

## **Kenya's National Framework to Enhance the Response Capability to Oil Spills**

Jose M. Rios<sup>1</sup>, Elliott Taylor<sup>2</sup>, Stellamaris Muthike<sup>3</sup>, and Michael Mbaru<sup>3</sup>

<sup>1</sup>REMS, 321 High School Rd NE, Suite D3 #171, Bainbridge Island, WA 98110-2483, USA

<sup>2</sup>Polaris Applied Sciences, Inc., 755 Winslow Way E. #302, Bainbridge Island, WA, 98110 USA

<sup>3</sup>Kenya Maritime Authority, Moi Ave, Mombasa, Kenya

### **ABSTRACT**

Investment in the oil and gas sector in the East Africa region should commingle with the incorporation of best practices in oil spill emergency response. Upstream, Midstream, and Downstream operations must focus on prevention of emergencies but always be prepared to implement response actions if all engineering and safety defenses fail. Elements of environmental stewardship, applied scientific research, and technology are among key considerations needed in contingency planning to mitigate the socioeconomic and ecological consequences of hydrocarbon releases.

Kenya is in the process of realizing its oil and gas potential. The country has started injection and production testing of its oil reserves in Turkana and has initiated oil export through the Port of Mombasa. These activities, coupled with increased rate of sea borne trade and planned relocation of Kipevu Oil Terminal to an offshore platform, places the country at risk of oil spills and therefore the need to have a robust system of spill prevention, preparedness and response.

The World Bank's International Development Assistance (IDA) recognized the relevance of enhancing preparedness and response capability and, through the Kenya Ministry of

Petroleum and Mining, initiated the development of the national framework for onshore and offshore oil prevention, preparedness, and response capacity in Kenya. The project is divided into four phases (Identification, Development, Implementation, and Kenya's Regional (East Africa) Response Capacity Enhancement) and four primary deliverables:

- National Oil Spill Contingency Plan for Marine and Navigable Waters
- Onshore National Oil Spill Contingency Plan
- National Shoreline Cleanup Assessment Technique (SCAT) Guidance Manual
- National Oiled Wildlife Response and Preparedness Guidance Manual

This paper provides an overview of the four phases, describes the approach used to meet the project objectives, and provides an overview of the national oil spill contingency plans and national guidance manuals.

## **INTRODUCTION**

The oil industry in Kenya has been under development for decades but just recently this nation entered the producing and exporting of crude market. Over 40 exploration wells have been drilled since 2012 and more than 500 million barrels of oil reserve identified. Kenya exported its first shipment of 250,000 barrels of crude oil, produced in the Lokichar Basin as part of Project Oil Kenya, the first production project in the country, in August 2019. The early oil pilot production scheme uses tanks truck to transport oil from Lokichar to Mombasa for temporary storage in the out-of-service refinery tanks: approximately 600 barrels of oil per day (BOPD) in 2018 and 2,000 BOPD in 2019.

Project Oil Kenya full field development and "first-oil" is expected to be completed by 2022; this includes a proposed 18" diameter and 821 km long crude oil pipeline from Lokichar to

Lamu. Meanwhile, trucking crude oil to Mombasa may continue. Expansion of crude oil production, and its transportation and export, represent a heightened spill risk for the country and the urgency to have in place the framework for spill response preparedness and planning.

Research conducted in 2018, addressing key preparedness and response (training and exercises, real spill experience of responders, national contingency plan, legislation, incident command system, response equipment, and sensitivity mapping), demonstrated unequivocally that the oil spill preparedness and response capability was not adequate for responding to a massive oil spill incident (Muthike, 2018). That same year, the World Bank provided the International Development Association (IDA) with funds to assist the Government of Kenya in developing and implementing a national framework for inland and marine-and-navigable waters oil prevention, preparedness and response. This funding strategy is aimed to strengthen Kenya's ability to manage the impacts of spill disasters on the national economy and the vulnerable. The project was initiated with the identification and engagement of key stakeholders, including lead agencies with jurisdiction in each potential spill scenario of national significance: onshore (Kenya National Environment Management Authority - NEMA) and marine and navigable waters (Kenya Maritime Authority – KMA).

