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Environmental pollution and shipping feasibility of the Nicaragua Canal

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ABSTRACT

In recent years, the Nicaraguan government's renewed interest in constructing this interoceanic canal has once again aroused widespread concern, particularly in the global shipping industry. The project's immense ecological risks, coupled with the recent expansions of both the Panama Canal and the Suez Canal, have raised questions among scientists and experts about its viability. Whether the Nicaragua Canal is really feasible for international shipping, given its high marine pollution risks, requires the further study. This paper discusses and analyses the feasibility of the Nicaragua Canal in the context of its environmental impact and value as a shipping service. This paper aims to provide an important information reference to inform strategic decision-making among policymakers and stakeholders. Our research results indicate that the environmental complexity, economic costs and safety risks of building a new transoceanic canal are simply too high to justify the project.

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1. Introduction

The environmental impact of the construction project of the Nicaragua Canal and the feasibility of its international shipping service have been being attracted the attention of the world people and the global maritime industry. In 2013 the Nicaraguan government, acting without public tender or a feasibility assessment, contracted with the Hong Kong Nicaragua Canal Development Investment Co., Ltd. (HKND) with Chinese background to build the canal. The HKND proposal envisions two ports, a free-trade area, resorts, international airports, highways, power plants, cement plants and other facilities, in a \$50 billion, five-year project involving several Chinese companies. HKND will have rights to operate the canal for 50 years, with an allowable extension of up to 50 additional years (HKND Group, 2014). The proposed waterway, nearly three times longer the Panama Canal, would cut a 276-kilometer (171-mile) path from Punta Gorda on the Caribbean Coast to the mouth of the River Brito (Fig. 1).

Since its approval by the Nicaraguan government, the canal has been harshly criticized by academics and the broader public. This backlash has repeatedly delayed the construction of the canal, which was originally expected to begin in 2014. Scientists warn that the canal threatens to cause irreversible environmental damage, and have lobbied for a rigorous, transparent, and independent environmental-impact assessment (Conti, 2014; Gross, 2014; Meyer and Huete-Pérez, 2014; Huete-Pérez et al., 2015a,b). At the same time, doubts have arisen about the canal's essential purpose—to provide shipping services for oceangoing vessels

by supplying an interoceanic shipping channel. The Nicaraguan government and HKND Group have not yet to disclose a specific feasibility assessment report regarding the canal's shipping service, long awaited by world maritime experts and scholars, who require such a report to provide a full evaluation of the feasibility of the proposed canal's shipping services.

The interoceanic Suez and Panama canals have provided convenient shipping routes for the world economy and trade globalization, greatly shortening the world sea trade voyage and making great contributions to the development of the world economy and global trade (Llacer, 2005; Obieta, 2012; Ungo and Sabonge, 2012). These canals' international shipping services have also brought huge economic benefits for the countries in which the canals are located. Driven by similar economic interests, the Nicaraguan government has actively promoted the canal project without regard to the likelihood that the canal will bring serious ecological consequences by polluting the area's marine environment and natural ecological system.

The Suez Canal has been operating for about 150 years. After its expansion in 2015, it is able to accommodate 20,000 TEU (twenty-equivalent-unit) containerships and can serve other ships as large as 280,000 DWT (deadweight tonnage) (Schøyen and Bråthen, 2011; Galall, 2015). The Panama Canal, which like the Nicaragua Canal is located in Central America, has served the world shipping industry for more than 100 years. The newly expanded Panama Canal is now open, and can accommodate 13,000 TEU containerships and other ships as large as 180,000 DWT (Pagano et al., 2012). Given the huge risks of environmental pollution and destruction associated with the Nicaragua Canal, and given the recent expansions of the two existing interoceanic canals, it is really necessary and feasible to dig a new interoceanic canal in Central

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Fig. 1. Planned Nicaragua Canal.
Source: Google Image.

