

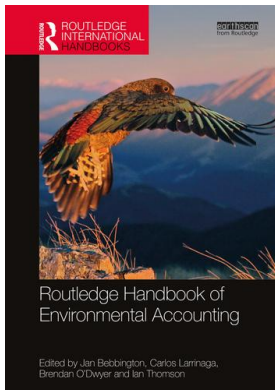
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### **The North American environmental accounting research landscape**

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# THE NORTH AMERICAN ENVIRONMENTAL ACCOUNTING RESEARCH LANDSCAPE

*Stacy L. Chavez and Andrea M. Romi*

## Introduction

North America (NA) provides a unique and dynamic landscape for environmental accounting research (EAR), particularly with respect to Canada and the United States of America (USA). In a region plagued with an ever-growing carbon footprint, a focus on unyielding growth and consumption, continuously increasing income inequality, and a portion of the population which formally denies the existence of climate change altogether, research on environmental accounting (EA) is distinctive. Over the last several decades, NA has experienced an explosion of EAR. Most research focuses on reporting mechanisms from an archival perspective in combination with positive and negative consequences, voluntary versus mandatory incentives, assurance, markets, value relevance, reliability, greenwashing, the use of performance metrics, etc. These studies tend to focus on legitimacy theory (e.g., Mobus 2005; Magness 2006; Cho et al. 2011; Cho et al. 2012a; Cho et al. 2015; Cho and Patten 2007; Peters and Romi 2014; Clarkson et al. 2008; Chen et al. 2008; Rodrigue et al. 2013; Thorne et al. 2014; Elayan 2019; Buhr 1998; Cormier and Gordon 2001; Iyer and Lulseged 2013; Freedman and Stagliano 2008), but also stakeholder theory (e.g., Clarkson et al. 2008), disclosure theory (e.g., Mahoney et al. 2013; Griffin et al. 2017; Clarkson et al. 2008), agency theory (e.g., Buhr 2001; Mallin et al. 2013), and economic theory (e.g., Peters and Romi 2014; Buhr 1998), or a combination thereof.

The NA region is certainly not uniform, with many unique continental aspects. Within Canada, for example, researchers have focused on mining and indigenous groups (Horn 2019). Within the USA, on the other hand, oil spills, B-corps<sup>1</sup>, Superfund sites, and voluntary carbon markets, including the defunct Chicago Climate Exchange (Griffin 2013; EDF 2019), have provided unique research opportunities. While less examined, Mexico also provides a unique setting to investigate air pollution, the lack of clean water, deforestation, and the effects on the environment from Mexico's insourcing of manufacturing from other countries. Each of these countries also deal with different governing structures, potentially influencing their environmental policies. While we outline the long history of EAR within NA in this chapter, there are many issues unresolved, providing us an opportunity to discuss limitations and possible avenues for future work.

The NA continent lies in the Western hemisphere, between the Arctic Circle and the Tropic of Cancer, and encompasses Canada, the USA, Mexico, Greenland, and the Caribbean Islands, terminating at the southern tip of Central America. A region of this size sustains a variety of ecosystems, terrain, climate, and cultural diversity, all potentially influenced by climate change. NA is surrounded on the east by the Atlantic Ocean and on the west by the Pacific Ocean, making the region particularly susceptible to severe oceanic storms. The West Coast and Hawaiian Islands lie along the Pacific Rim, or the Ring of Fire, highly sensitive to earthquakes and volcano eruptions. A large swath of the US Midwest, with expansive agricultural responsibilities, comprises the severe weather path known as “tornado alley.” The far northern regions also experience climate change effects, both on the Canadian permafrost and on icebergs in the Arctic Sea between Canada and Greenland. One far-reaching environmental concern connecting the entire NA region is the ever-deteriorating Monarch butterfly migration, from Mexico, through the USA, and into Canada. The Monarch parallels other declining pollinator populations, such as the honeybee, which provide the natural pollination imperative to sustain the global food supply. Pollinator decline from human-induced habitat loss, disease, pesticides, climate change, etc., foreshadows the potential consequences to civilization from ignoring environmental concerns.

