

## **Some Environmental Challenges and Solutions in the Nigerian ports systems: *The Publicly-Owned and Private Ports in Ontario, Canada Example***

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**Abstract:** Some Environmental Challenges and Solutions in the Nigerian ports systems with emphasis on the publicly-owned and private ports in Ontario, Canada example were reviewed to improve the Nigerian ports systems. The meanings of ports and systems and considered problems associated with the Nigerian ports system. Location, facilities and port traffic and industry, port status and Port administration in Canada Port Authorities such as Toronto, *Hamilton, Windsor, Thunder Bay Prescott, Oshawa, port Colborne, Port Stanle, Sarnia, Goderich, Owen Sound* Publicly Owned or Administered Ports and *Nanticoke, Meldrum Bay and Sault Ste Marie* Non-publicly Owned or Administered Ports were Canada examples reviewed. Malfunctioning port systems, Government's interventions and interferences, Inadequate infrastructural materials for efficient and fast services, Complicated Traffic Structure and Implementation, Misunderstanding of the usage and current functions of ports, Proliferation of Government Agencies operating at the ports, Cumbersome Documentation and Delivery Procedure, Insecurity of Cargo and Lives, Manpower and Labor Problems, NPA'S Lack of Financial Autonomy and Port Environmental Pollution Problems are some environmental challenges faced by the Nigerian Ports system; which solutions were proffered. Other problems associated with the Nigerian ports system are: Many of the shipping companies claiming to operate in its maritime industry exist only on paper "portfolio shipping companies" without owning their own ships, the traffic pattern is such that there are more imports than exports thereby causing balance of trade problems, duplicity of shipping and shipping related associations and the absence of integration of maritime transport with other means of transport thereby making door to door delivery mirage. The fact that the problems have solutions that can be applied means that they are partially solved. If there the solutions are correctly implemented, the problems will be reduced if not totally solved and the Nigerian ports, its maritime industry and the Nigerian economy would all be better for it.

**Keywords:** Environmental challenges, ports in Ontario, ports in Nigeria, sea ports, suggested solution

### **INTRODUCTION**

Ship transport is watercraft carrying people (passengers) or goods (cargo). Sea transport has been the largest carrier of freight throughout recorded history. Although the importance of sea travel for passengers has decreased due to aviation, it is effective for short trips and pleasure cruises. Transport by water is cheaper than transport by air. Ship transport can be over any distance by boat, ship, sailboat or barge, over oceans and lakes, through canals or along rivers (David *et al.*, 2004). Shipping may be for commerce, recreation or the military. Virtually any material that can be moved, can be moved by water, however water transport becomes impractical when material delivery is highly time-critical. "General cargo" is goods packaged

in boxes, cases, pallets and barrels. Containerization revolutionized ship transport in the 1960s. When a cargo is carried in more than one mode, it is intermodal or co-modal. A nation's shipping fleet (merchant navy, merchant marine, merchant fleet) consists of the ships operated by civilian crews to transport passengers or cargo. Professionals are merchant seaman, merchant sailor and merchant mariner, or simply seaman, sailor, or mariner. The terms "seaman" or "sailor" may refer to a member of a country's navy (Surumi, 2000).

A seaport has been simply described by transport experts as a geographic nodal point along a given shore line where the mode of transportation changes from land to sea or water, or vice versa and involves the provision and presence of geographical opportunities and merits, socio-economic potentialities and

endowments, state of technological advancement and political considerations (Patrick, 1999). An author also stated that a port provides for the transfer of cargo from one mode of transportation to another. A port is comprised of three elements:

- Physical structure: This includes wharves, dock, storage, space and cranes
- Port Authority: The management of business entity
- Service providers: Such as longshoreman and terminal operators.

The port authority acts as a centralized planning board, provides quasi-public goods and attempts to control competition in ways that may be destructive. A port is described by the United Nations Convention of the Law of the Sea, 1982 for the purpose of delimiting the territorial sea, as the outermost permanent harbor works which form an integral part of the harbor system and forming part of the coast but excluding offshore installations and artificial islands. A port can also be defined as an area where there are facilities for berthing and anchoring of ships and where there is the equipment for the transfer of goods from ship to shore or from ship to ship and includes the unusual places where the ships wait for their turn or are ordered or obliged to wait for their turn no matter the distance from that area. In modern parlance, a port is known as a ship/shore interface or a maritime intermodal interface (Bello, 2001).

A system has been defined as a group interrelated objects called sub-systems or sub-components interacting together to form a wholistic relationship in which each sub-system depends on the other to survive. It can be either a closed system (which goes on and on in a circle without allowing a new entrant) or open system (which is endless and embraces new additional sub-systems or alternatives). A dictionary defines system as "Orderly combination or arrangement, as in particulars, parts or elements into a whole; especially such combination according to some rational principles. Any methodic arrangement of parts includes methods, manner and modes.

Both publicly-owned and private ports in Ontario, Canada are typical of well established ports (Dele, 2000).

For each port, we will provide information on its location, facilities in the port area, major industries using the port and data on commodities handled at the port, which will also provide insight into the types of carriers servicing the port. We have attempted to provide information that is comparable from port to port but not necessarily identical, as each port is subject to sensitivities such as competitiveness with other ports.

In 1998, the federal government commenced a major restructuring of the Canadian port system. At that time it was intended to roll former Harbor Commissions and CPC ports into new organizations called Canada Port Authorities (CPA). These are the major commercial ports in Canada. At the same time a major program was instituted to devolve many of the smaller operations from federal ownership and operation to ownership and operation by others-Goderich was devolved to the Town of Goderich and federal facilities at Sault Ste Marie were sold to Purvis Marine. The Canada Port Corporation was eliminated with the larger ports becoming CPA's and the smaller ports in Ontario (Prescott and Port Colborne) being devolved to the local municipality. The facilities at Meldrum Bay and Nanticoke are privately owned and operated (Copeland, 2008).

The structure we have adopted in this study follows from the way in which port ownership and administration is structured. Most of the ports being reviewed, fall within the purview of federal statutes either the *Canada Marine Act* or the *Harbor Commission Act* while others are either devolved federal (public harbor or Canada Ports Corporation) facilities or continuing private facilities. It should be noted that, even within federal ports, many of the facilities are privately owned and operated (e.g., steel company docks in the Port of Hamilton). Accordingly, the classification of ports is somewhat less than precise (Surumi, 2000). The 14 ports in this review fall into three categories:

- *Canada Port Authorities* - Toronto, Hamilton, Windsor and Thunder Bay
- *Other Publicly Owned or Administered Ports*- Prescott, Oshawa, Port Colborne
- Port Stanley, Sarnia, Goderich, Owen Sound
- *Non-publicly Owned or Administered Ports*
- Nanticoke, Meldrum Bay and Sault Ste Marie.

A review some environmental challenges and solutions in the Nigerian ports systems with emphasis on the publicly-owned and private ports in Ontario, Canada example provides the required knowledge to improve the Nigerian ports systems

**Canada port authorities:** The Canada Marine Act defines port as follows: "port" means the navigable waters under the jurisdiction of a port authority and the real property and immovable that the port authority manages, holds or occupies as set out in the letters patent. Canada Port Authorities comprise most of the diverse port operations in Ontario. These organizations are established pursuant to the *Canada Marine Act*. Each of these ports has its own letters patent and a Board of Directors appointed as follows:

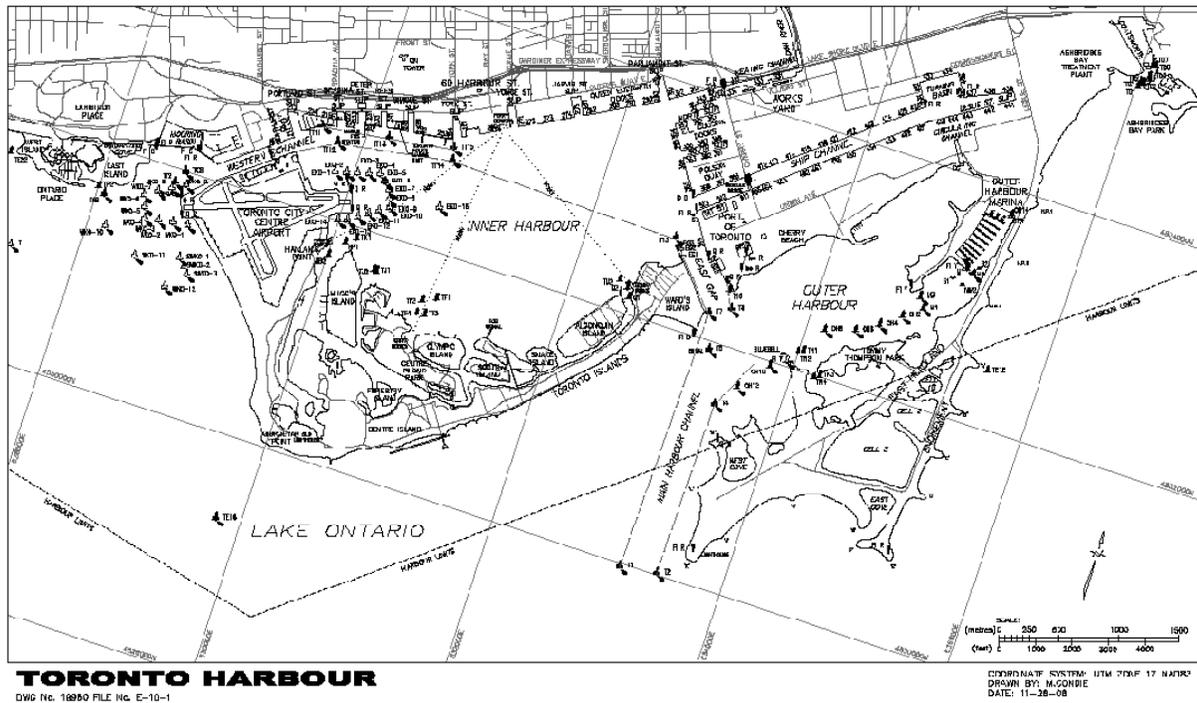


Fig. 1: Port of Toronto

- The number of directors, between seven and eleven, to be appointed under section 14, to be chosen as follows:
  - One individual nominated by the Minister
  - One individual appointed by the municipalities mentioned in the letters patent
  - One individual appointed by the province in which the port is situated and, in the case of the port wholly or partially located in Vancouver, another individual appointed by the Provinces of Alberta, Saskatchewan and Manitoba acting together
  - The remaining individuals nominated by the Minister in consultation with the users selected by the Minister or the classes of users mentioned in the letters patent.

