity through sustainable resource use [4]. Implementing countries are obligated to establish ABS measures in alignment with the Nagoya Protocol goals and the core principles that center around fairness, equity, clarity, and transparency [5]. The established legislative and regulatory policies are supposed to be based on the consistent use of non-arbitrary rules and procedures that should be triggered by requests to access genetic resources and traditional knowledge for commercialization [4]. Another specified objective of the ABS framework is the promotion of conservation or academic research that in turn supports local economies and creates opportunities for capacity development [4].

The Commonwealth of The Bahamas (hereafter The Bahamas) is an archipelagic nation and SIDS with biodiverse marine and terrestrial ecosystems that support rare, endemic and threatened species [6–9]. The country has a long history of research, and most of this work has been designed to document biodiversity, assess threats, tackle emerging issues, and gather data to inform natural resource management and the conservation of species and habitats [6–16]. For decades, this SIDS has been a regional leader in conservation—signing on to ~20 multilateral environmental agreements (International Conventions) [17], establishing an expansive network of protected areas [10,11], and implementing legislations and policies [12] to sustainably manage its natural resources and foster economic growth. However, anthropogenic impacts (e.g., climate change, overexploitation, unsustainable development, invasive species, pollution, and diseases), coupled with deficiencies in local governance and enforcement, pose significant threats to marine and terrestrial ecosystems and the value they provide to the country [13–15,18–20]. Key ecosystem services include food provisioning, supporting livelihoods and industries, coastal protection, and climate regulation. Lack of financial resources and human resource capacity, coupled with conflicting resource use pressures and competing interests (e.g., tourism, fisheries, agricultural activities, and housing) pose additional challenges for effectively managing its biodiversity.

Governance via international agreements, national legislations, and policies are intended to facilitate the sustainable management of natural resources and allow for socioeconomic and cultural benefits. Here, we use The Bahamas as a case study to discuss how these international agreements have led to new legislation and policies, as well as the issues arising from the implementation of the ABS legislation and its associated new permitting regime, to the detriment of biodiversity research and conservation in the country. We also offer potential solutions and recommendations for other countries to facilitate a more efficient and effective ABS framework.

2. The Case of The Bahamas

After The Bahamas ratified the CBD in 1993, the country pledged to adhere to the principles stipulated under the CBD's articles. While The Bahamas did not become party to the Nagoya Protocol until more than 10 years after it was first adopted by other countries, the impetus for the country to ratify and implement it was partly driven by the successful bioprospecting of two species: *Salinispora tropica*, a marine actinomycete (bacteria) and *Antilogorgia elisabethae* (formerly *Pseudopterogorgia elisabethae*), an octocoral. *S. tropica* and *A. elisabethae* were initially obtained from The Bahamas for academic research and were later

used in the research and development of commercially viable pharmaceutical and cosmetic products [21,22]. The Bahamas received financial compensation from exports of legally harvested *A. elisabethae* that were sold to Lipo Chemicals, now Vantage [23]. *A. elisabethae* can be viewed as a success story despite the absence of a legal framework compelling the corporation to develop products from Bahamian resources. However, because no legal frameworks or benefit-sharing agreements were in place, and direct negotiations were unsuccessful, the country did not receive any financial benefits in the case of *S. tropica*, highlighting the need for a legal framework to be implemented.

To address this need, in 2014 the government of The Bahamas submitted a proposal to the Global Environment Facility (GEF)—"Strengthening Access and Benefit Sharing in The Bahamas" to prevent future biopiracy, enable the country to meet its obligations under the CBD, and become signatory to the Nagoya Protocol. This project was subsequently approved and funded in 2016 as a three-year project, but due to delays, it was extended through 2022.

3. ABS Implementation in the Bahamas

The implementation of the ABS GEF-funded project in The Bahamas was preceded by a 2019 moratorium on all permit applications seeking to export samples from the country (Table 1). While this decision minimally affected existing in-country research or permits to export materials, no new permits were provided to export samples through April 2021, for a total of at least 24 months. In April 2021, the Government of The Bahamas enacted the Biological Resources & Traditional Knowledge Act (BRTKA) [24] of 2021, also referred to as the ABS legislation (Table 1). The ABS framework was intended to safeguard biodiversity through sustainable resource use while allowing countries to receive compensation from any research that results in the development of products or patents originating from natural resources or traditional knowledge. However, the BRTKA fell short of this intention in many regards.

Table 1. Timeline of ABS legislative and policy implementation in The Bahamas.

