Unit 4: Economic Geography

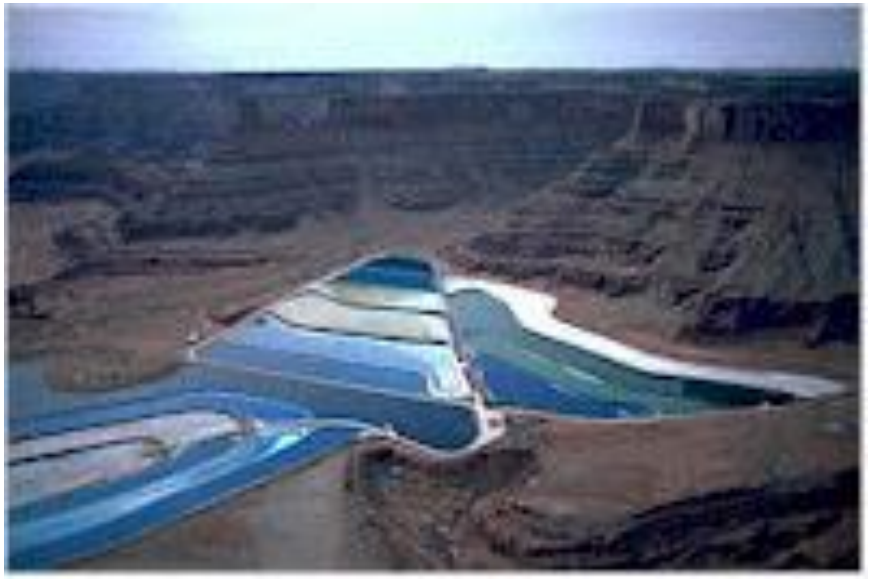
Resources from the
Land & Sea

Economic Geography

- Primary Resource Activity
- Secondary Resource Activity
- Tertiary Resource Activity

Economic Geography

- Primary Resource Activity:
  - Includes agriculture, fishing, forestry and mining.
  - The jobs here involve **resource extraction** and **agriculture**.

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Economic Geography

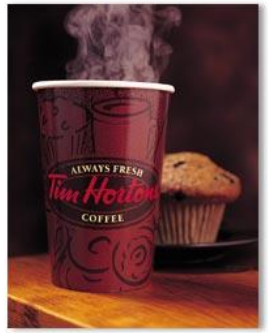
- **Secondary Resource Activity**:
- Includes **construction** and the **manufacturing** industries. Examples include fish plants and pulp and paper mills.

Economic Geography

- **Tertiary Resource Activity:**
  - Covers the **service producing industry**. Example Clothing stores, restaurants, etc.

Example:

Coffee Beans (Primary Resource Activity)
Filter Coffee (Secondary Resource Activity)
Coffee Sold (Tertiary Resource Activity)



Resource: An Introduction

- For a material to be considered a resource it MUST meet all 3 of the following conditions.

1. **Need or Want:** A culture must have a need or a want for the natural material itself or things that need the natural material.

Example: Hibernia Oil field (could be a resource).

Cont'd

2. **Technology-** A culture must have ability to extract and develop the natural material.

Example: The oil in the Hibernia field was not a resource until we developed the proper rig to extract it.

3. **Profit-** A culture must be able to make a profit from the material.

Example: Since 1997, the Hibernia project has been making money.

How Culture Affects Resources

- Example: Sea Urchins in Newfoundland
- In South East Asia Sea Urchins are a desired food source. (Want)
- Newfoundland developed inexpensive harvesting "Technology" because of the high demand.
- Thus, Sea Urchins (resource) were profitable due to inexpensive technology and high demand.

- Note: All 3 Conditions were met.

In these two pictures below, what resource(s) are the developed nation using in greater amounts than the lesser developed nation?

Systems Model

- Refers to a way of looking at any system and seeing that there are **inputs, processes, and outputs.**

1) Inputs

- **Inputs** are things that are **put into the system**, either by nature or by humans.
- For example, in **farming**:
  - **Human inputs:** Labour, equipment, fertilizer and irrigation systems
  - **Natural inputs:** Sunshine, heat and soil type.

Given a case study of a farming operation you should be able to briefly describe (inputs):

- - the workers and their source
- - the kinds of tools and equipment used
- - the infrastructure
- - the capital invested in the operation
- - the types of seeds or young livestock used
- - the nature of the land
- - the quality of the soil
- - climatic conditions.

2) Processes

- **Processes** are the **procedures** that occur in the system **to convert the inputs to outputs**.

- **Example:** In vegetable farming the processes would include:

  - **sowing seed**
  - **watering**
  - **fertilizing**
  - **weeding**
  - **aerating**
  - **harvesting**

3) Outputs

- **Outputs** are the things that are **produced by the system.**

- **Examples:**
  - In cattle farming: beef and raw hide
  - In vegetable farming: carrots, potatoes and cabbage.

Farming Inputs, Processes, and Outputs

Inputs

Climate
Topography
Seeds
Water
Sunlight
Labor
Plants
Fertilizer

Processes

Ploughing
Sowing Seed
Weeding
Harvesting
Spraying pests
Fertilizing

Outputs

Meat
Livestock
Crops

Inputs → Processes → Outputs

Insect infestation	Spray pesticides	good harvest
Dry Climate	water crops	good harvest

IMPORTANT:

- **The inputs you have determine the processes you use**
- **Both the inputs and processes affect what kind out outputs you get.**

Case study of a farming operation

- You should be able to briefly examine (processes):

-the **division of labour**…who does what?

-the **movement of people and animals**…do the workers **migrate**?
→ Are the animals moved between grazing lands?

Continued →

- how the crops are planted; **crop rotation**, **contour plowing**, is any land left **fallow**?
- **irrigation and soil maintenance** practices:

→is there a need for watering?

→How frequently do they fertilize?

→What do they fertilize with?

- What is the **annual cycle** of farming activities

Practice Multiple Choice

Which set of farming components is correct?

	Input	Process	Output
(A)	soil	seeding	rice
(B)	ploughing	pesticides	potatoes
(C)	seed	ploughing	labour
(D)	weeding	irrigation	vegetables

Recall from earlier…

- **Natural Inputs-** are natures inputs , into a farming system. (ex. climate , topography, soil etc.)

