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VIMS Shoreline Permit Database Impacts and Alterations Impacts and Alterations Summary 1993- 2000

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Wetlands
Program



Technical Report

Summer 2001

No. 01-4

VIMS Shoreline Permit Database Impacts and Alterations Summary 1993- 2000

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Summary

Permitted vegetated tidal wetland impacts in Virginia for the period 1993 through 2000 averaged 7.5 acres per year. This compares with annual impacts during the years 1988 through 1992 which averaged 18.1 acres per annum. 1988 was the first year VIMS began tracking wetland losses in Virginia through the tidal wetland data base.

Permitted nonvegetated tidal wetland impacts in Virginia during the years 1993 through 2000 averaged 24.2 acres per year. Matching numbers for the years 1988 through 1992 show average nonvegetated impacts were 21 acres per annum.

Over the eight year period, 1993 through 2000, an average of 12.7 miles of Virginia shoreline were treated with riprap each year and an average 4.8 miles were bulkheaded. The totals were 82.9 miles of riprap and 38 miles of bulkhead for a total for the eight year period of 120.9 miles of hardened shoreline.

Introduction

The management of wetland resources has always been hampered by the lack of knowledge regarding the rates of wetlands loss from permitted activities. These statistics have usually been the most intractable data to acquire because of the numerous agencies involved in the permit process, the frequent modifications of permit applications and the difficulties involved with ensuring the inclusion of all projects proposed. The development of this database which documents tidal wetland losses in Virginia provides a number of new perspectives on the management process. First, it can help determine the effectiveness of management efforts by document-

ing the permitted losses of tidal wetlands. Secondly, it allows an assessment of the cumulative impact of incremental wetland losses on the resource as a whole. Thirdly, the data are a critical baseline element necessary to assess the Commonwealth's relationship to the goal of "no net loss" of wetlands, a current management priority. Lastly, interpretation of these data may illuminate trends in construction activity or impacts requiring special management attention.

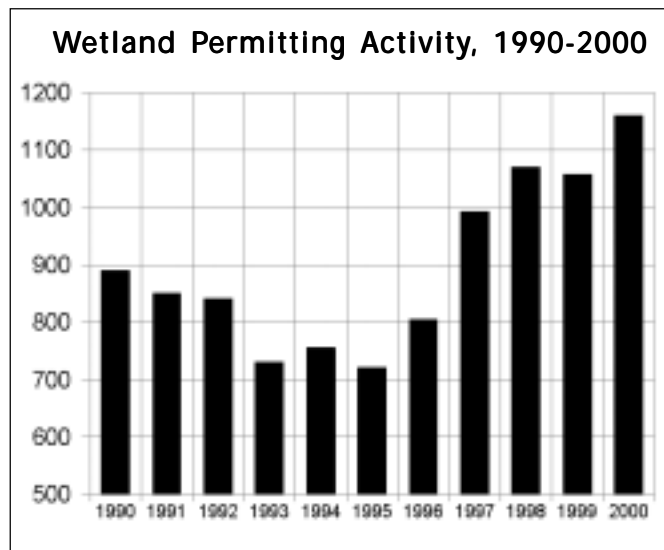
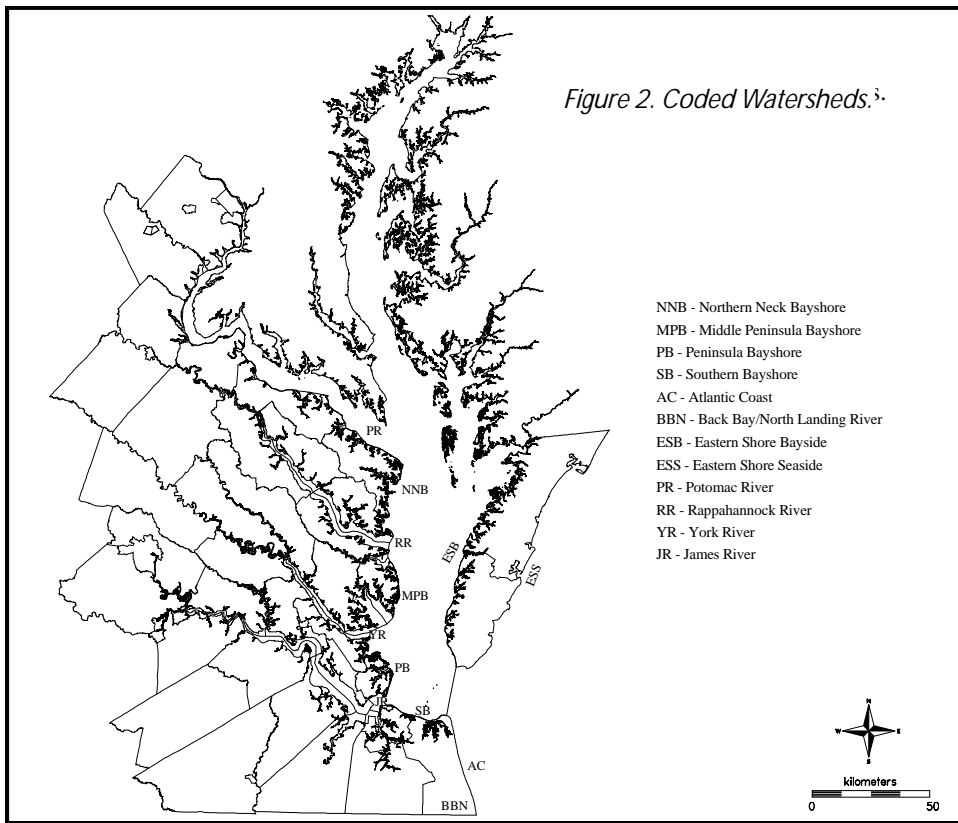