## **SCOPE**

The original scope of the national oil spill preparedness and planning framework included:

- Review the historical cases of uncontrolled, incidental or accidental hydrocarbon escape (oil spills) in the categories of near misses, incidents, and accidents and

- identify root causes and the containment responses that were applied and their effectiveness;
- Assess comprehensively the current (2014 draft) National Oil Spill Contingency Plan and identify inadequacies, existing gaps, and draw recommendations for gaps closure according to international standards and best practices;
  - Select underlying international standards, response technologies, program philosophies, emergency preparation and response capabilities including regulation, monitoring and enforcement of these standards;
  - Develop relevant procedures and manuals for the risk mitigation and response management system;
  - Develop notification, communication, and coordination strategies for mobilization in case of an occurring hazard;
  - Enhance prevention, preparedness and response capacity through skills transfer and development of emergency hydrocarbon fire drill exercise procedures;
  - Evaluate and develop regional preparedness and response capacity in onshore and offshore hydrocarbon escape incidents in East Africa.

## **PROJECT STRUCTURE**

The project structure consisted of one inception report (to ensure alignment of a Kenya Government Technical Committee's expectations and the consultant's action plan) and four phases.

- Phase 1 (Assessment of gaps and strengths in oil spill response and management),
- Phase 2 (development of four primary deliverables):
  - National Oil Spill Contingency Plan for Marine and Navigable Waters,

- Onshore National Oil Spill Contingency Plan,
- National Shoreline Cleanup Assessment Technique (SCAT) Guidance Manual, and
- National Oiled Wildlife Response and Preparedness Guidance Manual)
- Phase 3 (Implementation of Phase 2 deliverables), and
- Phase 4 (development of a Kenya regional (East-Africa) oil spill response capacity enhancement plan).

## **METHODOLOGY AND RESULTS**

### **Phase 1 (Assessment)**

Phase 1 was triggered with a comprehensive review and analysis of information and documentation received from key stakeholders and found online. This included reviewing historical spill cases, reviewing the 2014 draft NOSCP, and assessing current response capabilities and coordination plans.

Two historical spill datasets, augmented through additional spill reports found online, were analyzed. The most common incidents recorded in the Kenya Port Authority dataset (1972-1994) were the eight groundings at Leven Reef between April 1973 and July 1990. A total of 16 grounding events (53% of the near-miss incidents) are reported in this dataset including areas near Ras Serani, Ras Mwakisenge (Likoni), Ras Mzimili, Leven reef, and Andromache reef. A second dataset (Oil Spill Mutual Aid Group - OSMAG), which covers the period 2002-2018, shows that dispersants have been widely used, including one case of a spill on land in 2013 where dispersants were applied to spilled oil in open drains. Dispersants also were used in multiple cases as surface washing agents on seawalls, vessels hulls, and port structures.

An assessment of the overall national oil spill response program in Kenya was performed using standardized international review criteria provided in the ARPEL RETOS™ v2.1 Manual and Excel Tool (ARPEL, 2017; Donohue et al., 2017; Taylor et al., 2017). The “National” scope and Level A from RETOS™ v2.1 were used for this review and analysis. This review encompassed the 2014 draft Marine-National Contingency Plan as well as other written documents, information provided by stakeholders, feedback and discussion from stakeholders during several workshops, and related spill response procedures. The assessment review criteria are organized under ten response categories and 29 elements (Table 1).

*Table 1 Overview of the ARPEL RETOS v 2.1 assessment considerations for oil spill preparedness*

<b>Category</b>	<b>Element</b>
A. Legislation, Regulations & Agreements	1) Legislation and Regulation 2) Multi-National Agreements
B. Oil Spill Contingency Planning	3) Spill Risk Analysis 4) Resources at Risk 5) Risk Minimization 6) Evaluation of Response Options, Equipment and Personnel 7) Net Environmental Benefit Analysis 8) Expert Information Sources 9) Plan Development
C. Response Coordination	10) Response Management Systems 11) Notification Systems 12) External Communication
D. Health, Safety & Security	13) Health and Safety for Responders and Public; including Personal Protective Clothing and Equipment 14) Security
E. Operational Response	15) Source Control, Salvage, and Firefighting 16) Response Strategies 17) Waste Management 18) Wildlife Recovery, Care, and Rehabilitation
F. Tracking, Assessment, and Information Management	19) Spill Monitoring, Tracking, and Sampling 20) Cleanup Assessment 21) Data Management and Access
G. Logistics	22) Logistics 23) Communications 24) Demobilization
H. Financial and Administrative Considerations	25) Finance, Administration, and Procurement 26) Claims
I. Training & Exercises	27) Exercises