- **Human Inputs-** are man's inputs into a farming system. (ex. labor, seeds, fertilizers, etc.)
  - **(Read pgs 145-146 and complete handout 9.1)**

Commercial Farming

- Farming becomes a **commercial activity** when farmers produce crops or raise animals mainly for sale to others.
- **Ex:** Chicken henery, vegetable farm

What Are the Factors of Commercial Farming?

1. **Size of Farm**: usually large.
2. **Equipment:** uses more machinery with not much manual (hands-on) labour.
3. **Yields (how much is produced):** Commercial farms use science, fertilizers and chemicals , and crop rotation to help increase yields.

Traditional, Non-commercial Farms Types Of Agriculture

- There are different ways to compare farms:
  - Commercial vs. subsistence farming
  - Extensive vs. intensive farming
  - Shifting cultivation vs. nomadic herding vs. agribusiness

Commercial farming

- producing food for sale

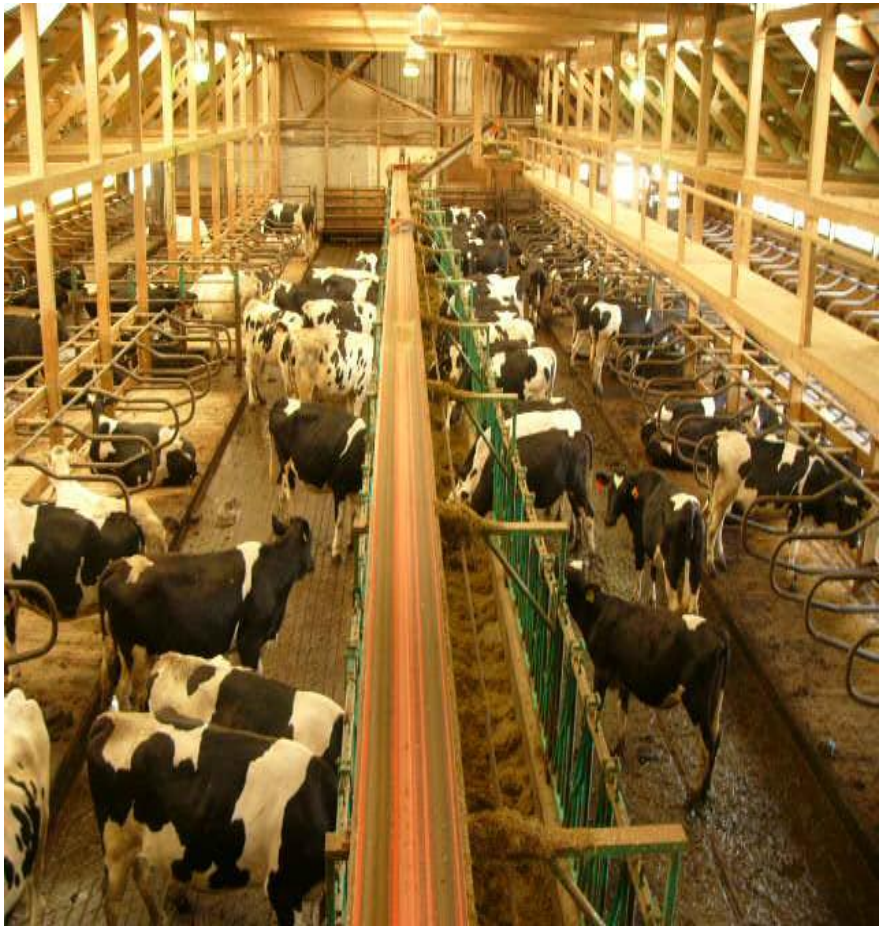
- **Example:** large wheat farms of the prairies

Subsistence farming

- Producing food to feed your family.

- **Example:** Sally's vegetable garden in the back yard

Commercial



Subsistence

Factors involved in Subsistence Farming

- **Equipment:** Subsistence farms are more **labour intensive.** Farms would be too small for things like tractors.

- **Yield:** Yields are **lower on subsistence farms** because farmers tend to produce the same crop year after year, which uses up the soils nutrients.

Another sample multiple choice…

Which is associated with subsistence farming?

(A) advanced technology
(B) capital intensive inputs
(C) high outputs
(D) slash and burn techniques

Extensive Agriculture

- Uses large areas of inexpensive land
- Found in unpopulated areas
- **Example**: Cattle farming in western Canada

Intensive Agriculture

- Uses smaller areas of land
- Found in more densely populated areas
- **Example:** Dairy farming in the Goulds (near St. John's)
  - Milk needs to be located near the market.

Intensive Agriculture…Examples

Shifting Cultivation

- A form of extensive agriculture
  - **Example:** Planting crops in a region until soil fertility is used up and then moving to a fresh area to plant
  - This means there must be lots of land available.

