

## **S2 GEOGRAPHY**

**NB. Please students, as you are copying these notes, do not draw the photographs but instead concentrate on maps. Photos are for visual understanding of the work.**

### **THE CITY OF NEW YORK**

#### **Historical Background**

New York is the chief city of U.S. A and it's the most popular city in the world. It is situated in the eastern coast of U.S.A built on the mouth of the Hudson River. New York was originary occupied by the Dutch immigrants in 1624 and they mainly settled on Manhattan Island as traders. The immigrants in 1626 bought the whole island from the Indians and named it New Amsterdam. However, in 1664, the Dutch surrendered the island to the British. During this period, it had a population of only 1500 people and by 1776 when America was declared independent, the population was about 30000 people. New York City has extended to cover the following islands:

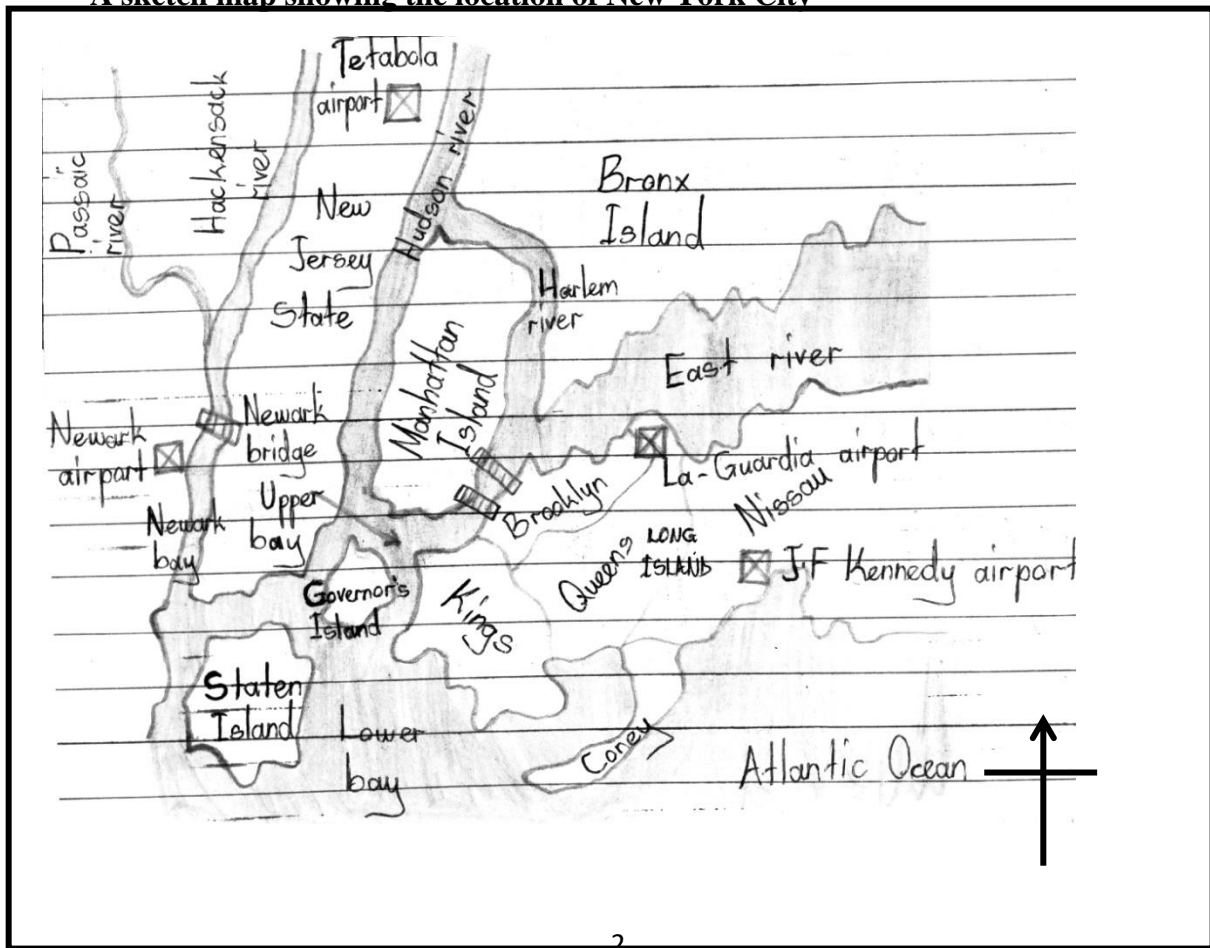
- ❖ Manhattan island
- ❖ Long island
- ❖ Bronx island
- ❖ Brooklyn island
- ❖ Richmond island
- ❖ Queens island
- ❖ Staten island
- ❖ Coney Island
- ❖ Jersey island



*Manhattan island before the construction of New York City*

*Manhattan island during the construction of New York City*

**A sketch map showing the location of New York City**





*An aerial photo of the lower Manhattan Island which is the heart of New York City*

*An aerial view or satellite image of the site of New York city.*



*If observed critically, different Islands making up the city and water bodies can be identified.*

### **The site of New York**

The term site means the physical characteristics of the actual ground on which the town is located i.e. the natural environment on which the town exists.

#### **Advantages of the site of New York**

- The island has fresh water as a result of rivers around it for both domestic and industrial use
- Being an island, it was easy to defend against enemies
- The island had fertile soils derived from river erosion for agricultural practices
- Her flat nature made construction of roads and railways easy
- It had hard metamorphic rocks which supported construction of infrastructure such as sky scrappers

- It has deep waters surrounding the port which enables big ships to sail hence handling a large bulk of cargo.

### **Disadvantages of New York site**

- Its flat nature has encouraged floods and swamps especially in the north of Manhattan island
- Rivers and bays hinder movement from one part of the city to another
- Its location attracts many people in the city leading to congestion of both traffic and people.

### **Factors that favored the growth of New York City.**

- Presence of a sheltered natural harbour which is not affected by strong winds from the Atlantic Ocean
- Its strategic location on the eastern coast of North America gave it easy accessibility to handle water traffic from Africa, Europe and South America.
- The presence of a rich and productive hinterland provided a variety of goods to be handled both agricultural and industrial.
- The generally flat relief provided ideal conditions for the construction of sky scrapers and other infrastructure.
- The existence of hard basement rocks provided a strong foundation for construction of tunnels and sky scrapers
- She experiences ice-free conditions which enable the port to function all year round
- It has a low tidal range allowing port activities to be carried out through out without disturbance by waves
- She has deep water harbours allowing anchorage of large vessels near the shore throughout the year
- It also has wide rivers giving large space for docks and quays (a long structure where boats are tied for loading and off-loading of goods)
- There are also numerous islands like long island, Staten, Queens giving ample space for the expansion of the city
- Its location at the southern end of the Hudson Mohawk gap gave it accessibility to the interior Great Lakes region, and the Prairies which are rich in agricultural products and mineral resources
- New York had a diversity of functions such as being the headquarters of the united nations making it politically stable
- The presence of advanced technology allowed construction of modern bridges and tunnels to connect the various islands making up the city
- The presence of a variety of transport means like air, water and railways gave it easy accessibility to its hinterland
- Historically, the coming of the early settlers, the Dutch and later the British founded the city and led to its development
- The favorable government policy of providing a large capital base for developing the city further led to its growth

- The availability of highly skilled labour to construct the infrastructure in the city also favoured its growth

### **Functions of New York City**

- It is a commercial or trade or business centre handling imports and exports to and from different countries.
- It's an education centre with colleges, universities, and higher institutions of learning.
- It's an industrial centre with light and heavy industries like ship building, chemical industry etc.
- It's an administrative centre with the United Nations Organization headquarters.
- It is a banking and financial centre with insurance companies and presence of stock exchange.
- It is a recreational centre and a place for entertainment with open houses, concert halls and cinema halls.
- It is a cultural centre with museums and art galleries.
- It is a tourist centre.
- It is an entrepot handling most of the imports and exports.
- It is a transport and communication centre with many terminals, roads, waterways, railways linking it to the outside world.
- It is a residential centre with over 17 million people living within the city hence New York is one of the most populated cities in the world.

