

SECTION 2.0 INTRODUCTION AND BACKGROUND

The New Hampshire Seacoast Wastewater Management Feasibility Study was developed to assess the existing condition and potential future condition of the 17 wastewater treatment facilities (WWTFs) and a number of environmental quality categories in the 44 community Study Area. Four wastewater management alternatives have been chosen to be evaluated. This report summarizes the development of these alternatives, the components of these alternatives, and the financial and non-financial impacts of these alternatives.

2.1 IDENTIFICATION OF ALTERNATIVES

During the Preliminary Findings Report (PFR) stage of the study, nine preliminary alternatives were developed to manage the future wastewater treatment and disposal needs in the study area. Included as Appendix A is a memo entitled *Alternatives Development Methodology* (February 2006) describing the development of the ten alternatives. These alternatives were developed and presented to the public at a Charrette conducted in March 2006. The ten alternatives were also posted on the project website for public review and comment. Based on the input received during the Charrette as well as public testimony received throughout the project via informational meetings, written comments, telephone conversations, etc., the alternatives were screened and four alternatives were selected for further development analysis under future flow and loading conditions, effluent limits, and environmental conditions. The four alternatives selected for further development and analysis are as follows:

- Alternative 1 – No Action
- Alternative 2 – Treatment at Existing WWTFs with a Regional Gulf of Maine Discharge
- Alternative 3 – Decentralized Treatment and Continued Use of Existing WWTFs
- Alternative 4 – Treatment at Existing WWTFs and Discharge to Land Application Sites

The methodology for selecting the four alternatives is contained on the technical memorandum titled *Method for Selecting Wastewater Management Alternatives* (April 2006) and is included as Appendix B.

Figures 2-1 through 2-4 show a graphical representation of each of the four alternatives.

2.2 FUTURE FLOW AND LOADS TO THE STUDY AREA WWTFs

During the development of the PFR (dated December 2005) for this study, flows and loads to the WWTFs in the study area were projected. The methods for their development are included in the appendices of the PFR. The projected flows to the 17 WWTFs in the study area for the years 2025 and 2055 are summarized in Table 2 -1.

2.3 SEPTAGE DISTRIBUTION

For the purpose of this report, it was assumed that the WWTFs that do not currently take septage would not take septage in the future, and that WWTFs that currently take septage would continue to take septage in the future. For these WWTFs, the amount of septage to be received in the future was increased at the same percent as the projected WWTF flow increase.

It was noted in the PFR that septage treatment and disposal is a growing concern for the communities in the study area and more broadly in the entire State of New Hampshire. The desire of the New Hampshire Department of Environmental Services (NHDES) is to provide septage disposal for all of the septage generated in the New Hampshire within New Hampshire.



Legend

-  WWTF
-  Treated WW
-  Untreated WW
-  New Regional WWTF
-  Abandoned WWTF
-  Land Application
-  River or Estuary