Shifting Cultivation

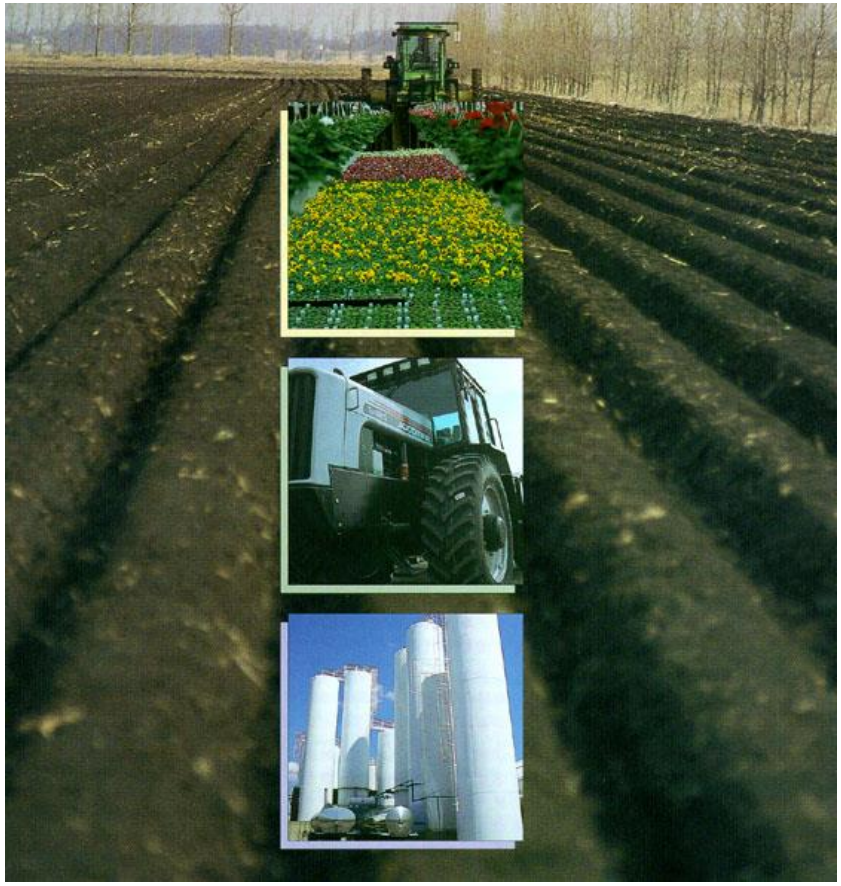
Nomadic herding

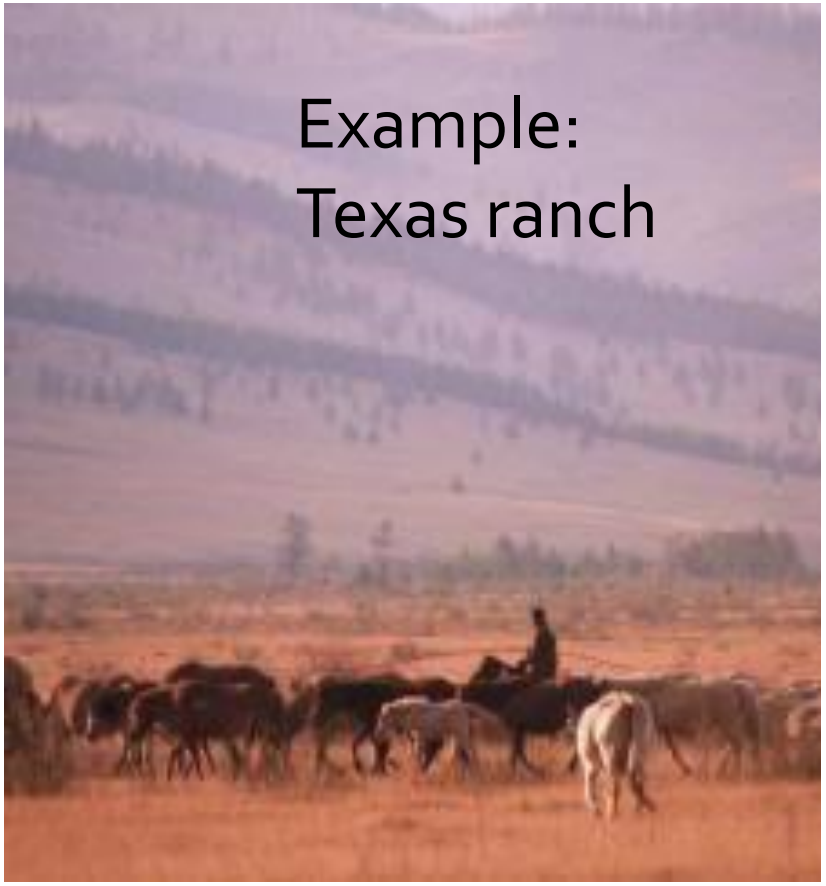
- Similar to shifting cultivation
- Instead of moving crops, this involves moving animals (cattle, sheep, etc.) from place to place using large areas of land.

Agribusiness

- A form of commercial farming
- Run by large corporations that are self sufficient, providing their own inputs and processing their own outputs

Agribusiness vs. Nomadic Herding





Forest Resources

- Forests & Climate
- Deforestation
- Clear Cutting & Selective Cutting
- Sustainable Forestry
- Clear Cutting Controversy

Forests & Climate

- What parts of climate affect forest development?
  - **Precipitation**
  - **Seasons**
  - **Diversity**

Precipitation

- Forests need lots of water.
- **One of the main factors that determine whether a forest will grow in a region is amount of precipitation.**
- Ex: **Tropical** areas with **high rainfall** have **tropical rain forests**.
- Ex: **Tropical** areas that only get rain during certain times of the year have **savannahs**.

Seasons

- **Temperate regions** of the world (like most of the United States) often have **deciduous trees** (that lose their leaves) to help them deal with the lack of water availability in winter.
- Some regions have dry seasons and they have deciduous trees even though it does not get "cold."
- So the **type of trees and forest** you see in a region depends on **the climate**.

Adaptations

- Trees have adapted to climate just as animals have.
- The **needle leaf trees** of the coniferous forests are adapted to deal with winter and the lack of available water in winter.
- Both the tropical regions of the world and the sub arctic regions of the world have evergreen trees.

Diversity

- **Biodiversity** is the amount of plant and animal life in an area.
- **Colder regions** tend to have **less biodiversity**
- **Tropical regions** tend to have **greater biodiversity.**
- The same is true of trees.
- **Tropical forests** tend to be a blend of **many different species**.
- **Coniferous forests** tend to be "pure stands" of **one type of tree**.

Tropical Forest

Coniferous Forest

Deforestation

- Approximately **one-third (1/3)** of the earth's land masses are **covered in forest**.

- **Deforestation** is the removal of forests for human uses by cutting and/or burning.

Forests provide the following:

- Biodiversity
- Habitats for animals
- Food for animals
- Air purification (taking in CO_2, releasing O_2)
- Water retention
- Man has used forests for: Recreation, building materials, home heat and paper .

Why are we using so much forest resource?

- Some reasons for extensive deforestation include:
  - expanding needs in agriculture
  - urbanization
  - mining operations
  - hydroelectric operations

Examples of deforestation

- In Africa forests are being cleared to make room for subsistence farming to support the growing population.

- Latin America has cleared forests for major hydroelectric projects to provide stable electrical supplies to an increasing number of people. Large scale cattle ranches and urbanization have also been the cause of deforestation in Latin America.