Figure 1. Annual tidal permit application review activity in Virginia: 1990-2000.



Methods

This report summarizes data from 1993-2000 that were collected by personnel from the Wetlands Advisory Group at the Virginia Institute of Marine Science. It is almost always based on a visit to the site to assess the anticipated impacts. Impacts to tidal wetlands are classified by date, locality, immediate water body, primary waterway, watershed, type and extent of proposed activity, and wetland community type. These data are entered into a computer database and a report is generated which summarizes proposed tidal

wetland impacts by location and community type, and includes advisory comments about the project.

The data set for this time period is based on the year in which the application was received. These data are representative of some of the highest years of permit activity (Fig. 1, previous page).

The data are also organized according to a standardized set of watersheds which are depicted in Figure 2 to help simplify geographical interpretation.

Tidewater Virginia Watersheds

The impacts reported for the 1993-2000 data include both habitat lost to filling and habitat impacted but not lost to the system, such as the conversion of intertidal mudflat to subtidal bottom by dredging or conversion of a sand beach to intertidal riprap. Impacts to vegetated wetlands estimated in the database are based on those activities actually permitted by the local wetlands boards and the Virginia Marine Resources Commission.

The database has several limitations which should be taken into account when analyzing or

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The views expressed herein are those of the authors and do not necessarily reflect the views of NOAA or any of its subagencies or DEQ.

Commonwealth's Declared Policy: "to preserve the wetlands and to prevent their despoliation and destruction..."

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interpreting the data. These permitted losses must be viewed in the context of natural changes from erosion and accretion as well as unpermitted activities which could involve larger or smaller areas than the losses reported here but are currently unquantified. In most instances, permitted projects are eventually constructed, however, there may be occasions where the projects are

never constructed and the impacts never accrue to the environment. Additionally, the 1993-2000 database does not exclude projects approved by a locality or the state that may have been subsequently denied by the Corps of Engineers. It also does not account for any compensation which may have been required.

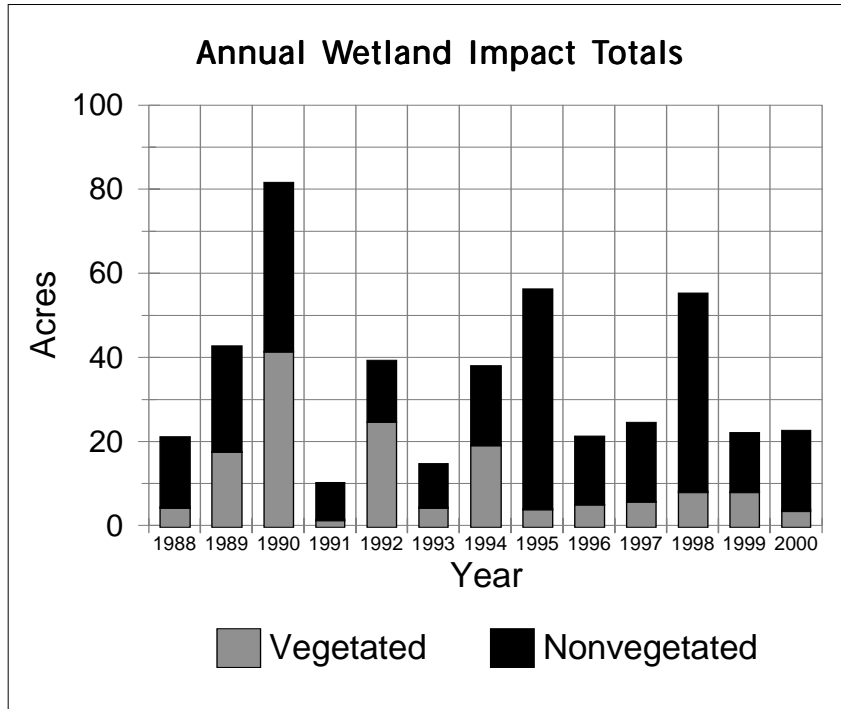


Figure 3. Annual permitted vegetated and non-vegetated wetland impacts, 1988-2000.

