Assessing the Efficacy of the Fisheries Act 36(3) in Alberta

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An Honours Project submitted in partial fulfilment

of the Degree requirements for the degree of

Bachelor of Arts—Criminal Justice (Honours)

Mount Royal University

April 2025

MOUNT ROYAL UNIVERSITY

CALGARY, ALBERTA., CANADA

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Land Acknowledgement

Mount Royal University resides on the traditional territory of the Niitspi people and the Treaty 7 people; these include the Piikani, the Kainai, the Siksika, the Tsuut'ina, and the Iyarhe Nakoda. The importance of environmental stewardship is deeply rooted in Indigenous knowledge systems, which have sustained the land for millennia. As this thesis examines the efficacy of environmental policy, I recognize and acknowledge the cultural connection and dependence on the land of Indigenous people. This research is done with respect for the Indigenous relationship with the land and waters of this region.

Abstract

This research provides an analysis that evaluates the efficacy of the Fisheries Act subsection 36(3) in preventing pollution in fish-bearing waters. The primary cause of pollution under this act, which has been identified using thematic analysis, is inadequate infrastructure and maintenance by companies that handle deleterious substances. Theoretical frameworks, such as Deterrence Theory and Shareholder Wealth Maximization Theory, are applied to create an understanding of why there continue to be violations of the Act. The aim of the act is to protect fish and their habitats, but findings suggest that the act is more effective in addressing existing environmental damage. While it is useful that fines are allocated to the Environmental Damages Fund, they are not large enough to deter companies from neglecting proper construction and maintenance of their infrastructure. Our analysis argues that fines should exceed the costs of proper infrastructure and maintenance in order to encourage construction of these facilities.

Personal Acknowledgements

I would like to express my thanks to Dr. Harpreet Aulakh, who has helped guide me through the process of this research. Your knowledge, support, and advice have been invaluable to me throughout these months. I am truly grateful for the opportunity that you have given me to do this project.

Assessing the Efficacy of the Fisheries Act 36(3) in Alberta

Extraction industries are vital to Alberta's economy; oil and gas alone reportedly generated 3.18 billion CAD from oil and oil sands in 2018 (Ali, 2020). This industry and other extraction industries contribute to a higher quality of life as they boost economic growth, heat homes, and allow for reliable transportation. However, extraction industries come with potential drawbacks as well. Spills, leaks, and overflows that lead into waterways occur frequently; this can be harmful to wildlife and people that rely on these bodies of water. This study analyzed the effectiveness of regulations that hold companies accountable for such overflows. It is important to understand the effectiveness of these regulations; if a regulation is too lenient, companies may be willing to cut corners to save money, leading to improper construction of storage infrastructure and unsafe waste management practices.

The Fisheries Act 36(3), which is the main prevention provision for aquatic life and life that relies on water bodies (Fisheries Act Registry, 2024a), “prohibits the deposit of deleterious substances into water frequented by fish, or to any place, under any conditions, where they may enter waters frequented by fish” (Fisheries Act Registry, 2024a). Further investigation on the regulations effectiveness was vital, as demonstrated by the sheer volume of cases that have violated this act in recent history. Between the years of 2012 and 2022, there have been 18 cases in Alberta alone that have violated this regulation (Environmental Offender Registries, 2024). By investigating these cases through the lens of the Fisheries Act 36(3), this research paper highlights potential reasons for this apparent ongoing issue of improper waste management. With little research done on this topic, we analyze common themes and conclusions between cases in an effort to understand the effectiveness of the Fisheries Act 36(3). The purpose of this research

was to explore why harmful pollution practices ensue in spite of the regulations and laws in place to deter them; consequently, determining the efficacy of the Fisheries Act 36(3). This research provides valuable insight into how enforcement mechanisms align with ecological preservation goals and industry practices. The findings could help policymakers create a more balanced framework that fulfills its purpose of protecting aquatic ecosystems.

The Fisheries Act's overall purpose is to conserve and protect fish habitats, ensure sustainable fisheries, and regulate fishing practices (Georgakopoulos et al., 2019). Since the creation of the act in 1868, there have been a few significant amendments to the act. In 2012 it was amended so that it would only apply to fish and fish habitats that are related to commercial, recreational, or aboriginal fisheries (Georgakopoulos et al., 2019). In 2019, the Fisheries Act was amended again to provide provisions that would guide ministerial decision-making as well as increase prohibitions on activities related to fish and fish habitat (Georgakopoulos et al., 2019). These amendments were put into effect to better protect fish and fish habitat. The 2012 amendment led to the creation of subsection 36(3), which evidently has the purpose of protecting fish and fish habitat, as its stated goal is “Prohibition against depositing or permitting the deposit of deleterious substances into water frequented by fish or in a place where the deleterious substance may enter water frequented by fish.” (Georgakopoulos et al., 2019, p. 5). In the 2019 amendment, the prohibition was not altered, which demonstrates that the government felt section 36(3) was effective in its intended protective purpose.

Research Questions, Objectives, and Aims

This research had the objective of assessing the efficacy of the Fisheries Act (36)(3) on regulating and preventing hazardous waste seepage and dumping into waters frequented by fish

in Alberta. We aimed to answer the question, Is the Fisheries Act 36(3) effective in its purpose of protecting the environment and those who use it? We achieved and answered this by identifying patterns in cases that consistently cite and violate the Fisheries Act 36(3). In these cases, we analyzed the impact that they have had on the communities around them, as well as the environment in which they occurred. We recognize these damages and sought to see if the regulation is effective in its means of enforcement to protect the environment and those who use it, which is the said purpose of the regulation according to the Fisheries Act Registry (2024a). We sought to connect topics such as shareholder wealth maximization theory and deterrence theory to better understand why section 36(3) of the Fisheries Act is continuously being broken. We aimed to uncover if the Act is effective in its purpose of protecting and aiding the environment from preventable pollution.

Research Design

The research design in the study is a policy analysis with a case study design. This was carried out by utilising and implementing a qualitative literature review that aimed to combine case studies of convicted environmental offenders with theoretical frameworks in order to evaluate and explain the efficacy of the Fisheries Act 36(3) and how the efficacy of this act impacts the environment and communities. Using theory and case studies to uncover the efficacy of the Act is suitable, as it demonstrates how the regulation is utilized in practice and allows for theoretical inferences to be drawn on why this Act is violated so often. By understanding why it is violated often and how it's applied, we were able to come to conclusions about the effectiveness of the Act in serving its purpose.

