

Planning and Responding to a Petrochemical Disaster in the North American Inland Seas

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ABSTRACT number

The Great Lakes represent the largest group of freshwater lakes in the world along a 1,500 mile international boundary between the United States and Canada. A source of drinking water for 35 million people and a hub of unique biodiversity, a major petrochemical spill would be devastating. With the increase in pipeline activity due to regional tar sands drilling and the navigationally challenging waterways hosting an increasing stream of petrochemical commerce, risk to the Lakes is higher than ever. Given the Lake's closed-system nature and their geographic remoteness relative to current US and Canadian government and private sector assets, the current response posture is inadequate. As the primary maritime spill response agency in the United States, the US Coast Guard retains the mantle of prevention and planning for a Great Lakes petrochemical disaster.

This paper seeks to examine the historic, current, and future states of the Great Lakes' oil-spill risk, in light of increased maritime commerce and recent spill "near-misses" regarding submerged pipelines in the Straits of Mackinac. The US Congress and the US Coast Guard have identified that the Great Lakes are not prepared for a large scale spill. Current resourcing levels and technology are insufficient, especially given the challenge of responding while the Lakes are frozen for a substantial portion of the year. With resources focused on the prospect of disaster in salt water regions, the "inland seas" of the Great Lakes receive too little attention.

After identifying the evolution of Great Lakes spill prevention and response policy, this paper will apply the Gulf of Mexico Deepwater Horizon spill as a case study into what spill response would look like on the Great Lakes. Given the authors' expansive experience as an

operator during that historic spill and current commander of one of two US oil spill response assets in the Great Lakes, this paper will also identify remaining challenges to an effective spill response policy, and conclude with recommendations on how to tackle the response issues identified. The US Congress recently established the US Coast Guard's National Center of Expertise for the Great Lakes and one of their primary tasks is to analyze the effect of a spill in freshwater and develop an appropriate response plan. By attempting to identify critical gaps, this paper seeks to advance government and industry's ability to posture the region swiftly in the face of a growing threat and assist in the Center's work.

INTRODUCTION

The Great Lakes span an international border and 10,500 miles of shoreline, and contains 21% of the Earth's fresh water.¹ The magnificent azure waters provide drinking water to 30 million people in the United States and Canada, while fueling agriculture and power generation.² However, the giant "inland seas" are in danger. With an increase in hydrocarbon drilling and transportation of fracked natural gas and oil, the risk of a major petrochemical spill looms. Given the Great Lakes importance and unique geography, an oil spill far smaller than the Exxon Valdez or Deepwater Horizon could have disastrous impacts. Responding during winter months would increase the difficulty of any response with the complication of ice coverage. Then Coast Guard Commandant, Admiral Paul Zukunft, feared in 2017 that the "Coast Guard is not *Semper Paratus* for a major pipeline oil spill in the Great Lakes."³ Responding to a question on the

¹ "Facts and Figures about the Great Lakes." Unites States Environmental Protection Agency. 4 April 2019.

² *Id.*

³ Hansen, Connor. "Environmental groups sue Coast Guard over oil spill response plan." *Up North Live*. 23 August 2018.

potential for a spill⁴, Admiral Zukunft's comments to a Congressional oversight committee struck a chord with planners, responders, environmental advocates, and residents alike. Not a year later, the foreboding testimony led to panic during a near miss anchor strike of an oil pipeline in the Straits of Mackinac.⁵ Yet, recent developments including establishing a Great Lakes Center of Excellence to investigate oil spill response readiness provide hope.⁶

This paper seeks to investigate whether the Coast Guard and the Great Lakes region have become '*Semper Paratus*'. First, it is necessary to review the current state of preparedness. Next, analyzing the 2018 near miss in the Straits of Mackinac, it is possible to identify planning and response gaps. Then, by applying relevant lessons learned from the *Deepwater Horizon* experience, the author seeks to identify where improvements maybe made, including giving new attention to responding in the "hard water," ice covered environment.

THE CURRENT STATE OF AFFAIRS: IDENTIFYING GAPS

After the 2018 near miss in the Straits of Mackinac, it was evident to the USCG and other contingency planning partners that the readiness of the Great Lakes response community for a large spill was not satisfactory. Thirty million people depend on the Great Lakes for their livelihood.⁷ The Coast Guard needs to be engaged in an evaluation of the response posture at the time of the 2018 incident taking in account previous incidents and near misses to identify preparedness gaps consistent with the unique geography and response challenges of the Great lakes.

⁴ The Straits of Mackinac are a freshwater strait connecting lakes Michigan and Huron in between the lower and upper peninsulas of the state of Michigan.

⁵ LeBlanc, Beth. "Mystery shrouds Great Lakes anchor strikes amid Line 5 worries." *The Detroit News*. 9 July 2019.

⁶ Gross, Bob. "Bill establishes Coast Guard oil spill center." *The Times Herald*. 5 Dec 2018.

⁷ "Facts and Figures about the Great Lakes." Unites States Environmental Protection Agency. 4 April 2019.

