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A REVIEW OF COMPREHENSIVE PLANS AND WATER QUALITY ISSUES FOR
MUNICIPALITIES LOCATED WITHIN THE LOWER CASCO BAY WATERSHED



Casco Bay Estuary Project

Prepared for the Casco Bay National Estuary Project
by
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I. INTRODUCTION

As part of the Casco Bay National Estuary Project, the Department of Economic and Community Development (DECD) received funding to review comprehensive plans completed under Maine's Growth Management Act (the Act) by municipalities located in the lower portion of the watershed. The primary focus of this review is on local water quality issues and concerns, and implementation strategies to address the concerns, as presented in local comprehensive plans. The purpose of the review is threefold. First, to note some general observations about demographic, housing, and land use trends for the watershed. Second, to recognize local water quality issues and implementation strategies. Third, to offer some recommendations, using these municipal comprehensive plans as a starting point, for future management of the Casco Bay watershed.

The report begins with a brief discussion of the status of municipal involvement in the Growth Management Program. To better understand changes taking place in the watershed, and to set a context for the issues that are addressed, a summary of demographic and housing changes follows. This section is followed by an overview of water quality issues and implementation strategies, and recommendations for the Casco Bay Estuary Program. The bulk of the report is an appendix that includes a detailed compilation, by municipality, of land use development trends, water quality concerns, infrastructure/CIP issues that are related to water quality, and water quality implementation strategies.

II. STATUS OF MUNICIPAL PARTICIPATION IN THE GROWTH MANAGEMENT PROGRAM

Twenty-four municipalities are included in the lower watershed, however, not all of them have received funding under the Act. (See box below.) Those municipalities that received funding are at different stages of the planning process, and some had not updated their plans in time for this overview. Therefore, the absence of a review does not indicate an absence of a comprehensive plan. In fact, most, if not all of the 24 municipalities already had comprehensive plans in place before the Act was passed.

LOCAL COMPREHENSIVE PLANNING UNDER THE ACT

Municipalities that have received funding, and have recently completed, or are about to complete Comprehensive Plans include:

Buxton, Durham, Freeport, Gorham, Gray, New Gloucester, North Yarmouth, Phippsburg, Poland, Pownal, Standish, West Bath, Windham, and Yarmouth

Municipalities that have received funding and are currently drafting comprehensive plans include:

Brunswick, Cape Elizabeth, Harpswell, and Scarborough.

The following municipalities did not receive funding:

Auburn, Cumberland, Falmouth, Portland, South Portland and Westbrook.

Eighteen communities in the lower watershed have received comprehensive planning grants from the state (see summary table on next page). Of these, 11 have submitted their plans for review by the Department of Economic and Community Development. Five of the eleven plans that were submitted have already been

found to be consistent with the Act. Of these five, three have received implementation grants. For the remaining six towns, where portions of the plans were found to be inconsistent by the State, revisions to the plans are in various phases of development and review. In general, the plans were of high quality, representing a tremendous amount of effort on the part of professionals and volunteer citizens. Objections concerning water quality were found only in plans from North Yarmouth, West Bath and Windham. Revisions from North Yarmouth and Windham have been submitted to the DECD and will be reviewed once staff and funding are restored during the Summer of 1992. In North Yarmouth, West Bath and Windham objections concerned the location of commercial districts, or high intensity development districts, over important ground water resources where sewer systems did not exist to support the development. In West Bath and Windham, there was also concern over high intensity use districts being proposed along important river segments.

**CASCO BAY MUNICIPALITIES
STATUS OF LOCAL COMPREHENSIVE PLANNING AND IMPLEMENTATION
UNDER THE GROWTH MANAGEMENT ACT - MAY 1992**

| <u>TOWN</u> | <u>DATE PLANNING GRANT RECEIVED</u> | <u>AMOUNT FUNDING</u> | <u>PLAN REVIEWED</u> | <u>PLAN CONSISTENT</u> | <u>RECEIVED IMPLEM. GRANT</u> |
|----------------|---|---------------------------|--------------------------|----------------------------|-----------------------------------|
| Brunswick | 8/90 | \$57,428 | YES (DRAFT) | N/A | |
| Buxton | 6/89 | \$27,675 | YES | YES | \$6,000 |
| Cape Elizabeth | 12/90 | \$30,943 | YES (DRAFT) | N/A | |
| Durham | 11/89 | \$15,990 | NO | | |
| Freeport | 10/89 | \$29,293 | YES | NO* | |
| Gorham | 2/90 | \$40,168 | NO | | |
| Gray | 9/89 | \$24,253 | YES | YES | \$12,500 |
| Harpswell | 11/90 | \$20,408 | YES (DRAFT) | N/A | |
| New Gloucester | 12/89 | \$20,328 | YES | YES | |
| North Yarmouth | 9/89 | \$15,635 | YES | NO* | |
| Phippsburg | 10/89 | \$14,223 | YES | NO* | |
| Poland | 3/90 | \$20,340 | YES | YES | \$12,500 |
| Pownal | 3/90 | \$13,568 | NO | | |
| Scarborough | 11/90 | \$39,915 | NO | | |
| Standish | 6/89 | \$27,830 | YES | YES | |
| West Bath | 4/90 | \$13,663 | YES | NO* | |
| Windham | 12/89 | \$42,743 | YES | NO* | |
| Yarmouth | 2/90 | \$29,293 | YES | NO* | |

**Not all plans are inconsistent for reasons relating to water quality concerns. Several towns have submitted revisions to address consistency issues; these cannot be reviewed until DECD planning staff are reinstated (Summer 1992).*

III. POPULATION AND HOUSING

According to preliminary 1990 Census figures, 22% of Maine's population live in the twenty-four Casco Bay communities surveyed in this report¹. Preliminary Census data puts the 1990 population total for these towns at 266,728. Six of the larger cities and towns make up 60% of the population (Portland, Auburn,

¹In discussing population, figures for the entire municipality are used even though only a portion of the town may be in the watershed, e.g. only a small part of Scarborough and Poland lie within the watershed, but Census data for all of Scarborough and Poland is included.

South Portland, Brunswick, Westbrook and Windham). Of these, half are coastal and half are inland communities. Unfortunately, few of the larger communities received comprehensive planning grants; only Windham's draft plan and the preliminary South Portland plan were reviewed.²

Table 1
PERCENTAGE OF TOTAL POPULATION IN THE WATERSHED FOR 1990³, by cities and towns

| | | |
|-----------------------|-----------------------|-----------------------|
| Portland - 24.1% | Cape Elizabeth - 3.3% | Harpswell - 1.9% |
| Auburn - 9.1% | Falmouth - 2.9% | Poland - 1.6% |
| South Portland - 8.7% | Standish - 2.9% | New Gloucester - 1.5% |
| Brunswick - 7.8% | Yarmouth - 2.9% | Durham - 1.1% |
| Westbrook - 6.0% | Freeport - 2.6% | North Yarmouth - 0.9% |
| Windham - 4.9% | Buxton - 2.4% | Phippsburg - 0.7% |
| Scarborough - 4.7% | Cumberland - 2.2% | West Bath - 0.6% |
| Gorham - 4.4% | Gray - 2.2% | Pownal - 0.5% |

Population Growth Patterns and Projections

The population of the twenty-four municipalities as a whole grew steadily, increasing 11.2% during the 1970s (24,113 persons) and 11.4% during the 1980s (27,184 persons). Growth was not evenly spread throughout the watershed, but rather concentrated in the rural or suburban communities (see Table 2). This is especially true of growth that took place during the 1970s. During this decade, the towns whose population grew the most included: Windham, Scarborough, Standish, Buxton, and Gorham. In several suburban, or rural communities, the population increased by more than 50%. At the same time, the cities of Portland, Auburn, and South Portland actually lost population. During the 1980s, rapid suburbanization slowed down and some of the more populous communities gained, rather than lost, population. Brunswick's population increased by the greatest number (3,570 persons), and the city of Portland added 2,786 to its population. Smaller communities that had significant increases included: Gorham (1,755), Windham (1,738), and Standish (1,732). In contrast to the 1970s, none of the communities had a percentage increase in population of more than 50%.

Looking at growth during the twenty year period from 1970 to 1990 as a whole, Windham's numbers increased the most. Growth occurring in Windham alone accounted for 12.5% of the overall growth within the twenty-four towns. Following Windham with high growth rates were Brunswick which grew by 4,711 people, Scarborough (4,673 people), Standish (4,556 people), Gorham (4,017 people), Buxton (3,359 people), Yarmouth (3,008 people), Gray (2,965 people), Harpswell (2,460 people), Poland (2,327 people), and Freeport (2,124 people). Together, growth in these eleven towns accounted for almost 80% of the total growth of the twenty - four communities. Due to their high growth rates, most of these municipalities have recently completed plans under the Growth Management Act.

It is difficult to make population growth projections. Many plans included figures from different sources, including projections from the Greater Portland Council of Governments, Southern Maine Regional Planning Commission, Androscoggin Valley Council of Governments, and the Maine Department of Human

²South Portland's plan was voluntarily submitted to DECD, but never received a formal review. Larger communities were less likely to receive Growth Management funds, as funding priorities were based on percent population increase which tends to place a priority on smaller towns, and because population increases primarily occurred in suburban areas.

³Preliminary Census data for 1990.

Services (DHS). Figures used below come from the DHS, and are based on 1988 population figures (new projections for 2000, based on 1990 Census data should be available from DHS by May, 1992).

The DHS projections indicate that by the year 2000, the population of the twenty-four communities will increase by 23,414 (or 9%) over the 1990 Census figures. This would be a smaller increase than the increases that took place during the 1970s and the 1980s. Table 3 gives the DHS projections. The figures indicate that, in general, the communities that had the largest population increases during the 1970s and 1980s will continue to add the most to their populations. Again, the majority of the growth is predicted to take place in suburban, "rural" communities (Gorham - 3,229 people; Portland - 2,664 people; Windham - 2,143 people; Buxton - 1,921 people; Gray - 1,751 people; Scarborough - 1,678 people; Yarmouth - 1,641 people; New Gloucester - 1,555 people, and Standish - 1,678 people).

Table 2
POPULATION FIGURES FOR CASCO BAY COMMUNITIES 1970, 1980, 1990
and PROJECTIONS FOR THE YEAR 2000

| <u>TOWN</u> | <u>1970</u> | <u>1980</u> | <u>1990</u> | <u>2000</u> |
|----------------|----------------|----------------|----------------|----------------|
| Auburn | 24,151 | 23,128 | 24,309 | 24,644 |
| Brunswick | 16,195 | 17,366 | 20,906 | 21,607 |
| Buxton | 3,135 | 5,775 | 6,494 | 8,415 |
| Cape Elizabeth | 7,873 | 7,838 | 8,854 | 9,566 |
| Cumberland | 4,096 | 5,284 | 5,836 | 6,031 |
| Durham | 1,264 | 2,074 | 2,842 | 2,927 |
| Falmouth | 6,291 | 6,853 | 7,610 | 7,840 |
| Freeport | 4,781 | 5,863 | 6,905 | 7,508 |
| Gorham | 7,839 | 10,101 | 11,856 | 15,085 |
| Gray | 2,939 | 4,344 | 5,904 | 7,655 |
| Harpswell | 2,552 | 3,796 | 5,012 | 4,755 |
| New Gloucester | 2,811 | 3,180 | 3,916 | 5,471 |
| North Yarmouth | 1,383 | 1,919 | 2,429 | 2,649 |
| Phippsburg | 1,229 | 1,527 | 1,815 | 2,060 |
| Poland | 2,015 | 3,578 | 4,342 | 4,676 |
| Portland | 65,116 | 61,572 | 64,358 | 67,022 |
| Pownal | 800 | 1,189 | 1,262 | 1,777 |
| Scarborough | 7,845 | 11,347 | 12,518 | 14,196 |
| South Portland | 23,267 | 22,712 | 23,163 | 23,742 |
| Standish | 3,122 | 5,946 | 7,678 | 8,875 |
| West Bath | 836 | 1,309 | 1,716 | 1,809 |
| Westbrook | 14,444 | 14,976 | 16,121 | 16,652 |
| Windham | 6,593 | 11,282 | 13,020 | 15,163 |
| Yarmouth | 4,854 | 6,585 | 7,862 | 9,503 |
| TOTAL | 215,431 | 239,544 | 266,728 | 289,628 |

**1970, 1980, 1990 U.S. Census of General Population, DHS population projections for the year 2000, based on 1988 population figures.*

Table 3
NUMBER AND PERCENT CHANGE IN POPULATION 1970, 1980, 1990 AND 2000

| <u>TOWN</u> | <u>1970 TO 1980</u> | <u>1980 TO 1990</u> | <u>1990 TO 2000</u> | <u>1970 TO 1990</u> |
|----------------|-----------------------|-----------------------|----------------------|---------------------|
| Auburn | -1,023 (-4.2%) | 1,181 (5.1%) | 335 (1.4%) | 158 (0.7%) |
| Brunswick | 1,171 (17.2%) | 3,570 (20.6%) | 701 (3.4%) | 4,741 (29.3%) |
| Buxton | 2,640 (84.2%) | 719 (12.5%) | 1,921 (29.6%) | 3,359 (107.1%) |
| Cape Elizabeth | -35 (-0.4%) | 1,016 (13.0%) | 712 (8.0%) | 981 (12.5%) |
| Cumberland | 1,188 (29.0%) | 552 (10.4%) | 195 (3.3%) | 1,740 (42.5%) |
| Durham | 810 (64.1%) | 768 (37.0%) | 85 (3.0%) | 1,578 (124.8%) |
| Falmouth | 562 (8.9%) | 757 (11.0%) | 230 (3.0%) | 1,319 (21.0%) |
| Freeport | 1,082 (22.6%) | 1,042 (17.8%) | 603 (8.7%) | 2,124 (44.4%) |
| Gorham | 2,262 (28.9%) | 1,755 (17.4%) | 3,229 (27.2%) | 4,017 (51.2%) |
| Gray | 1,405 (47.8%) | 1,560 (35.9%) | 1,751 (29.7%) | 2,965 (101.0%) |
| Harpswell | 1,244 (48.7%) | 1,216 (32.1%) | -257 (-5.1%) | 2,460 (96.4%) |
| New Gloucester | 369 (13.1%) | 736 (23.1%) | 1,555 (39.7%) | 1,105 (39.3%) |
| North Yarmouth | 536 (38.8%) | 510 (26.6%) | 220 (9.1%) | 1,046 (75.6%) |
| Phippsburg | 298 (24.2%) | 288 (18.9%) | 245 (13.5%) | 586 (47.7%) |
| Poland | 1,563 (77.6%) | 764 (21.4%) | 334 (7.7%) | 2,327 (115.5%) |
| Portland | -3,544 (-5.4%) | 2,786 (4.5%) | 2,664 (4.1%) | -758 (-0.01%) |
| Pownal | 389 (48.6%) | 73 (6.1%) | 515 (40.8%) | 462 (57.8%) |
| Scarborough | 3,502 (44.6%) | 1,171 (10.3%) | 1,678 (13.4%) | 4,673 (59.6%) |
| South Portland | -555 (2.4%) | 451 (2.0%) | 579 (2.5%) | -104 (-0.0%) |
| Standish | 2,824 (90.5%) | 1,732 (29.1%) | 1,197 (15.6%) | 4,556 (146.0%) |
| West Bath | 473 (56.6%) | 407 (31.1%) | 93 (5.4%) | 880 (105.3%) |
| Westbrook | 532 (3.7%) | 1,145 (7.6%) | 531 (3.3%) | 1,677 (11.6%) |
| Windham | 4,689 (71.1%) | 1,738 (15.4%) | 2,143 (16.5%) | 6,427 (97.5%) |
| Yarmouth | 1,731 (35.7%) | 1,277 (19.4%) | 1,641 (20.9%) | 3,008 (62.0%) |
| TOTAL | 24,113 (11.2%) | 27,214 (11.4%) | 22,900 (8.6%) | 51,327 (23.8%) |

**Boldface type highlights communities that grew or are projected to grow by 2,000 persons or more, or by more than 50% in a ten year period. Note that in contrast to growth that took place in the 1970s, none of the communities grew more than 50% in the 1980s, nor are they expected to do so during the 1990s.*

Housing Unit Growth Patterns and Projections

Whereas the change in population remained steady during the 1970s and 1980s, the change in housing units was higher during the 1970's than during the 1980s. During the 1970s, there was a 23.5% increase in housing units (18,489 new housing units) which declined to an increase of 18.5% during the 1980s (18,119).⁴ There were roughly 400 more units built during the 1970s than in the 1980s. During the 1970s, the communities that added the most numbers of housing units included: Portland (2,568), Windham (1,636), Scarborough (1,402), South Portland (1,286), Standish (1,170), Gorham (1,151), Brunswick (1,105) and Buxton (1,046). Most of these communities were high population growth areas with the exception of Portland and South Portland which added to their housing stocks in spite of population declines. During the 1980s the following communities added the most numbers of housing units to their housing stock: Portland (3,331), Brunswick (1,956), Auburn (1,345), South Portland (1,277), Scarborough (1,158) and Westbrook (1,039). Most municipalities are predicted to add fewer housing units during the 1990's than they did during the 1980s or

⁴This figure does not include increases for Pownal or West Bath since data for 1970 was unavailable.

the 1970s. The exceptions being Buxton, Gorham, Gray, New Gloucester, Pownal, Standish and Windham, which are projected to add more housing units during the 1990s than they did in the 1980s.

Looking at growth during the twenty year period from 1970 to 1990 as a whole, Portland's numbers increased the most (up 5,899 units or 16% of the overall growth in the watershed). Following behind Portland were Brunswick which grew by 3,061 units, South Portland (2,563 units), Scarborough (2,560 units), Windham (2,367 units), Auburn (2,003 units), Westbrook (1,974 units), Gorham (1,841 units), Standish (1,783 units) and Yarmouth (1,590 units). Housing unit growth in these ten towns accounted for 70% of the total growth in units in the lower watershed.

Table 4
TOTAL HOUSING UNITS 1970, 1980, 1990 and PROJECTED UNITS FOR 2000

| <u>TOWN</u> | <u>1970</u> | <u>1980</u> | <u>1990</u> | <u>2000**</u> <u>Projected #</u> <u>Total Units</u> |
|----------------|------------------|---------------|----------------|---|
| Auburn | 8,403 | 9,061 | 10,406 | 10,715 |
| Brunswick | 5,136 | 6,241 | 8,197 | 8,643 |
| Buxton | 999 | 2,045 | 2,362 | 3,117 |
| Cape Elizabeth | 2,501 | 2,824 | 3,456 | 3,679 |
| Cumberland | 1,506 | 1,981 | 2,365 | 2,412 |
| Durham | 376 | 682 | 994 | 1,045 |
| Falmouth | 2,164 | 2,664 | 3,322 | 3,409 |
| Freeport | 1,902 | 2,361 | 3,011 | 3,264 |
| Gorham | 2,207 | 3,358 | 4,048 | 5,202 |
| Gray | 1,701 | 2,291 | 2,836 | 3,645 |
| Harpswell | 2,248 | 2,852 | 3,432 | 3,170 |
| New Gloucester | 686 | 1,077 | 1,363 | 1,887 |
| North Yarmouth | 395 | 609 | 833 | 913 |
| Phippsburg | 796 | 1,056 | 1,224 | 1,373 |
| Poland | 1,032 | 1,509 | 1,895 | 2,033 |
| Portland | 25,394 | 27,962 | 31,293 | 33,511 |
| Pownal | -- | 372 | 434 | 613 |
| Scarborough | 2,831 | 4,233 | 5,391 | 6,172 |
| South Portland | 7,150 | 8,436 | 9,713 | 9,893 |
| Standish | 1,786 | 2,956 | 3,569 | 4,226 |
| West Bath | -- | 776 | 894 | 952 |
| Westbrook | 4,697 | 5,632 | 6,671 | 6,938 |
| Windham | 2,833 | 4,469 | 5,200 | 6,065 |
| Yarmouth | 1,719 | 2,652 | 3,309 | 3,960 |
| TOTAL | 78,512*** | 98,099 | 116,218 | 126,837 |

**1970 US Census on General Housing Characteristics; 1980 US Census on General Housing Characteristics; 1990 US Census Summary Population and Housing Characteristics.*

***Projected number of total housing units is derived at by dividing the population projection for the year 2000 by the number of persons per housing unit from the 1990 Census. It should be noted that this figure may be somewhat conservative since the trend has been for decreasing household size. If this trend continues and the 2000 projections remain the same there would be more housing units.*

****This figure does not include population figures for West Bath and Pownal.*

Table 5
NUMBER AND PERCENT CHANGE IN HOUSING UNITS FROM 1970 TO 2000

| <u>TOWN</u> | <u>1970 to 1980</u> | <u>1980 to 1990</u> | <u>1990 to 2000</u> | <u>1970 to 1990</u> |
|----------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Auburn | 658 (7.8%) | 1,345 (14.8%) | 309 (3.0%) | 2,003 (23.8%) |
| Brunswick | 1,105 (21.5%) | 1,956 (31.3%) | 446 (5.4%) | 3,061 (59.6%) |
| Buxton | 1,046 (104.7%) | 317 (15.5%) | 755 (32.0%) | 1,363 (136.4%) |
| Cape Elizabeth | 323 (12.9%) | 632 (22.4%) | 223 (6.4%) | 955 (38.2%) |
| Cumberland | 475 (31.5%) | 384 (19.4%) | 47 (2.0%) | 859 (57.0%) |
| Durham | 306 (81.4%) | 312 (45.7%) | 51 (5.1%) | 618 (164.4%) |
| Falmouth | 500 (23.1%) | 658 (24.7%) | 87 (2.6%) | 1,158 (53.5%) |
| Freeport | 459 (24.1%) | 650 (27.5%) | 253 (8.4%) | 1,109 (58.3%) |
| Gorham | 1,151 (52.2%) | 690 (20.5%) | 1,154 (28.5%) | 1,841 (83.4%) |
| Gray | 590 (34.7%) | 545 (23.8%) | 809 (28.5%) | 1,135 (66.7%) |
| Harpswell | 604 (26.9%) | 580 (20.3%) | -262 | 1,184 (52.7%) |
| New Gloucester | 391 (60.0%) | 286 (26.6%) | 524 (38.4%) | 677 (98.7%) |
| North Yarmouth | 214 (54.2%) | 224 (36.8%) | 80 (9.6%) | 438 (111.0%) |
| Phippsburg | 260 (32.7%) | 168 (15.9%) | 149 (12.2%) | 428 (53.8%) |
| Poland | 477 (46.2%) | 386 (25.6%) | 138 (7.3%) | 863 (83.6%) |
| Portland | 2,568 (10.1%) | 3,331 (11.9%) | 2,218 (7.1%) | 5,899 (23.2%) |
| Pownal | -- | 62 (16.7%) | 179 (41.2%) | -- |
| Scarborough | 1,402 (49.5%) | 1,158 (27.4%) | 781 (14.5%) | 2,560 (90.4%) |
| South Portland | 1,286 (18.0%) | 1,277 (15.1%) | 180 (1.9%) | 2,563 (35.8%) |
| Standish | 1,170 (65.5%) | 613 (20.7%) | 657 (18.4%) | 1,783 (99.8%) |
| West Bath | -- | 118 (15.2%) | 58 (6.5%) | -- |
| Westbrook | 935 (19.9%) | 1,039 (18.4%) | 267 (4.0%) | 1,974 (42.0%) |
| Windham | 1,636 (57.7%) | 731 (16.4%) | 865 (16.6%) | 2,367 (83.6%) |
| Yarmouth | 933 (54.3%) | 657 (24.8%) | 651 (19.7%) | 1,590 (92.5%) |
| TOTAL | 18,489 (23.5%) | 18,119 (18.5%) | 14,753 (12.6%) | 36,608 (46.6%) |

Summary of Population and Housing Trends:

The following points are observations about population and housing trends that should be considered by the Casco Bay Estuary Project as a management plan is drafted.

- Population growth that took place during the 1970s and the 1980s was not evenly spread throughout the watershed, but concentrated in the rural, suburban communities. From 1970 to 1990, Windham's numbers increased the most (6,427 additional people). Following Windham, with high growth rates were Brunswick which grew by 4,711 people, Scarborough (4,673), Standish (4,566), Gorham (4,017), Buxton (3,359), Yarmouth (3,009), Gray (2,965), Harpswell (2,460), Poland (2,327), and Freeport (2,124). Together, growth in these eleven towns accounted for almost 80% of the total growth of the twenty-four communities studied. During this same period of time, the urban areas of Portland and South Portland lost population (losses of 758 and 104 respectively), and the population of Auburn remained virtually unchanged.

- More housing units were added to the housing stock during the 1970s than during the 1980s. In 1970, 18,489 new units were constructed in the lower watershed, during the 1980s 18,119 units were built.

communities focus the major river corridors within the watershed. Towns are interested in the use of taxation policies (i.e. tree growth, open space and agriculture) to preserve open space along with direct acquisition of land or conservation easements. (Freeport's plan notes that some 5,131 acres or 22% of Freeport's total land area is in the tree growth tax program.) A better inventory of how much land is protected via the tree growth tax policy should be a part of considering future land use change in the watershed.

