

Appendix B

Land-Use Statistics and Explanatory Notes

The Buzzards Bay Project (BBP) has drawn extensively on a database of geographic information developed by the MassGIS Project. The MassGIS Project was established to develop a geographic information system and uses ARC/INFO computer software. The project is administered through the Massachusetts Executive Office of Environmental Affairs.

Statewide coverage of a variety of geographic information is available through MassGIS. Most of this information is from maps at a scale of either 1:25000 or 1:100000. Land use has been mapped for most of the state, including southeastern Massachusetts, and the BBP has used this information extensively. The discussion below provides background information on the source of the land-use data, the methods used in compiling it, and some of its limitations.

Sources and Methods

Statewide land-use mapping based on interpreting aerial photographs has been performed since the early 1950s by the University of Massachusetts in Amherst. The Resource Mapping Project (RMP) in the university's Department of Forestry now interprets and maps information on land use. One of the land-use maps prepared at the university was based on aerial photography from 1971. The 1971 map has since been computerized by RMP staff using a microcomputer version of the ARC/INFO software.

The most recent land-use mapping by the RMP is based on interpreting 1:25000 scale 9- x 9-in color infrared aerial photographs taken in September of 1984 and 1985. The photography for southeastern Massachusetts dates from 1984.

Land use for 1984 was determined by comparing the 1984 photographs to those taken in 1971. Resource Mapping Project staff mapped the land-use changes since 1971. The RMP then used ARC/INFO software to create a computer map of only the changed areas. The MassGIS project combined the 1971 information and the 1984 changes to produce a map of land use in 1984.

Additional information concerning interpretation of land use from aerial photographs can be obtained by contacting the Resource Mapping Group. The 1984/1985 photographs are held by the Cartographic Information Research Service at the University of Massachusetts in Amherst.

Land-Use Categories

The original 1971 map included 104 land-use categories. The RMP aggregated these 104 categories into 21 categories (28 on the western shore of Buzzards Bay) before

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interpreting the 1984 photographs. The 21 categories are listed in Table B.1. On the western shore, 28 categories better suited the needs of the Southeastern Regional Planning and Economic Development District (SRPEDD). The seven additional categories were marinas, cranberry bogs, power lines, saltwater sandy beaches, golf courses, tidal salt marshes, and irregularly flooded salt marshes. However, for consistency across all Buzzards Bay communities, the extra categories were aggregated into the 21 categories listed in Table B.1. The percentage of a specific land-use type is calculated relative to the total land area; area in water is not included in that total.

Cape Cod towns have four additional categories defined: cranberry bogs, golf courses, marinas, and new ocean. As with the western shore of Buzzards Bay, these extra categories have been aggregated into the more common 21 categories.

Limitations

Land-use classification does not fit neatly into specific categories, no matter how many categories are defined. Photograph interpreters make subjective classification decisions. The RMP staff performing the interpretations are well trained and their land-use interpretations have resulted in maps that a variety of users have found a satisfactory and valid source of information.

Specific limitations of the photo interpretations are as follows. The smallest area mapped as being in a specific land-use category was approximately 1 acre. In addition, the accuracy of the interpretations of changes in land use were not tested in the field. However, the RMP and its staff have extensive experience in interpreting land-use photographs and the photo-visible characteristics of specific land-use types are well known and have been field verified.

The 1984 photographs were taken in September, when leaves were on all trees and bushes. This condition may have resulted in overestimates of the "forest" category, and underestimates of low density development: that is high density of trees in low density residential development may result in incorrectly classifying some low density residential areas as forested areas if roads and homes are not visible from the air. The extent to which the leaf-on condition contributed to overestimates of the "forest" category is not known. Forested wetlands were not easy to discern with this particular areal coverage, hence, forested wetlands are included in the forest category.

Finally, it is important to note that the land-use maps presented in the CCMP (e.g., Apponagansett Bay, Chapter 5, and Buttermilk Bay, Chapter 8) are at a much larger scale than the source maps from which they were extracted. The CCMP land-use map scales are approximately 1:3500, whereas the source map scale was 1:25,000 (or "smaller" in cartographic terms). This difference in scales means that the boundaries between land-use types in the CCMP land-use maps are less exact than shown.