Time	Event(s)
Prior to 2019	Permits were issued by the Department of Marine Resources (DMR), the Bahamas Environment Science and Technology (BEST) Commission, the Department of Agriculture, and the Bahamas National Trust (BNT) separately, on up to an annual basis, for fees of up to USD 125 per project.
May 2019	The Cabinet approved an 18-month moratorium on all permit applications seeking to export samples, but no permits were provided to export samples through April 2021, for a total of at least 24 months.
17 Jan 2020	The BEST Commission becomes the Department of Environmental Planning and Protection (DEPP) under the DEPP Act.
Mar 2020	Stony coral tissue loss disease (SCTLD), first verified and reported in Grand Bahama.
Jun 2020	The Cabinet approves the establishment of the SCTLD Task Force, comprised of government and non-governmental organizations (NGOs).
Oct 2020	The DMR and NGOs begin to work with the DEPP on the Mutually Agreed Terms (MATs) Contract—the first under the new ABS system to allow NGOs to conduct SCTLD assessments, research, treatments, and monitoring, as recommended by the Task Force.
25 Nov 2020	The DEPP holds first meeting with scientific community to present the ABS Act. This was a one-way flow of information, not a consultation, and no details of the permitting process, online portal, or fees were presented.

Table 1. *Cont.*

Time	Event(s)
8 Mar 2021	The Biological Resources and Traditional Knowledge Act (BRTKA) was gazetted (BRTKA 2021).
24 Mar 2021	DEPP holds an informational meeting with scientific community to announce the launch of the online portal and explain the penalties associated with violating the new legislation.
1 Apr 2021	The new online portal for applying for research permits went online, but full functionality was delayed, and the issues with functionality persisted. This system was designed by foreign consultants with no input from or consultation with researchers actively working in the Bahamas on its design.
7 Apr & 7 May 2021	The research and conservation community reach out to the director of the DEPP, the Prime Minister, and government officials to point out the issues with the new permitting system and request an opportunity to resolve them in a consultative manner. No acknowledgement was received and no changes were made.
16 Jun 2021	The research and conservation community submitted potential recommendations for reforming the permitting process to the Minister of the Environment, the Permanent Secretary, and the DEPP.
June 2021	The DMR and NGOs sign the MATs contract to allow for SCTLD assessments, treatments, and monitoring, as recommended by the SCTLD Task Force.
Sep 2021	National elections were held, and a new administration appointed to the government.
Nov 2021	The newly appointed Attorney General (AG) and the Prime Minister recognize the need to reform the Biological Resources & Traditional Knowledge Act (BRTKA) 2021 and pursuant permitting system, and the Cabinet agrees.
Dec 2021	Facilities Operation permit form sent to research community to go into effect in January 2022.
Jan 2022	Independent legal team contracted to revise legislation and template commercial and non-commercial MATs contracts.
Jan 2022	The DEPP director was removed as the director of the DEPP and installed as an advisor on Climate Change and Environment to the Office of the Prime Minister. A new DEPP director is appointed.
7 Mar 2022	Recommended amendments to BRTKA legislation and template MATs sent to AG's office.
Mar 2022	The science and conservation community holds a press conference about SCTLD and the need for permits.
Mar 2022	First permit issued for SCTLD assessments and treatments to save corals but only good for 75 days.
30 Mar 2022	The Bahamas becomes party to the Nagoya Protocol by accession.
Jul 2022	The DEPP shares permitting responsibility for mangrove restoration with the Department of Forestry, enabling post Hurricane Dorian mangrove restoration projects to proceed in August 2022. Forestry permit does not allow for data collection or community engagement for the monitoring and evaluation of restoration efforts, which still require separate research permits from the DEPP.
Sep 2022	The new DEPP director announces policy changes to restore science communication and the registration fees are reduced.

The BRTKA consists of six sections that collectively provide information on its objectives, scope, administration, access to genetic resources and traditional knowledge, benefit sharing, monitoring, compliance and enforcement, regulations and provisions. Under the BRTKA, the Minister of the Environment and Natural Resources is the Competent National Authority with responsibility for the administration and enforcement of the Act. The Ministry of the Environment is listed as the legal National Focal Point and its Department of Environmental Planning and Protection (DEPP) as Permitting Authority for the implementation of the Nagoya Protocol in The Bahamas. Accordingly, the DEPP assumed responsibility for the administration of the new research-permitting regime (Table 1), which was intended to create a much-needed central repository for all research permit applications to be filtered through before being directed to the appropriate permitting agency(ies). It

was envisioned that this new system would facilitate better tracking of all research being conducted in The Bahamas and help to streamline the permitting process by improving the time taken for permits to be issued.

The scientific and conservation community is fully supportive of the overriding objective of the Nagoya Protocol [4] and intent of the BRTKA [24] to ensure benefits to The Bahamas derived from the commercial exploitation of biological, genetic resources, and traditional knowledge within the country. However, the recently established national ABS legislation and new permitting regime have created several major issues that unnecessarily obstruct non-commercial scientific research and conservation efforts, which provide benefits to The Bahamas, are required by Nagoya, and underpin the biodiversity conservation under the CBD.