3) Groundwater. Concern over protecting ground water resources is raised in virtually all of the plans that were examined. Regardless of whether or not the community has sewer, the most often mentioned source of concern is failing septic systems. Many communities referred to groundwater studies that had been done in order to establish safe levels of development based on nitrogen concerns. Other sources of concern included leaking underground storage tanks, the use and storage of road salt and sand, and excavation of sand and gravel pits. Communities express a desire to have more information about their ground water resources, particularly where the aquifer served as a public water supply, or was viewed as a potential future source of drinking water.

4) Lakes and Phosphorous Control. Concern over phosphorous loading in lake watersheds is raised in many plans. The DEP deserves credit in not only raising awareness of this problem, but in establishing a methodology that can be adopted through planning efforts (plans and ordinances) to limit the amount of phosphorous that enters lakes. Specific reference to DEP's Phosphorous Loading Model is made in several plans. Plans identify lake watersheds and the communities that need to work together. Many strategies were included to address phosphorous loading including: monitoring to establish baseline data; designing mechanisms to evaluate and track ordinances which protect water quality; inventorying existing sources of nutrient run-off; public education, and involving third parties in contractual agreements to inspect sites and ensure maintenance of condition of Planning Board approval.

5) Wetlands. Wetland mapping, establishing wetland buffers and protection of the wetland itself were common issues. Plans also refer to subtracting wetland areas out in calculating net residential acreage requirements. Cape Elizabeth has a wetland protection ordinance that protects wetlands and establishes buffering requirements. Additional protection via wetlands protection ordinance restrictions is often mentioned as being needed. Also noted are public education efforts, requiring high intensity soil surveys to map areas, and setting wetland areas aside from development via net residential acreage requirements.

Other Issue Areas

In addition to the five topics above, sewer system needs and coastal water quality issues also merit some discussion. They did not come out at the top of the list for a couple of reasons. In terms of sewer issues many communities identified water quality problems associated with the lack of a sewer system or the need to upgrade existing systems. However, with the exception of the coastal communities, the issues associated with sewer system needs did not come out as a major topic area because few implementation strategies were developed to address these problems(see Appendix).

The spectrum of concern ranged from Brunswick's lead in defending marine water quality by the creation of a "Coastal Protection Zone," to the bare mention of it in Cumberland's Plan. For the most part, the coastal towns devoted a great amount of time and energy to the marine water quality in their Marine Resources sections, especially insofar as the effect upon water quality and shellfishing by failing septic systems or overboard discharges are concerned.

Sewer Systems

- The lack of implementation strategies to address the need for sewer systems and sewer system upgrades may be attributed to several reasons. Cost is clearly a factor. The plans for Gray, Windham, West Bath, Phippsburg, and Standish all describe compelling needs for central sewage systems. In the final analysis, however, most conclude that in spite of serious water quality concerns, such systems are not the most cost effective implementation strategy. Another important factor that towns consider is the extent to which such infrastructure might attract future growth. Towns that have sewer systems are investing millions of dollars to address capacity issues and inflow and infiltration problems. The implications that these serious costs have on water quality, sprawl, the inability to expand existing village areas, and overall economic development needs to be examined.

- For towns that have sewer systems, sewer capacity may not be as great an issue as are the costs involved in accessing that capacity. For example, Gorham's plan notes that through the Portland Water District, the town has enough sewer capacity to handle the 10 year growth projections, however the capacity may not be made available to Gorham because of stormwater infiltration into the Westbrook treatment plant. Through a DEP ruling, before entities can get a permit, five gallons of stormwater must be removed for every one gallon of wastewater that needs to be treated. The end result is that although Gorham has ample line and treatment capacity, without a change in DEP's policy, connections and extension of the sewer line for new development will be very expensive.

- Whether the costs incurred by communities with sewer systems, along with state policies for storm water removal are encouraging commercial development to locate outside of areas with commercial districts, and into unsewered areas should be examined.

Coastal Issues

- For the coastal towns, the two most important issues were groundwater protection and sewage/septic system "health"; the towns (for the most part) saw these two as inextricably linked. With typically thin, limiting soils, towns like Harpswell and the Portland Islands expressed their chief concerns in the suitability of the soils for expanded or continued development. At the same time, these soils tended to be the limiting factor for subsurface sewage disposal systems, and hence by de facto, limited the availability of areas for future growth. It is encouraging to note, however, that nearly all of the coastal towns recognized this in their Plans, with varying success in promoting more careful planning for future growth.

- As would be expected, all the coastal communities took note of their marine water quality in terms of their productivity. In the Casco Bay watershed, the most productive areas appear to be along the Freeport, Brunswick, Phippsburg, and Harpswell shores, as was noted in their respective Plans. With this in mind, the primary reasons cited for closure of these flats and beds are malfunctioning subsurface septic systems and the presense of overboard discharges, licensed and otherwise. Brunswick and Harpswell recognized the Casco Bay Estuary Project as a way to address coastal water quality issues. These communities are hopeful that the Project will help address these concerns. On the other hand, some inland communities recognized the linkages between rivers and the Bay. It is important to note, however, that the Casco Bay Estuary Project was not clearly recognized as a means by which water quality problems could be addressed.

- For coastal communities, while the Plans all noted the problems associated with malfunctioning septic systems and overboard discharges, Brunswick and Harpswell were the only towns which recognized a greater need for public education. In addition, where towns acknowledged the lack of information

concerning the location and condition of groundwater aquifers, they also acknowledged the urgency of groundwater studies to help develop protection strategies. In short, the will is there, but not the way.

Types of Implementation Strategies

The following list shows the nine different implementation strategy categories. The water quality issue(s) that were most often associated with the strategies are indicated. The matrix (Table 6) includes a list of all of the water quality issues raised in the plans and indicates the frequency with which each one was associated with the nine types of implementation actions.

- 1) Monitoring and Reporting - Lakes and phosphorous control
- 2) Further Planning, Study, Research - Drinking water supplies and septic systems.
- 3) Improved Local and State Management - Taxation Policies (i.e. tree growth, open space, agriculture).
- 4) Ordinances, Regulations, Performance Standards - Groundwater, and wetlands (top 2 areas). Followed by excavation (i.e. sand and gravel), shoreland zoning, and septic systems.
- 5) Inspections and Enforcement - Septic Systems were the top issue, although a number of plans also mentioned the need to train local officials. It should be noted that a number of towns mention the need for enforcement of existing ordinances and regulations.
- 6) Public/Private Infrastructure Improvements - Septic systems, stormwater, sand and salt piles.
- 7) Protection of land (i.e. acquisition, easements, development rights, grants, donations) - Open space and greenbelts (mostly along rivers).
- 8) Public Education- There were no clear front runners, but a number of issues seem to be equally important - wetlands, septic systems, forestry, agriculture, chemical use.
- 9) Interlocal Activities- groundwater aquifer protection.

VI. RECOMMENDATIONS FOR THE CASCO BAY ESTUARY PROJECT

Taken together, the municipalities within the watershed that developed comprehensive plans under the Growth Management Program proposed a wide range of actions to protect water quality. In terms of "lessons learned" and suggestions for the Casco Bay Estuary Project, the following observations are offered.

Information Sharing

Municipalities that are currently, or will be preparing comprehensive plans, should be encouraged to review the ideas and strategies for protecting water quality outlined in the comprehensive plans that have already been completed. The Casco Bay Estuary Project could facilitate this by sharing copies of this report and by working with the four regional planning councils (Greater Portland COG, Capital Coastal COG, Androscoggin Valley COG, and Southern Maine RPC) to organize meetings of local officials to discuss specific implementation strategies and water quality issues.

Comprehensive Planning Assistance

Given the state's budget crisis, the Casco Bay Estuary Project could provide comprehensive planning funds to the towns and cities that have not yet received state support. Minimally, funds could be used to update sections of plans that address water quality issues.

Technical and Financial Assistance to Implement Plans

Based on the review of implementation strategies, there is clearly an opportunity to offer technical and financial assistance for the implementation of local plans. For example, a number of communities are interested in developing ordinances to protect groundwater and wetlands. The Casco Bay Estuary Project could provide funds and technical assistance to help develop these ordinances. Similarly, towns appear to be extremely concerned about failing septic systems and overboard discharges - both about the extent of the problem and figuring out ways to inspect, and if needed, replace systems. The Casco Bay Estuary Project could assist local governments by better coordinating state and local efforts to mitigate existing problems. Some project ideas to consider include: developing management plans for maintaining and inspecting septic systems; helping communities conduct inventories of failing septic systems and, establishing public education programs for homeowners; and assisting groups of local officials and homeowners in identifying alternatives to overboard discharges within specific neighborhoods (i.e. adjacent to priority shellfish areas). Researching what types of computer programs could be used on the local level for such things as tracking development and establishing maintenance schedules (i.e. following building permits, subdivision plat approval, maintenance schedules for septic systems) should be done. Ideally the system would serve local planning needs and be conducive to use on the regional level to more accurately analyze land use development trends.

Other technical assistance projects could focus on helping municipal planning boards, CEOs, and public works officials become more familiar with and use the new DEP Best Management Practices for construction, agriculture and forestry activities. DECD and DEP staff began an educational process during 1991-1992, but this work will need to continue. Follow-up training for Code Officers will be important, as will work with individual planning boards as they begin to incorporate BMPs into local ordinances.

Interlocal Coordination and Regional Planning

Most of the municipalities identified areas for interlocal activities. The most commonly mentioned issue for coordination was protection of groundwater resources, but there are many other areas where interlocal coordination would be appropriate, e.g. coastal water quality protection, marine resources management. The Casco Bay Estuary Project should consider ways of encouraging towns to coordinate actions aimed at protecting regional resources. Funding of and technical assistance for interlocal water quality protection

projects should be considered.

There is also a need to examine land use plans and development trends on the regional level to better plan for future development. There needs to be further analysis at the regional level of factors that are directing growth and contributing to "sprawl." From the plans, some of the following factors should be examined: 1) how the lack of municipal sewer systems and the need for expensive sewer system upgrades contributes to unwanted sprawl and water quality degradation, 2) whether lower costs to develop in rural areas as opposed to urban areas is a strong incentive in developing in suburban communities, and 3) how taxation policies can best be used to enhance water quality protection.

Developing the Casco Bay Management Plan

Finally, the importance of building on the ideas and strategies, outlined in these local plans, as a Casco Bay Estuary Plan is crafted is critical. The municipalities in the region have invested substantial funds and volunteer resources in identifying their priority water quality issues and designing strategies to address them. The Casco Bay Estuary Project has an opportunity to pull together all of the ideas and actions outlined in the plans and to help local governments turn their strategies into actions.

Table 6
TYPES OF IMPLEMENTATION ACTIONS
continued (2)

| | Monitoring/ Reporting (incl. estab. database) | Further Plan- ning, study &/or Research (includes mapping) | Improved Local, State, Regional Management | Ordinances, Regulations, Performance Standards | Inspections & Enforcement | Public/Private Improvements donations) | Land (Acq., developmt. rights, ease- ments, grants, donations) | Public Education | Interlocal Activities |
|--|--|--|---|---|---------------------------------|--|--|---------------------|--------------------------|
| 12) Lakes/Phosphorous controls | 6 | 1 | - | 5 | - | - | - | 2 | 2 |
| 13) Landfills, Dumps, Hazardous Waste Sites | 3 | - | - | 1 | 1 | - | - | 1 | - |
| 14) Land Use | - | 3 | - | - | - | - | - | - | 3 |
| 15) Natural Resources ("important," "sensi- tive," "critical") | - | 1 | 1 | 2 | - | - | 3 | 2 | 1 |
| 16) Open Space, Green- belt, Trail Systems, Public Access | - | 2 | 3 | 4 | - | - | 8 | 2 | 1 |
| 17) Overboard Discharges/ Boat Pump-Outs | 1 | 1 | - | 1 | 1 | 2 | - | - | - |
| 18) Plumbing Code/ Seasonal Conversions | - | - | - | 3 | 2 | - | - | - | - |
| 19) Rivers &/or Streams | 2 | - | - | - | - | - | - | - | 4 |
| 20) Sand & Salt Use &/or Piles | - | - | - | - | - | - | - | - | - |
| 21) Septic Systems/ Density Based on Soil Suitability | 2 | 4 | 1 | 6 | 4 | 5 | - | 3 | - |

Total #
of Funding
Activities
16

16 #4

6

3

10

#2

20

6

5

6

#1

25

Table 6

TYPES OF IMPLEMENTATION ACTIONS

| | Monitoring/ Reporting (incl. estab. database) | Further Plan- ning, study &/or Research (includes mapping) | Improved Local, State, Regional Management | Ordinances, Regulations, Performance Standards | Inspections & Enforcement | Public/Private rights, grants, Infrastructure Improvements | Protection of Land (Acq., developmt.) | Public Education | Interlocal Activities |
|--|--|--|---|---|---------------------------------|--|---|---------------------|--------------------------|
| 1) Agriculture | - | 1 | - | 1 | - | - | - | 3 | - |
| 2) Casco Bay | - | - | 2 | - | - | - | - | - | 2 |
| 3) Chemical Use (Pesti- cides, fertilizers, Household Hazardous Waste, Aerial Spraying) | 2 | - | - | 1 | - | - | - | 3 | - |
| 4) Coastal Erosion Sea Level Rise | - | - | - | 1 | - | - | - | - | - |
| 5) Coastal Water Quality | - | - | - | - | - | - | - | - | 1 |
| 6) Drinking Water Supplies and Systems/ Wellhead Protection | 1 | 4 | 1 | 3 | 1 | 1 | 1 | - | 1 |
| 7) Erosion/Sedimentation Controls/BMPs | - | - | 1 | 4 | 1 | - | - | 1 | - |
| 8) Excavation/Mining (i.e. sand & gravel) | - | - | - | 6 | 1 | - | - | - | - |
| 9) Floodplains/Flooding | - | - | - | 3 | - | - | - | - | - |
| 10) Forestry | 1 | - | 1 | 3 | - | - | 1 | 3 | - |
| 11) Groundwater/Aquifers | - | 3 | - | 9 | - | - | - | - | 7 |

Total #
of items
mentioned in plans

19 #3

VII. APPENDIX

This section presents a summary of development trends, water quality concerns, water quality related infrastructure issues, and implementation strategies that communities have developed to address water quality concerns. Information comes directly from draft and final Comprehensive Plans that municipalities submitted to the former Office of Comprehensive Planning (now the Office of Community Development). It should be noted that the wording of the individual implementation strategies is taken directly from the comprehensive plans. This was done so as not to misrepresent strategies by using the wrong verb, e.g. "the town should do...." v.s. "the town will do..." or "the town will consider..." Also, strategies to protect forest lands and open space were included, since many communities made a connection between protecting these resources and protecting water quality.

For towns that have not received state funding to write comprehensive plans, basic information on existing zoning is presented. This information was obtained through the Regional Planning Councils, local ordinances, and phone interviews with local planners. The "current zoning" describes zoning that is in place, and does not describe zoning strategies outlined in comprehensive plans as means to implement the plan.

1. AUBURN: [Plan not reviewed]

This section was reviewed by Lee Feldman, City Planner for Auburn.

Current Land Use Zoning: Within the Casco Bay watershed there are four different zoning districts. The majority of the land in the watershed falls under Auburn's Agriculture and Resource Protection District which requires a minimum lot size of 10 acres - the only uses allowed are agriculturally related uses. Other districts include: Rural Residential - 1 acre minimum lot size; Industrial - size limited by frontage requirements and a requirement that building coverage not exceed 40% lot coverage; General Business - 10,000 sq. ft. minimum lot size. The City has enacted phosphorous control standards for Lake Auburn and Taylor Pond (Taylor pond feeds into the Androscoggin River).

2. BRUNSWICK:

Information for this review is from the Brunswick Comprehensive Plan, Inventory and Analysis - Draft, October 1, 1992. Revisions will follow, and this section has been reviewed by Amy Naylor, Town Planner for Brunswick.

Current Land Use Zoning: Brunswick currently has a total of 27 different zoning districts, with fifteen districts developed for land use concerns, and twelve special districts. Those concerning this review are the Town Center, Intown Residential I, II, and III, Suburban Residential, Mixed Use Zone (Urban), Country Residential I & II, Commercial Development, Mixed Use Zones I & II, Moderate & High Density Industrial Zones, College Use, and Coastal Protection Zone districts. Of the twelve additional districts or zones, the most important are the Cluster Housing Development, Natural Resource Protection, and Aquifer Protection Zones.

The required minimum lot sizes vary greatly with the district, typically larger in the outlying areas, and either minimal or nonexistent in the town center. The smallest minimum lot size ranges from zero in the Town Center District (with 100% gross density allowed, and one dwelling unit per 2,500 sq. ft.), to the moderately restrictive Country Residential Districts I and II (former: 80,000 sq. ft. lots, 30% gross density, and 1 dwelling unit/80,000 sq. ft.; and, latter: 40,000 sq. ft. lots, 30% gross density, and 1 dwelling unit/40,000 sq. ft.). The most restrictive is the Coastal Protection Zone, with 1 dwelling unit/216,800 sq. ft. (five acres). Lots in this latter district, however, which were in existence prior to the adoption of the ordinance that have at least 160,000 sq. ft. (3 acres) but are less than 10 acres may be divided into two lots provided that neither lot has an area less than 80,000 sq. ft.

Land Use Development Trends: The population of Brunswick more than doubled in the fifty years between 1940 - 1990, from 8,658 to 20,906. The bulk of the "suburbanization" in Brunswick has occurred in an area largely in the "Intown Residential Districts," the result of the availability of public sewer and water. In the remainder of Brunswick, individual homes and mobile homes have been scattered along the frontages of existing roads and highways, often as the result of the breakup of farms and larger undeveloped tracts. Through the years there have been generally small-scale subdivisions in all of the outlying sectors, with the typically strong correlation between location and soil suitability for septic systems. The Plan notes that there are currently approximately 260 unbuilt lots within existing subdivisions: about 100 in the "Intown" and Suburban Residential" Districts (Sector 1), 100 in the lower northeastern quadrant (Sector 5), and the balance in Sectors 2, 3, and 4. Given the potential for single family dwelling at 2.47 people/household, "infill" development has a population potential growth of 640 people, with current projections set at 1,045 within the next decade. Thus, the build-out population at current zoning is somewhere around 65,000 to 70,000 persons. In addition, there are ten "Planned Unit Developments," tending to be located in the "Intown Residential Districts."

The Plan delineates existing conditions in each of the seven "Sectors." Insofar as additional development opportunities are concerned, Sector 1A has about 40 acres of undeveloped land. However, it lies within the Naval Air Station aircraft flight zone and the Aquifer Protection Zone, and thus has considerable deterrents to development. In the northwest section of Sector 2, there has been a whittling away of the rural "working landscape" by development for individual new dwellings. In addition, a large subdivision for manufactured housing on individually owned lots, with a communal sewage disposal system, has been approved. In the southwest section of Sector 4, mobil home parks are clustered near the junction of Maquoit and Mere Point Roads, providing 32% of the town total. These are not served by sewer, some three quarters of a mile beyond the end of the Maine St. sewer line. Given that the new High School is slated to be constructed on the Maquoit Road, the main will in all likelihood be extended, with increased development and sewage connection requirements in this area.

In regards to open space availability, the areas set aside for the tree growth and open space categories,

combined with undeveloped tracts, total about 18,500 acres, or 61% of the town total. As the Plan states, however, the amount of buildable land is substantially less than this figure might suggest, given poor soils for septic systems, and the like. Excluding open space, single dwellings are clearly the dominant use in terms of acreage consumed. Although still largely concentrated in the urban core (Sector 1), there has been a trend for houses to scatter through the rural areas and this trend continues unabated. Such "sprawl", if continued, will threaten the viability of farming (both near term and potential), exacerbate the degradation of scenic and recreational areas, and more importantly, cause an inordinate rise in the costs of services.

Certainly one of the greatest pressures facing the retention of open space and thus creating future development pressures is the property tax issue. Given the continued definition of assessment based on "the highest and best use" criteria, there is little incentive to maintain open space given that it is taxed as potential house lots. Another problem is the recent trend in assessment to higher valuations on farm buildings, creating yet another financial burden on the farming community, and hence, the availability of open space.

Relative to other uses, business and industry occupy relatively little space. Current zoning provides ample space for business expansion, but industrial space is in short supply. If the Naval Air Station is closed, however, this would be an ideal site for increased industrial development, given the combination of rail and highway access, and sewer and other utilities.

Water Quality Concerns:

Much of Brunswick's private drinking water supply is derived from bedrock aquifers, while all of Brunswick's public water supply, provided by the Brunswick and Topsham Water District, is derived from sand and gravel aquifers. There is an adequate yield from each of the sand and gravel aquifers in town, of which one large aquifer underlies the most highly developed areas, with a yield between 10-50 GPM. The central portions of the River Road aquifer and an area in east Brunswick have potential yields of greater than 50 GPM.

The two major soil types are the Suffield-Buxton-Hollis and the Windsor-Hinckley-Deerfield types. The former tends to limit residential use, where not sewered, by slow and very slow permeability and shallowness to bedrock, which adversely affects subsurface sewage disposal on site; insofar as the latter is concerned, even though a major proportion of the area underlain by these soils is served by sanitary sewer, the danger of groundwater contamination from development and underground storage tanks remains.

There are numerous small ponds, man-made and natural, in Brunswick, but there are no "Great Ponds." The New Meadows Lake actually refers to a broad portion of the New Meadows River between Bath Rd. and the Old Bath Rd., and is considered estuarine rather than fresh. The major watersheds in Brunswick feed the Androscoggin, the headwaters of the Royal River, the New Meadows River, and the Bays. The Plan notes that the vast majority of pollution problems in the Androscoggin River result from past and ongoing activities in upstream towns. Among the most significant are the estuarine waters of the bays, which are highly productive waters.

Currently, all inland streams and tributaries are Class B waters, the Androscoggin River is Class C, and all estuarine waters are Class SB. Mere Brook is noted as a Class B (and is one of the most intensely developed). Eleven of the 13 Naval Air Station waste sites are within Mere Brook's watershed.

The surface water quality problems in Brunswick are related to many different factors; potential threats include: the Bunganuc Stream watershed includes an abandoned town landfill, several underground storage tanks, a floor drain and an overboard discharge; the land adjacent to the streams feeding into Maquoit Bay have undergone a large amount of new development in the last few years, with one trailer park having over 200 underground storage tanks alone; Merepoint Neck's soils and extensive shoreline development

patterns create problems in Merepoint and Maquoit Bays via the overboard discharges; considerable new residential development has occurred within the narrow watersheds whose streams discharge to Buttermilk and Woodward Coves, with several overboard discharges located at Buttermilk Point.

The New Meadows River is listed as a non-attainment estuary; the Androscoggin River watershed includes the downtown and Bath road areas, as well as the rapidly expanding east Brunswick and northwest corner of town; in east Brunswick, wastewater from 300 residential units discharge to the Androscoggin at the head of Merrymeeting Bay, while individual septic systems are suspected of contributing contaminants to groundwater in the sand and gravel aquifer.

Perhaps one of the most important threats to the River Road aquifer which supplies most of Brunswick's municipal drinking water comes from the stream which drains a small watershed, in which is the interchange of I-95 and Rte. 1. Finally, the Androscoggin River is classified as a non-attainment river due to the presence of elevated levels of dioxin in sediments and fish, due to historic or past activities.

Approximately two-thirds of the Brunswick and Topsham Water District's services are in Brunswick. Between 1980 and 1990, active services increased by 46%, with an average annual increase of 3.8%. The District's supply is groundwater from several wells and/or wellfields: Jordan Ave. (recharged from surface precipitation and induced infiltration from the Androscoggin), Williams Farm (recharged from bedrock system recharging sand and gravel deposits), Taylor Farm (all in Brunswick), and the Jackson Station in Topsham (both of which are recharged from bedrock and the Androscoggin).

An important fact is that water main extensions are made at the request and expense of the property owners to be served by the extension. The only recent extension of lines has been to a new storage tank. Private lines off main roads have been extended at the request and expense of the property owners.

A 1986 E.C. Jordan study delineated the threats to groundwater quality which could stall or close the supplies at the Jackson and Taylor wells. As a result, aquifer protection ordinances were passed in both Topsham and Brunswick in 1986. In addition, the Brunswick zoning ordinance was amended in 1989 to be more definitive.

The private water supply comes from the River Road, Jordan Avenue, and east Brunswick aquifers. While the water quality is generally poor in the bedrock well, and generally good in the sand and gravel aquifer wells, the major threats are existing and future septic systems either close to or in the same aquifer as those used for shallow dug wells. The major contaminants appear to be nitrates and viruses(?). The study indicated that "modelling of nitrate loading in this near-surface aquifer shows that average concentrations of nitrate-nitrogen could be kept at half the State standard at a housing density of...approximately one home per acre...But is it likely that some household wells will be contaminated by septic effluent unless careful consideration is given to groundwater flow in the citing of both septic systems and wells."

As the Plan so adeptly suggests, "clams can be a barometer of the health of marine resources, and as such, show the Bays to be in an increasingly vulnerable condition." The three major threats are septic systems or overboard discharges, and over-harvesting, and development in and around the bays and their watersheds. "Clean water in the New Meadows River depends upon the combined efforts of West Bath, Harpswell, and Bath." Eutrophication in the New Meadows Lake contributed to a serious foam problem in the upper New Meadows River which, while not ecologically damaging, is a detriment to the attractiveness of the River. The four major sources of pollution to the coastal waters here are from freshwater run-off, overboard discharges, leaching of pollutants, and commercial and recreational boating. Bunganuc Brook is suspected of supplying fecal coliform levels as high as 600/100 ml. Higher than normal fecal coliform counts have also been found in the Pleasant Hill watershed. In addition, agricultural activity in other smaller watersheds may contribute to poor marine water quality.