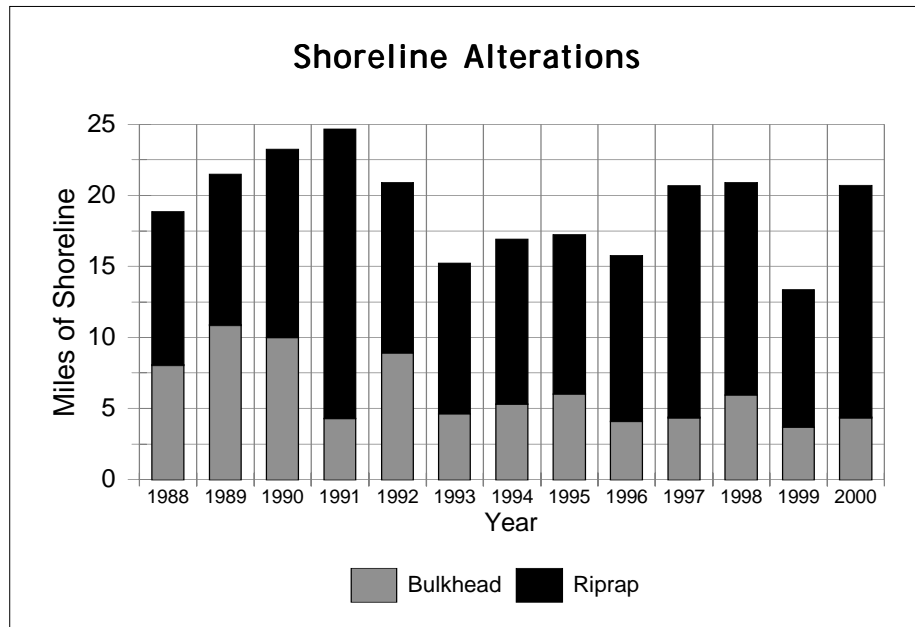


Figure 4. Annual miles of Virginia shoreline hardened using riprap or bulkhead, 1988-2000.

Tidal wetlands impacts permitted in 1993 by watershed

Vegetated Wetlands (square feet)

WS	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TOTAL
AC	8700	0	0	0	0	0	0	246	0	0	0	0	8946
BBN	0	0	0	0	0	0	0	0	0	0	491	0	491
ESB	69445	346	0	560	260	0	0	0	0	0	0	13220	83831
ESS	3960	1550	0	48	0	0	0	1407	0	0	0	310	7275
JR	2593	697	0	2032	1350	0	0	1435	0	0	1584	2420	12111
MPB	5749	910	0	0	0	0	0	165	0	0	0	1804	8628
NNB	1780	50	0	0	0	0	0	0	0	0	0	1325	3155
PB	4872	1250	0	326	0	0	0	668	0	0	0	2380	9496
PR	3518	0	0	50	0	0	0	0	39000	0	3000	946	46514
RR	3696	250	0	0	25	0	0	420	0	0	0	875	5266
SB	935	1660	0	994	0	0	0	190	0	0	0	1086	4865
YR	0	50	0	120	0	0	0	165	0	0	360	870	1565

Non-vegetated Wetlands (square feet)

WS	TP13	TP14	TP15	TP16	TP17	TP18	TOTAL
AC	0	9200	0	4794	0	1000	14994
BBN	0	626	4608	4794	0	1000	11028
ESB	2840	1600	6655	86444	0	300	97839
ESS	11000	0	6	1005	0	300	12311
JR	8686	2403	18719	3452	0	1612	34872
MPB	27793	15945	7589	2850	0	100	54277
NNB	14029	5740	20335	2850	0	100	43054
PB	0	450	1805	6137	0	300	8692
PR	6824	10977	25130	930	0	141	44002
RR	11441	8491	33398	0	0	1710	55040
SB	9750	3271	3839	9010	0	3330	29200
YR	9456	950	19183	0	0	132	29721

Community Types

TP1	Saltmarsh Cordgrass	TP10	Saltwort
TP2	Saltmeadow Hay	TP11	Freshwater Mixed
TP3	Black Needlerush	TP12	Brackish Water Mixed
TP4	Saltbush	TP13	Intertidal Beach
TP5	Big Cordgrass	TP14	Sand Flat
TP6	Cattail	TP15	Sand/Mud Mix
TP7	Arrow Arum-Pickerelweed	TP16	Mud Flat
TP8	ReedGrass	TP17	Intertidal Oyster Reef
TP9	Yellow Pond Lily	TP18	Intertidal Riprap/Rubble

Tidal wetlands impacts permitted in 1994 by watershed

Vegetated Wetlands (square feet)