4. Challenges with ABS Implementation

4.1. Legal Concerns

Under the current BRTKA, the Bahamian government is the sovereign owner and "provider" of genetic resources and grants access to individuals or institutions ("users") to conduct research. The ABS framework of the BRTKA was intended to focus on genetic resources and traditional knowledge to ensure that The Bahamas received monetary and/or non-monetary benefits from research resulting in commercial products from Bahamian resources [4]. However, a fundamental flaw of the current ABS regime is the lack of differentiation between commercial (i.e., bioprospecting, biotechnology, and other biodiscovery) and non-commercial (i.e., academic or conservation) research in the regulatory framework and associated permitting policies. All research in The Bahamas is being subjected to the same level of scrutiny despite the specified purpose (i.e., commercial vs. non-commercial research) or type of data being collected (e.g., field observations vs. genetic analyses). Problems with the BRTKA are based on (1) ambiguous legal definitions and provisions to monitor and regulate access to biological resources and traditional knowledge for non-commercial research; and (2) a lack of clear policies and procedures to handle the exchange of research information (i.e., data or samples), along with changes in the scope or intent of research that would trigger additional levels of scrutiny and/or regulation [24].

Furthermore, in addition to the research permit(s) issued to individuals, a Mutually Agreed Terms (MAT) contract must be signed by researchers and institutions for permits to be issued (Supplementary S1). The legal requirements outlined in the MAT contract explicitly state that the government owns all data collected as part of the research and has the right to approve how data are shared (Supplementary S1). This is often in direct conflict with grant and publishing requirements, as well as modern scientific practices involving the free exchange of data. For example, grant requirements with the National Science Foundation in the United States call for researchers to make data freely available within a specified time. However, because the government of The Bahamas owns the data and places limitations on data sharing, the MAT contract is in direct conflict with the agreement researchers must sign to receive funding.

Restrictions on sharing data may also conflict with the freedom of expression clauses in The Constitution of The Commonwealth of The Bahamas [25]. The Constitution is the supreme law of The Bahamas, and any laws found to be inconsistent with the Constitution "shall, to the extent of the inconsistency, be void" (Article 2). Article 23.1 of the Constitution grants citizens the "freedom to hold opinions, to receive and *impart ideas and information* without interference" (emphasis added) [25]. However, the BRTKA text mandates users to obtain government permission before publishing "any results of any scientific research or discovery of any derivatives or other findings, other than strictly taxonomic and conservation related non-commercial data" [24] (Supplementary S1). Although exceptions

to freedom of expression are provided "in the interests of defence, public safety, public order, public morality or public health" and for protecting the rights and freedoms of other persons, the restrictions on information sharing in the BRTKA may put its validity in jeopardy.

The restrictions on data sharing are coupled with liability clauses that mandate arbitrarily large fines ("fixed sum of USD 7 million and any other damages and penalties that may apply") and criminal sanctions (up to 10 years upon conviction) associated with any breach in compliance, including sharing data with any individual or institution not listed on the permit [24]. Legally, this is problematic because these fines are not anchored in the enabling legislation. Operationally, many institutions have been advised not to sign the MAT contract or, in some cases, do not have the legal authority to enter into an agreement with the government of The Bahamas. Additionally, third party service providers (e.g., commercial labs) that process samples and provide data to researchers are now required to be listed on permits and sign the MAT agreement. Since these companies have nothing to do with the use of data, but may still be held liable for data misuse, most have indicated unwillingness to provide services under the new system—making it impossible to execute planned studies.

Nationally, the ABS regime conflicts with the mandates of existing organizations such as the Bahamas National Trust (BNT) and the Department of Marine Resources (DMR), which are also permitting bodies with responsibility for the management of natural resources under their enabling legislations. For example, the BNT is legally mandated under the BNT Act to manage protected areas and national parks within the country's protected area system. This requires routine monitoring, in addition to species-specific research within national parks to support conservation and management objectives. The Bahamas National Trust Act (1959) and its 2014 amendment [26] do not specify that BNT is required to obtain permits from the DEPP or any other institution to conduct research within the areas it is legally obligated to manage. Additional overlaps with national institutions are likely to exist with other permitting agencies, e.g., the DMR, which is a government agency that is responsible for the sustainable management of marine resources within the country's exclusive economic zone. As a result, even government agencies or government-sanctioned research and resource management agencies need to apply for permits just to do the work that they are mandated to perform.

At the international level, The Bahamas has existing bi- and multi-lateral treaties that overlap with the ABS process introduced through the BRTKA. In a bilateral agreement signed in 1974 with the United Nations Development Programme (UNDP) [27], The Bahamas granted that the "patent rights, copyright rights, and other similar rights to any discoveries or work resulting from UNDP assistance. . . shall belong to the UNDP" (Article 3.8, UN Treaty Series 13732) [27]. The agreement allows for the Bahamian government "to use any such discoveries or work within the country free of royalty or any charge of similar nature", consistent with the objectives of the ABS framework. Therefore, any research undertaken under the auspices of the UNDP already has protections in place to prevent unscrupulous commercialization by third parties, but this complicates the issue of who should or could sign a MAT agreement.