Table B.1. 1984 Land use in the Buzzards Bay drainage basin

LANDUSE	footnote	(areas in acres unless noted otherwise)																			BASIN BASIN BASIN			
		Acush	Bourn	Carve	Dartm	Fairh	FallR	Falmo	Free	Gosno	Marion	Matta	Middl	NewBe	Plymo	Roche	Sand	Wareh	Westp	RI (acres)	TOTALS (sqmi)	TOTALS (% of Land)		
cropland	1	462	67	104	2391	557	70	2	44	0	78	277	137	8	142	796	0	22	4216	490	9863	15.41	3.5	
pasture	2	986	35	56	2304	645	0	53	150	0	75	139	43	131	14	940	0	116	520	0	6206	9.70	2.2	
forest	3	7029	14953	11721	23528	2829	5694	7765	1967	3451	5837	7740	8307	3601	22268	14078	833	12282	16817	3675	174375	272.46	62.7	
non-forest wetland	4	199	125	1361	311	17	216	28	93	41	176	70	442	228	158	638	0	781	315	1	5199	8.12	1.9	
mining	5	282	140	63	450	0	3	225	26	0	21	76	47	8	23	59	0	82	133	0	1638	2.56	0.6	
open land	6	535	965	504	1585	316	120	358	131	4633	166	295	190	357	570	398	85	785	914	2	12910	20.17	4.6	
particip. recreat.	7	30	130	15	84	17	6	89	0	0	9	5	0	421	212	118	68	23	71	0	1297	2.03	0.5	
spectator recreat.	8	3	114	8	96	49	0	6	0	0	29	21	0	118	3	13	12	34	14	0	521	0.81	0.2	
waterbased recreat.	9	5	90	1	494	52	0	83	1	24	198	103	0	37	3	2	0	238	235	0	1566	2.45	0.6	
resid, multi-fam	10	3	402	10	89	24	0	12	0	0	2	4	0	244	0	0	6	33	4	0	833	1.30	0.3	
resid, <1/4 ac lots	11	203	684	243	296	635	0	88	0	0	37	304	0	2931	57	0	0	1262	59	0	6800	10.62	2.4	
resid, 1/4-1/2 acre	12	664	1112	940	2700	1188	0	1354	77	42	434	504	41	723	1125	45	0	1450	1240	162	13799	21.56	5.0	
resid, >1/2 ac lots	13	819	1284	640	1804	218	29	1125	339	203	857	679	275	73	401	820	0	1108	2046	0	12718	19.87	4.6	
saltmarsh	14	23	267	0	1168	693	0	298	0	140	433	409	0	0	0	0	0	783	1046	0	5260	8.22	1.9	
commercial	15	78	239	40	411	170	0	68	25	0	90	94	0	596	5	29	0	379	190	50	2463	3.85	0.9	
industrial	16	24	83	2	75	69	0	23	1	0	24	33	7	944	2	9	0	75	16	0	1387	2.17	0.5	
urban open	17	108	561	195	797	183	110	108	55	3	140	63	122	805	360	285	186	431	201	0	4713	7.36	1.7	
transportation	18	20	295	59	242	236	4	233	0	0	164	212	147	912	232	17	16	629	250	0	3669	5.73	1.3	
waste disposal	19	63	8	26	247	59	0	6	0	0	61	31	0	174	1	22	0	57	59	0	814	1.27	0.3	
water	20	284	184	1005	331	18	566	234	10	178	7	15	38	87	1906	1072	0	988	177	0	7099	11.09		
woody perennial	21	291	210	4457	168	43	0	53	202	0	237	98	1081	32	1098	1789	0	2382	31	0	12173	19.02	4.4	
LAND TOTAL (acres)	22	11830	21763	20445	39239	8000	6252	11976	3111	8538	9068	11155	10840	12342	26675	20057	1206	22952	28377	4380	278204		100	
LAND TOTAL (sq.mi.)		18.48	34.00	31.95	61.31	12.50	9.77	18.71	4.86	13.34	14.17	17.43	16.94	19.28	41.68	31.34	1.88	35.86	44.34	6.84		434.69		
Saltmarsh, source #2	23	30	298	0	1143	608	4	297	0	90	306	350	0	0	0	0	0	917	1117	NA	5159	8.06		
(acre diff from GIS)	24	-7	-31	0	25	85	-4	1	0	50	127	59	0	0	0	0	0	-134	-70		101			
#desig Barr Beaches	25	0	28	0	13	23	0	19	0	44	14	26	0	0	0	0	0	36	6	NA	209			
Barrier Beach area	26	0	75	0	154	86	0	278	0	186	37	84	0	0	0	0	0	59	729	NA	1689	2.64		
Marine Flat area	27	0	36	0	15	442	0	880	0	25	47	440	0	0	0	0	0	256	0	NA	2141	3.34		
Estuar. Flat area	27	50	166	0	267	140	0	122	0	9	47	14	0	108	0	0	0	195	2033	NA	3150	4.92		
TOTAL Tidal Flat	27	50	202	0	282	582	0	1002	0	34	94	454	0	108	0	0	0	451	2033	NA	5291	8.27		
1988 population estimated within basin		8907	14145	7986	25607	15410	229	8332	983	50	4240	5980	1471	92719	8108	4057	112	21120	13281	NA	232737			