Response Posture

On April 1, 2018, a tug and barge operator dropped and dragged a 12,000 pound anchor striking the “Line 5” pipeline between the upper and lower peninsulas of Michigan. The incident caused \$100 million in damage to the pipeline and a marginal petroleum product spill, it could have been much worse. Although only 800 gallons of mineral oil leached into the Great Lakes, the incident emphasized where responders stood.

The public was outraged. Parties on all sides of the political and socioeconomic spectrum called for the pipeline to be decommissioned. Ice contributed to the incident, and it is not uncommon for heavy ice to cover the Straits of Mackinaw well into April.⁸ Responders and local officials breathed a collective sigh of relief that a larger spill did not materialize, but did then begin to focus more closely on what would happen if a larger spill occurred. Given the increased transport of refined and unrefined petroleum products through the area, combined with more drilling operations in the Great Lakes generally over the past 20 years, they had reason for concern.⁹

The current response scheme dictates that all response to oil or chemical spills be coordinated by the National Response System.¹⁰ While the United States Environmental Protection Agency (EPA) governs the system, the US Coast Guard is responsible for maritime response on US navigable waters, including the Great Lakes.^{11 12} Over the years, the Coast

⁸ “Historical Great Lakes Ice Cover.” *National Oceanic and Atmospheric Administration: Great Lakes Environmental Research Laboratory*. <https://www.glerl.noaa.gov/data/ice/#historical>.

⁹ Beckman, Jeremy. “Intensive drilling sustains Lake Erie gas production.” *Offshore Magazine*. 1 Jan 1999.

¹⁰ “National Response System.” *US Environmental Protection Agency*. <https://www.epa.gov/emergency-response/national-response-system>.

¹¹ David M. Bearden and Jonathan L. Ramseur, “Oil and Chemical Spills: Federal Emergency Response Framework” Congressional Research Service, August 29, 2017.

¹² Per Presidential Executive Order 12580 and 12777, oil spill response is determined by location. Inland incidents are covered by the EPA, while coastal, port, and Great Lakes waters are covered by the US Coast Guard.

Guard has responded to a number of high visibility incidents, including the *Exxon Valdez* and *Deepwater Horizon* spills. Following the *Exxon Valdez* incident in 1989, the Oil Spill Liability Trust Fund and Hazardous Substance Superfund (Trust Fund) became instruments of law.¹³ Both schemes rely on the notion that, in the case of oil spill response, the “spiller pays.”¹⁴ Yet, funding for the comprehensive prevention and preparedness is only one issue facing a Great Lakes oil spill response. Practically, deploying resources and the unique environment will be the greatest challenges to a successful response.

The modern response posture relies on Oil Spill Removal Organizations (OSROs) in the region to meet required preparedness plans and serve as assets for the Captain of the Port.¹⁵ The OSRO coverage in the Great Lakes is not as robust as in other areas of the country, with the list of available commercial resources both shorter and less capable.¹⁶ While the Coast Guard remains the primary authority, its “National Strike Teams”¹⁷ are not located in the Great Lakes, but in California, New Jersey, and Alabama.¹⁸ While some areas one may suspect, including the Gulf of Mexico, have robust available resources, the Great Lakes are home to only two organic Coast Guard units capable of responding in the Great Lakes environment. These vessels, cutters *Hollyhock (WLB 214)* and *Alder (WLB 216)*, homeported in Port Huron, Michigan and Duluth, Minnesota, respectively, have minimal skimming capability.¹⁹

¹³ “Superfund.” *US Environmental Protection Agency*. www.epa.gov/superfund.

¹⁴ *Id.*

¹⁵ “OSRO Mechanical Classifications by COTP Zones.” *United States Coast Guard Response Resource Inventory System*. <https://cgri.uscg.mil/UserReports/WebClassificationReport.aspx>.

¹⁶ *Id.*

¹⁷ National Strike Teams are the tactical units tasked with responding to maritime oil spills. They are considered a “Deployable Specialized Force” because of their mobility and unique capabilities. Ideally, these units could respond to any place in the country in a matter of hours after a request for support.

¹⁸ “National Strike Force.” *United States Coast Guard*. <https://www.dco.uscg.mil/Our-Organization/National-Strike-Force/>

¹⁹ “Coast Guard’s Mechanical Oil Spill Recovery Capability.” *US Coast Guard National Strike Force Coordination Center*. May 2006.