The Bahamas ratified the United Nations Convention on the Law of the Sea (UNCLOS) in 1995 [28]. The UNCLOS stipulates that "States and competent international organizations are required to cooperate, through the conclusion of bilateral and multilateral agreements, to create favorable conditions for the conduct of marine scientific research in the marine environment" [28]. More recently, The Bahamas has expressed interest in working with member states to manage areas beyond national jurisdiction (ABNJ) through the creation of a new legally binding instrument that would contain provisions for marine genetic

resources (MGRs), benefit sharing using area-based management tools, including marine protected areas, environmental impact assessments, capacity building, and the transfer of marine technology in ABNJ. However, the states have been unable to agree on how to equitably distribute the benefits arising from MGRs and digital sequence information (DSI). Currently, the prevailing BRTKA and ABS permitting process conflicts with the principles and provisions articulated in the CBD, the Nagoya Protocol (which The Bahamas became signatory to in March 2022; Table 1), and the UNCLOS.

4.2. Implementation of Policies and Procedures

In addition to the legal challenges outlined above, the implementation of BRTKA policies and procedures has also been problematic. The design of the new permitting system is rooted in bureaucratic complexities. The permit application requires information that is incompatible with the way modern scientific research is conducted and funded. Key contributing factors include the following: (1) persistent technical issues with the online portal developed by Oldham et al. [29] for both front-end and back-end users; (2) the high volume of permit applications required for each research project, where individual activities within a project may require separate permit applications over random timelines or multiple sequential permits to complete a project; (3) the DEPP staff arbitrarily splitting projects into components and permitting individual activities (e.g., animal tagging, aerial drone surveys, in situ surveys, sample collection, stakeholder assessments, and sample export/analysis), with only some of the activities being allowed; (4) the excessive level of uninformed scrutiny of methods (e.g., the use of one tool over a similar one to collect a sample) rather than the outcomes of the research in terms of its impact on resources or use of the data for commercial vs. non-commercial applications; and (5) the excessive time undertaken to review permit applications, with some permit applications being in review for over a year, without a decision. To date, this process has been overseen by a small group of individuals who lack the expertise to evaluate the highly specialized technical information of the research and determine whether an application should be approved. Decisions about whether a permit is issued are not directly related to whether the proposed actions and use of data are consistent with the governing BRTKA legislation and the underlying principles of safeguarding biodiversity. As a result, the process fails to meet the standards of transparency, timeliness, and fairness (called for by the Nagoya Protocol).

The current permitting process is not executed according to transparent or consistent criteria. Some individuals and organizations have received research and institution operational facilities permits while others performing similar research, who applied at the same time, have not. Similarly, some organizations have been required to obtain an institution operational facilities permit in addition to research permits, while others have not, without any clear standards defining why this permit is required. Several organizations that do not operate research facilities have been required to obtain this extra permit because the Bahamian government "thought that they should" without meeting any clearly defined criteria, while other organizations have not. Because this additional level of institutional permitting has been required primarily of Bahamian organizations to date, this has favored foreign researchers over Bahamian researchers and institutions, resulting in interruptions to long-term monitoring datasets for species and ecosystems and the redirection of research projects to other countries (e.g., research on sea turtles and sharks).

Despite the new permitting process being advertised as a streamlined process intended to result in faster turnaround times for issuing permits, initially estimated at 2–4 weeks for review and either approval or denial of permits, researchers have routinely waited between 4–16 months (and counting) for this process to be completed. Often permits have been issued after the project's funding period has ended or after the biological event being

studied has concluded (e.g., fish- spawning aggregations or coral spawning). The lengthy delays for receiving permits have been coupled with shorter permit durations. Whereas permits were typically issued for up to a calendar year under the prior permitting system, permits under the current system are being issued for a shorter duration of time ranging from two weeks to six months (Table 1). This has made it more difficult to plan and execute research at crucial times (e.g., around biological cycles) and in a cost-effective manner for critical topics on resource management, ecosystem monitoring and restoration. The uncertainty regarding whether permits will be issued, when they will be issued, and the short duration of permits for work that is often long-term has also impacted livelihoods and reduced capacity-development opportunities for students and early-career professionals.

Even when permits are issued, they rarely, if ever, allow for the sharing of samples outside of The Bahamas. Prohibition on sampling and exporting samples is crippling to most modern research, particularly as there is currently no in-country capacity for processing samples (genetic or otherwise). Although the moratorium on sample exports that began in 2019 was lifted when the new permitting system went in place in 2021, and sampling has been permitted in some instances, difficulties persist in obtaining approvals for collected samples to be exported from the country for analysis. This policy appears to stem from the government's "fear" of biopiracy and desire to curtail "parachute science". A frequently cited example is *S. tropica*, which is currently being used in phase two clinical trials for cancer treatment [21,30,31]. This species was originally collected under a non-commercial research permit to Scripps University over 14 years ago, but the data were subsequently transferred to other institutions for bioprospecting [31]. While this is an example of commercialization of non-commercial research involving the export of samples, this one case has led to a complete shutdown of conservation research involving population genetics of key fishery species and critically endangered species, investigations into the status of potentially new species, subspecies or unique genotypes, eDNA research, and investigations into the genetic component of climate change adaptations in critically endangered species. Continued restrictions on sample export also prevent critical advancements in research that may be time sensitive (e.g., efforts to identify the pathogen(s) responsible for the rapid progression of stony coral tissue loss disease [SCTLD]). This approach fails to recognize that DSI from online data repositories is increasingly used to synthesize products for commercial use and does not require the physical collection of samples. DSI is currently unregulated under the Nagoya Protocol [4].