- Asia's growing population means that more forest is cleared for housing and for agricultural land to feed the people.

Clear Cutting

- **Clear cutting** is a form of forest harvesting that **removes all trees from an area.**
- Marketable trees and undesired trees alike are cleared and the land is left uncovered.
- **Strip cutting** is a kind of clear cutting where strips of forest are left between the clear cut areas.

Selective cutting

- A form of forest harvesting that **removes only the desired trees** and leaves the other trees in place.

- Immature trees, undesired species and underbrush is all left in place.

Clear Cutting & Selective Cutting

- **Clear cutting** has the advantage of being **economical (cheaper) and safe** because harvesters don't have to spend time picking out the trees to leave behind.

- **Selective cutting** has the advantage of **leaving the ecosystem intact** because only certain trees get picked out to cut.

Sustainable Forestry

- **Sustainable forestry:** Cutting forest at a rate that the forest will re-grow or be replanted.

- If we cut trees faster than they grow back, we will run out of trees.)

Sustainable forestry from a "Systems Model" perspective:

We have three options :

1. Improve **inputs**: Replant more seedlings.
2. Improve **processes** like:
   - Building better woods roads
   - harvesting techniques: Maybe do more selective cutting
   - environmental protection actions
   - Waste less wood (use all of the tree)

- Reduce the need of output product
  - Recycle more wood
  - Use alternate building materials

Systems Model & Offshore Oil

UNIT 4
Resources from the Sea

Offshore Oil Formation and Reserves

- The oil we use today began to form millions of years ago when plants and animals from the oceans died and settled on the ocean floor.
- Both large and smaller organisms contributed the bulk of the **carbon** for oil.

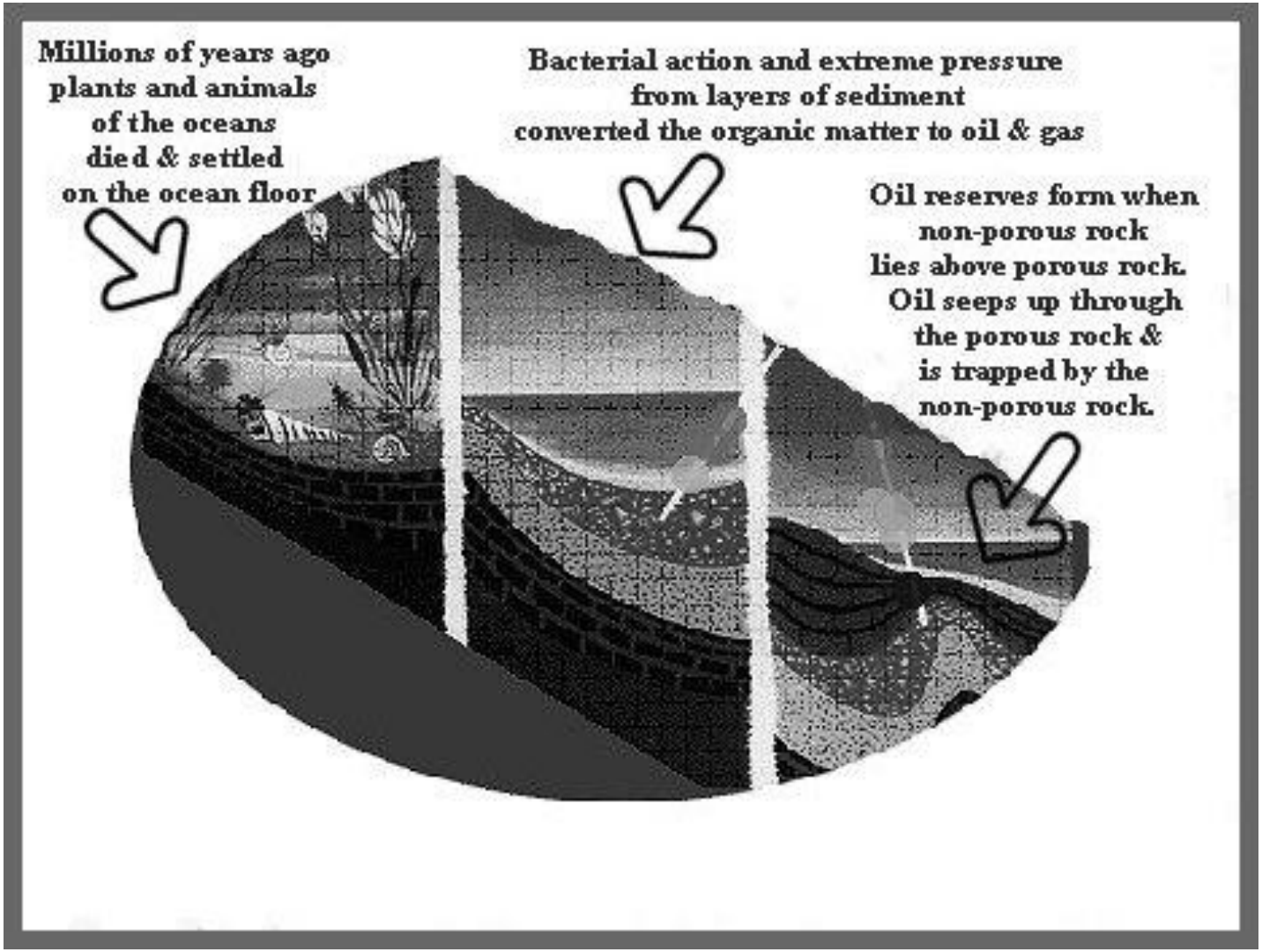
Offshore Oil Formation and Reserves

- Over many thousands of years **bacterial action (breaking down) and extreme pressure** from layers of **sediment** (thin soil) converted the organic matter to oil & gas. The more layers of sediment that built up, the more pressure there was.

- The **pressure** created great amounts of **heat** which helped the process along.

Offshore Oil Formation and Reserves

- Over time, the oil was squeezed through layers of **porous rock** (rocks with holes) and into empty pockets below the earth.
- **Non-porous** (solid) rock that sat above these pockets acted like a cover and kept the oil from getting out.
- The pockets happen because of **folds and faults** (from Unit 1) below the earth's surface.