**Source:** Canada Marine Act, Section 14(1)(f) A CPA is an agent of “Her Majesty in right of Canada only for the purposes of engaging in the port activities referred to in paragraph 28(2)(a)” but not for the purpose of borrowing money (derived from CMA Sec 7). CPAs have the authority to engage staff in order to carry out their assigned functions. There are restrictions placed on the ability of a CPA to obtain federal funds (CMA Sec 25) 25. Even if the port authority or subsidiary is an agent of Her Majesty in right of Canada as provided under section 7, no payment to a port authority or a wholly-owned subsidiary of a port authority may be

made under an appropriation by Parliament to enable the port authority or subsidiary to discharge an obligation or liability unless:

- (a) The payment
  - (i) Is made under the Emergencies Act or any other Act in respect of emergencies
  - (ii) Is a contribution in respect of the capital costs of an infrastructure project
  - (iii) Is a contribution in respect of environmental sustainability
  - (iv) Is a contribution in respect of security
- (b) The authority for the funding of Her Majesty’s obligations is an agreement that was in existence before March 1, 1999. 1998, c. 10, s. 25; 2008, c. 21, s. 14. Contribution 25.1 The Minister may, with the approval of the Governor in Council given on the recommendation of the Treasury Board and on any terms and conditions specified by the Governor in Council on the recommendation of the Treasury Board, make a contribution under subparagraph 25(a)(iv). It is notable for the purposes of this project that Section 25 would appear to allow federal infrastructure funding to flow to a Port Authority

The Port of Toronto is operated by the Toronto Port Authority pursuant to the *Canada Marine Act*. The

Toronto Port Authority (TPA) has an extended mandate over a range of facilities and activities on and around the Toronto waterfront. Management reports to a President and CEO who reports to the Board of Directors. This brief discussion will be limited to the marine portion of its mandate. In 2007, The TPA had revenues of \$15.2 million of which \$6.1 million or 40% derived from Port Operations. Expenses were \$4.9 and \$17.1 million, respectively. In other words, revenues from port operations exceeded expenses from port operations by \$1.2 million but other parts of the TPA's responsibility were not so successful. At the end of 2007, the TPA had an ongoing dispute with the City of Toronto with the City withholding payments of \$7 million to the TPA.9.

**Location:** Commercial operations at the Port of Toronto are located at the eastern end of the Inner Harbour adjacent to downtown Toronto (Fig. 1).

**Facilities:** The Port of Toronto is served by both major railways and has ready access to the major Ontario highway system via Queen's Quay East, the Lakeshore Boulevard East and then via the Gardiner Expressway or the Don Valley Parkway. Both of these latter roads carry large amounts of traffic and are frequently congested.

The commercial marine facilities at the Port of Toronto have been shrinking for many years due to the redevelopment of the waterfront and industrial relocation. In the 1980's, David Crombie headed a Commission looking into the future of the port and the lands along the waterfront. Since then, the commercial port has shrunk considerably and the traditional hub of the port is now tourist-friendly with floating restaurants, tour boats and urban redevelopment projects. At present, the commercial part of the port is limited to a strip along Queen's Quay East as far east as the Don River, with several of the facilities being privately owned and operated (e.g., the sugar refinery at the foot of Jarvis Street). As with most other major port areas in Canada, the Port Authority operates a limited number of facilities within the overall port area.

**Toronto:** The Toronto Port Authority (TPA) owns and operates Marine Terminal 51 and Warehouse 52 located at the foot of Cherry Street. The TPA also owns the International Marine Passenger Terminal which currently services the cruise ship industry. The terminal has six berths (512, 513, 514, 515 and 521/522 RORO), each with Seaway depths that vary in length from 256 to 408 m. The latter berths are where the Toronto-Rochester ferry docked. The terminals are serviced by rail line and there is a storage area for containers. We

note that the Statistics Canada data do not indicate any container transport by marine into or out of Toronto so the storage area must be used by shippers and/or railways and/or truckers for temporary container storage. In addition to the port-owned and operated facilities, several private docks operate nearby including:

- The sugar refinery with 157 m of dock face and Seaway draft
- Canadian Salt with 145 m of dock face and Seaway draft
- Cargill with 114 m of dock and Seaway draft
- ESSROC with 184 m of dock and 6.4 m of draft
- Lafarge with two docks, one for stone and one for cement, with 213 m of dock and Seaway draft for stone and 152 m of dock and 6.1 m of draft
- Sifto with 137 m of dock and Seaway draft.

It should be noted that the dock wall is continuous between the several salt facilities and Lafarge cement, Lafarge aggregate facilities allowing accommodation for larger vessels than the dock length would otherwise indicate. Storage capacity at this and other ports is stated in short tons unless otherwise noted.

**Port traffic:** Marine traffic has hovered in the range of 1.5 to 2.1 million tones/year from 2003 to 2007. Data obtained from the Port Authority, while showing fluctuations from year to year, consistently show that salt, cement, stone and aggregate comprise the major domestic commodities and sugar the major international commodity. The latest Statistics Canada data for the Port of Toronto are for the calendar year 2005 and were released in early 2008. These data indicate that Toronto is essentially a receiving port with salt, stone and aggregate, cement and agriculture products comprising most of the domestic trade. The movement of coal (via berths 512/513 was probably a one-time Ontario Power Generation movement from either the Hearn Generating Station or the Lakeview Generating Station, both of which are closed, to the generating station at Nanticoke. Shipment data for the port include the goods moved to or from all of the facilities within the defined port area, not just from TPA-owned facilities. Most traffic was domestic Canadian movements. The major imported commodities were raw sugar (to the sugar refinery) and salt and asphalt from the US. The TPA currently does not handle any containers by marine. Previously, the TPA container terminal was used by Highland Transport but this company relocated to Markham in 2008. On a recent visit, the container terminal appeared to be empty and unused.

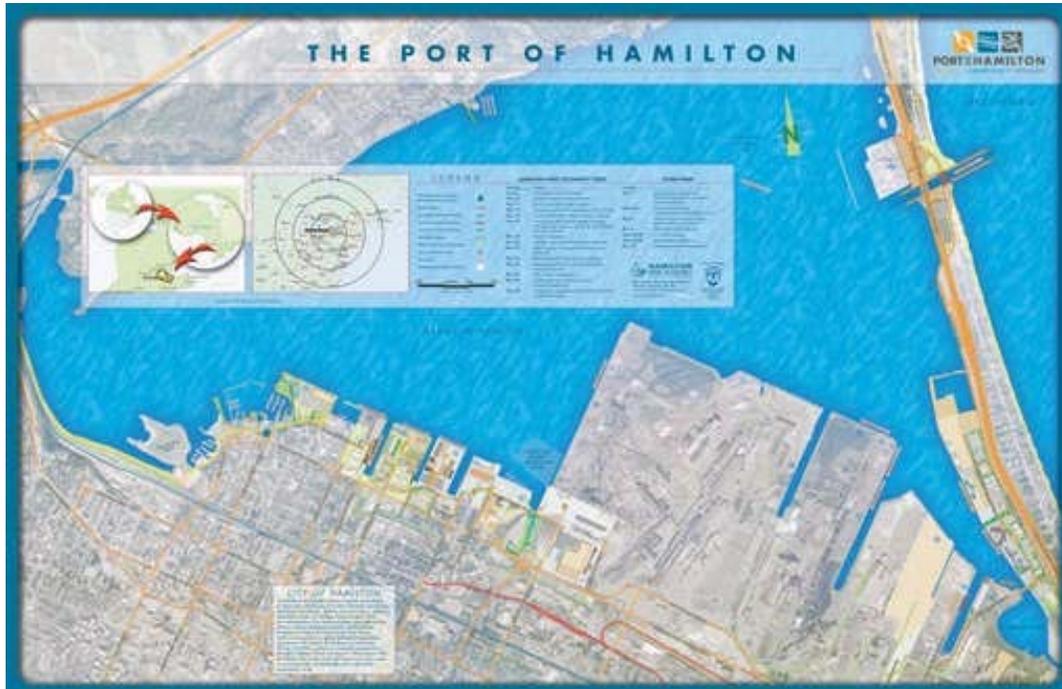


Fig. 2: Port of Hamilton Hamilton Port Authority website

**Hamilton:** The Port of Hamilton was established as a Port Authority pursuant to the *Canada Marine Act*. Management reports to a President who reports to the Board of Directors. In 2007, the Hamilton Port Authority (HPA) had an excess of revenue over expenses of \$1.9 million and equity of almost \$105 million.

**Location:** Hamilton, the largest fully commercial port on the Canadian Great Lakes based on tonnage, is located on Burlington Bay and is thereby sheltered from Lake Ontario. Access to the harbor is via the Burlington Canal which is crossed by the Burlington Skyway. It is home to two major steel mills, an oilseed crushing plant and many other industries. Figure 2 illustrates the extent of the Port of Hamilton.

The Port area is reached by roads that lead from the QEW and Highway 403. The Eastport area (Piers 25-28) connects directly to the QEW via Eastport Drive. There is an extensive network of on-dock rail facilities serviced by the Southern Ontario Railway which connects with both mainline service providers (CN and CP).

**Facilities and industries:** The major facilities at the Port, especially the steel mills, are set up to receive raw materials by water and it is not known if there would be

sufficient property to establish unit train unloading operations should the eventuality arise. At one time, Dofasco did receive iron ore by rail from northern Ontario and Stelco received by rail from western Quebec, but these were small operations and ceased long ago. With the steel mills receiving millions of tons of coal, iron ore and fluxing limestone by water each year, a shift in mode is most unlikely. Much of the outbound product is transported by rail and truck to North American destinations. The port is home to US Steel Canada and Arcelor-Mittal Dofasco, the two major producers of steel in Canada. It is also home to other important industries. Port facilities have a minimum of Seaway draft and can be dredged as needed. The channel is dredged every three to five years. We were told there is excess capacity in the port and that port infrastructure is aging and will require upgrading or replacing over time. The Port Authority will plan this as needed. There is also an ongoing environmental project to remediate the Randle Reef located within the harbor. Tugs are available from McKeil and Ocean Group. Mobile cranes can be provided by the stevedoring companies as needed. The lift bridge over the Burlington Canal is owned by Public Works and Government Services Canada (PWGSC) and is on its divestiture list.

**Port traffic:** The Port of Hamilton website provides the above basic traffic data for the period 2005 to 2007. The website also indicated that over 700 vessels call at Hamilton each year, almost 600 of which are in domestic and US trades. From the volumes of traffic shown in the following tables, it is safe to say that most of these vessels are either carrying raw materials to the steel mills or finished and semi-finished product from them to markets around the world. Hamilton is predominantly a receiving port for iron ore from Quebec-Labrador and the USA Lake Superior ports. There is also a large volume of imported primary steel.<sup>16</sup> Other commodities such as sand, gravel, potash-largely unloaded in the Eastport area-move beyond the port area, predominantly by truck although a pipeline takes jet fuel to Pearson International Airport.