Methodology

Data Collection Methods and Sources

Data for this research was gathered by reviewing relevant and recent court cases that have specifically cited section 36(3) of the Fisheries Act. This data was easily obtained through the Environmental Offenders Registry list using the Government of Canada's website (2024). Purposive sampling was used to select 6 cases that are all from 2012 onward and all of which occurred in Alberta. Selection of cases from 2012 and onward was done to ensure that our results are relevant to how the act is currently being interpreted. The “Alberta focus” allowed for conclusions to be drawn on the specific province, which acts as the nation's energy capital (Energy Fact Book, 2024). The reasoning behind using cases no older than 12 years is that cases are still relevant and not outdated. For example, sizes of fines that might be smaller due to inflation in older cases. Additionally, some of the landmark cases, which demonstrate the efficacy of the Fisheries Act 36(3), occur in 2012, which highlights a good year to create the cutoff. Very recent cases were not used, as full details were limited around them. Furthermore, using cases from 2012 allows for analysis of cases since the 2012 amendment, which greatly altered how the Fisheries Act was and is applied (Georgakopoulos et al., 2019). Once the parameters were defined (Alberta-based, citing section 36(3), and dated from 2012 onward), 19 cases were identified on the Environmental Offenders Registry. All cases were reviewed, and a purposive sampling approach was used to select six for detailed analysis. These six cases were chosen because they provided the most comprehensive data related to the application of section 36(3) of the Fisheries Act and illustrated common patterns regarding infrastructure issues and the allocation of fines. This approach allowed for an in-depth exploration of the recurring themes

central to this study, while also accommodating the practical constraints of time and scope of study.

Search terms were used to find the relevant theoretical explanations as well as additional information about environmental and community damage caused by hazardous waste. These search terms included “environmental offender,” “pollution,” “Fisheries Act 36(3),” “shareholder wealth maximization theory,” “deterrence theory,” “community impact,” and “community pollution.” The key terms were put into Google Scholar. Additionally, search results were screened for relevance by reviewing abstracts; if abstracts aligned with the research's objective, they would then be read and analyzed.

Data Analysis

First, all 6 selected cases were reviewed for content. Next, thematic analysis was used across different cases to determine common themes that are found in violating section 36(3) of the Fisheries Act. By digesting multiple cases, we were able to determine themes that arose between the causes of violating the act (spills, seepage, dumping). Furthermore, analyzing court remedies produced themes related to the effectiveness of the act in deterring corporations from violating the act. Additionally, the thematic analysis of cases and surrounding literature allowed us to contextualize how different factors, such as stakeholder interests and environmental policy, influence the effectiveness of Section 36(3). It was our goal to discover common themes between cases and seek to better understand these themes by reviewing possible theories that explain why this statute continues to be violated and if there is a possible change that could be made to policy to better protect our water bodies.

Review of violations of the Fisheries Act subsection 36(3)

Upon reviewing recent cases from the Environmental Offenders Registry list (2024a), the most common trend between the cases is improper storage construction or maintenance that leads to pollution of the surrounding area. Six of these cases note improper infrastructure as the main cause for the illegal pollution; these cases include the Drever Agencies Inc. case (2017), Panther Industries Inc. (2012), Prairie Mines and Royalty ULC (2013), Alberta Capital Wastewater Commission (2012), Shooter Hills Livestock Inc. (2014), and Ensign Well Servicing Inc. (2013). It is important to note that these cases are not misrepresentations of the data and that 77.7% of the cases that cite section 36(3) of the Fisheries Act in Alberta since 2012 have noted improper infrastructure as the cause for overflow and spills (Environmental Offender Registries List, 2024a).

Drever Agencies Inc

The first case that was analyzed was the Drever Agencies Inc. incident. Drever Agencies Inc. (DAI) operated as a bulk sale outlet for various selections of fuel in the Wetaskiwin area of Alberta (Environmental Offender Registries List, 2024b). On the day of August 20th, 2017, DAI was informed that one of their above-ground storage tanks had overflowed, resulting in approximately 1,800 litres of Petrosol flowing into nearby storm drains and entering an unnamed creek (Environmental Offender Registries List, 2024b). Petrosol is a toxic, multi-use, oil-based solvent; it's used primarily for thinning paints and cleaning automotive components. The unnamed creek that the Petrosol had polluted led to a series of other creeks, including Pipestone Creek, which is described as being a hub for sportfishing by members of the nearby communities (Environmental Offender Registries List, 2024b).

This was concerning, as the sample taken from the unknown creek was discovered to be lethal to fish, confirming that the 458 dead fish found downstream of the site were killed by the spill (Environmental Offender Registries List, 2024b). The fish infected and/or killed by the spill included stickleback and fathead minnow, which are the primary food sources for Northern Pike. The danger in this arises from the fact that northern pike are sought after by fishermen. If these northern pike are consuming infected minnows, then the fishermen who catch the northern pike are at risk for poisoning due to the petrosol. The damage to the environment was caused by the deposit of a deleterious substance into water frequented by fish, and so DAI was found guilty of violating section 36(3) of the Fisheries Act. DAI was subsequently fined a total amount of $1,250,000, which was directly put into the Environmental Damages Fund (Environmental Offender Registries List, 2024b).

The most notable thing about this case upon analysis is that DAI did not have a secondary containment unit around the above-ground storage tanks (Environmental Offender Registries List, 2024b); secondary containment units around the storage tanks could have contained all or most of the Petrosol that had flowed from the primary above-ground storage tank, ultimately stopping or reducing the flow of the Petrosol into the unnamed creek. This increased infrastructure could have prevented the death of 458 fish and decreased the risk to fishermen in the area. The lack of infrastructure, evident by the absence of secondary containment units, is a clear depiction of negligence from a company harbouring toxic materials.

Panther Industries Inc

The next case that was analyzed was the Panther Industries Inc. (PII) case of 2012. PII was an Edmonton-based miscellaneous manufacturing company at the time of the incident

(Environmental Offender Registries List, 2024c). On December 9th, 2012, a sight glass on one of the six 100,000-litre hydrochloric acid tanks had broken, resulting in two connected tanks spilling (Environmental Offender Registries List, 2024c). According to records, a total amount of 150,000 litres of hydrochloric acid was released; a secondary unit was in place in case of spills, which contained approximately 110,000 litres before overflowing; of the 40,000 litres that overflowed the secondary containment unit, 5,000 litres had flowed into a nearby creek (Environmental Offender Registries List, 2024c). The 5000 litres of the potential 40,000 had caused an area of 1.5 kilometres of the creek to have a pH level of one (Environmental Offender Registries List, 2024c); pH levels of 1 are considered extremely acidic (Campbell, 2022) and can be compared to things such as battery acid and hydrochloric acid (Water Science School, 2019). The change of pH in the creek from around 7 to 1 resulted in the eradication of all aquatic life in that 1.5-kilometre radius.