	28) Training
J. Sustainability & Improvement	29) Sustainability & Improvement

Each sub-category includes several criteria to be evaluated using one of three indicators of evidence found: Missing, Partial, or Complete. A category in which all criteria have been evaluated as ‘Complete’ will show 100% in the quantitative Global Performance Analysis (GPA) report from the RETOS™ v2.1 tool. The GPA report provides yellow highlighting for any category with “critical” criteria missing or incomplete. Based on the assessment conducted with information in hand, as of June 2019, the Kenya national oil spill response program was approximately 39% complete at a basic Level A, with critical criteria (as defined in the ARPEL RETOS Manual) that needed to be addressed in each category (Figure 1).

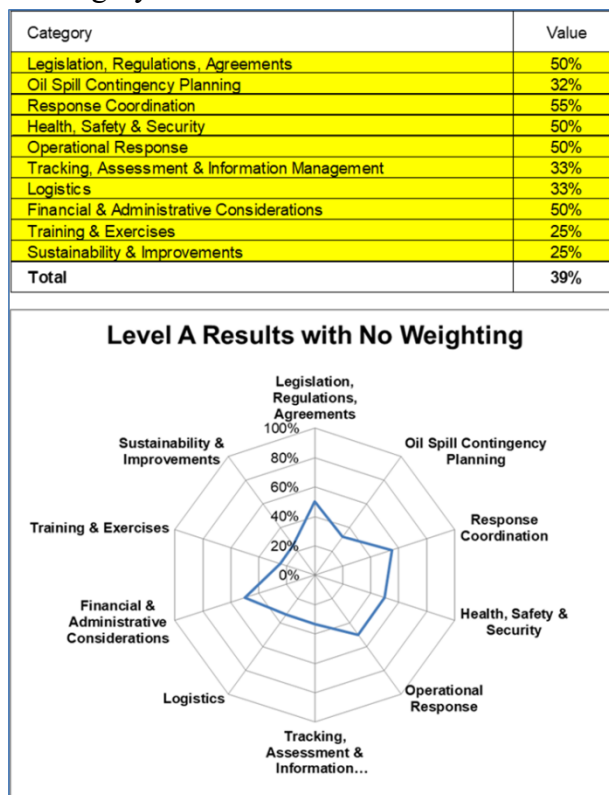


Figure 1 Global Performance Analysis results for the Kenya National Oil Spill Program (June 2019)

The conclusion reached from the RETOS assessment confirmed the findings of a previous evaluation of the oil spill response and management capability in Kenya (i.e., Muthike, 2018). The quantitative and qualitative results from Phase 1 triggered internal an evaluation processes for each of the two lead agencies (KMA and NEMA) as well as for other agencies (e.g., Kenya Wildlife Services, Kenya Port Authority) with roles and responsibilities for spill response actions. The main products of this project, developed during Phase 2, provide procedures, best practices, and guidelines for robust response coordination. To address other

critical criteria found as incomplete during the Phase 1 assessment (e.g., regulatory, financial & administrative considerations), each support agency and organization must analyze their own internal procedures and take action to close the gaps in response readiness. Internal and external evaluation and continued assessment of the national response program provides for a sustainable and evolving program beyond the duration of this project.

As an example, Phase 1 results from using the RETOS tool identified gaps in the Legislation, Regulation and Agreement criteria. The legal framework that defines requirements for mitigating the consequences of spill events and contingency planning in marine and navigable waters of Kenya are well defined under the KMA Act; however, other legislation is required. There is no legislation, or regulations, to define the legal framework for spills outside of the areas of KMA jurisdiction. The lack of regulations for planning and response to inland areas leaves a gap for potential spill risks such as inland upstream operations associated with pipelines, transportation, and spills to land and non-navigable waters. A new NCP regulation, under the Environmental Management and Coordination Act (EMCA) Cap 387, is recommended which could address this concern, close this legal framework gap for inland spills, and clearly identify NEMA as the lead agency for those cases. Similarly for the marine and navigable waters scenarios, a recommended regulation under the Merchant Shipping Act, No. 4 of 2009, Section 450(d) should define the responsibility and authority of KMA to assume the lead position in any response, including staffing or supervising all Command and General Staff positions of the National Incident Management Team if necessary, and define clearly the jurisdiction and relationship between KPA and KMA.