In addition to restrictions on sample exports, the government of The Bahamas has also been prohibiting the sharing of scientific data under these new ABS policies. Data sharing and access are fundamental to the scientific process, and the ability to share data maximizes efficiency and productivity, fostering innovation that benefits society, e.g., [32]. Moreover, communicating science (e.g., via peer-reviewed publications, popular articles, conferences, documentaries, and social media) is an invaluable tool for increasing awareness and building advocacy for the changes needed to effectively manage, protect, and preserve biodiversity. Many pressing conservation issues in The Bahamas persist over a large geographic scale, so coordinated collaboration and timely data sharing are crucial to make effective progress with these issues. The introduced ABS format for data sharing greatly restricted, and in some instances, prohibited the ability of researchers to do so. From April 2021 to September 2022, the DEPP prohibited researchers from sharing non-commercialized scientific information with collaborators, funders (to fulfill grant requirements), and stakeholders (for educational purposes) without written pre-approval (Table 1). Because approval for sharing information resulting from permitted research was denied, or requests for sharing of information went unanswered, several research presentations at conferences had to be cancelled, educational materials developed from

research were prohibited from being released, and even social media posts were censored by the DEPP with threats of penalties for posting.

Finally, the fees related to permits in The Bahamas used to be consistent with regional and international rates (Table 2). Prior to 2019, permits were issued by the DMR, the Bahamas Environment Science and Technology (BEST) Commission [now the DEPP], the Department of Agriculture and Marine Resources, and the Bahamas National Trust separately, on up to an annual basis for fees of up to USD 125 per project per year, and (up to the time of writing) these permit fees remain largely unchanged (Table 2). However, additional non-refundable "registration" fees were launched by the DEPP on April 1st, 2021, in conjunction with the new ABS permitting system (Table 3). Each individual must now register just to be listed on a permit application (with no guarantee of receiving the permit) and pay an annual registration fee that can be as much as USD 1500 per person for senior level researchers on a project. These fees have proven prohibitive for many local organizations and researchers and funders. This new system introduced exorbitant fees for the annual registration of researchers, students, and institutions, which were not derived through a consultative process with key stakeholders. Furthermore, details were not shared with stakeholders in public forums prior to the permitting portal going live online in April 2021, so the rationale behind the fee structure is unknown (Table 3).

Table 2. Examples of regional and international permit fees, including Bahamian fees prior to 1 April 2021. Fees for countries that have ratified the Nagoya Protocol are indicated with an asterisk.

Country	Permitting Fees (USD)
The Bahamas	USD 11.20–USD 125
Australia *	USD 0–USD 50
Belize	USD 15–USD 250
British Virgin Islands	USD 0
Canada	USD 0–USD 100
Costa Rica	USD 150 (+USD 35 for co-investigators)
Kenya *	USD 150–USD 500
Mexico	USD 500–USD 794
Panama	USD 95
Indonesia	USD 270–USD 1500
South Africa *	USD 36
United States of America	USD 0–USD 95
United Kingdom	USD 0–USD 69

Table 3. Details of annual registration fees published by DEPP on 1 April 2021.

Annual Registration Fee Structure	
Researchers	USD 1500.00
Foreign students (Undergraduate)	USD 400.00
Foreign student (Graduate)	USD 700.00
Bahamian students (International)	USD 300.00
Bahamian students (Local)	USD 50.00
Research institutions (NGO-registered)	USD 3000.00
Research institutions (Business)	USD 5000.00

The introduced registration fee structure made obtaining research permits in The Bahamas an order of magnitude more expensive than in most countries (Table 3). For example, research to assess the impacts of Hurricane Dorian on Bahamian reefs incurred USD 7421 in fees, of which or USD 7125 (96%) was in registration fees for a two-week expedition. In this case, the registration fees were assigned to the six-member research team, as well as two crew members of the vessel chartered for the expedition, who were

arbitrarily charged because they had advanced degrees in science and videography, even though their roles were boat captain and ship crew, and they were not involved in any data collection or analysis.

On top of the registration fee for each individual listed on a project, an additional institutional facilities operations permit with a minimum USD 3000 fee was also introduced for all institutions operating within the Bahamas. The annual institutional fees were waived in 2021, but since 2022, all fees have been applied to individuals and organizations in addition to the established national fees by permitting agencies (e.g., the DMR and BNT). Furthermore, the institution operational facilities permit (Tables 1 and 3) does not convey any benefits to applicants and, in many cases, it does not align with the realities of how research is conducted. Some organizations that only have an office in The Bahamas to support Bahamian staff but do not operate a laboratory or field station are required to pay these fees. It is counterproductive and has added an extra layer of cost, bureaucracy, and delays in receiving permits for Bahamas-based organizations, as opposed to foreign organizations. Not only are these fees misaligned with global rates (Table 2), but they often exceed allowable administrative expenses for many foundation grants (especially small grant funding). Thus, they not only make conducting research in The Bahamas more expensive and less attractive to researchers but also disincentivize funders from investing in Bahamas-based projects. In addition, they present unnecessary hurdles for conducting much needed conservation research, which is already underfunded. Overall, this new fee structure has not only drastically reduced available funding to conduct research and the potential scope of research efforts but has also reduced the benefits of the data produced, which are required for The Bahamas to better safeguard biodiversity.