### **Environmental context shaping accounting**

While some researchers adopt a global perspective, in the North American context, we find that EAR almost exclusively takes place in a US or Canadian setting. As such, this chapter focuses on the research issues in these countries. Both governments have environmental regulations in place, motivating EAR examining disclosures related to firm-specific environmental performance (EP). Table 23.1 provides a summary of the NA environmental regulatory agencies and regulations commonly discussed in the literature.<sup>2</sup>

NA EAR addresses various issues and observes a relationship between some industries and greater environmental degradation, based solely on industry-specific operations (Patten 1991). For example, Cho and Patten (2007) describe firms in the oil exploration (SIC 13), pulp and paper (SIC 26), chemical and allied products (SIC 28), petroleum refining (SIC 29), and metals (SIC 33) as environmentally sensitive industries (ESI) where firms are likely to exhibit unique behaviors with respect to both EP and disclosures. Although two of these industries (oil and gas, pulp and paper) dominate the research, other industries, such as mining, power plants (electricity), and chemical plants, stimulate greater variety in research topic areas, including disclosure (e.g., Cormier and Gordon 2001; Freedman and Stagliano 2008; Magness 2006; Buhr 1998), firm value (e.g., Hughes 2000; Joshi et al. 2001), eco-efficiency (e.g., Burnett and Hansen 2008; Henri and Journeault 2010), and biodiversity (Schneider and Andreas 2018).

With respect to non-weather-related environmental disasters, perhaps the most commonly recognized relates to oil, with approximately 44 recorded oil spill disasters since 1969 (NOAA 2019). Most notable among them was the 1989 Exxon Valdez disaster, which resulted in the leakage of approximately 11 million gallons of crude oil (NOAA 1989). The 2010 Deepwater Horizon disaster is possibly the most “famous” spill, contributing to its central role in a Hollywood movie. The rig exploded during a drilling procedure, resulting in 11 deaths and oil spillage of approximately 168 million gallons into the Gulf of Mexico (NOAA 2010).

Oil tankers are not the only source of environmental concern. Many oil pipelines crisscross the continent, which threaten not only the land, but also waterways sourcing drinking water and crop irrigation. In 2015, the Nexen pipeline in Alberta, Canada, began leaking a mixture

Table 23.1 Overview of regulatory environment

<i>North American Environmental Regulatory Agencies</i>	
Carbon Disclosure Project (CDP)	Sustainability Accounting Standards Board (SASB)
Federal Energy Regulatory Commission (FERC)	United States Environmental Protection Agency (EPA)
International Accounting Standards Board (IASB)	United States Financial Accounting Standards Board (FASB)
North American Free Trade Agreement (NAFTA)	United States Securities and Exchange Commission (SEC)
<i>North American Environmental Acts/Agreements</i>	
<i>Name</i>	<i>Description (citation)</i>
Canadian Environmental Protection Act (CEPA)	Aims to prevent pollution and protect the environment and human health (Canada 1999)
The Clean Air Act (CAA)	Aims to solve the problem of air pollution through science and technology (EPA 1970)
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) – also known as the Superfund	Allows the EPA to identify potentially responsible parties (PRP) that contribute to contamination of an environmental site, thus holding them liable for the cleanup and transaction costs (EPA 1980)
Dodd Frank Act (in response to the 2008 financial crisis)	Enacts regulation on the financial industry and swaps market to protect consumers, as well as requiring responsible minerals sourcing (CFTC 2010)
Emergency Planning and Community Right to Know Act (EPCRA)	Helps communities plan for chemical emergencies, as well as reporting on hazardous substances (EPA 1986)
National Environmental Policy Act (NEPA)	This act aims to declare a national policy to protect the environment through harmony between humans and their environment (EPA 1969)
Toxic Release Inventory (TRI)	Database containing details of chemical transfers by most manufacturing facilities; falls under the EPCRA (EPA 1986)

of approximately 31,000 gallons of bitumen oil, sand, and water in the largest land spillage on record (Gaworecki 2015). While pipelines are a major source of employment, they are also a hotly contested environmental and political issue. For instance, the US Native Americans and Canada's First Nations heavily protested the Keystone XL project, concerned about the environment, damage to sacred sites, and the health of indigenous peoples.