WS	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TOTAL
AC	0	0	0	146	0	0	0	165	0	0	360	870	1541
BBN	0	155	0	0	0	0	0	0	0	0	712545	870	713570
ESB	2400	215	0	0	0	0	430	0	0	0	0	830	3875
ESS	440	149	0	0	0	0	0	1539	0	0	0	921	3049
JR	1291	9312	0	1628	0	0	35	0	0	0	1080	15304	28650
MPB	9090	2001	60	70	0	0	0	0	0	0	0	2161	13382
NNB	2855	75	60	70	0	0	0	0	0	0	0	2161	5221
PB	3005	460	0	4971	0	0	0	460	0	0	460	33574	42930
PR	2292	300	60	0	0	0	0	500	0	0	50	266	3468
RR	1305	114	130	92	0	0	0	0	0	0	0	6660	8301
SB	2989	1663	0	5029	0	0	0	50	0	0	0	1202	10933
YR	36	0	0	0	0	0	0	0	0	0	0	1730	1766

Non-vegetated Wetlands (square feet)

WS	TP13	TP14	TP15	TP16	TP17	TP18	TOTAL
AC	0	0	13776	2159	0	132	16067
BBN	0	31862	1596	786	0	750	34994
ESB	36129	1020	7685	1168	0	750	46752
ESS	0	74	638	3052	0	80	3844
JR	180783	3589	32285	2419	0	4353	223429
MPB	39669	40836	21722	9124	0	4353	115704
NNB	97	3297	23829	9124	0	4353	40700
PB	0	1265	7684	8272	0	2345	19566
PR	7028	18981	33855	364	0	5	60233
RR	3235	107996	28912	710	0	5	140858
SB	2100	1776	4008	84830	0	2206	94920
YR	25794	5039	2569	960	0	2206	36568

Watershed (WS)

AC =	Atlantic Coast	NNB=	Northern Neck Bayshore
BBN=	Back Bay/North Landing River	PB =	Peninsula Bayshore
ESB=	Eastern Shore Bayside	PR =	Potomac River
ESS=	Eastern Shore Seaside	RR =	Rappahannock River
JR =	James River	SB =	Southern Bayshore
MPB=	Middle Peninsula Bayshore	YR =	York River

Tidal wetlands impacts permitted in 1995 by watershed

Vegetated Wetlands (square feet)

WS	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TOTAL
AC	10600	0	0	0	0	0	0	0	0	0	0	2700	13300
BBN	0	70	0	0	0	0	0	0	0	0	54	2700	2824
ESB	284	204	0	42	0	0	0	0	0	0	0	60	590
ESS	3732	1085	0	280	0	0	0	3030	0	0	0	860	8987
JR	1863	412	0	1962	0	0	0	210	0	0	22488	38497	65432
MPB	4477	90	0	1550	0	0	0	0	0	0	0	4092	10209
NNB	1525	75	0	1550	0	0	0	0	0	0	0	4092	7242
PB	7187	64	0	4560	0	0	0	90	0	0	0	10205	22106
PR	1363	0	0	0	0	0	0	10	0	0	6870	2149	10392
RR	2338	6995	0	5	7300	0	0	0	0	0	0	223	16861
SB	2633	4550	0	1772	0	0	0	922	0	0	0	2539	12416
YR	1230	0	0	645	0	0	0	0	0	0	2220	5144	9239

Non-vegetated Wetlands (square feet)

WS	TP13	TP14	TP15	TP16	TP17	TP18	TOTAL
AC	1456000	1620	37700	4380	0	2206	1501906
BBN	0	906	846	1000	0	2206	4958
ESB	13379	4310	1463	180	0	200	19532
ESS	0	0	5060	668	0	2390	8118
JR	13725	5790	91006	12734	0	7491	130746
MPB	3596	6199	30216	11139	0	1171	52321
NNB	2320	2921	22312	462	0	1171	29186
PB	113	0	5787	7608	0	1171	14679
PR	9885	9070	50567	7608	0	1171	78301
RR	5949	15415	27083	1725	0	10	50182
SB	333780	7237	1587	29202	17000	3453	392259
YR	0	3100	4210	80	17000	3453	27843

Community Types

TP1	Saltmarsh Cordgrass	TP10	Saltwort
TP2	Saltmeadow Hay	TP11	Freshwater Mixed
TP3	Black Needlerush	TP12	Brackish Water Mixed
TP4	Saltbush	TP13	Intertidal Beach
TP5	Big Cordgrass	TP14	Sand Flat
TP6	Cattail	TP15	Sand/Mud Mix
TP7	Arrow Arum-Pickerelweed	TP16	Mud Flat
TP8	ReedGrass	TP17	Intertidal Oyster Reef
TP9	Yellow Pond Lily	TP18	Intertidal Riprap/Rubble

Tidal wetlands impacts permitted in 1996 by watershed

Vegetated Wetlands (square feet)

