

Junior Summer Reading 2012 Questions

Turning the Tide, Saving the Chesapeake Bay by Tom Horton

As an additional resource, go to www.chesapeakebay.net and click on the “Bay Resource Library” then look for the “Bay Barometer”, from here you can click around on different aspects of Bay health and get the latest information from the Chesapeake Bay Program.

Part I- The Chesapeake Ecosystem (pp. 1-35)

1. On page 5, you see *Figure 1.1 The Shallow, Vulnerable Bay*, this figure is very important in your understanding of the uniqueness of the CB. From your reading, explain why the shallowness of the Bay is so important to its high productivity.
2. “If you harvest the Bay, pray for drought”, why would the author say this? What happens to the Bay when there is a drought and conversely when there is a lot of rainfall?
3. In the CB today, there are only about 2% of the historical population of oysters left, why? What role do the oysters play in the estuary’s health, what jobs do they do?
4. Go to www.chesapeakebay.net, the Bay Barometer page and click on “Bay Health” and “Fish and Shellfish abundance”. Look at the graph of “Native Oyster Abundance”, how would you characterize the restoration efforts from 1994-2008? What environmental factors have negatively impacted oyster survival and restoration?

Part II- State of the Bay (pp. 37-149)

5. The concept of “resilience” is a very important one. Define resilience and in the context of that definition explain how resilience applies to this ecosystem.
6. Look at page 45, **Figure 2.1 “The Concentrations of Animals on Pennsylvania Farms”**. Calculate the percent increase from 1954-1997 for each of the graphs: milk cows, hogs, and broiler chickens using the formula:
$$(\text{increased amount} - \text{original amount} / \text{original amount}) * 100 = \% \text{ increase}$$

Yes, these are big numbers. What impact have these increases had in terms of pollution in the Chesapeake Bay? How do you as an individual contribute to this problem?

7. What is a “BMP” and how do they work? What is one BMP that has proven to be very effective in removing farm pollution from the water, but not yet widespread in its use in the Chesapeake Bay watershed?
8. There is an old saying “*Dilution is not the solution to pollution*”, and nowhere is it more applicable than in the case of sewage in the Chesapeake Bay. In your own words, based on the reading, explain how this saying applies to sewage in the Bay and what Horton thinks we need to do to fix the problem.
9. Horton calls septic tanks “outhouse technology”. Most of us at CBGS have septic systems as we live in rural communities. According to Wikipedia, in the 26th century B.C. the Indus Valley civilization had flush toilets and a sophisticated sewage system; the more modern version of toilet

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technology that we recognize came about in the 1700's. The point is, this system has evolved little throughout human history, while everything else has completely changed! Just for fun, survey your house and see how modern your "conveniences" are- do you have low flow toilets, low flow faucets - are you a water hog? How do your daily water habits contribute to the sewage waste discharge into the Chesapeake Bay? Do you agree with Horton's analysis?

10. What are the major airborne pollutants of the Chesapeake Bay and where do they come from? What kinds of things can be done to limit the amount of airborne pollutants entering the CB?

11. The Susquehanna River is tamed at one point by the 110 foot high Conowingo Dam. Go to Youtube and watch these two videos:

<http://www.youtube.com/watch?v=yL1Crf5cCY4&feature=related>

<http://www.youtube.com/watch?v=pigob5SnUfE>

you'll get an idea of the enormous power of this engineering restriction on the river's progress. What is the "time bomb" Horton talks about at Conowingo and what are some circumstances that can lead to the release of massive amounts of material from behind the dam?

12. Sediment is a major pollutant of the CB and it is a particularly difficult problem to deal with because of its source. Sediments wash into the estuary from runoff from both anthropogenic and natural sources. What human activities contribute sediment to the Bay and what natural processes add to this sediment load?

13. A hot, muggy August afternoon in Northern Virginia, clouds build overhead, and with a crack of thunder and a gust of wind an afternoon thunder shower dumps a quick inch of rain over road and roof, driveway, parking lot and fertilized lawn. This rain happens so fast that little of it soaks into the ground and most of it runs off as stormwater runoff. What is the problem with stormwater runoff in the CB watershed? Why is this runoff a particularly insidious vector of pollution?

14. Toxic pollutants can be found in the environment from Antarctica to the Chesapeake Bay Bridge Tunnel. Many of these toxins bioaccumulate in higher levels of the food chain and affect reproductive success or cause cancers and tumors in fish and wildlife. Look up the following toxic pollutants and fill out the following table (recreate in your notebook):

Toxin	Sources	Lifespan in the environment	Health Effects
PCB's			
Mercury			
PAH's			
DDT			

15. Why is dissolved oxygen "the Bay's bottom line"?

Congratulations, you're done! We'll read the rest during the school year!