**Port status:** While Hamilton has had some disagreements with the City in the past over the waterfront, it appears (from what we were told) that calm is the order of the day. Some of the waterfront has been converted to recreational and tourist uses leaving the major components of the port intact. After all, the port and its industries are the economic lifeblood of the city. The port has a land use plan developed in 2002 which includes improving road access to the port areas. Currently, the Port Authority has land for development at Piers 22 and 27. Hamilton is trying to develop Pier 22, which has 103 acres, Seaway draft and is ready for development.

**Windsor:** The Port of Windsor is a Port Authority pursuant to the *Canada Marine Act*. Management reports to a President who in turn reports to the Board of Directors.

**Location:** The Port of Windsor is located on the Detroit River facing the City of Detroit. Port facilities are to the west of the Ambassador Bridge. Highway 401 ends (or begins) at Windsor connecting to the EC Row Parkway and other main routes such as Huron Church Road which leads onto the Ambassador Bridge. After many years of study, a new highway connection between Windsor and Detroit is planned. The waterfront in the centre of the city has been redeveloped into an attractive waterfront park and promenade. The view is spectacular with the new skyline of Detroit across the river. This change, we were told, came about without the kind of problems encountered elsewhere concerning the interface of commercial port and city. The promenade area was once home to extensive railway lines and ferry services that carried rail freight cars between Windsor and Detroit.

**Facilities and industry:** The Essex Terminal Railway provides direct rail service to terminal in the port area and connects at Windsor to CN and CP and through them, to the US rail network. Highway 401 ends (or begins) at Windsor connecting to the EC Row Parkway and other main routes such as Huron Church Road, which leads onto the Ambassador Bridge. After many years of study, a new highway connection between Windsor and Detroit is planned. Within the port, available existing property and potential additional property are the drivers behind expansion potential. There is excess capacity at all terminals. The port has 50 acres left to be developed and may be looking at new industries for that location.

On-dock production and processing facilities include a cement batching plant, the grain elevator, an oilseed crushing plant and the salt company. Aggregate and petroleum industries are transfer operations. Sterling Fuels has a ship bunkering facility which (until recent changes in procedures by US Customs) did considerable business bunkering US flag lakes vessels. Channels and berthage have Seaway depth. No dredging is planned although two aggregate terminals have draft restrictions because of low water in recent years.

**Port traffic:** Like most of the main lake and river ports covered by this study, Windsor is primarily a receiving port with the exception of salt shipments. Windsor also has a unique distinction in that a truck ferry operates on a regular basis between Windsor and Detroit. Like most other ports within major cities, the physical area of the port has declined over a period of time. Traffic handled at the port for 2006 and 2007 follows. Two additional commodities (lumber and other liquid bulk) were listed in the data provided but no traffic was recorded. In addition to the above, the truck ferry made 1,123 trips in 2007 and carried 95,599 tones. In 2006, ferry volumes were 1,169 trips and 90,381 tones. In 2007, 1,163 commercial and ocean vessels docked at Windsor, up from 997 the previous year. Also, five cruise vessels docked in 2007, up from four in 2006.

**Thunder Bay:** The Port of Thunder Bay (Fig. 3) is operated by the Thunder Bay Port Authority (TBPA) pursuant to the *Canada Marine Act*. The TBPA has a CEO who is responsible for managing port operations and who reports to the Board of Directors. In 2007, the Authority experienced a loss on operations of just over \$1 million after earning \$276,716 in 2006. Accumulated equity as at December 31, 2007 was \$34.8 million.



Fig. 3: Port of thunder bay Thunder Bay Port Authority website

**Location:** Thunder Bay is located at the Canadian head of Lake Superior. It has been a major port since the Canadian Pacific Railway was built in the late 19th century and is primarily a transfer point for goods moving between Eastern and Western Canada.

**Facilities:** The port is accessed by a major four-lane artery called the Harbor Expressway that connects with Highways 11 and 17 (Trans Canada). Both CN and CP Rail have access to all major docks and elevators either directly or through interswitching. For example, the Keefer terminal, the major break-bulk handling facility, has both railways serving it with numerous tracks. The Port Authority has its own intermodal yard acquired from CP Rail. Several highway carriers, such as Manitoulin and Gardewine Transport, are tenants of the Port Authority. Arnone Transport, a major regional carrier, is on-site at the Keefer Terminal. Other carriers include Bison, McKeivitt, M.O. Bulk Carriers, Purolator and Consolidated Fastrate. There are eight grain terminals, including Canada Malting, Cargill, Parrish & Heimbecker, Richardson International Limited, Viterra, Mission Terminals and Western Grain By-Products, handling all types of grain and grain by-products. The major terminals have Seaway draft except for P & H and Western Grain By-products which have 7.9 m.

There are two bulk terminals: Thunder Bay Terminals and Valley Camp, handling coal, potash and salt. Keefer Terminal is a break bulk facility with over 550,000 square feet inside storage and about 16 acres open storage for handling forest products, steel, wind turbines, dimensional and heavy lift cargo and bagged goods. Additional facility information includes:

- Lake head Marine and Industrial (north end of port) has a graving dock (750 feet) for all types ship repairs and inspections

- Lafarge Inc. has a receiving dock for stone and salt by self-unloaders only with both CN and CP Rail connections; and
- Great West Timber has a loading dock for forest products using cranes and fork lifts with a CP connection.

**Port traffic and industries:** Thunder Bay is an important port for eastbound movements of grain and coal. Shipment data for the Thunder Bay Port Authority for 2005 to 2007 follow. Grain remains the dominant commodity at Thunder Bay. While most grain is shown in the domestic table (agriculture), this traffic to ports such as Baie Comeau, Port Cartier, Quebec/Levis is export traffic into the transfer elevators at those locations pending overseas export. Most grain traffic to Montreal would also be export traffic. International marine traffic would be in ocean going vessels, while shipments to the US lakes and the East Coast would be predominantly in Canadian registered vessels, of particular interest, at the end of 2007. Thunder Bay had the largest storage for grain of any port in North America and is the largest grain port on the Great Lakes. In addition to grain forwarded by the marine mode, facilities at the port are also used for winter storage and for rail shipments to the east during the close of navigation. Bulk facilities for other than grain are also plentiful. For example, Valley Camp Inc has storage for 2 million tones of bulk cargo which is about the total annual port volume excluding grain. Grain and bulk cargoes can be handled at Thunder Bay Terminals and Valley Camp on a “direct hit” basis, with direct loading to ship from rail.

**Other publicly owned or administered ports:**

**Prescott:** The Port of Prescott (Fig. 4) a former Canada Ports Canada Division Port, is now owned by the Township of Edwardsburgh/Cardinal. In 2007, the port had operating revenues of \$5.3 million, expenses of \$3.4 million and Net Operating Income of \$1.9 million. Of the revenues, over \$4.1 million came from grain services (elevation, storage, cleaning, drying and miscellaneous). Just over \$440,000 came from harbor services (wharfage and berthage). The port has a Port Management Committee and is managed by a staff which is headed by a General Manager.

**Location:** The Port of Prescott is located in the Township of Edwardsburgh/Cardinal just east of the Town of Prescott and west of the last lock (Iroquois) in the Montreal-Lake Ontario section (MLO) of the St Lawrence Seaway. As such, it has access to open water as far as the eastern entrance to the Well and Canal.



Fig. 4: Port of Prescott Port of Prescott website

Prior to the building of the MLO, Prescott was the easternmost port that could receive full Seaway size Lakers. The port has excellent road and rail connections with eastern Ontario, Quebec and the United States via Highways 401 and 416 and the bridge to Ogdensburg, NY. Congestion is not an issue. Canadian National Railway provides service to the loading and unloading sheds at the grain elevator and is close to the other docks. Canadian Pacific Railway has access through interswitching at Brockville.

**Facilities:** The elevator at Prescott remains from the period before the opening of the MLO when fully laden Lakers discharged cargo there to be transferred to smaller canallers that would carry grain to Montreal and Quebec, or to rail cars for winter shipment to the east. The elevator is licensed by the Canadian Grain Commission as a transfer elevator with a capacity of 154,020 tones. The elevator has two wharves; a 398 m long unloading wharf and a 282 m long loading wharf. In addition, the port has 193 m long “port dock” used for unloading salt with an adjacent salt pad, a 142 m long “Riverfront” dock and a 442 m long “Harbor front” dock which are used for unloading salt and aggregate onto adjacent pads. All docks at Prescott



Fig. 5: Green field ethanol plant with port of prescott in the background Port of Prescott website

have full Seaway depth. The Fig. 5 shows the port facilities’ layout.

**Port traffic:** Prescott is primarily a receiving port with the major commodity being salt destined for the City of Ottawa and other road and highway users. Waterborne grain handlings have declined significantly over the years due to changes in grain markets and shipping patterns. Most grain handlings at the elevator are received from and loaded into trucks-the business is now domestic Ontario grain, mostly corn, rather than

western grains. There is also a feed mill at the elevator that processes small amounts of grain each year (3,859 tones in 2008). The catchment area for the grain elevator encompasses Eastern Ontario from Lennox and Addington Counties to Prescott-Russell County and up as far as Renfrew. Salt is received for counties and municipalities in a similar area including the City of Ottawa. The salt dock (Harbor front) is leased by Rideau Bulk Terminals, which handles all the salt received at Prescott (Surumi, 2000).

Marine traffic flows for the year 2005 follow from Statistics Canada data. It should be noted that these data do not correspond exactly with Port of Prescott data. International marine traffic in 2005 was limited to a shipment of 23,680 tones of aggregate to Lake Michigan. Aggregate is shipped out of Prescott from a quarry located in the Brockville area. In 2008, 41 vessels called at Prescott to load or discharge cargo with the first arriving on March 28 and the last on December 17. As can be seen from the foregoing, activity at the Port of Prescott has risen considerably during the past several years. Industrial development is ongoing in the industrial areas close to the port. Most notably, a new Green Field Ethanol plant was completed in early 2009 (Fig. 5). It is expected to consume 20 million bushels of Ontario corn and to produce 200 million liters of ethanol and 154,000 tones annually of distillers' grains to be used as feed. The port has "tired" infrastructure. It consists of timber docks built many years ago and not maintained by Ports Canada or Transport Canada. While appropriate for the time, the construction is not suitable for today's business where ships unload faster and commodity piles on-dock are bigger than the docks were designed for. The port has approximately 20 ha available for development in the port area and the township has approx 80 ha across County Road 2 from the port available for development (Patrick, 1999).