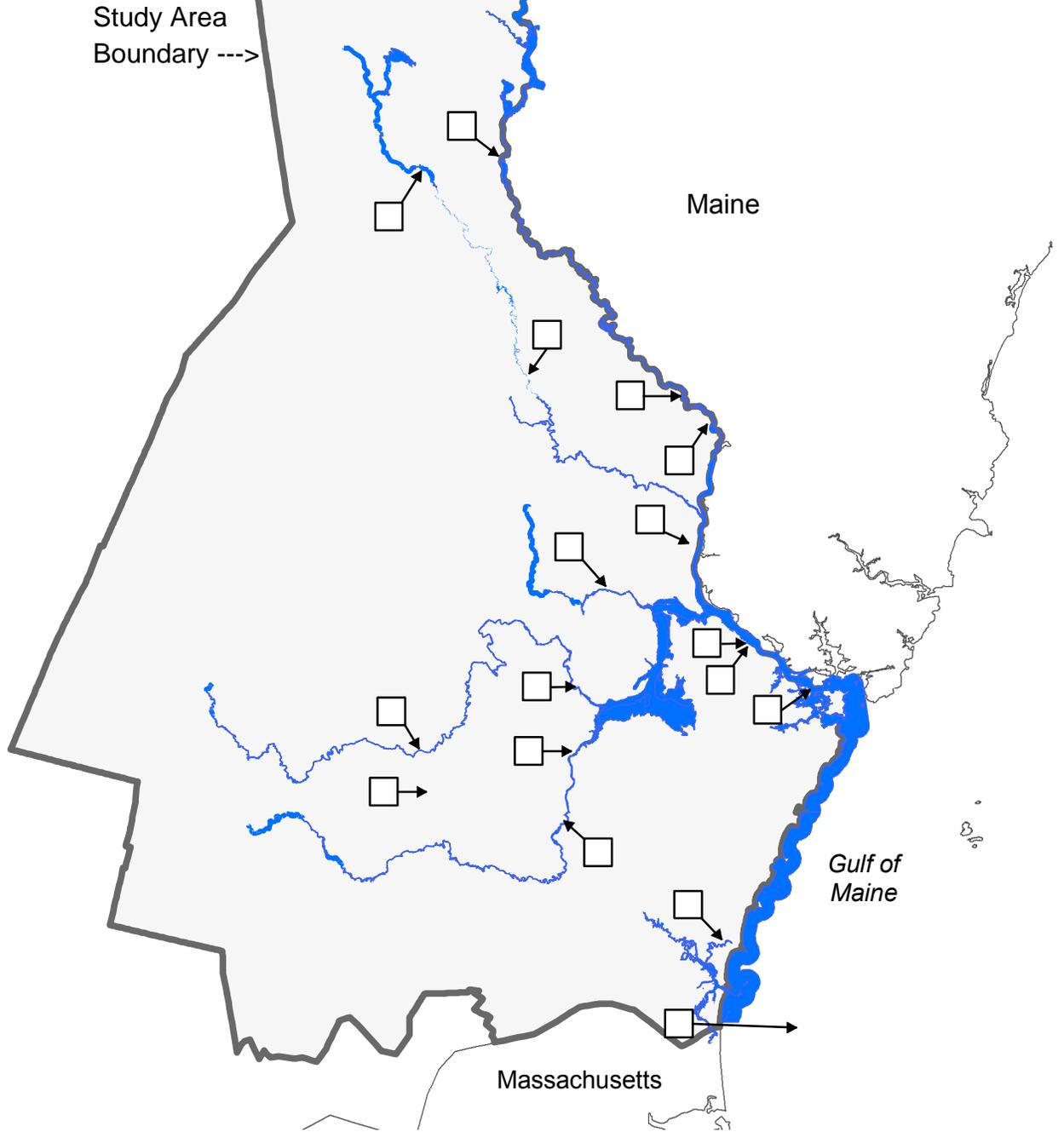


Figure 2-1. Alternative 1 - No Action



Legend

-  WWTF
-  Treated WW
-  Untreated WW
-  New Regional WWTF
-  Abandoned WWTF
-  Land Application
-  River or Estuary

