

Survival of Bacterial Indicator - Species on Impervious Environmental Surfaces

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- BS, Biology, South Alabama, 1977
- BChE, Biochemistry, Auburn, 1988
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“However, there are nonhuman and naturally occurring coliforms and enterococi, and their presence confounds the results of the total coliform and enterococci tests.”

NRC [2005], p. 114

EPA did not develop nationally applicable criteria values that adjust for the source of the fecal contamination, for non-human sources. Rather, EPA recommends that States use these nationally applicable criteria in all waters designated for primary contact recreation.

EPA 820-D-11-002

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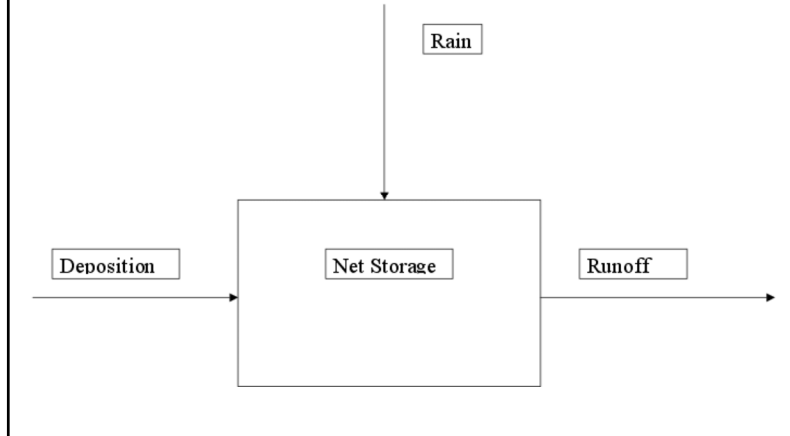
- Pervious-Surface Studies
- Disaggregation/P article Affiliation (maceration studies, cascade filtering and settling)
- Source-Area Stormwater Sampling

Perspective



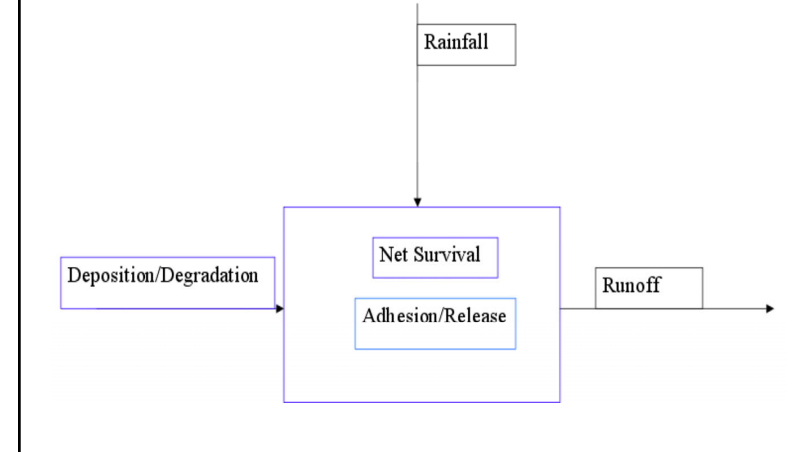
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Mass Balance Approach



