Unit 4: Economic Geography

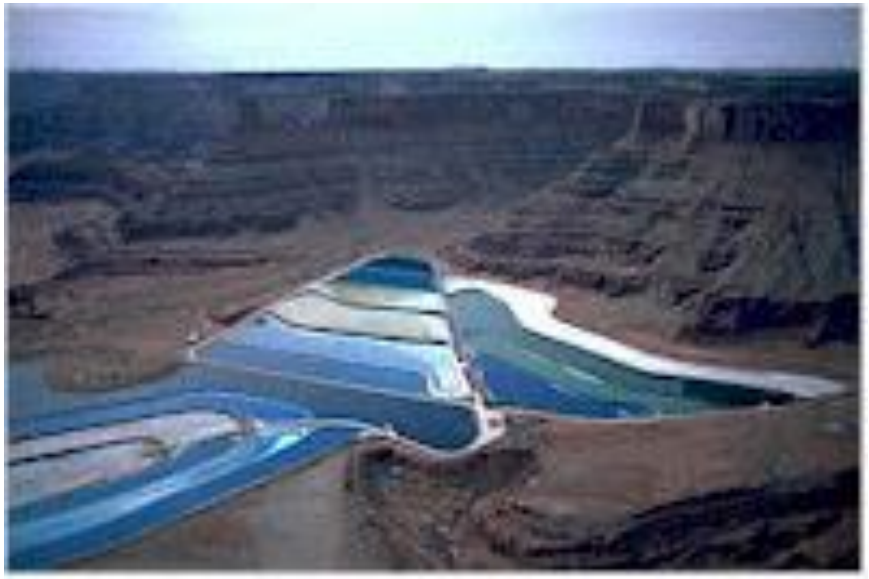
Resources from the
Land & Sea

Economic Geography

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

Economic Geography

- Primary Resource Activity:
  - Includes agriculture, fishing, forestry and mining.
  - The primary industries are associated with **resource extraction** and **agriculture**.

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Economic Geography

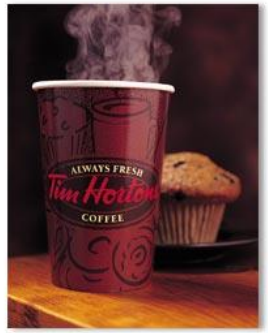
- **Secondary Resource Activity**:
- Includes **construction** and the **manufacturing** industries. Examples include fish plants and pulp and paper mills.

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 natural occurring material to be considered a resource it MUST meet all three of the following conditions.

1. **Need or Want:** A culture must have a need or a want for the natural material itself or things requiring the natural material.
   Example: Hibernia Oil field (potential resource).

Cont'd

2. **Technological Development-** A culture must have technological capabilities to extract and develop the natural material. **Example:** The oil in Hibernia was not a resource until we developed the proper machinery to extract it.

3. **Profitability-** A culture must be able to make a profit from the material. **Example:** Since 1997, the Hibernia project has been profitable.

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.

Using the two pictures below determine what resource (s) the developed nation is using in greater amounts than the lesser developed nation.

Systems Model

Refers to a model for looking at any system (farming, oil production, tire factory, schooling) and recognizing there are **inputs, processes, and outputs.**

1) Inputs

- Refers to those things that are **put into the system**, either naturally 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

- Refers to those **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

- Refers to those things that are **produced by the system.**
- **Example:** In cattle farming the outputs could include beef and raw hide
- Vegetable farm outputs could include 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	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.**
- **So…**

Case study of a farming operation

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

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

-the **spatial movement of people and animals**…are the workers **migratory**?

- 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?
- the **annual cycle** of farming activities
- how farming activities spatially arranged

The Case Study

"A Mixed-Vegetable Farm In Canada"
Read pages 145-146 and the associated questions will help you apply your knowledge.

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)**

Practice Multiple Choice

Which is a human input in a farming operation?

(A) climate
(B) genetically altered seed
(C) quality and depth of soil
(D) sunlight

Commercial Farming

- Farming becomes a commercial activity when farmers produce crops or raise animals primarily for sale to others. **(ex. Ferguson's vegetable farm in Canada…textbook)**

Determining Factors of Commercial Farming

1. **Size of Farm**: large commercial operation
2. **Equipment:** technologically advanced operations with a low labour requirement.
3. **Yields:** Scientific farming techniques , use of fertilizers and chemicals , and crop rotation all help increase yields.

Traditional, Non-commercial Farms Types Of Agriculture

- Classifications of farms:
  - Commercial farming vs. subsistence farming.
  - Extensive farming vs. intensive farming
  - Shifting cultivation vs. agribusiness, vs. nomadic herding

Commercial farming

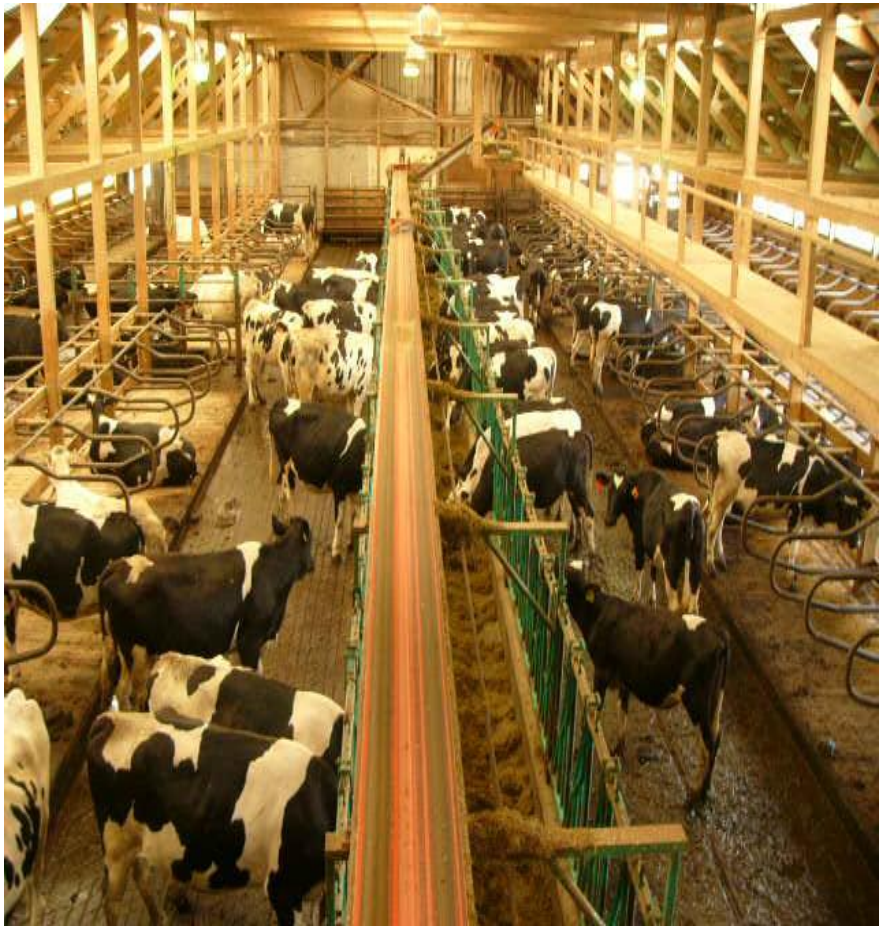
- the production of food for sale

- Example: large wheat farms of the prairies

Subsistence farming

- Production of food to feed your family.
- Example: Sally's vegetable garden in the back yard