America? Even setting the canal's environmental impact aside, the international shipping service feasibility of this huge marine engineering project brings grave doubts that require careful attention.

This paper will focus on the following two problems facing the proposed Nicaragua Canal. First, the authors will examine the environmental pollution risks and potential impacts of the canal project, and secondly will analyse the feasibility of the project's shipping service from the perspectives of international shipping demand and maritime security.

The remainder of the paper is organised as follows. Section 2 will provide specific analysis of the high environmental risks of the Nicaragua Canal project. Section 3 will analyse the shipping service feasibility of the Nicaragua Canal with regard to shipping perspectives. A detailed discussion of the uncertain shipping demand and shipping safety problems facing the project will be provided. Finally, Section 4 will summarize this paper's conclusions.

2. High environmental pollution risks

As for the environmental impact of the Nicaragua Canal project, although most scientists and experts have the negative views for this, some scholars hold different views, they thought scientists should not exaggerate the negative impact of the canal project on environmental damage (Condit, 2015; McCrary, 2015). However, the research conclusions of those scholars, who hold different views with most scientists and experts, were derived from their subjective judgments. They believed that the current ecological environment in Nicaragua had deteriorated, and thus the canal project had little effect on the environment in the future. This kind of extreme views were not correct and unreasonable. As for such huge a shipping engineering construction projects, we should be cautious and have the objective attitude of the environmental impact of the Nicaragua Canal. The uncertainty and complexity of the environmental problems faced by the canal project cannot be ignored.

Currently, the world shipping industry has the common goal of providing green, environmentally friendly shipping service (Winebrake et al., 2009; Lun, 2013). Green shipping maintains a focus on maintaining healthy ecological environments, emphasizing sustainable development ideas to govern maritime logistics activities, avoiding damage to

ecological and environmental resources, and reducing or even eliminating risk of environmental damage from shipping activities (Coutts and Dodgshun, 2007; David and Gollasch, 2008; Salomon, 2009; Chang et al., 2010; Lai et al., 2011; Wuisan et al., 2012). However, the canal's construction process alone may pose huge risks of natural and ecological damage, even before the consequences of the canal itself are taken into consideration. As most scientists have feared, the Nicaragua canal is likely to be a huge disaster for the human environment and natural ecosystems (Huete-Perez et al., 2013). The Nicaragua canal's construction process and its future shipping activities are likely to cause great pollution or damage to surrounding natural ecosystems, such as freshwater resources, endangered species, tropical rain forests, forests and wetlands, etc. At the same time, it threatens to destroy local social and cultural structures in Nicaragua, including historical and archaeological sites, indigenous communities, etc. (Meyer and Huete-Pérez, 2014; Huete-Perez et al., 2015a).

2.1. Water pollution and natural ecosystem destruction

The proposed canal route as announced by the Nicaraguan government will pass through Nicaragua's largest freshwater lake, Lake Nicaragua, bringing severe threats to the lake's water quality and ecosystem. As the largest freshwater lake in Central America, Lake Nicaragua's water area reaches 8264 km² and is the most important source of fresh water for Nicaragua's people. The lake is an indispensable natural ecological reserve for dozens of rare species of fish in Central America. Since fish from the bay have gradually adapted to the desalination of water in the lake, Lake Nicaragua is the world's only freshwater lake to contain marine fish. Particularly threatened is the endangered *Carcharhinus leucas*, the only species of shark to move from seawater to freshwater (Oguri, 1964; Ballantyne and Robinson, 2010).

The average depth of Lake Nicaragua is presently about 15 m. Canal construction would entail large-scale of dredging work, bringing the lake's water-depth conditions to about 28 m to meet the technical navigational requirements of the so-called large ships envisioned by HKND Group. This immense dredging process will require millions of tons of sludge to be deposited in the lake or on nearby land, forming sediments that seriously threaten the environment. This large-scale dredging project will also reduce the level of dissolved oxygen in the lake water,

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