Marine Resources

1. Marine Economics, Marine Resources

--\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_—individuals, businesses, and governments making economic decisions about what ocean-related goods and services to produce, how to produce them, how much to produce, and how to distribute and consume them

--In a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, buyers and sellers work on the premise of supply and demand, competition, and fair price. They also have full access to information about beneficial and harmful effects so informed decisions can be made

--There is no pure free market system. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are usually not informed about harmful effects of goods and services, and prices do not reflect the true cost to the environment.

--\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are naturally replaced by the growth of marine organisms or by natural physical processes.

--\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ such as oil, gas, and solid mineral deposits are present in the ocean in fixed amounts and cannot be replenished over time spans as short as human lifetimes.

--Marine economies are grouped into physical resources, marine energy resources, biological resources, and nonextractive resources.

* 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--these include hydrocarbon deposits, mineral deposits, and fresh water

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Offshore drilling generally produces \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_in worldwide revenues

--\_\_\_\_\_\_\_\_of crude oil and \_\_\_\_\_\_\_\_ of natural gas come from the seabed located on continental margins, very little is found in deep ocean basins.

--\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ forms from dead organisms that have accumulated on the ocean floor where there were no scavengers to break them down. Anaerobic bacteria convert the original tissue into simple compounds that get buried to a depth of between 1.2 and 1.8 miles. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ convert these buried sediments into petroleum.

--If the temperature is too great and the time too long, the sediments convert into methane. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ deposits occur at buried depths of 4.4 miles and deeper.

--Petroleum and methane, being less dense than surrounding media, tend to float up through the sediments, until they are trapped under solid rock. Offshore drilling must penetrate these rocks to find these fuels.

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--This is when methane becomes trapped in ice crystals \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ below the seafloor. It is the largest known reservoir of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on Earth.

--At depth, the compounds are very \_\_\_\_\_\_\_\_\_\_\_\_, but become \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ when brought up from the depths. It is too expensive and dangerous to remove this resource from the crystals they are locked within.

--Methane release from the depths causes major changes to the world’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. If global warming continues, and the oceans continue to warm, more methane could be released, leading to higher and higher temperatures (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Second only to petroleum and natural gas for economic importance. \_\_\_\_\_\_\_ billion tons are removed from the oceans annually bringing in about \_\_\_\_\_\_\_\_\_ million in revenues. Island nations like Japan and the UK get \_\_\_\_\_\_\_\_\_ of their sand and gravel from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

--\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mining in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (this sand being mostly \_\_\_\_\_\_\_\_\_\_\_\_) is used to make cement, glass, animal food supplements, and products that reduce soil acidity.

--Coastal sand and gravel in the U.S. is used for constructing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

--\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ have also been found in offshore sand and gravel deposits off Australia and Africa. DeBeers, a diamond company, has expanded its marine presence since 1995, when they mined 450,000 carats of diamonds worth \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ dollars.

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--\_\_\_\_\_ is the 3rd most abundant element dissolved in seawater. It precipitates in the forms of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The metal can be extracted from seawater to be used in aircraft construction and as a strong, lightweight building material. \_\_\_\_\_\_\_ of U.S. magnesium production is carried out in one Texas processing plant for a tidy profit of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

--Magnesium salts are used in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, as soil conditioners, and in the linings of high-temperature furnaces. \_\_\_\_\_\_\_\_\_\_\_\_ of magnesium compounds produced in the U.S. are from seawater, which brings in around \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Seawater is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to extract such salts as CaCO3, CaSO4 (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_), NaCl, as well as magnesium and potassium salts. 78% of seawater salts are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

--\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_salts are used in chemicals and fertilizers. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ is used in medicines, chemical processes, and gasoline. \_\_\_\_\_\_\_\_\_\_\_\_\_ is used in sheetrock and other building materials. One third of table salt is evaporated from seawater. Salt is used for snow and ice removal, water softeners, agriculture, and food processing. The U.S. evaporates about \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of table salt worth \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Manganese nodules are rounded black objects found in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

--These nodules contain iron, manganese, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, nickel, and cobalt, which are useful for industrial nations lacking these natural resources.