### **NB. Factors which led to a large population size in New York**

- Location of New York on the Eastern sea board of U.S.A which has a very large population concentration of over 200 people km<sup>2</sup>.
- The presence of a natural harbour which made New York as a large entre port.
- There was intense rural- urban migration in search for employment opportunities.
- Existence of a variety of functions in New York for example administration, commercial, recreation, communication attracted many people.
- Efficient transport and communication made it possible to access by roads, water and air.
- The presence of a rich hinterland, agriculturally and industrially productive attracted large populations.
- Manhattan Island with a strong basement rock suitable for construction of tall buildings adequate for accommodation.
- New York is the headquarter of international organizations of U.N which attract populations and employment.
- Favourable government policy (liberal migration laws) like the green card system which allows free settlement in New York.
- A relatively flat land favouring construction of infrastructure.
- Political stability for free movement to the city.
- Improved health facilities which have reduced death rates.
- Historical factors because of early settlement of the British and Dutch.

- A lot of capital available for construction of infrastructure particularly sky scrapers and roads

### **Environmental problems facing New York (Port and City)**

- A lot of pollution of air, water and land by poor disposal of wastes, vehicle fumes, chemicals and gases degrading the environment
- Traffic congestion especially during rush hours leads to accidents and delays
- There is overcrowding of the city leading to shortage of space for settlement
- There is destruction of vegetation for land for settlement and industrialization leading to environmental degradation
- There are high rates of unemployment due to high population
- There is a problem of poor sanitation leading to easy spread of diseases
- There are inadequate housing facilities leading to the development of slums or ghettos and their associated problems like theft, prostitution.
- They are faced with smog which leads to poor visibility resulting into accidents losing lives and property
- They are faced with high rates of crime due to unemployment
- There is limited land for expansion due to high population in the city
- They are faced with high costs of living due to high demand for goods and services
- There is racial discrimination especially among the whites and Negros causing insecurity
- Over expansion (urban sprawl) has limited land for other activities such as recreation, creation of Green parks etc.
- There are high levels of moral decay like drug abuse and prostitution
- They are also faced with flooding due to city expansion to the coastal lowlands



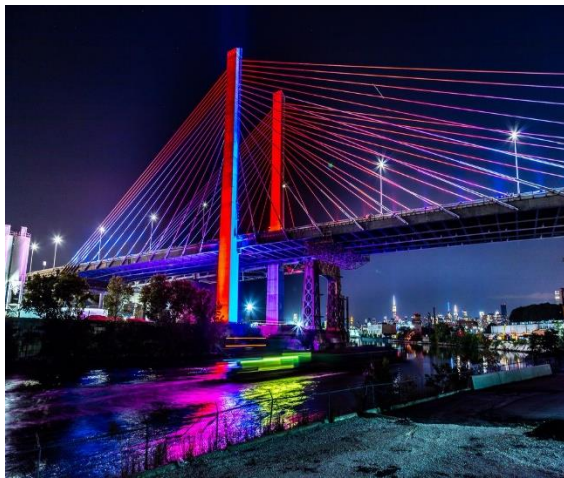
*Traffic congestion on roads causing delays*



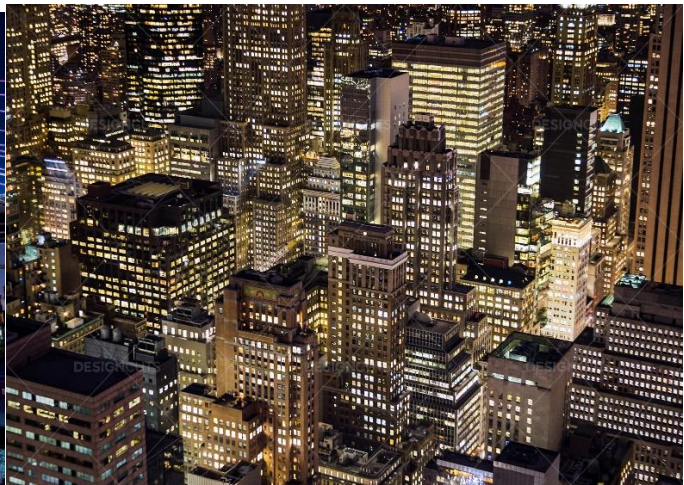
*Smog reducing visibility*

## **Solutions to the problems facing New York**

- Recycling or treatment and proper disposal of wastes to reduce pollution
- Construction of city tunnels and subways to reduce traffic congestion
- Building of sky scrapers to solve the problem of land shortage
- Strengthening of the police force through training and deployment to help fight against high crime rate
- Construction of more industries to solve the problem of unemployment by creating more jobs
- Putting in place legislations to reduce environmental pollution
- Put in place timetables and containers to ease flow of traffic on land and water
- Carry out land reclamation of some marginal lands on docks to extend housing
- Development of peri-urban suburbs to decongest the central business district
- Carry out urban planning and upgrading of former slum areas (urban renewal)
- Encourage decentralization of economic, industrial, and administrative activities by relocating industries outside urban centres
- Limiting illegal immigrations into New York by encouraging outward migration a
- Political sensitization to reduce the problem of racial discrimination
- Use of radars to help reduce the fog problem



*City tunnels, fly overs, bridges and subways to reduce traffic congestion*



*Sky scrapers to solve the problem of land shortage*

## **Factors favouring the growth of New York as a port**

- The presence of a hard basement rock that provided a firm foundation for the building of the port
- New York has deep ocean waters which allow large ocean-going vessels to sail and anchor throughout the year
- It has ice-free conditions therefore it can function throughout the year
- It has a low tidal range allowing large vessels sail throughout the year in and out of the port



- It has a rich hinterland which provides market for goods brought in
- New York is sheltered from strong winds of the Atlantic Ocean by islands like long island
- It is close to the commercialized countries of western Europe providing market to her goods
- New York is relatively flat enabling the easy construction of the port and sky scrapers
- Presence of deep natural harbours that enable large ships to float

**NB problems and solutions refer to those of the city**

❖ **Exports handled by the Port.**

Machinery, textiles chemicals, wheat, electronics, timber, canned food, automobiles

❖ **Imports handled by the Port.**

Coffee, cotton, tea, cocoa, iron ore, copper, diamonds, oil, coal, uranium, gold.

**Problems faced by the transport sector in New York City**

- Traffic congestion leading to delays in movements especially during peak hours.
- There are narrow bridges which slow down traffic causing delays.
- Transshipment from ferry to land is costly and time consuming.
- There is a problem of fog leading to poor visibility causing accidents.
- There is a problem of slow ferry movement leading to delays.
- It is also associated with accidents and deaths caused by traffic congestion.
- They are also faced with high transport fares due to high demand for means of transport.
- They also experience high construction costs of bridges and tunnels.

**Effects of the transport sector on the environment in New York**

There are both positive and negative effects of transport on the environment. The following are the **positive effects**;

- It facilitates the development of trade and commerce by connecting to various markets centres
- It has led to urbanization because of easy movement of people
- It has led to industrial development because of easy transportation of goods to market centres and raw materials to industrials
- It provided employment opportunities in form of engineers, mechanics, drivers
- It has facilitated the movement of people and goods
- It has facilitated the growth of the tourist industry by easing movement while the subways and magnificent bridges form tourist attractions
- It facilitated the development of regional and international co-operation by linking different countries.