Commercial and Subsistence Farming



Factors involved…

- **Equipment:** Farms are **labour intensive** and not suitable for modern farm technology

- **Yield:** Yields are **lower on subsistence farms** because farmers tend to produce the same crop year after year, which depletes 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

- Large tracts of inexpensive land
- Unpopulated areas
- Cattle farming in western Canada

Intensive Agriculture

- uses smaller tracts of land
- Found in more densely populated areas
- Example: Dairy farming in the Goulds (near St. John's)
  - A time-sensitive product located near the market

Intensive Agriculture…Examples

Shifting Cultivation

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

Shifting Cultivation

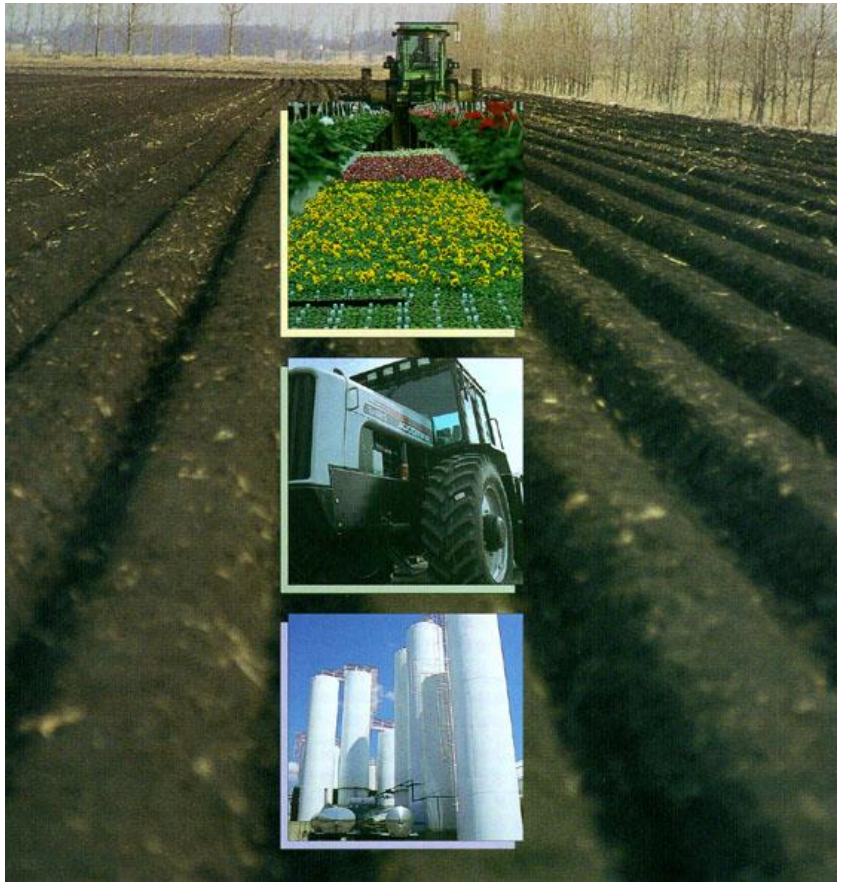
Nomadic herding

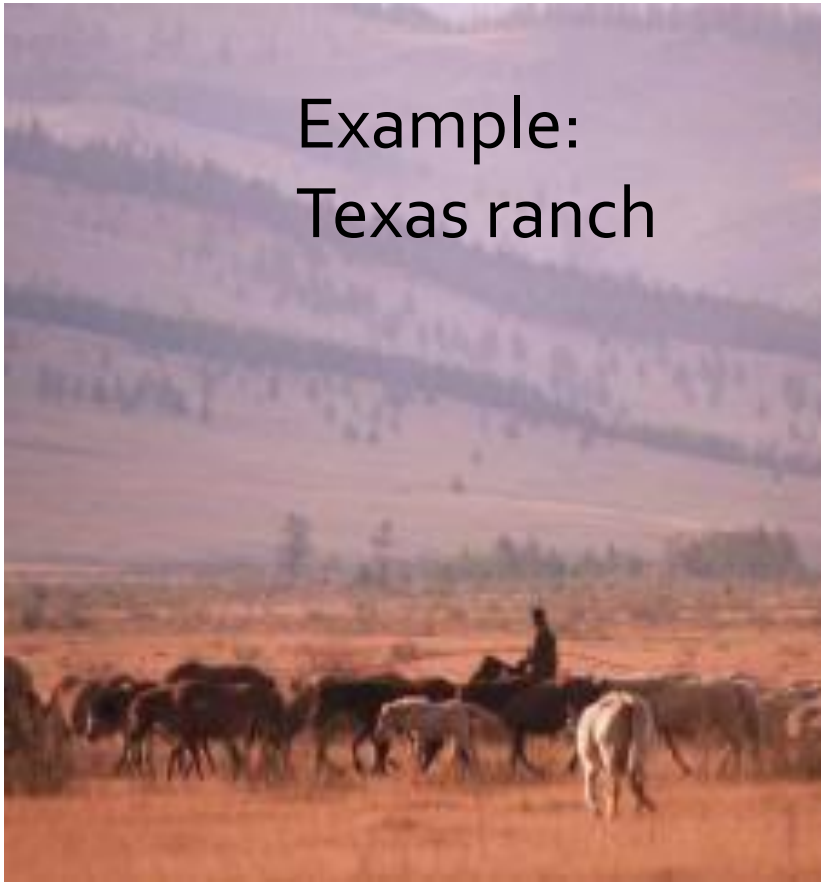
- similar to shifting agriculture
- involves moving from place to place with an extensive use of land
- differs in that nomadic herding involves the raising of cattle, sheep or other herding animals.

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





Soil:
How to maintain it.

Unit 4: Primary Resources

Introduction

- Global challenge: *Maintaining soil without threatening fertility.*
- Various pesticides & other chemical additives are causing long term effects that gradually decrease the fertility level greatly. (note: role of worms/insects…how do they help?)
- Soil fertility can be maintained by **crop rotation-changing crops on a field each year**.

Land-use techniques…preserving soil quality (fertility), protecting against erosion

1. Strip Cropping:

- Crops are grown in strips on an area of land.
- **The idea:** Decrease erosion between strips by growing different crops types side by side that allow erosion at different rates (**Example:** one crop might have a root system that holds soil together better)

Techniques (con't)

2. **Cover cropping:**

- Whenever soil is left **fallow** (empty) to replenish it, it may suffer from erosion by wind or water.
- To prevent this, a close-growing crop is grown (like hay), then ploughed back into the soil. This increases nutrients.