5. Impacts on Research and Environmental Conservation in The Bahamas

Bahamian government departments conduct no research or restoration, and minimal data collection of any kind [11,12]. Instead, they rely on international and local non-governmental organizations (NGOs) and researchers for information needed to meet international obligations under various agreements, treaties, and conventions to which The Bahamas is party, as well as the reporting requirements of international funding bodies (e.g., GEF). Many of these NGOs and researchers, however, have left The Bahamas because of the new administrative burden, unsustainable financial costs, and inability to obtain research permits. Even those that have remained active in The Bahamas have not received permits to complete the full range of restoration and research that they had been conducting prior to the new ABS legislation and policies. For example, long-term (>20 yr) research and monitoring of endangered rock iguanas and a new collaborative research project investigating the resilience of reef-building corals to thermal stress have not been approved. Consequently, information needed for climate change mitigation, adaptation, fisheries management, endangered species management, and other priorities of the Bahamian government is not being collected and will prevent The Bahamas from meeting future reporting obligations.

These issues are not limited to international researchers and organizations. Bahamian researchers, including PhD students, have struggled to obtain permits for research necessary to monitor species, manage fisheries, conserve and restore ecosystems (e.g., the mangroves damaged by Hurricane Dorian) in The Bahamas. For example, since SCTLD was confirmed in The Bahamas in March 2020, a full two years passed before the first nationwide permits were issued to assess and treat the disease, and even then, short-term permits (2–4 months), coupled with lengthy delays in approvals, led to disruptions in these activities (Table 1). Major delays in receiving permits for SCTLD monitoring and treatment resulted in the

progression of the disease, the mortality of millions of corals across hundreds of miles of reef, drastic declines in coral cover, and local extinctions of previously common species [14,33].

Bahamian-based research facilities have also been affected by the loss in visitation from scientists and research groups (Supplementary Table S1). For example, the Forfar Field Station, established in 1970 on the island of Andros, typically had up to 41 researchers per year using its facilities in Andros. However, since 2021, Forfar has experienced a 98% reduction in visitation, with only three researchers staying at the station over the past three years (Supplementary Table S1). Additionally, five potential new groups (10–20 people each) decided to go to another country because of the permitting process (*pers. comm. with M. England, Forfar Station Manager*).

6. Lessons Learned for Other Countries

In April 2021, 107 local and international scientists, conservation practitioners, and students expressed concerns regarding the implementation of the ABS legislation and new permitting process with the DEPP and the Bahamian government (Table 1). The scientific and conservation community flagged potential negative impacts to research, funding, collaborations and capacity building opportunities. The government was also warned of potential unintended and adverse consequences on eco-tourism and Family Island communities, which directly and indirectly benefit from visiting scientists and research groups. Unfortunately, despite over two years of repeated efforts advocating for mutually beneficial changes to the BRTKA and ABS permitting process, most of these concerns have not been addressed. As a result, the forecasted potential risks have become the reality for researchers, students, Bahamian-based organizations and Family Island businesses (Supplementary Table S1).

The GEF ABS project failed to consult with key stakeholders (e.g., researchers) to solicit input during the process of creating the new legislation, policies, and permitting portal. This project also failed to inform the public both adequately and accurately about the new legislation and permitting regime. The legislation itself was presented in a nationalistic manner—making it attractive to Bahamians to support it, even though most were (and still are) not familiar with the intricacies of specific policies and the implications for The Bahamas. While some sectors were informed to varying degrees, most of the public, including key stakeholders, were not made aware of the new policies associated with the legislation until after the fact. For example, no information was provided to stakeholders, including some ABS Committee Members, ahead of the online launch of the new registration fee structure, despite multiple requests for this information to assist with planning and budgeting (Tables 1 and 3).

To date, the current ABS system in The Bahamas has stifled research that contributes to preserving healthy and biodiverse ecosystems that are needed to provide food security, address climate change, safeguard biodiversity, sustain livelihoods, and build a blue economy. This interruption has also hindered efforts to build capacity for both academic and conservation-based research and support eco-tourism throughout the country, resulting in economic losses as well (Table S1). Many researchers, students, and organizations have been forced to leave the country and work elsewhere. Those that remain have lost substantial funding and are at continued risk of losing funding and jobs due to massive permitting delays.