One of the largest and most capable OSROs, described here as an example, highlights how the industry has approached a Great Lakes region spill response. Recognizing that the “spiller pays,” the maritime transportation and energy industry founded the Marine Preservation Association (MPA) in 1990.²⁰ The MPA’s primary response arm is the Marine Spill Response Corporation (MSRC), designed and intended to meet legal requirements for planning and response following the *Exxon Valdez* spill and the subsequent Oil Pollution Act legislation.²¹ One of MSRC’s largest contributions to preparedness is the development and maintenance of fourteen specially designed oil spill recovery vessels (OSRVs).²² The Great Lakes are home to zero MSRC vessels.²³ There are no plans for MSRC vessels in the Great Lakes.²⁴ With the quick response capability of specialized OSRVs, and the nearest MSRC vessel located days away from the Great Lakes in New Jersey, the only quick response vessels available with a large scale organic spill recovery capability are the *Hollyhock* and *Alder*.²⁵

With facilities earning OSRO classification based on their capability, other contractors and non-governmental organizations are available to respond in the Great Lakes in the absence of MSRC assets.²⁶ A look through the current list of resources at the Captain of the Port’s disposal includes, superficially at least, a robust menu of options.²⁷ Per OSRO classifications, the list of capable responders is “rated” based on capacity, resource type, and response posture.²⁸ For

²⁰ “Marine Spill Response Corporation.” <https://www.msrc.org/>

²¹ *Id.*

²² “Locations of Responder Class Oil Spill Response Vessels (OSRV).” *MSRC*. <https://www.msrc.org/services/oil-spill-response/equipment/type/126>

²³ *Id.*

²⁴ *Id.*

²⁵ *Id.*

²⁶ “OSRO Mechanical Classifications by COTP Zones.” *United States Coast Guard Response Resource Inventory System*. <https://cgri.uscg.mil/UserReports/WebClassificationReport.aspx>.

²⁷ *Id.*

²⁸ “Guidelines for the U.S. Coast Guard Oil Spill Removal Organization Classification Program.” *US Coast Guard*. April 2013.

example, in the Captain of the Port zone for Duluth, Minnesota, the Coast Guard lists five operators both commercial and government owned capable of mobilizing a vessel (not arriving on scene) for a “worst case discharge 1” (WCD1) in two hours.²⁹ ³⁰ A WCD1 response time for these vessels to establish booms, oil recovery equipment, and recovered oil storage in the Great Lakes is 18 hours.³¹ The WCD1 classification is the highest readiness rating.³² As will be discussed below, even a WCD1 rated operation may not be capable of responding quick enough to minimize or prevent devastating impacts.

Certainly, the list of other OSRO’s available to the US Coast Guard and EPA is substantial.³³ In some parts of the country, as illustrated by the MRSC example, response resources are plentiful. Yet, as discussed below during the Line 5 incident, complications and complexities in the Great Lakes remain. In some regards the question remains one of quality, over that of quantity.

Line 5 Near Miss

Only a year prior to the Line 5 anchor strike, Enbridge (the pipeline owner) reported that the pipeline was vulnerable to just such an incident.³⁴ Given that the pipeline was not buried, the risk remains today.³⁵ The Captain of the Port has issued a marine safety zone notice declaring the

²⁹ *Id.*

³⁰ “OSRO Mechanical Classifications by COTP Zones.” *United States Coast Guard Response Resource Inventory System*. <https://cgri.uscg.mil/UserReports/WebClassificationReport.aspx>.

³¹ *Id.*

³² *Id.*

³³ “OSRO Mechanical Classifications by COTP Zones.” *United States Coast Guard Response Resource Inventory System*. <https://cgri.uscg.mil/UserReports/WebClassificationReport.aspx>.

³⁴ Ryan Schnurr, “The Oil Pipelines Putting the Great Lakes at risk.” *Belt Magazine*. July 28th, 2017.

³⁵ “Line 5 Pipeline Fact Sheet.” *Enbridge*. https://www.enbridge.com/~media/Enb/Documents/Factsheets/FS_Line_5_Straits_tunnel_project.pdf.

area around the pipeline a “no anchoring zone” to reduce the risk of a repeat incident.^{36 37}

Following the incident, environmental activists, politicians, and community leaders were up in arms. Lawsuits were filed against the pipeline’s owner and the tug and barge operator. Through these lawsuits and subsequent investigation, new issues emerged. Of these issues, preparedness, and the Great Lakes’ unique environment take center stage, highlighting that response and planning require a unique policy approach.

Judge Mark Goldsmith’s decision in the Eastern District of Michigan railed on the Line 5 pipeline’s owner, Enbridge.³⁸ In a scathing opinion following the National Wildlife Federation’s lawsuit to shut down the pipeline after the spill, Judge Goldsmith challenged Enbridge’s response plans as “faulty and inadequate,” posing a “significant threat to Lake Michigan and Lake Huron.”³⁹ Among other substantial issues, the case underscored major spill response difficulties and gaps, specifically in the Straits of Mackinac.⁴⁰

Preparedness Gaps

Of particular note in the Line 5 case, the litigants allege that Enbridge’s response plan was inadequate to United States standards, and potentially involved an approval under faulty assumptions.⁴¹ The plan in question, an approved “2017 Great Lakes Plan” included all of the Line 5 footprint in the state of Michigan.⁴² As a Canadian operator and owner, Enbridge was not

³⁶ Captain of the Port authority rests with the United States Coast Guard, often delegated to regional Sector Commanders. For this case, the relevant unit, Sector Sault Saint Marie, determined that preventing vessels from anchoring would minimize the threat to the pipeline.

