**Everglades, Biscayne Bay and Dry Tortugas 2**

1. During the interval when sea level dropped, runoff carved stream channels across the carbonate platform.
2. When sea level rose, these submerged and became the relatively deep channels that now provide boaters with safe and easy passage across the keys.
3. 120,000 years ago streams flowed through such channels towards a shoreline that was more than 300 feet lower.
4. Today, tidal currents sweep sediment from the channels and deposit it in tidal deltas on both sides of the keys.
5. Where mainland runoff causes a lasting and significant reduction in bay side salinity, the bays can be called estuaries.
6. Since runoff is relatively nutrient rich, sea-grass meadows grow on estuarine sand bars and shoals.
7. Fresh water influence and nutrient supply is especially great in Biscayne Bay because it is one of the most ocean-restricted of the estuaries.
8. Thus, sea-grass meadows abound. Unfortunately, so do careless boaters.
9. In the more ocean-exposed parts of Florida Bay, fresh water influence and associated nutrient supply is minimized, while ocean currents become far more influential.
10. That results in barren, shifting shoals of carbonate sand.
11. In the most protected estuaries, complex depositional mechanisms create a maze of coastal features that make the term coastline useless, but give meaning to the term Netherlands.
12. Much of the complexity results from submerged sinkholes, ….
13. … but the brackish estuarine waters are conducive to oysters, which form somewhat elongated, but mostly irregular beds between the sinkholes.
14. Oyster beds provide a stable bottom for mangroves to gain a foothold on. Eventually the mangrove-populated areas become the “glades” which are ever-so-common in the Everglades.
15. Relax, I’m just kidding. But we are finally ready to make some sense of this mess.
16. First, oyster beds form on sinkhole margins. This large, mature bed is exposed at low tide, but it takes some time for an oyster bed to reach this size and thickness.
17. When the pile of oysters grows close enough to the surface, mangroves can take root.
18. True mangroves tolerate salt water, …
19. … due in part to their stilt-like root systems which elevate most of the tree above sea level.
20. As currents flow through the complex mangrove root system, …
21. … they slow down enough for suspended sediment particles to deposit under the mangroves.
22. The root system also catches leaf litter falling from above, forming spongy, suspended peat mats known as hammocks.
23. Eventually oysters, inorganic sediment and peat hammocks all combine to form new land.
24. Although that new land is pretty saturated, it tremendously reduces the inflow of seawater relative to fresh water coming from land. When the ecology of the estuary changes from brackish water to something a lot closer to fresh water, …
25. … true mangrove hammocks are replaced by treeless areas known as glades.
26. Although true mangroves only grow near salt or brackish water, several other types of trees may form hammocks within the glades. In this part of the world, the term slough is used to describe the broad depressions that crudely channelize runoff and consist of both glades and hammocks.
27. Two types of deposition occur in the sloughs. Peat forms from fresh water hammocks and a limey mud called marl deposits throughout the glades.
28. Whether hammocks or glades form in the slough is determined by the length of time the area stays wet.
29. Since the decomposition of organic material is far faster in air than water, peat tends to accumulate much faster in wet areas …
30. … eventually forming hammocks slightly elevated above the water level.
31. If dry conditions last more than about 3 months out of the year, then virtually all that year’s organic detritus will decompose and no peat can form.
32. If you look closely you can see a little water pooling around some of the hammocks, inhibiting dry-season decomposition and ensuring that some organic material will survive so that peat can accumulate.
33. Where peat does not accumulate, usually marl does.
34. Marl is a mixture of lime and mud …
35. … which in the Everglades generally forms in glades. That’s because during the wet season a calcareous algae encrusts the submerged portions of most glade plants.
36. Although dominantly made of calcareous algae, the sausage-sized encrustations (periphyton) are a complex mixture of algae, microbes and detritus.
37. The crusty mixture ends up settling beneath virtually the entire glade along with …
38. … clay and decomposed organic matter formerly suspended in the sloughs. The baby gators are my cue to wrap this up now.
39. So in closing, I hope you understand now why flatness does not necessary imply geologic simplicity. On the contrary, complex depositional environments often form in flat areas because they are extremely sensitive to changes in sea and fresh water levels.