## **Phase 2 (Development)**



Comments and recommendations made during Phase 1 were incorporated and aligned with international best practices available from the IPIECA-IOGP series (IPIECA 2019) in the development of two National Contingency Plans (NCP) and two national guides during Phase 2.

### National Oil Spill Contingency Plans

The International Maritime Organization (IMO) guidance for national oil spill contingency plans (IMO 2018) provides the foundation for the key elements and best practices that are incorporated into the drafts of the two national contingency plans (Onshore and Marine and Navigable Waters), including:

- Competent National Authority or Lead Agency, supporting agencies, and responsibilities;
- relevant national and international legislation;
- initial response, notification, and reporting;
- risk assessment and management;
- tiered response planning;
- response management organization and management system;
- oil spill assessment;
- response resources and logistics;
- sensitivity maps, vulnerability atlases or environmental sensitivity indices;
- response strategies;
- waste management;
- demobilization and termination of response;
- training, exercises, and plan update requirements; and

- cost recovery.

The draft revised plan provides a more rigorous and systematic approach to many aspects of spill response. For example, the review of historical spill cases documented by OSMAG shows that the use of dispersants has been considered as the primary countermeasure used for response to oil spills on water. No documented evidence was found to show the decision making process for using dispersants. Dispersant use best practices and other key response procedures (e.g., Net Environmental Benefit Analysis or NEBA) are now included in the draft NCPs, with specific responsibilities and considerations for local stakeholders during spill exercises or actual response.

#### National Response Guidance Manuals

The Shoreline Cleanup Assessment Technique (SCAT) process is a tool to assess oiled shorelines and is now an integral component of spill response operations. SCAT programs were initially established to provide objective and accurate shoreline oiling information directly to cleanup operations. The role of the SCAT program has since expanded and the information generated by the field teams is used now by planners and decision-makers to develop shoreline treatment recommendations, select appropriate treatment techniques, and establish the level or degree of treatment that is appropriate (Owens and Sergy, 2003). The national SCAT Guidance Manual provides industry and government with clear approaches, procedures, and expectations for managing shoreline treatment operations for both coastal and onshore areas following international guidelines and best practices such as set forth in ECCC (2018) and IPIECA (2014, 2015).

Protecting oiled wildlife is a critical aspect of emergency response in Kenya. The tourism industry accounts for 21% of total foreign exchange earnings and 12% of the Kenya's GDP and wildlife tourism represents approximately 75% of total tourism earning (<http://www.kws.go.ke>). Implementing best practices and internationally recognized protocols as a foundation for providing the best achievable care for oiled wildlife was the incentive to developing the Kenya Oiled Wildlife Response and Preparedness Guidance Manual as part of the national framework. The Oiled Wildlife Guidance Manual is intended to assist the responsible spill party (RP), spill response lead agency, Kenya Wildlife Services (KWS), and other stakeholders during response operations and in their wildlife response plans development. Response actions concerning the protection, identification, rescue, processing, and rehabilitation of oiled or threatened wildlife, described in the guideline, will be carried out by the Wildlife Branch within the Operations Section of the Incident Management Team (IMT). This standardized approach helps to mitigate potential spill impacts to wildlife resources, enables the Unified Command to focus on other aspects of spill response, and instills public and the tourism industry confidence in overall response activities.

### **Phase 3 (Implementation)**

Kenya's sustained economic growth, social development, and political gains (e.g., a new constitution in 2010 that introduced a bicameral legislative house) over the past decade has been recognized by organizations such as the World Bank. This type of national growth requires government officials, including potential members of a National Incident Management Team, to adapt their daily job assignments to multiple organizational changes, roles, and responsibilities.

The responsibility for mitigating the consequences of spill events and contingency planning, in marine and navigable waters of Kenya, is with KMA as defined under the KMA

Act. However, prior to the implementation of this project, the primary guidance document for responding to spills of national significance was a Marine NCP, in a “draft” status (not officially approved), developed by KMA. This project recognized the spill risk at the National level regardless of the event location; thus, including inland as well as marine and navigable waters scenarios. Phase 3 of this project is the next step in implementing a comprehensive approach to the national framework. The implementation phase of this project is focused on capacity building for the two lead agencies: NEMA for onshore and inland areas and KMA for marine and navigable waters. This includes building awareness and a higher level of understanding in the roles and responsibilities of the National Incident Management Team, the guidance and procedures adopted in the two NCPs, and use of related tools and best practices for the range of activities encompassed in a national response program. The implementation phase also will raise a much greater awareness of the resources available, and of those needed, to support the lead agencies and key stakeholders in Kenya.