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Factorial Experiment



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Factorial Experiment

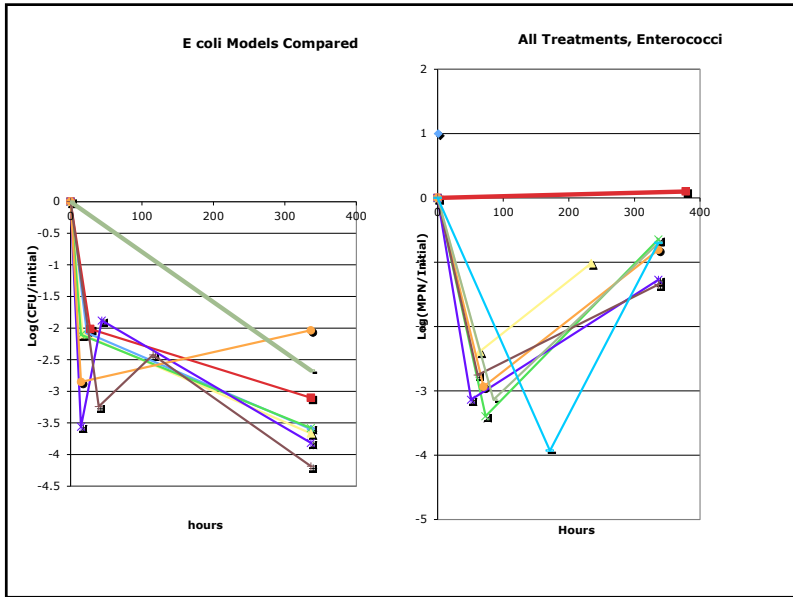


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Individual Treatments Modeled by Segmented Regression with Unknown Breakpoints

- MLE=Min SSE [Hudson'66]
- Unstationarity of MLE at T(obs) [Feder, 75]
- Grid-search method for edited and identified models [Lerman,'80]
- Sequential Search - sup(Ft) test [Bai and Perron,'98]
- Multiple linear regression (each segment) of environmental factors on rate constant k

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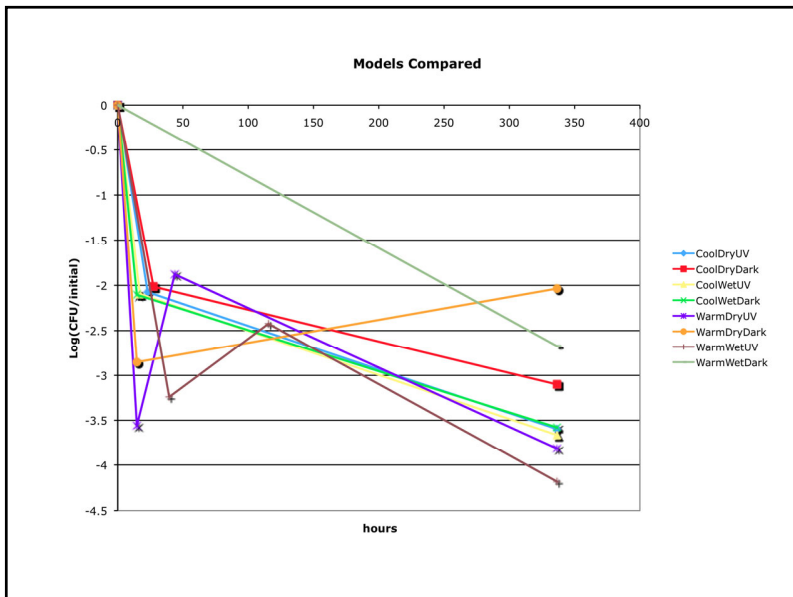


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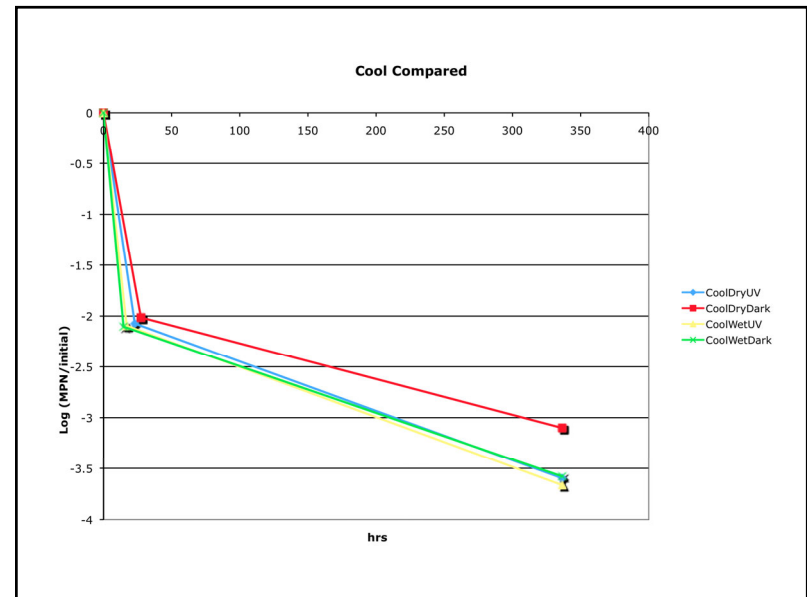
E Coli