The port has applied to Build Canada for \$35 million to add 20,000 tones capacity to the elevator (approx \$5 million) and for replacement of the "harbor front" salt dock (approx \$34 million).

**Oshawa:** Prior to the enactment of the CMA, most of the major ports in Canada were either Harbor Commissions (Toronto, Hamilton, Windsor, Thunder Bay and Fraser River) or Local Port Authorities under the CPC. One Harbor Commission remains-Oshawa. Interestingly, at one time Transport Canada issued a press release announcing that conversion of Oshawa to CPA status was underway. The port's legal status is subject to change following the release of the *Crombie* report and subsequent discussions between Transport Canada (which actually owns the property), the City of

Oshawa, the port users' group and other interested parties. Oshawa has appointed commissioners who serve for specified terms and one permanent staff member (Dele, 2000).

**Location:**

Latitude 43d 52m N  
Longitude 78d 50m W

The Port of Oshawa is located on the north shore of Lake Ontario and can be easily accessed by road using Highway 401 and Harbor Road. The Port does not have any onsite rail facilities but discussions are being held with CN to extend a spur line to the East Dock.

**Facilities:** Current facilities include the East Wharf which is the main cargo facility and the West Wharf which is used for overflow traffic. Within the port, there is also a turning basin with a stated draft of 6.7 m. 24 Oshawa Stevedoring has an exclusive contract to handle all cargoes on the East Wharf and to provide whatever unloading equipment is necessary. Tugs are available at the port, as required. Upon request, customs officials come from the Oshawa airport at no charge. Port-owned facilities include:

- Four domes used for storing green salt (Cargill)
- One potash dome (Agrico)
- One tank terminal and one calcium chloride tank (Miller Paving and Morris Chemicals)
- One 50,000 square foot warehouse.

Privately owned facilities comprise the McAsphalt industries' tank farm. Also, the port is used by McNally Construction, CCC steel and Mammoet, which handles project cargo such as windmills over the dock at Oshawa.

**Port traffic:** Oshawa is a receiving port with all (or almost all) cargo being unloaded at the port. Traffic levels have fluctuated in recent years between a high of over 393, 000 tons in 2006 to a low of just less than 198,000 tons in 2003. The major cargo is steel landed at the port. The 2006 high traffic level included over 240,000 tons of steel which fell to 98,000 tons in 2007.

Statistics Canada data for 2005 come close to but do not quite match the Oshawa data for that year and indicate that 310,000 of the 343,000 tones handled were international including import/export overseas trade and trade with the US such as calcium chloride. Seaway data show that 32 shipments comprising 243,000 tones were inbound through the Seaway. The port data indicate a total of 48 vessels at Oshawa in 2005, 50 in 2006 and 32 in 2007. Of the 2007 vessels, 16 required tugs, two did not require tugs and 14 were tug/barge combinations. Domestic traffic in 2005 was restricted to receipts of almost 31,000 tons of fuel and

basic chemicals. It should be noted that 2,319 tons of uranium or thorium were exported via Oshawa in 2005 to Western Europe. In discussion with a port official, it was indicated that the current facilities are capable of handling up to 500,000 tons each season (Dele, 1986).

The Port of Oshawa is favored for import steel unloading because of its proximity to Toronto and easy access from the port to Highway 401. At the time of the interview (August 2008), the port was anticipating an agreement with CN for the provision of a railway spur into the port area. This was seen as a necessary condition to attract an ethanol plant onto vacant land within the port. The existing status, opposition from the City of Oshawa to the spur and concern about what the port might look like in the future (post *Crombie*) were all factors cited for the delay in obtaining the spur. We were told by a representative of the Port that an appeal to the Canadian Transportation Agency had been successful and that this could soon lead to an agreement with Canadian National for the installation of a spur line into the port. The spur is seen as being the catalyst for the attraction of an ethanol plant and a grain elevator into the port area. In addition to the foregoing, the port has plans to expand its ability to handle freight, develop a recreation area including a marina and develop a cruise ship terminal and a ferry service facility, expand indoor storage and relocate the freight berth from the west dock to the south end of the east dock. These plans have been developed over a number of years and are expected to take place over an extended period-the cruise ship terminal is probably at least 10 years away (David *et al.*, 2004).

**Port colborne:** The Port of Port Colborne (Fig. 6) is a former Ports Canada Divisional port on Lake Erie which has been devolved to the City of Port Colborne pursuant to the *Canada Marine Act*. In addition, port operations are also located at facilities owned by Transport Canada and operated by the St Lawrence Seaway Management Corporation along the Well and Canal including the Ramey's Bend area.

**Location:** This port is located at the western end of the Well and Canal.

**Facilities:** The west side of the Well and the City-owned port is served by the Port Colborne Harbor Railway which is owned by the City and operated by Trillium Railway. This railway connects with CN at Merritton. CN has a line east of the Welland that does not appear to connect with industry along that waterway. Highway facilities are an issue with the City, which wants a limited access four-lane road extended to Port Colborne. At present, Highway 406 ends at East Main Street in Welland with Highway 140 continuing to meet Highway 3 at Port Colborne. Niagara Region has plans to expand a regional road to link with the



Fig. 6: Port colborne with grain elevators in background (photo by David Hackston)

QEW at or near Fort Erie. Maritime traffic on the Welland Canal can disrupt traffic in the city due to the need to open bridges to allow ships to transit the Canal. Much of the "port" area is located along the Welland Canal. Industry uses Seaway dock faces and draws and returns water to the Canal. This area, while counted in cargo data as part of Port Colborne (and some in Seaway data as Ramey's Bend), falls within the purview of the Seaway Authority. When visiting the facilities and industry along the Welland it is obvious that the area within the City of Port Colborne adjoins other industry and facilities along the Canal in nearby Welland. Draft along the Seaway wall is to maximum Seaway level but draft in the City-owned harbor is listed at 6.7 m in Greenwood's. In recent years, draft has been an issue due to lower water levels in Lake Erie. The canal wall is said to require some work and this is the responsibility of the Seaway. Port Colborne has 800 acres of available along or near the Welland in the northern part of the City (Copeland, 2008).

The City of Port Colborne is a very attractive tourist location, somewhat off the beaten track in Niagara. The City is very interested in developing a cruise business. In recent years several cruise ships have called but there is no suitable area to moor such a vessel. A Canadian Navy vessel was to visit in the fall of 2008 and be tied up at a stone dock along the Welland, with the area being cleaned up to handle those who would come to visit the ship. At present, there is no really suitable location to berth cruise ships.

**Industry:** The major marine-based industry at Port Colborne is grain handling and milling. Traditionally, this was the second largest flour milling centre in Canada after Montreal. Now, the Robin Hood mill (located at Ramey's Bend on the old Welland Canal) is closed and is for sale. ADM and Goderich Elevators (City-owned) have facilities in the City-owned port area (Fig. 6).

The Seaway has extensive tie-up walls that are used for loading and unloading cargo and for winter tie-ups. Construction materials and petroleum products are transferred at points along the canal and Casco receives corn from the US.<sup>26</sup> International Marine Salvage has a ship dismantling operation at the mouth of the Canal and Fraser Marine provides ship repair services along the Canal. Tugs are available from McKeil and NorLake Marine.

**Port traffic:** Commercial marine facilities at Port Colborne would not appear to be at anywhere near capacity. Commercial traffic has declined in recent years due to the situation at Robin Hood. With the shift in overseas grain markets and the ending some years ago of federal subsidies on the rail transport of western grain brought in by water from Thunder Bay and then reshipped by rail from Ontario elevators (At and East program), the elevators here and at other Ontario lake and river ports were curtailed.

**Port Stanley:** Port Stanley remains a Transport Canada port and is managed by Transport Canada, Ontario Region pursuant to Part 2 of the *Canada Marine Act*. Transport Canada has listed Port Stanley to be devolved pursuant to provisions of the *Canada Marine Act*.

**Location:**

Latitude 42d 39m N  
Longitude 81d 13m W

Located at the mouth of Kettle Creek on the north shore of Lake Erie about 35 kilometers due south of London, Port Stanley has traditionally been the largest commercial port between Port Colborne and Windsor. It is also a fishing port.

**Facilities:** The commercial port has been in decline for many years starting with the shift away from coal as a heating source. This led to the abandonment of the London and Port Stanley (LPS), Railway which once handled large volumes of coal per year from ships from Ohio ports. The remaining part of the LPS is now operated as a tourist railway by the Port Stanley Terminal Railway and operates as far as St Thomas. There is no rail freight service at Port Stanley and road access is by county road Number 4 or county road Number 20. Access by county road Number 4 brings trucks through the main part of the village. Port Stanley has always been used for summer beach-front recreation and in recent years there has been considerable residential development in the area (Copeland, 2008). Port Stanley was also once a cross lake ferry terminal and some would like to revive such an operation. Even when fully operational, the port had

limited draft of 21 ft at the commercial docks which meant that a large lake ship could not come in fully loaded or take on a full load. From discussions with several interested parties it now appears that the draft at Port Stanley is severely limited due to silting from Kettle Creek, such that one carrier which previously tied up at the port for the winter is now reported to be unable to enter the port in ballast (Bello, 2001). There are two piers (East and West) at Port Stanley effectively parallel to each other at the mouth of Kettle Creek. Transport Canada lists four piers at Port Stanley:

- West Pier 1 length 642.0 m
- West Pier 2 length 70.0 m
- East Pier 1 length 259.0 m
- East Pier 2 length 300.0 m

Piers East 2 and West 2 were accessible only by shallow draft vessels such as fishing boats. The East Pier 1 was mostly used for unloading coal. The West Pier 1 was used for unloading asphalt and potash and for loading corn and Ontario wheat.

**Port traffic:** During the late 1980's, Port Stanley annually handled several hundred thousand tones of goods including potash, grain, coal and asphalt. Statistics Canada reported that volumes declined to 13.5 thousand tons of carbon black from US lakes ports and just over 8,000 tons of fuel and basic chemicals from Sarnia and Windsor-probably asphalt for McAsphalt in 2005. The new Transport Canada Information Sheet on Port Stanley states: With the virtual elimination of break bulk and the decline of bulk traffic, compounded by the suspension of TC's maintenance dredging program, the harbor is currently only accessible to Lake Erie Fishing Vessels and service craft to the Lake Erie natural gas exploration industry. With the increasing gentrification of the village and demand for lake view properties, the commercial port may come under increased pressure.

