

2011 California Envirothon

Wildlife Station Test

Total Points = 100

Please write your team number on the top of EACH page. You may unstaple the test work on the questions in any order, but pages should be in the correct order when the test is turned in. You may choose to split your team and work on several questions at once or work on them together.



Part 1 (20 points): Whose who?

Identify the following two fish: (2pts - 1pt each)

A. _____

B. _____

Which of the two species above would be described as benthic? (1 pt) _____

Which skull belongs to a rodent? (1 pt)

- A. Skull number 1
- B. Skull number 2
- C. Skull number 3
- D. Skull number 4

Which species of rodent is it? (1pt) _____

Which scat would the above rodent have left? (1pt)

- A. Scat number 1
- B. Scat number 2
- C. Scat number 3
- D. Scat number 4

Part 1 continued:

Match the skull with the correct animal: **(4pts)**

Write the number associated with the matching skull in front of the name of the correct animal

1		crow
2		duck
3		goose
4		great blue heron

Which one of the above species is likely to have left Scat Number 5? **(1 pt)** _____





Match the track with the correct animal: **(4 pts)**


Write the number associated with each track in front of the name of the animal that would have left it

1		cougar
2		coyote
3		crow
4		duck



Part 1 continued: Matching Orders and Families with an example species and with common terms used to refer to the group of birds. Place the letter next to the order and family in front of both the correct species and the common term (1/2 point for each match (total of 5 pts))

	Species		Order and Family		Commonly referred to as:
1	 green-winged teal	A	Ciconiiformes Ardeidae		perching birds/ songbirds
2	 song sparrow	B	Passeriformes Emberizidae		ducks, geese and swans
3	 Caspian tern	C	Charadriiformes Scolopacidae		shorebirds
4	 great egret	D	Anseriformes Anatidae		gulls and terns

5		E	Charadriiformes Laridae	long legged wading birds
	long-billed dowitcher			

Part 2 (30 points): Guess who's coming to dinner?

Draw a diagram of a likely food web of an estuary. Include **10 species** from the list below and show at least four trophic levels. **Use arrows** to show the associations among the trophic levels. **(10 pts)**

- | | | |
|--------------------|------------------|-------------------------|
| anchovy | diatoms | salmon (adult) |
| barnacle | eel grass | saltgrass |
| bass (adult) | geese | saltmarsh harvest mouse |
| black-necked stilt | great blue heron | shrimp |
| clam | gumplant | smelt |
| copepod | herring | tide water goby |
| crab | mussel | water flea |

Part 2 continued:

Define phytoplankton. **(1 pt)**

From the list of species provided from the food web exercise, which is a type of phytoplankton? **(1pt)**

Describe what a phytoplankton bloom is? **(1 pt)**

Define zooplankton. **(1pt)**

From the list of species provided from the food web exercise, give an example of a zooplankton. **(1pt)**





Most of the living plants, such as cordgrass and pickleweed, in a marsh are not eaten directly by animals. Why would this be? **(1pt)**


The energy and nutrients of these plants, however, does not go unused. Tidal actions physically break apart dead plant material, which is then attacked by decomposing bacteria. The vegetation is eventually broken down into small, nutrient-rich, bacteria-coated particles known as detritus. These detrital particles are eaten by many animals including many filter-feeders.

From the list of species provided from the food web exercise, give an example of a filter-feeder. **(1pt)**

Part 2 continued:

Matching: Based beak and body shape, along with your general knowledge, match the bird with its correct feeding method (5 pts)

	Species		Food and Feeding Methods
1	 <p>green-winged teal</p>	A	flies over water with bill pointing down; plunges into water to catch fish; eats almost entirely fish; occasionally crayfish and insects
2	 <p>song sparrow</p>	B	walks slowly, stands and stabs prey with quick lunge of the bill; eats fish, invertebrates, amphibians, reptiles, birds and small mammals
3	 <p>Caspian tern</p>	C	dabbles and filter-feeds at surface of water, tips-up in shallow water; eats aquatic vegetation, primarily seeds of grasses and sedges; also consumes some aquatic larvae and other invertebrates
4	 <p>great egret</p>	D	probes deeply into soft substances; makes short jabbing and probing in a distinctive "sewing machine" motion feeding on a diet of aquatic invertebrates and insects

5	 <p>long-billed dowitcher</p>	E	<p>walks or hops on the ground and flits or hops through branches, grass, and weeds; stays low and forages secretively eating mainly seeds and fruits, supplemented by many kinds of invertebrates in summer</p>
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Part 2 continued:

The estuaries of San Francisco bay, as well as other estuaries of California have been polluted with high levels of mercury due to the use of mercury in the extraction of gold in the coastal and Sierra Nevada ranges. Of the 5 bird species from the matching section above, which species would be the most likely to be affected by mercury contamination? **(1 pt)**

Explain why you believe this species is more at risk than the other species. **(2 pts)**

What term is used to describe this phenomenon? **(1 pt)**



The estuaries of California provide critical habitat along the Pacific Flyway. What does the Pacific Flyway refer to? **(2 pts)**

And why are estuaries such an important component of the Pacific Flyway? **(2 pts)**

Part 3 (15 points): Special Status – Considering an Endangered Species

The endangered salt marsh harvest mouse (*Reithrodontomys raviventris*) is endemic to the bays of San Francisco. This cover-dependent mouse uses dense stands of pickleweed (*Salicornia virginica*) as its primary/preferred habitat, but also needs areas of non-submerged, salt-tolerant vegetation of the upper marsh zone to escape from extreme high tides. It will nest above ground in grass, a shrub, or small tree. The mouse's diet consists mostly of the stems and leaves of salt marsh plants. It also eats some seeds and insects. It is able to survive for long periods of time without freshwater eating halophytic plants and drinking saltwater.

Individual salt marsh harvest mice are typically short-lived and the species has a low reproductive potential. Most mice rarely live beyond one year and females typically only bear around 4 young per litter and have only one litter in their lifetime. The species is also density-dependent: when the populations are too high, breeding is suppressed until later.

Describe an unusual adaptation of the salt harvest mouse that allows it to live in the salt marshes of San Francisco? **(1 pt)**

What other habitat might require animals to have a similar adaptation? **(1 pt)**

- A. Riverine wetlands
- B. Desert
- C. Temperate hardwood forest
- D. Bogs

Explain why animals of the habitat you selected in the above question would also need a similar adaptation. **(1 pt)**

The salt marsh harvest mouse requires areas of the upper marsh zone since these areas provide escape cover during the highest tides. Why might diking marshes, which limits tidal influence, negatively affect the salt marsh harvest mouse? **(3 pts)**

Part 3 continued:

Describe the ecological niche that the salt marsh harvest mouse fills. **(2 pts)**

Give two reasons why a locally endemic species, such as the salt marsh harvest mouse, would be more likely than other species to become endangered or threatened? **(2 pts)**

What is another characteristic that the salt marsh harvest mouse has which is often the case with endangered or threatened species? **(1 pt)**

- A. It is cover dependent
- B. It is omnivorous
- C. It has a short life span
- D. It has a low reproductive potential

The salt marsh harvest mouse is recognized as endangered both by the federal government and by the State of California. What **two** federal agencies are responsible for implementing the Endangered Species Act? **(2pts)**

Which one of these federal agencies has jurisdiction over the salt marsh harvest mouse? **(1 pt)**

Which branch of the State of California has jurisdiction over the mouse? **(1 pt)**



Part 4 (10 points): An Unwelcomed Guest

The Chinese mitten crab (*Eriocheir sinensis*) is native to the estuaries of Southeast Asia from southern China to the Korean Peninsula and was first reported in San Francisco Estuary in 1992. The mitten crabs spend most of their life in fresh water, but they must return to the sea to breed. During their fourth or fifth year in late summer, the crustaceans migrate downstream to the tidal estuaries where they mate. After mating, the females continue seaward, overwintering in deeper waters, but returning to brackish water in the spring to lay their eggs. After developing from as larvae, the juvenile crabs gradually move upstream into fresh water, thus completing the life cycle.

Chinese mitten crabs cause numerous problems. The crabs are omnivorous and opportunistic, consuming a wide variety of plant and animal material. Their diet includes algae, macrophytes, detritus, and invertebrates. They will also steal a wide range of bait from fishermen. The crabs also harm the fishing industry due to the crabs feeding on fish catch, the spiny carapace and legs of the crabs damaging fish, and entanglement of the crabs in gear, increasing handling time and causing damage to fishing nets. Chinese mitten crabs also cause other problems, such as interfering with operations at water facilities and pumping stations. Burrowing activities can cause damage to dykes, coastal protection systems, harbor installations, and soft sediment banks when populations reach high abundance. Damage to soft sediment banks has the potential to affect flooding, increasing erosion and repair expenses.