- Treatment Comparisons
- Model

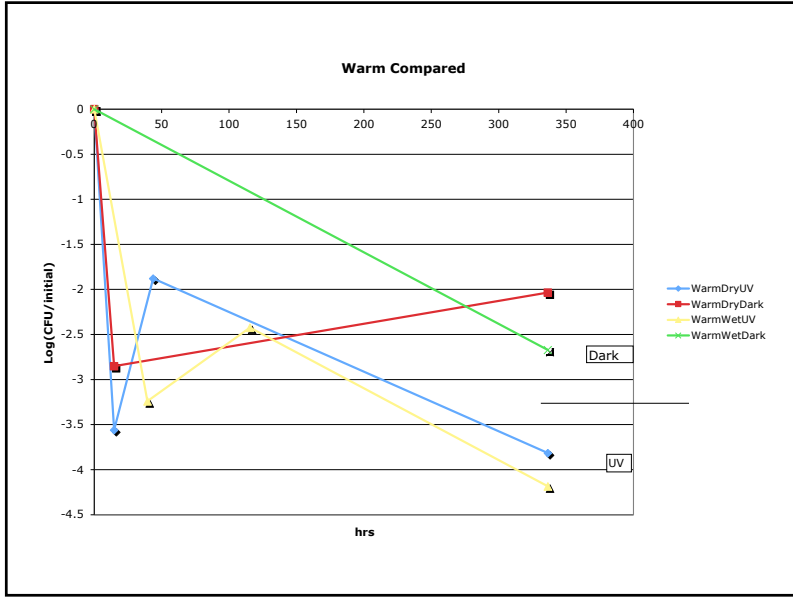
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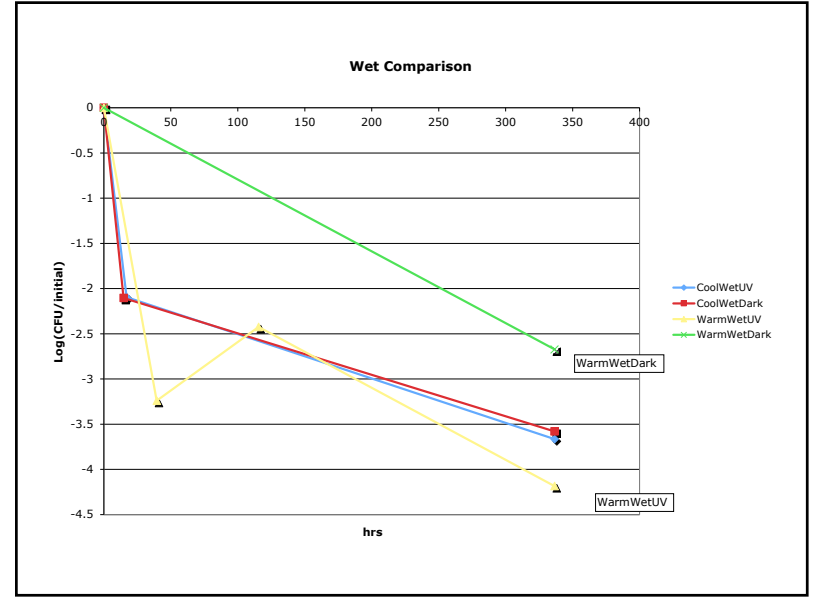
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