

MEMORANDUM

DATE: December 5, 2007

TO: Division of Shellfish Sanitation Staff

FROM: Robert E. Croonenberghs, Ph.D., Director
Division of Shellfish Sanitation 

SUBJECT: Parameters for Developing Shellfish Buffer Zones around Marinas and Wastewater Discharges

Delete Working Memo #320

Purpose

To establish policy for the input parameters for use by the Division in the simple mixing and transport model developed by VIMS in 1989.

Introduction

The Division uses a computerized, mathematical model to develop buffer (closure) zones around marinas and wastewater treatment facilities (WWTF). This model is an advection, dilution and dispersion model that uses readily available “desktop” data in a complex mathematical formula to develop the size of closure zones.

Discussion

The Division has used certain input parameters almost since obtaining the model from VIMS. Other parameters have been developed through recommendations from VIMS and USFDA. This Working Memo is designed to establish the input parameters for that model as Division policy.

While the model is intended for use in sizing these buffer zones, Dr. John Hamrick, the lead developer of the model, indicated that it is to be used as a tool, and should not be looked upon as a replacement for professional judgment. The model assumes a rectangular channel with a certain amount of bottom roughness, and then indicates the fecal coliform concentrations at varying distances offshore and along shore. The model cannot address variations in current patterns such as those caused by wind driven tides, or shoreline/bottom contours or bars.

Input Parameters

<u>Parameter</u>	<u>Source</u>
Fecal coliforms (FC)	
marina (per person)	
2×10^9 FC/day = 2.3×10^4 FC/sec	NSSP
WWTF treated sewage to a waterway	
chlorinated effluent	
1000 MPN/100 ml	FDA
UV treatment	
400 MPN/100 ml	FDA

Input Parameters (Cont.)

<u>Parameter</u>	<u>Source</u>
Fecal coliforms (FC)	
WWTF treated sewage to a 24-day-minimum detention pond, which negates the requirement for a prohibited area chlorinated effluent	
500 MPN/100 ml	FDA/DSS experience
UV treatment	
200 MPN/100 ml	FDA/DSS experience
Two persons per-boat-minimum for marinas	NSSP
The number of slips present at a marina is used	NSSP
Occupancy rate (fraction of boats occupied) for marinas	
0.3 or 0.15 depending on typical use of marina	DSS experience
Die-off coefficient for fecal coliforms	
marina	
4.1 x 10 ⁻⁶ (15° C)	VIMS
WWTF	
2.1 x 10 ⁻⁶ (5° C)	VIMS

Fecal Coliform Critical Limits (end point parameters)

Marina	
restricted area	
< 14 FC/100 ml	NSSP
WWTF both chlorinated effluent and UV disinfectant	
prohibited area	
88 FC/100 ml	NSSP
restricted area	
1 FC/100 ml	FDA