There are currently 37 overboard discharges in Brunswick. The Town Council has prohibited new overboard discharges, and existing systems may remain so long as they comply with all state regulations. In 1988, a demonstration project was initiated at the head of Merepoint Neck to replace overboard systems with seven cluster systems for 33 obsolete systems.

Leaching of pollutants comes from known underground fuel tanks (all known sites mapped), as well as hazardous waste site leakages on the Naval Air Station. A proposal was made to establish a Wastewater Management District, but it was defeated in the State legislature. There may well be legal standing already existing for the creation of this body. Finally, while overboard discharge into the ocean is regulated, and overboard toilets have been outlawed, sewage from on-board toilets, fuel and oil discharged from bilge pumps while in anchorage remains a problem. Marinas with more than ten slips must provide pump-out facilities, including the one at Mere's Point.

Infrastructure/C.I.P. Related Issues to Water Quality: As noted above, the Brunswick and Topsham Water District serve as the quasi-municipal organization to supply water to Brunswick and Topsham. A 1989 study identified four possible sites for additional wells on District property, while the current source of supply appears to be adequate to meet future community needs.

The estimated yields for the District are between 5.6-12.4 MGD. The District reported a reduction in per capita use from 1985-90, due primarily to a 37% increase in water rates in 1987, and significant sewer rate increases during the last five years. There are currently four pumping stations, with a recently installed greensand filter system to remove iron and manganese from the water. The District will undoubtedly face increased costs, procedures, and requirements however due to the federal Safe Drinking Water Act amendments. There are three water storage facilities: one steel and two concrete storage tanks.

The District finances its operations through water rates, which have been stable since 1987. The District does not anticipate another rate increase until late 1992-93. Current tariffs require new building owners to pay for the initial cost of the public portion of the service line (main to curb) and water meter, but ownership is retained by the District. A "system development charge" is a tool which can be utilized by charging all new development, minor and major, that connect to the water supply system. Funds obtained from this charge are placed in an escrow account and can only be used to help finance system upgrading and expansion, if that becomes necessary. Thus far, the District has not adopted this system charge.

In regards to sewage treatment, the Brunswick Sewer District has existed as a wastewater utility since 1948. The potential service area is limited to east of I-95 and south of the Androscoggin River roughly equivalent to the service area of the Water District, but including the large undeveloped parcels of land between the major roadways. The service area included the Naval Air Station and the Shopping Center. Not all of this area is actually served. The unsewered area includes west of Church Road and the area north of the Air Station to the Androscoggin River. Approximately 2,800 residences are connected to the public sewer lines. Another 5,300 residences are not connected to the public sewer. The public sewer serves approximately 35% of the town's total population. Areas which have seen recent growth are the Mere Point and Hennessey roads area, the Arrowhead and Church Road area, the outer Bath Road area, and Cooks Corner.

A study by Wright-Pierce indicates that District flows, excluding flows generated by the Naval Air Station, are 32% residential. The non-residential flows make up 53% of flows. The current District contract with Topsham provides for no future additional flows limitations. The treatment plant, constructed in 1967-68, with expansion in 1985 of the capacity of the original primary treatment facility from average daily design flow of 2.5 MGD to the current 3.85 MGD. Design flows are exceeded with flows over 109 MGD in association with major storms. The plant exceeds 3.85 MGD an average of 25-30 days per year. Currently, the treatment plant receives an average daily flow of 2.5 MGD, representing about 65% of the plant's capacity. Improvements to the Naval Air Station sewer system will reduce the amount of wastewater contributed to the treatment plant

by reducing the amount of infiltration to its collection system. The plant will develop capacity problems in about 10-12 years, sooner if a faster growth rate or connection to existing mobile home parks in east Brunswick occurs.

In 1954, the storm water and sanitary sewers were separated in 1954, and current estimates for infiltration and inflow account for 26-28% of the average daily flow. The Church Road, River Road, Richards Drive, and Bowker Street areas are currently at or near capacity. Seven smaller pump stations were constructed in the 1980s, most required by the growth experience during the decade. Within the next decade two to three pump stations will need to be upgraded. The Maine St., Harpswell Rd., Church Rd, and Cooks Corner pump stations are at or near capacity.

For sludge disposal, the District owns a 20 acre sludge use site, and holds permits to use three other privately owned sites totaling another 150 acres. When the primary treatment facilities were expanded, so too was the total volume of sludge generated annually. In addition to this increase, the secondary sludge is also expected to contain greater amounts of pollutants. For septage disposal, the District is licensed by DEP to accept up to 5,000 gallons of septage per day, with recent years utilizing about 85% of the licensed allowance. Future growth, however, could lead to municipal wastewater flows that would lead to approaching plant capacity, independent of any septage loading.

Financing is provided through user fees, determined by quantity, strength, and characteristics of the wastewater. All costs and expenses as part of installation and connection to the District lines are required to be paid by the property owner. All extension costs, direct and indirect, are required to be paid by the developer. The District's current borrowing capacity is \$20 million, with \$11 million already committed. Capital costs up to \$250,000 per year are financed through District user revenues.

Implementation Strategies [DRAFT]:

- Restrictions on multifamily housing, including density standards, minimum size of units should be eased in some growth areas.
- The Town should work with the Brunswick Water District to ensure adequate protection for existing drinking water supplies.
- The Town should work closely with the Brunswick Sewer District to coordinate pipe replacement with other public works projects.
- The Town should explore the creation of a Wastewater Management District, to service and maintain septic systems.
- The Sewer District's 20 year Plan should be modified to reflect the future land use plan.
- Sewer line extensions should not be made in identified Rural Areas and pipe and pumping station capacities should be designed to absorb growth in identified Growth Areas.
- A systematic investigation of the condition and adequacy of storm drains should be completed. The study should include surface drainage options that incorporate stormwater treatment rather than direct discharge.
- The Town should, with other communities in the region, establish a regional watershed management district that promotes water quality and habitat protection while managing stormwater issues associated with development.
- Establish a program for the continuation of the eelgrass assessment and monitoring study in coastal waters.
- Anticipate changes in marine habitats and species, and institute proactive management measures to protect marine resources.
- Review the Shoreland Zoning Ordinance for potential changes in upland movement of the intertidal zone; monitor marsh and mudflat scouring rates and accumulation rates throughout the coastal waters.
- Cooperate actively with regional programs with resource management emphasis including the Casco Bay Estuary Program, the Oil Spill Commission, the Regional Shellfish Compact, and

the Shore Stewards Program.

- The Planning Board should require applicants to fund professional peer reviews of sedimentation and erosion plans.
- All developments in the watershed should be required to utilize management plans that allow for maximum pre-treatment on site. Limits on suspended solids should be set for stormwater run-off in the watershed.
- Expand the Coastal Protection Zone to cover the true watershed of the Brunswick coast.
- Strongly consider mandatory clustering in the watershed area of the coast, thus preserving rural character, enhancement of availability of wildlife habitat, and use of large areas of open space to pre-treat stormwater and protect groundwater, streams and saltwater tributary water quality.
- Development of a regional program to protect and enhance the quality of the Androscoggin River. Carefully evaluate all pollution sources and threats to the River.
- Study the New Meadows River in the same manner that the Maquoit and Middle Bays were studied. Development of a joint program with West Bath to investigate the causes of nutrient loading, foam, and pollution in the New Meadows Lake and River.
- The Town shall implement development standards and practices in the New Meadows Lake watershed designed to maintain or improve its water quality. These standards should be directed at reducing levels of phosphorus transported to the lake.
- Educate and assist residents in the watershed by providing accessible information about fertilizer spreading, septic system maintenance and disposal of household toxic materials.
- Continue to work with the Me. Dept. of Ag. and the Cumberland County SWCD to help local farmers use the latest BMPs. Encourage land-based farmers and ocean-based farmers to share information about how to best manage resources so that both groups improve their economic base.
- Develop a regional watershed management district involving Freeport, West Bath, and Harpswell, to include stormwater management programs, protect streams and waters from erosion siltation and other pollutant.
- Assess the locations and discharges of pollutants to the Bunganuc Watershed and evaluate relative costs of cleanup and the economic impact on the region if the Bunganuc Creek flats were open.
- The Town and the Naval Air Station should continue joint efforts to identify and resolve any runoff or pollution discharge that pollutes coastal waters.
- Investigate minimum setback and installation procedures for all fuel storage tanks (surface and subsurface) in excess of 350 gallon capacity.
- The Wastewater Management district should include all septic systems in town.
- Establishment of an administrative program that treats these private septic systems in a similar manner to public sewer users.
- The District should be responsible for inspecting, pumping, and ensuring maintenance of septic systems through a user fee. Low interest loans and grants should be developed to help eligible owners replace or repair malfunctioning systems.
- The Town should consider applying a mandatory cluster and open-space zoning approach and/or extremely low density to any and all future development in rural areas (and in growth areas where possible).
- Areas not currently served by public sewer and water shall remain as such, unless they fall into Growth areas. In the event that the Town deems it necessary to expand the infrastructure into a designated Rural area for reasons of public safety or welfare, there shall be no alteration of permitted densities in that Rural area.
- All areas designated as "Rural" shall include a Resource Protection Zone within 250 feet of high water in coastal areas, and within 250 feet of all perennial streams regardless of whether or not they are classified as second order streams. Within the next 150 feet of these waterbodies, the timber harvesting standards of the Shoreland Zoning Ordinance shall be

observed.

- All new development in areas not served by public water or sewer shall be required to demonstrate nitrate levels at all well heads and property lines no greater than the standards (10 mg/l) set by the DEP.
- Take specific steps to protect the East Brunswick aquifer as a potential source of local or regional water supply by extending the Aquifer protection regulations to this area.
- Continue to concentrate major commercial activity in the three existing centers already served by sewer and water: out Pleasant St., the village center, and the Cooks Corner area.
- All limited commercial uses and "low impact" industries in rural areas provided they conform to strict performance standards.
- Within 1 year of adoption, the Conservation Commission will prepare the Open Space Plan.

3. BUXTON:

Information on all but current land use zoning is taken directly from *Buxton, Maine Comprehensive Plan, 1991 Part I Inventory of Data and Part II Summary of Data and Planning Implications, Community Goals, Implementation Strategies*.

Current Land Use Zoning: There are four districts: 1) Downtown/Village - 2 acre minimum lot size; 2) Residential - 3 acre minimum lot size; 3) Rural - 5 acre minimum lot size, and 4) Business/Commercial/Industrial District along Route 2 with a minimum lot size in range of 1 1/2 to 2 acres.

Land Use Development Trends: Historically, Buxton consisted of a number of villages separated by actively farmed fields and woodland. Today, the Town has some retail trade and service industries, but it is primarily residential and viewed as a "bedroom" community. Residents commute to Portland and South Portland for work (90% work out of town), and the plan has identified its residential development pressure as coming from these nearby cities. Buxton experienced significant growth during the 1970's and 1980's. The plan notes that 63% of Buxton's homes were built during the last twenty years, and that such residential development has "made rural sprawl widespread." During the 1980s 1,182.7 acres of land were subdivided into 228 house lots that were accompanied by 15,043 feet of roads. If housing growth is allowed to continue unguided, there is concern that it could place additional pressure on rural character, ground water contamination and congestion of roads.

The plan views its development trends in context with the nation's trend towards suburbanization, stating: "Historically land costs higher near the village center and lower with increasing distance from the center. During the 1970s and 1980s, people moved in favor of rural living and probably lower land costs over the cost to commute."

Water Quality Concerns: There is concern over ground water pollution. Buxton hired Robert Gerber Inc., a geological consulting firm, to create a "groundwater special features map" and to use ground water recharge capabilities to recommend a maximum residential density limit based on water quality impacts from septic systems. Based on the nitrate level reaching ground water from septic systems, appropriate densities were found to range from .4 to 1.6 acres per unit up to 3.7 to 16.6 acres per unit, depending on the soil type and its recharge capability. The plan includes a general list of threats to water resources (development, malfunctioning septic systems, phosphorous loading) and an inventory of sand and gravel aquifers, as well as bedrock aquifers. The locations of known threats to ground water resources are shown on a "Ground Water Special Features Map"; they include: gasoline from former gas station, the landfill, road salt storage facilities, etc.

Buxton also has a great pond. Only 9% of the pond's watershed is in Buxton while 91% in is Standish, which is proposing to use DEP's review method for phosphorous control.

Infrastructure/C.I.P Issues Related to Water Quality: Buxton does not have a sewer system. One of the plan's "significant goals" is to guide growth so that public sewer and water will not be required, and so that the natural environment is also protected." To insure that septic tank discharge is safe at the property line, the Town requires all subdivision applications to include a hydrogeologic assessment.

Implementation Strategies:

- To help control the amount of phosphorus entering Bonny Eagle Pond, a public education program will be conducted. The shore front property owners will be told of the affects of phosphorous loading on the pond.
- A lake water quality monitoring program should be encouraged to track the quality of the lakes in town.

- Aggressive enforcement of the Plumbing Code and the State's Seasonal Conversion Law will take place along the shores of ponds and rivers.
- The appropriate State Zoning requirements will be incorporated into the zoning ordinance for the areas required to be regulated by the Maine Shoreland Zoning Act.
- The ability of soils to filter and dilute septic tank discharges will be one of the criteria used to establish various density requirements.
- To assure that septic tank discharges are safe by the time they reach a well or a neighboring property, all subdivision development applications will be required to include a hydrogeologic assessment if the planning board determines, based upon review of the Ground Water Special Features Map, that potential exists for adverse impacts on ground water quality.
- A study of the impacts on the aquifer will be required if a development is proposed in areas shown on the Prime Aquifers Map as being a Prime Aquifer. If the study determines that the developments adversely affect the quality or quantity of the ground water the development will be required to be modified so that the ground water will not be adversely affected.
- The town will work with appropriate towns and other appropriate agencies to manage regional resources (water quality resources included are - Saco River and Bonny Eagle Pond)

Other Possibly Related Activities:

- The Recreation Committee, with the assistance of other Buxton residents, will identify hiking, bicycling, and skiing trails, and areas for town sponsored ice skating. - Open space created in cluster subdivisions will be planned so that they connect with other open spaces and with the above mentioned trail system.

4. CAPE ELIZABETH:

The following information was taken from the Cape Elizabeth Comprehensive Plan, 1990 and amendments, and reviewed by Maureen O'Meara, Town Planner.

Current Zoning: Development in Cape Elizabeth occurred in spurts: after 1850 with the development of Delano Park; after the separation in 1895 of South Portland and Cape Elizabeth; and after WWII with the advent of suburban development.

Almost all of the land in the Casco Bay watershed is zoned "Residential" with an 80,000 sq. ft. required minimum lot size (just short of 2 acres); the area bordering South Portland is zoned for residential use with a minimum lot size of 20,000 sq. ft. There are two wetland zones that apply to small wetlands which are spread throughout the area; these zones protect the wetland and establish buffers. The Resource Protection I Zone (Critical Wetland Zone - CWZ) applies to very poorly drained soils, sand dunes, and areas with obligate vegetation. The "CWZ" applies to wetlands from one acre in size, prohibits most uses in the wetland (except very low impact activities, e.g. camping without a vehicle), and requires a 100-250 foot buffer around the wetland (buffer size can be reduced depending upon site condition, topography, and wetland size). The second zone is the Resource Protection II Zone (Wetland Protection Zone - WPZ) which applies to wetlands on poorly drained soils, and on very poorly drained soils where the wetland is less than one acre in size. In the "WPZ" most uses are allowed with a special use permit from the Planning Board and no buffer is required. A couple of small business zones may fall within the watershed, where the watershed has been filled.

Land Use Development Trends: While there is no "village center," there are two adjacent sites which serve as the town center: the Pond Cove Shopping Center and the Town Hall municipal center. The latter is split from the shopping center, the library, and the elementary school. The Plan called for the acquisition of land adjacent to the Town Hall, thus creating a town center, but that has been put on hold. Expansion of the business zoning district (including Pond Cove Shopping Center) is intended, in addition to obtaining rights to first refusal for residential property in the area in order to add to this district. First, however, an update is being performed to reflect the existing conditions.

Cape Elizabeth's delineations of the "Growth" and "Rural" areas reflects the topography and future housing projections as their definitional basis. The "Rural" areas are defined as those which have the following attributes: tidal and nontidal wetlands, major surface waterbodies, sand dunes, scenic viewshed and vistas, active farmland, existing and proposed portions of the Cape Elizabeth Greenbelt, groundwater aquifers, and floodplains. To protect scenic areas, a "Prime Scenic Viewshed" contract/conditional zoning overlay district would be adopted into the town zoning ordinance. In addition, local ordinances should be amended to more clearly provide for a detailed analysis, either through performance standards or other means, of impacts of development upon significant scenic views.

Despite the intention of limiting pasting development by creating large minimum lot sizes, and thus maintaining existing open space, it appears that just the opposite has occurred. Recent residential growth has occurred in both sewered and unsewered sections of the town, including formerly agricultural land and marginally suitable lands. The successes however have been in the retention of open space by developers using the Zoning Ordinance's "Cluster Development Performance Standards."

The "Growth" areas are mostly dependent upon the future housing projections which indicate that an additional 534 units will be added to the existing housing stock over the next ten years. Fifteen percent of these new units would be "in-fill development" occurring in existing neighborhoods. Ten percent of the projected units would be developed on land currently zoned "Residence C" (20,000 sq. ft. lots) and that 75% would be located in areas currently zoned "Residence A" (80,000 sq. ft. lots). Based on this, it was forecasted that given the current zoning regulations, 761 acres of land would be required to accommodate new residential development over the next ten years.

The concern is that while much of the 72% of the remaining land in Cape Elizabeth is undeveloped, over 30% of that is controlled by a small number of families or corporations, and if they decide to sell their land, it would have a tremendous impact upon the character of the town. With that in mind, the town could consider the use of easements or covenants to maintain open space for perpetuity.

Water Quality Concerns: Much of the town is served by public water, through the Portland Water District. In the southeastern section, however, approximately 20 residences rely on well water. The primary contaminant in private wells is iron. In the northwestern corner of the town, on the Scarborough and South Portland border, is a very small portion of a large sand and gravel aquifer, located primarily in those towns. The location and existence of any bedrock aquifers located in town are currently unknown.

Aside from the Atlantic Ocean, which provides recreation and employment for members of the community, there is Great Pond, approximately 131 acres in size, a freshwater pond which is surrounded by a significant wetland. The town currently has a great deal of data on this waterbody. In addition, there are eleven different watersheds in Cape Elizabeth. The Great Pond watershed is considered the most sensitive in the town. There is a great deal of concern regarding phosphorus loading due to the large number of private septic systems surrounding this waterbody. Nevertheless, there is evidence that not only is the eutrophication rate fairly stable over time, but that the Pond has actually increased in size. There is also the Spurwink Marsh watershed, which is less vulnerable given its tidal nature.

Infrastructure/ C.I.P Issues Related to Water Quality: In regards to municipal sewer system service, the most densely populated neighborhoods are served by public sewer. The northern portion is served by the South Portland Sewage Treatment Plant, utilizing an agreement between the former and Cape Elizabeth. With the construction of a new plant however, allowing expansions (and hence increased demand) of the municipal system, came a controversy.

In the late 1970s and early 1980s after documentation of private septic system failure rates of up to 23% in some areas and much debate, a referendum was passed for the construction and expansion of the existing municipal system to service those areas with (1) the highest known septic system problems, (2) existing sewer areas, (3) limited in-fill development (which currently occurs only in the northern part of town, as the southern and central sections utilize septic systems), and (4) to handle combined sewer overflows. As the system now stands for the northern portion of town, there is enough capacity to allow for hook-ups for the in-fill development, and development on a street where the municipal system currently exists.

Implementation Strategies:

- Development of a methodology for identifying and prioritizing significant scenic views. [This has been achieved through the "Visual Access/View Study". The next step is the creation of regulations governing visual access.]
- The town should require mandatory clustering for residential developments proposed for parcels with significant open space.
- The Subdivision Ordinance and site plan review provisions should be strengthened to increase screening and buffering standards and require retention of as many existing trees as possible.
- Designation on the Zoning Map of growth areas for both residential and commercial development; "rural/protection areas" for sites unsuitable for development for either physical or policy reasons.
- Creation of at least one new residential zone that allows greater density than currently allowed (in combination with mandatory clustering).
- Revision of the sewer ordinance to allow for more flexibility in allocating the remaining sewer hook-ups or after consideration of the expansion of the sewage treatment plant's capacity.
- Develop a "contract zoning/conditional rezoning" type of provision that gives the town greater control over development impacts, and developers more flexibility for creative residential development.
- [Insofar as water quality is concerned], revise the existing TDR system by reducing reliance on access

[Since the writing of the Plan, a Subdivision Ordinance was passed which contains specific performance standards to be met with the intention of protecting the rural character and to ensure conformity in development. In addition, sanitary standards have been added to the Zoning Ordinance, allowing the Town to require soil borings, observation wells, hydrogeologic studies, etc. if compliance with is questionable. Certain soil types have since been deemed unsuitable for septic systems. Finally, the Aquifer Protection Overlay Zone further limits land uses in those sensitive areas.]

Water Quality Concerns: Eighty percent of the town obtains its water from groundwater in Cumberland (including one community well). The public water supply is currently provided by the Portland Water District to Cumberland Center and the Foreside from Sebago Lake. The Center is also supplied by wells on Greely Road and a supply tower off Main Street. The Portland Water District plans to construct a 3 million gallon tank and pump station in Falmouth that would serve most of Cumberland Center and West Cumberland, thus using Sebago Lake water while eliminating the tower in the Center and the well water source. In addition, the plan calls for the replacement of dead-ends with loops, thereby increasing the system's efficiency. This plan is important for West Cumberland, given that a number of wells in the Methodist Road area have become polluted by toxic chemicals (tetrachloroethylene). [In July of this year, a groundwater study was completed for Chebeague Island, and will be used for future land use planning decisions.]

Infrastructure/ C.I.P. Issues Related to Water Quality: The present sewer system was designed for 750 households, with a recent upgrade to serve 1100 homes. This system is owned by the Portland Water District. The maximum capacity of the Foreside interceptor is 1100 single family "user units." The remaining "units" consist of the following: 49 unreserved units, 80 reserved for areas with failed septic systems, and 100 reserved for elderly or affordable housing units, totalling 229. The unreserved units will be allocated based on twelve units per year (13 the first year), at a cost of \$2,000 per unit. It should be noted, however, that the regulations concerning the requirements for lot sizes were meant to protect water quality, not create the availability of public sewers.

In addition to the remaining user units above, there are 101 units approved for developers of several uncompleted developments (including 35 office/commercial units) and approximately 145 units are reserved for homes that continue to use subsurface wastewater disposal but are "paying a readiness-to-serve charge to the town." The Plan notes that further system upgrades would require pipe replacement which is seen as prohibitively expensive. It notes, however, that "approximately 400 more units would be available at the Falmouth treatment facility if: (1) a new sewer line to Falmouth were constructed (the Foreside interceptor being at capacity; and, (2) the town were to assist Falmouth financially with an upgrade of the Mill Creek pump station." The "Community Groundwater Study" suggested that "...municipal sewers be extended to include the bulk of the area north of and in-and-around Cumberland Center and in-and-around Cumberland Junction."

Among the expansions listed by town department heads, aside from the landfill closure which was completed in July of this year, there was no mention of any costs associated with either public water supply or sewer system expansions. Since the formulation of the Plan, however, sewer extensions on the remainder of Farwell and Main St., from Lawn Ave. to Cottage Farms, should be complete by the end of November of this year. In addition, while the Plan mentioned the use of impact fees for additional facilities and services necessitated by continued growth, the sewer unit fees are designed as establishing future readiness-to-serve rather than simply be "impact fees."

Despite the requirement of new subdivisions to install storm sewers, only certain parts of Cumberland have existing storm sewer drainage. An extensive system will be put in place when the State improves Main Street. The Plan suggests that storm sewers be added along Rte. 88 from Seacove to the Falmouth town line.

Implementation Strategies:

- Develop an outreach program to provide landowners contemplating selling/developing their land with information concerning limited development options.
- Develop and update property inventory and maps that point out potential conflicts between landowner interests and community interests.
- Allow reductions in space standards, including lot size reductions, provided that the overall net residential density is decreased and the net amount of open space is increased. **[This has been done through the use of net residential acreage and clustering.]**
- Guide residential development towards land which has the capacity (i.e. appropriate soils, water, or which has existing water and sewer lines) to absorb that development, but away from areas where development is inappropriate. **[This is addressed by newly enacted performance standards.]**
- Consider allowing a density bonus for developers who take actions, including but not limited to: [among other things] dedicating open space in resource protection areas. **[This is being done through clustering and affordable housing.]**
- Develop a fair and equitable method for extending sewer lines to homes with failing septic systems, particularly when two-thirds of the intervening homes do not want the extension, as is currently required. **[Septic systems or wells can be required to be monitored, although there is no maintenance requirement for septic systems.]**
- Monitor the progress of sewer line extensions in Falmouth toward Cumberland along Longwoods Road and consider the possibility of allowing the extension of the Longwoods sewer to continue into Cumberland.
- Encourage the Portland Water District and developers to extend water lines to West Cumberland.
- Maintain low development densities in those areas where either public sewer or public water is not available. **[This has been done, and points up the problem of requiring costly new systems vs. traditional systems.]**
- Encourage the Portland Water District not to discontinue use of the Greely Road community wells; at a minimum, ensure that the PWD does not abandon the possibility of reusing this water supply in the future-encourage continued water quality monitoring.
- Provide developers with a standard format for such studies to eliminate confusion.**[This is being accomplished through permit pre-application meetings.]**
- Conduct further study of appropriate density requirements for Chebeague Island; study the "full range of options related to public water supply."
- Continue to require high intensity soil studies for major subdivisions, and when necessary, for minor subdivisions.
- **[While the Plan called for "permit developments with State-approved secondary wastewater treatment systems to use to minimum lot size for projects served by sewer," this has never been used as it is perceived as being too difficult to regulate.]**

6. DURHAM:

The following information is taken from *The Town of Durham Comprehensive Plan, October, 1991*.