## Negative

- There is pollution caused by vehicles emitting fumes.
- Creation of barren land where rocks have been excavated.
- There is loss of aquatic life due to oil spillage.
- There is loss of bio-diversity where animals and birds migrate due to noise pollution.
- It has led to global warming due to gases emitted in the atmosphere.
- Smog in the atmosphere causes poor visibility leading to accidents.

## INDUSTRIALIZATION IN NEW YORK

There are two types of industries in New York i.e.

- ✚ Light industries
- ✚ Heavy industries

### Light industries

- \* Printing and publishing; mainly found in central Manhattan and they deal in paper production and book printing
- \* Textiles; concentrated in the jersey area and specialize in production of women clothing and carpets
- \* Food processing; dealing in brewing soft drinks and processing tea, coffee, cocoa, sugar, tobacco, meat.
- \* Shoe making and furniture industries;

**NB.** Most of the light industries are located in the suburbs of New York and on long island due to ample space

### Heavy industries

- \* Ship building; deals in ship repairing and building
- \* Engineering; deals in production of engines, motor vehicles etc.
- \* Chemical industries; are bases on oil as their raw material and produce goods such as plastics, detergents, cosmetics, industrial acids etc.
- \* Oil refining

**NB.** Most of the heavy industries are found on the reclaimed marshes of New York

### Factors that have favoured the growth of industries in New York

- The presence of relatively flat relief enabled easy construction of industries
- The presence of abundant raw materials for industries such as iron ore used in the iron and steel industries
- Presence of abundant power supply to run machinery and for lighting in form of oil, coal and hydro electricity
- The strategic location of New York on the eastern sea board gives it easy access to the imported raw materials like cotton, copper, coffee etc.

- The presence of well-developed transport and communication network like roads, railways, water and air used to transport raw materials to industrial centres and finished products to market centres
- Presence of adequate capital to buy industrial raw materials, machinery and for paying off workers
- Presence of advanced technology where much of the work is automated leading to high quality and quantity output
- Presence of abundant supply of skilled labour force to work in the industries as engineers, technicians, managers etc.
- Presence of a large domestic and foreign market for the manufactured goods
- Political stability attracted both foreign and local investors in the industrial sector.
- A positive government policy of encouraging and promoting industrialization in New York
- The availability of vast land for establishing and expanding industrial establishments

### **Contributions/importance of industries in New York**

- It is a source of employment opportunities to the people earning income with which they have improved their standards of living
- It has led to the development of infrastructure such as roads hospitals etc.
- It is a source of government revenue in form of taxes and this is used to develop other sectors of the economy like agriculture
- It has helped to develop skills among workers like technicians improving their efficiency
- It has led to international relationships with countries that import her goods increasing international trade
- It promotes urbanization in New York due to infrastructural development in the town centres attracting big populations
- It is a source of foreign exchange obtained after exportation of industrial goods used to develop other sectors like transport network
- It has helped to promote mineral exploitation in the USA encouraging the development of the mining and industrial sectors
- It has helped in the economic diversification of USA through the booming trade activities
- It has helped to improve the agricultural sector by providing ready market for their goods
- It has encouraged the growth of the tourist sector where the various industries are an attraction as well as a source of the needed industrial goods.
- It has promoted research which has resulted into greater innovations and inventions.

### **Problems faced due to industrial development in New York**

- Pollution of air, water and land due to poor industrial waste disposal and emission of poisonous fumes endangering human life
- There is increased population causing overcrowding and its related problems like poor sanitation
- There is shortage of accommodation facilities leading to slum development and associated problems like theft high crime rate
- There is a problem of land shortage due to increased industrial growth

- There are high crime rates due to wide spread unemployment such as drug abuse, theft prostitution etc.
- Exhaustion of resources especially minerals which are used by the industries
- There are high levels of unemployment due to increased populations attracted by the industries in the area so
- Traffic congestion is common especially on the roads where is movement of goods to market centres and raw materials to industries
- There are inadequate social services like health centres, recreational centres etc. because priority is given to industrial establishments

### **Solutions to the problems above**

- Underground tunnels and subways are built for vehicles and trains to reduce congestion
- Encouraging treating industrial wastes, gases and chemicals before dumping to reduce pollution
- Expanding the city both horizontally by extending to nearby islands and vertically by construction of sky scrapers to solve the problem of land shortage
- Reclaiming of more land for settlement to reduce over crowding
- Training more policemen to reduce the crime rates
- Importation of raw materials to solve the problem of exhaustion of particularly minerals
- Construction of more industries to create more jobs in order to solve the unemployment problem.

### **Effects of the development of New York port on the physical environment**

- There is pollution of the environment through emission of toxic gasses in the atmosphere and disposal of wastes in water and on land.
- They are faced with smog or fog due to industrial pollution leading to poor visibility hence accidents.
- Development of slums leading to poor sanitation and spread of diseases.
- High prices of land due to competition among land uses leading to land shortage
- Destruction of marginal lands or swamps leading to loss of natural beauty and floods.
- There is land shortage leading to high costs.
- Extension of concrete surface increases surface run off resulting in floods.
- There is traffic congestion between Long Island, Newark and Manhattan leading to delays in movement.

### **Steps being taken to improve New York port.**

- Continuous dredging to remove silt allowing the harbor to remain deep.
- Increase the construction of bridges and ferries connecting Manhattan to the surrounding areas.
- Construction of alternative means of transport such as airways, subways, flyovers to reduce on congestion.
- Construction of more skyscrapers such as The Trump Tower to reduce on shortage of land.

- Recycling or treatment of industrial wastes before dumping and proper disposal of wastes.
- Containerization to reduce on handling time and space.
- Time tabling of voyages to reduce congestion.
- Carry out urban renewal to solve the problem of slums.
- Encourage opening up of inland ports on the mainland to reduce congestion at the port.
- Use of radar system or flood lights to improve on visibility.

### **Comparison between Mombasa and New York**

#### Similarities

- Both are located at the mouths of rivers with New York at the Hudson River and Mombasa at Mwachi.
- Both are built on islands.
- Both ports have a low tidal range.
- Both are ice-free throughout the year.
- Both have deep natural harbours.
- Both are well sheltered from strong winds.
- Both are located on the eastern sides of the continents.
- Both have an extensive hinterland.
- Both ports have developed various industries.
- Both have grown into big urban centres.
- For both the entrance of the harbours is free from coral reefs.

#### Differences

- New York is bigger than Mombasa in size.
- New York is busier than Mombasa.
- New York has more advanced port handling facilities than Mombasa.
- The hinterland of New York is larger and more economically productive than Mombasa.
- New York port occasionally suffers from fog while Mombasa does not.
- New York is located on high latitudes while Mombasa is located on low latitudes.
- New York is located in North America while Mombasa is in East Africa.