The Provincial Court of Alberta found PII guilty of violating section 36(3) of the Fisheries Act as they deposited a deleterious substance (hydrochloride) into water frequented by fish (Environmental Offender Registries List, 2024c). PII was faced with two additional charges, which first included failure to take all reasonable measures to protect the environment and public safety in the case of an environmental emergency (Canadian Environmental Protection Act, Subsection 201(1), 1999); and second included the lack of an environmental emergency plan, violating section 4(3) of the Canadian Environmental Protection Act (1999). PII was fined $375,000 for the charges (Environmental Offender Registries List, 2024c).

In this case it was notable that a secondary containment unit was present and functional; however, the case raises a few questions, such as why was the sight glass not maintained better? And more importantly, why does the secondary containment unit only hold 110,000 litres when

there is a potential risk for a release of 600,000 litres? This leads to the inference that the infrastructure in place is inadequate to handle the load of dangerous materials that is being used by the company.

Prairie Mines and Royalty ULC

The next case that was reviewed was the Prairie Mines and Royalty ULC (PMR) incident that took place at the Obed Mountain mine. On October 31, 2013, the Obed open-pit coal mine suffered a failure in one of their dikes. This failure led to the spill of 670 million litres of water into the nearby Apetowun Creek, and with it, 90,000 tons of toxic sediment (Environmental Offenders Registry, 2018). Apetowun Creek flows into various creeks, and within 28 km, it reaches the Athabasca River. Apetowun Creek was a spawning ground for rainbow trout, whitefish, burbot, and other fish at the time of the incident (Environmental Offenders Registry, 2018). Athabasca rainbow trout were listed as endangered at the time of the incident, and since the Apetowun Creek spawned rainbow trout that would end up in the Athabasca River, PMR was not only found guilty of violating the Fisheries Act subsection 36(3), but they were also in violation of subsection 35(1) of the Fisheries Act (Fisheries Act Registry, 2024b), which states that “no person shall carry on any work, undertaking, or activity that results in the harmful alteration, disruption, or destruction of fish habitat.” PMR violated this as the failure in their dike system directly disrupted a known rainbow trout spawning area (Apetowun Creek). PMR was fined $3,500,000 for violating sections 36(3) and 35(1) of the Fisheries Act, along with $615,175 to Fisheries and Oceans Canada (DFO) in order to fund the costs of rehabilitation of Apetowun Creek (Environmental Offenders Registry, 2018).

The primary cause of this incident was the failure in PMR’s dike containment unit. A dike is a constructed embankment that is made to prevent the overflow of waters into the area on

the other side of the dike (FloodWise, 2025). In order for a dike to be effective over time, it must be regularly maintained, inspected, and upgraded (FloodWise, 2025). Although the Environmental Offenders Registry list (2018) does not state the cause of the failure. It can be inferred that a failure resulting in the release of 670 million litres of water is most likely due to inadequate maintenance or construction.

Alberta Capital Wastewater Commission

The next case takes place in Gibbons, Alberta. Environment Canada had discovered that a pumping station in Gibbons had failed on August 10th, 2012 (Environmental Offenders Registry, 2018). This failure led to the release of raw sewage into the nearby fish-bearing Sturgeon River. Samples of the raw sewage flowing into the river were taken and were found to be deleterious to fish (Environmental Offenders Registry, 2018). Upon further investigation, it was discovered that the Alberta Capital Region Wastewater Commission did not take proper procedures to prevent the release of the raw sewage; there were approximately 500,000 litres of raw sewage that were released over a 12-hour time frame in this incident (Environmental Offenders Registry, 2018).

Around two years later, on July 10th, 2014, the Alberta Capital Region Wastewater Commission pleaded guilty to violating the Fisheries Act by acknowledging that their actions led to the release of deleterious sewage into the fish-bearing Sturgeon River (Environmental Offenders Registry, 2018). A monetary fine of $200,000 was set, and notably, 90% of the fine would be directly diverted into the Government of Canada's Environmental Damages Fund, which is used to promote and protect fish and fish habitats in the affected area (Environmental Offenders Registry, 2018).

Shooters Hill Livestock Inc

Shooters Hill Livestock Inc. (SHL) was a farm near Calmar, Alberta, at the time of the incident (Environmental Offenders Registry, 2025a). The incident started on May 10th, 2014, when officers discovered that hog manure was being released into the nearby Conjuring Creek. Upon investigation, it was discovered that a broken culvert had been releasing a black liquid into the creek (Environmental Offenders Registry, 2025a). Reportedly, the black liquid from the culvert had turned the creek black, as well as created a strong smell of manure. This was alarming at the time, as manure contains ammonia, which elevates pH to a level that is often deleterious to fish (Environmental Offenders Registry, 2025a); samples were then taken to determine the toxicity of the black liquid against rainbow trout. Later during the investigation, dead fish were seen floating downstream of the creek; samples came back and showed that even in the area with the lowest concentration of the manure, it was deemed deleterious to fish (Environmental Offenders Registry, 2025a).

Damage to the culvert was traced back to a specific moment: SHL was transferring manure from one lagoon into another for holding purposes; during the transfer process, a culvert in the new lagoon was damaged. This was not caught at the time of the transfer, as the transfer was left unsupervised (Environmental Offenders Registry, 2025a). It was the damage of this culvert that caused the release of hog manure into nearby creeks, including Winding Creek and Conjuring Creek (Environmental Offenders Registry, 2025a). Reports by experts noted that the release of the deleterious manure was during fish spawning season, which would have impacted the fish, fry, and eggs, causing a reduction of fish population in the area in 2014 (Environmental Offenders Registry, 2025a).

The next year, on November 25th, 2015, in the Provincial Court of Alberta, SHI pleaded guilty to the deposit of a deleterious substance, violating section 36(3) of the Fisheries Act (Environmental Offenders Registry, 2025a). SHI was given a monetary fine of $50,000, which would be delivered in whole to Canada's Environmental Damages Fund with the intention of conservation of fish habitat (Environmental Offenders Registry, 2025a). The report of this case mentioned that the court took into account the serious damage to fish habitat during the spawning period, as well as the fact that the release of the deleterious substance was unintentional, and SHL cooperated fully in the investigation (Environmental Offenders Registry, 2025a).