³⁷ Michels, Laura. “Coast Guard names Straits of Mackinac ‘no anchor zone.’” *Michigan Radio NPR*. 15 Oct. 2018.

³⁸ “Federal Court Ruling on Weak Line 5 Great Lakes Oil Response Plans Requires Immediate Action to Decommission High Risk Pipeline.” *Oil and Water Don’t Mix*. 1 April 2019.

³⁹ *Id.*

⁴⁰ *Nat’l Wildlife Fed v. Sec of the Dept of Transportation, et al*, 374 F.Supp.3d 634 (E.D. Mich. 2019)

⁴¹ *Id.*

⁴² *Id.*

subject to exactly the same strict regime as outlined above regarding the US oil spill response posture.⁴³ The Line 5 controversy brought to light the difficulties in regulating a trans-national pipeline spanning an international maritime border on internal waters, a novel issue for planners and unique to the Great Lakes.

Recalling the OSRO regime, Goldsmith determined that “it is not enough that the United States Coast Guard qualifies than an OSRO has sufficient resources to address a WCD in a given response zone.”⁴⁴ Harkening back to the evolution of OSROs following the response gaps to the *Exxon Valdez* spills, the court criticized Enbridge’s plans, and the US approval, for failing to provide enough specificity in the instance of a major response.⁴⁵ Recognizing the specific nature of the Great Lakes, the court finds that the Line 5 incident made apparent that a larger spill would have been difficult to contain, and that the current response posture was inadequate.⁴⁶ Noting that the response plan development by operators, and review by regulators, is not simply a “checkbox requirement,” it was not enough to simply identify “two responders and a bucket” from the list of approved OSROs; instead, the requirement for robust plans, especially for a major project such as Line 5, is meant to be substantial.⁴⁷ As noted earlier, Coast Guard leadership under Admiral Zukunft largely agreed to the general notion of ill preparedness.

While the OSRO scheme managed by the Coast Guard and EPA discussed above provides robust and sufficient coverage in other vulnerable areas of the country, the Line 5 incident, and follow-on discussion, identified the major response posture gap in resources and planning for the Great Lakes.

⁴³ *Id.*

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ *Id.*

UNIQUE GREAT LAKES ENVIRONMENT RESPONSE GAPS DUE TO ICE AND GEOGRAPHY

As noted, the Great Lakes stand alone as the largest group of freshwater lakes in the world.⁴⁸ With constantly shifting currents, which can reverse direction, and a strong wind effect on surface water, “more than 700 miles of shoreline” are vulnerable to a spill in the Straits.⁴⁹ In addition to the potential for disaster in a closed freshwater system, the Lakes, especially Lakes Superior, Huron, and Michigan, are subject to substantial ice cover from December through April each year. Even as late as April 1st, the day when the Line 5 strike occurred, Lake Michigan still has an historical average of 8.9% ice coverage, with the majority in the northern sections in and around the Straits of Mackinac and Green Bay.⁵⁰ By a stroke of luck, the Line 5 strike occurred during a below average ice year.⁵¹

Although not a major factor in the 2019 decision, Enbridge has faced criticism on its ability to respond during the winter months. In company literature, responding to handling a winter oil spill during ice coverage, Enbridge claims that it would “immediately leverage the resources of the US Coast Guard.”⁵² As discussed, the Coast Guard has only two resources, the *Hollyhock* and *Alder*. Although both are icebreakers capable of responding to a marine environmental spill, the *Alder* would be unavailable, or substantially delayed, during the closed navigation season⁵³ while the Soo Locks are under maintenance. Because it is homeported in

⁴⁸ Zimmerman, Kim Ann. “Great Facts About the Five Great Lakes.” *Live Science*. 30 June 2017.

⁴⁹ *Nat'l Wildlife Fed v. Sec of the Dept of Transportation, et al*, 374 F.Supp.3d 634 (E.D. Mich. 2019)

⁵⁰ “Historical Ice Cover.” *Great Lakes Environmental Research Laboratory*.

<https://www.glerl.noaa.gov/data/ice/#historical>

⁵¹ *Id.*

⁵² “Safety in the Straits: Line 5 Winter Emergency Respond.” *Enbridge*.

https://www.enbridge.com/~media/Enb/Documents/Projects/line5/Safety_in_the_Straits_FS_Winter_Emerg_Respone.pdf

⁵³ The closed navigation season is the period in the winter where the Soo Locks, connecting Lakes Superior and Huron, and “closed” for maintenance. This period generally lasts from mid-January to mid March each year.

Duluth, even if the locks were available to transit below Lake Superior, the response time to the Straits of Mackinac would be 3-4 days. Similarly, for the *Hollyhock*, although not subject to the lock closure issue given its homeport in Port Huron, Michigan, she would not be able to respond any sooner than 48 hours. The Coast Guards most capable organic assets would not be able to meet the WCD1 response threshold, notwithstanding the practical difficulties of operating the equipment in ice cover.