Techniques (con't)

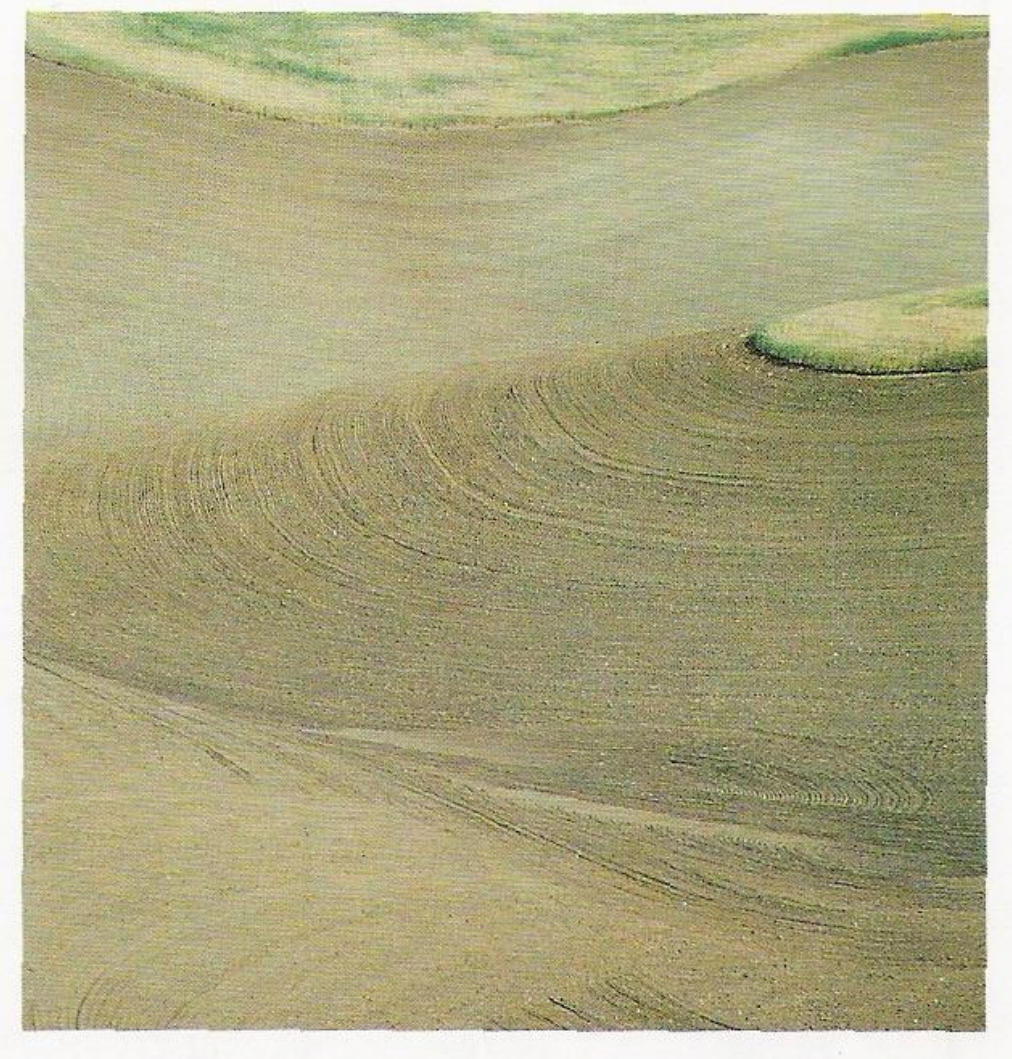
3. **Contour ploughing:**

- A method that respects the natural shape (or contours) of an area of land.
- Crops are planted along the contours, which creates mini-terraces (like steps or shelves), which discourages water run-off.
- Instead of the water eroding the soil, it soaks into it.

4. **Terracing:**

- Involves constructing **steps** (shelves) on hillsides or land slopes. This has the same effect as contour ploughing but is done on a larger scale (bigger farms).

Example of Contour Ploughing



Example of Terracing

Intensive Subsistence Farming

- Complete the following case studies,

1) "Rice Farming in Bangladesh"

- Read p. 147-149
- Answer questions 7-9 on p. 149

2) Shifting Cultivation in Borneo

- Read p. 149-151
- Answer questions 10 & 11, p. 151

Extensive Commercial Farming

- Case study "Plantation Farming in Hawaii". It is a good example of extensive commercial farming.
- This case study also asks you to analyze the impact of weather. We do not expect you to memorize the global location of every type of crop and farm. However, we do expect that given the climate requirements of a crop you be able to use a climate map to determine the likely location said crop

More Extensive Commercial Farming

- Case study "Wheat Farming in The Ukraine". It is a good example of extensive commercial farming.
- We expect that given the climate requirements of a crop you be able to use a climate map and determine the likely location where said crop would grow well.

Even More Extensive Commercial Farming

- Case study "An Agribusiness in the Philippines". It is a good example of extensive commercial farming.
- We expect that given the climate requirements and soil requirements of a crop you be able to use a climate map and a soil map to determine the likely location said crop.

Forest Resources

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

Forests & Climate

- Some aspects of climate that impact on forest development are:
  - **Precipitation**
  - **Seasons**
  - **Diversity**

Precipitation

- Forests require a large amount of water.
- **One of the greatest 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 have **intermittent** (not constant)rainfall have **savannahs**.

Seasons

- **Temperate regions** of the world often have **deciduous trees** 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."
- The **type of trees and forest** present in a region is **determined by 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

- **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

- In this lesson you will:
  - describe the major threats to our forest resources
  - describe patterns in depletion of our forest resources

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.

Forest 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.

- In the activities section of this lesson you will use a world map showing deforestation trends. It is important that you be able to interpret this type of map as shown on p. 164 figure 10.2.

Clear Cutting & Selective Cutting

- In this lesson you will:
  - state the definition and description of clear cutting
  - state the definition and description of selective cutting
  - describe the differences between clear cutting and selective cutting
  - discuss the advantages and disadvantages of clear cutting
  - discuss the advantages and disadvantages of 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 actually a variation on clear cutting where strips of forest are left between the clear cut areas.

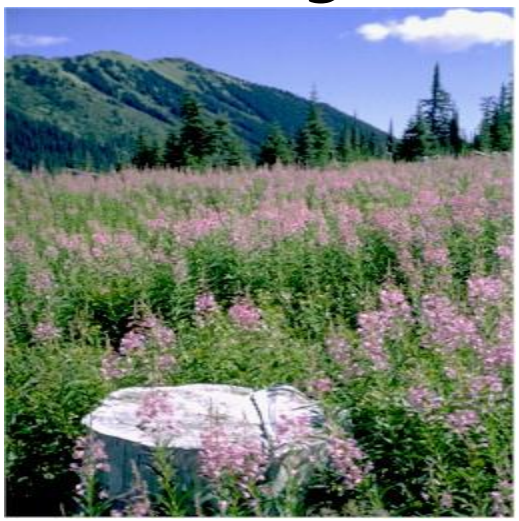
Selective cutting

- 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 intact.

Clear Cutting & Selective Cutting

- **Clear cutting** has the advantage of being **economical and safe**



- **Selective cutting** has the advantage of **leaving the ecosystem intact**.

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 what we input into forestry (replanting & seedlings)
2. Improve processes like:
   - road construction
   - harvesting techniques
   - environmental protection actions
   - reducing losses (use all of the tree)

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

Sustainable Forestry

- **Assigned activities**
  - Read " Case Study; Tree Harvesting in Various Ecosystems" p. 166-169
  - Complete Questions # 8-11 p. 168-169

Clear Cutting Controversy

- This lesson consists of a case study specific to a region of British Columbia where the controversy over clear cutting has been raging for some time now.
- Please go to the activities section and complete the case study there.

Systems Model & Offshore Oil

UNIT 4
Resources from the Sea

Offshore Oil Formation and Reserves

- In this lesson you will:
- Analyze patterns in the location of off-shore oil reserves, including the following delineations:
  - 4.5.1 Explain how oil and gas are formed. (k)
  - 4.5.2 Describe the techniques used to locate offshore oil and gas reserves. (k)
  - 4.5.3 Analyze data to arrive at patterns in the distribution of proven oil and gas reserves. (a)

Offshore Oil Formation and Reserves

- The formation of today's oil began millions of years ago when plants and animals from the oceans died and settled on the ocean floor.
- While large organisms contributed to the oil it was often the mass of small and microscopic organisms that contributed the bulk of the **carbon** for oil.