According to the World Wildlife Fund, the pulp and paper industry, commonly associated with deforestation and air pollution, is responsible for consumption of 40% of industrial wood traded throughout the world (WWF 2019). Deforestation, while benefiting many industries within NA, is a topic often discussed in relation to the Amazon Rainforest in South America, and as such has not been examined in the NA accounting literature. NA EAR, however, has focused on the pulp and paper industry, and how air and water pollution relate to firm disclosures

(e.g., Spicer 1978; Clarkson et al. 2004; Shane and Spicer 1983; Cho et al. 2006; Clarkson et al. 2008) and firm value (e.g., Clarkson et al. 2004; Freedman and Jaggi 1992).

Despite the environmental impacts of these industries, very little accounting research examines the actual impacts of these disasters (e.g., biodiversity damage, increased water contamination, and long-term health costs). Instead, research to date in the petroleum industry primarily focuses on firm-specific disclosures (e.g., Mobus 2005; Cho et al. 2006; Clarkson et al. 2008; Herremans et al. 2009) and level of commitment to social responsibility (e.g., Mobus 2005; Schneider et al. 2017; Cho et al. 2018; Herremans et al. 2009). Other research considers the value impact of disclosure by external parties (e.g., Shane and Spicer 1983) and the choice of accounting treatment for environmental liabilities related to abatement regulation (e.g., Schneider et al. 2017).

### Accounting research outline

Disclosure emerges as the dominant topic in the NA EA literature. Both voluntary and mandatory environmental disclosures (EDs) exist in various locations, including financial statements, stand-alone reports, integrated reports, firm-specific websites, etc. Disclosures help accounting researchers examine firm environmental behavior with respect to a myriad of topics, such as accountability, investor interest, and governance.

The primary source of environmental information for external parties is voluntary disclosure. External stakeholders without access to internal firm-specific environmental information must rely on firm disclosures to evaluate potential decisions. Research often examines investor interest in firm-specific environmental actions by examining the market reaction to, or a change in firm value associated with, an environmental event or disclosure. For example, Blacconiere and Patten (1994) examined the market response for all US firms in the chemical industry after the Union Carbide chemical leak in Bhopal, India. All chemical industry firms experienced a negative stock market reaction following the leak, yet firms with more extensive ED prior to the leak experienced less of a negative reaction, providing initial evidence that investors interpret extensive disclosures as a sign of proactive environmental strategy within firms. Clarkson et al. (2013) also established investor interest in environmental activities for US polluting industries, finding that investors incorporate environmental information into decision-making, with respect to both performance and disclosures.

In addition to these studies, EA literature has also examined investor perceptions of disclosures based on the type of investor (e.g., Epstein and Freedman 1994; Dilla et al. 2019), the environmental strategy of the firm (e.g., Spicer 1978; Clarkson et al. 2004; Shane and Spicer 1983; Reitenga 2000), the ranking of the firm by third-party agencies (e.g., Cordeiro and Tewari 2015), firm responses to regulation or regulatory pressure (e.g., Elayan 2019; Patten and Nance 1998), overall firm-specific ED (e.g., Anderson and Frankle 1980; Griffin and Sun 2013; Griffin et al. 2017), and the quality of a firm's ED (e.g., Cho et al. 2015; Guidry and Patten 2010). The direction of investor reaction resulting from these studies is mixed, while some find no reaction at all.

Political forces and the media also play a particularly important role as external stakeholders, pressuring firms into desired behaviors. Greater attention to poor EP is likely to result in increased negative attention, influencing the firm's bottom line through boycotts, negative market reactions, higher employee turnover, etc. Cho et al. (2006) examined the possibility that worse environmentally performing firms might spend more on political activities than better performing firms as a way to influence policy and decrease political risk. They found that poor environmentally performing firms in US ESI spent more on political donations to

manage political exposure and that political donations and ED were complementary strategies to manage public policy pressures.