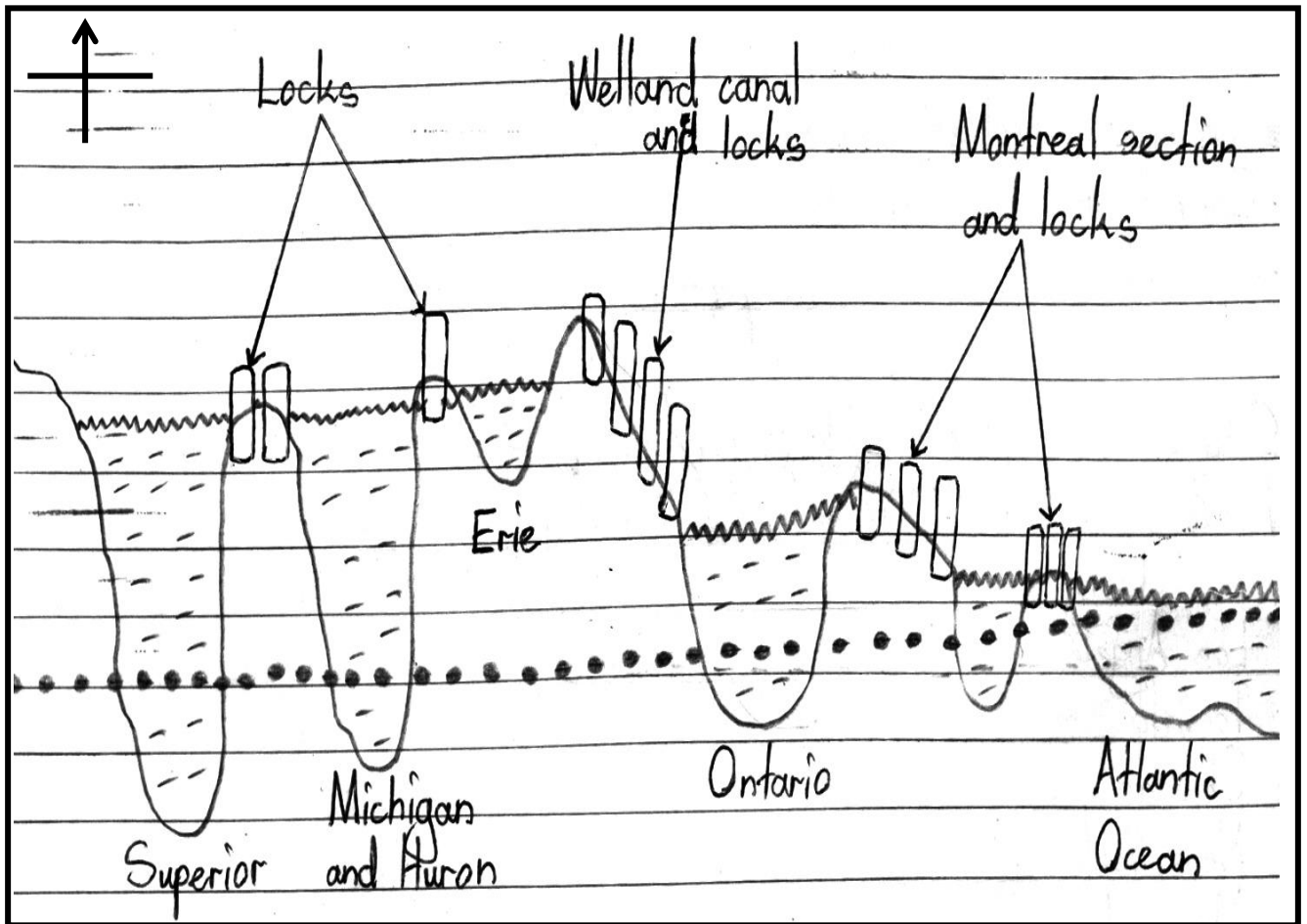
## ST. LAWRENCE SEAWAY (POWER PROJECT) AND THE GREAT LAKES REGION

St. Lawrence Sea way is part of St. Lawrence River which connects the Great Lakes region (Lake Superior) to the Atlantic Ocean on the eastern part of North America.

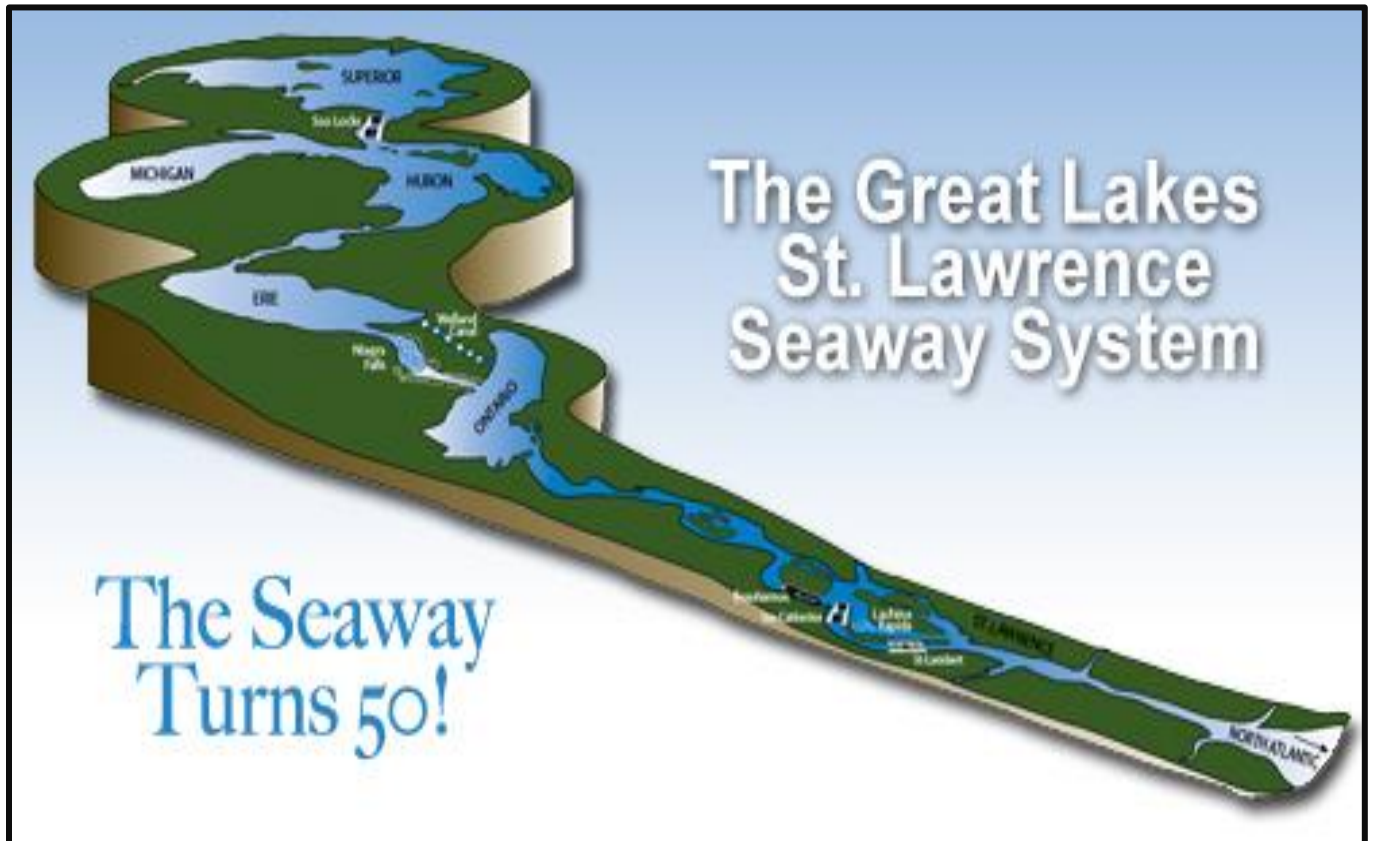
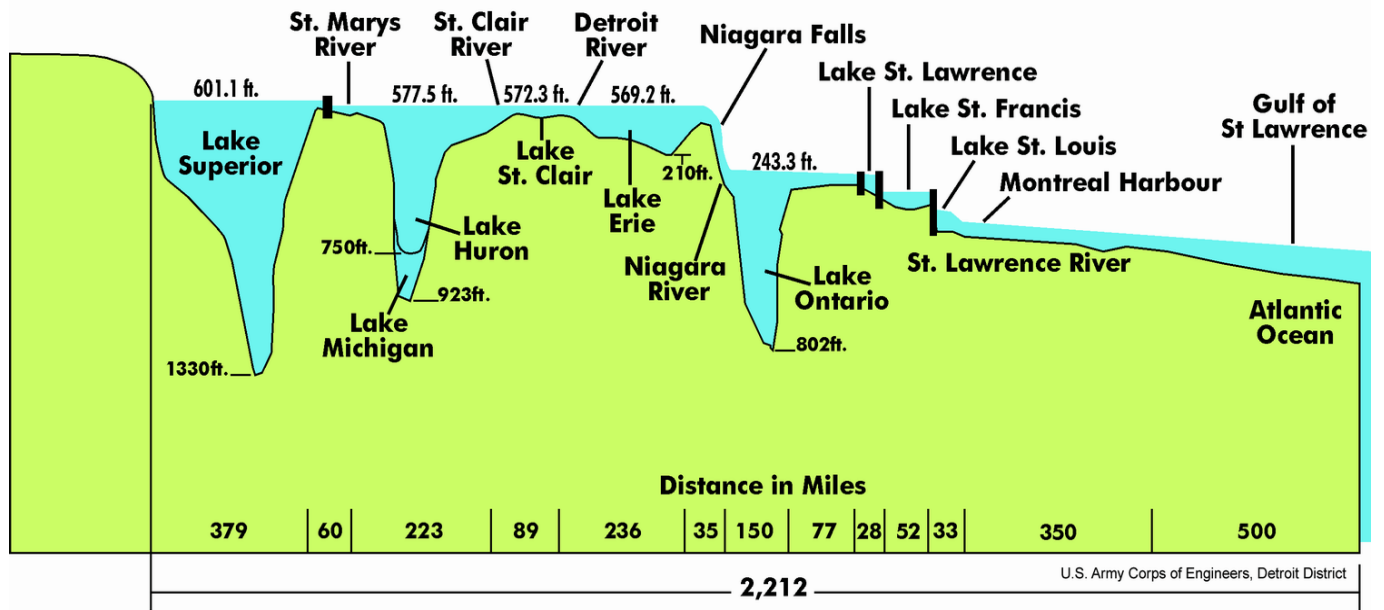
It is a sea route which was constructed to ease and accelerate quick transportation of commodities through creation of a deep navigable water between Montreal and Lake Ontario.