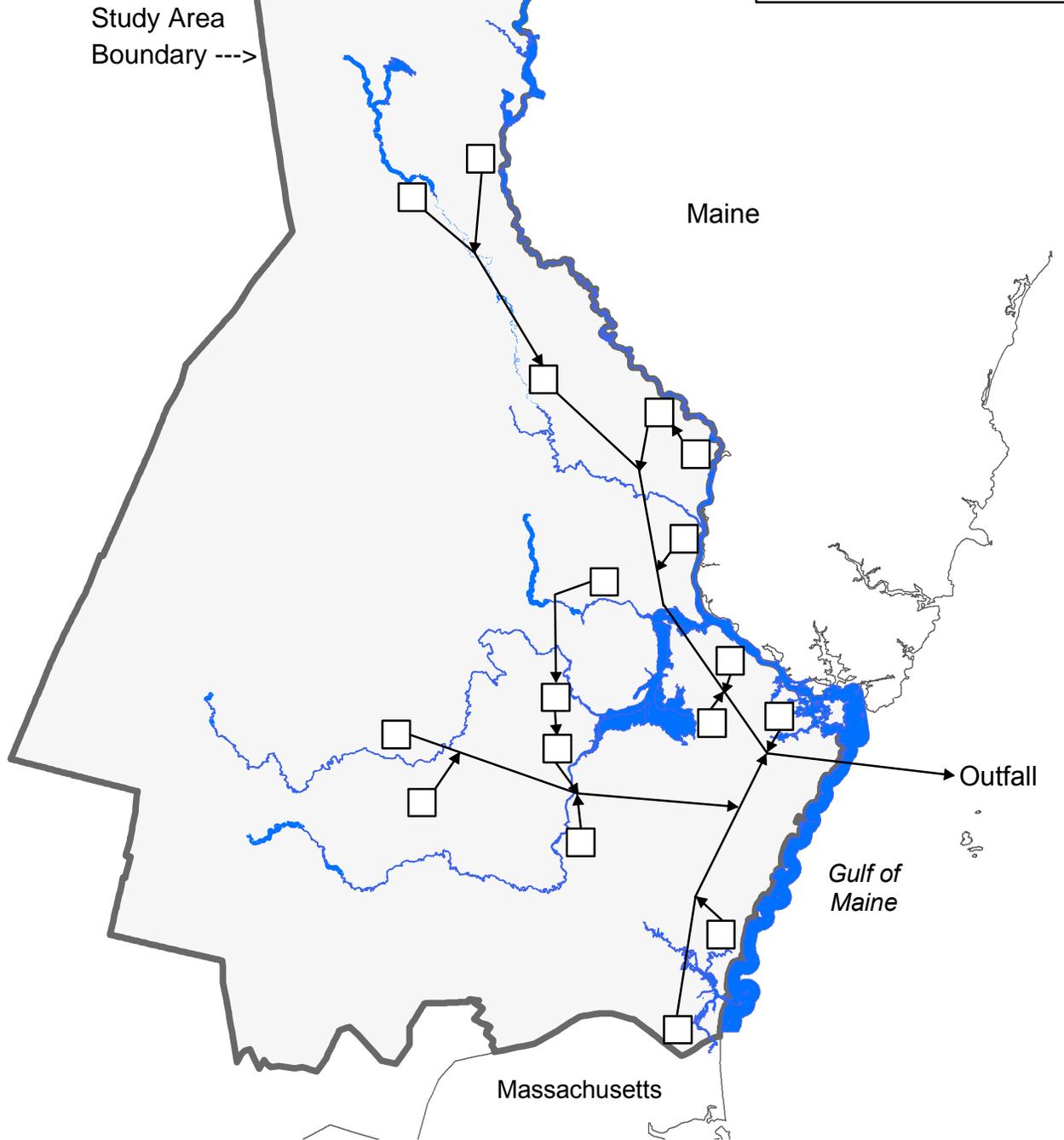


Figure 2-2. Alternative 2 - Treatment at Existing WWTFs with a Regional Gulf of Maine Discharge