Phase 3 is just the start of a multiyear, continuous improvement program that includes training, exercising, and evaluating response performance and agencies capabilities. Lead agencies and key stakeholders must practice and evaluate their own capabilities to address applicable elements in the national framework that would determine their performance during a spill of national significance. While Phase 3 will trigger the spill management capability building process (and will address spill response and management processes, best practices, and guidelines), the specific details pertinent to each stakeholder need to be developed on a case by case basis.

A key objective of Phase 3 is to initiate implementation of worldwide spill response and management best practices within Kenya. The use of NEBA as the process to compare

advantages and disadvantages of different oil spill responses, and of spill impact mitigation assessment (SIMA), as an adaptation of NEBA applicable to large environmental and socio-economic consequence spill incidents, are examples of new concepts currently being implemented in Kenya through the new national framework.

Multi-year training and exercise requirements will be required for response organizations in Kenya per the new National framework (detailed in Section 11 of both NCPs). Key elements in basic spill response training include: health and safety, response plan familiarization and strategies, and spill equipment use and maintenance. Similarly, basic exercise and drills to be implemented at the national level are also described in the NCPs (Table 2).

*Table 2 Spill drills and exercises*

<b>Exercise/Drill</b>	<b>Frequency</b>	<b>Participants</b>
Notifications and Call-outs	Quarterly	Facility Management National IMT
Equipment Deployment Drills	Annually*	Facility Tier 1 Designated National IMT Personnel
Spill Management Team Tabletop Exercise	Annually*	Facility Tier 1 Team National IMT
Worst-Case Tabletop Exercise and Equipment Deployment Drill	Triennially (3 years)*	Designated Facility ORT Personnel National IMT Designated Tier 2 and 3 Resources (Mutual Aid)

*\*Actual spill response that entails a comparable level of response may be substituted for these exercises.*

#### **Phase 4 (Kenya regional capacity)**

The last phase of the project consists of the development of a Kenya regional (East-Africa) oil spill response capacity enhancement plan. Kenya has been instrumental in the development of the regional contingency plan (RCP) for preparedness for and response to major marine pollution incidents in the Western Indian Ocean (draft WIO-RCP). The Governments of

the Union of Comoros, France, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, South Africa and Tanzania agreed to adopt, within the framework of the Emergency Protocol to the Nairobi Convention, a Regional Contingency Plan for responding promptly and effectively to major marine pollution incidents, affecting or likely to affect the territorial sea, coasts and related interests of any of the nine Parties concerned; however, the plan has not been approved and only one of the nine states participating in the draft WIO-RCP has ratified the International 2010 Hazardous and Noxious Substance (HNS) protocol. All nine States of the Western Indian Ocean region have ratified the OPRC 90 Convention. Considering the transport of refined products, finalizing and approving the WIO-RCP and ratifying this international Protocol should be a priority for all states in the region. The regional enhancement plan will identify this and other opportunities for Kenya to work in cooperation with neighbors nations in case of an international incident. This cooperation includes, but is not limited to, customs and immigration policies and requirements to streamline transport and delivery of personnel and equipment between regions/areas, including marine, terrestrial and aviation services.

## **DISCUSSION**

A national framework for spill preparedness and response was a top priority for Kenya given the country's entry into the crude oil export market. This priority was heightened by a lack of national guidelines for multiple response topics, need for alignment with best practices, and the fact that Kenya has not experienced a significant oil spill incident to marine or navigable waters since the 2005 MV Ratna Shallini spill (Muthike, 2018). The lack of national-level experience in response actions can only be mitigated through a robust training and exercises program.