Due to some problems, the seaway construction was limited not until 1954 when the construction of this joint project was undertaken by both Canada and USA.

**A cross-section of the ST. Lawrence Seaway through the Great Lakes**



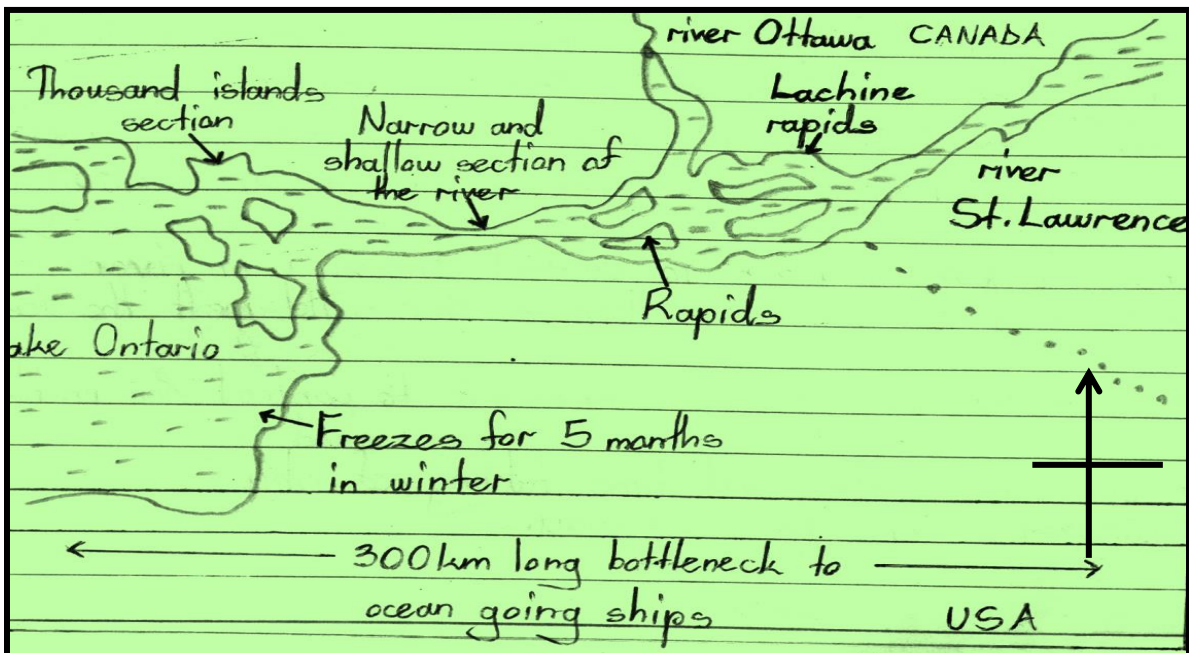
# Great Lakes System Profile



**Problems /shipping hazards faced before construction of the seaway (conditions which led to the construction of the seaway)**

- Many waterfalls and rapids on river St. Lawrence like Niagara Falls and Sault St. Marie made navigation impossible.
- Existence of thousands of small rocky islands restricted smooth flow of large ocean-going vessels.
- The seasonal flooding needed to be controlled using dams and locks to regulate the flow of water
- Seasonal blockage of the seaway by ice during winter needed to be broken to minimize the piling of goods and navigation delays.
- Some parts of river St. Lawrence were narrow and needed widening for all vessels to sail through.
- Some parts of the seaway were shallow therefore needed to be deepened.
- Silting of the seaway reduced the depth of water on river St. Lawrence.
- The Great Lakes were at different altitudinal levels i.e. Lake Superior at 183m, Huron at 174m, and Erie at 177m, and Ontario at 75m above sea level and so the need to regulate the level of water by building locks.
- Small ships would face the occurrence of fog during summer and this would result into accidents at Kingston and Montreal.
- There were numerous small lakes between Montreal and Ontario about 22 in number which made navigation difficult.
- The need to open up the interior of north America by exploiting resources such as extraction of iron ore at Labrador, wheat growing in the prairies of Canada etc. (condition not problem).