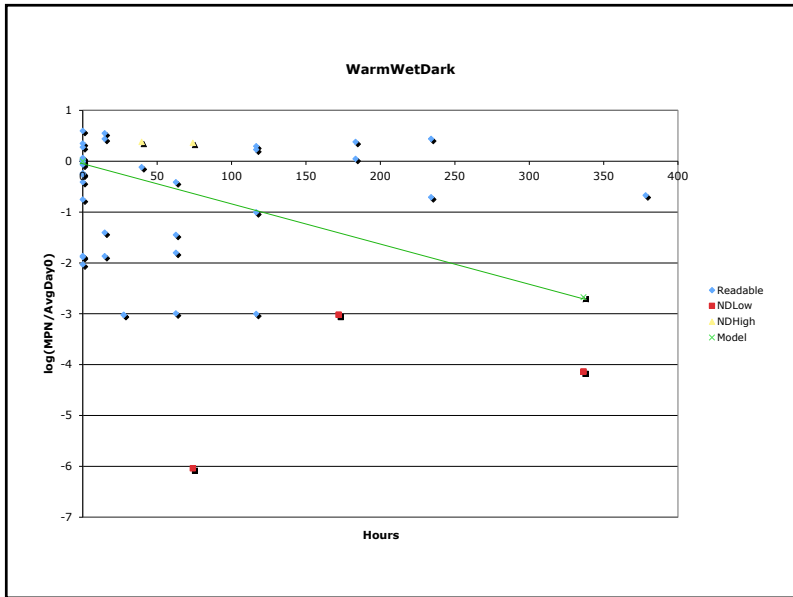
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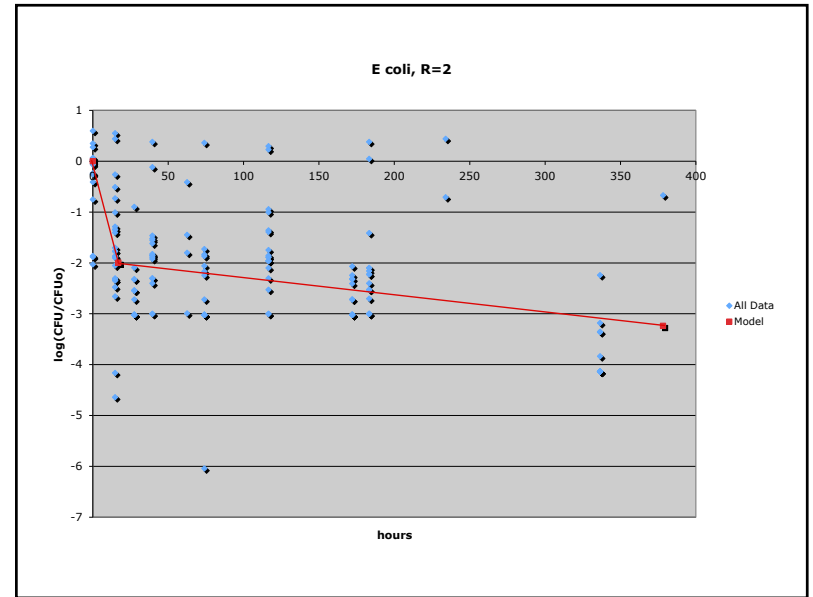
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Model, E coli survival