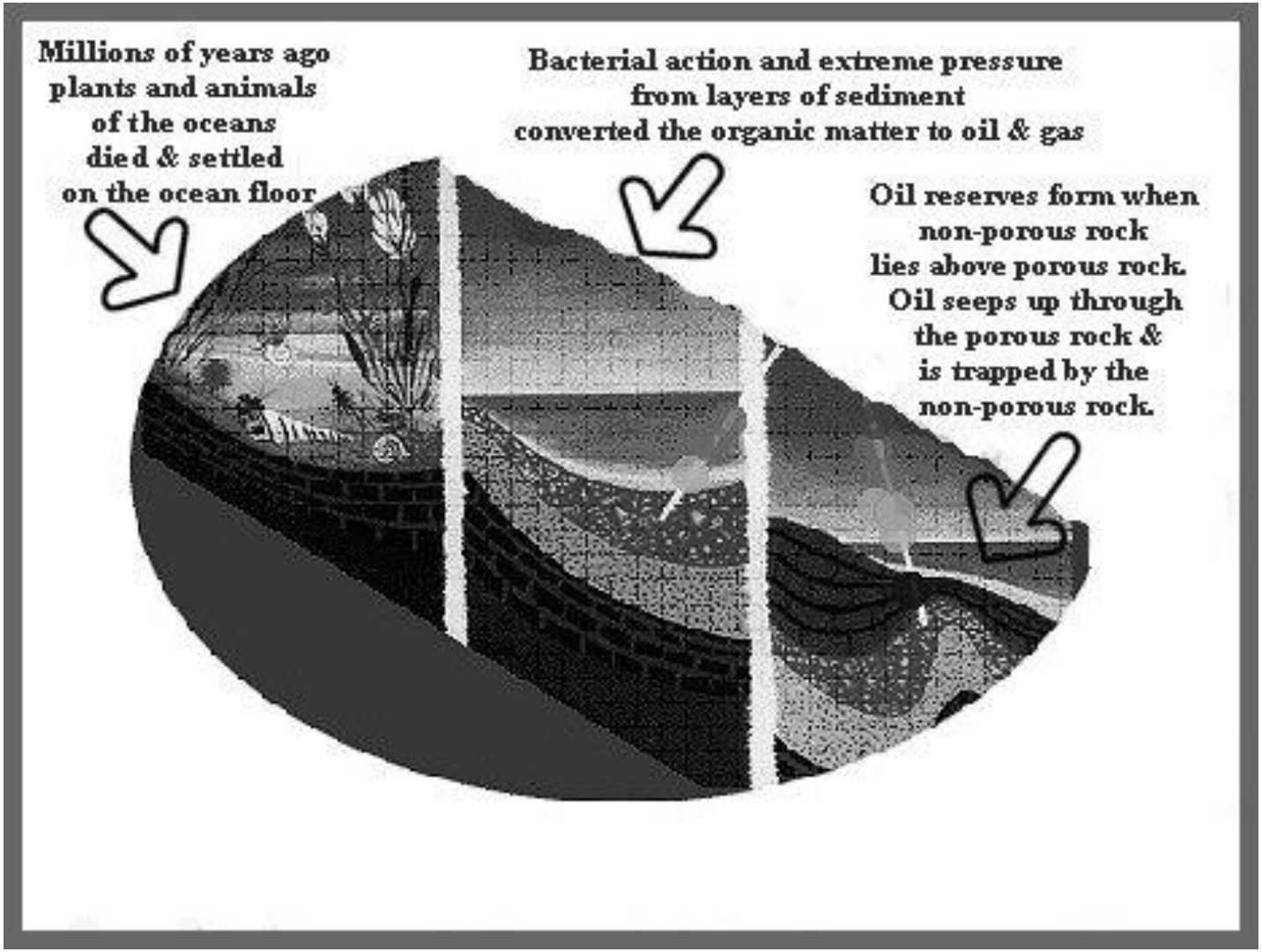
Offshore Oil Formation and Reserves

- Over many thousands of years **bacterial action and extreme pressure** from layers of sediment converted the organic matter to oil & gas. The extreme pressure came form the continuous build up of sediment.

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

Offshore Oil Formation and Reserves

- The oil moved within the soil and oil reserves formed when non-porous rock lay above porous rock.
- Oil seeps up through the porous rock & is trapped by the non-porous rock.


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.

Oil Reserves

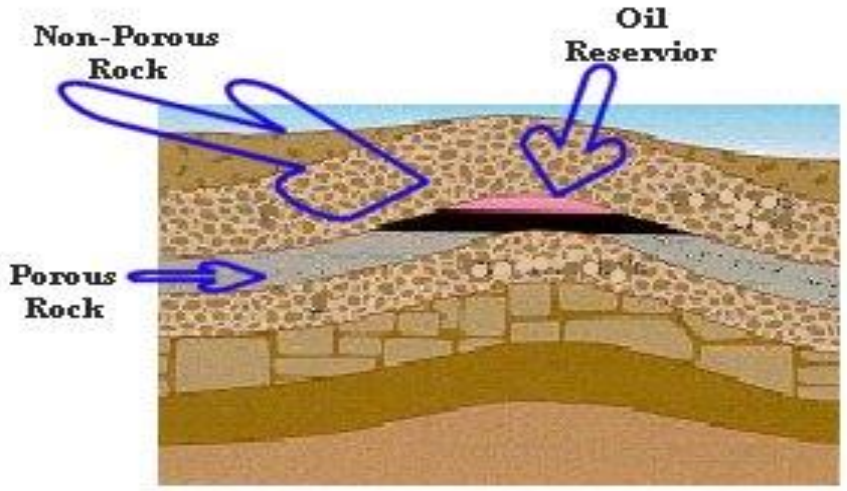
- There are 4 types of oil reserves.
- You will notice that:
  - all four have a **nonporous rock cap** and a **porous rock source**.
  - The porous rock allows the oil to seep into the cavity and the nonporous rock prevents the oil from leaving

4 types of oil reserves

- Fold Trap
- Fault Trap
- Salt Dome Trap
- Stratigraphic trap

Fold Trap

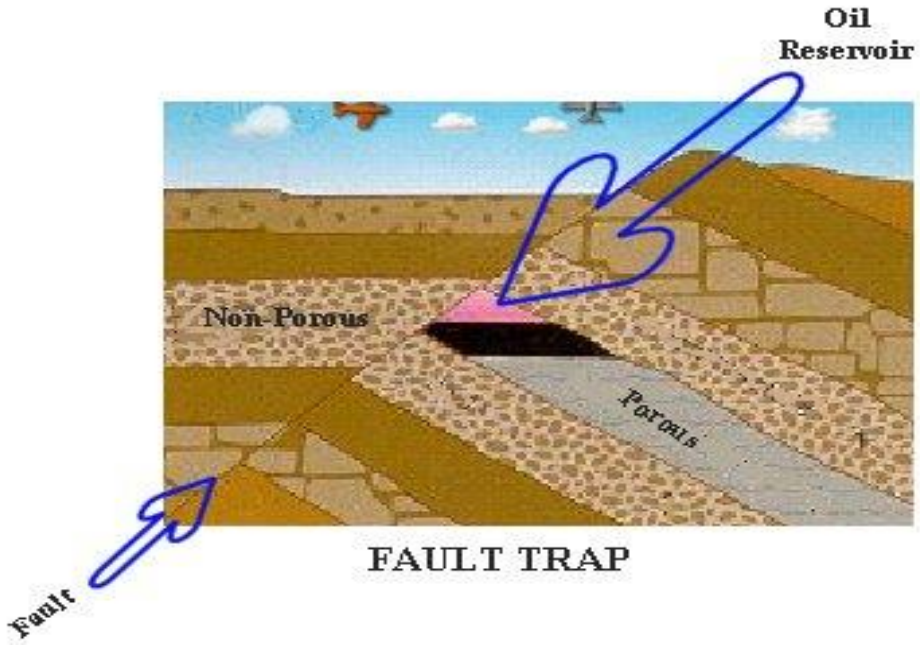
- the up-fold or anticline in the layers of the earth's crust form the reservoir