**A sketch map showing shipping hazards existed along the St. Lawrence Seaway before construction.**





## **Aims of the St. Lawrence Seaway**

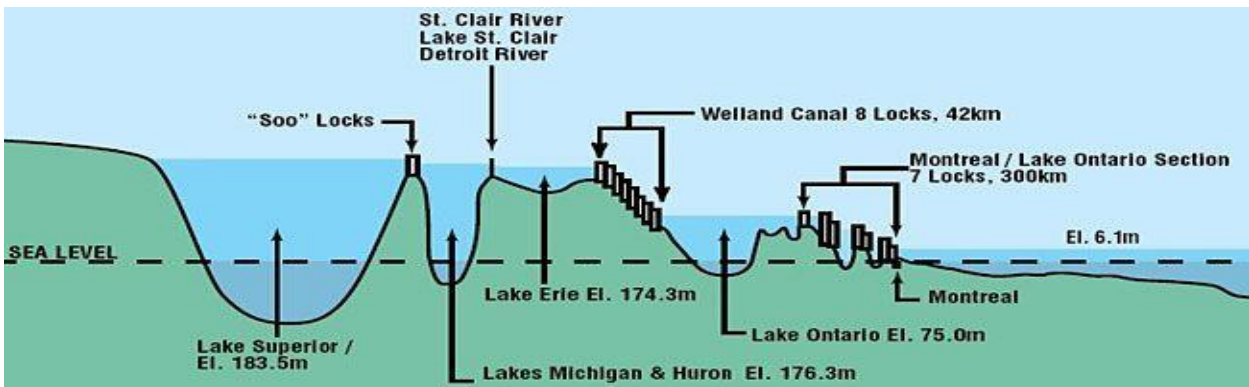
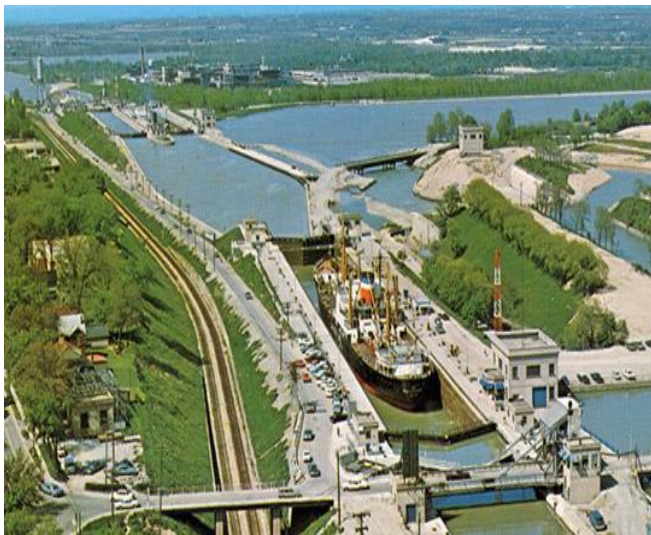
- To create deep and wide waters for navigation especially between Lake Ontario and Montreal
- To build dams for generation of hydroelectric power.
- To control floods of River St. Lawrence
- To enable cheap transportation of Canadian wheat from the prairies.
- To help in the exploitation of minerals such as iron ore at Mesabi ranges near the Great Lakes and Labrador.
- To provide an alternative route to the Northern route which would be frozen for several months in a year.
- To create employment opportunities in the region
- To industrialize the region since hydroelectric power was generated.
- To overcome the problems of rapids and water falls that were hindering navigation.
- It was to provide a cheap sea route into the interior for the transportation of the bulky imports and exports and a connection to the rest of the world.

## **Steps taken to improve navigation on the seaway /solve shipping hazards**

- Rocks were blasted using explosives to deepen the seaway like the thousand islands section.
- Ice-breakers were used to minimize the problem of freezing on the river.
- Use of radars to reduce the problem of fog
- Construction of canals to bypass waterfalls and rapids like the Welland Canal to bypass the Niagara Falls.
- Construction of locks to raise the water levels in shallow areas of the seaway enabling big vessels to sail through
- Dams were constructed to allow navigation and control flooding in areas with rapids like the Lachine and long Sault rapids.
- Dredging was done in areas that were shallow to deepen and widen the seaway.
- Alternative means of transport like roads and railways were used to avoid winter freezing.
- Introduction of containerization and timetabling of ships to overcome the problem of congestion on the seaway.

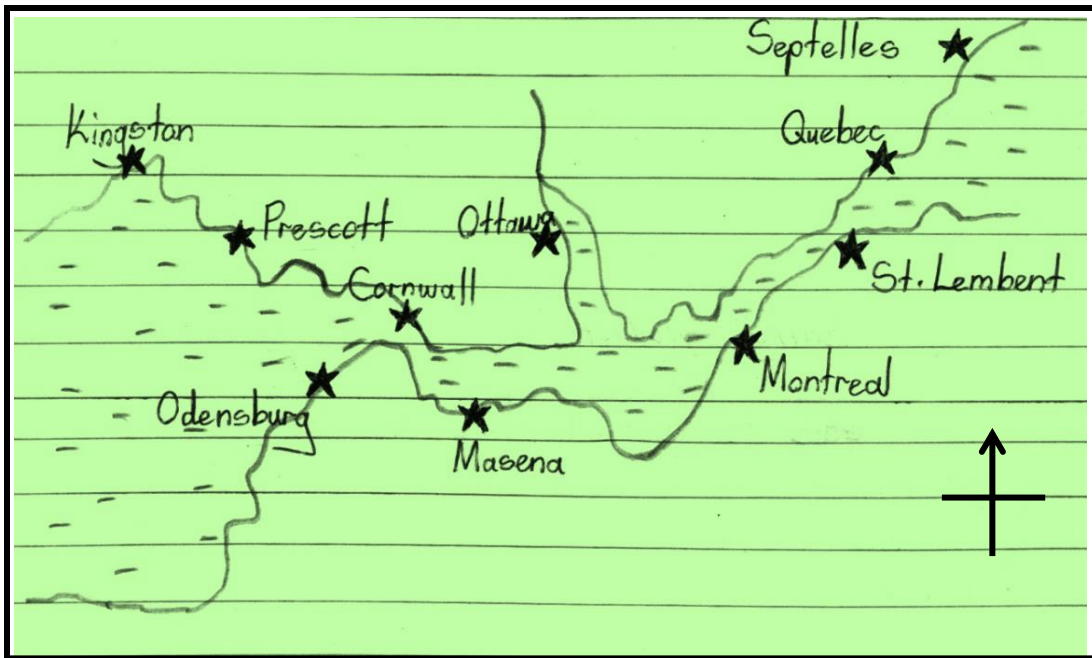


*Canals to bypass waterfalls and rapids like the Welland Canal to bypass the Niagara Falls.*



*Locks were constructed to raise the water levels in shallow areas of the seaway enabling big vessels to sail through.*

### The seaway after construction



#### Problems faced by people using the seaway/still experienced along the seaway.

- Seasonal freezing of the seaway for three months reduces its use for navigation.
- The occurrence of smog and foggy conditions at the mouth of river St. Lawrence leads to poor visibility causing accidents
- The seaway is still narrow and shallow especially for large ocean-going vessels.
- There is pollution of the seaway by well-established industries and oil spills causing air, water and land pollution
- Very large vessels cannot be used due to small size of the canals.
- Continuous silting of the seaway affects its usefulness for navigation as it becomes shallow for big vessels
- The seaway has many locks causing congestion and delays at the locks and ports.
- They are faced with problems of high costs of maintaining the locks and channels.
- There are problems of sea pirates
- There are many accidents especially those caused by oil spills leading to loss of lives.
- There is a decline in fishing industry since the seaway is always busy.
- There is traffic congestion due to many water vessels along the river causing delays.

#### Measures being taken to solve the problems above

- Timetabling ships to avoid congestion, delays and accidents
- Containerization to ease loading and offloading of goods to avoid delays
- Use of ice-breakers during winter to clear the seaway
- Use of alternative means of transport like roads, railways during winter when the seaway is frozen

- Constant dredging to overcome siltation
- Twinning of locks is being done which allows two-way traffic.
- Establishment of strict laws against pollution like clean air production act to minimize levels of pollution
- There is use of flood light or strong head lights on ocean going vessels to improve visibility.

### **Commodities transported along the seaway**

Various commodities are transported along the seaway and the Great Lakes region. These include Crude oil, wheat, coal, iron ore, machinery, timber, dairy products and metallic ores. Of these, imports include oil, iron ore, coal, asbestos, cobalt, tea, wheat, maize, corn. Exports include machinery and vehicles.

