PROPOSED DRAFT BUFFER MATRIX
EPA WA 4-18, NH Surface Water Supply Buffers

NON-POINT SOURCE POLLUTANT	AVERAGE BUFFER WIDTH PER POLLUTANT (FEET)	RANGE OF RECOMMENDED BUFFER WIDTHS (FEET)	AVERAGE BUFFER WIDTH (FEET)	COMMENT/ REFERENCE
Phosphorous	253	Varies depending on slope of buffer. Natural buffer more effective than created grass buffer.	N/A	Simon, John, 2004. ME DEP Filter Buffer Study (produced for DEP).
				Maine DEP, 1992. Phosphorus Control in Lake Watersheds: A Technical Guide to Evaluating New Development. Maine DEP, Augusta, ME.
		Based on multiple studies, a 280-foot minimum buffer width could be expected to remove about 80% sediment inputs.[1]	280	Desbonnet, A., P. Pogue, V. Lee, and N. Wolff. 1994. Vegetated Buffers in the Coastal Zone: A Summary Review and Bibliography. Coastal Resources Center, Rhode Island Sea Grant, University of Rhode Island. 71pp.
		150-300	225	Clark, 1977 (in Palfrey, R., Bradley, E., 1981. Natural Buffer Areas: An Annotated Bibliography. Coastal Resources Div., Tidewater Admin., MD Dept. of Natural Resources.)
Nitrogen	156	Based on multiple studies, a 200-foot minimum buffer width could be expected to remove about 80% nitrogen inputs.[1]	200	Desbonnet, A., P. Pogue, V. Lee, and N. Wolff. 1994. Vegetated Buffers in the Coastal Zone: A Summary Review and Bibliography. Coastal Resources Center, Rhode Island Sea Grant, University of Rhode Island. 71pp.
		100	100	Pinay, G., Roques, L.., Fabre, A.. 1993. "Spatial and Temporal Patterns of Denitrification in a Riparian Forest," J. of Applied Ecology 30: 581-591.
		100	100	Wenger, S. 1999. A Review of the Scientific Literature on Riparian Buffer Width, Extent and Vegetation. Office of Public Service & Outreach, Institute of Ecology, University of Georgia, Athens, Georgia, 59 pp.
		150-300	225	Clark, 1977 (in Palfrey, R., Bradley, E., 1981. Natural Buffer Areas: An Annotated Bibliography. Coastal Resources Div., Tidewater Admin., MD Dept. of Natural Resources.)
Sediment	118	Based on multiple studies, an 80-foot minimum buffer width could be expected to remove about 80% sediment inputs.[2]	80	Desbonnet, A., P. Pogue, V. Lee, and N. Wolff. 1994. Vegetated Buffers in the Coastal Zone: A Summary Review and Bibliography. Coastal Resources Center, Rhode Island Sea Grant, University of Rhode Island. 71pp.
		43-154	99	Swift, L.W., 1986. "Filter Strip Widths for Forest Roads in the Southern Appalachians," Southern J. of Applied Forestry, 10: 27-34.
		150	150	Erman, 1977 (in Palfrey, R., Bradley, E., 1981. Natural Buffer Areas: An Annotated Bibliography. Coastal Resources Div., Tidewater Admin., MD Dept. of Natural Resources.)
		25-300	163	Palmstrom, N. 1991. Vegetated Buffer Strip Designation Method Guidance Manual. I.E.P., Inc. Consulting Environmental Scientists.

