Bio 362 (Marine Biology)
Spring 2017
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# Exam 2 Study Guide

**1. Definitions** (be able to define & give an example if appropriate)

*Nearshore oceanography*
Waves, swell, Eulerian vs. Lagrangian measurements of flow, significant wave height, advection vs. diffusion, boundary layers (3 types at 3 scales)

*Intertidal communities*
Spring vs. neap tide, important tide levels (MLW, MLLW, etc), zonation, settlement vs. recruitment, keystone vs. diffuse predator, suspension vs. deposit feeding, thixotropy, meiofauna, redox zone, bioturbation, epibenthic, epifauna, infauna, demersal, microbial stripping hypothesis, particle size selection by suspension feeders

*Estuaries*
Estuary, flocculation, stenohaline vs. euryhaline, anadromy vs catadromy, osmoregulation vs. osmoconformer, hypoxia, allochthonous vs. autochthonous, retention time, turnover time

*Salt marshes*
Halophilic, halophyte, accretion, subsidence, aerenchyma

*Mangroves*
pneumatophore, lenticel, prop root

*Coral Reefs*
hermatypic, zooxanthellate, constructional, atoll, barrier reef, fringing reef, adaptive bleaching, sequential vs. simultaneous hermaphroditism, protogyny

**2. Details to know**
• Types of waves, parts of a wave, relationships to bottom depth
• Types of tides (diurnal, semidiurnal, mixed), what type of tides are found along the coast of North America
• Locations of rocky intertidal North America. Differences in rocky intertidal communities between Pacific & Atlantic coasts
• Typical rocky intertidal zonation patterns: laminarian macroalgae – mussels – barnacles – snails
• Names of larval forms of major intertidal invertebrate fauna (bivalves, crustaceans, seastars)

• Major taxa of intertidal invertebrates & key distinguishing traits: bivalves, gastropods, amphipods, isopods, decapods, cirripedes, asteroids, polychaetes
• Why is $H_2S$ common in the redox zone, and why are the sediments black?
• Types of predation & strategies used by predators in soft sediment habitats; strategies used to avoid predation
• Geomorphological classifications of estuaries, major distinguishing features of each
• Circulation-based classification of estuaries, major distinguishing features of each
• Factors producing mixing in estuaries
• How freshwater vs. saltwater bony fish osmoregulate. Hormones affecting chloride cell function. Contrast to how elasmobranchs osmoregulate
• Major species in southeastern US salt marshes, and their ecological roles: *Spartina alterniflora, Spartina patens, Juncus, Distichlis, Salicornia, Iva*
• Head-down vs. head-up deposit feeders
• Broad taxonomy of corals: Anthozoa, Hydrozoa, Octocorallia, Hexacorallia, Scleractinia, which ones are hermatypic, zooxanthellate, constructional
• Important grazers & coral predators on coral reefs
• Physical requirements for reefs (water temp, clarity, etc)

**3. Concepts** (understand these ideas well enough to apply the concept to a novel situation)
• Orbital motion of waves, relationship to water depth, Stokes drift
• Velocity gradients/boundary layers. How do they develop, what affects their thickness (relationship to Re). Consequences of boundary layers for benthic organisms
• How do organisms respond/adapt/take advantage of the predicatiblity and timing of the tides?
• Tides, factors affecting magnitude, timing
• Critical tide levels
• Sources of physical stress in the intertidal (rocky & soft)
• Causes of zonation in each intertidal community (abiotic vs. biotic)
• Hypothesized effects of coastal upwelling on recruitment and settlement in the intertidal
• Pre- and post-settlement factors affecting recruitment. How to design experiments to test for those factors.
• Succession in the rocky intertidal
• Adaptations & strategies used by bivalves & gastropods for respiration, avoiding dessication, movement
• Compare & contrast the intertidal habitats based on various physical stresses, factors (e.g., wave energy, sediment grain size, etc)
• Compare & contrast soft sediment habitats in terms of physical factors (grain size, wave energy) and food web (e.g., source of primary productivity)
• Strategies used by burrowing animals
• Strategies used by organisms to cope with drag & flow
• Biological effects of redox zone, effects of organisms on redox zone.
• Sources of disturbance in soft sediment communities
• Biological consequences of estuarine sediment flocculation
• Factors structuring communities in soft sediment habitat
• Why are estuaries relatively species poor?

• Patterns of estuarine fish habitat use (residents vs. migrants). What are the relative advantages of each strategy?
• Strategies that estuarine larvae use to exit & return to the estuary
• Compare/contrast osmoregulation in freshwater vs. saltwater fish
• Roles of facilitation and competition in salt marshes
• Trait mediated effects of predators
• Role of grazing in salt marshes. Role of *Littoraria*
• Main spaceholding groups on coral reefs, modes of feeding & contribution to habitat (coral, sponge, algae)
• Typical zonation of reef (reef crest, reef flat, etc.) & types of species in each zone
* How can coral reefs be so productive despite oligotrophic water?
• Examples of antipredator adaptations on reefs
• Inverted trophic pyramid
• Size-advantage hypothesis
• Examples of facilitation on reefs, how cooperation can evolve without cheating
• Factors affecting coral bleaching & explanations for adaptive bleaching
• Alternate stable states on reefs

**Sections in the book not to worry about:**
In general, you will not be tested on material in the "going deeper" and "hot topics" boxes.

Ch 12: This test will only cover the Mollusca, Lophophorates (Bryozoa, Brachiopoda, Phoronida), and Echinodermata. Other groups will be covered on later exams.

**Things you should know that were not in lecture but are in the book:**

Ch 13: Suspension & deposit feeding (pp 288-297)
Ch 14: Invasions in intertidal communities (pp 330-332)