FOLD TRAP

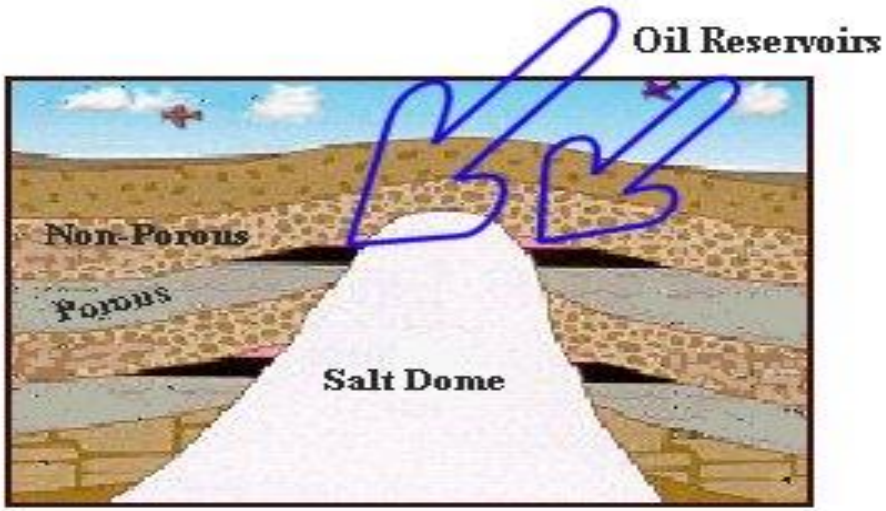
Fault Trap

- The vertical movement of the earth's crust forms a v-shaped reservoir.



Salt Dome Trap

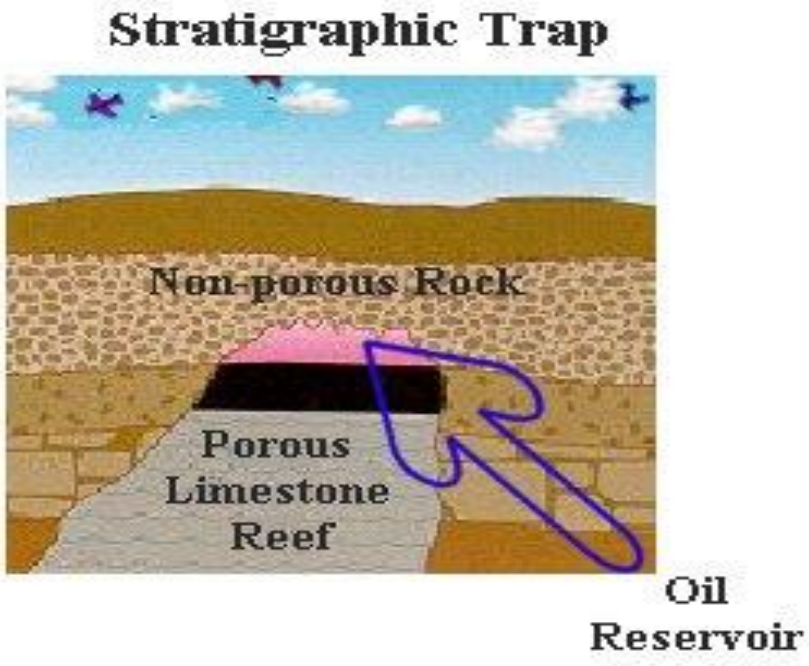
- The salt dome forms an up-fold in the earth's crust similar the anticline caused by tectonic forces.



Salt Dome Trap

Stratigraphic trap

- Has a former limestone reef as its porous rock feeding the reservoir.



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
- Limited to ocean depths of **20 m**
- **Limited to 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

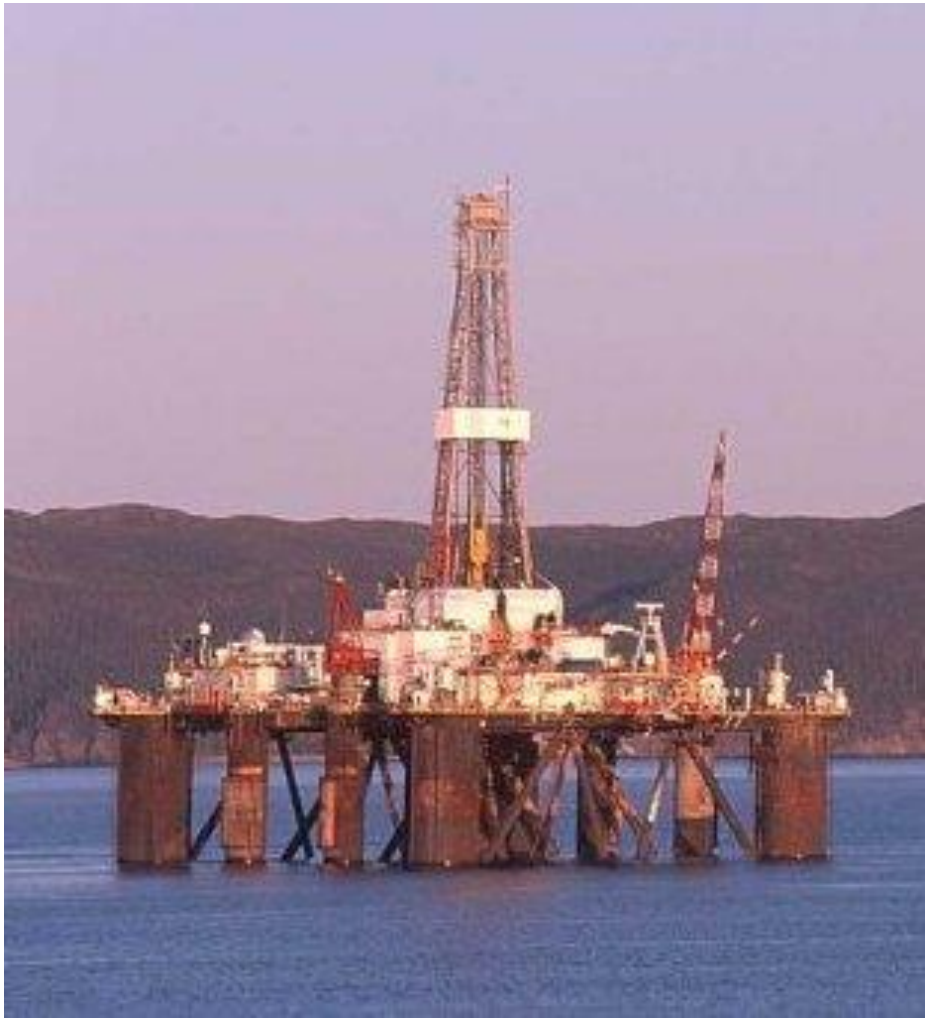
- **Extendable legs** ground them on the ocean floor
- Able to **drill in deeper water than submersible rigs**
- Limited to a maximum ocean depth of **100 m**
- Similar to the submersible in that it **rests on the ocean floor.**
- However its **steel legs** (not columns) rest on ocean floor.