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NON-POINT SOURCE POLLUTANT	AVERAGE BUFFER WIDTH PER POLLUTANT (FEET)	RANGE OF RECOMMENDED BUFFER WIDTHS (FEET)	AVERAGE BUFFER WIDTH (FEET)	COMMENT/ REFERENCE
		100	100	Wenger, S. 1999. A Review of the Scientific Literature on Riparian Buffer Width, Extent and Vegetation. Office of Public Service & Outreach, Institute of Ecology, University of Georgia, Athens, Georgia, 59 pp.
		75-375	113	Brown, M.T., Schaefer, J.M., and Brandt, K.H. 1990. Buffer Zones for Water, Wetlands, and Wildlife. CFW Pub. #89-0, Florida Agricultural Experiment Stations Journal Series No. T- 00061. East Central Florida Regional Planning Council.
Salt	N/A	N/A	N/A	N/A
Metals	N/A	Although buffers have been shown to remove heavy metals, the width necessary is unclear from the existing research.	N/A	Wenger, S. 1999. A Review of the Scientific Literature on Riparian Buffer Width, Extent and Vegetation. Office of Public Service & Outreach, Institute of Ecology, University of Georgia, Athens, Georgia, 59 pp.
Pathogens* (viruses)	N/A	Although the width necessary to remove pathogens is unclear from the existing research, buffers have been shown to decrease pathogenic activity in streams. Also, since the survivability of pathogens is correlated to high nutrient, sediment and temperature levels, buffer widths that remove these contaminants should also decrease pathogenic	N/A	Chesapeake Bay Local Assistance Department. 2003. Riparian Buffer Modification & Mitigation Manual: chap. 2.

PROPOSED DRAFT BUFFER MATRIX
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NON-POINT SOURCE POLLUTANT	SETBACK OR VERTICAL SEPARATION (FEET)	APPLICATION OF SETBACK REQUIREMENT	COMMENT/ REFERENCE
Phosphorous	250	Setback requirement to avoid the installation of loam liners. Loam liners must be installed for septic systems: - within 250 feet of a lake or its perennial tributary; and - in sand and gravel soils, or in shallow bedrock.	Maine DEP, 1992. Phosphorus Control in Lake Watersheds: A Technical Guide to Evaluating New Development.
	200 (Combined horizontal and vertical)	Setback requirement is a combination of vertical distance between the bottom of the leaching area and the groundwater table, and horizontal distance to the drinking water source	Pinehills Development, Plymouth, MA, Groundwater Discharge Permit
	300	Setback recommended between septic systems and fresh water lakes and ponds.	United States Environmental Protection Agency. 1980. Design Manual for on-site wastewater treatment and disposal systems. (EPA 625/1-80-012)
Nitrogen	>100	Not a setback requirement, rather an observation of nitrogen contamination within 100 feet of a well in areas with more than 1 on-site sewage disposal/ acre.	Ford, K.L., Schoff, J.H.S., and Keefe, T.J. 1980. Mountain residential development minimum well protective distances. Well water quality. J. Env. Health 43:130-133.
Sediment	N/A	N/A	N/A
Salt	N/A	N/A	N/A
Metals	N/A	N/A	N/A
Pathogens (virus and bacteria)	100-400	- 400-ft setback for system leaching field - 200-ft setback from tributaries to surface water supplies, - 100-ft setback for wetlands bordering surface water supplies or tributaries	MA Title V Regulations, 310 CMR 15.00
	200 day travel time	Travel time can be converted to setback distance based on soil and climate properties.	Yates, M.V. 1987. Septic tank siting to minimize the contamination of groundwater by micro-organisms. US EPA publication #440/6-87-007, 87pp.
	> 16-48m (50-150 feet)	Modeled distances for bacteria and virus requirements in New Zealand Recreational Water Quality Guidelines and Drinking Water Standards	Pang L., CloseM., Goltz., Sinton L., Davies H., Hall C., and Stanton G. 2004. Estimation of Septic Tank setback distances based on transport of E. coli and F-RNA phages. Environ Int. 29(7): 907-21.

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Multiple pollutants (bacteria, viruses, phosphorous, and metals)	6 inch-12 feet (vertical separation)	Vertical separation between the bottom of the leaching structure and the underlying water table. Required by individual state codes	United States Environmental Protection Agency, Oceans and Coastal Protection Division. 1994. Septic Systems and Coastal Waters, Technical Assistance Document.
	50-100 feet	Distance between trenches and bed systems, and, water supply wells, surface waters, and springs.	United States Environmental Protection Agency. 1980. Design Manual for on-site wastewater treatment and disposal systems. (EPA 625/1-80-012)