In addition to ice hindering operations, Line 5's location in a vessel traffic chokepoint and proximity to land make a quick response time more critical. As discussed, as the region's primary source of freshwater, dynamic marine currents and wind would quickly expand any spill's scope. While other spills, notably *Deepwater Horizon* and *Exxon Valdez*, took up to a week before they had impacts to sensitive shorelines, it is estimated that a major spill from Line 5 in the Straits of Mackinac would travel 9 miles within hours in all directions, before responders may even begin to mobilize.⁵⁴ The Straits of Mackinac shorelines, with the waterway's narrow channels, could be covered in oil before responders arrive.

Given the fallout from the Line 5 incident and subsequent legal challenges, it is not difficult to imagine the potential risk of an environmental disaster. Shocking gaps in response capacity due to challenges with planning and the unique environment are now readily apparent. Although the outlook is dim, all parties are eager to solve the issue. The spill of national significance surrounding the *Deepwater Horizon* explosion, and follow-on analysis, may provide a framework for lessons learned and how planners and responders can apply them to address the gaps in the Great Lakes posture.

⁵⁴ Nat'l Wildlife Fed v. Sec of the Dept of Transportation, et al, 374 F.Supp.3d 634 (E.D. Mich. 2019)

APPLYING LESSONS LEARNED FROM *DEEPWATER HORIZON* TO FILL GREAT LAKES RESPONSE GAPS

Literature analyzing the *Deepwater Horizon* spill response is plentiful. This paper does not seek a re-analysis. Instead, relying on the most prominent after action reports, the authors have identified the two most relevant lessons learned from the *Deepwater Horizon* response and how they may relate to solving the response gaps indicated above. The areas of concern include pre-planning and response strategy.⁵⁵

Pre-Planning for Prevention in the Great Lakes

One of the most important lessons learned is that response plans do not exist in a vacuum. During the *Deepwater Horizon* response, unexpected political pressure from local, state and federal government all played a role in decision making. Most political representatives were unfamiliar with how the response framework functioned, and lobbied for quick changes. Confusion in planning led to confusion in response, sometimes slowing the process. Planners should expect and plan for similar types of political involvement in the event of a major Great Lakes spill, with potentially even more players given the proximity to international stakeholders.

Due to the extent and duration of the *Deepwater Horizon* response, the Coast Guard found that state and local officials remained heavily involved. Liaison officers were in short supply; many officials felt that their voices were not heard until liaison positions were established. To minimize confusion and introduce clarity into preparedness plans, officials should include liaison officer positions in the Great Lakes response plans. At a minimum, these liaison officers would seek to better inform stakeholders, while also in a position to quickly

⁵⁵ For a more comprehensive review and discussion on the *Deepwater Horizon* response, the authors recommend the US Coast Guard's Final Action Memorandum of 18 March 2011, signed by then Commandant Admiral Papp.

clarify response plans and intentions. Simply establishing liaison officer positions ahead of time, for example, in Enbridge's response plan, would have negated much of the negative fall out from the Line 5 incident. Informed liaison officers who can speak to the complexity of a large scale response would remain critical. The process of identifying these liaison positions would encourage planners to dive deeper into their plans, making them less "faulty" (using the court's words).⁵⁶

Another important outcome of studying the *Deepwater Horizon* spill was the necessity of integrating oil spill contingency plans.⁵⁷ With 4 of the 5 Great Lakes spanning a border with Canada, planning becomes an international exercise. As Judge Goldsmith noted, one of the problems with Enbridge's plan for a Line 5 spill was how to coordinate with federal and local officials.⁵⁸ More involvement by officials and industry, through joint cooperation, is key to filling this particular response gap. Not only should both the US and Canadian governments take an active role in assisting industry, industry must cooperate better amongst itself. A spill in the Great Lakes will affect all users, very quickly. Integrated contingency plans will minimize the disruption through education and awareness. With the increase in need for transporting petrochemicals from fracking operations in Canada and the United States via pipelines in the Great Lakes region, simply shutting down the pipelines, as many advocate, remains impractical.⁵⁹

Another component to pre-planning highlighted by after actions reports is practice. Plans must be exercised. As the commanding officer of the only US asset available for a winter oil spill

⁵⁶ *Nat'l Wildlife Fed v. Sec of the Dept of Transportation, et al*, 374 F.Supp.3d 634 (E.D. Mich. 2019)

⁵⁷ "Final Action Memorandum – Incident Specific Preparedness Review (ISPR) Deepwater Horizon Oil Spill." *US Coast Guard*. 18 March 2011.