Given that the goal of the ABS legislation is to advance biodiversity conservation and ensure commercial benefits from bioprospecting are received, impeding the work of academic and conservation-based researchers is not only ineffective, but also prevents the collection of information needed to safeguard biodiversity. The focus should be shifted to applying appropriate controls for commercial researchers and institutions (especially

those handling threatened [i.e., vulnerable, endangered, or critically endangered] species or working in sensitive areas, even if they are not collecting data to mitigate biodiversity loss). Moreover, strategies should be developed to detect and prevent non-compliant researchers from conducting additional work within The Bahamas. Countries considering an ABS framework are strongly encouraged to abide by the following guidelines:

1. Thoroughly consult and engage with all relevant stakeholders throughout the design and implementation process.
2. Allocate sufficient time for strategic planning:
    a. Learn from both the successes and failures of other countries with ABS systems;
    b. Consider and account for capacity constraints by conducting feasibility assessments;
    c. Adopt a phased approach to allow for adequate testing and refinement prior to implementation.
3. Adhere to the principles of consistency, transparency, and accountability.
4. Adapt and make necessary adjustments in a timely manner.
5. Raise awareness about ABS with key stakeholders and the public.

The GEF ABS project's goals and targets were intended to align with national development policies and priorities and remain relevant. Failure to appropriately engage key stakeholders (e.g., the research and conservation community) during the development of the new ABS permitting system and associated policies resulted in significant flaws and poor implementation, which could have been avoided. While personnel and recent policy changes within the DEPP (e.g., reduction in registration fees; Tables 1 and 4) and renewed promises for legislative amendments offer a small glimmer of hope for an eventual ABS reform, these are minor incremental changes and do not address the major issues that continue to hamper research in The Bahamas.

Table 4. Details of revised annual registration fees published by DEPP in September 2022.

Annal Registration Fees	Lead	Support
Foreign Academic Fees		
PhD	USD 1500.00	USD 900.00
MSc	USD 700.00	USD 500.00
BSc	USD 400.00	USD 300.00
Non-Scientific/Volunteer	USD-	USD 125.00
Groups/School	USD-	USD 100.00
Bahamian Academic Fees		
PhD	USD 500.00	USD 125.00
MSc/BSc	USD 300.00	USD 125.00
High School/18 and under	USD-	USD-
Bahamian Commercial Fees		
Lead—All Levels	USD 2000.00	
Support—All Levels	USD 700.00	
Foreign Commercial Fees		
Lead—All Levels	USD 5000.00	
Support—All Levels	USD 1000.00	
Other Considerations		
University of The Bahamas and Bahamas Agriculture & Marine Science Institute students are exempt from fees.		

To prevent further biodiversity loss, re-establish The Bahamas as a regional leader in environmental conservation, and create enabling conditions for economic diversification through bioprospecting and biotechnology, we strongly urge the government to immedi-

ately amend the BRTKA and reform the permitting regime and ABS policies through a transparent and consultative process with all relevant stakeholders.

7. Recommended Solutions to Improve the ABS Framework

There is considerable scope for improving the ABS framework and revising the permitting process so that it is mutually beneficial for all parties. A logical path forward involves the following:

- Amendments to existing BRTKA legislation to clarify scope, clearly define roles and responsibilities of the various stakeholders, and ensure better alignment with the intent of the Nagoya Protocol, CBD, and national priorities/objectives.
- Revisions for commercial and non-commercial MATs, including fines and penalties to align them with existing legislation, as well as the inclusion of conversion clauses for cases where non-commercial research may lead to future discoveries that may be commercialized.
- Removing barriers for sharing non-commercial data (critical for major funders such as the National Science Foundation).
- Streamlining of the entire permitting system:
    - Simplified process to fast-track non-commercial research (Figure 1) [34];
    - Implementing a fully functional user-friendly online application portal that is compatible with modern scientific research;
    - Automatic annual renewal application option for on-going or long-term monitoring projects.
- Issuing permits to the principal investigator (instead of requiring multiple permit applications for each participant) for the proposed duration of the project or on an annual basis to allow the proposed activities outlined in the permit application to be completed.
- Providing accurate documentation/resources (e.g., application checklists, guides, templates, FAQ sheets, and tutorials) for users to better help navigate the permitting process and alleviate the administrative burden on DEPP and researchers.
- Consistently following clear and standardized procedures/criteria for evaluating, approving, or denying research permit applications.
- Implementing a globally competitive and equitable fee structure and adhering to published registration fee charges.
- Implementing systems (e.g., TRUST that allow for better traceability via unique identifiers) and adopting appropriate policy frameworks to enable both access and benefit sharing [34,35].
- Coordinating with all relevant government agencies (including Immigration and Customs) to ensure that researchers can enter the country to conduct research with a valid research permit.

Additionally, the ABS regime is encouraged to redirect its focus to intellectual property rights such as patent, copyright, and trademark applications associated with genetic/biological resources and traditional knowledge obtained within The Bahamas. Implementing efficient and transparent systems for tracking and monitoring [34,35] will be essential to ensure that the benefits are fairly and equitably distributed. Permitting agencies should establish and maintain internal data management systems to keep better records of submitted data, reports, and scientific publications. This should facilitate easier reporting to meet both national and international obligations.