- 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
- Limited to a maximum ocean depth of **200 meters**
- The rigs are built on land which is flooded upon completion so the rig floats
- 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.

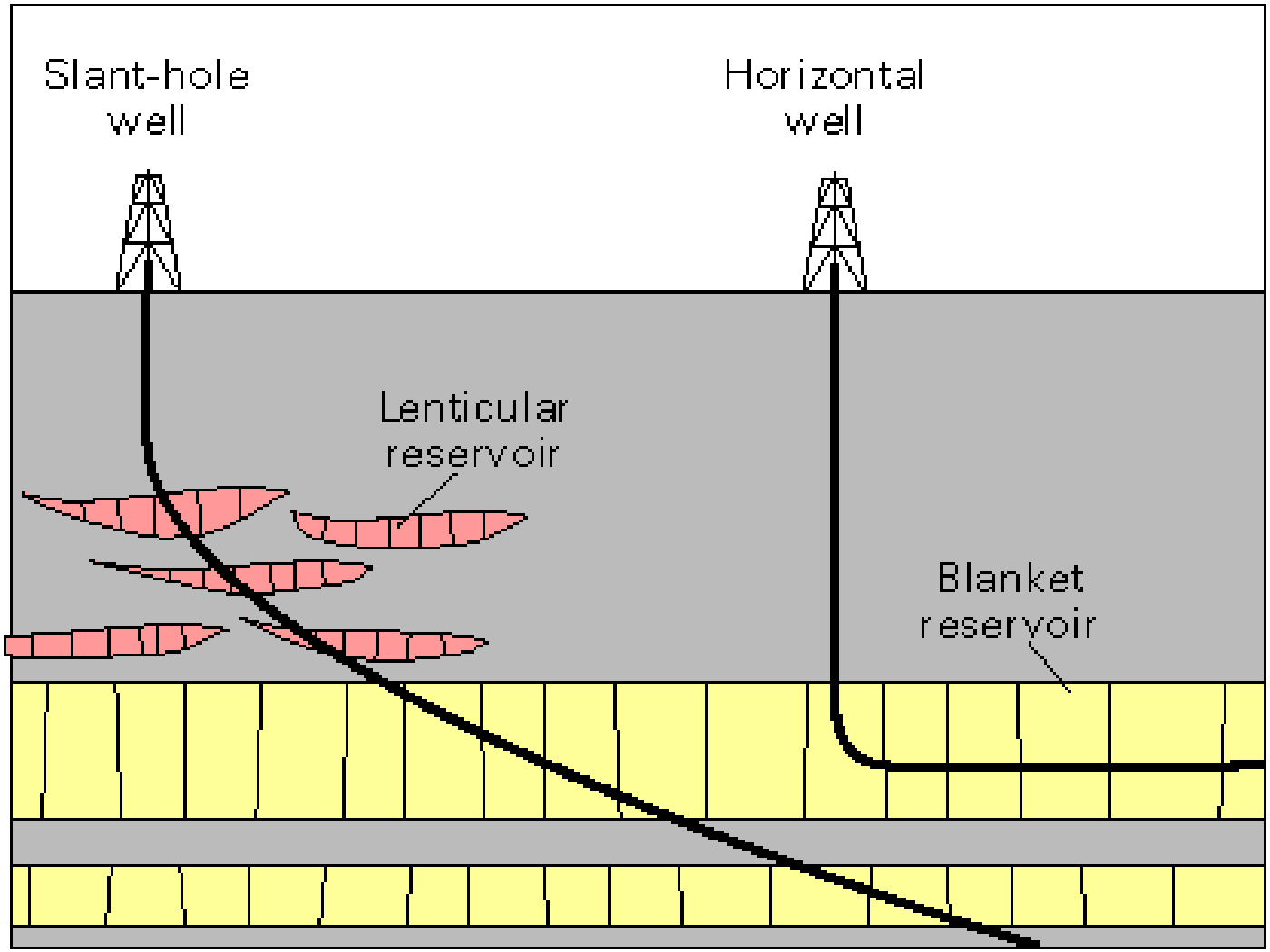
Semi Submersible-Dynamically Positioned

- **Note: dynamic means changing or moving.**
- These rigs are **able to drill outside the continental shelf**.
- Still limited to a maximum ocean depth of **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** position the rig over the drill site.
- **Oil is stored in pontoons** until shipped on-shore.

Directional Drilling

- Directional Drilling is depicted in figure 11.5 on page 187 of your text.
- This technique **allows drill companies to reduce movement from one small oil pocket to the next**.
- It also increases the drill holes' exposure to source (porous) rock.

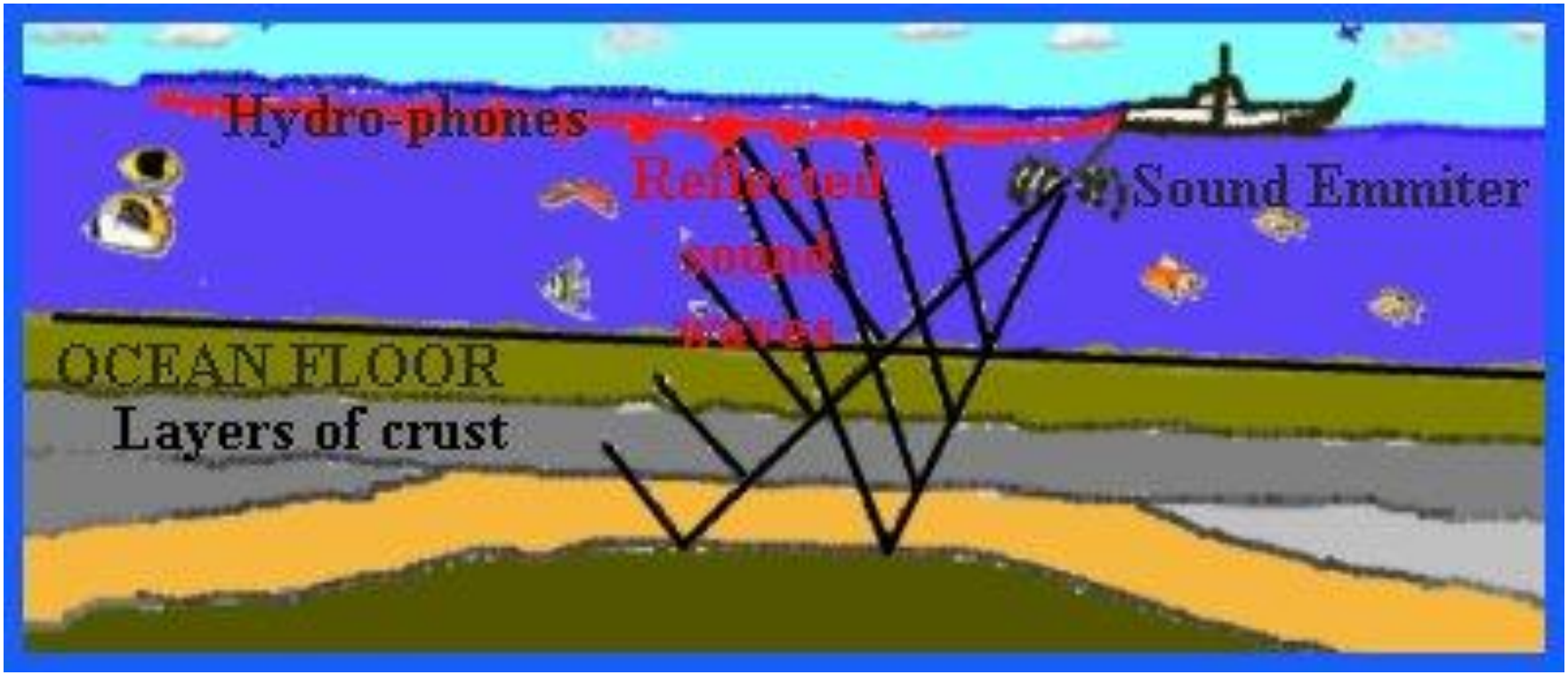
Example of Directional Drilling



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, **delineating wells** are drilled to determine the size of the reservoir;
  - if they miss oil then 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 ones that are under the ocean floor are concentrated in the North Sea around the United Kingdom and in the Gulf of Mexico.