⁵⁸ *Nat'l Wildlife Fed v. Sec of the Dept of Transportation, et al*, 374 F.Supp.3d 634 (E.D. Mich. 2019)

⁵⁹ *Id.*

response in the lower Great Lakes, the author cannot stress enough the importance of exercising contingency plans. The Line 5 incident highlighted the complexities of planning for a spill in the region, and how “the old way of doing business” in other regions may be insufficient. Only through a comprehensive review of plans, through practical exercise, can responders have confidence in their ability to adequately respond. Exercises cost money; responding to oil spills costs more money. Response and exercise costs pale in comparison to the lasting economic and environmental impact of a spill. In addition to identifying weaknesses in contingency plans, a public exercise brings awareness to agency preparedness. Had public exercises regularly been conducted around and near the Line 5 pipeline, the authors believe that public outcry following the 2018 incident would have been less intense.

Informed Response Strategy

Though planners may prefer to exercise contingencies without having to test them in a real-world disaster, ensuring that a robust response is feasible and timely remains a critical component in securing the Great Lakes. Being a unique international inland waterway, the Great Lakes introduce complicated response concerns that were not present during the *Deepwater Horizon* incident (as noted above), yet that disaster must inform a response plan moving forward. Applying *Deepwater Horizon* lessons learned, three of the most important areas for a sound response strategy in the Great Lakes are asset acquisition and availability, command and control, and specialized tactics.

Asset Acquisition and Availability

As discussed, the Great Lakes do not currently possess an organic ability to contain and clean up a large magnitude petrochemical spill. The Line 5 incident highlighted a lack of

resources. Comparatively, one of the high points of the *Deepwater Horizon* incident was the quick mobilization and deployment of specialized response assets from around the globe.⁶⁰ Given the Gulf of Mexico's central location and availability of shoreside support locations, including major bases in Mobile, Alabama and Pensacola, Florida, assets and people were able to flood to the scene and respond quickly.⁶¹

The Great Lakes is more remote, with not as many assets prepositioned for response. Although the US Coast Guard maintains a small footprint of shoreside and cutter based spill response equipment, it pales in comparison to what was available at the fingertips of responders in the Gulf of Mexico.⁶² Compounding the remoteness of some areas of the Great Lakes, deploying assets would involve a lengthy transit through the St. Lawrence Seaway, taking ships a week longer or more to arrive on scene than if they were prepositioned.⁶³ Further, port infrastructure is much more decentralized in the Great Lakes, which compounds the logistics issues that responders may face, especially in winter months. It is not difficult to imagine the stream of logistical challenges that would surround an oil spill recovery platform making its way through the St. Lawrence Seaway or Welland Canal after they had closed for the winter, or if each vessel required an ice breaker escort to arrive on scene.⁶⁴

In some cases during the winter months, it may in fact be impossible to sortie sufficient maritime spill response assets.⁶⁵ The current response inventory and classification does not

⁶⁰ "Final Action Memorandum – Incident Specific Preparedness Review (ISPR) Deepwater Horizon Oil Spill." *US Coast Guard*. 18 March 2011.

⁶¹ *Id.*

⁶² *Id.*

⁶³ "Great Lakes St. Lawrence Seaway System." *The St. Lawrence Seaway Management Company*. http://www.greatlakes-seaway.com/en/commercial/vessel_transit.html

⁶⁴ *Id.*

⁶⁵ *Id.*

account for an ice capable vessel requirement.⁶⁶ Although it may not be reasonable to build and preposition ice capable spill response vessels in the Great Lakes, the capability (or lack thereof) must be addressed before an active response. Responding to a Great Lakes oil spill would be challenging, especially in a winter environment. Given the high environmental, human health, and commercial stakes, the Great Lakes cannot afford to take this risk. Both the United States and Canada must work to identify suitable spill response assets that are capable of arriving on scene even when inconvenient, which requires substantial advanced logistical preparations. Although the risk of a spill may be less than in the Gulf of Mexico, the potential impact is more severe and justifies the international effort. As a start, regulators must address the need for an ice-covered environment spill response capability when classifying OSROs.⁶⁷

Command and Control

The *Deepwater Horizon* response is noted as the largest, and longest lasting Incident Command System (ICS) construct in Coast Guard history to date.^{68 69} As a unified command and control structure, ICS enabled responders across local, state, federal, and civilian groups to work towards common goals.⁷⁰ The Line 5 incident, and as Great Lakes planners anticipate, a major spill in the inland seas will also require comprehensive command and control elements. Although experts critiqued the *Deepwater Horizon* ICS during and after the response, those lessons provide insight into preparing the Great Lakes to stand up its own ICS in the case of disaster.

⁶⁶ “Guidelines for the U.S. Coast Guard Oil Spill Removal Organization Classification Program.” *US Coast Guard*. April 2013.

⁶⁷ “Guidelines for the U.S. Coast Guard Oil Spill Removal Organization Classification Program.” *US Coast Guard*. April 2013.

⁶⁸ Khatchadourian, Raffi. “The Gulf War.” *The New Yorker*. 7 March 2011.

⁶⁹ ICS is not the subject of this paper. For a more in depth discussion of ICS, its common uses, and how it operates, the Federal Emergency Management Agency has a number of comprehensive resources.