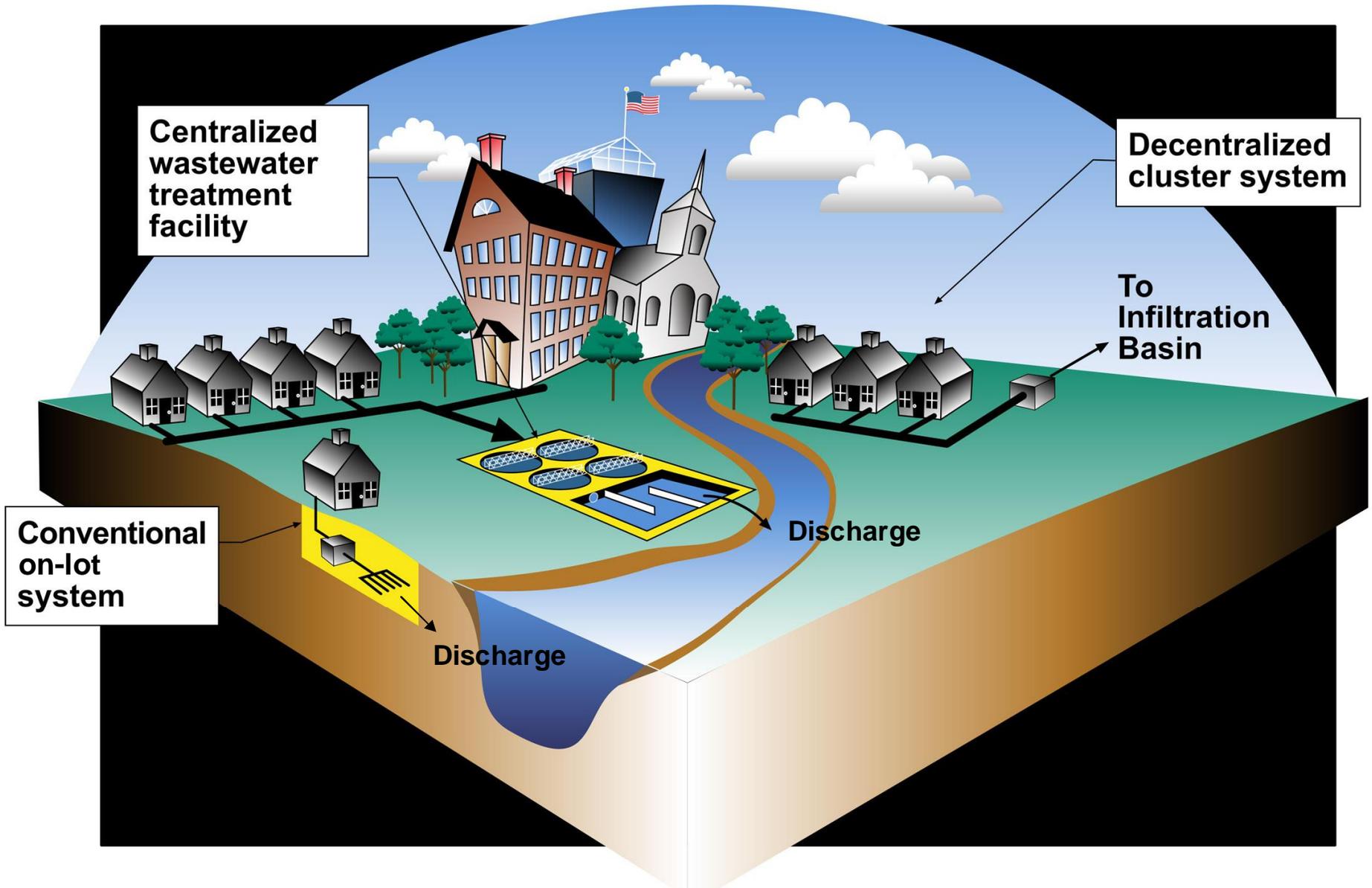


Figure 2-3. Alternative 3 – Decentralized Treatment and Continued Use of Existing WWTFs



Legend

-  WWTF
-  Treated WW
-  Untreated WW
-  New Regional WWTF
-  Abandoned WWTF
-  Land Application
-  River or Estuary