Current Zoning: Resource Protection; Rural - 90,000 sq. ft. minimum lot size; land located within the ground water protection district has a minimum lot size requirement of 3 acres for lots having road frontage and 5 acres for back lots.

Durham has a residential growth ordinance that regulates the number of building permits issued for all new dwelling units, mobile homes and conversions from seasonal to year round homes. A building cap consisting of 5% of Durham's current housing stock establishes the annual maximum number of building permits which can be issued (for 1990 the cap was 50 permits). It should be noted that the projections for housing development during the 1990s are for 51 units, so that it is doubtful that this cap will be exceeded. Durham also has a back lot development ordinance that allows and sets standards for the development of lots for single family homes which lack frontage on town accepted roads. The Town also has a ground water protection ordinance (see below).

Land Use Development Trends: In the early 1900s, Durham was not one town, but four separate settlements. Durham has retained its rural character, in spite of a steady increase in population. During the 1960's and 1970's new businesses opened up in town, including a gas station, a general store, butcher shop, gift shop and an automobile repair shop. The plan concludes that, Durham's rural character and its close proximity to southern Maine's employment centers make it a desirable place in which to live.

Water Quality Concerns: The plan states that "Protecting water supplies and ensuring adequate on-site sewage disposal have been of primary importance." Durham has adopted a groundwater protection ordinance for a significant sand and gravel aquifer that has been identified by the Maine Geologic Survey (there are over 1,400 acres of mapped aquifer in town). The ordinance encourages conservation and evenly distributed subsurface waste disposal systems. It discourages large multifamily developments with large concentrated disposal systems, prohibits the handling of hazardous and leachable materials, minimizes maintenance and refueling of heavy equipment and prevents land uses which disturb the soil during periods of high ground water. Current land ordinances are thought to do well in protecting the environment and integrating new development with available municipal services. However, additional regulatory and nonregulatory measures to adequately protect resources "will need to be considered." This may include such measures as open space acquisition, improved regulation of gravel mining operations, and enforcement of regulations to protect surface and ground water supplies. The plan notes that enforcement of local regulations will be critical to continued protection.

Durham's plan includes information on the DEP water body classification system along with an inventory of point and non point sources of pollution. The plan notes that many older septic systems are believed to be inadequate, and represent potential threats to surface water and ground water quality. The extent of leach bed failures is not known. There is a statement to support and participate in regional management of the Androscoggin River, to upgrade quality of surface water through effective code enforcement of existing state and local ordinances, and several other measures (see implementation strategy section).

Infrastructure/C.I.P Issues Related to Water Quality: Durham does not have a public sewer system, nor does it have sewage collection and treatment. One of the plan's policies is to encourage the use of ecologically sound alternatives to sub-surface waste treatment systems.

Implementation Strategies:

- Assess and ensure the capability of the existing Code Enforcement staff to enforce existing zoning ordinance and regulations.
- Educate residents through the school system, workshops, and newsletters regarding the proper

operation, use and maintenance of septic systems and leach fields; natural resource and open space protection; proper storage and disposal of household hazardous wastes; recycling programs; application, storage, and disposal of pesticides, herbicides, fertilizers, soil conservation, good forestry management.

- Establish procedures for periodically inspecting existing septic systems and leach fields.
- Establish on-going reporting procedures designed to document the type location, and extent of septic system failures.
- Work with state agencies, environmental organizations and neighboring communities to establish a water quality sampling and monitoring program for significant surface water bodies including Chandler Brook, the Androscoggin River, and Runaround Pond.
- Adopt an Earth Removal Ordinance which requires mining and excavation operations over a certain size to submit site excavation and restoration plans. This ordinance should also require operations to be conducted in conformance with specific excavation and site restoration standards.
- Continue work to reduce the amount of road salt used, especially in ground water recharge areas. Strategies may include: emphasizing mechanical snow removal; mixing sodium chloride with calcium chloride and/or sand to reduce the total amount of sodium chloride applied; periodically re-calibrating salt spreaders to ensure that the correct mix is applied and posting reduced salt application areas.
- Encourage agricultural uses and homeowners to employ BMPs for manure, sludge storage and application, and pesticide, herbicide and fertilizer application.
- Adopt minimum standards, as prescribed by the State, for the Planning Board to follow in issuing conditional-use permits for tree cutting within Resource Protection zones.
- Establish an Open Space and Recreation Task Force and/or a Community Land Trust to accomplish activities such as: identify and prioritize parcels to be protected from future development using as criteria the land's importance to the protection of town character, ground or surface water resources, farmlands, scenic views, wildlife habitat, or recreational potential. Priority areas may include Runaround Pond, the Androscoggin River corridor, and Lauraffe Ledge.
- Protect key parcels through the purchase or donation of land, conservation easements, or development rights.
- Educate residents regarding approaches to open space protection including tax incentives such as the tax benefits of donating land for conservation easements.
- Seek land acquisition funding through State and Federal grants.
- Establish a capital reserve fund to purchase key open space parcels or easements.
- Connect open space and conservation lands through additional land acquisitions or easements.
- Require all subdivisions to set aside a percentage of the parcel as common open space.
- Catalogue existing trail systems (hiking, nature, snowmobile, cross country skiing, etc.) both in-Town and those connecting with adjacent communities, and encourage their preservation.
- Investigate whether the Town currently owns any parcels that could be sold and the proceeds used for the purchase of parcels with high open space value.
- Establish a Town Forest for the purposes of producing revenue from timber sales, protecting wildlife habitat and water quality, and providing recreation.
- Develop standards for maintenance, repair and construction of municipal storm drainage control facilities including ditches, culverts, road embankments in order to minimize erosion and sedimentation; develop standards for winter sand usage and removal.
- Inspect and maintain municipal storm drainage control facilities on a regular basis to ensure that they function properly.
- Work with surrounding towns to promote land use planning practices that protect the Royal River, Androscoggin River, and other common surface waters and watersheds, as well as common wetlands, wildlife corridors, and groundwater resources.
- Work with neighboring communities to establish a greenbelt along the Androscoggin River through acquisition of land and conservation easements.
- The Planning Boards of Durham and Pownal should be notified when development activities are proposed over, or will impact, shared aquifer resources, and collectively work to mitigate any negative

impacts on this resource.

- Route 136 and Route 9 pass over several aquifers in Town. These areas should be brought to the attention of the Maine Department of Transportation and alternatives to winter road salt application should be explored.
- The Town should work together with adjacent communities towards the protection and management of the Androscoggin. To this end, a representative of Durham should participate with the Lewiston-Auburn River committee in establishing inter-local cooperation.

7. FALMOUTH:

Information is taken directly from the "Town of Falmouth Comprehensive Plan - June 1988," prepared by the Town of Falmouth Comprehensive Plan Review Committee, Maine Tomorrow, and GPCOG; and reviewed and updated by George Theberge, Falmouth Town Planner.

Current Land Use Zoning: Zoning districts include three Residential Districts, one Suburban Business District, one Business Professional District, one Village Mixed Use District, one Mixed Use Cluster District, and one Farm and forest District. In all, there are eight separate zones with minimum lot size requirements ranging from 20,000, 40,000, 60,000, and 80,000 sq. ft. The past pattern has been for residential strip development along the major roads west of Rte. 295. Recent large scale development subdivisions have been located off the major roadway system and west of Rte. 9. Commercial strip development has occurred along Rte. 1, primarily between Rte. 88 and Johnson Road. In addition, some office park development is occurring along Rte. 1, northeast of Bucknam Rd. Agricultural land use has declined, following state-wide trends, down from 601 acres to 572 acres under active cultivation. There is no industrial development noted.

As the Plan states, "The current Zoning Ordinance is strongly biased in favor of low-density, high-cost, single family, detached housing. Other types of housing such as town houses, condominiums, multiplex, multi-family and manufactured housing are either discouraged or flatly prohibited." [This is still true.]

The Town currently allows a density bonus for developers who take actions, including but not limited to: (a) providing public access; (b) dedicating open space in mapped resource protection areas; (c) providing roadside greenbelt; (d) providing affordable housing as part of the project. In addition, zero side and rear lot line development and a lot size reduction is allowed, provided that the overall net residential density is not increased and that the net amount of open space is increased. Finally, innovative zoning techniques such as performance zoning and floating zones are considered to permit small lot sizes (e.g., 5,000-8,000 sq. ft. minimum lots similar to the side of existing house lots in the Foreside area) and maintain minimum housing design standards in these zones consistent with public health and safety.

Land Use Development Trends: Almost half of the land is classified as vacant land (8,653 acres), and just under 45% of the land (8,016 acres) was developed for residential uses. Commercially developed land occupies nearly 4% of the total land area, and agricultural land uses constitute 3% of land use. Seventy percent of the town's vacant land is located in rural areas, without public sewer or water. Vacant land that is available for commercial or office park development constitutes 9% of Falmouth's total vacant land area. Most of this land is within the Commercial District (563 acres). The Suburban Business or Business and Professional Districts contain 249 acres or 3% of the commercially vacant land. Commercial development in the Suburban district is limited by the flood plain of the Piscataqua River. In addition, there is currently no access to the commercially zoned property from the Falmouth spur of the Maine Turnpike, thus eliminating future commercial development there. Finally, future development along a portion of the Business and Professional District along Rte. 1 is limited by the Mill Creek flood plain.

Fifty percent (4,308 acres) of the land used for residential use is located in the Farm and Forest Zones. The Residential B District contains 2,032 acres (24%) of the residentially developed land, and Residential A District contains 1,218 acres (14%). The Residential C District has less than 3% of its land developed, with less than 50% of that available for development. Over 30% of the land (214 acres) in the Suburban Business Zone (Rte. 1) was developed for commercial uses and less than 9% of the land in the other commercial districts have been developed. The Residential B and C Districts have a significant amount of land occupied by commercial uses, 16.4% (108 acres) and 21.4% (142 acres), respectively.

To estimate the additional land available for development, the residential land was sorted according to its specific use. Parcels that contained one dwelling unit with 10 or more acres of land were selected.

Deducting the minimum 2 acre lot size, and with the remainder of the acreage identified as potentially available for development, it was found that 50% (4,267 acres) of the residential land could be further subdivided. In combination with other vacant land, 70% of the land in Falmouth is potentially available for development. This amount is reduced by an unstated number of acres which have been or will be found to be unsuitable for development. [As part of the future Plan update, a complete build-out will be performed.]

Water Quality Concerns: Falmouth is situated within the Presumpscot River Basin, with 14 watersheds draining into the river. Past studies of water quality have blamed road runoff, failing septic systems (many of which have since been replaced), and malfunctioning sewage treatment plants for problems in the basin. There are four watersheds that drain into Highland Lake: two in Windham, one in both Windham and Falmouth, and one in Falmouth alone. In addition, the edge of Highland Lake is surrounded by densely developed seasonal homes. The Mill Brook flows from Highland Lake to the Presumpscot in Westbrook. Meader Brook begins in Falmouth and flows into the Presumpscot in Westbrook. The Piscataqua River serves as a major tributary to the Presumpscot, beginning at Forest Lake, flowing through Cumberland to Falmouth. There is one large watershed for the Piscataqua River in Falmouth. While the River runs parallel to and is crossed twice by the Turnpike, there are large vacant and agricultural parcels of land abutting the river; in addition, there are very few homes adjacent to the river.

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operation, use and maintenance of septic systems and leach fields; natural resource and open space protection; proper storage and disposal of household hazardous wastes; recycling programs; application, storage, and disposal of pesticides, herbicides, fertilizers, soil conservation, good forestry management.

- Establish procedures for periodically inspecting existing septic systems and leach fields.
- Establish on-going reporting procedures designed to document the type location, and extent of septic system failures.
- Work with state agencies, environmental organizations and neighboring communities to establish a water quality sampling and monitoring program for significant surface water bodies including Chandler Brook, the Androscoggin River, and Runaround Pond.
- Adopt an Earth Removal Ordinance which requires mining and excavation operations over a certain size to submit site excavation and restoration plans. This ordinance should also require operations to be conducted in conformance with specific excavation and site restoration standards.
- Continue work to reduce the amount of road salt used, especially in ground water recharge areas. Strategies may include: emphasizing mechanical snow removal; mixing sodium chloride with calcium chloride and/or sand to reduce the total amount of sodium chloride applied; periodically re-calibrating salt spreaders to ensure that the correct mix is applied and posting reduced salt application areas.
- Encourage agricultural uses and homeowners to employ BMPs for manure, sludge storage and application, and pesticide, herbicide and fertilizer application.
- Adopt minimum standards, as prescribed by the State, for the Planning Board to follow in issuing conditional-use permits for tree cutting within Resource Protection zones.
- Establish an Open Space and Recreation Task Force and/or a Community Land Trust to accomplish activities such as: identify and prioritize parcels to be protected from future development using as criteria the land's importance to the protection of town character, ground or surface water resources, farmlands, scenic views, wildlife habitat, or recreational potential. Priority areas may include Runaround Pond, the Androscoggin River corridor, and Lauraffe Ledge.
- Protect key parcels through the purchase or donation of land, conservation easements, or development rights.
- Educate residents regarding approaches to open space protection including tax incentives such as the tax benefits of donating land for conservation easements.
- Seek land acquisition funding through State and Federal grants.
- Establish a capital reserve fund to purchase key open space parcels or easements.
- Connect open space and conservation lands through additional land acquisitions or easements.
- Require all subdivisions to set aside a percentage of the parcel as common open space.
- Catalogue existing trail systems (hiking, nature, snowmobile, cross country skiing, etc.) both in-Town and those connecting with adjacent communities, and encourage their preservation.
- Investigate whether the Town currently owns any parcels that could be sold and the proceeds used for the purchase of parcels with high open space value.
- Establish a Town Forest for the purposes of producing revenue from timber sales, protecting wildlife habitat and water quality, and providing recreation.
- Develop standards for maintenance, repair and construction of municipal storm drainage control facilities including ditches, culverts, road embankments in order to minimize erosion and sedimentation; develop standards for winter sand usage and removal.
- Inspect and maintain municipal storm drainage control facilities on a regular basis to ensure that they function properly.
- Work with surrounding towns to promote land use planning practices that protect the Royal River, Androscoggin River, and other common surface waters and watersheds, as well as common wetlands, wildlife corridors, and groundwater resources.
- Work with neighboring communities to establish a greenbelt along the Androscoggin River through acquisition of land and conservation easements.
- The Planning Boards of Durham and Pownal should be notified when development activities are proposed over, or will impact, shared aquifer resources, and collectively work to mitigate any negative

impacts on this resource.

- Route 136 and Route 9 pass over several aquifers in Town. These areas should be brought to the attention of the Maine Department of Transportation and alternatives to winter road salt application should be explored.
- The Town should work together with adjacent communities towards the protection and management of the Androscoggin. To this end, a representative of Durham should participate with the Lewiston-Auburn River committee in establishing inter-local cooperation.

7. FALMOUTH:

Information is taken directly from the "Town of Falmouth Comprehensive Plan - June 1988," prepared by the Town of Falmouth Comprehensive Plan Review Committee, Maine Tomorrow, and GPCOG; and reviewed and updated by George Theberge, Falmouth Town Planner.

Current Land Use Zoning: Zoning districts include three Residential Districts, one Suburban Business District, one Business Professional District, one Village Mixed Use District, one Mixed Use Cluster District, and one Farm and forest District. In all, there are eight separate zones with minimum lot size requirements ranging from 20,000, 40,000, 60,000, and 80,000 sq. ft. The past pattern has been for residential strip development along the major roads west of Rte. 295. Recent large scale development subdivisions have been located off the major roadway system and west of Rte. 9. Commercial strip development has occurred along Rte. 1, primarily between Rte. 88 and Johnson Road. In addition, some office park development is occurring along Rte. 1, northeast of Bucknam Rd. Agricultural land use has declined, following state-wide trends, down from 601 acres to 572 acres under active cultivation. There is no industrial development noted.

As the Plan states, "The current Zoning Ordinance is strongly biased in favor of low-density, high-cost, single family, detached housing. Other types of housing such as town houses, condominiums, multiplex, multi-family and manufactured housing are either discouraged or flatly prohibited." [This is still true.]

The Town currently allows a density bonus for developers who take actions, including but not limited to: (a) providing public access; (b) dedicating open space in mapped resource protection areas; (c) providing roadside greenbelt; (d) providing affordable housing as part of the project. In addition, zero side and rear lot line development and a lot size reduction is allowed, provided that the overall net residential density is not increased and that the net amount of open space is increased. Finally, innovative zoning techniques such as performance zoning and floating zones are considered to permit small lot sizes (e.g., 5,000-8,000 sq. ft. minimum lots similar to the side of existing house lots in the Foreside area) and maintain minimum housing design standards in these zones consistent with public health and safety.

Land Use Development Trends: Almost half of the land is classified as vacant land (8,653 acres), and just under 45% of the land (8,016 acres) was developed for residential uses. Commercially developed land occupies nearly 4% of the total land area, and agricultural land uses constitute 3% of land use. Seventy percent of the town's vacant land is located in rural areas, without public sewer or water. Vacant land that is available for commercial or office park development constitutes 9% of Falmouth's total vacant land area. Most of this land is within the Commercial District (563 acres). The Suburban Business or Business and Professional Districts contain 249 acres or 3% of the commercially vacant land. Commercial development in the Suburban district is limited by the flood plain of the Piscataqua River. In addition, there is currently no access to the commercially zoned property from the Falmouth spur of the Maine Turnpike, thus eliminating future commercial development there. Finally, future development along a portion of the Business and Professional District along Rte. 1 is limited by the Mill Creek flood plain.

Fifty percent (4,308 acres) of the land used for residential use is located in the Farm and Forest Zones. The Residential B District contains 2,032 acres (24%) of the residentially developed land, and Residential A District contains 1,218 acres (14%). The Residential C District has less than 3% of its land developed, with less than 50% of that available for development. Over 30% of the land (214 acres) in the Suburban Business Zone (Rte. 1) was developed for commercial uses and less than 9% of the land in the other commercial districts have been developed. The Residential B and C Districts have a significant amount of land occupied by commercial uses, 16.4% (108 acres) and 21.4% (142 acres), respectively.

To estimate the additional land available for development, the residential land was sorted according to its specific use. Parcels that contained one dwelling unit with 10 or more acres of land were selected.

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Infrastructure/ C.I.P. Issues Related to Water Quality: For groundwater resources, Falmouth has both bedrock, and sand and gravel aquifers. Thirteen of the former have been identified west of Rte 1. Two-thirds of the respondents to a survey have bedrock wells. There were excessive concentrations of coliform bacteria, nitrate, chloride or iron in 29% of the wells. The most frequent contaminant was iron from soil and bedrock. Only 6% of the wells had high bacteria counts, and 6 wells were contaminated by chloride from road salt or septic systems. There are two sand and gravel aquifers in the town. One is located near the Cumberland/Falmouth line, and parallel to the Turnpike. The other encompasses the Presumpscot River and then follows the east Branch of the Piscataqua. A Bedrock Aquifer Study for Falmouth was performed, and addressed failed septic systems, underground storage tanks, road salt storage, and municipal landfills.

Falmouth's sewer system has been recognized as one of the best in the area. Operated as an enterprise fund, supported by user fees (\$125 semi-annual), it is in sound financial condition. Physically, the system continues to operate at only one half of its design capacity. In unsewered areas, growth is limited by the 80% of the town's land which is characterized by soils that are unsuitable for septic systems. In addition, sewer impact fees are charged of developments to fund sewer extensions only, not system wide maintenance or development.

Some sewer lines in the town's system are privately owned, and are not under the direct supervision of the town. These include lines in three developments. In addition, the location of the privately owned lines in the Old Powerhouse (Benoit) System which were previously unknown, and "may run underneath some of the homes," are in the process of being improved and accepted by the town as the last major privately owned system. The Town currently requires easements and the upgrading of private lines prior to their being accepted by the community.

Approximately 80% of the residents receive their water from the Portland Water District, which has statutory authority to review all plans for subsurface sewage disposal systems around Sebago Lake, and to inspect cottages around the lake for septic system infractions or failures. Several water lines in the town have been upgraded. Finally, like Cumberland, the Portland Water District cannot service lot elevations greater than 180 feet above sea level without an expensive booster station and standpipe construction. This has not deterred development, as private wells and septic systems can be used.

Implementation Strategies:

- Direct the long-range planning committee to research and designate appropriate or preferred areas for growth and to design incentives to direct growth to those areas. [This is part of the Plan update, whereby the fiscal impact and build-out analysis, i.e. implications, of the growth and rural areas will be examined.]
- Continue development prohibitions contained in the Town's current ordinances, and continue to require that coastal wetlands be excluded from zoning density calculations.
- Consider zoning coastal wetlands as resource protection districts.
- Enact regulations to limit timber cutting adjacent to the Town's major rivers and streams.
- Continue to exclude wetlands from residential density calculations.
- Ensure that the storage of petroleum and hazardous materials is consistent with the most current technology.
- Develop an aquifer protection ordinance.
- Continue to protect groundwater.
- Maintain large lot size requirements in marginal soil areas where there are not sewers.
- Continue to require high intensity soil tests for on-site, subsurface sewage disposal systems, and continue to exclude from density calculations soils which are classified as very poorly drained, or poorly drained and having a slope of less than 3%. [Planned to be part of the revised subdivision ordinance.]
- Continue to exclude slopes of 25% from net residential area calculations.

- Review and clarify ordinance provisions regarding cutting and filling.
- Continue the strict regulation of land use activities adjacent to the Town's major water bodies.
- Seek to improve water quality, particularly as related to wastewater and stormwater management.
- Guide residential development towards land which has the capacity (i.e., appropriate soils, water or which has existing water and sewer lines) to absorb that development, but away from areas which, because of resource, scenic or open space value are inappropriate.
- The Long Range Planning Committee, as proposed, should review zoning densities in all zones and recommend to the Council any changes necessary to come into conformity with the Comprehensive Plan.
- Maintain existing zoning requirements, encourage light manufacturing in well planned developments along the Rte. 1 and Rte 100 corridors, and require suitable utilities and transportation access.
- Require any industrial uses to strictly control possible toxic and hazardous materials handling and discharges by requiring state-of-the-art containment methods.
- Encourage the retention of farmland by the creative uses of clustering and other open space preservation techniques, including significant property tax incentives, outright purchases, and deed restrictions. [This is being accomplished through the Conservation Commission and Land Trust.]
- Provide sewage discharge facilities for boat holding tanks, possibly in conjunction with existing private facilities. [This has been done.]
- Continue to acquire private sewer lines.
- Continue the policy of requiring that new sewer lines be public lines.
- Extend sewers into those developed areas that (1) have existing environmental problems, due to poor soils and malfunctioning septic systems, and (2) those areas where sewer extensions would serve the Town's land use goals. [Three extensions have been accomplished since 1989.]
- Extend public sewers to newly developing areas adjacent to the existing sewer service area when developers are willing to pay the cost. Such a policy should not encourage or promote extensions into environmentally sensitive areas or land areas with development limitations.
- Mandate sewer connection for all new subdivision and commercial buildings located within close proximity to an existing sewer line. [This is being reviewed for cost effectiveness.]
- Encourage the use of the Falmouth system, rather than the Portland Water District system, when lines are extended to the Allen Avenue Extension/Pleasant Hill, and Gray Road areas.
- Revise the town's ordinances to ensure that the use of the cluster or other off-site subsurface systems does not result in greater residential densities than allowed under traditional single lot subsurface disposal systems. [This has been done as part of the Subdivision Ordinance Review process.]
- Require that appropriate groundwater standards be met at lot boundaries. [Accomplished through Subdivision Ordinance Review process.]
- Encourage the Portland Water District to extend water lines to West Falmouth.
- Work with the Portland Water District to upgrade the water system in West Falmouth.
- Enact a subdivision provision requiring that in new developments outside the water service area and at elevations higher than 180 feet, developers demonstrate the availability of a safe and adequate supply of ground water.
- Maintain low density in those areas where public water is not available.
- Work closely with the Portland Water District to ensure that the Water District's planning process is compatible with the Town's long range planning goals.
- Inventory existing facilities and establish level-of-service standards.
- Analyze the ratio of population within the service area to the available facilities, and compare with the level of service standards to identify excess capacity and deficiencies.
- Analyze the costs of providing specific levels of service;
- Establish a fee system to require applicants to pay for that portion of their project impact that exceeds the established standards. [This has been institutionalized through the impact fee system.]

8. FREEPORT:

Information on all but current land use zoning is taken directly from *The Town of Freeport Comprehensive Plan, 1991*, prepared by the Growth Management Group. Subsequent revisions to the section were provided by Jacki Cohen, Town Planner for Freeport.