Patterns of Offshore Oil Production

- The North Sea and the Gulf of Mexico are regions of high offshore oil production.
- It also reveals that offshore oil production is increasing faster than land production of oil.
- West Africa, especially around the Ivory Coast, seems to have high oil reserves and is increasing in oil production too.

Off-shore Oil…The Decision to Recover

- In this lesson you will:
  - Describe physical factors that influence the decision to recover offshore oil and gas.
  - Describe human factors that influence the decision to recover offshore oil and gas.

Off-shore Oil…The Decision to Recover (DO NOT COPY)

- The systems model is useful in helping determine the viability of an oil reserve.
- **The determination must be made whether cost of inputs and processing will be offset by the value of the output oil.**
- This lesson looks at the physical and human factors that influence 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?

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

When to DRILL???

- The decision whether to drill or not often comes down to the question: **Will the cost of overcoming the all other factors be offset by the price oil can be sold for and make the venture financially viable?**

Factors that affect the profitability of oil production

- **Oil Price – Cost of Production = Profit**
- The cost of production and the price of oil are the two sides of the equation.
- Production can not proceed unless the company has a good expectation of making a profit

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.

Hibernia Case Study Part 2

- The case study of Hibernia shows this equation well. While production costs were decreasing the price of oil was too low to make the project profitable.

White Rose

- Petro-Canada has a 27.5% working interest in the White Rose project, a $2.3 billion offshore development. The White Rose oil field is located 350 km east of St. John’s, Newfoundland and Labrador, Canada.

White Rose Production & Petro-Canada's Share

- White Rose has a design capacity of 100,000 barrels per day, with an anticipated plateau production rate of 90,000 b/d.
- Oil was successfully introduced into the process stream on the Sea Rose FPSO in November of 2005.
- The White Rose field was expected to reach peak production of 100,000 b/d in the first half of 2006. Petro-Canada's share of production will ramp up to 25,000 b/d at peak production.

http://www.huskyenergy.ca/whiterose/

TERRA NOVA

- Petro-Canada is the operator and 34% interest holder in the Terra Nova oil field development 350 kilometres off the coast of Newfoundland and Labrador.
- Discovered in 1984 by Petro-Canada, the field is the second largest off Canada's East Coast. Terra Nova is the first harsh environment development in North America to use a **Floating Production Storage and Offloading (FPSO)** vessel. Production from the field began in January 2002.

Terra Nova Production Life

- The Terra Nova Field has 440 million barrels of recoverable oil including 40 million barrels which will come from the Far East Development, approved in late 2005, and is expected to be on-stream in the first quarter of 2006. Plans are in place to achieve first quartile performance at the Terra Nova Field through an extended turnaround in 2006.

HIBERNIA

- The Hibernia oil field was discovered in 1979. It lies under the Atlantic Ocean about 315 kilometres southeast of St. John's, Nfld. The oil is below 80 metres of water and 3,700 metres of ocean floor.
- The Hibernia field is in the Jeanne d'Arc Basin in the northeast portion of the Grand Banks. A limited number of exploratory, or "wildcat", wells were drilled in the area before the Hibernia project got underway.

HIBERNIA OWNERSHIP

- ExxonMobil Canada is the lead partner in the Hibernia project with a 33-per-cent stake. The other partners are:

  - Chevron Canada Resources
  - Petro Canada
  - The Canadian government
  - Murphy Oil
  - Norsk Hydro of Norway

- In 2004, Newfoundland Premier Danny Williams bargained aggressively for a better deal with Ottawa. When negotiations stalled, he angered the federal government and many Canadians by lowering Canadian flags on government buildings as a protest.
- In early 2005, after the flags went back up, the federal government agreed to a deal. It lets Newfoundland keep all of its oil and gas revenues, without losing any equalization payments, for eight years. The deal will put at least $2 billion into the province's treasury.