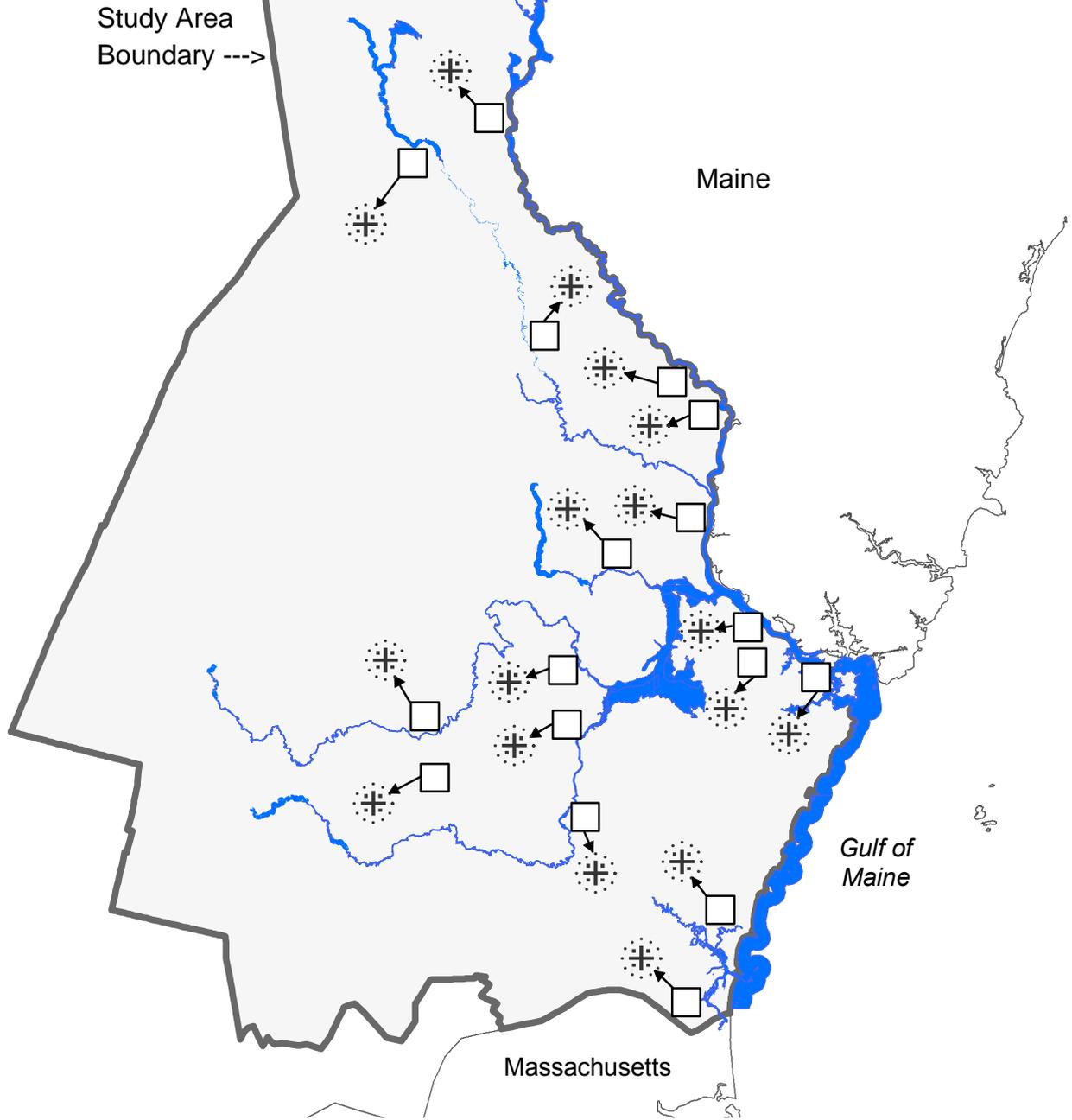


Figure 2-4. Alternative 4 - Treatment at Existing WWTFs with Land Application Discharge

Table 2-1. Current and Projected Flows to Study Area WWTFs in 2004, 2025, and 2055.

FACILITY	YEAR 2004				YEAR 2025				YEAR 2055			
	2004 Annual Ave Flow, MGD	2004 Max Month Flow, MGD	2004 Max Day Flow, MGD	2004 Peak Hour Flow, MGD	2025 Annual Ave Flow, MGD	2025 Max Month Flow, MGD	2025 Max Day Flow, MGD	2025 Peak Hour Flow, MGD	2055 Annual Ave Flow, MGD	2055 Max Month Flow, MGD	2055 Max Day Flow, MGD	2055 Peak Hour Flow, MGD
DOVER WASTEWATER	2.54	4.57	5.07	16.70	2.85	4.87	5.81	18.18	3.05	5.85	6.31	19.16
DURHAM WASTEWATER	1.00	1.71	2.00	7.10	1.10	1.80	2.30	7.80	1.20	2.50	2.50	8.20
EPPING WATER & SEWER	0.20	0.41	0.41	0.59	0.22	0.43	0.43	0.69	0.23	0.62	0.62	0.78
EXETER WASTEWATER	1.86	3.60	3.72	5.58	2.10	3.90	4.50	7.10	2.30	4.10	5.10	8.40
FARMINGTON WASTEWATER	0.21	0.52	0.52	0.64	0.26	0.57	0.57	0.92	0.30	0.61	0.68	1.14
HAMPTON WASTEWATER	2.40	3.30	4.70	7.10	2.80	3.70	5.70	9.10	3.10	4.90	6.50	10.70
MILTON WASTEWATER	0.05	0.08	0.10	0.15	0.06	0.09	0.14	0.23	0.07	0.14	0.17	0.30
NEWFIELDS WASTEWATER	0.05	0.08	0.09	0.14	0.05	0.08	0.11	0.18	0.06	0.11	0.13	0.21
NEWINGTON WASTEWATER	0.13	0.18	0.27	0.40	0.16	0.20	0.34	0.56	0.18	0.26	0.40	0.67
NEWMARKET WASTEWATER	0.64	1.04	1.28	1.93	0.77	1.16	1.66	2.68	0.82	1.45	1.82	3.00
PEASE DEVELOPMENT AUTHORITY	0.38	0.72	0.76	3.00	0.52	0.86	1.18	3.85	0.66	1.00	1.60	4.70
PORTSMOUTH WASTEWATER	4.70	8.23	22.00	22.00	5.20	8.70	22.00	22.00	5.60	11.60	22.00	22.00
ROCHESTER WASTEWATER	2.90	5.51	10.00	10.00	3.50	6.10	10.00	10.00	4.10	9.10	10.00	10.00
ROCKINGHAM COUNTY WWTF	0.08	0.09	0.16	0.23	0.11	0.12	0.26	0.44	0.13	0.15	0.32	0.55
ROLLINSFORD WASTEWATER	0.09	0.15	0.19	0.28	0.11	0.17	0.24	0.38	0.13	0.22	0.27	0.44
SEABROOK WASTEWATER	0.98	1.17	1.96	2.94	1.20	1.39	2.50	4.03	1.35	1.78	2.90	4.81
SOMERSWORTH WASTEWATER	1.10	1.79	3.30	6.00	1.30	1.90	3.70	6.80	1.40	2.40	4.00	7.50
Total	19.30	33.14	56.53	84.78	22.31	36.04	61.44	94.93	24.68	46.80	65.32	102.55