Current Land Use Zoning: There are 23 separate zones throughout town where minimum lot sizes of 8,000, 20,000, 50,000 square feet, 1 acre and 2.5 acres may apply.

Land Use Development Trends: Historically, development in Freeport centered around several identifiable village areas. People began vacationing on Freeport's islands in the late 1880s, however, it wasn't until the 1950s when the proliferation of automobiles and the creation of I-95, which cut through the town, caused the population to spread out in small houses and trailers along the roads into traditionally rural areas. Over the past decade, there has been a large amount of housing growth in the form of single family structures on individual lots scattered throughout the town. The plan notes that "in contrast to other greater portland suburban communities, much of the single family development occurred on individual lots, and not in multi-lot subdivisions." Since 1980, most single family growth has occurred west of I-95, while multifamily development has taken place east of I-95, close to the village and served by public water and sewer.

Existing land use is primarily residential, with concentrated areas of commercial uses located east of I-95 on public sewer and water. Land west of I-95 is less intensively developed, however, there is an area that is zoned for an industrial park. Over the past 10 - 20 years, Freeport changed from a community with a large manufacturing base and small retail stores into a major destination shopping center with little manufacturing activity. There is little remaining land in the downtown area to accommodate further commercial and retail growth and "an increasing desire to diversify the economy" (presumably to increase the manufacturing base).

An estimated 80% of the town is undeveloped (residential 17%, commercial 1%, industrial 1%, public/infrastructure 1%, forest/other undeveloped 81%). The plan notes that 5,131 acres (22% of Freeport's total land area) are in the tree growth tax program and that much of this land has been enrolled long enough so that large financial penalties would occur if withdrawn. The plan concludes that it is likely that most of the land will remain in the program for the next 5 - 10 years.

Water Quality Concerns: Freeport has some of the most productive clam flats in Maine, yet many are closed due to failing septic systems and non-point source pollution. The Town's Conservation Commission has funded studies to detect pollution sources. Several pollution problems related to stormwater runoff have been identified for the Commission by Robert Gerber, Inc. These studies have served as a basis to convince EPA's Casco Bay Estuary Program to undertake a major stormwater and surface water quality study. The exact source of coliform causing shellfish closures is unknown (except in an area where its clearly the sewage treatment plant). It is suspected, however, that the primary source is coming from failing septic systems and overboard discharges (there are 6 overboard discharges in Town). The Royal River in Yarmouth may also be influencing the water quality in the Cousins River, since water from the Royal River flows into the Cousins River on the incoming tide. Freeport's primary watershed is for the Harraseeket River which drains 10,500 acres of land and which flows to Casco Bay.

Groundwater protection is also a concern. A 1986 study by Robert Gerber Inc. identified potential bedrock aquifer locations, however, the locations were not substantiated by field checks. Without additional information and research, Freeport cannot regulate its bedrock aquifers (it is noted that a future public water source may need to be from a bedrock aquifer).

The Department of Human Services (DHS) inventory of point source discharges includes: 1) Freeport Sewer District Outflow to the Harraseeket, 2) A subdivision which contributes up to 6,000 g.p.d from a sand

filter system to Harvey Brook, 3) Freeport Sewer District leachate (1.35 mill. gals/yr) from the old town landfill which is spray irrigated onto open fields, and 4) residential discharges for houses on Bustins, Flying Point Road, Wolfneck Road, and near the Cousins River.

Freeport's plan lists the following mechanisms for natural resource protection - aquifer protection regulations, open space preservation regulations, net residential acreage calculations, and two local conservation organizations to preserve resources and acquire open space. The plan states that current zoning provides some degree of protection of natural resources, but many significant natural resources such as smaller streams, aquifers that are not currently used for public drinking water, and wildlife habitat are not protected by local regulations. Stronger wetlands regulations are needed.

Infrastructure/ C.I.P Issues Related to Water Quality: Freeport's sewer system is provided and managed by the Freeport Sewer District, a nonprofit, public utility. The sewer system serves approximately 800 accounts and its boundaries extend to cover all of the downtown business district. Outlying areas are served by individual septic systems. The system's capacity of 500,000 gallons per day has been exceeded and the plant is currently at capacity. System upgrades to control inflow and infiltration are required to meet future capacity needs. The system may also need to be expanded. The sewer connection fee is \$5,000. Sewage sludge is spread on fields in Freeport.

Freeport has two categories of stormwater controls: 1) open drainage, such as roadside ditches, drainage channels and roadway culverts, and 2) enclosed drainage systems consisting of catch basins, manholes, and connecting piping. The condition of open systems is relatively good. These facilities are generally maintained and upgraded by the Public Works Department (PWD) as part of normal road maintenance, and are located primarily in the rural parts of town. New systems associated with new subdivision roads have expanded the rural storm drainage system. Enclosed drainage is in the downtown area. Commercial growth has not had a big impact the enclosed system since the town's ordinances require development to detain flows to pre-development levels. The town-owned systems are expected to work satisfactorily over next five years. Part of the covered system is state maintained (by the Department of Transportation - DOT). Currently, new connections onto the state maintained system are not allowed, and some sections are old and in poor condition. The condition of the State's storm drain tributaries at the outfall of enclosed systems are of particular concern, since flows from these outfalls are causing, through erosion, the creation of deep gullies with steep sided slopes.

Implementation Strategies:

- Use whatever local tax or land management incentives that are at the Town's disposal to encourage the preservation of Freeport's agricultural land, forest land and open space.
- To the maximum extent permitted by law, provide property tax relief to landowners who preserve open space through the State's Farm and Open Space Tax Law, Tree Growth Tax Law, or who conduct and maintain agricultural and forest activities. This should include directives to the Assessor that such classifications do not per se increase the value of the existing homestead.
- Confirm with the state's "Model Subdivision Regulations for Small Towns" that Freeport has the best possible performance standards for preservation of open space.
- Support those private and public organizations that can assist in the preservation of Freeport's open space and rural character. In this regard, the Town should fund its Land Bank so that it is in a position to purchase fee interest or easements on significant areas, as well as development rights to significant parcels.
- Encourage the possibility of establishing walking trail systems in Freeport, working with private organizations such as the Freeport Conservation Trust, with adequate public access that will permit passive recreational uses for residents.
- Map and protect the function and value of all wetlands over 20,000 square feet in aggregate size. This protection should include wetlands that cross property lines and also apply to smaller wetlands

- ($<20,000$ sq. ft.) if their alteration would result in a negative cumulative impact within a watershed.
- Recognize importance of a critical edge buffer around all protected wetlands (class I and II, under the Maine classification system).
 - Institute an ordinance that establishes a procedure for the review of proposed alterations to protected wetlands.
 - Encourage consistent protection of wetlands that extend beyond the Town's boundaries.
 - Accurately identify and map Freeport's aquifers and aquifer recharge zones.
 - Draft an ordinance that would establish standards to require applicants to prove that the proposed development will have no adverse impact on any aquifer.
 - Correct existing water quality problems, such as failing septic systems and leaking underground storage tanks.
 - Analyze impact of existing stormwater collection and disposal system on Freeport's ground water areas.
 - Work with neighboring communities to identify and resolve threats to groundwater.
 - Work with Pownal and Yarmouth to establish zoning and other land use controls that will protect the shared aquifer and aquifer recharge area from future degradation.
 - Adopt a new shoreland zoning ordinance that regulates development and land uses in and near Freeport's shoreland (which meets or clarifies the minimum State standards). Standards to be included in the new ordinance should include but not be limited to timber cutting and harvesting, appropriate development densities, conversion of seasonal residences to year-round use, strict septic system requirements, and dimensional variances.
 - Determine effect of stormwater drainage system on Harraseeket River.
 - Enclose the Town's salt and sand piles, to prevent infiltration.
 - Work with Yarmouth to protect Cousins River which is a mutually shared resource.
 - Encourage, where appropriate, the creation of easements or transfer of land ownership to create a connected network of significant wildlife habitats.
 - Strictly limit development in, and develop strong performance standards for, areas that are both prone to "slumping" and have slopes of 15% and greater, through revisions of the shoreland zoning provisions and/or the net residential acreage formula.
 - Implement performance standards that reduce erosion and sedimentation.
 - Develop performance standards to ensure that construction of new wells and septic systems will not adversely affect groundwater used as public and private drinking water supplies.
 - Extend the sewer and water lines to the designated future residential and commercial growth areas, as the demand arises, the major costs of which will be borne by developments that require these extended lines.
 - Work with the Town of Yarmouth to promote the extension of a Yarmouth sewer line to the Freeport Inn property, in order to rectify their existing septage problem.
 - Continue improving the public stormwater drainage systems.
 - Maintain or improve the water quality of Freeport's coastal waters. Continue participation in the implementation of the Casco Bay Estuary Project. Its goals will be considered in the next Comprehensive Plan.
 - Encourage compliance with federal, state and local regulations regarding overboard discharge systems.
 - Work with neighboring towns to identify and work toward elimination of point and nonpoint sources of pollution that negatively impact shellfish harvest areas.

10. GRAY:

Information on all but current land use zoning is from the *Town of Gray Draft Comprehensive Plan, October 18, 1990*, and from Richard Cahill, Gray's Town Planner.

Current Zoning: There are 10 separate zones requiring minimum lot sizes of 40,000, 80,000 square feet or 4 acres (in aquifer protection areas).

Land Use Development Trends: From the 1800s to the early 1900s there were distinct communities within Gray. During the 1900s, summer cottages developed along the lakes and today, the seasonal population continues to be a large factor. The 1980 census found that nearly 32% of the housing stock was seasonal; if all units were occupied, at the time, the population would have increased by 1,800 to 2,000. In the last 13 years, most of the growth has occurred in the west side of town between the turnpike and Little Sebago Lake. Development has also occurred in a linear fashion along major roads. "Areas which were once isolated areas of "leapfrog" development have served as a seed for new areas of linear development." Roughly 21,000 acres of land remain undeveloped. If all undeveloped land were developed at the Town's largest minimum lot size (4 acres per lot), another 5,166 homes could be built. Regardless of the designated zoning districts, single family residential development is the dominant land use, even in the commercial zones. Of the 2,930 developed acres in town 2,664.5, or 91%, are devoted to single family residential use. Another 42 acres are developed as multi-family and there is one 64 acre mobile home park. Of the 2,465 residential lots in Gray, 773, or 31.4% do not meet current acreage requirement of the zone in which they are located. The vast majority of these are the lake front properties around Crystal Lake and Little Sebago Lake. (Minimum lot size is 80,000 sq. ft. and most lots are on the order of 6,000 to 8,000 sq. ft.).

In terms of commercial development, 29.4% of the 32.5 acres that are developed do not meet current minimum lot size requirements. Additionally, the existing commercial zone which is located in the village area, lies over the Town's current source of water. This area is now protected by a Village Aquifer Zone. And the plan notes that the area is already overbuilt according to current aquifer protection standards. Gray is in the process of developing a commercial park around the new turnpike spur.

Water Quality Concerns: The primary water quality concern in Gray is groundwater contamination. The Town's major water source was contaminated by the McKin site - an EPA Super Fund site which has been cleaned up. The Town's dump is located in the recharge area of the current water supply. A proposed commercial park is tentatively located near this recharge area. The maximum "safe yield" for this aquifer is 432,000 g.p.d. which could serve roughly 2,600 homes (the District currently has 800 customers). The search for a new water source is a top priority. Most of Gray's developed land areas are located above the town's major aquifers. Although existing development is a problem, the plan notes that "The creation of the Crystal Lake Aquifer and the Village Aquifer Protection Districts are a major step toward conserving future water supplies." Sources of aquifer pollution are identified and summarized on the Threats to Ground Water Map.

The plan notes that three lake watersheds are located in Gray's boundaries, and portions of 3 major watersheds are located in Gray: 1) the Pleasant River which flows to the Presumpscot, 2) the Piscataqua River, which flows to join the Presumpscot just west of its Casco Bay Estuary, and 3) Royal River which also flows to Casco Bay.

Infrastructure/C.I.P Issues Related to Water Quality: Gray is not sewered. This could be a problem since the village is located directly over the recharge area of the town's central water source. Water quality for both surface and ground water sources may be threatened by the fact that existing lots in the village and around the lakes are extremely small and there is concern about septic contamination. Almost one-third of the existing lots do not meet current acreage requirements. The majority of the nonconforming lots occur in the village center in the aquifer recharge zone. There is an ordinance to protect the recharge area, however, it

was adopted after most of the area had been developed. Although the plan notes that development in the aquifer protection zone already exceeds calculated development limits, the plan concludes:

"At this point in time there is not a clear threat to our water supply which would make providing a sewer system cost effective. Should there come a time when the threat is clear and a new sewer system can best eliminate that threat, we will reconsider the planning of a system. "

In the meantime, Gray proposes to "maintain and improve the village center as the primary focus of commercial activity in the town." This is accompanied by a strategy to "develop an adequate service plan for the Village center which ensures that development in and around the village center does not contaminate the aquifer." The strategy is unclear in explaining how ground water protection will be provided while commercial activities and further growth is encouraged.

Implementation Strategies:

- Prohibit storage of hazardous materials over aquifer; establish a periodic review and update of hazardous waste regulations.
- Ensure that the townspeople are kept informed of the status of the McKin Site cleanup and encourage and support the study of the health effects of the McKin site.
- Provide public educational materials and programs concerning issues related to lake detriment including the importance of well water testing and septic tank maintenance.
- Work with the Gray Water District to clearly establish the capacity of the public water supply to meet local and regional needs and incorporate such capacities into all ordinances regulating growth.
- Work with the Gray Water District on the Wellhead Protection Program.
- Continue to search for and secure a second drinking water source.
- Develop a mechanism for ongoing coordinated review of changes to Aquifer Protection and Village Aquifer Protection Districts to maintain the quality of present drinking water supply.
- Develop a program to identify present and potential sources of pollution and recommend immediate remedial action to correct the problems. Three areas of concentration would be septic system failure, submerged fuel tank leakage and road salt concentrations.
- Review all local ordinances to determine adequacy to protect existing aquifers, water bodies, wetlands, floodplains from pollution or other types of physical and aesthetic destruction; adopt new regulations, if necessary.
- Devise a Comprehensive Water Quality Testing Program for Gray which includes all streams, rivers and lakes to ensure that the Town meets and/or exceeds State water quality standards. The Comprehensive Water Quality Testing Program for Gray should establish the town as the coordinator of results, and take advantage of all existing technical resources available from the State, regional entities, lake associations and/or universities. The results should be summarized for the public in an annual report.
- Require a hydrogeologic assessment before major development to predict the impact on water quality of phosphorous, coliform bacteria, nitrates and nitrites with an annual testing program set up by the developer and monitored by Town Officials. Information should be shared and evaluated by Town Officials and the Gray Water District.
- Monitor the condition of wetlands on an annual basis.
- Strengthen regulations pertaining to seasonal conversions which pose potential lake pollution problems.
- Review the regulations and enforcement of the expansion and opening of new sand and gravel pits to ensure that environmentally sound extraction practices are followed.
- Map watershed areas of the Town's water bodies and incorporate into Town ordinances the development capacities established for each watershed in Gray from the DEP Phosphorous Loading Model.
- Locate and map all submerged fuel tanks; monitor annual testing as required by State Law and maintain contact with the State as data is gathered.

- Work with the State Department of Transportation, Maine Turnpike and local government to minimize and ultimately eliminate the use of salt on the section of the Maine Turnpike that runs through Gray, especially in environmentally sensitive areas.
- Require erosion and sedimentation control during construction
- Require ponding and other forms of runoff retention for new development where appropriate to address phosphorous and other pollutants of lakes.
- Minimize impervious cover of land in new development and develop alternatives for the treatment of drainage from extensive pavement.
- Establish a maintenance program for all drainage systems in town.
- Review and revise current drainage standards in ordinances and enforce standards.
- Evaluate existing drainage patterns within the Town and modify as necessary to ensure no threat to water quality and the local environment.
- Review allowable uses in the Village Center to ensure that additional gas stations and other traffic intensive uses are prohibited.
- Direct additional intensive nonresidential uses to locate away from the Village Center due to development constraints of the aquifer.
- Direct growth to areas which are contiguous to current development to prevent sprawl.
- Direct growth to areas which are free from significant environmental impacts.
- Direct growth away from Lake Areas which are already overbuilt according to current zoning regulations.
- Until/unless a sewer system is built, recruit businesses which do not require a sewer facility.
- Utilize the Gray News, public television, and other local and regional media to educate and inform the townspeople on environmental issues and programs.
- Encourage local schools to educate young people on conservation issues, and assist in developing specific educational programs for all grade levels.
- Provide for the participation on environmental and waste management issues by Town members of local, regional and State seminars, workshops, lectures, etc.
- Quantify the importance of natural resources, their carrying capacity and their ability to survive the impact of development.
- Prohibit the discharge of sewage effluent which would lower water quality.
- Develop a septic tank ordinance to address the cumulative impact of septic waste on water quality which includes guidelines for cluster systems, seasonal conversions, outdated septic systems and tank pumping.
- Coordinate the designation of business zones with the development of any improvements of the sewage collection system.
- Develop an ongoing informational mechanism by town boards and administration regarding septic system codes, citizen responsibility, informational and assistance resources, and methods of correction of system failures.
- Regularly investigate alternative methods of sewage collection and treatment and employ the best combination of sewage systems obtainable for the Town.
- Continually seek significant financial resources which could be used for the development of a sewer system which would improve natural environmental conditions or alleviate/prevent environmental degradation.
- If the need for a sewer system becomes evident, examine various sewage collection methods, disposal areas, and financing techniques.
- Develop standards and guidelines for the use of sludge within town limits.
- Establish provisions for tax reduction and/or elimination in exchange for a) easements or deed restrictions preserving forests, wildlife habitats and watershed areas and/or b) the conservation of valuable natural resources.

Several open space incentives are also included.

11. HARPSWELL:

Information on all but the current land use zoning is from the "Harpwell Comprehensive Plan Draft Goals and Policies (10/8/92)," written by the people of Harpswell and reviewed by Beth Della Valle of Market Decisions.

Current Zoning: There are currently five zoning districts; two residential districts ("RA" & "RB"), a business zone, commercial fishing and industrial district, and a resource protection district. The minimum lot sizes for both the "RA" & "RB" zones is 20,000 sq. ft. In the Shoreland Zone, there are five zones: Resource Protection, Shoreline residential, Shoreline Business, and Commercial Fisheries I & II. With the exception of the requirement of 60,000 sq. ft. for each commercial structure within the Shoreland Zone adjacent to non-tidal areas, and no required minimum lot size for the Commercial Fisheries I & II adjacent to tidal areas within the Shoreland Zone, the minimum lot size is 40,000 sq. ft.

Land Use Development Trends: Harpswell grew during the 1980s, with an increase of almost 600 additional housing units, with an average rate of 30-40 new units per year in the first half of the decade. Based on growth projections, the number of households will double in about twenty-five years. While some development occurred in new subdivisions, a substantial amount occurred on a lot-by-lot basis, thus creating "suburban sprawl." Thirty-five to forty affordable units will need to be added to the Town's housing stock over the next decade to satisfy the State goal of 10% affordability.

Despite the historical development of Harpswell from a series of fishing villages, the majority of services for shopping and employment are now provided outside the town, with Brunswick being the primary retail center. As a result of its isolation, nonresidential uses in Harpswell are typically scattered throughout the town, with tourist businesses most heavily concentrated along Rte. 24 on Orr's and Bailey's Islands; but, a significant level of development occurred in the 1980s along the town's two major road. A small farming community remains in Harpswell Neck.

The draft Plan as offered by the community presents two strategies related to town-wide minimum lot sizes: Proposal One calls for one acre in the Shoreland Zone, one half acre in the interior, and two acres in subdivisions; Proposal Two calls for one acre in the Shoreland Zone, one acre in the interior, and two acres in subdivisions. Both call for a density bonus for cluster/open space developments. The draft Plan also relies heavily on State Shoreland Zoning minimums or Plumbing Code restrictions.

Water Quality Concerns: This is the central most important issue facing Harpswell, and all future development appears to hinge on the availability of good water quality. The town relies completely on groundwater as its source of drinking water, and there is a high incidence of saltwater intrusion, dry wells during the summer, and isolated cases of high nitrate concentrations in the groundwater, possibly from failing septic systems. According to the 1982 study by Gerber and Rand, 90% of the town's water supplies are from individual wells drilled into bedrock aquifers, with the remainder shallow dug wells. In addition, there is grouping of wells affected by salt-water intrusion on Potts Point, Bailey Island, the southern end of Orr's Island, and the eastern side of Cundy's Harbor, with a total of 21 wells reported to be contaminated by salt.

There are a number of common private wells serving multiple users, but there is little information about how many of these there are and what protective measures are being taken. In addition, little is known about the water quality in the streams which drain into the ocean. There are potential high yield sand and gravel aquifers near South Harpswell, Merriman Cove/Harpwell Center, and on Bailey Island. The Plan adeptly notes that, "While development does diminish the quantity of groundwater recharge to the aquifers, and especially so with dwellings grouped on half-acre lots and closer, the potential impact on water quality is notably greater."

The Plan calls for the use of the State Shoreland Zoning minimum lot size of 40,000 sq. ft., while the State Plumbing Code utilizes maximum separation distances between wells and septic systems and maximum septic loading within 300 ft. of a domestic well. The soils which occur in Harpswell are the Suffield-Hollis-Buxton types, all of which present severe limitations to growth, specifically insofar as septic/sewage systems are concerned.

A 1987 listing noted in the Plan indicates that there were 47 underground fuel storage tanks; of these, 14 were located at the Defense Fuel Service's Casco Bay tank farm. A 1991 DEP listing notes that 73 tanks are registered in the town. Historic locations of tanks have been determined through recent surveys, but the "subsequent fate of the tanks was not determined." While many of these tanks have been removed, the Plan does not note any specific numbers.

The Plan also notes six major water quality issues: (1) the existence of a few areas of sustained, low level groundwater contaminations by petroleum; (2) incomplete information of the past locations and disposition of certain known or suspected in-ground petroleum storage tanks; (3) isolated cases of high nitrate concentrations in groundwater possibly related to malfunctioning septic systems; (4) inadequate knowledge about the management of share water supplies for which responsibility and protection may or may not be adequate; (5) the apparent increases in the number of wells affected by saltwater intrusion on Bailey Island, the southern end of Orr's Island, and Potts Point; and (6), the existence of sixty shallow groundwater sources of which only 9 (15%) require treatment.

Infrastructure/C.I.P. Issues Related to Water Quality: Just as groundwater quality is a crucial issue governing Harpswell's growth, so too are the issues of septic systems and overboard discharges. Given that the soils are so severely limiting for subsurface disposal systems, Harpswell faces the challenge by using two three major elements: (1) adoption of a townwide minimum lot size; (2) adoption of performance standards for certain uses and areas (new uses, significant expansions other than single family homes, and activities in sensitive areas to demonstrate compliance on a case-by-case basis); and (3) controlling development where roads or access are not adequate to service the development. The two most important soil properties for Harpswell are: the ability of soil to treat ("renovate") wastewater in subsurface sewage disposal systems, and the permeability of the soil in allowing precipitation to migrate down and recharge the groundwater.

Insofar as marine water quality is concerned, Harpswell (like Brunswick) has a tremendously valuable local resource. In addition to the thirteen clam flats which are preferred for commercial clam digging, the town issues the largest number of commercial lobster licenses of any other town, with an industry serviced by at least nine commercial fishing wharves. During the last twenty years, commercial menhaden seining has increased, with a more recent increase in harvesting of sea urchins. These flats cover over 200 acres, with half of this considered "prime", holding approximately 10,000 bushels of clams, or about 95 bushels/acre. Given a low market price of \$55/bushel, these flats could produce more than \$560,000 worth of clams per year.

The Plan notes that "the area between White's and Scrag Islands is probably one of the most productive clamming areas in all of Casco Bay, while the flats on the northern end of Birch Island, support the greatest density of clams found anywhere in town." Harpswell is also involved in a regional shellfish management program, in cooperation with Brunswick and West Bath. There are, however, a number of productive flats which are closed by the DMR, due to excessive fecal coliform bacteria counts, and closures in compliance with Interstate Shellfish Sanitation Conference rules.

Implementation Strategies [DRAFT - from Goals & Policies]:

- Manage the intensity of development so that the "carrying capacity" is not exceeded.
- Adopt performance standards for certain uses and areas to protect groundwater from contamination by salt, bacteria, nitrates, petroleum, and other potential hazards.
- New uses and significant expansions, other than single family homes and activities in sensitive areas,

should be required to demonstrate compliance with performance standards on a case-by-case basis, among them multifamily residential uses, uses with high daily volumes, uses in areas with existing water quality problems, uses which propose common water and/or sewer systems, and new large-scale residential projects involving 10 or more acres.