Town abbreviations for Acushnet, Bourne, Carver, Dartmouth, Fairhaven, Fall River, Freetown, Gosnold, Marion, Mattapoisett, Middleborough, Plymouth, Sandwich, Wareham, Westport, and Rhode Island (principally Tiverton and a small part of Little Compton)

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Footnotes for Table B.1.

FOOTNOTE EXPLANATION

- ¹ Cropland = Intensive agriculture
- ² Pasture = Extensive agriculture
- ³ Forest = Forest
- ⁴ Wetland = Nonforested freshwater wetland
- ⁵ Mining = Sand, gravel & rock
- ⁶ Open Land = Abandoned agriculture, power lines, areas of no vegetation
- ⁷ Participation Recreation = Golf, tennis, playgrounds, skiing
- ⁸ Spectator Recreation = Stadiums, racetracks, fairgrounds, drive-ins
- ⁹ Water Based Recreation = Beaches, marinas, swimming pools
- ¹⁰ Residential = Multi-family
- ¹¹ Residential = Smaller than 1/4 acre lots
- ¹² Residential = 1/4 - 1/2 acre lots
- ¹³ Residential = Larger than 1/2 acre lots
- ¹⁴ Salt Wetland = Salt marsh
- ¹⁵ Commercial = General urban, shopping center
- ¹⁶ Industrial = Light & heavy industry
- ¹⁷ Urban Open = Parks, cemeteries, public & institutional greenspace, also vacant undeveloped land
- ¹⁸ Transportation = Airports, docks, divided highway, freight storage, railroads
- ¹⁹ Waste Disposal = Landfills, sewage lagoons
- ²⁰ Water = Fresh water, coastal embayments
- ²¹ Woody Perennial = Orchard, nursery, cranberry bog
- ²² Land totals for all categories except 20 (water)
- ²³ Salt marsh area from U.S. Fish and Wildlife Service maps as digitized and reported in Hankin et al. (1985). Falmouth total adjusted by multiplying the ratio of saltmarsh area inside the basin to salt marsh total for town based on MassGIS data (=5.6%)
- ²⁴ Differences in totals reflect the differing methodologies used, but basinwide, values differ by only 5%
- ²⁵ From CZM maps
- ²⁶ From Hankin et al. (1985); areas for Gosnold include total for all shoreline
- ²⁷ From Hankin et al. (1985)

OTHER NOTES

-% land use derived by dividing total for land-use category excluding category #2, water area. No drainage basin boundary was delineated for the Elizabeth Islands, hence GIS land use for Gosnold included all island land areas.