WS	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TOTAL
AC	0	0	0	0	0	0	0	246	0	0	2220	5144	7610
BBN	0	206	0	0	0	0	0	10750	0	0	37326	250	48532
ESB	1875	2090	120	170	0	0	0	10750	0	0	37326	250	52581
ESS	15081	6797	0	1065	0	0	0	1345	0	150	0	5165	29603
JR	2110	3650	0	3535	0	0	0	2736	0	0	8185	14967	35183
MPB	11529	518	210	850	0	0	0	0	0	0	0	5192	18299
NNB	1683	0	130	0	0	0	0	0	0	0	0	30	1843
PB	7210	160	100	3460	0	0	0	455	0	0	0	1707	13092
PR	2654	123	80	0	0	0	0	314	0	0	0	1368	4539
RR	12971	580	0	0	0	0	0	0	0	0	0	982	14533
SB	2555	11831	0	9602	0	0	0	0	0	0	0	4818	28806
YR	13699	0	0	4760	0	0	0	6600	0	0	1195	4818	31072

Non-vegetated Wetlands (square feet)

WS	TP13	TP14	TP15	TP16	TP17	TP18	TOTAL
AC		44000	0	0	1956	17000	3453 66409
BBN		0	195	692	0	0	644 1531
ESB		640	800	5480	850	0	644 8414
ESS		0	120	881	1073	0	2037 4111
JR		54320	5773	73990	1880	0	14794 150757
MPB		3660	11318	22326	1765	0	3645 42714
NNB		2048	163	52527	325	0	3924 58987
PB		201300	1092	5162	2049	0	155 209758
PR		18664	2466	51644	2049	0	155 74978
RR		5688	15179	25132	1022	0	544 47565
SB		14000	6388	7033	22292	0	2526 52239
YR		1130	5012	10184	0	0	750 17076

Watershed (WS)

AC =	Atlantic Coast	NNB=	Northern Neck Bayshore
BBN=	Back Bay/North Landing River	PB =	Peninsula Bayshore
ESB=	Eastern Shore Bayside	PR =	Potomac River
ESS=	Eastern Shore Seaside	RR =	Rappahannock River
JR =	James River	SB =	Southern Bayshore
MPB=	Middle Peninsula Bayshore	YR =	York River

Tidal wetlands impacts permitted in 1997 by watershed

Vegetated Wetlands (square feet)

WS	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TOTAL
AC	0	0	0	0	0	0	0	0	0	0	0	0	0
BBN	0	373	0	0	0	0	0	0	0	0	42012	4818	47203
ESB	935	0	0	240	0	0	0	0	0	0	0	185	1360
ESS	3447	182	0	1156	0	0	0	1965	0	0	0	18352	25102
JR	4940	200	525	4572	1877	100	0	100	0	0	11475	46750	70539
MPB	5016	0	20	185	0	0	0	0	0	0	0	11692	16913
NNB	2735	314	20	185	0	0	0	0	0	0	0	11692	14946
PB	12151	0	0	1460	0	0	0	0	0	0	0	8458	22069
PR	1572	90	60	0	0	0	0	0	0	0	0	240	1962
RR	3427	530	136	400	0	0	0	3120	0	0	0	1789	9402
SB	2275	5940	0	12905	0	0	0	50	0	0	0	650	21820
YR	13579	60	0	0	0	0	0	0	0	0	0	29935	43574

Non-vegetated Wetlands (square feet)

WS	TP13	TP14	TP15	TP16	TP17	TP18	TOTAL
AC	2400	0	8020	0	0	750	11170
BBN	0	700	3060	0	0	750	4510
ESB	66503	1100	3961	0	0	3040	74604
ESS	0	950	22226	13615	0	732	37523
JR	52800	19603	111794	9121	0	49058	242376
MPB	1258	23116	27454	270	0	12247	64345
NNB	5962	9206	50171	270	0	12247	77856
PB	0	2543	3158	8360	0	1577	15638
PR	14078	20392	47173	0	0	2203	83846
RR	5231	13067	53355	500	0	2295	74448
SB	50970	9248	4101	34874	0	8978	108171
YR	400	14824	19960	0	0	6746	41930

Community Types

TP1	Saltmarsh Cordgrass	TP10	Saltwort
TP2	Saltmeadow Hay	TP11	Freshwater Mixed
TP3	Black Needlerush	TP12	Brackish Water Mixed
TP4	Saltbush	TP13	Intertidal Beach
TP5	Big Cordgrass	TP14	Sand Flat
TP6	Cattail	TP15	Sand/Mud Mix
TP7	Arrow Arum-Pickerelweed	TP16	Mud Flat
TP8	ReedGrass	TP17	Intertidal Oyster Reef
TP9	Yellow Pond Lily	TP18	Intertidal Riprap/Rubble

Tidal wetlands impacts permitted in 1998 by watershed

Vegetated Wetlands (square feet)

WS	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TOTAL
AC	115	60	0	0	0	0	0	0	0	0	0	29935	30110
BBN	0	247	0	0	0	0	0	0	0	0	650	29935	30832
ESB	758	0	0	630	0	0	0	0	0	0	0	83756	85144
ESS	2045	115	0	170	0	0	0	895	0	0	0	4480	7705
JR	35837	17837	0	14944	0	0	600	13702	0	0	7765	3648	94333
MPB	3887	45	120	220	0	0	0	0	0	0	200	7358	11830
NNB	3157	202	140	598	0	0	0	250	0	0	0	420	4767
PB	12404	694	0	2149	0	0	0	175	0	0	0	38049	53471
PR	2650	124	0	232	0	0	0	0	0	0	200	3724	6930
RR	2420	165	140	188	285	0	0	110	0	0	96	2823	6227
SB	3659	500	25	2512	0	0	0	707	0	0	0	65453	72856
YR	1802	0	0	0	4956	0	0	0	0	0	0	1572	8330