- Limit development in areas with current salt water intrusion problems by requiring adherence to performance standards designed to protect groundwater recharge and limit groundwater contamination.
- Limit the replacement of existing residential uses located on lots which don't meet the town's minimum lot size requirements, using performance standards as noted above.
- Limit the expansion of existing residential uses on lots not meeting the town's minimum lot size requirements by limiting the number of bedrooms unless performance standards are met.
- Adopt performance standards governing recharge of groundwater, to protect groundwater from contamination by salt, bacteria, nitrates, petroleum, and other potential hazards, as well as not allowing the coverage of more than 20% of the lot with impervious surface.
- Encourage common water and/or sewer systems in problem areas and developments that propose cluster or open space development, notwithstanding the minimum lot size.
- Prohibit the continuous "mining" or withdrawal of groundwater for use in heating or cooling systems or for industrial or commercial process water.
- Enforce sewage disposal regulations. Provide oversight of sewage disposal systems that are malfunctioning or illegal.
- Identify existing "shared" water supplies in the community.
- Identify particularly important watersheds which drain into flats.
- Continue the annual survey of the more commonly harvested flats in order to evaluate the resource and appropriate protection levels.
- Consider a program to eliminate all overboard discharges and malfunctioning septic systems.
- Adapt the development density to a level that is appropriate to the physical capacity of the natural resources to support that use, with special attention paid to the off-shore islands.
- Restrict development in areas where public facilities such as roads or access are not adequate to service the development unless provisions are made for upgrading those facilities.
- Encourage cluster/open space development in larger residential developments of 10 or more acres.
- Base minimum lot sizes for residential uses such as apartments on 120 gallons of wastewater generated per day/per bedroom.
- Development standards should address: building site placement, road and open space lay-out, septic system installation, the provision of adequate site access, and the setback/buffering of structures from major roadways to preserve the open quality of those roadways.
- Projects which use more than 1,000 gallons of water per day shall be required to demonstrate compliance with water quality performance standards.
- Require all new and expanded nonresidential uses be reviewed and approved by the Planning Board.
- For uses which generate more than 300 gallons of sewage per day or generate or handle unusual or hazardous types of waste should be required to demonstrate compliance with water quality performance standards.
- Require the developer to demonstrate that the site has adequate water supply and sewage disposal, and that the proposal demonstrates that surface drainage will be disposed of without adversely impacting downstream properties.
- Direct future growth to "suitable areas" of town, areas that do not have existing groundwater quality or quantity problems, unsuitable soils for septic disposal, or valuable marine resources.
- Require the developers of large, residential projects to set aside an area as permanent open space.
- Explore the concept of a land transfer tax to be used to fund the acquisition of open space.

12. NEW GLOUCESTER:

Information on all but the current zoning is from *The Town of New Gloucester Draft Comprehensive Plan, January 1991*, Greater Portland Council of Governments. The section was updated by Pheobe Hardesty, New Gloucester Subcommittee on Water Resources.

Current Zoning: Farm and Forest District - 5 acre minimum; Rural Residential District - 2 acre; Village - 1 acre; Aquifer Overlay Zone.

Land Use Development Trends: One of the goals in New Gloucester's plan is to encourage a land use pattern that preserves natural and historical areas, the rural character and eliminates the current pattern of development sprawl. The plan states that New Gloucester should "Maintain its land use pattern of traditional rural countryside and village centers through a clear distinction between different zoning districts." A major objective of the previous town plan was to limit development in the Farm and Forest District. This was done by implementing a 5 acre minimum lot size which has been successful to a limited extent because more of the recent development has occurred in the Rural Residential District (between 1986 and 1990, 207 of the total 376 developed acres or 55% were located in the Rural Residential Zone and 32% were in the Farm and Forest Zone). Much of the town is zoned for a 2 acre minimum lot size - a zoning technique described in the plan as doing "very little to direct growth and arguably contributing to sprawl". In 1989, total developed land was calculated to be 10% of the total land in town. New Gloucester's plan states that the town recently adopted a zoning ordinance and subdivision regulations "light years ahead of previous documents in establishing and strengthening natural resource protection. Following the amendments to the ordinance and other regulations, the Planning Board became more professional in its undertakings and more skilled at reviewing technical plans."

The plan notes that New Gloucester is an attractive community in which to live, due to its location within commuting distance from Portland and Lewiston/Auburn. One key change that may have a "significant impact" on New Gloucester is a proposed location of a new exit in New Gloucester, near Gray off of the Maine Turnpike. The plan notes that due to ease of access to the turnpike, speculative interest in the northwest section of town may rise, increasing the potential for development to take place in an existing business zone. Currently, industrial uses are limited to saw mills, planing mills, gravel crushing operations and some light manufacturing.

Water Quality Concerns: In the 1990 public opinion survey, respondents defined those things as most important to town character as clean water, reasonable tax rate, natural environment, rural character, and quality schools. Clean water was ranked #1. Groundwater quality is a concern. The plan notes that the DEP's "State of Maine Nonpoint Source Pollution Assessment Report" for 1989 lists five areas in town overlying ground water that are not attaining water quality standards due to nonpoint source pollution (2 leaking underground storage tanks, 2 uncovered sand and salt piles, and a landfill). Remedial actions to address these sources have been taken. At least one of the sand and salt piles (the Town owned one has been properly covered and it is believed that the tanks have been removed. There has been on-going monitoring in the area where salt contamination has been a problem; recent test results show levels have dropped. Testing and monitoring of the landfill, following its closure, will continue to take pace. A 1987 ground water study by Robert Gerber Inc. found that 7 of 10 wells sampled in the sand and gravel aquifer were affected by septic system effluent. Nitrate-N concentrations were found to be quite high "considering that elevations indicated few water quality problems should exist in the aquifer." Relatively high concentrations of sodium chloride were also found. The Gerber study recommended more site specific sampling. The results of the water quality monitoring efforts are on a computer data base and the Town hopes to include the sample results and their geographic locations in a GIS. The plan states that New Gloucester, Gray, Raymond, and Poland need to work to protect the aquifer and suggest that uniform development standards be developed. The plan notes that land over the aquifer is flat and would be attractive to develop. There are also some extensively

developed gravel pits that already increase the vulnerability of the aquifer. New Gloucester has an Aquifer Protection Overlay Zone that limits the amount of impervious surface, establishes performance standards for sand and gravel extraction, density, and permitted uses. A hydrogeologic study is required for development proposed to take place in the Aquifer Overlay Zone.

The plan recognizes important watersheds noting that New Gloucester needs to work with Gray, Auburn, Durham, Pownal, Poland, and Raymond on protecting Crystal Lake, Runaround Pond, Notched Pond, and Upper Range Pond. Notched Pond is of particular importance as it is on DEP's list of endangered ponds and the outlet drains to Sabbath Day Lake. The Royal River watershed is also identified.

Infrastructure/C.I.P. Issues Related to Water Quality: New Gloucester does not have a sewer system. The Town's strategy has been to avoid the need for public water and sewer by allowing only low density development. New Gloucester has an implementation strategy to establish a contingency plan for septage disposal in the event that disposal through the Lewiston/Auburn water pollution control authority is no longer available.

Implementation Strategies:

- Propose a board member incentive program that involves funding for attendance at pertinent workshops, and purchase of appropriate training video tapes.
- Devise a method for reviewing the development of individual lots such as: 1) Creating a local definition of "subdivision" to include the creation of two (rather than three) lots, thereby permitting the Planning Board to conduct site by site review for each lot developed in New Gloucester. A simplified, streamlined review process shall be designed for these smaller divisions so as to avoid hardship upon the individual applicant; 2) Creating an environmental site review of individual lots.
- Among other methods discussed, sensitive environmental features will be protected by basing allowable development densities on the amount of buildable land left after subtracting critical areas.
- All Resource Protection boundaries should be evaluated to ensure that all features listed as warranting resource protection status are included within that zoning category and minimum requirements of Shoreland Zoning Ordinances are met or exceeded.
- The Conservation Commission shall continue to investigate the environmental impacts of proposed development projects and comment to the Planning Board on same.
- A watershed protection plan, incorporating modern standards for protection should be developed for Sabbathday Lake and Lily Pond and incorporated into the zoning ordinance. Such standards, at a minimum should make use of the "lake vulnerability index" and phosphorus loading models developed by DEP. (*The Town's Water Resources Sub-Committee is in the process of doing this.*)
- Phosphorus control performance standards shall include timber harvesting standards, recommendations for agricultural practices, retention of forested areas to act as buffers, and road construction and maintenance standards.
- Per acre phosphorus calculations should be employed on a single lot basis as well as for subdivisions. Methodologies for this technique and for administering it should be included in zoning and subdivision regulations.
- Development projections for lake watersheds should be updated every 5 years to adjust the phosphorus allocation accordingly.
- Consideration should be given to further limiting the expansion of non-conforming uses and structures around lakes and streams, except for cases of proven hardship.
- The stream protection district provisions of the State Shoreland Zoning Ordinance should be applied to streams within the Town.
- Required setbacks from intermittent streams and drainageways shall be determined during the development review process based on soil and vegetation characteristics, erosion potential and slope.
- A regional watershed protection effort in conjunction with the Towns of Gray, Poland, Raymond and others who share common watersheds should be continued. The Conservation Commission shall be

responsible for continued communication. (The Water Resources Subcommittee has contacted communities that shares watersheds with New Gloucester to let them know that the Subcommittee is available to work with them.)

- The Wetlands Protection section of the current zoning ordinance should be amended to include the latest recognized criteria for defining wetland boundaries. The burden of proof for determining the existence or non-existence of wetlands should fall on the developer.
- The Wetlands Protection section of the current zoning ordinance should be continually modified based on new research, findings and technologies that afford more practical and workable solutions.
- The Town Water Resources Map which shows wetland locations should be prominently displayed in Town Hall and used as a guide during the development review process.
- Studies should be undertaken to determine the exact location of a future public well site. A request for funding for additional study should be presented to Town Meeting. Methods for site acquisition and/or protection for the "zone of influence" should then be explored.
- A comprehensive Town-wide water supply protection effort should be developed to address bedrock aquifer resources, springs and surface water, as well as the sand and gravel aquifer resource.
- Clustered development and mixed use development in village-like patterns may be allowed in designated areas where hydrogeologic analysis shows it to be appropriate and safe.
- The boundaries of the existing groundwater protection overlay zone should be reviewed on an annual basis, in light of any new credible data that may become available concerning the location of aquifers and recharge areas, as well as the restrictive provisions applicable to that zone, and recommendations for any amendments necessary to assure adequate protection for the groundwater resources of the town should be proposed.
- A regional groundwater protection effort in conjunction with the Towns of Gray, Poland, Raymond and others who share the sand and gravel resource, should be continued.
- The town-wide water quality monitoring program should be continued and funded on yearly appropriations. The continued focus of the program should be on well and lake/pond monitoring efforts, and expansion into the area of non-point source pollution assessments along streams and the Royal River.
- The Conservation Commission should continue to investigate the equipment and resources needed to accurately record and map water quality information on a computer data base. A request for funding should be submitted to the Town Meeting if needed.
- A standing committee on Water Resources should be appointed by the Selectmen, to take advantage of the expertise of certain Town residents in hydrology, geology and biochemistry. The group could serve in an advisory capacity on such issues as impact of major new developments, water quality problems and plans for future monitoring and control measures.
- Potential areas of non-point source pollution and areas where historical land uses may have impacted water quality have been mapped by the Conservation Commission. Further testing/investigation should be done to document the effect of the mapped sites.
- The aquifer protection standards in the zoning ordinance and the subdivision regulations should be examined for consistency.
- Deficiencies in the State Plumbing Code should be analyzed, and a supplemental (local) plumbing code developed to address these inadequacies.
- The sharing of common leach beds should be discouraged unless a soils and hydrogeologic analysis shows that cluster housing, multi-family, institutional, elderly/group housing or commercial uses such as motels can be safely accommodated, or unless new technologies become available. This shall be accomplished through the addition of specific standards to appropriate regulations.
- The adoption of a townwide septic waste management program should be considered, to be implemented by the CEO. Elements of the program would include periodic inspections, pumping, a response program for malfunctioning systems and an educational program regarding septic system maintenance. (The response program for malfunctioning systems is in place.)
- The Town should become active in effecting policy changes at the State level to make the Tree

- Growth Taxation law more effective and to allow municipalities to alter their taxation structure to offer additional incentives for the management of forest land.
- Existing standards for development and management of gravel pits should be updated as needed to reflect credible new information on management and reclamation techniques.
 - Advocate for and where possible, participate in the development of a greenbelt system. (The Conservation Commission is working with other groups that use town trails on mapping the system and identifying commonly used trails.)
 - Work with the Planning Board to establish standards and regulations that require developers to take into consideration the permanent preservation of existing trails that run through their proposed development; use the development constraints map as a base for identifying such trails and update on a periodic basis.
 - Working with the New Gloucester Land Trust, acquire trails and open space areas of significance through fee simple acquisition, donation or through tax acquired property.
 - Where outright ownership is impossible, secure easements or establish restrictive covenants during the review process across various parcels to protect their quality as an important piece of open space, wildlife are or connecting trail.
 - The Conservation Commission should study ways to protect Lily Pond and surrounding land from resource degradation. (The Water Resources Subcommittee is working on this with the Royal River Committee.)
 - The Conservation Commission should meet with other towns to establish a Royal River Corridor Commission to establish guidelines and procedures for ensuring protection of the River and lands along its banks and should work with the GPCOG on the current Royal River watershed project. (The Water Resources Subcommittee is working on this with the Royal River Committee.)
 - The Town should prioritize the acquisition or protection of any lands needed for the protection of a future public water supply.
 - Establish a contingency plan for septage disposal in the event that disposal through the Lewiston-Auburn Water Pollution Control Authority is no longer available.

13. NORTH YARMOUTH:

Information for this section is from the *Town of North Yarmouth Comprehensive Plan, January 1991*, and from later revisions dated May 28th, 1991. This section was also updated with assistance from Ted Tiedeman, Comprehensive Planning Committee Chair.

Current Zoning: 1 acre minimum in village district; 1 acre in the Rural District, and 3 acres in the Farm and Forest District.

Land Use Development Trends: Historically, North Yarmouth's economy was based on agriculture and the town developed as a decentralized group of villages. In an effort to control residential development, North Yarmouth enacted a minimum lot size requirement of 3 acres. This may have helped slow development, but has "added to market-driven price increases making affordable housing difficult." Commercial development is insignificant and residential development has been modest. The plan states, "The central problem is that inevitable increases in residential land use threatens every aspect of the town's present character, including features that presently make it an attractive place to live", and notes that North Yarmouth's proximity to Portland, Lewiston/Auburn and Brunswick, along with its abundance of undeveloped land, make it an especially attractive growth area. The current land use breakdown is as follows: developed land - 2,040 acres (16% total land area); public land 395 acres (3%), flood plains 1,380 acres (11%), steep slopes 240 acres (2%), wetlands greater than 10 acres - 95 acres (<1%), deer yards 950 acres (8%), undeveloped land 7,210 acres (59%). Under current zoning 2,040 to 2,250 additional lots could be created.

Water Quality Concerns: One-third to two-thirds of the town is on a sand and gravel aquifer. The committee found 34 potential threats to ground water that include historic and present locations of land use threats. Although the town is an inland community, the plan has a marine resource section that notes the inhabitants of North Yarmouth, via a 1849 legal provision have common rights and privileges to public landings, muscle beds, flats and fisheries of Yarmouth. The future land use plan includes a Royal River Corridor proposed to have the most restrictive environmental development constraints.

Infrastructure/C.I.P. Issues Related to Water Quality: North Yarmouth does not have public sewer. The plan notes that septic tank disposal is done via a Portland Water District contract.

Implementation Strategies:

- Adopt appropriate measures to discourage land uses and developments in wetlands, over aquifers and their recharge areas in flood plains on unsuitable or sensitive soils or areas designated for scenic, ecological, agricultural, recreational or water quality." (Efforts to accomplish this have already been undertaken as resource protection ordinances have been drafted.)
- Conduct a land use inventory to continually update land use and development patterns within the town so as to evaluate cumulative impacts on natural resources.
- Locate, record, and monitor underground and above ground gasoline and fuel oil storage tanks, areas of sludge spreading and aerial spraying, sand and salt storage piles, and tire dumps, and encourage compliance with state and local regulations where applicable.
- Work with the Yarmouth Water District to more accurately identify and map North Yarmouth's aquifers and recharge areas.
- Prohibit chemical dumping or spraying and take vigorous action against known polluters.
- Control the disposal of sludge and other solid waste. Monitor the types, approximate volume, and sources of waste being deposited at the former town landfill.
- Strictly enforce the Natural Resources Protection Act (NRPA), State Plumbing Codes, Shoreland Zoning Act and other applicable regulations.
- Adopt a groundwater protection ordinance to protect sand and gravel aquifers, sensitive bedrock aquifers and their recharge areas by expanding the existing provisions of the North Yarmouth Zoning

Ordinance to include all areas of North Yarmouth.

- Consider for possible adoption a Wetlands Protection Ordinance and/or the establishment of additional zoning regulations to protect wetlands.
- Assess impacts new developments will have on water quality, drainage, erosion, vegetation, wildlife, and scenic resources. Develop protection strategies and/or incentives which will protect and preserve these resources.
- Establish as a top priority obtaining public access to the Royal River and the preservation of the entire Royal River Corridor system, including tributaries. Consider town acquisition, conservation easements, transfer of development rights and other incentives to protect their scenic, recreational, wildlife, and water quality attributes.
- Consider town purchase of other critical areas, in addition to the Royal River corridor, which have ecological, recreational, scenic, water quality, or agricultural significance.
- Continue to utilize, and explore areas to expand, the sharing of services and facilities with other communities and organizations and the sharing of ideas that will be mutually beneficial to all parties. Areas that are presently unexplored or that are in their infancy that should be explored include, but are not limited to: 1) Adopting interlocal agreements that will provide continuity to aquifer protection measures where the identified aquifer crosses town lines; 2) Continue to work with the Yarmouth Water District relative to managing the three existing, and any future water supplies, that fall within the Town of North Yarmouth; 3) Provide input to any groups or organizations working in any surrounding community whose gathering of specific information will enhance the Town of North Yarmouth's effort to protect its natural resources which are shared with other communities. (Since the plan was written, North Yarmouth has merged with the Yarmouth Water District.)

14. PHIPPSBURG:

Information for this section is from *A Comprehensive Plan for the Town of Phippsburg, Maine, Prepared by Townspeople to meet the needs of the Town 1991 through 2001 A.D., 3/12/91.*

Current Zoning: There is no townwide zoning. There is no local minimum lot size requirement.

Land Use Development Trends: Historically, commercial growth in Phippsburg has taken place around small village areas where businesses and private residences have existed side by side. The plan notes that the population has grown by 18% in the last decade while housing units have increased by 31%. Phippsburg's economy is based primarily on marine resources and tourism. In 1980, the summer population made up 66% of the total population (there were 2,950 seasonal residents, and 1,527 year round residents). Figures for 1990 put the summer population at 4,200 and the year round population at 3,650, thereby increasing the percentage of seasonal residents to 68% of the total population. The plan further notes that in 1989, non-residents owned 76.7% of the waterfront property, while residents owned only 23.3%.

The Phippsburg plan has a policy that growth should not exceed a rate of 2% annually. And where known or emergent problems with septic or well water capacities or quality exist, the number of new housing units or significantly altered units should be limited. The implementation strategy for this policy is to limit the number of new units and conversions town-wide so as not to exceed 2% per year; consider limiting the number or type of subdivisions approved; and consider having the planning board phase in subdivisions of 10 or more lots.

The land use inventory states that 14,054.2 acres or 78.2% of the total land area is forested (10.5% of which are in tree growth tax program); there are 14 acres of fields (.08% of the total land); 96.1 acres of beach (.57% total land); 1,386 acres salt marsh (7.7% total land); 1,305 acres developed land (7.3% total land), and 1,111.4 acres of roads and water (6.1% total land). There are 39 parcels of undeveloped land, in single ownership that each exceed 100 acres in size.

Water Quality Concerns: Phippsburg's plan states that its "commitment to clean water and a healthy environment is reflected in the Town Meeting vote that made Phippsburg the first town in the state to ban the overboard discharge of wastes from new homes constructed adjacent to the water." At risk from coastal water contamination, is Phippsburg's traditional fishing industry. It is noted that there are no sewage pump-out stations for marine holding tanks anywhere in town, and at least 20 licensed overboard discharges exist.

Groundwater supplies are said to be highly susceptible to pollution. The plan notes that salt water intrusion is an occasional problem in the West Point/Popham area, but there are few problems with wells. The major threat to potable water is said to be improperly working, poorly located, or failed septic systems. In 1989, 24 replacement systems had to be built. In general, soils require an average of 3 acres to find suitable septic sites. There are also some underground storage tanks. Gravel pits are recognized as a possible threat, however, its noted that whether they pose an actual threat to water resources is unknown.

The plan states that Center pond has declining eutrophic status and identifies possible threats. Because of a lack of industry and large developments, there are few major threats from stormwater runoff. The exception being Center park which has roads and parking nearby. The plan states that "presently ordinances fail to address the need to protect pond water quality, which is best accomplished with buffers."

Infrastructure/C.I.P Issues Related to Water Quality: Phippsburg does not have a central sewage system. In some densely settled areas, holding tanks are the only means of sewage disposal ("an expensive alternative"). Poor soils and frequent outcrops make septic tanks and filter beds a serious risk to groundwater, ponds, and wetland contamination. The plan states:

"It may well be necessary for the Town to assist in providing some type of central sewage treatment facilities in certain sections of town in the relatively near future. Currently, the worst groundwater contamination problem due to effluent runoff exists in West Point Village."

Under the plan's section on opportunities and constraints it states, "No sewage system exists. West Point is in need of some type of collective approach to solving septic system malfunctions; other villages may have similar problems." The public opinion survey that was done as part of the planning process found that 59% (489) residents had their septic tanks pumped within the last 3 years. 77% of the respondents believed that the town should require the repair of polluting sewage systems regardless of the homeowners resulting hardship.

Implementation Strategies:

- Strengthen and enforce regulations to buffer tidal wetlands.
- Encourage the State to vigorously enforce new laws that phase out overboard discharge of effluent from private sewage treatment plants onto "redeemable" shellfish flats.
- Seek to limit erosion and runoff from construction activity, from roads and driveways, and from other landscape modifications.
- Consideration should be given to establishing a ratio of permeable to impermeable surfaces on each affected lot, particularly smaller lots.
- Educate citizens about the proper design, installation, function, use, and care of septic systems, and the proper disposal of hazardous substances used in and around homes and businesses.
- Form a committee to review in more detail those areas in Town with special septic problems such as areas requiring replacement of phased out overboard discharge systems which may be suitable for special solutions through the Maine DEP's "Wastewater Facilities Construction Program."
- Special care should be taken when wells are placed down slope from nearby septic leach fields or other potential sources of pollution. (The current 100 foot minimum distance between septic systems and wells is arbitrary and town should consider increasing the distance. Property owners should be aware of the location of neighboring septic systems and wells when positioning their own systems.)
- Wellheads should be constructed so as to prevent intrusion of surface water and contaminants into drilled wells.
- Water quality in Center Pond should be monitored to determine whether further pollution controls should be enacted, particular attention given to phosphorous levels. Water quality in other ponds should be tested to establish a baseline for the monitoring of their condition.
- Study existing gravel pits and the location of underground storage tanks to establish a record for control of erosion and water pollution.
- Conservation Commission should work with science classes at the Phippsburg Elementary School and other groups to teach people of the value of our tidal wetlands.
- Adopt ordinances which at least parallel state regulations to protect tidal wetlands.
- Strengthen and enforce regulations requiring minimum buffer of natural vegetation between tidal wetlands and nearest structure, lawn, driveway or other development to provide a buffer for wildlife and room for natural migration of wetlands in response to rising waters.
- Wider buffers should be used where necessary to protect particularly valuable wildlife resources, or to prevent construction in shoreline areas particularly susceptible to sea level rise or that are otherwise prone to erosion.
- Prohibit new buildings within a certain buffer distance from a freshwater wetland larger than 10 acres and adopt a shorter buffer distance to freshwater wetlands between one acre and 10 acres (recommended distances are 125 and 75 feet respectively).
- Prohibit filling of a freshwater wetland larger than one-half acre except for limited public or private road construction to provide access to adjacent upland areas, providing non practical alternative road location is available and steps are taken to minimize damage to the wetland.
- Take special care constructing septic tank filter beds in the watershed of the ponds to assure that phosphorus from cleaning materials and bacteria from human wastes are not leached into the ponds.

- **Maintain a buffer of natural vegetation around the edge of all ponds unless the lay of the land or lack of wildlife makes such a buffer unnecessary (recommended distance 125 feet).**
- **Discourage the use of lawn fertilizers in watersheds of ponds.**
- **The State (Bureau of Parks and Recreation) should be urged to include a marine holding pump-out station in its plans for the new boat launch facility at Fiddler's Reach.**
- **Encourage the Shellfish Conservation Committee to enhance the development and protection of all bivalves of commercial interest.**
- **Take all possible steps to have the Department of Marine Resources reopen the Parker Head flats, the largest and potentially the most valuable in this section of Maine.**
- **Develop and implement an alternative to the School's sand-filter septic and overboard discharge system.**
- **Develop a comprehensive listing of regional municipal and private discharges to marine waters.**

15. POLAND:

Information on all but current zoning, is from the Draft *Town of Poland Comprehensive Plan*, by the Poland Comprehensive Plan Committee and Maine Tomorrow, January, 1991. Subsequent revisions to this section were provided by Ralph Stanley, Poland's Code Enforcement Officer.

Current Zoning: 2 acre minimum throughout town. The town has a hazardous waste ordinance, and provisions for cluster development, open space preservation, storm water management, soil erosion, lake watershed protection, impact assessment on groundwater.