The national framework project addresses all aspects of the oil industry (upstream, midstream, and downstream) and the entire national territory (inland and marine and navigable waters); however, regulations (as part of the legal framework in Kenya) that define the requirements for prevention, planning, readiness, and sustained response are required. There is a deficiency of legislation, and regulations, to define the legal framework for spills outside of the areas of KMA jurisdiction. The current lack of regulations for planning and response to inland areas leaves a gap for potential spill risks such as inland upstream operations associated with pipelines, transportation, and spills to non-navigable waters. A new regulation, under the Environmental Management and Coordination Act (EMCA) Cap 387, could address this concern and close this legal framework gap for inland spills and for assigning NEMA as the lead agency. Similarly for the marine and navigable waters spill scenarios, a recommended regulation under the Merchant Shipping Act, No. 4 of 2009, Section 450(d) would define the responsibility and authority of KMA to assume the lead position in any response, including staffing or supervising all Command and General Staff positions, if necessary, and define clearly the jurisdiction and relationship between KPA and KMA.

Based on the legal mandates of NEMA, KMA, and the National Disaster Operation Centre, response procedures in place, and current legislation and regulations there is no clear response coordination defined specifically for the complexity a Tier 2 and Tier 3 oil or HNS spill. The new NCPs define a robust Incident Management System with a response coordination process that incorporates the specific functions of these agencies and other stakeholders.

Phase 3 (Implementation) and Phase 4 (Kenya Regional Capacity) of the project are to take place during 2020. The successes and learnings of the Kenya project should be evaluated at the end of Phase 4 in order to identify possible and recommended steps that can be emulated in

other nations under similar circumstances. A clear best practice used during this project was the identification of lead agencies and response authorities. However, such designation should be embedded with appropriate resources allocation. This project identified two lead agencies in Kenya based on existing jurisdictional authority and responsibilities: KMA covering marine and navigable waters and NEMA for incident occurring onshore and to non-navigable waters. Lead agency responsibilities include prevention, response, enforcement, as well as mitigation activities. Both KMA and NEMA will have to simultaneously learn about their new responsibilities under the National framework for spill response and preparedness and allocate existing resources, and leverage support from other organizations, to address them. Tier 2 and 3 exercises and drills are required in the near future to test the project NCPs and national guidelines as well as the lead agencies and key stakeholders response capacity.

## REFERENCES

- ARPEL, 2017. Manual and Tool to Evaluate Oil Spill Management Capabilities – RETOS V 2.1. [online]. Regional Association of Oil and Gas Companies - Latin America and the Caribbean. Available from: <https://arpel.org/library/publication/341/> [Accessed 21 November 2019]
- Donohue, K., Moyano, M., Miranda-Rodríguez, D., Taylor, E., Moscoso, I., and Jensen, R., 2017. A True Roadmap for Response Preparedness Capacity Building in Developing States. Proc. of the International Oil Spill Conference, 2017. American Petroleum Institute, Washington, DC. <https://ioscproceedings.org/doi/pdf/10.7901/2169-3358-2017.1.822> [Accessed 21 November 2019]



- ECCC, 2018. Environment and Climate Change Canada (ECCC), Shoreline Cleanup Assessment Technique (SCAT) Manual, 3<sup>rd</sup> Ed., Ottawa, Canada. 73 pp.
- IMO, 2018. Manual on Oil Pollution, Section II – Contingency Planning. International Maritime Organization, London, UK, 103 pp.
- IPIECA-OGP, 2014. A guide to oiled shoreline assessment (SCAT) surveys, OGP Report 504, 40pp.
- IPIECA-OGP, 2015. A guide to shoreline clean-up techniques, OGP Report 521, 69 pp.
- IPIECA, 2019. Oil spill preparedness series. Available from: <http://www.ipieca.org/our-work/oil-spill/> [Accessed 21 November 2019]
- Muthike, S. N., 2018. Assessment of Kenya's capacity to effectively prepare for and respond to oil spill incidents. Dissertation, World Maritime University, Sweden.
- Owens, E. H. and Sergy, G. A., 2003. The development of the SCAT process for the assessment of oiled shorelines. *Marine Pollution Bulletin*, 47(9-12), 415-422.
- Taylor, E., Moyano, M., and Miranda, D., 2017. RETOS™: Use of an International Tool for Assessing Oil Spill Planning and Preparedness. In Proc.2017 International Oil Spill Conference, American Petroleum Institute, Washington, DC.  
<http://ioscproceedings.org/doi/pdf/10.7901/2169-3358-2017.1.1> [Accessed 21 November 2019]