⁷⁰ *Id.*

Time is critical in responding to a Great Lakes spill. *Deepwater Horizon* provided a model for standing up an ICS structure quickly. However, “it was clear that both public and private sectors lacked sufficient numbers of trained and experienced responders for a sustained effort.”⁷¹ Reports go on to note that “just-in-time training was beneficial,” but “could not provide the same benefits as pre-incident training.”⁷² To establish an Incident Command Post quickly with the proper personnel, substantial resources for continuing training and exercises are necessary.⁷³

One major concern with the Line 5 incident was the lack of trained personnel who could quickly respond. Applying the lessons learned from *Deepwater Horizon*, it is apparent that planners and responders need to begin training qualified personnel before an incident occurs. Although it is possible to train a number of individuals as they report to the response effort, just-in-time training will have similar effectiveness challenges as during *Deepwater Horizon*.⁷⁴ Ongoing training for likely responders can be facilitated by regular live exercises. Table top exercises and advanced education can supplement live exercises. Training should take into account the unique requirements of a Great Lakes spill, to minimize disruptions in coordinating a response.

One major difference that a Great Lakes response would have from *Deepwater Horizon* regarding command and control is the introduction of international authorities. As discussed elsewhere, the international nature of the waterway will require an international response, regardless of the source. Although ICS contemplates adding international players, Canada does

⁷¹ “Final Action Memorandum – Incident Specific Preparedness Review (ISPR) Deepwater Horizon Oil Spill.” *US Coast Guard*. 18 March 2011.

⁷² *Id.*

⁷³ *Id.*

⁷⁴ *Id.*

not follow the exact same requirements as the National Incident Management System (which dictates training and use for ICS in the United States).⁷⁵ However, Canada does use ICS and trains on the same basic structure.⁷⁶ Joint training between US and Canadian partners while standardizing ICS approaches will enable a quicker and more complete response to the Great Lakes.

Specialized Tactics

The Line 5 incident underscored how responding to a spill in the Great Lakes would be tactically difficult. The Great Lakes requires the development of specialized response tactics. Given the unique nature of the Lakes, including ice cover and the interaction of petrochemicals with fresh water compared with salt water, it is no surprise that the US Coast Guard has been working to address the issue. During *Deepwater Horizon*, it became apparent that the tactics playbook was not sufficient, with many methods tried, many failing.⁷⁷ Agencies wrote reports documenting how to implement trial and error type response tactics, in the hope that something, anything, would work.⁷⁸ Video of plugs, in situ burning, dispersants and chemical response agents, and physical barriers all typified the notion that “necessity is the mother of invention.”⁷⁹

While a new center of excellence will begin investigating in earnest, one of the issues is that the technology simply may need to be developed in real time, similar to during the *Deepwater Horizon* response.⁸⁰ While some tactics can be tested and evaluated, others will not

⁷⁵ “ICS Resource Center.” *Federal Emergency Management Institute*. <https://training.fema.gov/emiweb/is/icsresource/index.htm>

⁷⁶ “Incident Command System.” *ICS Canada*. <http://www.icscanada.ca/>

⁷⁷ “Final Action Memorandum – Incident Specific Preparedness Review (ISPR) Deepwater Horizon Oil Spill.” *US Coast Guard*. 18 March 2011.

⁷⁸ *Id.*

⁷⁹ *Id.*

⁸⁰ Gross, Bob. “Bill establishes Coast Guard oil spill center.” *The Times Herald*. 5 Dec 2018.

be proven until a real response. Although specialized for the Great Lakes, those tactics relating to spill containment in ice cover conditions will translate to operations in the Arctic. It is an area for innovative thinking, and we must empower those with the knowledge to challenge and evaluate the current state of the art. Consequently, planners and operational elements must be willing to spend the time and resources on efforts that, inevitably, may fail. Oftentimes, the US Coast Guard has been pulled in many directions away from addressing the issue due to resource constraints.⁸¹ The new center of excellence must re-establish the need, and inform operational commanders on the risks involved, to ensure that real-world operational testing occurs.

Due to the Lakes' closed nature, delays in implementing new tactics will be costly. No matter which way the wind or current travel, the spill will reach land and impact millions of people. Given the compressed timeline for deploying effective tactics, it becomes ever more imperative that regular exercises and research are conducted prior to a spill. To that end, the United States and Canada must work together to identify relative response strengths and address weaknesses, so that each nation is best prepared to respond.

Developing specialized tactics will require technological innovation and substantial resources. While there is much disagreement over who should bear the burden for expending resources, that debate will be moot during an actual event. If industry, government, and non-government agencies are not prepared, a minor spill could quickly spiral into an international environmental and economic catastrophe. As *Deepwater Horizon* demonstrated, and the Line 5 incident intimated, an informed response requires informed tactics.⁸² The playbook will be difficult to write, inviting trial and error. However, combined with efforts to practice and

⁸¹ *Id.*

⁸² "Final Action Memorandum – Incident Specific Preparedness Review (ISPR) Deepwater Horizon Oil Spill." *US Coast Guard*. 18 March 2011.

exercise contingency plans, regulators must expand on current initiatives to innovate and prototype cutting edge techniques.