Ensign Well Servicing Inc

The final case that was reviewed was the Ensign Well Servicing Inc. (EWS) case. EWS at the time of the incident was a company that stored inactive oilfield equipment; the company operated out of Nisku, Alberta, near Blackmud Creek (Environmental Offenders Registry, 2025b). On the day of June 18th, 2013, a 1400-litre above-ground storage tank containing between 400 and 700 litres of diesel had experienced failure and spilled almost all of the diesel (300-600 litres); this spill was caused by a broken fuel level indicator on the storage tank (Environmental Offenders Registry, 2025b). An unknown amount of diesel flowed from the tank towards Blackmud Creek. Reports state that the above-ground tank belonging to EWS had been sitting unused for approximately 6 years while also being 25 years old (Environmental Offenders Registry, 2025b). This violates the National Fire Code of Canada, which declares that “when an aboveground storage tank will be out of service or unsupervised for a period exceeding 180 days, all liquid and vapours shall be removed from the storage tank” (Environmental Offenders

Registry, 2025b). Non-compliance with this standard demonstrates negligence in properly maintaining and upgrading infrastructure, which protects the environment and those who use it.

The non-compliance to follow proper procedure resulted in the release of deleterious material to flow from the property of EWS to the fish-bearing waters of Blackmud Creek (Environmental Offenders Registry, 2025b). This violates section 36(3) of the Fisheries Act, resulting in fines of $185,000, $180,000 of which were allocated to the Government of Canada's Environmental Damages Fund (Environmental Offenders Registry, 2025b).

Emerging Themes and analysis

After reviewing and analyzing these six cases, there are a few common themes that highlight the cause of the incidents and the punishments of said incidents. Along with common themes, there are also distinct differences in how each case is handled in relation to the determination of fines. The most obvious underlying theme is that all cases lead to the release of toxic substances into fish-bearing waters, which negatively impacts aquatic ecosystems; we can attribute this theme as our baseline requirement for cases that involve the application of subsection 36(3) of the Fisheries Act, as the Act seeks to protect fish and fish habitat from deleterious substances (Fisheries Act Registry, 2024a).

Improper infrastructure and maintenance

In the cases of Drever Agencies Inc. (DAI), Ensign Well Servicing Inc. (EWS), Panther Industries Inc. (PII), and Shooters Hill Livestock Inc. (SHL), the failure of infrastructure and sufficient maintenance are the primary causes of the incidents that lead to the release of deleterious substances into fish-bearing waters. In these cases, it is clear that the companies had

failed to invest in or maintain necessary safeguards that could have reduced or prevented the severity of the environmental damage that took place.

Lack of secondary containment:

Both the DAI case and the EWS case demonstrate improper infrastructure related to secondary containment units. To begin, DAI completely lacked a fundamental safety measure as there was no secondary containment unit in place at all (Environmental Offenders Registry, 2021). This demonstrates negligence in addressing the risks associated with storing hazardous materials. Evidently, there was no forethought of an instant where primary containment fails; secondary containment systems, which act as buffers to prevent substances from spilling or leaking into the surrounding environment, are necessary safeguards that should be invested in. If DAI had even ⅛ the size of secondary containment as PII, which was a secondary containment unit holding up to 110,000 litres (Environmental Offender Registries List, 2024c), then the spill would not have reached the unnamed creek, as only 1,800 litres of Petrosol reached the creek (Environmental Offender Registries List, 2024b).

The theme of lack of secondary containment is also evident in the EWS case. One may argue that EWS should not require a secondary containment unit, as they operated strictly as a storage company for oilfield-serving equipment (Environmental Offenders Registry, 2025b). However, we argue that in any case where a company is responsible for storing large amounts of deleterious material, a secondary containment unit should be in place in case of primary containment failure. This case, along with the DAI case, demonstrates a disregard of foresight regarding the potential environmental risks posed by long-term storage of deleterious material.

Another case that relates to the theme of secondary containment units is the PII case. Unlike DAI and EWS, PII had a secondary containment unit in place, which was capable of

holding 110,000 litres (Environmental Offender Registries List, 2024c). Although this is a very sizable secondary containment unit, it is inadequate when compared to the amount of hazardous material stored by the company. Although unlikely, it is possible that 600,000 litres of hydrochloric acid could be released from the storage tanks (Environmental Offender Registries List, 2024c); a secondary containment unit that can only contain around 18% of the total volume on site is a disregard of the potential environmental risks associated with large spills and overflows. The existence of a secondary containment unit is a step in the right direction. However, a secondary containment unit should be relative in size to the amount of deleterious material on site in order to eliminate or minimize environmental impact.

Inspections and Maintenance

The next emerging subtheme that relates to improper infrastructure and maintenance is the inadequate or lack of proper inspections and maintenance. This theme relates to the PII case, the SHL case, the EWS case, and the PMR case. In most of these cases, the spill was caused by the failure of a piece of equipment; this demonstrates failure to regularly inspect equipment.

The first case that demonstrates failure to inspect and detect failing equipment is PII. In the case of PII, the sight glass, a component necessary for monitoring levels of chemicals in the tanks, had been damaged (Environmental Offender Registries List, 2024c); this is what ultimately led to the release of the hydrochloric acid. Increased inspection and maintenance on vital components such as the sight glass could have prevented the incident from occurring, demonstrating the importance of such procedures.

This theme continues in the SHL case. The broken culvert that caused the release of hog manure into Conjuring Creek (Environmental Offenders Registry, 2025a) had been shown to be constructed well; however, there was clearly a lack of inspection by the company, as the release

of the hog manure continued until officers intervened (Environmental Offenders Registry, 2025a). With proper inspection and maintenance checks, SHL should have been able to notice the damage and act accordingly. If thorough inspections had taken place, the amount of hog manure that was released into Conjuring Creek would have been reduced.

EWS also demonstrates the theme of improper inspection and maintenance. EWS ignored the procedures of the National Fire Code of Canada by leaving a partially full storage tank unsupervised for 6 years, when the limit is at most 180 days (Environmental Offenders Registry, 2025a). This is a clear case of neglecting inspections, which ended up with the pollution of fish-bearing waters. With proper inspection and maintenance, the tank would either have been emptied in accordance with the National Fire Code of Canada's guidelines or would have met the guidelines by receiving supervision through inspection every 180 days. The lack of supervision in this case demonstrates an example of a company neglecting the potential environmental risks of their actions.