**Sarnia:** The Port of Sarnia (Fig. 7) is a public port managed by Transport Canada, Ontario Region pursuant to the provisions of the *Canada Marine Act*. This port is not listed for devolution. The Port of Sarnia encompasses a large geographical area, which includes various communities and private facilities as well as the Public Port Facilities. The port provides seagoing access for lake freighters and deep sea ships carrying cargos of grain and petroleum products to national and international markets. In addition to both inbound and outbound "project" and purpose built cargoes, Transport Canada's marine facilities are utilized for year-round lay-up and repair by both Great Lakes and

Deep Sea vessels. Sarnia is located where Lake Huron drains into the St Clair River. The port is located along the Canadian side of the St Clair River (Bello, 2001).

**Facilities:** While Transport Canada owns some shore property, most port facilities are private and located on private property. In addition to the Port of Sarnia, the strip downstream along the St Clair River is also home to other privately owned port facilities, mostly associated with the petrochemical industry. It is interesting to note that while the river channel is capable of handling 1,000 foot US lakers, most of the listed docks at Sarnia have less than Seaway draft. This is probably due to the limited size and draft of the lakes' tanker fleet.

**Port traffic:** Major port users include the Cargill elevator and the several petrochemical based industries in the area. It is worth noting that the agricultural flow to Baie Comeau is really an export movement that will go into the house there for transfer to an ocean going vessel. The predominant traffic is related to the petrochemical industry and domestic shipments about double international movements of goods. The major destinations are ports around the lakes in both Canada and the United States. It is also interesting to note that there appears to be some intra-port movement of fuels and basic chemicals. Sarnia also has one of the most balanced inflows and outflows based on tonnage along the lakes. It is also tanker dominated traffic, which may explain why the draft at docks is frequently below Seaway maximum (Bello, 2001).

**Goderich:** The Port of Goderich (Fig. 8) was devolved from Transport Canada to the City of Goderich. The port is managed by the Goderich Port Management Corporation (effectively managed by Sifto), a non-profit corporation set up by the port users. Current members are Sifto, Goderich Elevators and Da-Lee. The port has no direct employees and there are no employees of the port users dedicated solely to port activity (Copeland, 2008).

**Location:**

Latitude 43d 45m N  
Longitude 81d 44m W

Goderich is located where the Maitland River flows into Lake Huron. The port is shown in the Fig. 8.

**Facilities:** The picture in Fig. 8 is more than 25 years old, but the port facilities remain largely unchanged visually with the salt mine and docks on the left and the grain elevators on the right. The channel is listed at 8.2 with 7 m in the harbor basin. Three berths are listed at

Goderich with two at Goderich Elevators and one at Sifto Salt. The draft at the elevators is listed at 7.9 m and at the salt mine as 8.23 m, Seaway depth. Goderich Elevators are CGC Licensed Transfer Elevators with a capacity of 140,020 tones. Overall, Goderich Elevators has storage capacity for over 5 million bushels of grain. There is rail access from Goderich Exeter to both the salt mine and the grain elevators. Service is five times a week. Truck access to the mine and the northern area used by Da-Lee is good, with a relatively steep grade paved road connecting to Highway 21 at the northern edge of the town. Truck access to the elevators is less ideal with trucks having to pass through the commercial town centre and a residential area to access the elevators on the south side of the port. This route also provides access to the recreational area and beaches (Bello, 2001). There are three berths used for loading; one for salt, one for grain and one used for both grain and calcium chloride.

There are also two additional berths available for winter vessel storage. There is no bunkering facility. Any bunkering requirement would have to be met by trucking fuel direct to the vessel. Tugs are available and used by some vessels based on the Master's decision. There may be a future dredging requirement beyond the break wall to connect with deep water. The port property ends at the break wall. Attempts to identify dredging responsibility beyond that point have been unsuccessful. Port traffic and industries Goderich is primarily a shipping port (Copeland, 2008). Port users consist of the salt mine, Goderich Elevators and Da-Lee. Salt goes to communities throughout the Great Lakes and as Far East as Quebec City. Grain is marine-dependent for access to export markets via the Lower St Lawrence. The port is almost exclusively used for outbound cargo, with Sifto Salt being the primary shipper and Goderich Elevators providing secondary volume. There is also a much smaller volume of calcium chloride shipped by Da-Lee, which is used for road dust control purposes and is shipped inland from the Port. There is a small volume of inbound grain from western Canada and there is no current capability to handle general cargo (Copeland, 2008).

**Owen Sound:** Owen Sound is a public port managed by Transport Canada, Ontario Region pursuant to the *Canada Marine Act*. It is on the list for devolution pursuant to Part 2 of the *Canada Marine Act*.

**Location:** Located at the head of Owen Sound off Georgian Bay, the Port of Owen Sound is a Transport Canada port slated for divestiture.

**Facilities and traffic:** As with Port Stanley, Transport Canada (TC) investment is limited to expenditures related to maintaining safety standards. The TC dock facilities are home to a Parrish and Heimbecker (Great Lakes Elevator Company) grain elevator, a road salt pad and Miller Terminals for cement facility. The grain elevator is a CGC licensed transfer elevator with a capacity of 106,420 tones. Water depth at the docks is in the range of 6.5 to 6.7 m. According to the RAC Atlas, there is no rail service at Owen Sound. Transport Canada lists the following facilities at Owen Sound:

- West Wharf Structure #7 length 150 m
- West Wharf Structure # 8 (private) length 125 m
- West Wharf #9 length 220 m
- West Wharf, South length 135 m
- East Wharf, Central length 200 m
- East Wharf, North length 230 m

**Port traffic and industries:**

Commodity flows are very low, being primarily grain in from Thunder Bay and Goderich and wheat out to the United States, of particular interest is the unloading of 49 tones of turbines in containers. Owen Sound is also used for winter lay up of Great Lakes vessels.

**Non-publicly owned or administered ports:**

**Nanticoke:** The Port of Nanticoke (Fig. 9) comprises wharf facilities owned and operated by US Steel Canada and Ontario Power Generation.

**Location:** Historically, Transport Canada owned a small harbor near the village of Nanticoke on the north shore of Lake Erie. This harbor has been devolved and now serves the needs of mostly recreational boaters.

**Facilities and industry:** The industrial facilities at Nanticoke are served by the Southern Ontario Railway which connects with CN at Brantford. Highway connections are by the county road network. The nearest provincial road is Highway 6 which leads to Jarvis and Highway 3. A number of years ago, Ontario Hydro (now Ontario Power Generation) built a major coal based power plant along the shore of Lake Erie in the Nanticoke area including docks for receiving coal. Later, Stelco (now US Steel Canada) bought land and built a steel mill and dock nearby. The US Steel Canada port facilities at Nanticoke are privately owned and consist of a pier with a conveyor system to move inbound raw material to the plant. There is also an outbound conveyor system operated by an external party, Waterford, to move slag (Bello, 2001). All material for the steel mill must come in by self-

unloader as there are no unloading facilities. In addition, US Steel owns substantial industrial park acreage (Lake Erie Industrial Park) around the steel mill complex with 2,500 acres. Access to the steel company dock is listed as a feature on the brochure advertising the industrial park. Imperial Oil built a refinery in the same area and a pipeline extends from the refinery to the OPG port facility which is used for receiving and shipping petroleum products via the OPG dock (Copeland, 2008).

**Port traffic:** All traffic at the above noted facilities are related to the three industries discussed. "Minerals" relates to the movement of stone and iron ore. It should be noted that, as with Sarnia, fuels and chemicals traffic sometimes involves flows in both directions between the same ports. Statistics Canada data for 2005 show over 12 million tones of international cargo and about 1.5 million tones of domestic cargo being handled at Nanticoke. The vast majority of this traffic would be inbound iron ore (mostly from the Mesabi Range but some from Quebec/Labrador) for the steel mill and inbound coal (from Pennsylvania and West Virginia mines) for the generating station and the steel mill via US Lake Erie ports. In addition, Imperial Oil shipped and received refined petroleum products via the OPG dock. OPG is scheduled to phase out coal fired electricity generation by 2014 and such a phase-out would significantly reduce coal receipts at Nanticoke (Copeland, 2008).

**Meldrum bay:** The commercial port facilities used by Lafarge Canada are owned and operated by Lafarge and were not part of the former Transport Canada public port of Meldrum Bay (Fig. 10).

**Location:** The Harbor of Meldrum Bay is located near the western end of Manitoulin Island in Lake Huron. It is strictly used for recreational purposes although at one time it was used for ferry services provided by Owen Sound Transportation. The Lafarge aggregate quarry and private port are located west of Meldrum Bay at the western end of Manitoulin Island on the Mississagi Strait, which separates Manitoulin Island from Cockburn Island.

As we were unable to obtain an interview with responsible Lafarge officials, the information that follows was obtained from published sources and from information gathered in previous projects.

**Facilities and industry:** The quarry, which is reported to be the largest marine based quarry in Canada, is located a long way from markets by road and does not have rail facilities. The Lafarge port facilities have the capability of loading at the rate of 2,500 tons/hour using

a belt conveyor slewing system. No unloading facilities appear to exist. Storage capacity at the port is reported to be 280,000 short tons and the dock has a draft of about 9.14 m. The volume of stone-related shipments from this facility came to about 4.5 million tons in 2005.

**Sault Ste Marie:** The former Transport Canada facilities at Sault Ste Marie (Fig. 11) have been devolved to Purvis Marine which now operates them.

**Location:** The Port of Sault Ste Marie is located on the St Mary's River and Lake Superior.

**Facilities:** Commercial port infrastructure at Sault Ste Marie is privately owned and operated by Essar Algoma Steel and Purvis Marine. The former Transport Canada port facilities have been devolved to Purvis Marine and the major port facilities belong to Essar Algoma. Facilities are along the St Mary's River; some are below the locks and some are above the locks. Purvis is below the locks and can operate year round. Figure 11 shows Sault Ste Marie along with the international bridge, the US locks and the large Essar Algoma property which is distinguished by the extensive rail layout. Information provided by Essar Steel Algoma indicates that all its docks had draft of between 21 and 23 ft except the export dock which has a draft of 27 ft (Seaway max). Purvis Marine owns and operates the former TC dock at Pim Street. It has a draft of 23 ft and is equipped to handle bulk petroleum products (on behalf of Esso and Sunoco) from vessel to pipeline to bulk storage facilities located away from the docks. Purvis also has mobile cranes and heavy fork lifts. Land access is by road only. The facility can handle oversize cargoes and break bulk such as coil steel. Purvis also can provide stevedores and has a small dry-dock next to the Essar export dock. In addition to marine transport, Sault Ste Marie also receives rail service from the Huron Central Railway and Canadian National. The Huron Central connects with CP at Sudbury. In addition, CN owns and operates the railway bridge to Michigan.