Why are Chinese mitten crabs considered invasive? **(2pts)**

Some invasive species were originally been brought to area by people on purpose while others were accidentally or inadvertently introduced. Why might someone have introduced a species, such as the Chinese mitten crab, on purpose? **(1 pt)**

Part 4 Continued:

Describe how the Chinese mitten crab may have been accidentally introduced by people. **(1 pt)**

Once an invasive species is present in a region, it is often difficult to stop its spread to other locations. Describe why this may be. **(1 pt)**

Invasive plants often create monotypic stands. In some cases these plants, prior to realizing they would become invasive, were originally valued for their high fruit or seed production. Give three reasons why a large area of one species may not be beneficial even if they produce copious food for wildlife. **(3 pts)**

Land managers are often faced with difficult choices, such as whether to use herbicides to manage invasive plants. Describe one reason why someone trying to manage a site for native plants and animals would choose to use a chemical herbicide over another method. **(2 pts)**

Part 5 (25 points): Wildcard: any topic goes

Multiple Choice – circle the letter of the best choice (15 pts - 1 pt each)

What is the study of amphibians and reptiles called?

- A. ichthyology
- B. ornithology
- C. entomology
- D. herpetology

Which species is **NOT** protected under the Migratory Bird Treaty Act?

- A. European Starling
- B. common yellowthroat
- C. long-billed curlew
- D. northern pintail

What is an example of a density-independent factor that would restrict population growth?

- A. food supply
- B. predators
- C. territorial behavior
- D. temperature

Flounders are able to alter their coloration and patterning in order to hide from predators. What term describes this ability?

- A. aestivation
- B. interspersion
- C. fecundity
- D. camouflage

What is the term describes a species that lays eggs?

- A. viviparous
- B. ovoviviparous
- C. oviparous
- D. clonal

Which species is an example of an ungulate?

- A. Aleutian Canada goose
- B. Morro Bay kangaroo rat
- C. Stellar sea lion

- D. California bighorn sheep

Part 5 continued:

Which species was on both the federal and State of California's list of threatened and endangered species, but has since been **delisted** by both federally and the state?

- A. California brown pelican
- B. California black rail
- C. Chinook salmon
- D. giant garter snake

Which book is best known for having raised public awareness and concern over the effects of pesticides and pollution on wildlife, particularly the problems DDT caused for raptors?

- A. Silent Spring
- B. The Omnivore's Dilemma
- C. A Sand County Almanac
- D. The World Without Us

The contact zone between two different types of habitat is called an edge. What is a typical result of the "edge effect"?

- A. more species present in an area of the same size than within either neighboring habitat
- B. less species present in an area of the same size than within either neighboring habitat
- C. less individuals present in an area of the same size than within either neighboring habitat
- D. more rare species present than within either neighboring habitat

Which would be an example of biological control?

- A. culling raccoons to aid in controlling rabies
- B. use of pesticides to control an outbreak of insects
- C. use of ladybird beetles to reduce the number of aphids
- D. tilling in order to control weeds

What is the term referring to the number of animals a habitat can support throughout the year?

- A. stocking rate
- B. population dynamics
- C. density
- D. carrying capacity

What is an organism that transmits a disease within and between populations called?

- A. Vector
- B. Predator
- C. Parasite

D. Pathogen

Part 5 continued:

Upright trunks of dead or dying trees provide important places for perching, nesting and feeding on larvae for many birds. What are these upright trunks called?

- A. leks
- B. forbs
- C. niches
- D. snags

Which term refers to the replacement, usually by substitution, of wildlife habitat lost to development or other land use project?

- A. habituation
- B. dispersion
- C. biomagnification
- D. mitigation

Which term would best describe a species that no longer exists in the wild within a given area, but exists in the wild outside of that particular area?

- A. endangered
- B. threatened
- C. extirpated
- D. extinct

Part 5 continued:

Matching - Write the letter corresponding to the correct definition for each term in the second column
(10 points – 1 point/each)

1	anadromous	A	primarily active during twilight, that is during dawn and dusk
2	diurnal	B	obtain nutrients by consuming decomposing organic matter
3	catadromous	C	active in the daytime
4	detritivore	D	principally consumes plants or algae
5	invasive	E	eat both plants and animals as their primary food source
6	herbivore	F	spending most of life in the sea, but returning to fresh water to breed
7	exotic	G	being unique to a particular geographic location
8	omnivore	H	living in fresh water but migrating to marine waters to breed
9	endemic	I	refers to an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health
10	crepuscular	J	has been introduced from another geographic region to an area outside its natural range

THE END