The final case that matches this theme of poor maintenance is the PMR case, which is a demonstration of how bad leaks and spills can be when proper maintenance and inspections are neglected. The failure of the dike at the open-pit coal mine run by PMR allowed 670 million litres of water to be released (Environmental Offenders Registry, 2018). This catastrophic failure is almost certainly due to improper inspections or maintenance of the dike; Floodwise (2025) describes that dikes are effective at preventing floods and spills; however, without proper inspection and maintenance upgrades, they are almost certain to fail. Frequent inspections and maintenance are reported to be expensive (Floodwise, 2025); this case shows that a lack of initial and ongoing investment in long-term infrastructure can have negative impacts on the

environment, as seen in the release of 90,000 tonnes of sediment into Apetowun Creek (Environmental Offenders Registry, 2018).

Lack of emergency procedures and oversight

The next common theme found between the cases was the lack of emergency procedure protocols and oversight. This includes a noticeable absence of preventative measures, oversight, and emergency planning.

This is first evident in the SHL case, as the incident was a direct result of an unsupervised operation. The transfer process of the manure from one lagoon to another was left unmonitored. It was during this time that the culvert was damaged, leading to the release of the hog manure (Environmental Offenders Registry, 2025a). If an employee had been present during this transfer, they would have detected and resolved the issue before it led to the contamination of Conjuring Creek. This emphasizes how the company failed to anticipate and mitigate the risks that arise from their business activities.

DAI's lack of a second containment unit (Environmental Offenders Registry, 2021), as already mentioned, further exemplifies this theme, as a lack of preventative measures was in place in case of overflow or emergency release. This is a complete failure to anticipate risks from a moderately sized company that works with deleterious materials.

Lack of emergency procedures

The Alberta Capital Wastewater Commission case is one of the few cases in which emergency management and procedures were inadequate. As reported, the ACWC failed to take proper procedures to prevent the release of raw sewage (Environmental Offenders Registry, 2018); this highlights inadequate maintenance; however, there was also poor emergency

detection and planning in this case, evident by the 500,000 litres of raw sewage that lasted for 12 hours (Environmental Offenders Registry, 2018). With proper emergency procedures and detection systems, this incident would have been greatly reduced. The flow of raw sewage for 12 continuous hours without action is a demonstration of gross negligence in regard to protecting the environment in which the company operates.

PII also failed to develop a comprehensive environmental emergency plan, as mentioned before; PII's secondary containment unit was far too small compared to the amount of deleterious material they were holding (Environmental Offender Registries List, 2024c). Having an emergency containment unit that only holds 18% of the potential release volume is far from adequate as an emergency plan to minimize environmental harm. The size of the unit would be appropriate if the company only had a single above-ground storage tank; however, the use of six 100,000-litre above-ground storage tanks with only 110,000 litres of emergency overflow storage demonstrates an absence of appropriate emergency planning from the company (Environmental Offender Registries List, 2024c).

Fines and accountability

The final common theme that will be discussed between these cases is the allocation of fines and accountability of companies. This is important to understand, as the effectiveness of these penalties is vital in preventing future incidents and protecting ecosystems. The size of fines between these cases varies greatly, from $4,115,175 in the PMR case (Environmental Offenders Registry, 2018) to $50,000 in the SHL case (Environmental Offenders Registry, 2025a). The two main factors that seem to affect how fines are levied are damages caused by the incident and actions in place to mitigate/prevent incidents from occurring. In the case of PMR, obvious neglect of maintenance of the dike is evident as it suffered catastrophic failure (Environmental

Offenders Registry, 2018); additionally, the impact the incident had on the environment was immense, as 90,000 tonnes of sediment rushed into the rainbow trout spawning grounds of the Apetowun Creek (Environmental Offenders Registry, 2018). Out of all of the reviewed cases, PMR had the largest spill, most damage caused, and highest element of blameworthiness; this is manifested in the $4,115,175 fine they were ordered to pay, which is $2,865,175 more than the DAI case, which was the second highest fined case (Environmental Offender Registries List, 2024b).

Further, by comparing the DAI case and the PII case, it is noticeable that the theme of fine allocation is consistent with the previously listed factors of damage caused and blameworthiness. In the DAI case, 1,800 litres were released and flowed into a nearby creek, ultimately killing 458 fish (Environmental Offender Registries List, 2024b). In the PII case, approximately 5000 litres of hydrochloric acid had entered a nearby creek, killing everything 1.5 km downstream of the entrance point (Environmental Offender Registries List, 2024c). In these cases the damage to the environment was reasonably similar, although PII released 2.8 times the amount of toxic material. Even though PII released more toxic material and the damages between the two sites are comparable, DAI was fined $875,000 more than PII (Environmental Offender Registries List, 2024b). Using the same logic as the PMR case, it is evident that the reason PII had a lower fine is that their actions were deemed less blameworthy. The reason for this is that they attempted to anticipate and mitigate environmental damage by implementing a secondary containment unit (Environmental Offender Registries List, 2024c), whereas DAI had no such secondary unit and was found to inadequately anticipate and plan for emergency overflows.

Another case that demonstrates the theme that fines are allocated based on damages and blameworthiness is the SHL case. In the case, deleterious hog manure was released into Conjuring Creek, a fish spawning ground, resulting in a fine of $50,000 (Environmental Offenders Registry, 2025a); compared to all the other fines in the cases mentioned, this is very low; this is most likely due to the fact that SHL was reportedly extremely cooperative in the investigation and displayed that the event was completely unintentional (Environmental Offenders Registry, 2025a). None of the other five cases state this level of cooperation, which creates the inference that the court deemed SHL less morally blameworthy and deserving of a fine of lesser value. This is further perpetuated by comparing SHL and PMR; although PMR caused far greater environmental damage, the type of damage was similar in that they both impacted rainbow trout spawning areas (Environmental Offenders Registry, 2018). The inference can be made that although PMR caused damages on a far greater scale than SHL, it is the level of moral blameworthiness that skyrocketed the amount of fines they had to pay. This is also demonstrated by the fact that PMR was charged $3,500,000, most of which is to be sent to the Environmental Damages Fund (Environmental Offenders Registry, 2018), as well as an additional $615,175 to Fisheries and Oceans Canada, which is stated as being paid to rehabilitate the Apetowun Creek (Environmental Offenders Registry, 2018). What this means is that the court estimated that only $615,175 was needed to rehabilitate the creek to its prior condition and that the additional $3,500,000 was added as a fine not for damages but for moral blameworthiness of failing to anticipate and plan for the incident.