**Port traffic and industries:** The steel company has recently announced an expansion that will increase inbound shipments of iron ore to about 4 million tones and coal to 1.7 million tones. The following tables show the volume of domestic and international marine shipments in 2005. Domestic traffic is much smaller than international traffic because of the reliance of the steel mill on iron ore and coal imported from the United States. Much of the outbound product goes by rail and truck.

**The Nigerian ports system:** Nigeria port system can therefore simply be described as the method or manner of Nigeria ship/shore interfaces or a maritime inter-modal interfaces or operations.

With the above definition of seaport and system, it is easier to understand that this study discusses the challenges and way forward for the Nigerian port systems.

The development of the Nigerian ports system was influenced by three factors namely:

- **Historical:** Involving the facilitation of the slave trade of the then British colonial masters to ship Nigerian natural resources through Lagos, Bonny, Warri and Degema;
- **Economical:** In order to facilitate trade in raw materials and for industrialization requiring importation of plants, machinery and equipment, crude oil export in post-independent Nigeria
- **Political influence:** Development of KoKo port less than 200 miles from Warri and Sapele and dredging of Port Harcourt port at the expense of the Calabar port, the building of the new Calabar port in spite of the sand silting from the cross River.

The Nigerian port systems is organized in such a way that the Ports Authority called Nigerian Ports Authority (NPA) which was set up by the ports act of 1954 as was amended subsequently and controls 8 major ports excluding oil terminals namely Apapa, Tincan Island, Roro (Lagos), Port Harcourt port, Delta port (Warri), Calabar ports, Container Terminal (Lagos), Federal lighter Terminal (Onne) and Federal Ocean Terminal (Onne). Their berthing facilities include 93 cargo berths, 5 Roro berths, 7 bulk sold cargo berths, 11 bulk liquid cargo berths and 63 buoy berths and there are other privately-owned jetties. Their cargo storage facilities comprise 63 transit sheds, 22 back-sheds, 4 arcon sheds (40 warehouses all with a total area of 460,459 square meters), 37 operational harbor crafts, over 550 different types of cargo handling plants and equipment. Until 1954, it was the Maritime unit of the Nigerian Railways that controlled the ports which included many ports privately owned by some multinational companies including John Holt, UAC, Elder Dempster and C.F.A.O (Bello, 2001).

Many of the present ports are administered by NAP under a service (operating) ports system where NPA provides both the infrastructure and super-structure in the ports system and carries out services of pilotage, stevedoring, warehousing and cargo delivery while few of the Federal Ports like Federal lighter Terminal (Onne) is partially a land locked port where the port provides the infrastructure and the sector operators

provide the super structure like plants and equipment cargo discharge, delivery, pilotage, stevedoring, etc., there are other ports at Gwette, Bonny, Brass, Sapele, Akassa, Degema and Okrika. It is note worthy that because the Nigerian port system had not yielded expected efficiency, convenience and cost advantage, reforms are being urged and introduced from time to time so as to overcome the problems associated with it and some of which arise from time to time (Dele, 2000).

The problems associated with the Nigerian port system and suggested way forward are:

**Malfunctioning port systems:** The problem of static and malfunctioning ports is still associated with Nigerian ports today. Even though there has been rapid economic development, yet because the Nigeria port system is static and malfunctioning, there arises port congestions and disruption of production activities of the economy. In 1975 there was serious port congestion problems in Nigeria, popularly known as “the cement Armada”, which had a multiplier effect locally and internationally on the Nigerian economy. At that time more than 450 ships were waiting for up to 180 days to berth, when the internationally accepted lay time is 10 days in 2001 after 26 years, lasting for some months after it started in May, 2001, the Nigerian port’s system faced a similar problem that brought its malfunctioning nature to fore (Dele, 1986).

For months from about May, 2001, Nigerian’s busiest ports of Apapa, Container Terminal, RoRo Terminal and Tin-can Island within Lagos State had a situation whereas as a result of the Federal Government introduction of 100% physical inspection of cargo and attendant penalties for concealment or under-declaration or under-devaluation of imported cargo, vessels were waiting longer than usual to berth, there was inadequate space to unload cargo due to port ‘bunching’ that was leading to ports congestion because of importers’ failure or neglect to come forward and clear their cargo from the ports. This almost grounded the Nigerian economy to a halt with the delayed berthing of vessels carrying imported raw materials and equipment for manufacturers and government parastatals and the non-clearing of discharged cargo, lack of space for empty containers and inflation due to scarcity of imported consumer goods.

Many of the importers are not able to locate where their containers have been block-stacked, thereby hampering quick clearing of their cargo in order to make room for the discharge of in-coming cargo and has caused undue delays, over-time port charges and increased prices of goods. Equipment ordered for the Abuja Emergency Power Project to take off and for the

National Electric Power Authority to meet its December, 2001 deadline for regular power supply have also been reported held up at the ports due to the problem. Some of the adverse effects the ugly situation had on the Nigerian economy are that the Lloyd’s of London and the liners threatened to increase the freight rates on cargo being shipped to Nigeria which would be upon implementation increase the cost of imported goods and inflation (Dele, 2000).

Moreover, the ‘bunching’ problem was due to ports’ management not changing its style in view of the high volume of business which, arose from a change into a democratic Government. It is note worthy that during the time of Sani Abacha, Nigeria was a Pariah Nation with which many countries did not want to do business thereby leading to under utilization of the ports capacity cause the ports management to lease spaces to private entrepreneurs like Dangote and Wasa Delmas. However, the volume of business at the ports sharply rose after the 4<sup>th</sup> republic was borne in May, 1999, thereby causing the ports to be faced with shortage of space stack containers in the face of the neglect or refusal or unwillingness of consignees and their agents to claim their goods in response to the new Government policy of 100% physical examination of goods by Nigerian Custom Service (Dele, 2000).

As stated recently by the managing director of the Nigerian Ports Authority in a speech read at at the June, 2001 members’ evening of the Institute of Directors, the Government should plan ahead in ensuring that the Nation’s ports will be able to cope with the ever increasing growth of the economy because in 10 years time from now, ports will not be able to cope with the volume of business. That way, bunching will be avoided in the long run.

As an immediate and medium term solution, The Government, NPA and the Nigerian Shippers’ Council should enter into discussions with shippers, cargo receivers and ship owners and other relevant stakeholders with a view of convincing the cargo receivers to agree to their cargo being diverted the less busy ports in the eastern region in return for lower concessionary port charges. The reduction of the port charges should be such as to compensate cargo receivers for the cost of transporting their cargo from Lagos from any of the eastern ports so that it will be a good incentive for cargo receivers to agree to such diversion and prevent the Cotonou port which has reduce its charges from snatching business from the Nigerian ports. Moreover, shipping agencies should be provided with a large space outside the ports of Apapa, Tin-Can Island, Ro-Ro and Container Terminal where they can be block-stacking their empty containers until they are ready to transport them abroad (Dele, 2000).

Failure by Government or Port Authority (NPA) to use present data to plan for the future of the ports in the face of growing economy is one of the causes of malfunctioning port systems and soon as a planning based on reliable data is made for the future and implemented, the system will move smoothly. The ports should therefore be expanded and new ports developed in Advance at strategic locations on the coastline or NPA's land that are not yet utilized and provided with appropriate modern equipment. For example the NPA has 500 ha of unused lands opposite Tin-Can Island and Apapa ports and could be developed by the Federal Government or the private sector for bulk handling facilities or large or centre port to serve as transshipment base in a hub and spoke trading pattern for the West and Central African Sub-region and through a channel the centre ports could be connected to the water land thereby removing stress from road network in Apapa and Tin Can Island. The pressure it will take away from the Apapa and Tin Can Island ports will enable to work more efficiently and effectively (Dele, 2000).

Moreover foreign shipping lines should be asked to delay for a little while, the departures of their vessels to Nigerian ports so as to reduce the number now awaiting berthing and to be discharged and so as to give room for the clearing of discharged goods. The high freight rate may also keep some shippers away from shipping goods to Nigeria for now thereby reducing the volume of available cargo and the frequency of carriage to Nigerian ports. The pressure due to bunching will gradually eased out (Bello, 2001).

The Nigerian Ports Authority should either quickly acquire enough automated cargo handling equipment and latest cargo handling innovation such as on-dock rail and post-Panmax cranes so as not to be left behind in achieving optimum productivity and efficiency or should start operation the landlord port system where competent and reliable private entrepreneurs will be allowed to provide such cargo handling equipment, while NPA concentrates only on the administration of the ports. The resulting increased productivity, efficiency and speed will ensure a faster turn around time for vessels at the ports (Bello, 2001).

So also the Federal Government should as a matter of urgency equip the Nigerian Custom Service with enough hydro-scanning machines and sufficient competent staff to facilitate their operation so as to stop manual 100% physical examination of the goods at the ports and avoid delayed examinations. Personnel's should also be urgently trained for their operation. Since hydro-scanners have been criticized as been unable to detect HS code (classification, value, quantity, composition and texture) of cargo on which

the value of the cargo is calculated because they are designed for tracking drugs and illegal arms, adequate customs personnel will assist where manual inspection is still needed in addition to the hydro-scanners (Bello, 2001).

The Nigerian Ports Authority should as a matter of urgency along with the Nigerian Custom Services make use of the Bonded Cargo Terminals outside the ports in Lagos in order to enhance productivity and operational efficiency, reduce stress on its existing facilities at the ports to encourage the use of the ports as "cargo transit" and not as "cargo storage" areas. In this connection NPA has taken a step in the right direction by its execution of various memoranda of understanding with many private port operators for the use of their Bonded cargo terminals with the stated capacities namely Michelle (1500 teus), RoRo Oceanic (3500 teus), SDV (2500 teus), Maersk (1600 teus), Nedlloyd (1500 teus), cargo vision (3500 teus). It is interesting that NPA has entered into arrangements with some shipping companies including Maersk and Panalpina to take cargo to Kirikiri and Lilipond terminals outside the Ports of Apapa and Tin-Can Island, Lagos for inspection and release to cargo receivers. These measures will help in decongesting the Apapa and Tin Can Island ports and facilitate quick delivery of cargo (Bello, 2001).

The Nigerian Ports Authority should also divert some of the vessels awaiting berthing which agree to same, to some other ports like Warri, Port Harcourt and Calabar for discharge with concessions on port charges as an incentive to the ship owners and consignees. The Authority should invoke its powers under sections 116 and 117 of Nigeria Port Authority Act, 1999 in order the granting of entry permits or altering the date allocated for the entry of, any ship into any port or approach to a port in Nigeria in such a way as to reduce the number of ships approaching or waiting to berth in a Nigerian port especially the presently congested ports (Bello, 2001).