### **Benefits of the seaway to Canada and USA**

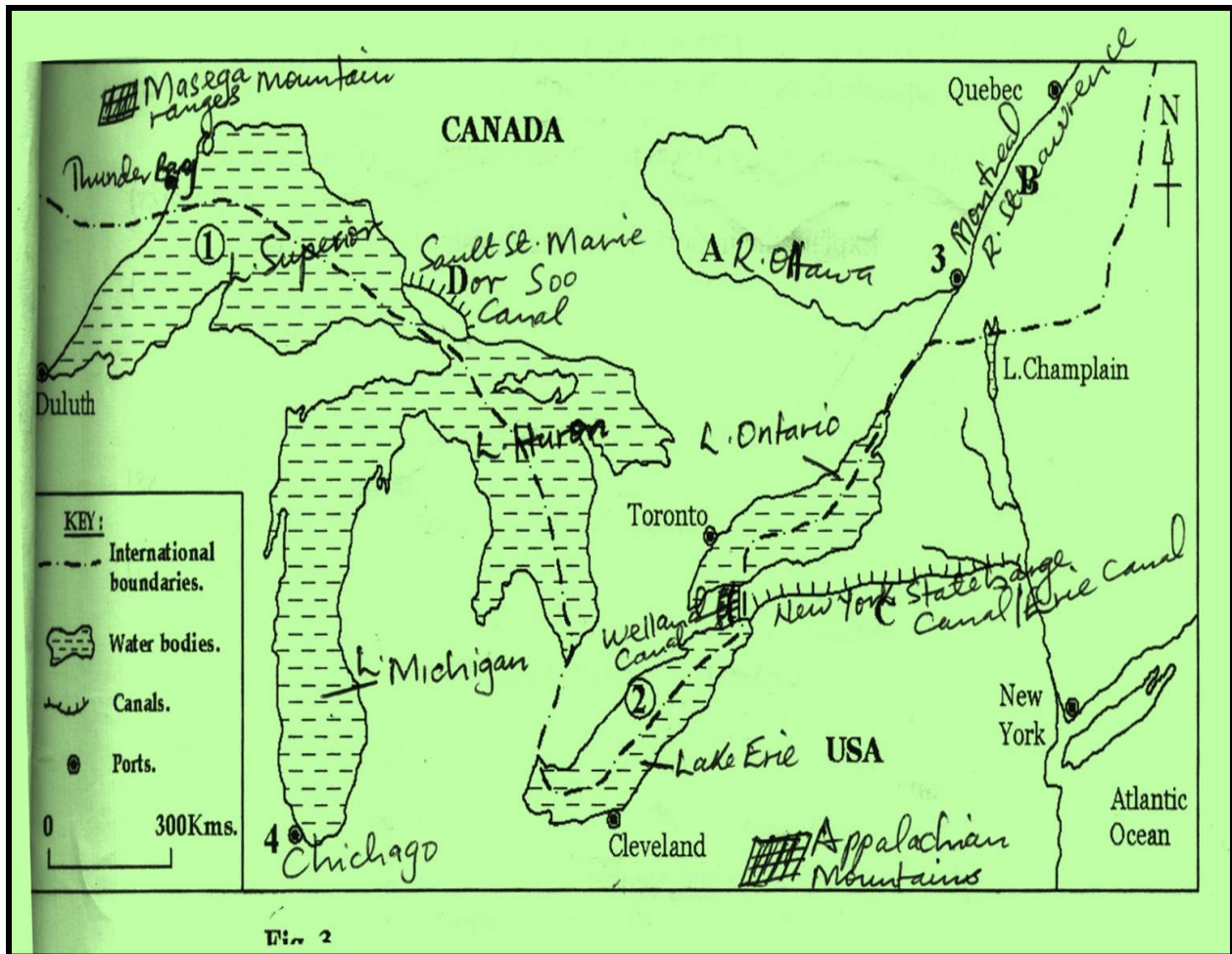
- The construction of dams led to the generation of hydroelectric power used for both domestic and industrial purposes.
- It has encouraged the exploitation of natural resources in the Great Lakes region like iron ore extraction from Mesabi ranges of USA and Labrador in Canada, coal from Pennsylvania and limestone from the southern parts of USA due to improved transport systems
- It provided cheap water transport to carry bulky goods like machinery, wheat, coal etc.
- It led to great improvement in navigation from the source of river St. Lawrence to Lake Superior.
- The seaway is a major tourist attraction because of its unique and scenic beauty like dams, waterfalls, locks, generating foreign exchange used to develop other sectors like infrastructure.
- It has led to growth of ports and towns like Montreal, Chicago, Toronto, and Kingston with their associated benefits like improved infrastructure.
- The project promoted international relationships between USA and Canada
- The seaway has generated revenue to the governments of Canada and USA from taxes on goods transported and ships sailing on the seaway.
- It has stimulated international trade among many countries in North America due to improved water transport in the region thus improving international relations.
- It led to industrial development in the Great Lakes region and along the river St. Lawrence like paper and pulp, iron and steel, and chemical industries due to presence of power.
- It generated employment opportunities in the transport sector, mining, power plants earning income thus improving their standards of living.

### **Problems created by the St. Lawrence seaway**

- Several villages and towns were flooded by the St. Lawrence Lake which was formed as a result of damming of the river St. Lawrence.
- There was displacement of people who had to be resettled elsewhere which was expensive

- More than 50km of the modern highways were destroyed during the construction of the seaway reducing transport network in the area.
- There was destruction of the natural habitat especially vegetation cover during construction of the seaway
- Loss of revenue from road and railway transport due to cheaper water transport.
- Creation of barren areas due to dumping of materials that were dug from the St. Lawrence River and also during the construction of the canals.

**A sketch map of the ST. Lawrence Seaway and the Great Lakes waterway, ports, towns, canals and rivers**





*This is an atlas abstract for reference purposes.*

### Major industries and industrial towns of the Great Lakes Region

- ❖ The major industrial towns include; Montreal, buffalo, Hamilton, Toledo, Quebec, Duluth, Chicago, Ottawa, Detroit, Pittsburgh, Toronto, Thunder Bay etc.