Land Use Development Trends: During the past 10 years, development in Poland has consisted mostly of single family development on individual house lots and mobile home development. From 1980 to 1989, Poland grew by 11.9%. The town's increase was one of the smaller growth rates in the region. The town's building limitation ordinance (35 units/year between 1979 and 1987, and 48 in 1988) is credited with contributing to the slowdown. However, it is not clear whether this limit has been tested, or reached. Poland's 2 acre minimum lot size requirement was adopted to protect sand and gravel aquifers that cover most of the town and are the source for 2 bottling companies. There are four village areas, little industrial development, little agriculture and extensive forest and seasonal development along ponds. Recent development has located along existing roadways and on ponds. Concern is expressed over future development of additional mobile home parks:

"The recent state law, which overrides some local mobile home park restrictions, will encourage the development of mobile home parks in communities like Poland where land is available and other mobile home parks already exist. Because of the way the law works, mobile home park developers can build a park at a density of 1 unit per 20,000 sq. ft., or 1 unit per 12,000 sq ft. with an engineered system. In contrast, developers of conventional site built homes must observe 2 to 5 acre densities."

Water Quality Concerns: The plan does an excellent job in analyzing issues that pertain to all water resources. In 1989, the Lake and Watershed Resource Management Association prepared and released a report for the Range Pond Association on water quality in Range Ponds. It found numerous small non-point sources of pollution with the most notable problems observed being the placement of sand along the shoreline for the creation of private beaches, and the extensive clearing of buffer vegetation between developed areas and the lake. According to the report, camp roads may be having the most serious impact on the water quality of Range Pond. The report concluded that a reduction of non-point sources in the watershed might improve water quality, but "short sampling seasons do not allow for a prediction of water quality trends." Continued monitoring with a full season of data is needed. Thompson Lake was also well profiled. The Thompson Lake Environmental Association recently noted more turbidity, and more phosphorous in the lake. The Association is "doing an excellent job monitoring and protecting lakes", the volunteer effort is said to be unique and laudable. The plan used information from the 208 water quality assessment of the 1970s in its analysis. Trip Pond has seen heavy shoreline development. In 1971, high nutrients and bacteria were attributed to malfunctioning systems; the 208 plan recommended better land use controls and enforcement of state or local plumbing regulations, along with adoption of a watershed protection ordinance. Trip Pond is being analyzed by Robert Gerber Inc. in order to assess watershed problems and identify good land use development practices. The Town is continuing to develop ordinance language to control phosphorous allocations.

In terms of ground water, the primary sources of contamination are malfunctioning septic tanks, leaking underground storage tanks, salt from stockpiles, and landfill leachate. There is one injection well at the Poland Mobile station which is located on an aquifer, underground oil tanks (#2 type heating oil tanks remain to be removed) and the 2 underground oil spills. It is noted that there are no aquifer protection provisions in the zoning ordinance that would protect ground water from adverse land uses.

Infrastructure/C.I.P Issues Related to Water Quality: Poland does not have public water or sewer. The Town relies on the Lewiston/Auburn Pollution Control Authority to haul pumped sewage to its pollution control plant. The plan notes that availability of this facility could be terminated at any point, and the town would be forced to find another facility or find an in-town site. Septic tank failure is a concern at Middle Range and Tripp Ponds. There have been several instances where owners had to purchase additional land to install new systems. The lack of a sewer system is reported to be a factor in the Poland Spring Water and Maine Bottling Company's decision to locate a portion of its operations out of state. Several areas along lakes are identified as being appropriate for sewer. The plan concludes that there is a need to explore further the feasibility of providing central sewers.

Implementation Strategies:

- Amend zoning ordinance to require that prior to the issuance of a conversion permit, the land owner shall meet the requirements of the State Plumbing Code.
- Conduct an inventory of all farms, golf courses, nurseries, and orchards in the watershed areas of the Town's Great Ponds to locate potential sources of nutrient run-off.
- Amend the zoning ordinance to require that within the watershed areas of the Town's Great Ponds, all agricultural activities be required to prepare and implement erosion and sedimentation control plan.
- Include in the Subdivision and Zoning Ordinances a requirement for an erosion and sedimentation control plan for residential developments of more than 5 lots and commercial and industrial uses.
- Include provisions in the Zoning and Subdivision Ordinances to mandate that developers demonstrate that soils are adequate for the intended purpose, that their projects will not be located on wetlands, on 20% slopes, or on floodplains.
- Conduct an inventory of underground petroleum storage tanks and other threats to ground water, in areas overlying aquifers. Notify landowners of State requirements for removal and State financial assistance; give top priority to underground tanks over town aquifers.
- Include provisions in the Zoning Ordinance to prohibit new underground storage tanks for the storage of petroleum products, including tanks for residential uses, in areas overlying the Town's aquifers as identified in the Comprehensive Plan and in watershed areas.
- Include language in the Zoning Ordinance to prohibit commercial and industrial uses which use, process, or store hazardous materials in all areas overlying town aquifers identified in the comprehensive plan.
- Provide funds for monitoring test wells and ground water testing, at the old Town dump on Route 26, the salt pile at the State garage on Route 26, and the Town garage on Poland Corner Road.
- Amend the Zoning ordinance to require that developers of projects involving mining, mineral extraction, and/or gravel extraction activities, demonstrate that their operations will have no adverse impacts on ground water quality or ground water levels.
- Continue to explore the feasibility of establishing an in-town facility for septic tank disposal, either on a long-term basis or for short-term emergencies.
- Meet on a biennial basis with representatives of adjacent communities to review strategies for protecting and enhancing shared surface and ground water resources, and work for the passage of similar protection strategies. These strategies should include prohibitions, by all communities, of land uses which may be incompatible with the protection of the aquifers such as, but not limited to, underground oil storage tanks, etc.
- Amend the Town's Shoreland Zoning Ordinance by placing all State-identified, moderate to high value 10 acre wetlands in a Resource Protection District. Include provisions to discourage or prohibit filling and other activities that would degrade or destroy those wetlands. Designate the CEO with responsibility for administration.
- Amend the Zoning Ordinance and add provisions to the Subdivision Ordinances, requiring that on slopes in excess of 20%, developers and subsequent owners retain trees and other natural vegetation to stabilize hillsides, reduce erosion, siltation and nutrient run-off.

- Amend the Zoning Ordinance to require a permit for forestry management practices which will take place on slopes greater than 20%. Designate the CEO with responsibility for administration.
- Monitor forest harvesting practices to ensure that clear-cutting does not harm the Town's scenic beauty, sustainable wildlife habitat, and water quality. Recommend clear-cutting limitations, if appropriate, to be added to the Zoning Ordinance.
- Publicize availability of Right to Farm, Farm and Open Space, and Tree Growth Tax Laws, and State forest practice regulations, by including mailing with tax bills and by developing/acquiring resource materials for future distribution.
- Amend the Subdivision Ordinance to require that open space be preserved in all developments that abut rivers, streams, and moderate to high value wetlands.
- Establish an open space fund, to be administered by the Conservation Commission, that would be funded by donations, grants, and at the discretion of the Town, tax penalties from the sale, or change of use or status of land which is currently tax exempt or subject to reduced taxation (such as land subject to the Tree Growth Tax).
- Maintain a minimum lot size requirement of at least two acres in all zoning districts so as to minimize the contamination of wells by subsurface sewage disposal systems
- Amend the Subdivision Ordinance to require that in areas where there have been water supply problems, developers of more than 5 lots provide evidence of adequate ground water for water supply purposes.
- Amend the Subdivision Ordinance to prohibit community septic systems except in mobile home parks.
- Continue vigorous administration and enforcement of the State's Plumbing Code; continue to require that a plumbing permit be obtained prior to a permit for a structure involving subsurface sewage disposal.
- Under the provisions of the town's building permit limitation ordinance, limit, on a first-come, first-served basis, the number of structures built around the Town's Great Ponds. Limit the annual permits for new structures as follows: one for Middle Range Pond, one for Upper Range Pond, one for Tripp Lake, two for Thompson Lake, one for Worthley Pond and one for Lower Range Pond. Review and revise the limitation every 5 years, as necessary, in accordance with water quality changes.
- Continue to require that a phosphorus impact analysis be included with subdivision applications in the watersheds of the Town's Great Ponds.

16. PORTLAND:

Information of all but the current land use zoning is from the "Portland Comprehensive Plan," and was reviewed by Richard Knowland of the Portland Planning Department.

Current Zoning: There are approximately twenty-eight zones, with seven residential zones, a waterfront district on the mainland, and three residential zones on six islands. Five of the seven zones allow attached/planned residential unit developments (PRUDs). The minimum lot sizes range from 3,000 to 15,000, and densities match the minimum lot sizes.

In 1988, amendments were added to the zoning ordinance which required that the net land area for PRUDs be calculated by subtracting the following factors from the gross area: the existence of stormwater retention (permanent storage), the existence of stormwater detention (temporary storage), and a holding of 25% of the remaining open space. While performance standards have been added to several zones, there is concern that the standards don't adequately specify the scale and intensity (density?) of developments. In the past, the Planning Board has negotiated down the number of dwellings proposed for a project in order for development to meet the PRUD standards, even though the number of units met the zoning density requirements.

Land Use Development Trends: Although provisions have been made in the zoning ordinance for minimum lot sizes on the mainland, there are very few remaining unsewered lots. To typify it simply, the land use intensity in the downtown (peninsula) is highest, with the greatest amount of impervious surface. Next is the Back Cove area, which is primarily residential and arterial highways. Third are the outlying areas, specifically along Forest Ave. and the commercial zones alongside the Presumpscot River.

For housing, the vacant land is that which has typically never been previously developed, or the recycling of existing buildings, especially in the Peninsula and Forest Ave. Insofar as office space is concerned, the office development build-out was projected in 1985 to occur within fifteen years - it occurred within three years. For the islands, the number of housing units actually fell from 1,352 in 1970, to 1,221 in 1980, to 1,366 in 1990. In the 1985 Plan, major conclusions were that there was likely to be more rapid growth of the year-round population on Peaks through the conversion of seasonal housing. Secondly, it was noted that there was considerable potential for infill on existing small lots - possibly in excess of 600 units, many with either seasonal or year-round public water. Thirdly, there were several large parcels remaining available for large scale development. It is also important to note that the zoning densities and permitted uses in the IR-1, IR-2, and IR-3 for grandfathered and lots of record are inconsistent with not only the State minimum lot size requirement, but also public safety and environmental limitations. The Plan calls for any major developer to provide an environmental impact statement, noting: effects on the quality and quantity of groundwater supplies, effects on surface waters and shoreline areas, and effects on commercial fishing and shellfishing harvests, among other things.

For the islands, in 1989 the Plan called for a number of major changes. In the Island Business Zone, IR-1, and IR-2, the allowable residential density would be determined by the most restrictive abutting residential zone, while the existing zoning lot of record provision allows the minimum lot size of 10,000 sq. ft. in the IR-1, and 6,500 sq. ft. in the IR-2 zone, with the base density 6,500 sq. ft./dwelling unit. For lots served by public water and sewer, the density would be determined by the least restrictive abutting residential zone. In the IR-3 zone, the base density would be raised from 32,500 sq. ft./dwelling unit to 42,500, those lots with public water remained at 5,000 sq. ft./dwelling unit, and the maximum density raised from 20,000 sq. ft./unit to 35,000 sq. ft./unit.

At the time of the 1989 Plan, the City Assessor's office determined that over 75% of island lots are less than 20,000 sq. ft. Just under one half of the lots are less than 10,000 sq. ft. While many are contiguous and

under the same ownership, many have been grandfathered as buildable lots. The residential density exceeding the one dwelling unit per acre would draw more water than can be recharged by precipitation. The Plan suggested, and the City Council amended the zoning ordinance to require that undersized lots be "merged" in order to meet present day lot size standards in order to qualify for a development permit. The amendment does not apply to those served by public sewer. "Merged" lots can be contiguous or noncontiguous to the actual building lot to meet the requirement. The noncontiguous lot can be located anywhere on the island, and any number of lots can be merged as long as the total land area meets the zone density requirement.

The lot merger is effected through provision of a conservation easement for the "extra" lots that will not contain the principal structure. The easement would be recorded by the applicant in the registry of deeds, and a copy of the recorded easement and copies of the deeds for the lots submitted to the building authority prior to the issuance of a building permit in order to verify the recording of the easement. The conservation easement would require that the properties be used only for recreation and conservation purposes.

In addition to other restrictions, no area of the property is allowed to be paved, and no parking or storage of vehicles or machinery is allowed. There is nothing in the ordinance to prohibit the "extra" lots from being owned by another property owner as long as the conservation easement is in place and the lots are not being used for another lot merger project. The net result would remain the same, whether a property owner purchases land or acquires conservation easements over someone else's vacant property, since open space is being protected for groundwater recharge. As a final note, there is no mention in either the original plan or the updates of what remains both on the mainland and the islands of open space acreage or percentage, nor is there any notion of how this open space is currently zoned.

Water Quality Concerns: The mainland is served exclusively by public water through the Portland Water District (PWD); the islands are served by both public water from the District, and private sources, and hence pose an entirely different set of problems and challenges. Generally, the islands consist of extensive rock ledge and shallow soils. The groundwater aquifers on Cliff, Long, and portions of other islands which lack public water make wells highly vulnerable to leachate pollution from septic systems and landfills, and are vulnerable to salt water intrusion. Both surface soils and bedrock conditions hamper the recharging of aquifers, and thus make the construction of public water lines expensive.

On Peaks Island, water is supplied by the PWD, as well as surface galvanized pipe and a 470,000 gallon standpipe for storage. On Long Island, all water is from private wells. For Little Diamond Island, water service is provided by two PWD lines from Great Diamond Island to LDI. Most lines from the main LDI line are to seasonal dwelling units. Supplying water to year-round residences would require expensive blasting through ledge, and hence there are no private wells or communal services available on the island. For Great Diamond Island, three PWD lines from Mackworth Island serve as the origin of all PWD service to all the islands; recently the PWD has upgraded the lines. Finally, for Cushing Island, all service is provided by the PWD through a single line from Peaks Island, through the Whitehead Passage which is owned by the PWD. All lines on the island are private, however.

In 1986, the city hired Robert Gerber, Inc. to perform a groundwater management study of the islands. The study's findings were (1) that the surficial aquifers were of minor importance given the relatively thin soils; (2) on Long Island, almost half of the wells had some coliform bacteria, and over one-third of the wells had excessive nitrate-nitrogen levels; (3) on Cliff Island, although the amount of human generated contamination was low, the levels of iron and manganese in wells were very prominent. The study made two major sets of recommendations, one seeking to preserve quantity and one set to preserve quality.

The "Quantity Recommendations" suggested (1) to minimize the loss of groundwater recharge through control of development; (2) reduce excessive and progressive lowering of the groundwater table through zoning densities and requirement of development impact review under site plan review; (3) prevent exceeding the safe

yield of aquifers by maintaining one dwelling unit/acre (the City's existing zoning system generally accomplished this density balance except for the grandfathered lot size provisions and densities as allowed in the Island Business Zone, and the provisions of the IR-3 zone); (5) develop a long-term monitoring program for wells; and (6) provide public education for island residents.

The "Quality Recommendations" suggested (1) setting appropriate zoning policy to strictly control the impacts of developments through subdivision and site plan reviews; (2) perform of periodic inspections of subsurface sewage disposal systems; (3) creation of an ordinance requiring that at the time of sale of all buildings which utilize subsurface disposal systems, the systems be inspected and replaced if necessary; (4) assume future self-sufficiency for water and sewage treatment, and base future densities on this; (5) discourage overboard discharges, but when present, increase the minimum lot size by 50%; (6) set zoning policy such that at the time of build-out, ground water quality still meets the Safe Drinking Water Standards; (7) control the effects of developments such that any discharge to ground waters will not result in exiting ground water exceeding one-half of the difference between the quality of ground water entering the property and the Safe Drinking Water Standards for the applicable physical, chemical, and biological standards, thus ensuring that no one developer uses all of the ground water's capability to treat and dilute contaminants; (8) control storage and disposal of materials which could affect groundwater quality by restricting them to bedrock aquifer "discharge areas" or by requiring extra precautions; (9) control nonpoint source pollution, including periodic inspection of all petroleum tanks; (10) develop a long-term groundwater quality monitoring plan; and (11) control saltwater intrusion by preventing wells from exceeding an aquifer's safe yield, and by reducing groundwater extraction to the extent possible.

Infrastructure/C.I.P. Issues Related to Water Quality: While the current zoning and required minimum lot sizes on the mainland make provisions for unsewered lots, there are but a handful remaining. Portions of Riverside St (which, incidently, is an industrial zone), along the Presumpscot River has no sewer, as well as along sections of Congress St. near Stroudwater. There are, however, no buildings in either the Shoreland Zone or near the river to impact water quality in either site.

The islands, on the other hand, create their own independent problems. At the time of the 1989 Plan, on Peaks Island the area sewage systems were gravity fed, except for connections on Wylie St. which required pumping. The City does permit new connections to the system, but a street opening permit must be obtained and pipes laid by the private contractor, and the City makes the connection. Between 1885-1985, 130-140 buildings were connected to the sewer system. Between 1985-present, less than ten connections were added. In addition, more development could connect to the public sewer given the modification along Brackett St. which separated the shared trench for water and sewer lines. As a result of the work performed on Peaks Island, the entire island is now a two-pipe system. On Long, Little Diamond, Great Diamond, Cliff, and Cushing Islands all systems consist of cesspools, septic systems, or overboard discharges, with some outhouses on Long Island, and some joint systems on Cliff Island. Again noting the 1985 Gerber study, almost half the wells on Long Island had some coliform bacteria problems, and over one-third of the wells had nitrate-nitrogen problems, typically from malfunctioning septic systems.

As a result of the Gerber study, the City has adjusted lot sizes on every island except Peaks, using the grandfathered lot merger system. On Peaks, a new treatment plant, providing secondary treatment, is under construction by the PWD, and will service a total of approximately 180 units. There are two outfalls which discharge into Casco Bay, and there are currently three licensed overboard discharges. The outfalls will be converted to stormdrains at the conclusion of the treatment plant construction. On Cliff Island, however, there are approximately 44 licensed overboard discharges.

The other major issue facing Portland are the combined sewer overflows (CSOs). The most recent policy states that all new development restrict stormwater discharges to pre-development levels through detention. In addition, the City utilizes a thin membrane-like lining for the inside of sewer lines to minimize leakage.

A preliminary design study for a sewer interceptor to serve the Riverside St. area (Riverside St. Sewer Interceptor Plan) has just been completed, thus providing additional development opportunities in the industrial park there.

In addition to this study, there are four other stormwater studies recently completed: the Edwards St. Interceptor Drainage Study, the Woodford's Area Sewer System Management Plan, the West Side Interceptor Drainage Study, and the East Side Study. These studies focus on correcting deficiencies as well as providing preventative measures for areas under development pressure. Currently, a portion of the stormwater is treated at the sewer treatment plant due to the combined sewer overflow collection systems. The current method of treatment, however, is designed to treat biological pollutants present in sanitary flows rather than chemical pollutant typically found in stormwater flows.

The City has a consent agreement with the DEP which requires the former to develop and implement sewer management plans to eliminate CSOs. Along with the studies noted above, the Riverside St. Plan is part of the implementation of a major storm and surface water management and sewer plan to eliminate both CSOs and surface water flooding. Additional parts of the implementation plan are creation of a CSO program; the Capisic Brook, Nason Brook, and Fall Brook Stormwater Management Plans; and the Torrington sewer extension on Peaks Island. For Fiscal year 1992, the total cost of the projects is \$3,524,400; for FY93, \$2,037,000 (representing 6 projects). The total ten year projected CIP for Utilities/Infrastructure is \$25,061,000 which represents 22% of the total budget.

Implementation Strategies [DRAFT]:

[Given that the Comprehensive Plan is not due to be completed until 1996, there are at present no discernible implementation strategies. As the recommendations of the Gerber study are followed, and the stormwater management plans are implemented, strategies will no doubt develop.]

17. POWNAL:

Information on all but the current zoning is from the *Town of Pownal Comprehensive Plan (Draft)*, November 1991, Pownal Comprehensive Plan Committee. The section was updated by Sherry Dietrick, Pownal Planning Board.

Current Zoning: There are 3 zones (2 residential, 1 village). Minimum lot size is 2 acres per building unit.

Land Use Development Trends: Pownal is a low density residential community with significant open space and forest cover. The Town has no industrial development. During the period from 1950 to 1970, Pownal only experienced moderate growth, a fact it attributes to the town being "a second ring suburban community of Portland." The Town's subdivision ordinance is also credited with slowing growth. The ordinance sets high standards for building roads, making it expensive to build on lots located off of existing roads. The Town also limits the length of dead end roads and has frontage requirements that restrict the number of lots that can be created on existing roads. A good portion of development has occurred over the town's largest aquifer which extends into Freeport, Durham and North Yarmouth. Development has concentrated along major roads in a pattern of "random, dispersed development". Currently, clustering of unattached houses on smaller lots is not allowed. The plan concludes that under present zoning and subdivision ordinances, continued development will result in sprawl and strip development along roads. The plan notes that although the subdivision ordinance can control medium and large scale development, it is less successful in controlling cumulative effects of 1 and 2 lot subdivisions.

Water Quality Concerns: Pownal shares a large aquifer with Freeport, a smaller one with Durham, and a small part of the North Yarmouth/Yarmouth aquifer. The plan notes that DEP's "State of Maine Non-point Pollution Assessment Report for 1989 lists one area of Pownal as not attaining water quality standards due to non-point pollution. The source was an uncovered sand/salt pile that has since been enclosed. There is some oil contamination coming from leaking underground storage tanks.

Infrastructure/C.I.P. Issues Related to Water Quality: Pownal is not served by public sewer or water. The plan states that even when septic systems have been conscientiously maintained by their owners through regular pumping, the lack of readily available sites for spreading the sludge pumped from these tanks may result in illegal dumping - "a regional problem in this state." The Town has an agreement with Lewiston/Auburn and Portland for disposal of septic tank sludge disposal at the expense of individual land owners.

Implementation Strategies:

- Enroll Code Enforcement Officer in State certification training program.
- Review performance standards for noise, dust and particulates, glare, runoff and pollution levels.
- Develop a Shoreland Zoning ordinance.
- Consider a Groundwater Protection Overlay Zone.
- Consider limits on the size of larger commercial and industrial uses
- Consider larger minimum lot sizes where there are limiting factors.
- Consider limiting the number of new residential building permits issued in any subdivision in any one year. (A limit of 2 is suggested.)
- Establish a program to plan and develop a network of conservation easements for protection of mapped wildlife areas, wildlife travel corridors and stream corridors.
- Continue compiling and updating the 1991 maps of land use constraints in Pownal.
- Employ a professional Code Enforcement Officer to administer Pownal Codes on a day to day basis.
- Maintain taxation strategy that enables continuance of larger parcels.
- Develop sound forestry practices.
- Review aquifer protection plans of adjacent towns.

18. SCARBOROUGH - Plan not reviewed.

Information for this section was provided by an over - the -phone interview with Joe Zipneiwski, Scarborough Town Planner.

Current Zoning: Only a portion of Scarborough lies within the Casco Bay watershed. The area that is in the watershed is mostly zoned as residential-farm which requires a minimum lot size of 80,000 sq. ft. State minimum shoreland zoning also applies to this area.

19. SOUTH PORTLAND:

Information on all but the current zoning comes from the *South Portland Comprehensive Plan (Draft 3/91)*, prepared by the South Portland Comprehensive Plan Committee, the South Portland Planning Department and the Growth Management Group. The section was updated by Charles Haeuser, City Planner for South Portland.

Current Zoning: 15 different zones, pending shoreland overlay zone. Minimum lot size requirements range from 7,500 sq. ft. to 80,000 sq. ft.

Land Use Development Trends: South Portland is mostly developed. The City has a total of 13.5 sq mi. of land of which 2,496 acres, or 33% is vacant (much of this is not developable). During the 1980s, the numbers of households increased by 1,119 or 13%, even though the population only increased by only 7%, reflecting the trend towards smaller household sizes. 18,000 jobs, or 13% of the jobs in Cumberland County, are located in South Portland. Most of these are retail trade and service jobs. Portland Harbor, which includes both South Portland and Portland comprises a total land and water area of approximately 2,074 acres. The inner harbor has a waterfront area of 2 1/2 miles providing berths for supertankers, cargo vessels, fishing vessels, and government vessels. There is approximately 54,000 feet of available berthing in the harbor, 31,000 feet consists of commercial and fishing vessel berthing. There are many marine related facilities in the harbor several marinas, the fish pier - other piers and launching facilities, and oil facilities. Encouraging water dependent uses is a city policy.

Water Quality Concerns: The plan notes that DMR shellfish Area #14 (Portland-Falmouth-Cumberland-Yarmouth) has been closed to shellfishing due to pollution. Area #14 was first closed in 1947. On 3/29/89 the ban was partially lifted to allow harvesting in flats and waters of Great Chebeague Island provided the waters continue to meet approved standards. In terms of coastal water quality, the plan states "the federal government has recently identified South Portland as one of the entities responsible for the water quality of Casco Bay. In the meantime, Casco Bay has been classified under the National Estuary Program, which will entail an evaluation of the pollution problem with recommendations for addressing it." The plan notes that through the National Estuary Program, South Portland has an opportunity to participate on a regional basis with neighboring communities to find solutions for pollution problems in Casco Bay.