Since all the solutions being implemented by the Nigerian Ports Authority since May, 2001 had not solved the problem of bunching and congestion and NPA seems to have exhausted all its ideas in handling the problems, the Federal Government should as a matter of urgency constitute panel of experienced stakeholders in the maritime to investigate the causes and proffer to the Federal Government for immediate implementation, correct solution to solve the problem of bunching and port congestion.

**Government's interventions and interferences:** Related to the problem of static and malfunctioning ports system is the intermittent sudden intervention by

Federal Government in the Nigerian ports systems. Granted that since the Nigerian Ports Authority is a Federal Government parastatal, its performance is of immense interest to the economy and Government because of its influence on the economy, yet the Federal Government usually reacts to notice developments in the ports systems through ad-hoc or fire brigade and "kill and go methods". The Government also usually takes or implements measures without having fully considered their effects or likely effects on the maritime sector and the other modes of transport even though they are in areas relating to the port systems. For instance, in 1977/78, the then Obasanjo's military regime introduced 'austerity economic measures' whereby the importation of certain luxury goods were banned or restricted thereby leading to under-utilization of the port facilities (Bello, 2001).

During the military regime of General Sani Abacha, his policies ostracized Nigeria from the international community leading to a depressive Nigerian economy and the leasing out of ports' facilities and spaces to private organizations which situation has contributed to the present problem of 'bunching' at the ports (Copeland, 2008).

Moreover, in the face of massive imports due to the new democratic civilian government the ports got busy again. However, Government intervention's in May, 2001 by suddenly introducing 100% physical examination of all imports, imposing not less than 50% penalty on or auctioning goods of importers who conceal or under-value their imported goods for the purpose of paying little or no custom duty so as to enable the Federal Government collect all the requisite Custom duties as part of the much needed revenue for economic development.

Such "fire brigade" and "kill and go" approaches of Government in introducing the 100% physical examination at a time when the Nigerian Custom Services that had been operating under the statutory pre-shipment inspection method of imported goods was not adequately prepared for its implementation with equipment and personnel as not to delay the clearing of goods from the ports; and the failure or neglect of the cargo receivers to come forward and clear their goods for fear of being penalized or incriminated; led to "bunching" and adversely affected the Nigerian economy. In a bid to quickly move goods out of the Apapa and Tin-Can Island ports May-July, 2001 and in the absence of working rail connection to these ports, only the transportation of goods by road in trailers was possible which serious traffic congestion in Apapa and its environs and put strenuous pressure on the road networks thereabouts, frustrated commuters and slowed down economic activities. In August 2001, the Federal

Government through the Nigerian Custom Services, intervened yet again in the ports system by introducing or implementing regime harmonized import duties on fairly-used vehicles known as "Tokunbo" based on the Ex-factory prices of the vehicles and uniform assessment standards at all ports in Nigeria and because of the believe that importers of such vehicles under-value their prices in order to pay low custom duties. For two days business activities at the Tin-Can Island and RoRo ports, Lagos were disrupted as a result of protests and strikes by freight forwarders against the implementation of such policy (Copeland, 2008).

It is suggested that in formulating and implementing interventionist policies or actions that concern the port systems, the Government should involve all relevant stake holders in the exportation and importation and clearing and forwarding of imported and exported goods namely: NPA, pre-shipment agencies, Nigerian Customs Services, freight forwarders, shipping companies and agents, operators, cargo interests/receivers and the relevant Government agencies, after the necessary surveys and stocktaking have been made by Government.

Moreover, in trying to solve problems related to the Nigerian's ports system through any needed Government intervention, the Government, or NPA or the Nigerian Customs Services, the Federal Government should apply the "open system" approach by adopting a wholistic approach to all modes of transport and not seeing the ports system in isolation but as been inter depended with and on, the other modes of transport by air, road and rail for their existence and efficient performance. Thus Government's solving of the problem of the port system will also solve the problem of road traffic since the problem of one mode of transport affects the other. In playing its role the Nigerian port system, The Government should take functional measures based on scientific systematic procedures for proper validation of corrective measures before they are implemented.

**Inadequate infrastructural materials for efficient and fast services:** It is noteworthy that vessels make money when are on the move and that the time spent on discharging and handling cargo carried by vessels cost the vessels owners money on the crew "port charges" vessels' running and so the less the delay in turn around time (The time to berth, unload cargo, load any new cargo and leave the port), the better for the vessels since while delayed at working at port, the vessels are accumulating heavy cost as much as between US\$5,000 to US\$10,000 per day depending on the size of the vessels. As at December, 1999, plants and equipment at the Nigerian ports were 585 and even with the purchase

of 4 new containers handlers, 18 tractors, 6 container handling equipment. Compared with the number of ships berthing and the volume of cargo needing discharging, there has been little improvement in the efficiency and productivity of the NPA in meeting IMO's stipulation of clearing cargo within 48 h. The situation in Nigerian ports is such that cargo handling equipment and plant are either old, malfunctioning or broken down or inadequate thereby slowing down cargo discharging and stacking and clearing operations, leading to low throughput, longer turn around time, Inefficiency, damage to or loss of cargo, high port charges and demurrage and the encouragement corruption at the expense of shippers, port operators and cargo receivers. These factors all make Nigerian ports user-unfriendly and unattractive to some liners, shippers and importers who therefore prefer berthing at neighboring ports especially Cotonou port to berth in Nigerian ports (Copeland, 2008).

There is also a lack of integrated or inter-modal transport that would have enabled discharged cargo to be quickly removed from the ports through other means of transportation like road and rail being well-connected to the ports to the hinterland. The present situation is that rail-routes to and from the ports are not being used and the roads to and from many of the port are traffic-congested thereby causing unnecessary delays in the evacuation of discharged cargo from the ports and its environment.

The federal Government through the Nigerian Port Authority should purchase and supply sufficient modern, efficient hi-tech cargo handling equipment including post-panmax cranes and dock laborers (Dockers) trained in modern technological labor practices at the nations ports in order to increase productivity and efficiency and to meet the needs of shippers, liners and cargo receivers. The equipment and plants should also be properly maintained and serviced regularly. A situation where, cranes (Fig. 12) are hired from private operators to be used inside the ports because, NPA has inadequate and malfunctioning cargo handling equipment, calls for immediate attention and addressing. A situation where the available cargo handling equipment are insufficient causes delays in cargo handling and delivery and also encourages corruption and extortion on the parts of NPA workers operating the cargo handling equipment. Electronic data interchange for the transmission of messages and documents and other information technology for monitoring movement of cargo in transit and clearing goods, should be acquired and installed and used (Copeland, 2008).

Vessel Traffic Services (VTS) that involves a traffic monitoring service for improving safety,

efficiency of vessel traffic and protection of the environment should be made effective and efficient with the supply of modern equipment by NPA for the discharge of their duties. Based on VTS, vessels are to follow a predetermined movement programme depending on their sizes and types, cargo carried, berth availability, pilotage requirements and can be used to reduce in the short term and in the long term eliminate port congestion and low patronage of Nigerian ports.

Another solution is for NPA to lease out or grant concessions to competent private entrepreneurs, port terminals and services at a fee for their operation by private operators. In the face of inaccessibility, to or paucity of budgetary allocated funds to NPA for the purchase of the requisite cargo handling equipment and plants, the cargo discharge and delivery function of NPA should be privatized without compromising national security and labor's interests. Thus instead of the present operating port system of administration being operated by NPA, it would operate the landlord port systems where NPA supplies the infrastructure (port facilities) and the private sector operators provide the superstructures (Plants and equipment) and execute the functions of cargo discharge and cargo delivery (Copeland, 2008).

In the alternative to the above, in view of the various competing interest for and against privatization of the ports, the private sector should be allowed to participate in port operations including pilotage and towage to the extent to which NPA cannot adequately cope so as to ensure high level productivity and efficiency and faster turn around times for vessels at the ports. This will be an extension of the present policy on NPA of allowing private sector participate in certain areas of port operation as already indicated.

Moreover, a 24-h, 7-days a week operations in the ports should be introduced and sufficient modern crafts are provided for the purpose of night pilotage so as to facilitate night unloading and delivery of goods to positioned trailers which would transport the cargo out of the ports at nights thereby not constituting obstruction of road traffic in the day time with its attendant problems. Thus the turn around at the biggest ports will substantially speed up and bunching and port congestion will be reduced if not eliminated.

#### **Complicated traffic structure and implementation:**

Another problem associated with the Nigerian port system is the complicated tariff structure and its implementation. The NPA statutorily empowered to inter alia provide facilities for berthing, towing and mooring, loading and unloading of goods, embarking and disembarking of passengers in or from ships, lighterage, warehousing and handling of goods for

carriage of passengers or goods; for which it is entitled charge harbor dues on all ships calling at its ports and using the facilities. The port charges collected are for maintenance and improvement of the ports' infrastructures and superstructures by the Federal Government through the Nigerian Ports Authority. However, the general notion of port charges in Nigeria being too high compared with port charges in neighboring countries, had caused the neighboring ports especially Cotonou in Benin Republic to be used by shippers and liners at the expense of major ports like Apapa and Tin-Can Island ports, Lagos. This causes Nigerian Ports to be uncompetitive with its neighboring ports in the region and to loose business to them (Copeland, 2008).

In addition to this, are the prohibitive, duplicated and multifarious local handling charges or local charges or shipping agents releasing charges imposed by multinational shipping agents in Nigeria which has put lot of costs on the Nigerian cargo receivers and shipper thereby making costs of exports and imports very high. The documentation procedures of these payments and clearing of goods are also unnecessarily prolonged. Efforts by the Nigerian Shippers' Council to regulate these charges and eliminate duplicated ones by promulgating the Nigerian Shippers' Council (Local Shipping Charges on Imports and Exports) Regulation, 1997 appears to have failed notwithstanding the court cases on them filed in 1997 to redress the bad situation upon general outcry by port users against the high cost of using Nigerian ports and which were settled out of court.

The traffic system should be simplified and duplicity eliminated. NPA appears to have initiated such steps by introducing what it calls "Simplified Tariff" effective from March 15, 2001, but the effectiveness of the Simplified Tariff in making the Nigerian ports to be competitive in the West and Central African sub-region has not been seen. The Simplified Tariff will however reduce corruption at the ports and they should be continuously be reviewed in order to remain competitive. A maritime expert that even though the computation of local handling charges arises in three main areas namely: Container related, document related and also wharfage/equipment/service-related, in determining the payable handling charges, there should be a balance whereby only true and verifiable costs are passed by the carriers to the shipper on a no-loss or no-gain bases in a transparent and participatory manner. Thus, the charges will be reduced and our ports made more attractive to shippers and cargo diversion to neighboring ports reduced if not eliminated (Copeland, 2008).