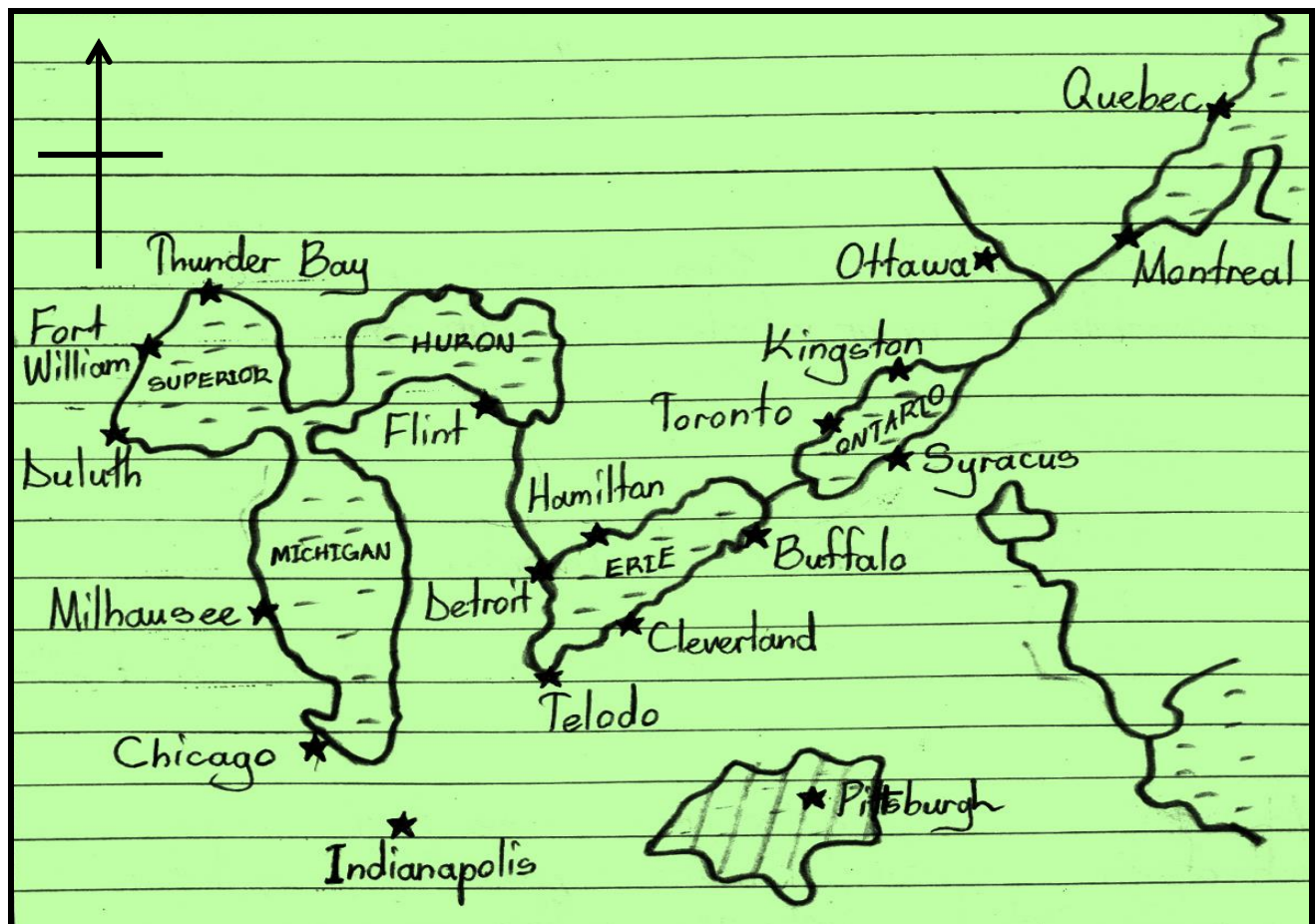
### Types of industries in the Great Lakes Region

- ❖ Pulp and paper; this industry is mainly found on the Canadian side of the Great Lakes region near the coniferous forests especially around Ottawa, Quebec and Ontario.
- ❖ Textile; this industry uses cotton as a raw material from the southern states of USA, wool from Australia, New Zealand and South Africa. It also uses synthetic fibers like nylon. They are found in Cleveland.
- ❖ Chemical industry; this has been encouraged by the availability of petroleum in the region and also from North Africa and the Middle East. Products from this industry

include; plastics, polythene sheets, detergents, dyes, paints, agricultural chemicals and pharmaceutical drugs. This is based in Detroit.

- ❖ Engineering industry; this specializes in the manufacture of automobiles /motor vehicles. It is found at Detroit, Buffalo with the main centre at Windsor.
- ❖ Ship building industry; this is based at Toronto and Detroit.
- ❖ Iron and steel, aluminum industry; this is one of the most important industries in the region. It depends on iron ore mined from around Lake Superior and coal from Pittsburgh. Products from this industry include; agro-machinery, railway wagons, cars etc. This is found in Chicago. Main centres for aluminum manufacturing are at Montreal and Hamilton.
- ❖ Agricultural processing; the Great Lakes region is agriculturally productive providing a variety of raw materials giving rise to the food processing industry. Examples include; meat packing, creameries, grain milling, fruit canneries and cigarettes manufacture. These are common in Chicago.
- ❖ Air craft engineering industry; this is based at Cleveland and Hamilton.
- ❖ Manufacture of leather products and footwear; this is based at Montreal.

#### A sketch map showing industrial towns in the Great Lakes Region



### **Factors that led to the growth of industries in the Great Lakes region**

- Availability of adequate raw materials like coal, iron ore, petroleum, wheat, cotton and timber for both light and heavy industries.
- The presence of efficient and well developed transport network of roads, railway and water for transporting raw materials and finished products.
- The availability of abundant power supply like hydroelectricity, petroleum, coal, and thermal power essential in running machines.
- Presence of large amounts of water from rivers and lakes used as a raw material in the beverage industry and cooling of machines.
- The availability of vast land for industrial establishment and expansion.
- The availability of adequate capital from private companies, individual investors, both USA and Canadian governments to invest in industrial establishments.
- Availability of adequate skilled labour due to the dense population in the region to work in the industries.
- The high level of technology based on the use of automated machines yielded maximum production of high quality products
- The presence of wide market for the industrial products both local and foreign.
- The favourable government policy of USA and Canada to support industrialization in the region by offering soft loans.

### **Importance of industrialization to Canada and USA**

- It generates employment opportunities to the local people around the Great Lakes region improving their standards of living.
- They are sources of various industrial products catering for people's needs such as detergents, plastics, dyes etc.
- They are sources of domestic revenue through taxes levied boosting the countries' economies.
- They are sources of foreign exchange through exportation of various industrial products used to develop other sectors of the economy like infrastructure.
- Industries have helped in promoting international relationships between USA, Canada and their trade partners increasing international trade
- They have promoted the exploitation of natural resources like minerals, forests, agricultural land encouraging the growth of more economic activities
- It has stimulated the growth of urban centres like Chicago, Duluth, Montreal with related growth of infrastructure like roads
- Workers have been able to acquire skills improving their efficiency
- Industries have promoted the development of infrastructure and social services such as roads, railways, hospitals, recreation centres etc.
- Industries have promoted economic diversification in both USA and Canada by promoting other economic activities like mining



### **Problems faced by the industrial sector in the Great Lakes region**

- Labour is gradually becoming expensive because workers are highly trained increases the cost of production
- Many industries have been set up limiting land for expansion of old ones and for new ones to be established
- Congestion of industries has facilitated competition between the industries for the available services especially labour and market
- There is pollution of the environment from industrial wastes and fumes as well as strict anti-pollution laws are limiting the expanding industry
- Winter freezing affects the transport network delaying delivery of raw materials and finished goods
- Traffic congestion in the industrial centres of the Great Lakes region cause delays in the delivery of products
- There is stiff competition for market for raw materials due to large scale industrial operation.

### **Solutions to the problems**

- Importation of raw materials from outside countries to reduce exhaustion and competition
- Importation of labour as well as use of automated machines like robots to reduce labour problems
- Recycling of industrial wastes before disposal to avoid pollution
- Use of ice breakers during winter to open up water transport
- Containerization as well as use of subways to control congestion

### **Problems faced due to industrialization in the Great Lakes region**

- There is over population in the industrial cities due to people seeking for employment leading to congestion
- There are high crime rates such as drug abuse, robbery due to high rates of unemployment
- There is high pollution rate of air, water and land due to poor waste industrial disposal and emission of poisonous gases leading to human health risks
- There is shortage of accommodation due to high population leading to the development of slums and their associated problems
- There is shortage of land for expansion due to competition with other land use types like settlement, farming, infrastructural development etc.
- High unemployment rates due to a large population as well as use of machines in various industrial processers
- There is easy spread of diseases due to overcrowding leading to low standards of living
- Mineral resources have been exhausted such as iron ore from Lake Superior and coal from Chicago.
- High costs of living are experienced due to high demand for goods and services.

- High government expenditure is experienced in the provision of social services to the big population



*Pollution of the environment from industrial wastes and fumes or emission of poisonous gases leading to human health risks*