Allocation of fines

First, it is important to mention that because this is federal legislation, the law is primarily enforced by the federal government.

All of the cases demonstrate that the money obtained from fining companies who violate section 36(3) of the Fisheries Act gets used in the same way, for the same reason. Wealth obtained from fines appears to be almost completely used for the preservation, rehabilitation and education of fish and fish habitats. This is a common theme through all cases: DAI, PII, ACWC, SHL, and EWS all paid fines of $1,250,000, $375,000, $200,000, $50,000, and $185,000, respectively. Of all of these fines, most or all of the collected money was directed into the Environmental Damages Fund. Additionally, in the PMR case, $615,175 is set aside to be used to rehabilitate the damaged area, and the other $3,500,000 is put into the Environmental Damages Fund (Environmental Offenders Registry, 2018). The recurring theme of collected fines being diverted into the Environmental Damages Fund demonstrates that the government is not imposing these fines as a way to generate revenue. But instead they are collecting the fines in an attempt to correct the damage that is being done to the environment. This is shown by the allocation of almost all of the fines to the Environmental Damages Fund, which is responsible for the conservation and protection of fish and fish habitat (Environmental Offenders Registry, 2018).

Earlier it was mentioned that there are aggravating factors that increase or decrease the sizes of fines offenders must pay, such as the impact of the incident and forethought of prevention; these are inferred conclusions to better understand how fines are placed; however, a more concrete system of fine allocation does exist specifically for subsection 36(3) of the Fisheries Act. For individual offenders who are convicted of violating 36(3), the offender will pay between $15,000 and $1,000,000 as a first-time offender on indictment and $5,000 and $300,000 as a first-time offender at the summary level (Georgakopoulos et al., 2019). For a repeat individual offender on the indictable level, the fine will be between $30,000 and

$2,000,000 and/or imprisonment for a term not exceeding 3 years; on the summary level, this would be between $10,000 and $600,000 with a maximum prison sentence of 6 months for repeat offenders (Georgakopoulos et al., 2019).

Next, it is evident that corporations (excluding small-revenue corporations) are penalized more than individuals. A corporation's first-time offence against 36(3) on indictment would result in a fine between $500,000 and $6,000,000, jumping to $1,000,000–$12,000,000 for repeat offences (Georgakopoulos et al., 2019). For summary offences, corporations will pay between $100,000 and $4,000,000 for a first-time offence and $200,000 and $8,000,000 for a second offence (Georgakopoulos et al., 2019).

Finally, there is also a specific allocation of fines for small revenue corporations. For convictions on indictment, a first-time offender will pay a fine between $75,000 and $4,000,000, while a repeat offender will pay between $150,000 and $8,000,000 as a repeat offender (Georgakopoulos et al., 2019). On the summary level, a small revenue corporation will pay a fine of $25,000 to $2,000,000 for a first-time offence and between $50,000 and $4,000,000 as a repeat offender (Georgakopoulos et al., 2019).

The thematic analysis of these cases reveals that there are deep-rooted issues within corporate practices when it comes to environmental safety and protection. The common themes emphasize that to reduce the frequency and severity of violations against section 36(3) of the Fisheries Act, companies must prioritize funding in infrastructure and proper maintenance of infrastructure. Themes related to fines suggest that damages to the environment and moral blameworthiness are the driving forces behind allocating fines within the specified guidelines that were created in the 2012 amendment. A comprehensive thematic analysis demonstrates that fines are allocated by first categorizing the identity (individual, corporation, etc.) of the offender;

then specific mitigating and aggravating factors are identified to decide how much an offender should pay compared to the category they fit into. Additional findings suggest that fines are not unjustified, as they are almost entirely used to reverse the damages caused by such incidents.

Community Impact

The efficacy of the Fisheries Act subsection 36(3) is not only important for the preservation and protection of fish and fish habitat; the efficacy of the Fisheries Act is also important for protecting humans who interact with aquatic life; the endangerment of aquatic life impacts and poses a threat to certain communities that rely on fish and other species. For example, in the 2017 Drever Agencies Inc. case, the court highlights that the deleterious material of Petrosol, which is an oil-based solvent, travelled from the unnamed creek into Pipestone Creek, which is often used for fishing purposes. It is not highlighted in this case whether this caused any adverse harm to community members; however, there is evidence to suggest that this does occur in other cases.

One of the cases that demonstrates the harm of deleterious material on communities is the Fort Chipewyan case (Druks, 2013). Fort Chipewyan is an Indigenous community that is situated near an oil sands extraction site. Oil sands are viscous petroleum deposits that are collected and later refined into oil (Druks, 2013). Concerningly, the areas in Alberta with the highest amount of oil sands are the Athabasca, the Peace River, and the Cold Lake areas. According to official reports, during the first years of oil sands development in the area near Fort Chipewyan, there were increased rates of cancer, specifically lymphoma and biliary tract cancer (Druks, 2013). Residents of Fort Chipewyan reported a strange new taste in their drinking water and that the fish in their river were now displaying strange, unusual colours and tastes (Druks, 2013). Residents

of Fort Chipewyan experienced two to three times more cases of biliary tract cancer and non-Hodgkin's lymphoma when compared to populations not located near oil sands extraction areas (Druks, 2013). Similarly, in the community of about 1000 people, six of the people were diagnosed with cholangiocarcinoma, a very rare cancer in the bile duct that is usually found in 2 of every 100,000 people (Druks, 2013).

Evidence suggests that Fort Chipewyan's increased biliary tract cancer rates can be attributed to the toxins found in oil sands wastewater. According to Druks (2013), oil sands wastewater contains phthalates and naphthenic acids; a study that assessed 183 from various European countries such as Germany, Italy, France and Denmark demonstrated that a positive correlation exists between biliary tract cancer and exposure to phthalate (Druks, 2013). This review by Druks (2013) highlights the potential risks for communities and people that rely on fish and fish-inhabited waters near sites that work with deleterious substances. Whether it be for food and water for survival in cases such as Fort Chipewyan or sport fishermen such as those who were fishing in the contaminated waters of Pipestone Creek (Environmental Offender Registries List, 2024b). It is outlined that the extraction of bitumen from the oil sands (which is necessary for the mining) creates large amounts of wastewater, which contains these toxic naphthenic acids (Chen, 2009). The wastewater, which contains these contaminants, is usually kept in tailings ponds, which are often contained using dikes (Tailings Ponds 101, 2021). As demonstrated in the PMR case (Environmental Offenders Registry, 2018), these dikes can suffer major failure; however, they can also experience low levels of seepage, which may be harder to detect but still harmful for fish-bearing waters and those who use them (Floodwise, 2025). The Case of Fort Chipewyan further demonstrates the importance of keeping fish-bearing waters clean, as the case notes that water levels in the community were deemed safe to drink; however,

fish in the nearby river contained higher levels of arsenic, mercury, and toxic acids (Chen, 2009); this can be attributed to the rise of the cancers, as fish is the main source of food for many of the people in Fort Chipewyan (Chen, 2009).