$k1 = 0.168 - 5.18E-3 (\text{Temp, in F}) - 4.17E-3 (\%RH) + 7.17E-5 (\text{Temp} \times RH) - 1.29E-3 (RH \times \text{ShadeCode}) + 3.09E-5$
 (3-way interaction) for 1st 17 hours of exposure.

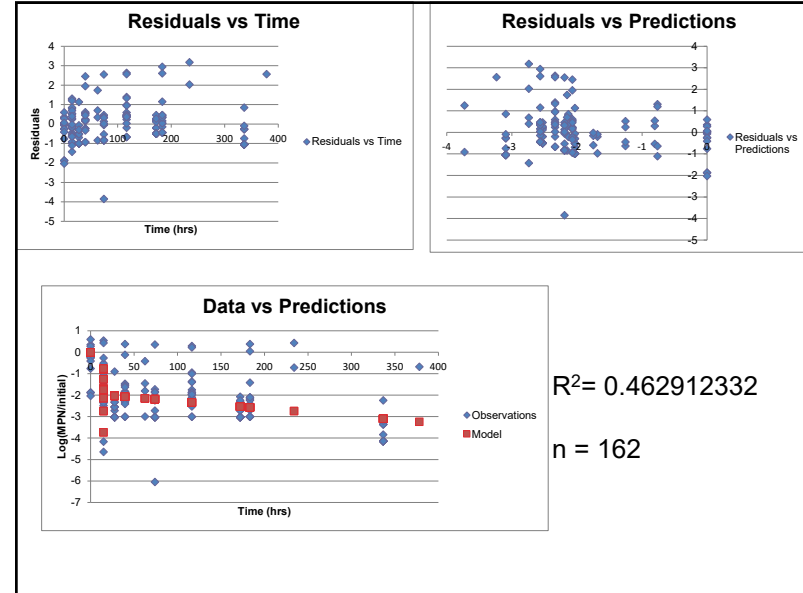
$k2 = 0.00344$ thereafter

Where ShadeCode = 1 for Shade
 = 0 for sun-exposed

Range ~40 F to 88 F
 ~25% RH to 75% RH

and
 $Y = k1 (\text{Time in hours})$ for left segment and
 $= -2.41 (\text{time} - 17 \text{ hrs})$

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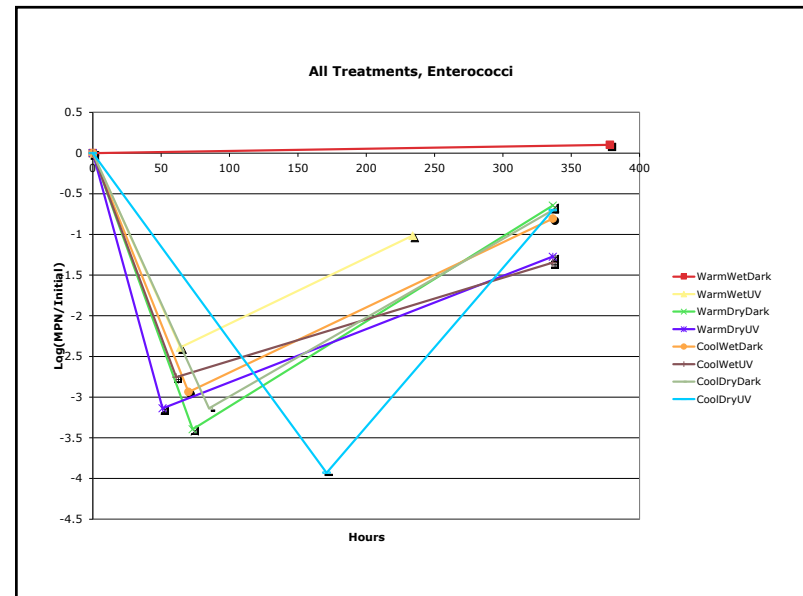


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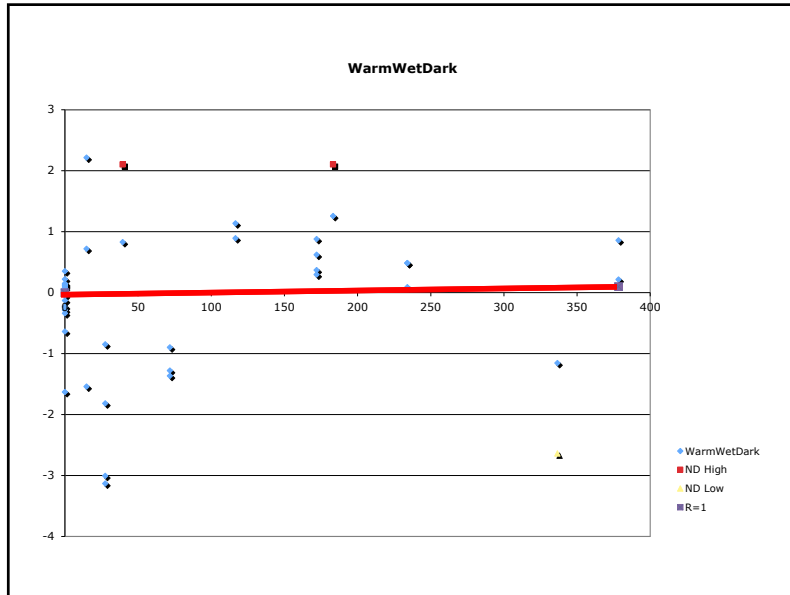
Enterococci

- Treatment Overview
- Model

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Questions?

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