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Subject: Restoration of Terrapin Nesting Habitat

I addressed the questions listed below based on a review of the turtle literature, contacts with turtle researchers, and personal experience with diamondback terrapins and other species of turtles. My overall assessment is that under normal circumstances grain size, organic content, or residual contamination need not be an area of concern in developing nesting beaches.

1) Is there an optimal grain size for new sand placed on an old terrapin nesting beach to increase nesting density at the site?

Within the expected limits to be found naturally on beaches in the area, no particular grain size has been confirmed as "optimal" for nesting success because of the suite of other environmental variables that can be far more influential. For example, among the most critical features that have been measured in egg survivorship and nest success studies in the laboratory have been hydric conditions of the nest. Numerous studies have also shown hydric conditions to be important in determining egg success, hatchling size, and length of incubation period. Hydric conditions can be affected to some degree by grain size (for example, sea turtle nesting success was determined to be lower on beaches with high grain size), but within normal limits of sand grain sizes the primary determinants of hydric conditions will be the amount of water (e.g., rainfall or wave washover), local humidity, and direct drying effects of wind and sunlight, not the grain size of the sand. Because of the unpredictability of these other environmental factors and the lack of specific studies on terrapins, no ideal grain size can be stated to be an optimal one for creating a nesting beach for diamondback terrapins.

2) Is there an ideal organic content to sand added to the beach to create terrapin nesting habitat, or are there any limits on how much or how little organic material should be present?

Turtles nest successfully in soil types ranging from loamy soils with high organic content to beach sands with little or no organic content. Other factors, such as predation, rainfall levels, and soil temperature and moisture, are much more influential on the survivorship of nests and hatchlings and will normally override any subtle effects of organic levels of the soil. Therefore, no studies have been conducted for diamondback terrapins to suggest that within normal limits,

the organic content in sands should have other than minimal, and in any case unpredictable, impacts on nesting success in the species.

3) Have any limits been determined for agricultural chemical contaminant concentrations in beach sands used by terrapins for nesting that might possibly cause adverse effects on eggs and/or hatchlings?

Uptake of contaminants, including organochlorines, PCBs, and trace metals, by turtle egg shells, hatchlings, or adults have been reported in freshwater turtles, and in a region where high application of pesticides had been used in attempts to eliminate fire ants, residues of mirex have been found in body tissues of turtles. However, the transfer of contaminants from soil to eggs at levels that could result in appreciable developmental abnormalities in eggs or hatchlings seems highly unlikely under standard application regimes of pesticides and herbicides used in most parts of the country. Concentrations of contaminants in egg shells or eggs might indeed be able to be measured as a result of transfer from the soil, but the impact on diamondback terrapin populations would presumably be unnoticeable if having any effect at all.

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