Analyzing the impact of environmental violations on communities is valuable in assessing the importance of Section 36(3); if violations of the act are seen to produce harm, as demonstrated by Drugs (2013), then it is evident that there is a pressing and substantial need for the regulation to be effective. An issue with this is that we might not always know the level of harm done to people or communities until much later, when the fines have already been placed. This is because it may take a long time for the deleterious substances to impact humans. This makes it difficult to measure; because of this fact, sizes of fines cannot be decided based on specific damages to the environment and those who use it; instead, they are calculated on the potential dangers that are known to be associated with the deleterious substance.

Corresponding theory

It is impossible to know for sure why companies such as Drever Agencies Inc. (2017), Panther Industries Inc. (2012), Prairie Mines and Royalty ULC (2013), Alberta Capital Wastewater Commission (2012), Shooter Hills Livestock Inc. (2014), and Ensign Well Servicing Inc. (2013) partake in poor infrastructure and maintenance practices. However, we have attempted to make sense of this issue by applying existing theories to better understand why this happens and continues to happen. We understand that there are instances of honest accidents, as demonstrated in the SHL case (Environmental Offenders Registry, 2025a). However, many of these other cases demonstrate an almost purposeful disregard for the safety of the environment. The two backed theories are shareholder wealth maximization theory and deterrence theory.

Shareholder Wealth Maximization Theory can be used to possibly explain why corporations frequently are violating this act continuously. Shareholder wealth maximization theory states that directors and officers in a corporation have the single goal of maximizing shareholder wealth by increasing the value of their stock (Edwards, 2021). Corporations are able to increase profit and minimize costs by creating cheaper infrastructure; this may be part of the reason that extraction companies in Alberta have their systems fail or have them be far insufficient, as seen in the cases above. This theory outlines that it's not their fault for cutting corners in infrastructure, as it saves them money and thus increases shareholder value, which is the primary purpose and goal (Edwards, 2021). Shareholder Wealth Maximization Theory uses a similar logic to deterrence theory, which is described as "Deterrence denotes a perceptual process by which would-be offenders calculate the costs of offending relative to the anticipated gains before deciding to offend" (Jacobs, 2010, pp. 418). Deterrence theory suggests that company owners weigh the costs and benefits of building or not building proper infrastructure and act accordingly (Jacobs, 2010).

Taken together, these theories can be used to explain why proper infrastructure and maintenance are not conducted in the cases presented. Using shareholder wealth maximization theory, it can be inferred that these companies are wanting to create as much profit for the shareholders as possible (Edwards, 2021); the companies are choosing to do this by spending less on infrastructure. It can be inferred that they do this because the cost of creating and maintaining this infrastructure is more likely to be more expensive than the fines they would receive in case of emergency leading to violation of the Fisheries Act subsection 36(3) (Poly Processing, 2017). In other words, using deterrence theory, the companies are not deterred from cutting corners and possibly violating the Fisheries Act; this is because the fines associated with

violating the Fisheries Act are often lower than the cost of creating the infrastructure. By doing a cost analysis, the companies are anticipating creating more wealth for their shareholders by saving money on infrastructure and possibly having to pay a fine later.

Some evidence for this exists; in the PII case, it is stated that there were six above-ground storage tanks, each holding an estimated 100,000 litres of hydrochloric acid (Environmental Offender Registries List, 2024c). That means in order to completely prevent any incidents related to overflow, the secondary containment unit would have to hold 600,000 litres rather than 110,000, which is what existed (Environmental Offender Registries List, 2024c). According to Poly Processing (2017), the concrete layout alone for a secondary containment unit of this size would cost $1,902,046.32; this does not factor in costs for leak detection systems, maintenance, and special coatings, which are necessary (Poly Processing, 2017). In the incident of PII, they were fined only $375,000 (Environmental Offender Registries List, 2024c), which means the company saved roughly $1,500,000 by choosing to take the potential of a fine rather than to construct proper emergency safety infrastructure. Thus, the fines allocated by the Fisheries Act section 36(3) are not a strong enough deterrent to encourage companies to build proper infrastructure (Jacobs, 2010); instead, companies will optimize their shareholders value by choosing to create cheaper infrastructure in regard to environmental safety (Edwards, 2021). This point is further demonstrated by the size of the secondary containment unit that was in place in the PII case; the size of the secondary containment unit was 110,000 litres (Environmental Offender Registries List, 2024c), which would have cost roughly $348,687 to construct (Poly Processing, 2017). The cost of this is similar to the $375,000 fine they were ordered to pay. However, the fact that they even had a secondary containment unit in place is what saved them from having to pay a much larger fine, such as the $1,250,000 fine ordered in the DAI case

(Environmental Offenders Registry, 2021), which caused a comparable amount of damage as the PII case. The construction of the secondary containment unit was enough to lower their fine in case of an emergency; however, it wasn't big enough to completely safeguard the environment. This demonstrates a cost analysis by PII in which they save the most money possible by appealing to the courts to receive lower fines, as well as creating insufficient but cheaper infrastructure. This demonstrates that their actions follow the principles of shareholder wealth maximization theory by finding the path to creating more wealth for their shareholders over a sustainable time period.

Discussion

As demonstrated by the thematic analysis, the most common reason pollution is entered into fish-bearing waters, triggering the Fisheries Act subsection 36(3), is due to the inadequate construction and maintenance of infrastructure by companies that harbour deleterious materials. Theoretical reasoning was then applied through the shareholder wealth maximization theory and deterrence theory to better understand why this may be continuously happening. This baseline understanding of what is causing the violation of the Fisheries Act subsection 36(3), as well as the theoretical understanding of why companies are behaving this way, is necessary in assessing the efficacy of the Fisheries Act subsection 36(3) in achieving its objectives. As previously outlined, the objective of this act is to prevent the release of deleterious substances into water frequented by fish or to any place, under any conditions, where they may enter waters frequented by fish (Fisheries Act Registry, 2024a). In other words, the purpose of the Fisheries Act 36(3) is to protect fish and fish habitat from pollution.