In addition to greater amounts of information to influence public perceptions, firms often disclose different types of information in different outlets. For example, Villiers and van Staden (2011) examined 120 NA firms, based on EP and experience with environmental crises, to determine the extent of ED in their annual reports and websites. They found that EP influenced managers' ED decisions. Firms with bad performance disclosed greater amounts of environmental information in their annual reports, which represented management's attempt to reduce information asymmetry for investors. Additionally, firms facing an environmental crisis reported more environmental information on their websites, where they could expedite the communication process toward investors and attempt to reduce political costs (Villiers and van Staden 2011, p. 521).

Another potential factor influencing environmental issues is that of strong governance, although these results remains largely mixed. Rupley et al. (2012) examined the relationship between strong boards (i.e., independence, gender diversity, proportion of board members serving on more than one board, chief executive officer [CEO] not a director, and Corporate Social Responsibility [CSR] committee), the tone of environmental media coverage, and ED and found a positive relationship. These findings demonstrate that firms facing negative media attention will attempt to change perceptions through higher quality and quantity of ED. Similarly, Peters and Romi (2014) suggested that strong environmental governance mechanisms, such as environmental committees, chief sustainability officers, and board environmental expertise, influence the quantity and quality of ED. Rodrigue et al. (2013), on the other hand, found that environmental governance is largely symbolic, employed by the board to protect the firm's reputation and reduce regulatory risk, ultimately having no impact on EP.

Additional literature in the political and public pressure arena includes investigations of the disclosure strategies to influence policy (e.g., Cho et al. 2012a), the amount or types of disclosures in response to facing greater public pressures overall (e.g., Cormier and Gordon 2001; Thorne et al. 2014; Li et al. 1997; Herremans et al. 2009), ED levels when firms are targeted specifically based on a differentiating characteristic (e.g., Freedman and Stagliano 2002; Dawkins and Fraas 2011), and ED levels when a firm faces a negative environmental event (e.g., Magness 2006; Darrell and Schwartz 1997). Many of these papers found increasing disclosures in response to additional public or political pressures, supporting legitimacy theory as the prominent theory in ED literature within NA.

As one of the most pervasive motivations suggested for ED results in accounting academic literature, legitimacy focuses on a firm's attempt to act in way that aligns the firm's objectives and actions with that of society's expectations (Dowling and Pfeffer 1975; Lindblom 1994; Suchman 1995). Much of the EA literature suggests that firm disclosures often do not match true performance, also known as "ceremonial conformity" (Meyer and Rowan 1977). Other papers focus on similar behavior but refer to it as "greenwashing" (e.g., Berrone et al. 2017; Walker and Wan 2012) or impression management (e.g., Talbot and Boiral 2015; Diouf and Boiral 2017; Lee and Sweeney 2015; Chen et al. 2014).

Prior to Patten (2002), many studies found no significant relationship between a firm's EP and ED. Patten (2002) examined US firm-specific toxic release and found a negative relationship between EP and disclosures, supporting Patten's (2002) assertion that firms with poor EP, facing threats to their legitimacy, will attempt to counter this threat by providing more environmental information. Additionally, Patten (2002) found that firms operating in non-ESIs provide greater levels of disclosure in response to greater toxic releases, indicating that firms

in ESIs already face greater exposure to the social/political environment, where preexisting expectations of poor EP negate firm benefits from additional disclosures.

Contending that all disclosure channels are not equally efficient or effective in reaching legitimacy goals and that different channels might serve as complements or substitutes to one another, Aerts and Cormier (2009) investigated the impact of a firm's environmental communication efforts on media legitimacy. The authors found, in Canadian and US firms, that the extent and quality of economic-based segments of ED in the annual report, and reactive press releases, positively affected the environmental legitimacy of the firm. Additionally, inclusion in an ESI negatively affected this positive relationship between annual report disclosures and legitimacy. Moreover, proactive press releases did not interfere with the effectiveness of annual report ED, suggesting complementary roles between press releases and annual report disclosures. Overall, these findings provided further evidence of the legitimizing role of ED.

