**Marine Biology Exam 4 Study Guide**

Key words or terms are new vocabulary from each lecture, which will likely be used in true or false, or multiple-choice questions. **Short answer and short essay questions will come from emboldened topics.** **Long essay questions will come from the emboldened and underlined topics**

**Chapter 10 – Population and Community Ecology**

Know the definition for ecology and the different levels that ecology is studied. What is demography? Know the four factors that determine the size of populations. What is fecundity? Know the difference between exponential growth and logistic growth and the shape of each growth curve. What is the carrying capacity of a population and what are some of the factors that act as environmental resistance? What type of population growth are humans currently experiencing? **Be able to describe the differences between r-selected and k-selected species concerning their environment, size, energy invested in offspring, offspring produced, life expectancy and number of reproductive events.** Know the different life history curves and know what type of species (r or k) follow each curve. Know the four interactions between organisms and know the affect each interaction has on the organisms involved. Know the difference between intraspecific and interspecific competition. What is an organisms ecological niche? Know the competitive exclusion principle. What is resource partitioning? **Be able to describe the differences between the fundamental niche and the realized niche.** How do predator and prey populations affect one another? **Be able to define a keystone species and provide an example of a keystone species**. What is a coevolutionary arms race? What are some of the ways that prey have evolved to avoid predation? Know the examples of mutualism, parasitism, and commensalism. What are the three levels of biodiversity? What is genetic diversity important? What percentage of coral reefs are threatened? What percentage of estuaries have been lost in California? Know the difference between pelagic organisms and benthic organisms, and the difference between plankton, nekton and sessile organisms. What is the difference between a food web and a food chain? **Be able to draw a food web and label the different trophic levels (fill in).** Know the different trophic levels and what each trophic level eats. How much biomass is transferred between trophic levels? Why are there fewer top predators? What is biomagnification? Know the different services that marine ecosystems provide humans.

**Key words and terms**: Ecology, individual, population, community, ecosystem, demography, natality, mortality, immigration, emigration, fecundity, exponential growth, logistic growth, carrying capacity, environmental resistance, competition, predation, parasitism, mutualism, commensalism, interspecific competition, intraspecific competition, ecological niche, fundamental niche, realized niche, competitive exclusion principle, resource partitioning, coexistence, keystone species, coevolutionary arms race, biodiversity, adaptive potential, pelagic organisms, plankton, nekton, benthic organisms, sessile, food chain, food web, primary producer, primary consumer, secondary consumer, tertiary consumer, biomagnification

**Chapter 11 - Between the Tides**

What is the difference between the intertidal zone and the subtidal zone. What are the two types of intertidal substrates? What is zonation? Know the four zones in the rocky intertidal and know the examples of organisms found in each zone. What zone are most soft bodied organisms found in? Hard shelled organisms? What factors limit the upper and lower range of organisms in the intertidal zone? What is desiccation? What zone are the greatest number of species found in? What is the difference between epifauna and infauna? What type of intertidal zone (rocky or sandy) are each type more common in? **Know the different challenges faced by organisms in the intertidal zone and be able to provide examples of adaptations that organisms have evolved to deal with the different challenges.** What role do seastars play in the rocky intertidal zone and how might seastar wasting disease lead to a transformation of the intertidal zone? What is ecological succession? Climax community. What type of sediment contains more oxygen, fine or coarse? Know the different zones of the soft bottom intertidal and the zones that have more infauna and epifauna.

**Key words and terms**: Intertidal, subtidal, zonation, desiccation, epifauna, infauna, wave shock, keystone species, ecological succession, climax community,

**Chapters 12, 13, 14 – Ecosystems of the Continental Shelf**

What is an estuary? Know the differ habitats within an estuary and which ones are covered with water during high tide and which ones are exposed during low tide. When is the salinity of the water in an estuary the lowest? What causes the salt wedge? Know the difference between osmoconformers and osmoregulators and the regulatory strategy of most estuarine species. Know the different estuary habitats and which one contains the greatest number of species. Know the difference between sandy intertidal and mudflats concerning the size of the substrate, amount of oxygen present, amount of detritus, amount of diversity, and type feeding strategies (suspension feeders vs. deposit feeders) found in most organisms in each type of habitat. What causes the rotten egg smell in most mudflats? What is resource partitioning? What are halophytes? Know the different salt march plants and which one is important to endangered species. Why are mangroves primarily found in tropical and subtropical shores? Know the different adaptations found in mangrove plants. Know the different reasons why estuaries are important. What is the continental shelf? Are continental shelves larger on active margins or passive margins of continents? What percentage of the commercial catch is caught on continental shelves? How are seagrasses different from algae like kelp? What organisms feed on seagrasses? What are epiphytes? Know how the presence or absence of sea otters affect the health of seagrasses. Where kelp forest found? **Be able to describe the changes in the kelp forest ecosystem with and without sea otter predation from killer whales**. What organisms make up coral reefs? Know the difference between hermatypic and ahermatypic corals. Which one contains zooxanthellae? How do most corals reproduce? Know the conditions for growth of reef-building corals. What happens when grazers are removed from a coral reef ecosystem? Know the different treats to coral reefs. How does coral bleaching occur? How does ocean acidification prevent reef-building corals from growing?

**Key words and terms**: Estuary, open water, mudflat, saltmarsh, freshwater marsh, riparian, upland, salt wedge, osmoconformer, osmoregulatory, suspension feeder, deposit feeder, resource partitioning, halophyte, prop roots, pneumatophores, continental shelf, subtidal, benthos, epiphytes

**Chapter 14 – Human Impacts on Marine Environments**

What is biodiversity? Know the difference between intrinsic and extrinsic value. Which marine species are at the greatest risk, marine species that have terrestrial contact or those that are exclusively marine? What human impact poses the greatest risk to biodiversity? Where is human population growth the greatest in the United States? What causes dead zones? What is overfishing? Know the factors that lead to overfishing. What fish species have had the greatest increase in numbers caught since 1975? Know the different fishing methods. **Be able to describe the concept of fishing down the food web.** Which country is responsible for the greatest marine catch? What is sustainable fishing and what is the maximum sustainable yield? What is bycatch? What is aquaculture? What was the worst oil spill in U.S history? Know the impacts of marine plastics. What percentage of plastic in the Giant Pacific Garbage Patch was from discarder fishing gear. What is shark finning and why is it done? How many sharks are killed every year? What percentage of marine fish in the aquarium trade are captured in the wild? How are the fish captured? What is the International Whaling Commission? Know the countries that still participate in annual whale hunts. What affects is climate change expected to have on our oceans? What is coral bleaching? What causes coral bleaching? How do hydroelectric dams impact marine species? **Know the definition of an invasive species and be able to provide an example of an invasive species.** Know the characteristics that make something a successful invader. Know the different ways that invasive species are introduced. Know the different examples of the invasive species. What are some ways that the U.S is working to preserve species? What are exclusive economic zones and marine protected areas?

**Key words and terms**: Biodiversity, extrinsic value, intrinsic value, eutrophication, hypoxia, dead zone, overfishing, purse-seining, trawling, gillnets, long-lining, sustainable fishing, maximum sustainable yield, bycatch, aquaculture, shark finning, whaling, sea surface temperature, coral bleaching, invasive species, ballast water, pet trade, aquarium release, Endangered Species Act, exclusive economic zones, marine protected areas,