Non-vegetated Wetlands (square feet)

WS	TP13	TP14	TP15	TP16	TP17	TP18	TOTAL
AC	220150	0	7560	345	0	6746	234801
BBN	0	160	4185	180	0	1256	5781
ESB	15725	4434	1390	5295	0	1256	28100
ESS	0	0	2308	5200	0	370	7878
JR	85725	16410	123150	3714	0	29641	258640
MPB	1746	7307	18388	915	0	6494	34850
NNB	5823	7748	42080	1286	0	6494	63431
PB	0	2725	9033	2639	0	6600	20997
PR	32349	17438	14410	1527	0	6585	72309
RR	11192	40320	70810	2078	0	1823	126223
SB	1103600	3654	7244	43557	0	6944	1164999
YR	13815	2747	28622	1320	0	6944	53448

Watershed (WS)

AC =	Atlantic Coast	NNB=	Northern Neck Bayshore
BBN=	Back Bay/North Landing River	PB =	Peninsula Bayshore
ESB=	Eastern Shore Bayside	PR =	Potomac River
ESS=	Eastern Shore Seaside	RR =	Rappahannock River
JR =	James River	SB =	Southern Bayshore
MPB=	Middle Peninsula Bayshore	YR =	York River

Tidal wetlands impacts permitted in 1999 by watershed

Vegetated Wetlands (square feet)

WS	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TOTAL
AC	0	50	0	40	0	0	0	382	0	0	0	1572	2044
BBN	0	420	0	0	0	0	0	1405	0	0	300	12454	14579
ESB	1074	0	0	0	0	0	0	100	0	0	0	2116	3290
ESS	416	0	0	145	0	0	0	2480	0	0	0	18534	21575
JR	7690	1105	300	9852	1038	0	0	16340	0	0	2850	8351	47526
MPB	1659	342	30	2133	0	0	0	0	0	0	0	17398	21562
NNB	228	0	0	30	0	0	0	0	0	0	0	17398	17656
PB	4241	713	0	1784	156	0	0	396	0	0	0	4007	11297
PR	3595	605	0	273	30	100	0	321	0	0	1000	207787	213711
RR	218	204	0	140	0	0	0	100	0	0	0	40	702
SB	3078	3124	0	18483	2050	0	0	22470	0	0	0	12951	62156
YR	1550	40	0	112	0	0	0	896	0	0	230	2526	5354

Non-vegetated Wetlands (square feet)

WS	TP13	TP14	TP15	TP16	TP17	TP18	TOTAL
AC	0	0	946	180	0	6944	8070
BBN	0	4421	18113	0	0	478	23012
ESB	788	2158	1118	1610	0	630	6304
ESS	0	180	5508	1170	0	425	7283
JR	14300	8196	39901	10784	0	17895	91076
MPB	16444	13378	17614	5504	0	1741	54681
NNB	384	61562	1650	280	0	1741	65617
PB	400	3025	16705	2992	0	5789	28911
PR	3564	18170	4355	6964	0	670	33723
RR	5288	14784	6397	1719	0	5005	33193
SB	12225	1539	18829	114622	0	5112	152327
YR	5964	10080	10599	20	0	5112	31775

Community Types

TP1	Saltmarsh Cordgrass	TP10	Saltwort
TP2	Saltmeadow Hay	TP11	Freshwater Mixed
TP3	Black Needlerush	TP12	Brackish Water Mixed
TP4	Saltbush	TP13	Intertidal Beach
TP5	Big Cordgrass	TP14	Sand Flat
TP6	Cattail	TP15	Sand/Mud Mix
TP7	Arrow Arum-Pickerelweed	TP16	Mud Flat
TP8	ReedGrass	TP17	Intertidal Oyster Reef
TP9	Yellow Pond Lily	TP18	Intertidal Riprap/Rubble

Tidal wetlands impacts permitted in 2000 by watershed

Vegetated Wetlands (square feet)

WS	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	Total
AC	180	0	0	0	0	0	0	0	0	0	0	900	1080
BBN	0	277	0	0	0	0	0	400	0	0	11631	8400	20708
ESB	600	350	0	500	0	0	0	0	0	0	0	0	1450
ESS	7295	1515	350	480	0	0	0	1152	0	0	0	825	11617
JR	10577	937	0	5159	282	0	0	2520	0	0	1346	12137	32958
MPB	2287	1010	0	1861	0	0	0	0	0	0	0	3054	8212
NNB	2802	20	460	747	70	0	0	0	0	0	0	4654	8753
PB	2937	468	0	2055	0	0	0	702	0	0	0	3710	9872
PR	1738	894	300	30	0	0	0	235	0	0	21000	3874	28071
RR	3808	830	54	2270	80	0	0	640	0	0	0	3272	10954
SB	4238	4511	0	8299	0	0	0	2991	0	0	0	4670	24709
YR	1500	0	0	0	0	0	0	0	0	0	525	4266	6291

