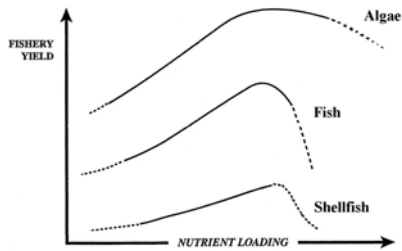


## BACKGROUND:

CHESAPEAKE BAY FISHERIES ARE SUFFERING FROM REDUCED YIELD DUE TO HYPOXIC DEAD ZONES. A MAJOR SOURCE OF THESE DEAD ZONES IS RUNOFF FROM LIVESTOCK WASTE IN THE DELMARVA

Trends in World Fishery Yield with Increasing Nutrient Loading

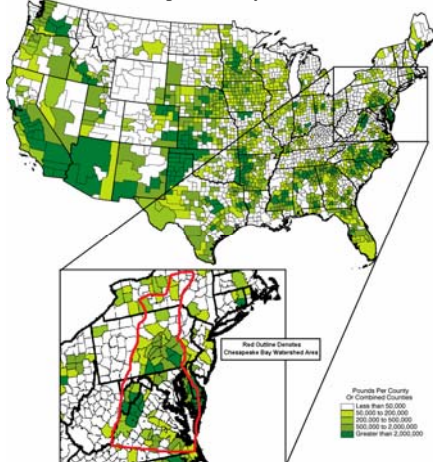


(Source: Diaz, R. J. (March-April, 2001). Overview of hypoxia around the world. Journal of Environmental Quality, 30(2), 278.)

## PROBLEM:

Concentrations of excess manure, like that of the Delmarva region (see inset), are contributing large amounts of nitrogen to a relatively small body of water.

Excess Manure Nitrogen for United States Counties  
Inset: Chesapeake Bay Watershed Area



(Source: Kellogg, Robert L., Ph.D., Lander, C. H., Moffitt, David C., P.E., & Gollehon, N., Ph.D. (December, 2000). Manure nutrients relative to the capacity of cropland and pastureland to assimilate nutrients: Spatial and temporal trends for the United States. Map #28. No. nps00-0579 United States Department of Agriculture through the Natural Resource Conservation Service by the Economic Research Service.)

## PROPOSED SOLUTION:

### GOVERNMENT POLICY:

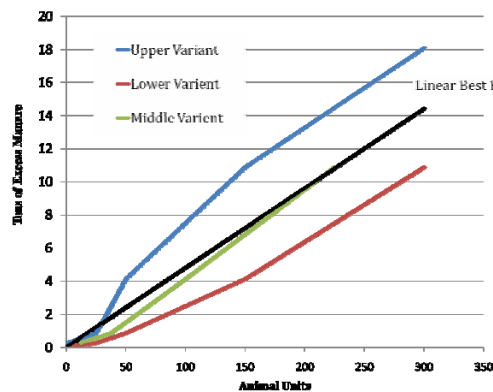
#### CURRENT POLICY:

Regulations currently in place for farmer's runoff are not strictly enforced.

#### PROPOSED POLICY:

Enforcement of a minimum level of yearly livestock manure to be removed from farms with a specified number of animals, standardized to a common unit (Animal Units).

Excess Manure per Animal Unit



| Animal                           | AU Factor |
|----------------------------------|-----------|
| Fattened cattle                  | 1.14      |
| Milk cows                        | 0.74      |
| Other beef and dairy             |           |
| Beef calves                      | 4.00      |
| Beef stockers and grass fed beef | 1.73      |
| Swine                            |           |
| Breeding hogs                    | 2.67      |
| Hogs for slaughter               | 9.09      |
| Poultry                          |           |
| Chickens, layers                 | 250       |
| Chickens, pullets                |           |
| Pullets less than 3 months old   | 455       |
| Pullets more than 3 months old   | 250       |
| Chickens, broilers               | 455       |
| Turkeys for breeding             | 50        |
| Turkeys for slaughter            | 67        |

(Source: Kellogg, Robert L., Ph.D., Lander, C. H., Moffitt, David C., P.E., & Gollehon, N., Ph.D. (December, 2000). Manure nutrients relative to the capacity of cropland and pastureland to assimilate nutrients: Spatial and temporal trends for the United States. Map #28. No. nps00-0579 United States Department of Agriculture through the Natural Resource Conservation Service by the Economic Research Service.)

Proposed federally mandated export of livestock manure per farm per year:

$$\text{Tons of Manure} = .048 \times \text{Animal Units}$$

**As farmers reduce their runoff according to this equation, nutrients in the Chesapeake Bay will return to natural levels thereby restoring fishery yield.**

### INCREASED AWARENESS:

#### DIGITAL STORY:

Short informational video that could be run as a commercial to urge voters pressure for legislation.

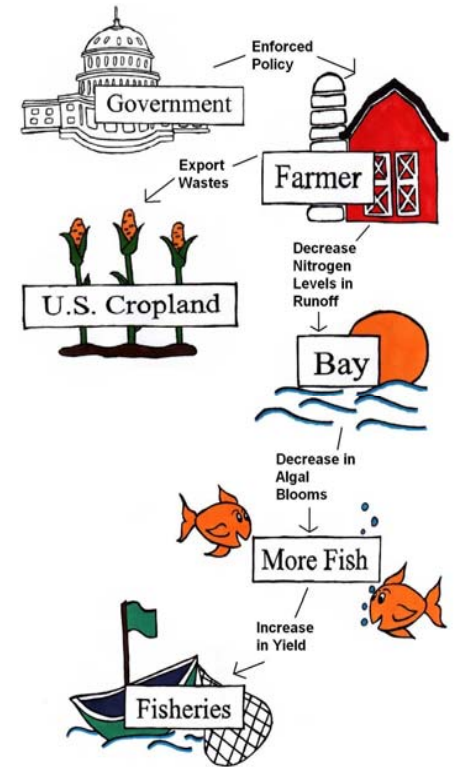
#### REPORT:

Summarize findings and distribute to EPA and USDA to inform and cause policy change.

### ENTREPRENEURIAL OPPORTUNITY:

By requiring farmers to export livestock manure a potential for a large scale manure removal company is created. Through this company, excess manure can be distributed over greater land area. Farmers purchasing the livestock fertilizer can therefore cut back on their use of synthetic fertilizers, the leading cause of world wide dead zones.

## MECHANISMS:



## ASSESSMENT OF RESULTS:

Biannually investigate farming operations to ensure farmers are properly disposing of waste.

- Measure nutrient amounts in local waterways.
- Re-evaluate the level of nutrients in Chesapeake Bay dead zones to see if they have improved.
- Monitor Delmarva fishery yields
- Distribute all results to government environmental agencies for evaluation.