**Misunderstanding of the usage and current functions of ports:** Nigerian ports system is associated with the problems of been seen as serving a storage

function when the current trend that ports now perform transitory function. After the unloading of their cargo from vessels, a lot of consignees choose to leave their cargo within the ports while they for buyers of such cargo, especially vehicles. The secured buyers the pays the custom duties and any overtime charges and clear the cargo out of the ports. While waiting for buyers, their cargos are stored in the ports unnecessarily occupying scarce spaces in the ports and leading to avoidable "bunching" and economic problems.

Ports are no longer seen as the end point for cargo but are seen by shipping consignees as flow points. It is suggested that the ports should be used as transitory from where discharged goods will be immediately taken delivery of and removed from the ports in other to create space for other consignments for ports efficiency. Thus the ports will meet the expected speed of 48 h delivery.

**Proliferation of government agencies operating at the ports:** There is also the problem of numerous Government Agencies operating at the ports which situation has been aptly referred to the operation of "toll gates" economic system where different agencies were brought into the ports to take ad hoc measures and different regulations were made to impede ports' operations in the name of ensuring security, standardization, environmental protection and fake drugs. There are up to 32 government agencies including NDLEA, Nigerian Custom Services, FMEV and NAFDAC, SON all of which cause avoidable delays in the clearing of goods and induce diversion of cargoes to neighboring ports. It is suggested that in order to remove the bottlenecks, the number of government agencies at the ports should be reduced to only those required for effective ship and cargo handling operations and national security and whose presence at the ports are not duplicative of the functions of the main government agencies. The approved agencies are the ports are: Nigerian Customs Services, Nigerian Police for provision of security at the ports, Nigerian Immigration Service, Authorized Destination Inspection Agents and Licensed Custom Agents for clearing goods, but the above number of approved agencies has since been exceeded (Bello, 2001).

**Cumbersome documentation and delivery procedure:** The Nigerian ports system is hampered by cumbersome documentation and delivery procedure. Although the notorious Customs Long Room has now been "shortened" and renamed Customs Processing Centre, the absence of reliable up to date data and the elongated documentary and delivery system that induce the involvement of numerous persons causing avoidable delays cargo discharges, delivery and receipt. Delays are also caused by either late arrival, faulty documents and outdated document requirements and processing

methods. Associated with this problem are the sharp practices and high levels of extortions by government agencies at the ports.

It is suggested that the documentation process should be shortened so that the number of persons handling consignees' documents may be drastically reduced so as to shorten the time for delivery of cargo to not longer than 48 h. Moreover, it is high time the relevant processes and procedures are automatically computerized and the Automated System of Customs Data (ASYCUDA) effectively used to speed up the clearing of cargo because corruption and irregularities will thus be reduced if not eliminated. In line with this suggestion, NPA has at present computerized ships' provisional bills and mechanical stores in all the ports and intends to computerize also all port bills including final bills, consignee bills, labor contractor bills and estate bills (Bello, 2001).

**Insecurity of Cargo and lives:** Another problem associated with the Nigerian ports system in the insecurity of cargo and lives. The so called "Wharf rats" vandalize or steal valuable parts of imported vehicles awaiting clearing or goods from containers after removing their seals and pirates carry out attacks at the ports of Warri and Onne because of the use of lighters to transport cargo from vessels to the terminals. There are many people without business in the ports who are loitering at the ports soliciting for "business" only to engage in criminal activities within the ports (Bello, 2001).

There is need for adequate security, provided by the naval police against piracy and armed robbery and that the ports' police should check pilferages at the ports. Importers should be encouraged to use containers to ship cargo. The acquisition of modern warehousing operation equipment like automatic stacking and retrieving devices, computerized cargo locator systems, narrow aisle automated pallet movers and deep shelf conveyors by the NPA will not only increase its productivity and efficiency, but will also reduce if not eliminate pilferages of cargo. The naval police need to be adequately equipped with modern arms and speed boats to arrest and deal with pirates and armed robbers. A Coast Guard may also be set up to perform functions similar to those of US coast Guards.

**Manpower and labor problems:** There is also inadequate well-trained manpower including dockworkers due to lack of the training of the ports personnel and maritime labor force as specialists are able to handle modern sophisticated cargo handling and delivery equipment. There are few workers with the managerial ability to manage the ports and their operations in the new trend of globalization of ports services. There are usually conflicts between dockworkers, clearing agents and port management

often leading to strikes crippling ports operations and the economy.

NPA staff should be continuously trained both locally and abroad in modern ports operations and management in order to acquire requisite skills and information to operate and to administer the ports inline with modern trends. Now a days, training is not only good, but it is also a good investment since in most ports a multi skilled workforce is required. Negotiations should also be entered into with dockworkers or customs licensed clearing agents as soon as disputes are brewing or arise with a view to amicably settling the disputes and nipping the in the bud before any damage is done to the ports' operation (Bello, 2001).

**NPA'S lack of financial autonomy:** The absence of financial autonomy in NPA is one of the problems associated with the Nigerian ports system. NPA is a Federal Government parastatal and statutory agency 100% shares capital in which are owned by Federal Government. It seems to be making lot of money for its sole shareholders but it does not have access to the funds for spending except as appropriated in national annual budgets. It is also not independent of the Federal Government or the supervising ministry (Federal Ministry of Transport). This makes for Government in its activities.

It is suggested that NPA should be financially autonomous and be given free hand by its stakeholders to operate. In 1992 the Technical Committee on Privatization and Commercialization (TCPC) commercialized NPA and gave it autonomy as "NP plc" but the reversal in 1996 of Government's policy also reversed its autonomy.

**Port environmental pollution problems:** Environmental impacts and pollution of the marine environment have become crucial considerations in not only port development but also port operations and management the world over which are now regulated by international conventions and since Nigeria is a coastal state member of the international community, its case cannot be different. Some of these conventions are the Convention on the Prevention of Marine pollution by Dumping of Waste and Other Matters in force since 1975, MARPOL 73/78, SOLAS, Oil Pollution Preparedness, Response and Cooperation in force since 1990, making it mandatory for ports to have oil pollution plans coordinated within a national contingency arrangement, UN Conference on Environment and Development, 1992 recommending assessment of environmental impact in project planning, port reception facilities, contingency plans for oil and chemical spills and systematic recording of the

state of the marine environment; The United Nation Convention on the Law of the Sea, 1982; to which Nigeria is a party imposes some duties on Nigeria as a coastal state and its ports in respect of the pollution of the marine environment from sea-bed and land based and vessels' activities and disposition of shipboard wastes and garbage through reception facilities. The problem is that either Nigeria is yet to ratify the conventions or has ratified but has not yet domesticated them or domesticated but has not yet been implementing the municipal laws on the conventions concerning marine pollution, thereby exposing its environment from being affected by them (Bello, 2001).

Nigerian ports thus stands great risk of facilitating pollution of the Nigerian marine environment through the toxic and noxious harmful substances or energy from oil/chemicals, oil exploration and exploitation because of the fact that Nigeria is a major oil producing country whose ports are used in the process of loading, transportation and unloading of crude and refined oil cargoes and the accidental discharges associated with tankers' collisions. Port environmental pollution can therefore be caused by maintenance dredging of toxic materials, maintenance of superstructure and equipment, development of ports infrastructure, maintenance repairs to ships and ports' industrialization, cargo handling and storage, discharges from ships including ballast waters, shore-based transport operations such as port/city interface and accidents involving vessels carrying dangerous substances occasioning spillages at ports. There is scarcely any report on any assessment carried out by NPA or any Government agency or the Federal Ministry of Environment on the types of pollution, sources and environmental effects and solutions to the pollution of any Nigerian port or harbor. There are also oil reception facilities to prevent, reduce or control marine pollution of the ports and harbors environment which were established by the Nigerian Ports Authority at all ports although reception facilities are yet to meet the standards set by MARPOL 73/78 (Bello, 2001).

Nigeria should immediately ratify and domesticate all the international conventions relating to marine pollution especially MARPOL 73/78 and implement them in our ports and harbors. Before any new port is developed or repaired, its environmental impact assessment must be carried out and there should be waste management strategy and provision of adequate reception facilities. The NPA and terminal operators should also develop plans for responding to likely oil spillages considering all emergency incidents like collision, grounding, fire and personnel casualties based on which priorities would be determined and

response mechanism set up. Well-trained search and rescue personnel backed by necessary equipment to execute the port plan, should be established to effectively fight marine pollution at the ports and protect and preserve the Nigerian marine environment (Bello, 2001).

Other problems associated with the Nigerian ports system are that many of the shipping companies claiming to operate in its maritime industry exist only on paper "portfolio shipping companies" without owning their own ships, the traffic pattern is such that there are more imports than exports thereby causing balance of trade problems, duplicity of shipping and shipping related associations and the absence of integration of maritime transport with other means of transport thereby making door to door delivery mirage (Bello, 2001).

## CONCLUSION

- Location, facilities and port traffic and industry, port status and Port administration in Canada Port Authorities such as Toronto, *Hamilton, Windsor, Thunder Bay Prescott, Oshawa, port Colborne, Port Stanle, Sarnia, Goderich, Owen Sound* Publicly Owned or Administered Ports and *Nanticoke, Meldrum Bay and Sault Ste Marie* Non-publicly Owned or Administered Ports are some *publicly-owned and private ports in Ontario, Canada example reviewed to improve the Nigerian ports systems.*
- The meanings of ports and systems and some challenges associated with the Nigerian ports system which include: Malfunctioning port systems, Government's interventions and interferences, Inadequate infrastructural materials for efficient and fast services, Complicated Traffic Structure and Implementation, Misunderstanding of the usage and current functions of ports, Proliferation of Government Agencies operating at the ports, Cumbersome Documentation and Delivery Procedure, Insecurity of Cargo and Lives, Manpower and Labor Problems, NPA'S Lack of Financial Autonomy and Port Environmental Pollution Problems are some environmental challenges faced the Nigerian Ports system which solutions were proffered to them.
- Other problems associated with the Nigerian ports system are that many of the shipping companies claiming to operate in its maritime industry exist only on study "portfolio shipping companies" without owning their own ships, the traffic pattern is such that there are more imports than exports thereby causing balance of trade problems,

duplicity of shipping and shipping related associations and the absence of integration of maritime transport with other means of transport thereby making door to door delivery mirage. The fact that the problems have solutions that can be applied means that they are partially solved.

- If there the solutions are correctly implemented, the problems will be reduced if not totally solved and the Nigerian ports, its maritime industry and the Nigerian economy would all be better for it.

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