Millions of years ago plants and animals of the oceans died & settled on the ocean floor
Bacterial action and extreme pressure from layers of sediment converted the organic matter to oil & gas
Oil reserves form when non-porous rock lies above porous rock. Oil seeps up through the porous rock & is trapped by the non-porous rock.

History of Oil Drilling

- **1860's:** Wharves were built extending 365m out into the ocean to allow ocean drilling off California.
- **1920's:** A drill rig was built on wooden pilings in Lake Maracaibo, Venezuela
- **1930's:** A drill rig was built on steel structures in the Gulf of Mexico but it was limited to 7m of water or less.
- **1956:** The first drill ship was built allowing drilling in deeper water. These types of drill ships allowed exploration off the shores of Newfoundland.

Modern Drill Rigs

- 4 different types of oil rigs used to recover oil from under the ocean floor:
  - Submersible Rigs
  - Jack-up Rigs
  - Semi-submersible Anchored rigs
  - Semi-submersible Dynamically Positioned

Submersible Rigs

- **Fixed columns** ground them on the ocean floor
- Can only work where the ocean is up to **20 m** deep.
- **Found mainly on continental shelves**, relatively close to shore.
- Floated as they are towed to drill site.
- Once in position **ballast tanks** are flooded until columns rest on ocean floor.

Jack-Up Rigs

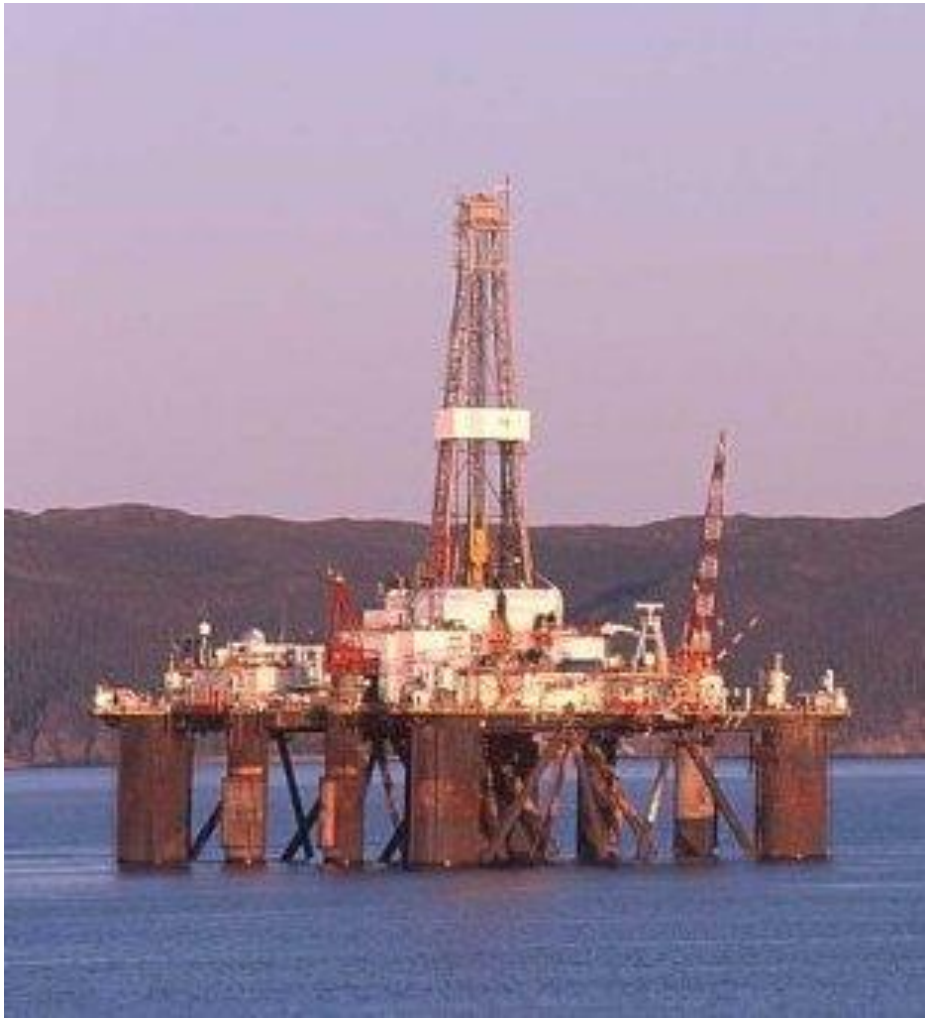
- **Extendable legs** ground them on the ocean floor
- Able to **drill in deeper water than submersible rigs**
- Maximum ocean depth: **100 m**
- Similar to the submersible in that it **rests on the ocean floor.**
- However its **steel legs** (not columns) rest on ocean floor.

- Jack-up rigs are distinguishable by **high X-braced steel legs** which extend above the platform**.**

Semi Submersible Anchored Rigs

- **Anchored** above the drill site
- **Floats** on the ocean
- Maximum ocean depth: **200 meters**
- Rig is towed to the drill site
- Water is pumped in and out of **ballast tanks** to help stability along with anchor lines .
- **Oil is stored in pontoons** until shipped on-shore.

This semi-submersible was repaired in Mary's Harbour, NL. Steel pontoons float and ballast the rig.



This picture was taken off Brazil and shows the importance of maintaining proper balance of stored oil and ballast in the columns.