--Estimates are that the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ocean contains 20 times more ore reserves than are found on all the world’s landmasses.

--The problem in accessing these reserves are the 12,000 ft depths in which they are found, currently, no widespread mining efforts have been made, only small scale \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ operations, but so far the costs are too high

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Phosphorite forms from decaying \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and are used in the production of industrial chemicals and agricultural fertilizers. The richest deposits are found between 100 and 1,000 feet in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Since it is so expensive to retrieve these deposits from the ocean, most phosphorous is stripmined in \_\_\_\_\_\_\_\_\_\_\_\_\_, which was once under the ocean.

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Recent discovery of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has led scientists and economists to new sources of zinc, iron, copper, lead, silver, and cadmium, all bonded to \_\_\_\_\_\_\_\_\_\_\_\_\_, and emerging from the lower crust and mantle.

--These sites are not economically advantageous, due to the \_\_\_\_\_\_\_\_\_\_ of the deposits, the small size of the deposits, and the short lifespan of the deposits.

--The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is another divergent plate boundary where these minerals are found closer to the surface. The concentration of these minerals coats the bottom of the Red Sea in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Only \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of Earth’s water is fresh water in the liquid state, available for easy human use. Most of this water is now polluted and unfit for human consumption. Potable water (suitable for drinking) determines \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

--Desalination is the separation of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from seawater, and processing facilities are working worldwide to help create more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Saudia Arabia operates the largest desalination plant, producing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ per day.

* + - 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is desalination by boiling. Three-fourths of all water is desalinated by distillation, but heating all that water is extremely energy intensive, and thus, expensive
      2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is also effective for removing salt from water. Ice crystals exude salt when they freeze. Again, due to the energy costs of freezing, this method is also expensive.
      3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is desalination by moving seawater against a semipermeable membrane at high pressure. Pure water travels across the membrane, leaving the \_\_\_\_\_\_\_\_\_\_\_ behind. Membranes are delicate and expensive, but overall, this method is cheaper than the previous two. About \_\_\_\_\_\_\_\_\_ of all water is desalinated in this way.

--as water becomes more scarce, desalination, water conservation, and iceberg harvesting will become more common.

* 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--energy crises in the 1970s led developed and developing countries to begin engineering new methods for harvesting energy that is more readily \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Wind is the fastest growing alternative to fossil fuels. The world’s largest wind farm is on the desert ridges of Oregon and Washington State. 460 turbines can provide power for 70,000 homes and businesses. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the home to over \_\_\_\_\_\_\_\_ different wind farms, producing more wind energy than any other state.

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Experiments are being done to discover is harnessing wave energy could become a maintainable, inexpensive new source of energy, but so far, the price has been too high.

--\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ may also be used to harness energy from ocean currents. The complexity of these systems so far has made them, as of yet, too expensive, but smaller versions operating in constricted areas where \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ flow rapidly are the only source to be successfully exploited on a large scale.

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Taking advantage of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between deep water and surface water looks to be the most abundant source of renewable energy on the planet. Using physical and chemical precepts, extracting the heat energy from 1600 cubic meters of water per second could provide more power than all the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the U.S.

--\_\_\_\_\_\_\_\_\_\_\_\_\_ (Ocean Thermal Energy Conversion) plants, were based on a 1880s design my a French physicist, d’Arsonval. It was built in Cuba in the 1930s, and proved profitable, but was destroyed by a hurricane. An experimental plant was built in \_\_\_\_\_\_\_\_\_\_\_\_ in the 1990s, proving the design.

--OTEC plants have not been more widely used, because they are only \_\_\_\_\_\_\_ efficient, due to the low range in high and low temperatures. OTEC plants would also have to be located in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, where cyclones and marine life would cause operational problems with the power plant.