Non-vegetated Wetlands (square feet)

WS	TP13	TP14	TP15	TP16	TP17	TP18	Total
AC	0	550	1817	0	0	0	2367
BBN	0	350	8738	9932	0	744	19764
ESB	11019	0	3050	0	0	600	14669
ESS	12362	1870	12542	1525	0	0	28299
JR	5724	12068	184081	120276	0	9190	331339
MPB	9224	42737	28032	2104	0	1766	83863
NNB	5738	8592	16853	4542	0	1292	37017
PB	0	3045	15511	2626	0	1520	22702
PR	18141	8328	12832	1655	0	4003	44959
RR	19308	11585	51485	5128	0	7258	94764
SB	296	1216	14568	50956	1248	8533	76817
YR	34618	3318	18756	1524	0	5510	63726

Watershed (WS)

AC =	Atlantic Coast	NNB=	Northern Neck Bayshore
BBN=	Back Bay/North Landing River	PB =	Peninsula Bayshore
ESB=	Eastern Shore Bayside	PR =	Potomac River
ESS=	Eastern Shore Seaside	RR =	Rappahannock River
JR =	James River	SB =	Southern Bayshore
MPB=	Middle Peninsula Bayshore	YR =	York River

Tidal Vegetated Wetland Impacts (square feet) Permitted by Locality, 1993-2000

	1993	1994	1995	1996	1997	1998	1999	2000
Accomack County	10336	6379	9182	33158	25042	92681	23219	11867
Arlington	0	0	0	0	0	0	0	0
Caroline	0	0	0	0	0	96	0	0
Charles City County	77890	0	0	0	0	0	1260	40
Chesterfield County	0	0	900	0	0	0	151	480
Chesapeake	1097	711249	11388	9280	28635	27950	5083	5823
Colonial Heights	0	0	0	0	0	0	0	0
Essex County	25	2600	0	0	315	518	180	215
Fairfax County	3	0	0	0	0	0	1000	21010
Fredericksburg	0	0	0	0	0	0	0	0
Gloucester County	2325	3906	3445	3417	11186	6039	18636	7850
Hampton	4716	4327	2370	10070	1505	41193	5479	2155
Henrico	0	0	0	0	0	0	0	0
Hopewell	0	0	0	0	0	0	0	0
Hanover	0	0	0	0	0	0	0	0
Isle of Wight County	0	16350	100	325	4027	470	1780	920
James City County	260	672	25268	2300	355	11301	4948	698
King George County	0	0	3750	0	300	85	206479	762
King and Queen County	0	0	1824	1995	21500	880	0	0
King William County	0	36	0	0	0	0	230	0
Lancaster County	3706	4553	7628	3086	2721	5154	140	6718
Mathews County	6779	8270	7630	7190	12688	1830	5289	4875
Middlesex County	1694	4296	1575	20218	9310	7168	1210	3666
Northampton County	2880	545	13695	700	1420	168	1646	1200
New Kent County	1760	600	420	10785	21580	0	0	525
Newport News	1050	31760	0	1535	20988	302	716	0
Norfolk	3451	5347	5001	8868	8224	46591	31731	10626
Northumberland County	4451	2450	2005	1827	3011	2555	278	11352
City of Petersburg	0	60	0	0	0	0	0	0
Prince George	0	50	0	0	0	790	0	0
Poquoson	1712	856	740	2966	9440	11185	7876	3618
Portsmouth	0	482	26569	195	1330	4565	5478	4266
Prince William County	3000	0	3120	0	0	0	0	0
Richmond City	0	0	0	0	0	0	0	0
Richmond County	360	988	9075	0	0	580	252	1628
Spotsylvania County	0	0	0	0	0	0	0	0
Stafford County	39000	50	0	0	0	400	0	0
Suffolk County	4315	650	100	6090	1820	6820	5605	9650
Surry County	0	0	0	0	0	0	0	0
Virginia Beach	14568	16829	12056	77054	64103	75550	64526	46562
Westmoreland County	3165	2750	2499	3901	230	5959	6182	3440
Williamsburg	0	0	0	0	0	0	0	0
West Point	0	0	0	13200	0	0	896	0
York County	3600	6075	20916	7025	8445	4135	2212	4729
Total	192143	832130	171256	225185	258175	354965	402482	164675

Tidal Non-Vegetated Wetland Impacts (square feet) Permitted by Locality, 1993-2000