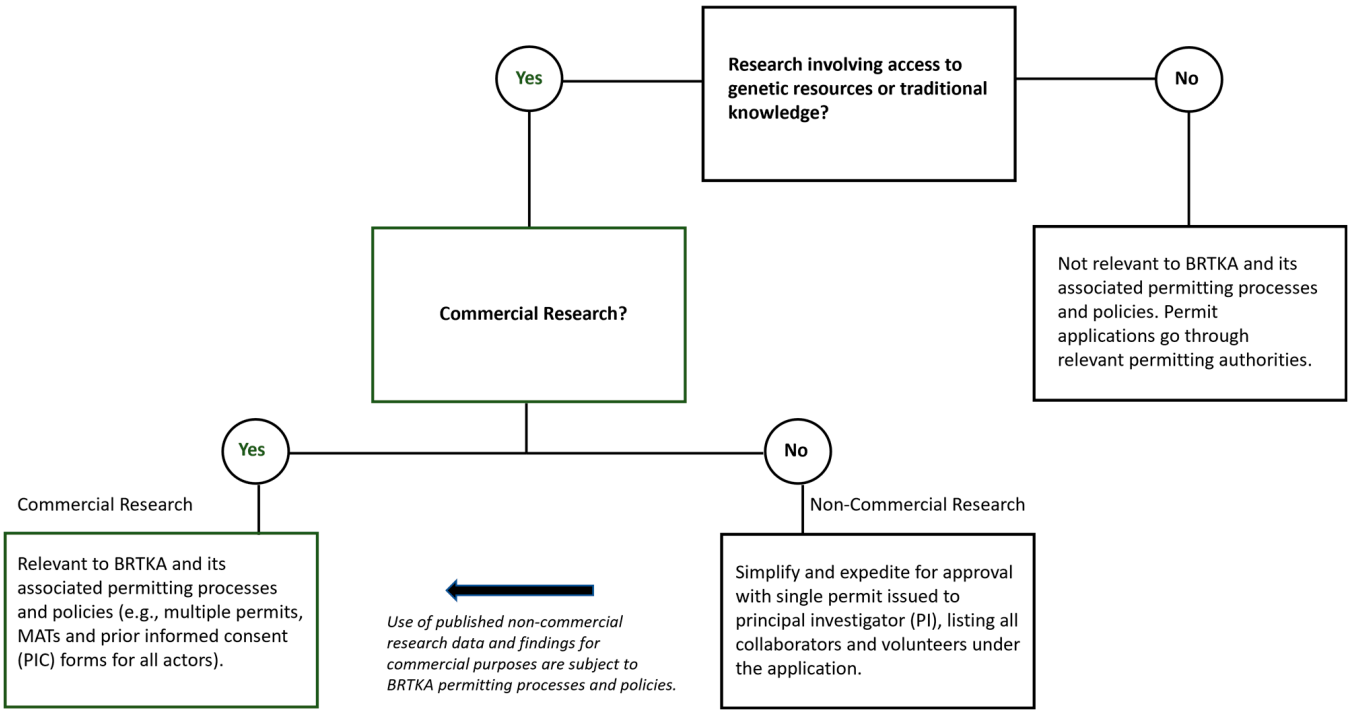


Figure 1. Flowchart illustrating a suggested simplified framework for evaluating and processing research applications.

8. Conclusions

There are 138 countries that have ratified the Nagoya Protocol [4], and The Bahamas is not unique in experiencing challenges with its implementation. A growing body of work has documented pervasive issues with the implementation of the ABS regime [5,34–40] and acknowledged the urgent need to re-evaluate and address these challenges. Indeed, the general trend associated with ABS to date has been reduced access and limited benefits, with few ABS agreements being realized [37,39]. Common criticisms are the inability of countries to strategically plan for ABS implementation and apply appropriate legal frameworks, regulatory processes, and policies that are clear, transparent, and neither overly complex nor restrictive [5,34–41]. The Bahamas has suffered massive losses in biodiversity because of poor ABS implementation and an ineffective and excessively bureaucratic permitting system. We recognize that ABS is a complex process involving a diverse group of stakeholders with varied interests. Political will, good governance, technical and scientific cooperation are all essential to achieve mutually beneficial and practical ABS frameworks. In addition to implementing the recommendations outlined above, it is critical to distinguish between commercial and non-commercial research and ensure that the enacted ABS legislation and policies do no obstruct or discourage research, which is vital for biodiversity conservation and natural resource management.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/conservation5010003/s1, Supplementary Material S1: Example of a Non-Commercial Mutually Agreed Terms (MAT) Contract, Table S1: Estimated number of researchers utilizing research facilities based in Andros, San Salvador, Eleuthera and Abaco in The Bahamas three years before (2017–2019) and three years post (2021–2024) changes to the permitting structure. Due to COVD-19 travel restrictions, no research was conducted in 2020.

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