It is recommended that any of the four alternatives that are further refined by additional, subsequent studies include increases in septage handling capacity. This additional septage handling capacity could be provided at the larger WWTFs (>1.0 MGD), at WWTFs that require significant upgrades or activated sludge process upgrades, and regional septage handling facilities.

2.4 DECENTRALIZED SYSTEM FLOWS

As discussed in the *Method for Selecting Wastewater Management Alternatives* (dated April 2006; see Appendix B), the decentralized system alternative was selected to be developed in order to assess the impact of reducing the amount of future flows to the WWTFs and increasing the amount of treated wastewater flow that is recharged to the ground. For this decentralized system alternative, it was assumed that two-thirds of the projected additional future flow would be directed to a decentralized system and not to any of the existing WWTFs. See Section 3.3 for a more detailed description of this alternative and its components.

2.5 EFFLUENT LIMITS

The level of treatment anticipated to be required at each WWTF under each alternative is dependent on the specific discharge location. The possible future effluent limits for each alternative were developed during the preparation of the PFR. The NHDES, New England Interstate Water Pollution Control Commission (NEIWPCC), and the Environmental Protection Agency (EPA) collaborated on establishing possible future effluent limits. The possible future effluent limits also took into account comments received during a public comment process. The effluent limits to be used in this study are included in Appendix K and Appendix L of the PFR in memos titled *Methodology for Development of Future WWTF Limits* (August 2005) and *Projected 2025 WWTF Discharge Limits* (August 2005), respectively.

2.6 ALTERNATIVES DEVELOPMENT

The four alternative concepts selected for evaluation were developed. The development included the identification of components anticipated to be required for each alternative. The components identified included the following:

- Anticipated WWTF Upgrade Requirements
- Anticipated Conveyance Requirements
- Anticipated Discharge and Disposal Requirements
- Additional Alternative Specific Anticipated Component Requirements (decentralized systems, regional disinfection facilities, etc.)

Section 3 of this report describes the components anticipated for each alternative as well as the preliminary sizing of these components.

2.7 METHODS FOR ANALYSIS

In order to compare the impact of the four alternatives, a number of methodologies were developed to standardize the analysis of the alternatives. The methodologies included the following:

- Environmental Analysis
- Non-Monetary Analysis

- Planning Level Construction Costs

Section 4 of this report describes the methodologies used to evaluate each alternative.

2.8 ANALYSIS

The four alternatives were analyzed for the following criteria:

- Environmental Analysis including:
 - Land Use and Growth
 - Air Quality
 - Surface Water Flow, Groundwater Recharge, and Water Quality
 - Wetland and Terrestrial Resources
 - Aquatic Resources
 - Rare and Endangered Species
- Non-Monetary Analysis including:
 - Complexity
 - Public Testimony
 - Implementation
- Planning Level Construction Costs

The alternatives are analyzed for these criteria in the following sections:

- Section 5 Alternative 1 – No Action
- Section 6 Alternative 2 – Treatment at Existing WWTFs with Regional Gulf of Maine Discharge
- Section 7 Alternative 3 – Decentralized Treatment and Continued Use of Existing WWTFs
- Section 8 Alternative 4 – Treatment at Existing WWTFs and Discharge to Land Application Sites

2.9 ALTERNATIVE COMPARISONS

The four alternatives were compared to each other based on the analysis criteria presented above. It should be noted that a number of evaluation criteria are qualitative in nature and that some professional judgment has been used in the comparisons. It was made clear at the Charrette held in March of 2006 that the public would decide on the relative importance of the analysis criteria. Accordingly we have not weighted or ranked the analysis criteria.

Section 9 of this report presents the comparisons.