While Patten (2002) found a negative association between EP and ED, the literature renders mixed results over time. Cho and Patten (2007) addressed these mixed results and argued that they are a product of a failure to consider management's motivation for ED, leading to issues with the disclosure metrics used in studies, where some disclosures were used as legitimizing tools, and others not. Attempting to isolate the legitimizing nature of disclosures, these authors focused on non-litigation-related environmental information, while also differentiating between monetary and non-monetary information. Overall, the authors provided additional evidence that corporations appear to use financial report ED as a legitimizing tool, and that there are differences in legitimizing behaviors depending on the type of ED examined. Other EA disclosure research focused on legitimacy includes those examining legitimacy tactics after an event or increased media attention (e.g., Buhr 1998; Patten 1992; Neu et al. 1998), the influence of external factors on legitimizing behavior (e.g., Cho et al. 2012b; Cho et al. 2011), and the difference in legitimizing tactics based on different aspects of ED (e.g., Patten 2005; Clarkson et al. 2008).

Not surprisingly, given all the regulatory bodies and regulations within NA, there is a large body of EAR focused on the effects of regulation. For example, Cho et al. (2008) examined how firms operating in an ESI influenced politicians during the passage of ED legislation proposing additional mandatory disclosures for firms in ESIs. The results suggested that the chemical and petroleum industry made significantly higher PAC contributions to members of Congress who held influential positions in the passage of the environmental amendment. Additionally, those congressional members receiving more campaign funds from the chemical and petroleum industry were more likely to vote against the amendment.

While some papers examine corporate strategy to avoid additional disclosure requirements, other papers examine corporate strategy to influence particular regulations (e.g., Cho et al. 2018), strategic responses after regulation (e.g., Patten 1998; Hughes 2000), the lack of disclosure pertaining to newly passed regulation (e.g., Buhr and Freedman 2001), the inconsistency in different types of disclosures (e.g., Freedman and Stagliano 2008), and the levels of disclosure around regulation (e.g., Alciatore et al. 2004; Patten and Trompeter 2003).

Each regulation passed results in newly mandated disclosure requirements. As such, another area of EAR within NA focuses on the determinates and/or consequences of mandated ED. Patten and Freedman (2008) evaluated and discussed the Government Accountability Office (GAO) report about the state of affairs regarding corporate ED. The authors suggested that the GAO did not make good use of their thorough data collection and that, in fact, the level and quality of corporate ED at the time were inadequate. Furthermore, they felt the GAO report should have examined the status of ED with a broader group of stakeholders in mind, beyond that of just investors. Finally, they concluded the Securities and Exchange Commission's (SEC)

monitoring and enforcement capabilities were lacking and that many firms were not complying with ED requirements. Peters and Romi (2013) supported these findings by examining the frequency and consequences of reporting mandated EPA environmental sanctions. The authors found a 72% non-compliance rate with the mandatory disclosures due to inadequate SEC monitoring and enforcement, in combination with a significant negative stock market reaction for firms choosing to comply and disclose required sanction information.

Additional papers in the mandatory environmental accounting literature stream examine the influence of mandatory disclosures on subsequent performance (e.g., Mobus 2005), the differences in reporting behavior in reaction to regulations between different countries (e.g., Chelli et al. 2018; Buhr and Freedman 2001), and reporting changes after the initial passage of an environmental regulation (e.g., Sankara et al. 2019).

While most NA disclosure papers focus on the relationship between EP and ED (e.g., Clarkson et al. 2008; Al-Tuwaijri et al. 2004; Wiseman 1982; Hughes et al. 2001), disclosures serve to influence other factors as well. Two unique areas include assurance, where the level of disclosure and industry participation influence the choice to obtain report assurance (e.g., Cho et al. 2014), and religion, where the religious and social norms of a community influence the types of ED (e.g., Griffin and Sun 2018). Despite all this research, there remain concerns about ED measurement. Some suggest that, in addition to quantity, the type and nature of ED should be considered as these characteristics would likely influence results (e.g., Cho et al. 2010; Plumlee et al. 2015).

