



## Department of Environmental Quality Wastewater Reuse Program

### Microbial Risk Assessment: Modeling Pathogen Infective Risk for Class A, B, C, D and E Wastewaters

M. Cook, DEQ; May 19, 2010



## Purpose

- Determine Risk at Distance from Source
- Determine Buffer Zones

## Modeled Scenarios

- Wastewater Types (5)
- Nozzle Types (5)
- Normal Operating Pressures
- Pathogen: *E. coli* (O157:H7)
- Meteorological Stability Classes (3)
- Risk – Total and Airborne
- 1,600+ Modeled Scenarios

## Wastewater Microbial Characteristics: Total Coliform\* (TC)

- Class A/B: 2.2 CFU/100 mL
- Class C: 23 CFU/100 mL
- Class D: 230 CFU/100 mL
- Class E: 2,300,000\*\* CFU/100 mL

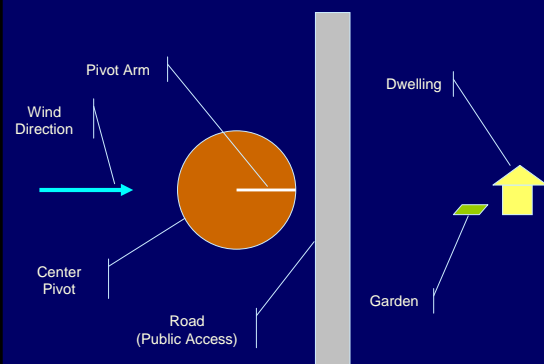
\* *E. coli* O157:H7 count assumed to be either 1% or 10% of TC Count

\*\* 'TNTC'

## Modeled Scenario

- Pivot, 126 acre
- 800 gpm discharge
- 60 hour set;
- 8 hour exposure time/set

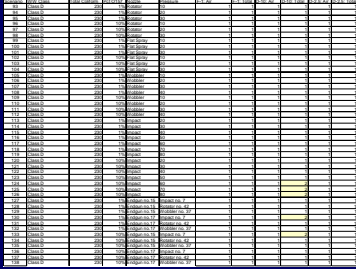
## Model Geometry







## Class D WW – 1320 ft



## What Model Output Tells Us

- **Decreasing Risk:**
  - Increasing Distance
  - Decreasing Operating Pressure
  - Decreasing Pathogen Count
  - Dwellings with no Gardens (Produce Ingestion)
- **Airborne Risk**
  - Higher in 'F-1' Conditions
  - Lower in 'D-10' and D-2.5 Conditions
- **Total Risk**
  - Higher in 'D-10' conditions