Unit 4 Resources from the Sea

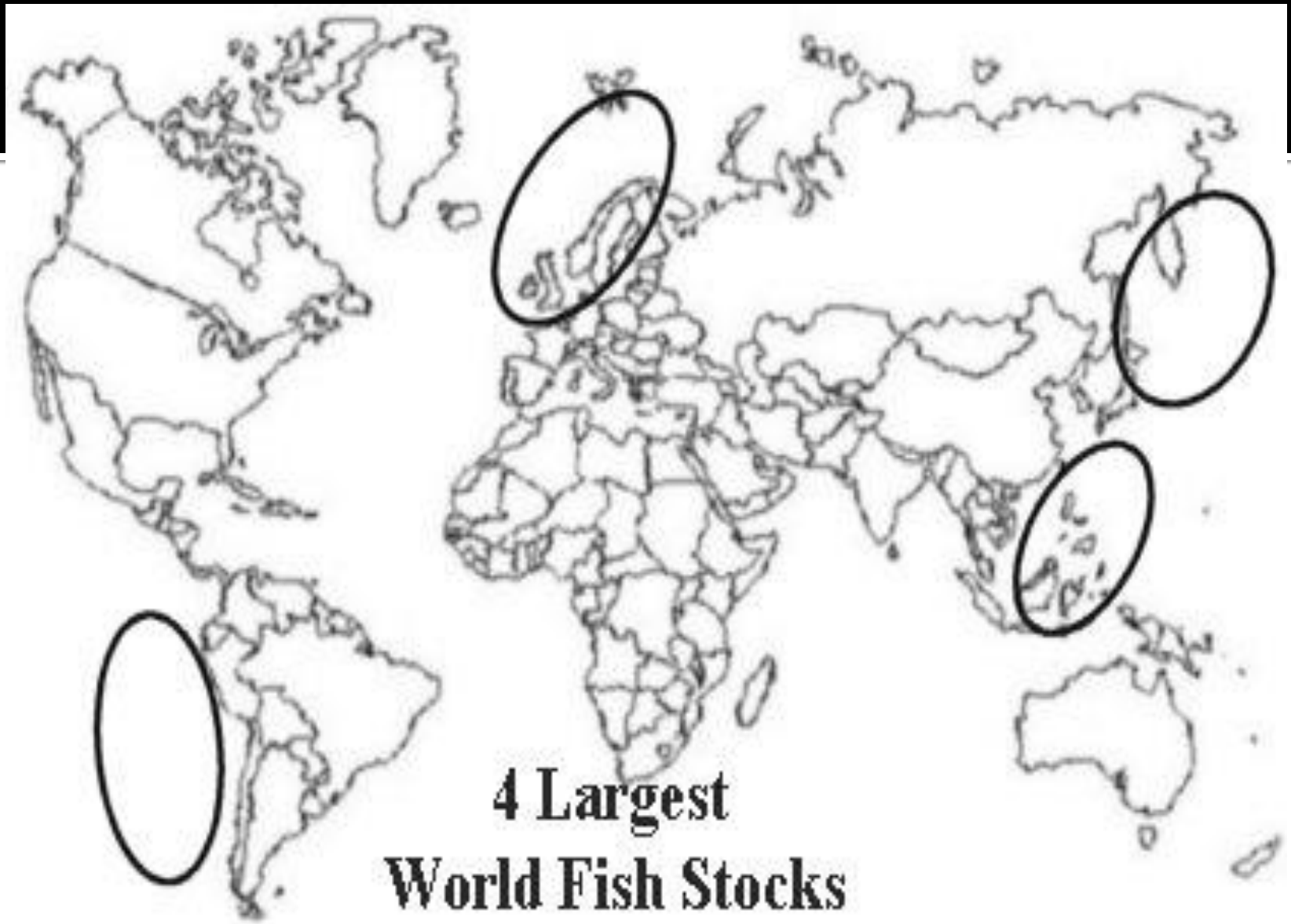
Fishery Resources

Fisheries; an Introduction

- Major World Fish Stocks
  - Simply put the worlds fish stocks are located almost exclusively 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 it would be expected that fresh water would only contain a small portion of the world's fish.

Four Major Fishing Region

- North east Atlantic (England/Norway);
- North west Pacific (Japan);
- West central Pacific (China/Indonesia);
- South east Pacific (Western South America).
- Map follows


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 make harvesting more cost effective.***

   The fish have to be landed on shore for human use so the regions closer to shore are fished most profitably.

2. The **shallow waters** of the shelf promote **plankton production** which serve as the **base of the marine food web** including fish.

- Shallow water ensures enough light for phytoplankton and effective circulation of nutrients.

(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

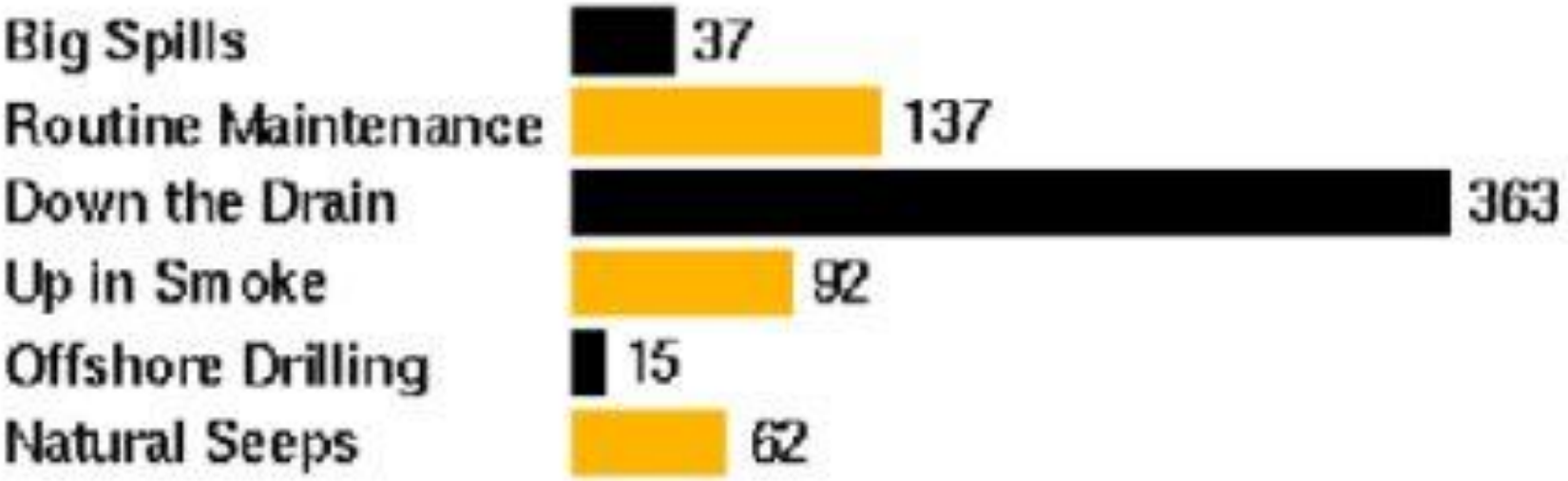
Major Sources of Ocean Pollution

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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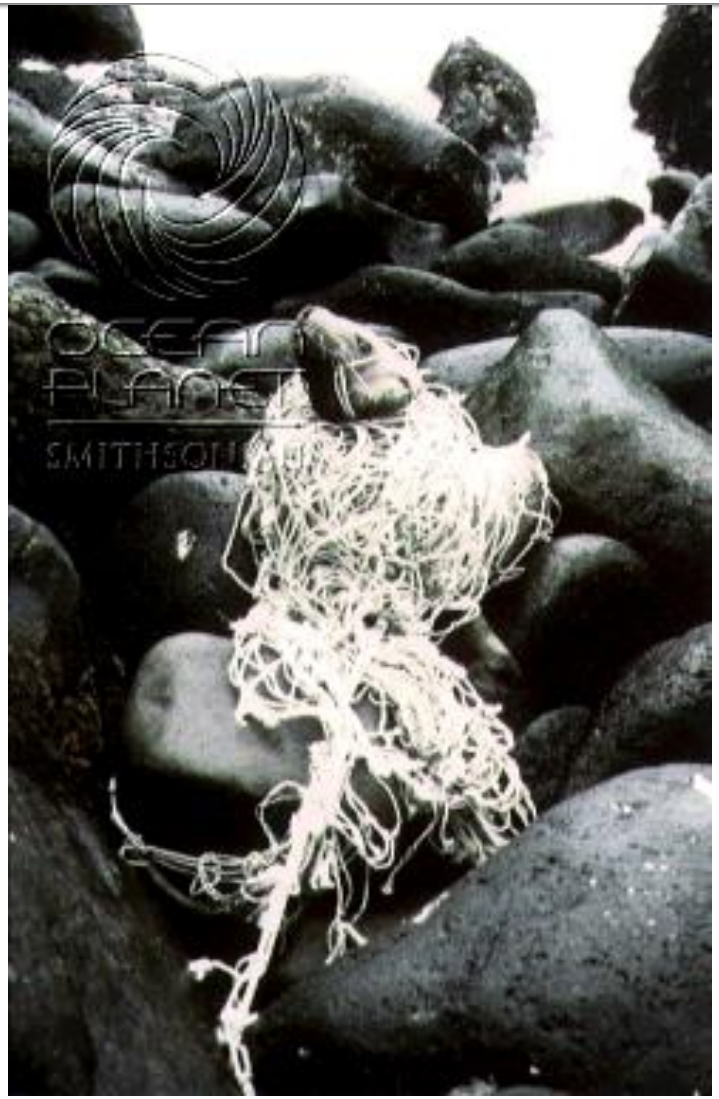
2) Toxic Material

- **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-- particularly 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.
  - **They are highly efficient at catching fish** which greatly reduces the population & reproduction. Large diesel engines, echo sounding equipment, onboard freezers, and GPS navigation contribute to their efficiency.
  - **Destruction of the ocean floor by trawls/draggers** eliminates good spawning locations for fish. Furthermore it **disperses eggs**, making fertilization more difficult.

Factory freezer Trawlers (cont.)

- **By-catch is often discarded**. Some regulations require ships to return with low levels of by catch.
- Traveling great distances and being able to stay at sea for long periods allows trawlers from all over the world to congregate 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

Empty Seas Case Study

- Read the case study "Empty Seas" p. 211-212
- Complete the questions #16-19 p. 212