Although disclosure continues to be an important topic, research also focuses on broader topics such as the economic result of environmental initiatives, the influence of regulation on environmental actions, etc. With respect to economic consequences, Johnston (2012) examined the influence of differing R&D components on future earnings volatility and found that environmental R&D is considered less risky than other R&D projects. In another study, Bouslah et al. (2010) analyzed the relationship between the adoption of forest environmental certification and the financial performance of firms. Relying on a sample of 160 third-party certifications in Canada and the USA made by 42 public firms, they found that certification did not have a short-term impact on financial performance but did have a long-term negative impact on financial performance. This negative result was attributed solely to industry-led certification, as opposed to certification by non-governmental organizations (NGOs). Other studies examining effects of EP include the positive influence of eco-efficiency on firm-specific financial performance (e.g., Henri and Journeault 2010; Burnett and Hansen 2008; Sinkin et al. 2008; Clarkson et al. 2011), the trade-off between the low cost of hydropower and the high cost to human rights and biodiversity (Schneider and Andraeus 2018), the charity donation behavior of firms with worse EP (e.g., Chen et al. 2008), the decreasing risk associated with firms with better EP (e.g., Cai et al. 2016), and the influence of managerial ability on improving EP (e.g., Sun 2017). Prior literature also examines the response of investors to EP based on issues such as the level of pollution (e.g., Cormier and Magnan 1997) and third-party performance scores (e.g., Cai and He 2014), as well as the impact of EP on executive compensation (e.g., Campbell et al. 2007).

NA EA literature extensively examines the relationship between regulation and environmental activities. For example, Johnston (2005) examines the influence of regulatory and voluntary environmental capital expenditures on future abnormal earnings, stock prices, and stock returns. While regulatory capital expenditures were negatively associated with financial performance (i.e., future abnormal earnings and negative market price), the voluntary capital expenditures were positively associated with future abnormal earnings, indicating different valuations for the regulatory and voluntary nature of environmental capital expenditures.



In a Canadian setting, Schneider et al. (2017) focused on the reporting diversity of environmental liabilities in response to changing regulation. When Canada changed to International Financial Reporting Standards (IFRS), they required a lower discount rate, rendering higher liabilities. Examining a sample of publicly traded ESI firms, which should have higher liabilities, the authors found a strategic choice by management to hide larger environmental liabilities, where approximately one-third of firms chose a higher discount rate. Other papers focusing on regulation include examinations of regulatory compliance (e.g., Mishra et al. 1997), firm-specific strategy in response to regulation (e.g., Johnston and Rock 2005), the financial consequences of regulation (e.g., Freedman and Jaggi 1992), and management's understanding and efficient use of EA metrics (e.g., Joshi et al. 2001).

## Conclusion

Throughout the literature, a common set of limitations is reported. First, there is often a lack of generalizability. Since many of these studies focus on one industry or a similar set of industries, it is difficult to argue that the results will hold true for other industries. Often, this focus also results in a limited sample size. Furthermore, much of the NA literature relies on archival-based research from large databases of public companies, with fewer focused on in-depth case studies, interviews, or smaller private firms, which may garner additional EA insights. Additionally, the research stream to date has relied almost exclusively on legitimacy theory; we encourage expansion into other theories, including those from other disciplines, not yet introduced to the accounting field. Finally, NA research concentrates on Canada and the USA, often excluding Mexico's large and important economy. We argue that there is much to learn from the areas of Mexico, Latin America, the Caribbean islands, and Greenland. Additional topics to consider for NA research might be the influence of drastic administrative shifts, the new and emerging cannabis industry, growing income inequality, and recent extreme weather events. With so many possibilities, it is our hope that current and future researchers will expand their horizons and explore new and exciting areas of EA.

## Notes

- 1 See Romi et al. (2018), Hiller (2012), André (2012), and B-Lab (2019).
- 2 The regulatory context is always in a state of flux, particularly with changes in administration.

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