CONCLUSION

The Great Lakes are special. Those able to take advantage of the crystal clear waters, sandy beaches, and breathtaking scenery are concerned of an oil spill's possible impact. A major spill in any of the Great Lakes would be a catastrophe. The Line 5 near miss is a call to action. Recognizing the need to improve, all must work together towards a common goal of preventing large scale disaster.

As a silver lining, the Line 5 incident provided an opportunity, and more importantly, time, to review areas for improvement. Leveraging past experiences, planners and responders can, and must, apply lessons learned to maximize success during a Great Lakes spill. Increased oil extraction increases the risk of a spill. Effective and thorough planning are key in responding to a Great Lakes spill. With the right framework and resources in place, the future is promising. The time to execute is now. The Great Lakes remain a fragile ecosystem with millions of people depending on them for survival. We must be *Semper Paratus* to avoid letting them down while remaining Ready, Relevant, and Responsive.

REFERENCES

Beckman, Jeremy. "Intensive drilling sustains Lake Erie gas production." *Offshore Magazine*. 1 Jan 1999.

Coast Guard's Mechanical Oil Spill Recovery Capability." *US Coast Guard National Strike Force Coordination Center*. May 2006.

"Marine Spill Response Corporation." <https://www.msrmc.org/>

David M. Bearden and Jonathan L. Ramseur, "Oil and Chemical Spills: Federal Emergency Response Framework" Congressional Research Service, August 29, 2017.

Facts and Figures about the Great Lakes." United States Environmental Protection Agency. 4 April 2019.

"Federal Court Ruling on Weak Line 5 Great Lakes Oil Response Plans Requires Immediate Action to Decommission High Risk Pipeline." *Oil and Water Don't Mix*. 1 April 2019.

"Final Action Memorandum – Incident Specific Preparedness Review (ISPR) Deepwater Horizon Oil Spill." *US*

"Great Lakes St. Lawrence Seaway System." *The St. Lawrence Seaway Management Company*. http://www.greatlakes-seaway.com/en/commercial/vessel_transit.html

"Guidelines for the U.S. Coast Guard Oil Spill Removal Organization Classification Program." *US Coast Guard*. April 2013.

Hansen, Connor. "Environmental groups sue Coast Guard over oil spill response plan." *Up North Live*. 23 August 2018.

"Historical Great Lakes Ice Cover." *National Oceanic and Atmospheric Administration: Great Lakes Environmental Research Laboratory*. <https://www.glerl.noaa.gov/data/ice/#historical>.

"Historical Ice Cover." *Great Lakes Environmental Research Laboratory*. <https://www.glerl.noaa.gov/data/ice/#historical>

"ICS Resource Center." *Federal Emergency Management Institute*. <https://training.fema.gov/emiweb/is/icsresource/index.htm>

Khatchadourian, Raffi. "The Gulf War." *The New Yorker*. 7 March 2011.

LeBlanc, Beth. "Mystery shrouds Great Lakes anchor strikes amid Line 5 worries." *The Detroit News*. 9 July 2019.

"Line 5 Pipeline Fact Sheet." *Enbridge*. https://www.enbridge.com/~media/Enb/Documents/Factsheets/FS_Line_5_Straits_tunnel_project.pdf.

“Locations of Responder Class Oil Spill Response Vessels (OSRV).” *MSRC*.
<https://www.msrc.org/services/oil-spill-response/equipment/type/126>

Michels, Laura. “Coast Guard names Straits of Mackinac ‘no anchor zone.’” *Michigan Radio NPR*. 15 Oct. 2018.

“National Response System.” *US Environmental Protection Agency*.
<https://www.epa.gov/emergency-response/national-response-system>.

“National Strike Force.” *United States Coast Guard*. <https://www.dco.uscg.mil/Our-Organization/National-Strike-Force/>

Nat’l Wildlife Fed v. Sec of the Dept of Transportation, et al, 374 F.Supp.3d 634 (E.D. Mich. 2019)

“OSRO Mechanical Classifications by COTP Zones.” *United States Coast Guard Response Resource Inventory System*. <https://cgrri.uscg.mil/UserReports/WebClassificationReport.aspx>.

Pluta, Rick. “Federal report says human error led to anchor strike that dented Line 5.” *Michigan Radio NPR*. 5 June 2019.

Ryan Schnurr, “The Oil Pipelines Putting the Great Lakes at risk.” *Belt Magazine*. July 28th, 2017.

“Safety in the Straits: Line 5 Winter Emergency Respond.” *Enbridge*.
https://www.enbridge.com/~media/Enb/Documents/Projects/line5/Safety_in_the_Straits_FS_Winter_Emerg_Response.pdf

“Superfund.” *US Environmental Protection Agency*. www.epa.gov/superfund.

Zimmerman, Kim Ann. “Great Facts About the Five Great Lakes.” *Live Science*. 30 June 2017.