The largest surface waterbody in the City is Clark's pond. A City study in 1983 revealed high levels of suspended solids and turbidity in Clark's Pond, along with high phosphorus levels. Watersheds are identified along with major rivers and streams. Taken together, rivers and streams represent roughly 84,500 linear feet of flowing water. There is also a portion of a larger sand and gravel aquifer that is located in the City, "the aquifer is of minimal importance to the City as a public water source, but inter-municipal protection measures are appropriate due to its potential future use by Scarborough residents."

Existing and potential threats to water quality are identified and include: agricultural operations, the remaining 40 miles of combined sanitary and storm sewers, overland stormwater runoff, approximately 270 septic systems, the landfill, petroleum storage areas, salt piles, extraction industries, businesses using toxic chemicals or hazardous materials, and sites of abandoned industries.

Existing protection measures require new developments to have stormwater detention or retention structures on site. The plan explains, "The theory is that by detaining the water, there will be time for pollutants to infiltrate the soil rather than remain in the stormwater that may eventually flow from the site. In recent years, however, some new developments within the Clark's Pond watershed have been relieved of this requirement in order to alleviate the potential for flooding, if stormwater from detention basins were to be discharged when the stormwater from outlying tributaries was also reaching the pond. These new development projects have been allowed to discharge stormwater directly into the tributaries of Clark's Pond.

The City will need to assess the merits of this policy vis a vis the water quality of the pond." The City's landfill is being closed. There is a program in place to remove and replace existing municipal fuel storage tanks; private tanks at gas stations and marinas will need to be removed in compliance with the schedule established by the state. All salt piles are stored in enclosed structures on paved bases. The City has performance standards for extractive industries, including reclamation requirements. Proposed industrial wastewater is analyzed by the Pollution Abatement Department to determine if pre-treatment is required before the wastewater enters the City's sanitary system. The Department maintains records and conducts periodic evaluations of operations that generate industrial waste water. The entire pre-treatment program is being evaluated to address revised federal requirements - additional types of wastewater may be required to be regulated. South Portland has an extensive and ongoing research program that is examining the effect of stormwater on marine water quality. Sufficient sampling has been done to reach a conclusion that stormwater contributes the greatest amount of pollution to Casco Bay. The City is applying for a grant to develop a pilot project for reducing stormwater pollution. Environmental assessments are required for proposed development on the sites of abandoned industries, such as WWII shipyards. This requirement should be formalized through a City ordinance. The City has a Resource Protection Overlay Zone.

Infrastructure/C.I.P Issues Related to Water Quality: Most of the City is served by public sewer and water (there are over 100 miles of sewer lines). South Portland has a pollution abatement department to manage all aspects of sewer collection and treatment systems that is staffed by 29 persons. The City estimates that the total costs of abating CSOs will exceed \$20 million. The plan states that expansion of the system should continue to be financed by developers. Included in the plan, is a goal to "strive to maintain and improve city services." The implementation strategy is to "explore new ways to finance community needs, e.g. impact fees, user fees, special assessment districts, tax base diversification." A major issue that the city faces is being able to provide adequate services during periods of slow economic growth. The plan recognizes improvements to the city's sewer system as "critical and costly" and involve three major issues: 1) reduction of pollution in Casco Bay caused by overflows from the plant, 2) expansion of current service area of treatment plant and 3) paying for needed expansions.

The City is undertaking an aggressive program for the 1990's to separate storm and sanitary sewer lines, remove infiltration and inflow in sanitary lines, and upgrade its treatment plant. These projects will reduce the amount of flow reaching the treatment plant and enable it to more effectively treat the sanitary sewage. The City is also studying the system in order to prioritize future work to separate the remaining combined lines. If stormwater treatment becomes a requirement of state or federal law, significant modifications to the plant and unknown additional expenses will be incurred.

Concern is expressed over the cost and difficulties of properly handling sewage sludge. The City currently gives the sludge to farmers and composts some of it. Plans are to double the size of the existing composting facility.

In terms of stormwater control, the City will encourage the maintenance of natural drainage patterns in order to minimize the amount of runoff entering the City's storm drain.

Implementation Strategies:

- Prepare a strategy of the preservation and protection of South Portland's water resources including acquisition, expansion of Resource Protection (RP) and easements or licenses.
- Determine the appropriate buffer for water bodies located within the RP zone. At a minimum, the size of the buffer should be linked to the State shoreland and floodplain zoning mandates.
- Take steps to eliminate problems as identified in the National Estuary Program project on the pollution problems in Casco Bay. Apply for additional grants to fund any necessary cleanup efforts.
- Use a variety of financial resources, including impact fees and existing bond money, to reclaim significant natural drainage areas such as Clark's Pond and Barberry Creek.

- Develop zoning standards to limit the amount of impervious surface permitted on a site and to encourage natural site drainage.
- Establish appropriate or available technology water quality control measures to minimize eutrophication of ponds.
- Adopt State Shoreland Zoning requirements.
- Identify the existing water quality levels of key water resources in order to establish benchmarks based on State water quality standards for improvement of these resources.
- Review the types of land uses that are allowed along the rivers and ocean and encourage only those uses that are non-polluting.
- Work with representatives of Cape Elizabeth, Scarborough, Portland, and Westbrook, and the Soil Conservation Service to establish water quality control.
- Participate with Scarborough and Cape Elizabeth to coordinate efforts to minimize contamination of the shared aquifer.
- Develop zoning requirements to minimize future groundwater contamination of the existing aquifer and surrounding watershed.
- Continue to monitor the testing wells located on the City's dump site.
- Establish criteria to require developers to prepare a groundwater study if septic systems and/or wells are to be installed on a proposed development site to determine proper design of the septic systems and if a sewer system link should be required.
- Give the Plumbing Inspector the option of expanding the distance between private wells and septic systems to 200 feet, if topological features warrant this greater distance.
- Adopt a local Wetlands Protection Ordinance in keeping with State statutes. As part of the ordinance, require developers of identified wetlands to conduct high intensity soil surveys and wetland vegetative analysis of their proposed development sites and to then prepare a development design that will not adversely impact identified wetlands.
- Annually update and prioritize open space areas the City is interested in purchasing; establish via referendum a \$1 million City land acquisition fund; create and encourage annual maintenance programs for greenbelt, beach clean up.
- Expand the definition of "net residential acreage" to include the subtraction of wetlands, surface waterbodies, and very poorly drained soils to decrease the permitted residential density on a parcel with such constraints.
- Design and implement public education programs that explain City studies relating to open space and natural resources.
- Encourage the establishment of school curriculum to emphasize the existence and importance of the City's natural resources.
- Publicize existing and future opportunities for public access to open space and natural resources.
- Coordinate efforts of Conservation Commission and South Portland Land Trust to design and implement public education programs relating to the need and opportunities for preservation of open space and natural resources. Create and adopt a logo for common signage of the Greenbelt.

20. STANDISH:

Information for this section is from *A Plan for the Future of Standish Maine, December 1990 - A Draft Comprehensive Plan Submitted for Review by the Standish Comprehensive Plan Committee.*

Current Zoning: Minimum lot sizes range from 1 to 3 acres.

Land Use Development Trends: Standish has three separate village areas. The plan notes that during the 1980s, in Cumberland County, rural areas increased at a much faster rate than urban communities and, "rural communities with lake front amenities increased most rapidly." In 1980, more than 42% of Standish's housing stock was seasonal. If all 874 seasonal units were occupied, Standish's population would have increased by 2,600 to 4,400 persons during the summer (assuming anywhere from 3 to 5 persons per unit). Seasonal structures are located all along Sebago Lake and on Frye Island. The Town has experienced a significant amount of scattered strip development.

Water Quality Concerns: The plan recognizes four major drainage basins: Tucker Brook and Strout Brook drainage basins which drain into the Saco river and are part of a larger drainage system which includes Baldwin and Limington. It is noted that the Saco River system continues southeast from Standish until it drains into the ocean between Saco and Biddeford. Another basin drains into Josie's Brook which also becomes part of the Saco River system. And another basin drains into the North Branch of the Little River which eventually joins the Presumpscot River and flows to Casco Bay. An aquifer is identified and mapped on the "Ground Water Resources Map." Water quality ratings are given, along with general types of threats to water quality. Lake water quality is a concern, particularly eutrophication caused by phosphorous.

Infrastructure/C.I.P Issues Related to Water Quality: No portion of the Town is on public sewer. The need for public sewer has been discussed in previous studies, however the majority of the town residents do not want to see public sewers developed. In a public opinion survey, the public was asked to respond to the need for new town services - public sewer ranked the lowest after money to go towards recycling, town beaches, expanded libraries, police, fire/rescue, other recreational facilities, a community activity center, fire stations, teen activity center, and a recreational sports fields. 52% of the respondents felt that there was no need for sewer.

Implementation Strategies -

Monitoring and Enforcement:

- Maintain an up-to-date land use map for use in monitoring new development.
- Ensure that the Code Enforcement Officer receives "state of the art" training in water quality and soil erosion inspection techniques and that the CEO participates in new ordinance development regarding soil erosion sand water quality issues.
- Establish a clearinghouse for water quality testing information on Standish water bodies and publish an annual report which provides residents with an understanding of the state of water quality in Standish. This report should address, where possible, the impact of development on water quality so that the Town has a clear picture of how to evaluate and track ordinances which protect water quality. The report should also address inadequacies in the testing program and seek funds for supplementing the testing program where needed.
- Develop and maintain updated lists of industrial chemicals to help monitor any potential contamination/pollution. Use all existing resources including the Regional Civil Defense in Windham.

Ordinance Revision/Creation:

- Establish appropriate densities, performance standards and other regulations to reflect the appropriate carrying capacity of the environmental systems in Standish and incorporate these standards in Town

Ordinances.

- Restrict development in areas where immediate slope is greater than 25%, areas where soils are unsuitable for septic systems, in State documented wetlands, and in designated floodplains on sites which are below the 100 year flood level.
- Develop a comprehensive groundwater ordinance based on information determined in a comprehensive hydrology study to determine the specific recharge area of the aquifer. Until the recharge area of the aquifer is specifically defined, direct higher intensity development away from the known boundaries of the aquifer.
- Develop a comprehensive sand and gravel pit operation ordinance which also defines the method of recovery, requires the replacement of native flora and reforestation to encourage the return of wildlife, and requires erosion control methods to be used prior to abandoning site.
- Amend the Site Plan and Subdivision Ordinance so as to implement long-term phosphorus management for Standish's lakes and ponds: 1) use the DEP phosphorus control method to establish appropriate levels of phosphorous control for each of the town's lake and pond watersheds; 2) Provide an appropriate level of protection, as defined in the DEP manual, "Phosphorus Control in Lake Watersheds: A Technical Guide to Evaluating New Development" for Watchic Pond, Little Watchic Pond, Bonny Eagle Pond, Adams Pond, Sebago Lake, Duck Pond, and Rich Mill Pond; 3) Develop individual Lake Watershed Inventories and growth projections and use these to determine phosphorus regulations for individual lake watersheds; 4) Cooperate with neighboring towns to protect water quality, including the management of phosphorus, in shared lake and pond watersheds; 5) Prohibit new development of slopes whose gradient exceeds 25%, except where necessary to stabilize steep slopes supporting or adjacent to existing roadways or other development; 6) Restrict development, filling, draining, or excavation of wetlands except where necessary to achieve vehicular access to public or private property.
- Establish and maintain a complete and up-to-date record of all approved site plans and subdivisions, so as to have an accurate inventory of development subject to phosphorus controls.
- To enforce phosphorus controls for site plan and subdivision approval, involve willing and capable third parties in a contractual agreement to periodically inspect the sites to ensure maintenance of effective control measures. Apply such third party contracts to site plans and subdivisions as a condition of Planning Board approval. Financially stable, reliable nonprofit conservation organizations, land trusts and, in the Sebago Lake Watershed only, the Portland Water District, are all examples of eligible organizations.
- Monitor water quality in all lakes and ponds in Standish by establishing a consistent and balanced program of lake water quality monitoring which will create a database, scientifically adequate for monitoring significant changes in lake ecology and lake phosphorous levels. Periodically review and, if necessary, revise ordinances as needed based on monitoring programs.
- Hold both the logger and the landowner responsible for clearcutting within the areas of waterways or the buffer zones in protected areas.
- Develop ordinance guidelines to minimize pavement cover.

Continued Research:

- Evaluate current solid, hazardous and special waste ordinances for water quality protection.
- Develop and/or provide from the Comprehensive Plan Inventory and Analysis Chapter the following map tools for use by the Planning Board in evaluating development proposals: Soil suitability map, existing land use, watershed boundary map, map of critical areas as defined by Natural Heritage Mapping Program, Maine Fish and Wildlife Service habitat maps, aquifer recharge areas, slopes, state designated wetlands, flora and fauna index, scenic vista, ...
- Develop and evaluate computerized mapping in order to build capacity for water resource analysis.
- Analyze the current water supply's capacity for serving the community's expected growth and development in the next ten years (including an analysis of pumping capacity, new well exploration, aquifer recharge areas and capacity of the area to absorb septic waste) and develop a strategy for ensuring the protection of town drinking water supplies.

- Investigate alternative methods of sewage disposal and/or treatment and develop a committee of qualified individuals to study and plan for the sewerage and municipal water systems in Standish. This committee should evaluate the wastewater system proposed in 1969 to prevent possible contamination of the Saco River and/or Josie's Brook.
- Evaluate the feasibility of a boat registration and inspection program for waste disposal systems.

Public Education:

- Broadcast available videos of lake pollution, water quality and other environmental and/or public interest subjects on Cable TV.
- Develop an educational video on water quality issues in Standish using Portland Water District and other local technical resources such as Bonny Eagle High School.
- Educate and encourage landowners to reintroduce indigenous vegetation along the shorelines and wetlands to promote and protect natural wildlife habitat by developing a cable TV show in conjunction with the local schools.
- Use the Town Office as a clearinghouse for instructions and information related to land and forestry management and encourage local realtors and brokers to distribute to new property owners. Develop cable TV spots where appropriate.
- Develop educational materials on organic farming.

Local and Regional Coordination:

- Help form a multi-town "Sebago Lake Association" to: educate and provide environmental information, provide public and private consulting, improve communication between the private and public sector, and act as a liaison between various towns, private associations, neighborhoods, public officials, and private businesses and the State.

New Programs:

- Develop a targeted recruitment list of businesses which do not require sewer facilities and can be adequately served by our present water supply system without posing a threat to its quality.

22. WESTBROOK: [Plan not reviewed]

The following information was provided by Barbara Barhydt, City Planner for Westbrook.

Current Zoning: All land along the Stroudwater is zoned Resource Protection. Property along the Presumpscot River is also zoned Resource Protection, except portions of the river that flow through the downtown and a Route 302 business district. Westbrook's densely developed downtown also includes a riverfront walkway and public parks along the Presumpscot, which are zoned Resource Protection. The City has 6 residential zones. The lowest density zone one dwelling unit per net residential acre with a minimum lot size of 40,000 square feet. Higher density residential zones permit lot sizes of 10,000 square feet and eight multi dwelling units per acre. The industrial district and mixed use district have a minimum lot size of 20,000 square feet and performance standards. Two of the three business zones have no minimum lot size requirements, but the districts contain space and bulk requirements. Additional standards are being considered under proposed revisions to shoreland zoning.

23. WINDHAM:

Information for this section is from the *1991 Comprehensive Plan, Town of Windham*, prepared by the Windham Comprehensive Plan Committee. The section was updated by Steven Westra, Town Planner for Windham.

Current Zoning: Farm District - 80,000 sq. ft.; Farm Residential District - 50,000 sq. ft.; Three Commercial Districts that have varying residential lot sizes from 40,000 sq. ft. for single family units to 30,000 sq. ft. for multi-family units and 60,000 sq. ft. to convert a non-residential building to a residential use, Commercial buildings require 20,000 sq. ft.; Industrial District - 20,000 sq. ft.; Business Park 40,000 sq. ft; Medium Residential 20,000 sq. ft. if not on public water and 15,000 sq. ft. if on public water; Mobile Home Park Overlay Zones 12,000 sq. ft. as per state requirements.

Land Use Development Trends: As noted in the previous section, the Town of Windham grew by more numbers than any of the other 23 towns. Added to the year-round population is a tourist population estimated to be 6,000 and a seasonal population of 5,982. In 1980, a medium density residential zone was created on the outskirts of a commercial district. The district has been successful in attracting anticipated growth. Although the plan notes that the district was designed to concentrate growth in areas close to municipal service, a very limited portion of the district is served by the Windham-Gorham Little Falls Sewer System. Other districts include "rural areas" consisting of a Farm and Farm Residential. More than 50% of the town is zoned under the Farm district and a citizen survey found that protecting the town's rural character was the highest priority of residents. According to the plan, growth has slowed in the rural areas, although some "exclusive subdivisions" have been developed in rural areas. In 1962, there were 5,200 acres of farm land, in 1990 - 2,063. The plan states that the town's rural character and commercial land base have been protected to some extent, but present ordinances and economic conditions may encourage residential development of a large area of farm land. Windham has a commercial area that is viewed as a regional shopping center. The Town has revised its zoning to encourage "lateral expansion" of the commercial zone.

Windham's Economic Development Corporation (WEDC), a private non-profit development corporation, is working with the Town Council on strategies to create necessary infrastructure to meet new industrial and business needs. The town survey concluded that residents are not in favor of further residential growth and are split on business and commercial growth. The WEDC is proposing to create a new industrial park of approximately 120 acres. The Town hopes to alleviate traffic by creating a road running parallel to Route 302 to encourage "lateral commercial expansion." The plan states that Windham should work with other towns in the region to discuss the possibility of a shared industrial park, and "municipal costs related to commercial development should be determined."

Water Quality Concerns: Windham's plan notes that the citizens' survey, completed as a part of the plan, indicates that most residents feel zoning adequately protects water resources. A large majority of people feel that the town should protect Chaffin Pond from development. The Pond is a source of public drinking water and is located in the heart of the commercial district. Threats to water quality are listed (leaks from underground storage tanks, landfills and dumps, sand and salt storage and spreading snow disposal, nitrate plumes, septage and sludge spreading practices, pesticides, erosion and sediment control, phosphorous, acid rain, radon, toxic chemical spills, storage and disposal, deforestation, uncontrolled stormwater discharges, fertilizers and some agricultural practices).

Waterbodies are identified along with their DEP ratings. There are 5099 buildings in Windham, Portland Water District serves 555 commercial accounts, 3 industrial accounts, 31 governmental accounts, and 2,203 residential accounts and 360 seasonal accounts totalling 3,232 accounts. This leaves an estimated 1867 homes and businesses on some type of well. The plan notes that only the public drinking water is protected with by the Aquifer Protection Ordinances.

Infrastructure Issues Related to Water Quality: There is an ongoing concern in Town over what to do about sewers, with only a small portion of town, South Windham Village currently served by sewer. Of particular concern is Windham's commercial area. Town officials, with private consultants, continue to determine areas which "may need public sewer at some time in the future". Respondents to the public opinion survey strongly opposed a sewer system. However, the plan notes that the septic system at the library fails each spring as runoff and groundwater saturates an "old style leaching area". Although the plan contains costs for other public improvements, nothing is set aside for sewer or stormwater projects. The plan contains a goal to minimize erosion, sedimentation, and unplanned stormwater discharge.

Implementation Strategies:

- The Town Council has appointed a Water Quality Commission based on the recommendations of this plan.
- Promote public education regarding water quality related issues.
- Invite local community civic organizations to conduct programs that help the community achieve policy [1. Support a "no degradation" approach to all aspects of water quality, 2. protect Windham's quality and quantity of water resources, both surface and subsurface]
- Standardize minimum water quality reporting requirements for studies being submitted to the town for project review. Set standards for what types of studies may or shall be used to review the study. The town presently requires a hydrogeologic study and Cumberland County Soil and Water Conservation District review. Seek alternative financing for all water quality related municipal projects and lend assistance to the private sector if cooperation would be mutually beneficial, and feasible.
- Provide adequate staffing for the Code Enforcement Office to allow effective field inspection with administrative support required.
- Formally adopt the Federal Manual for Identifying and Delineating "Jurisdictional Wetlands" as the definition of "Wetlands" in all the town's rules, regulations and ordinances.
- The town should seek representation on the State Land and Water Resources Council.
- Find a way to most economically contribute to the benefit from local and regional GIS data storage and usage. Promote participation in the "Best Management Practices" assistance program to help farmers address water quality issues.
- Consider establishing a permitting or registration policy for the installation of a private water supply, i.e. drilled wells, dug wells, driven points, and lake draws. Consider making CEO inspection a part of the permitting or registration process.
- Encourage training for water supply installers and establish a certification process for individuals who have met minimum criteria.
- Encourage training for subsurface wastewater disposal area installers and establish a certification process for individuals who have met minimum criteria.
- Accelerate plans to safely contain sand and salt storage.
- Incorporate DEP standards for phosphorous control in Land Use Ordinances.
- Develop a town-wide watershed development management plan consistent with town's watershed maps.
- Establish shoreline and streambank stabilization programs to help individual land owners convert existing problems and reduce likelihood or recurrence.
- The town should inventory existing stormwater systems and continue to restrict discharge into municipal systems when on site solutions are possible.
- Explore the feasibility of establishing a marine warden service as a means of enforcing waterbody and shoreland rules and regulations.
- The town should adopt as expeditiously as possible changes in ordinances that will protect and enhance the environment
- "Town policy should be developed to ensure that all decisions are made that will affect the quality of the environment will take into consideration, ecology, economics and ethics as well as other pertinent

conditions."

- Revise zoning districts to preserve farmland and activity.
- Strongly regulate development in Farm zones to preserve rural character, open space, farmland, forests and wetlands.
- Protect agricultural viability by ordinance or charter.
- Enact lower density zoning in agricultural areas and discourage development of open space through cluster development.
- Recreation/Conservation: The Windham Conservation Commission is exploring the following options: outright purchase of land through bonding, impact fees, annual budget allocation or surplus funds; encouragement of land acquisition by land trusts; acquisition of conservation easements; promotion of open space/recreation land acquisition through appropriate zoning and negotiations with developers; development and promoting of a mechanism to accept donation of lands and funding for recreational facilities; exploration of involvement in federal/State/regional land acquisition and funding programs; acquisition of approved access to existing timberland for minimal impact usage.
- Greenbelt along Presumpscot and/or Pleasant Rivers, and/or along the banks of the town's many lakes and ponds should be developed for mixed usage including nature trails, cross country and snowmobile trails.
- Explore limitations of type, size and horsepower of crafts on certain waterways to help minimize the harmful effects these crafts can have on water quality and shoreline stability.
- Town officials, with private consultants, will continue to determine areas which may need public sewer at some time in the future. Windham's commercial area is of particular concern.

- and pesticides in Yarmouth through educational efforts; c) Require residences to hook-up to a public sewer within two years of its availability; d) Continue the town's septic system maintenance program to ensure that the septic systems within the watersheds are properly maintained and pumped out; e) Work with neighboring towns for similar controls on non-point pollution sources; f) Ensure the replacement of all outdated underground fuel storage tanks, in accordance with state law; g) Construct a sand and salt storage facility
- Reclaim the "Black Ash" site to reduce need to dredge: a) Collect all existing technical information on the Black Ash site for review in Town Hall by prospective buyers and/or developers; b) Encourage improvements that correct severs public safety and erosion problems; c) Explore the availability of state and federal funds to reduce the problem.
 - Protection of Undeveloped Shoreline: a) Adopt at a minimum new State Shoreland Zoning regulations and map all Resource Protection Districts; b) Evaluate other areas in proposed scenic inventory, wildlife habitat areas, and wetland maps for expanded Resource Protection areas; c) Work with Freeport to protect scenic and habitat values of Cousins River.
 - Maintenance and Protection of Natural drainage systems: a) Map the Town's watersheds and water courses and implement a management plan to minimize adverse impacts of flooding due to past or future land developments; b) Incorporate recommendations of the management plan into the development review requirements of the site plan and subdivision ordinances. Site plan and subdivision ordinances should require consideration of off-site impacts; c) Incorporate impervious surface and maximum building coverage limits in each zone to help reduce storm water problems; d) Consider establishing minimum open space, i.e. landscaping requirements to improve storm water control.
 - Pollution in coastal Waters: a) Work with regional and State officials to develop long-range improvement plans; b) Work with other municipalities in the watershed to determine and eliminate sources of pollution; c) Require pump-out facilities at all marinas; d) Prohibit new overboard discharge systems and require that all existing overboard discharge systems be converted within a given time period; e) Participate in committee meetings and provide input to the process of addressing pollution in Casco Bay.
 - Waterfront: a) Continue to improve the water quality in the harbor so that all clam flats can be reopened; b) Continue to support the goals and policies of the Piers, Docks and Wharves Ordinance for the preservation of the shoreline.
 - Islands: a) Conduct an island "carrying capacity" study that will provide information on the impact of growth on the island infrastructure; b) Based on the "carrying capacity" study, establish development standards pertaining to substandard lots, roadways, parking, water septic, shore access, setbacks, overall density, and other issues; c) Consider vacating existing undeveloped substandard subdivisions that do not meet current state and local standards for frontage, size, sewage disposal, and water supply; d) Assess the need for a sewer line extension to serve existing homes on Cousins Island; e) Assess the need for sewer and water service to Little John Island.
 - Sewer system: a) Give high priority to [sewering] the islands and other problem areas, b) Continue systematic efforts to reduce inflow/infiltration; c) Review sewer connecting fee structure periodically and adjust fees accordingly.
 - Storm water facilities: a) Fund and implement storm water improvements as recommended in 1991 storm water system analysis plan.