Using the understanding of what is causing the pollution and why it's occurring, we are able to infer that the Fisheries Act 36(3) is not fully effective in protecting fish-bearing waters from pollution. The allocations of fines straight into the Environmental Damages Fund (Environmental Offenders Registry, 2018) are a good use of the fines, as they get directly used to aid damages caused by pollution, fulfilling the purpose of sustaining fish and fish habitat. However, the fines allocated by the court for this violation are not heavy enough to properly deter companies from violating this act. According to our understanding of shareholder wealth maximization theory and deterrence theory, the fines for violating the Fisheries Act subsection 36(3) should be larger than the estimated costs of building and maintaining proper infrastructure. This would encourage companies to invest in building and maintaining proper infrastructure, as it would be more economical to do so rather than pay more expensive fines.

Overall, it has been demonstrated that the size of fines for the Fisheries Act subsection 36(3) renders the act ineffective at achieving its desired goal of protecting fish-bearing waters. This act does, however, succeed in its allocation of its fines, which are used to directly protect and support ecosystems damaged by these incidents. With this in mind, the Fisheries Act subsection 36(3) can be described as legislation that is more effective in providing relief from already existing damages and ineffective in preventing these incidents from occurring in the first place (excluding real accidents).

Analyzing the cases and the literature, it can be inferred that the Fisheries Act subsection 36(3) is ineffective at protecting the environment, which is its intended purpose. This is based on the fact that fines that are allocated to corporations are ineffective as a means of deterrence. This is best explained by shareholder wealth maximization theory; according to Edwards (2021), companies have a duty to create as much wealth for their shareholders as possible. This means

that if a company is able to cut corners to save money and maximize profits, it is then optimal to do that. With this understanding of how corporations function, it can be inferred that companies are more obliged to spend less on infrastructure and environmental safety, as the fines allocated for violating acts such as 36(3) have been proven to be less than the cost for construction. This is evident in the PII (2024c) case, as the corporation was fined a total of $375,000 for violating the Fisheries Act 36(3) for allowing deleterious substances to enter bodies due to improper infrastructure. As mentioned, the estimated cost to create proper secondary containment units in this case would have been around $1.9 million. Fines of this amount demonstrate the effects of deterrence theory. According to Jacobs (2010), company owners such as those in charge of PII weigh the costs and benefits in every decision; in this instance the company had to choose between creating expensive infrastructure that would protect the environment and the company from fines associated with environmental harm or creating cheap infrastructure that would save money in construction but inevitably lead to fines. In the PII case, the company was not deterred by the size of fines and chose to instead create inadequate infrastructure. This demonstrates that the Fisheries Act 36(3) is ineffective, as it fails to properly deter corporations from violating the Fisheries Act. It can be assumed using deterrence theory (Jacobs, 2010) and shareholder wealth maximization theory (Edwards, 2021) that if fines cost more than the construction of proper infrastructure, then corporations would be encouraged and more likely to invest in the construction, as the cost of creating the infrastructure would be more economical than being faced with a potentially larger fine.

It is evident that the Fisheries Act subsection 36(3) is ineffective as a deterrent to protect the environment; however, it is successful in its allocation of fines. As mentioned, almost all fines that are collected under the Fisheries Act are diverted to the DFO and to the

Environmental Damages Fund, which are responsible for the conservation and protection of fish and fish habitat (Environmental Offenders Registry, 2018). This means that the fines of these companies are collected by federal agencies. The fines can be used to repair the direct damage to the affected area of the incident, such as the PMR case (Environmental Offenders Registry, 2018), or the federal agencies can use this to repair other more damaged areas throughout Canada, which also occurred in the PMR case, as the fine was so large there were extra funds to allocate elsewhere (Environmental Offenders Registry, 2018). Finally, it is important to mention that although these cases create the inference that the Fisheries Act 36(3) is effective, other cases might not demonstrate this. The selection of the cases that were used in this study may be problematic, as cases with the most information pertaining to infrastructure and fines were used; because these studies were purposefully selected, the results of this research may demonstrate that the issue of poor infrastructure is worse than it is. Future research using more cases may reveal different trends and themes than what were found during this study.

Conclusion

Investigating the efficacy of the Fisheries Act 36(3) is vital for maintaining and sustaining our environment, as well as protecting communities that rely on fish and other aquatic animals. By analyzing the Fisheries Act 36(3), we were able to determine whether the regulation serves its intended purpose. It was discovered that the regulation does not serve its intended purpose. Through the understanding of shareholder wealth maximization theory and deterrence theory, we were able to determine that companies need to be incentivized to participate in the construction and maintenance of proper infrastructure. This incentivization is best achieved by increasing the size of fines allocated for violating the Fisheries Act 36(3); this demonstrates that

there was a missed opportunity to make the legislation more retributive and deterrent, as the government decided not to change anything to the prohibition in the 2019 amendment. Policymakers can be better suited to modify the fines for section 36(3) of the Fisheries Act in order to fulfill its purpose of protecting the environment and communities and overall encouraging sustainability and health in Canada. Ultimately, this analysis highlights the broader need for policies that incentivize compliance and safeguard aquatic ecosystems, ensuring sustainable resource management for future generations.

Limitations and Future Research

This research is limited by making some assumptions and generalizations on why companies don't invest in better infrastructure. We use accredited theories to make the inference that companies do not build proper infrastructure and partake in inspections as they are expensive and would rather take the fines allocated by the Fisheries Act 36(3), as they may be comparatively low in contrast to the cost of building such infrastructure. The weakness in our study lies in the fact that we do not know the exact costs of creating such infrastructure, and so we cannot directly compare fines to the costs of construction and inspection. Instead, we rely on assumptions and general reports from sources that such procedures are expensive.

Future research around the costs of proper infrastructure and inspections would greatly improve the ability to measure whether the Fisheries Act subsection 36(3) is effective in its goal of protecting the environment, specifically fish and fish habitat.

Another clear limitation of this research is that Google Scholar was the only search engine used; although Google Scholar is a valuable resource, it does not contain all peer-reviewed journals and may contain inconsistent and overly broad results. Additionally, the

selection of cases may be a limitation in this study. This is because cases were picked for detail and content pertaining to the main themes; other cases may show different trends in future research.

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