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     1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--143.2 million tons of fish, crustaceans, and mollusks are harvested by commercial fisheries yearly. Only about \_\_\_\_\_\_\_\_\_\_ different species are regularly caught and processed. \_\_\_\_\_\_\_ major groups comprise \_\_\_\_\_\_\_\_\_\_ of the commercial marine catch. About \_\_\_\_\_ of human food comes from the sea.

--15 million people worldwide are employed in the fishing industry. Commercial fishermen lose 155 out of 100,000 workers to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ each year. Average fishing values are estimated to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ annually. Half of the world’s catch goes to only \_\_\_\_\_\_ countries. 75% of worldwide catch is made by \_\_\_\_\_\_\_\_\_\_, not individuals, with some factory ships following along to process the catch en route. Most fishing is by \_\_\_\_\_\_\_\_\_\_\_\_\_\_ or gill-netting, no longer by fishing lines. Between 1950 and 2000, commercial fisheries increased more than \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ its original size.

--Even though \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has made commercial fisheries more efficient with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ increasing somewhat since the 1980s, harvests are beginning to decline, even though efforts are increased. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ world fish catch had increased up until the 1970s, but began declining after that.

--The best fishing grounds are located in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ waters over \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

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--Maximum sustainable yield—the maximum amount of each type of fish, crustacean, or mollusk that can be caught without \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Thought to be between 110 and 150 million tons annually. We are approaching the 150 million ton limit.

--In 1997, 30% of recognized marine fisheries were being \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or were already \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, with 50% reaching their maximum exploitation levels. U.S. National Marine Fisheries Service estimates that 45% of fish stocks are overfished—harvested to the point that breeding stock is not sufficient to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

--Trouble comes with competition between immediate \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ fisheries, with the former taking precedence over the latter. Governments legislate fishing regulations, but penalties are usually not severe enough to slow \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

--Fish like the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which do not reach sexual maturity for 25 or 30 years, have been brought to the brink of commercial \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Fisheries moved on to Cuban sea bass, and also brought them to the brink. The cycle perpetuates itself.

--Commercial fishing is also responsible for bycatch, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. One third of all species caught while trawling is thrown away and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Endangered \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are being caught in shrimp nets, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are being caught in drift nets, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are being caught by tuna fishermen. Broken nets left in the ocean survive for decades, trapping and killing more animals while lying on the ocean floor.

* + 1. “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”

--In 1995, the U.S. fishing industry spent \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to catch \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ worth of fish, with government subsidies and tax breaks making up the difference.

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Whales have been targeted since the 1880s and used for \_\_\_\_\_\_\_\_\_\_ for human and animal consumption, \_\_\_\_\_\_\_\_\_\_ for lubrication, illumination, industrial products, cosmetics, and margarine; \_\_\_\_\_\_\_\_\_\_\_\_\_ for fertilizers and food supplements; and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for clothing accessories.

--Since 1900, large whale populations have been reduced by \_\_\_\_\_\_\_\_\_\_\_\_\_. Eight of the \_\_\_\_\_\_\_\_\_\_\_\_\_ species are now commercially extinct. The International Whaling Commission banned the hunting of large whales in \_\_\_\_\_\_\_\_\_\_\_, even though some countries still catch whales for food sales by calling it “scientific study.” Japan never stopped whaling, and Norway resumed whaling in 1993, putting surviving populations at risk. In 1994, the IWC outlawed whaling in an area of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that protects most of the remaining species.

--The U.S. Marine Mammal Protection Act was passed in \_\_\_\_\_\_\_\_\_\_, to help protect all whale species, not just large whales. This has led to fewer American mammal fisheries, but other countries have made up the difference. In 1988, Congress banned the importation of \_\_\_\_\_\_\_\_\_\_\_\_ that wasn’t “dolphin-safe.”

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Between 300,000 and 450,000 seals and sea lions are taken annually for fur. Eight seal species and one sea lion species are of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ importance. The U.S. protects all marine mammals except the Northern Fur Seal. Baby Harp Seals are killed by the thousands each year for their snow white fur, but they are still below \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and their population continues to grow.