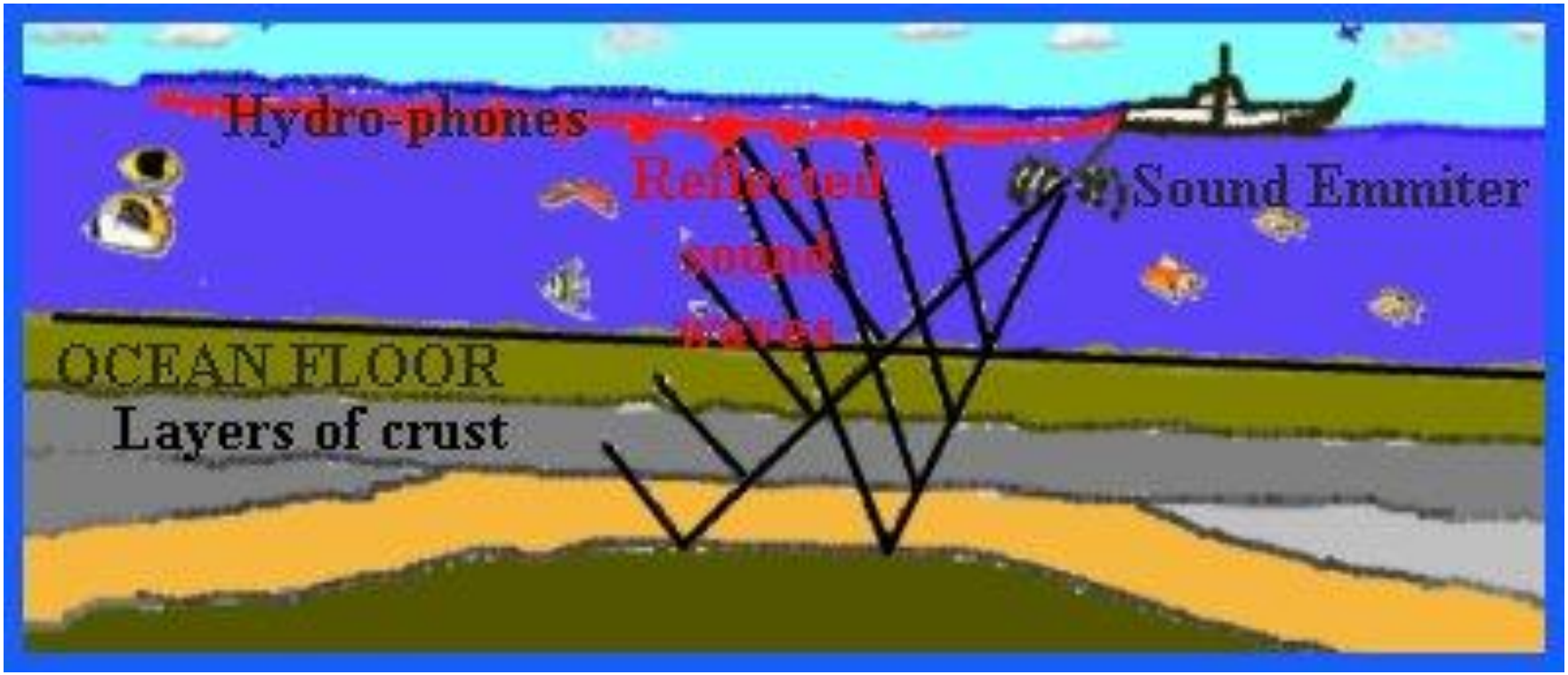
Semi Submersible-Dynamically Positioned

- **Note: dynamic means changing or moving.**
- These rigs are **able to drill outside the continental shelf**.
- Maximum ocean depth: **2000 meters**.
- Towed to the drill site.
- Water is pumped in and out of ballast tanks to help stability
- There are **no anchor lines**.
- **Thrusters (like propellers)** position the rig over the drill site.
- **Oil is stored in pontoons** until shipped on-shore.

Modern oil exploration on the seas

- Ships tow **sound emitters** and **hydrophones**
- Different rock layers reflect sound differently
- Computers convert the **sound data into 3D pictures** of the ocean's rock layers.
- **"Wild cat" wells** are drilled to test for oil:
  - if they strike oil, other wells are drilled to figure out the size of the reservoir **(oil pocket)**
  - if they miss oil, the **core samples** are examined for evidence of oil.

Modern oil exploration on the seas



Patterns of Offshore Oil Production

- Most oil regions of the world are on land.

- The largest ones that are under the ocean floor are concentrated in:
  - The North Sea (between England and Norway)
  - The Gulf of Mexico
  - West Africa

Off-shore Oil…The Decision to Recover

- The systems model is useful in helping determine whether an oil reserve is worth developing.
- Oil companies must decide whether the cost of inputs and processing will be paid for by the value of the output oil.
- **Oil Price – Cost of Production = Profit**
- There are physical and human factors that help make the decision to recover oil and gas from an off-shore reserve.

Physical Factors Affecting Off-shore Oil Recovery

- Ocean related factors
- Climate/weather related factors
- Oil Related factors
- Environmental protection factors

Ocean related factors include

- 1) Ocean depth
- 2) Ocean currents
- 3) Icebergs & pack ice

Climate/weather related factors include

- 1) Wind speeds
- 2) Storms

Oil-related factors include

- 1) Size of the reserve
- 2) Oil quality

Environmental factors

- **Question to consider:** How do these other physical factors affect the chances of an oil spill?

- **Answer:** Other resources like fish stocks, marine mammals, and spawning grounds would be affected in the event of an oil spill.

Human Factors Affecting Off-shore Oil Recovery

- Worker Safety
- Financial Factors

- How safe can the drill rig and production platform be for the workers?

Financial Factors include

- Cost of inputs
- Cost of processes
- Price of oil

Cost of inputs like…

- Building a rig to withstand icebergs
- Building a rig to drill at great depths
- Building a production platform that can withstand hurricane winds

Cost of processes like…

- Transporting the oil from off-shore to land
- Maintaining the platform's equipment
- Pressurizing the reserve

Price of Oil

- This is set by world markets and determines if enough money is recovered from the oil to exceed the cost of production

Factors that affect the profitability of oil production

- **Oil exploration is more accurate** so less money is spent finding the oil
- Production platforms are **more efficient**.
- **Directional drilling has increased contact with source rock** and reduced the need for movement of production platforms.
- Oil prices are controlled by the markets and OPEC (Oil Producing Economic Countries) When oil prices are high we complain at the pumps but the oil companies have a greater chance of making a profit.