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Algin is a commercial product taken from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It is used in fabric preparation, salad dressings, paint, and printer ink. It keeps ice cream from crystallizing, clarifies beer and wine, and is used in abrasives.

--The U.S. produces $220 million worth of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ annually, with world estimates for algin products to be around \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ annually.

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Aquaculture is growing water animals and plants in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ conditions. It is responsible for over one quarter of all fish consumed by humans. Most aquaculture occurs in \_\_\_\_\_\_\_\_\_\_\_\_\_\_. Around 43 million tons of fish are produced annually worldwide. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is one such cultured species.

--Mariculture is the farming of marine organisms. Mariculture is estimated to produce one eighth as much product as freshwater aquaculture. \_\_\_\_\_\_\_\_\_\_\_ mariculture is estimated to generate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ yearly. U.S. mariculture generates over $150 million, mostly lobster, abalone, salmon and oysters. Oysters are cultured for \_\_\_\_\_\_\_\_\_\_\_ as well as for their \_\_\_\_\_\_\_\_\_\_\_\_.

--Ranching is the culture of juveniles, releasing them into the ocean, and expecting their return when mature. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ranching accounts for 20% of salmon supplies.

* + 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Estimates are that 10% of all marine organisms are likely to yield useful chemicals. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ secrete a chemical that has been used to treat herpes. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ give off a chemical that acts as an anti-inflammatory. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are harvested for a chemical that seems to treat cancer. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ have a chemical that is antiviral as well as antitumor. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ chemicals may help AIDS patients. A marine \_\_\_\_\_\_\_\_\_\_\_\_\_\_ has been harvested for a chemical that works as an insecticide.

* 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: Cargo brings in much more money than passenger transportation, with 53% of the total value of ocean transportation being the movement of \_\_\_\_\_\_\_\_\_\_. Iron, coal, and grain make up 24% of all ocean transportation. \_\_\_\_\_\_\_ is the busiest North American Port. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the port with the greatest volume, but \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the world’s largest and busiest port. Honk Kong was the first port to move 1 million containers in one month.

--\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ industry has experienced vast growth in the last two decades. Sport fishing, surfing, diving, day cruising, sunbathing, dining in seaside restaurants, and just relaxing all contribute to marine economies. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and theme parks like Sea World bring in millions of guests per year. Whale watching trips bring in an estimated $210 million per year, while overall marine mammal themed products and displays bring in over \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

--Real estate: 165 million Americans live in coastal areas with property values in excess of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

--Hugo Grotius, a Dutchman, wrote *On the Law and Prize and Booty* in 1604, of which one chapter (*A Free Ocean*) was used as a basis for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ of the sea.

--In 1703, territorial seas were recognized as the boundary of a nation being \_\_\_\_\_\_\_\_\_\_\_\_\_ off the adjacent shore.

* + 1. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the International Law of the Sea

--After World War II, the U.S. annexed the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the U.S. beyond the 3 mile line to gain access to oil reserves found out there. Other countries followed suit. The United Nations became involved and held a conference in \_\_\_\_\_\_\_\_\_\_. In \_\_\_\_\_\_\_\_\_\_, the U.N. finally drafted a Law of the Sea.

* + - 1. Territorial waters extend to \_\_\_\_\_\_\_\_\_\_\_\_\_\_ from shore.
      2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from shore is an exclusive economic zone. (\_\_\_\_\_\_\_\_\_\_ of the oceans)
      3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are outside the EEZ and belong to everyone. (\_\_\_\_\_\_\_\_\_\_\_\_\_ of the oceans)
      4. Endorsement of values for protecting the ocean and preventing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
      5. Encouragement of the freedom of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
    1. The United States Exclusive Economic Zone

--The U.S. did not sign the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but instead claimed its EEZ in a resolution, fearing having to share high seas resources.

--The project of mapping the U.S. EEZ still continues today, locating new resources yearly, including \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

--The U.S. EEZ project also researches \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, weather forecasting, environmental studies, ocean floor plate movement, effects of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and geohazard studies.

--The future is wide open for the development of new marine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and international \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.