Unit 4 Resources from the Sea

Fishery Resources

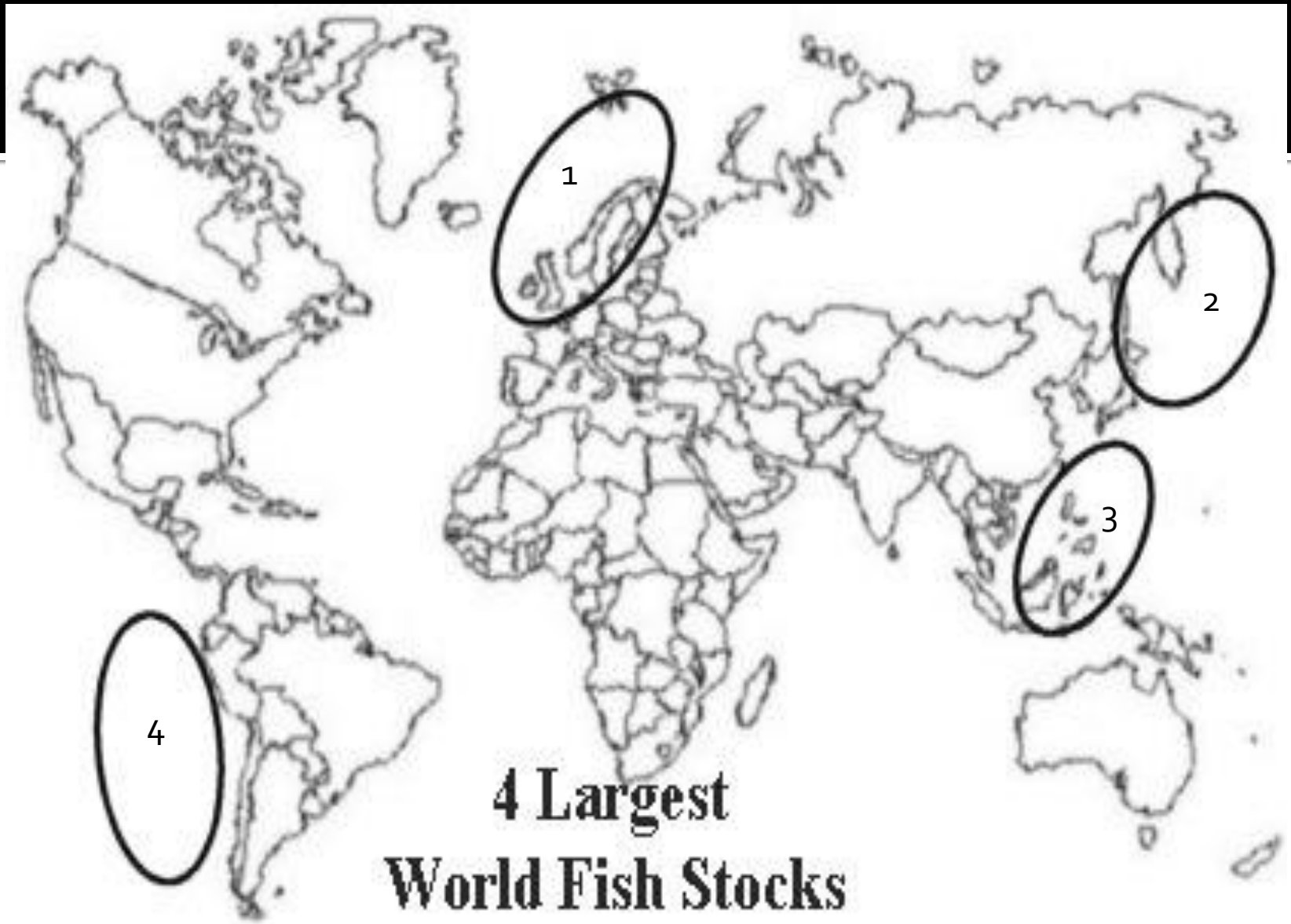
Fisheries; an Introduction

- Major World Fish Stocks
  - Almost all the world's fish stocks are located on the **continental shelves** around the world.
  - **About 80% of fish harvested come from oceans**.
  - **WHY ?** Most of the world's water is ocean therefore most of the world's fish live there instead of in fresh water (lakes, rivers)

Four Major Fishing Regions

1) North east Atlantic (England/Norway);
2) North west Pacific (Japan);
3) West central Pacific (China/Indonesia);
4) South east Pacific (Western South America)

- Map follows


1
2
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4 Largest
World Fish Stocks

Continental Shelves

- Most fishing grounds are found on **continental shelves** for 2 reasons:

1. The **shallow waters** of the shelf help **phytoplankton** to grow better. They act as the **base of the marine food web,** including fish.
   - **Shallow water ensures enough light for phytoplankton** and effective circulation of nutrients.

2. The shallow waters of the shelf make harvesting more **cost effective**.

- This means that it **costs less money** for fishers to go to the continental shelf. They can make more trips and bring back more fish to sell.

(See figure 12.4 on page 200. Figure 12.6, page 202 shows stocks correspond to shelves & figure 12.4 shows food web and shelves.)

Fisheries Management

- Describe the major sources of ocean pollution
- Discuss issues regarding fisheries management
- Describe the impact on fishers' lives

Some of the issues related to the fishery that require management are:

- pollution
- conservation of fish stocks

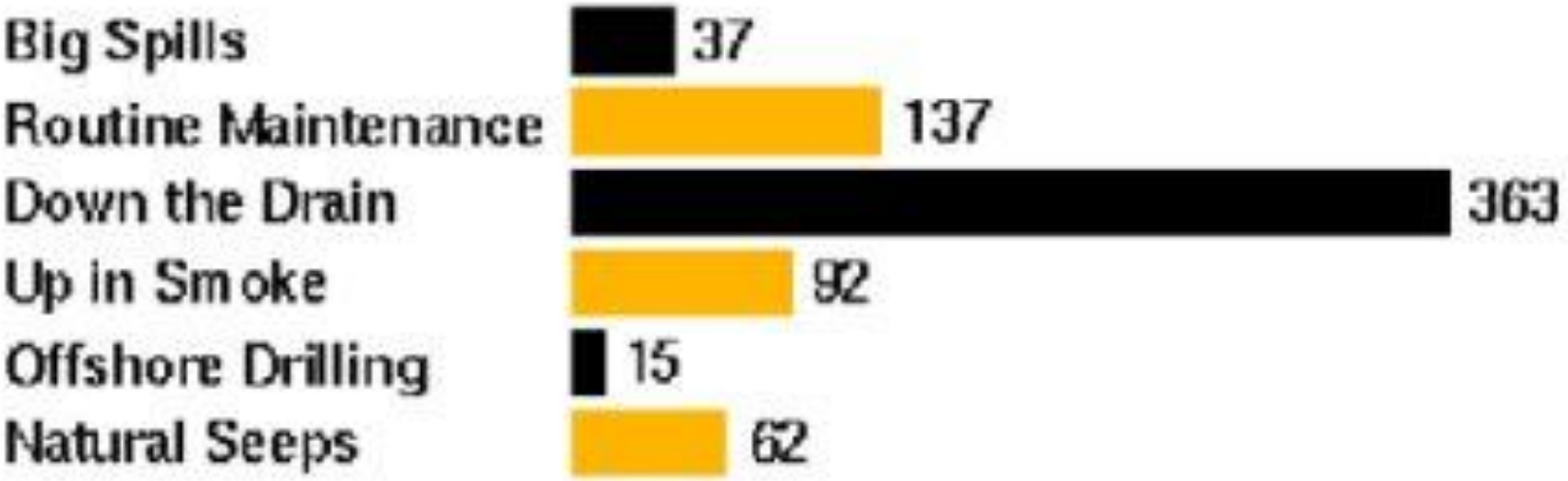
Major Sources of Ocean Pollution

1. *Oil*
2. *Toxic Material*
3. *Dangerous Debris*
4. *Deposits & Withdrawals*

1) Oil

- When it comes to mixing oil and water, oceans suffer from far more than an occasional devastating spill.
- Disasters make headlines, but hundreds of millions of gallons of oil quietly end up in the seas every year, mostly from non-accidental sources.

Main causes of oil pollution (millions of gallons [4L/gallon])

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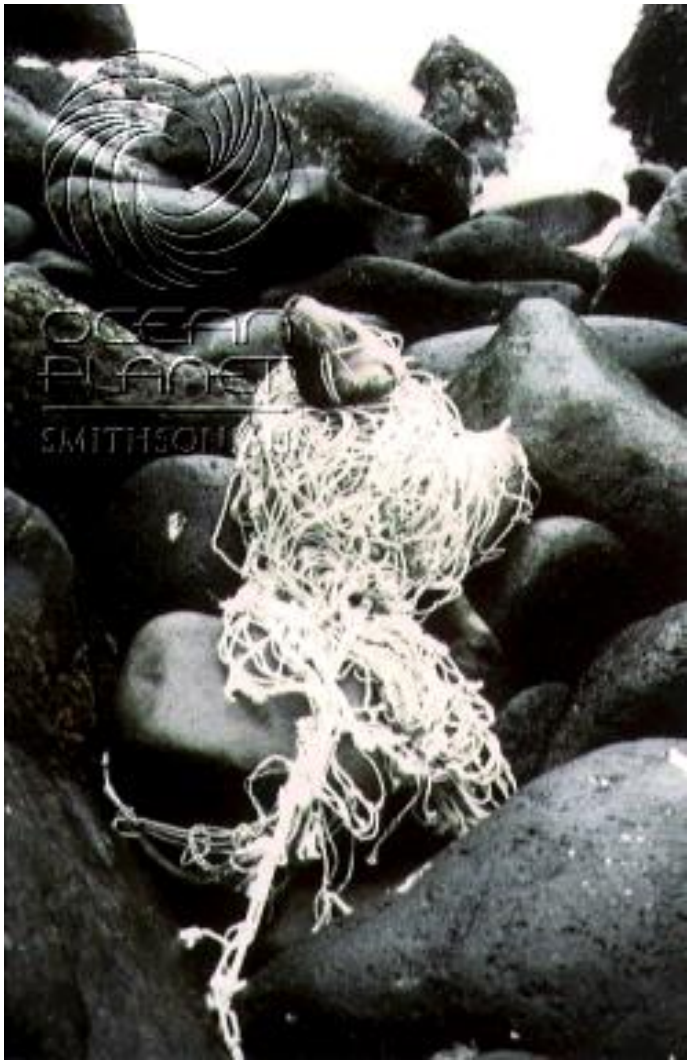
2) Toxic Material

- **Industrial, agricultural, household cleaning, gardening, and automotive products regularly end up in water**.
- About 65,000 chemicals are used commercially in North America today, with about 1,000 new ones added each year. Only about 300 have been extensively tested for toxicity.
- **TBT**, or **tributyl tin**, is added to boat paints to kill or repel barnacles and other nuisance organisms that foul ships' hulls.

3) Dangerous Debris

- Our trash kills. When odds and ends of life on land-- especially plastics--end up in the sea, they pose hazards to marine life.
- Animals drown or strangle from getting tangled in discarded or lost fishing gear, or suffer and even die from eating plastics and other garbage.

A northern sea lion, entangled in an old net

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a party balloon that killed a sperm whale by blocking its digestive tract.

4) Deposits & Withdrawals

- For thousands of years humans have viewed oceans as vast dumps for domestic, municipal, and industrial garbage.
- The enormous deep-sea resources will undoubtedly attract more miners in the future, as easy-to-reach deposits on land are depleted.


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Impact of New Catch Technology on the Environment

- **Factory freezer trawlers** have likely had the most significant and negative impact.

1) **They are highly efficient (very good) at catching fish** which greatly reduces the population & reproduction. They have large diesel engines, echo sounding equipment, onboard freezers, and GPS navigation.
2) **Destruction of the ocean floor by trawls/draggers** disturbs fish spawning grounds and makes it harder for fish eggs to grow into new fish.
3) **By-catch (unwanted fish) is often thrown back…dead or alive**. Some regulations require ships to return with low levels of by-catch.

Factory freezer Trawlers (cont.)

- Traveling great distances and being able to stay at sea for long periods allows trawlers from all over the world to gather in good fishing areas. This puts added pressure on the fish stocks.

Declining Fish Resource & the Livelihood of Fishers

- Fishers may **concentrate more on conservation**.
- Fishers and the community they live in will have to **diversify**:
  - develop **aquaculture**. Ex. Bay D'Espoir (NL south coast)
  - sea weed aquaculture. Ex. Isle aux Morts (NL southwest coast)
  - **eco-tourism.** Ex: Whale-watching, iceberg tours
  - catch **underutilized species (**fish that may have a use if a market can be found**)**