	1993	1994	1995	1996	1997	1998	1999	2000
Accomack County	8256	45876	11767	5081	24102	13985	7917	23107
Arlington	0	0	0	0	0	0	0	0
Caroline	0	0	10	0	10	200	0	0
Charles City County	84380	8003	1240	2634	6798	6750	4090	1764
Chesterfield County	0	13663	0	0	0	4700	0	0
Chesapeake	1504	4831	16110	11929	17234	45994	12451	6028
Colonial Heights	0	0	0	0	0	0	0	0
Essex County	1583	899	236	2690	11031	23850	7091	6027
Fairfax County	5426	125	3325	2420	3155	2718	4784	700
Fredericksburg	0	0	0	0	0	0	0	0
Gloucester County	24734	11229	6624	22928	43407	17314	36495	67973
Hampton	25239	10087	7565	208363	8442	19855	10950	6492
Henrico	840	0	1140	0	0	1775	0	0
Hopewell	0	0	0	0	0	240	0	4000
Hanover	0	0	0	0	0	0	0	0
Isle of Wight County	935	17603	11650	1990	16196	82280	4500	1692
James City County	4734	6143	5676	58843	20894	14940	3964	9893
King George County	265	520	4334	5	1219	8149	9392	2863
King and Queen County	0	60	30	426	121	2810	2694	0
King William County	400	75	80	50	0	1950	6792	0
Lancaster County	39268	103200	45237	43931	68961	101623	67674	68588
Mathews County	24904	75802	39333	20370	41658	17302	19434	29808
Middlesex County	18964	36869	14916	23863	28379	35131	30283	63275
Northampton County	17800	3970	56583	6800	88025	20737	5670	19861
New Kent County	1025	3782	2922	515	1650	14398	32	0
Newport News	9811	11178	14884	7237	4368	3158	16013	165265
Norfolk	12987	12613	386567	60170	85966	1175110	38155	106402
Northumberland County	50513	52377	52016	72240	94470	56418	5252	48231
City of Petersburg	0	0	0	0	0	0	0	0
Prince George	0	6234	0	900	200	1800	0	0
Poquoson	4025	8629	542	380	5279	2655	6084	4110
Portsmouth	0	854	14555	1451	41960	7742	1118	4524
Prince William County	0	0	12708	9100	30	4590	0	3633
Richmond City	0	0	100	0	0	0	0	0
Richmond County	2664	33133	6414	4086	2836	893	3021	5688
Spotsylvania County	0	0	0	0	250	0	0	0
Stafford County	4370	2177	510	1201	50	16090	2485	6275
Suffolk County	1090	2980	1150	1370	43810	4900	4110	19256
Surry County	656	134660	8000	0	1000	4050	10590	6944
Virginia Beach	46703	144881	1520327	99674	122199	296774	166150	99141
Westmoreland County	20082	27072	15581	30536	20593	14581	14052	14283
Williamsburg	0	0	0	0	0	0	0	0
West Point	0	0	0	0	0	0	0	0
York County	12828	33187	11913	10055	14693	26123	20932	24476
Total	425986	812712	2274045	711238	818986	2051585	522175	820299

Tidal wetlands impacts permitted in 1988-1992 by locality and wetlands category.*

LOCALITY	Total Vegetated Wetlands (ft ²)					Total Non-Vegetated Wetlands (ft ²)				
	1988	1989	1990	1991	1992	1988	1989	1990	1991	1992
Accomack County	64913	110653	1575675	17654	834602	13187	20145	79263	4536	162330
Arlington	0	0	0	0	0	0	0	0	0	0
Caroline	0	0	0	0	0	70	0	0	0	0
Charles City County	1100	0	0	0	0	1900	1165	1020	3300	8300
Chesterfield County	0	0	0	0	120	1000	203	504	0	0
Chesapeake	12161	18044	32559	1070	31126	67864	87965	13400	2765	15044
Colonial Heights	0	54363	0	0	120	0	0	0	0	312
Essex County	15731	9135	140	0	0	22905	1020	12936	820	2882
Fairfax County	0	300	0	0	816	5010	9830	37071	0	1840
Fredericksburg	0	0	0	0	0	0	0	0	0	0
Gloucester County	591	1750	892	1895	13144	6003	12437	10386	13051	29865
Hampton	9680	36045	5653	3015	60336	31000	484300	22456	2289	1454
Henrico	0	0	0	0	0	950	2300	0	640	3000
Hopewell	0	0	0	0	0	35780	0	0	0	0
Isle of Wight County	1000	25025	100	860	200	800	400	1960	4150	2600
James City County	120	2047	186	1650	2220	4910	6847	64891	1465	7695
King George County	0	2430	985	0	0	240	725	1355	260	562
King & Queen County	0	0	182	0	12257	360	1316	400	0	6960
King William County	0	0	142	0	280	672	730	1249	0	156
Lancaster County	10519	10757	25441	860	4789	40330	139035	67171	31440	44363
Mathews County	1797	5804	128	1335	6201	107332	10782	62475	142001	21658
Middlesex County	1220	3698	1284	339	8886	28338	19446	31051	1831	61146
Northampton County	14030	11485	320	0	13330	5160	32102	7686	40	87089
New Kent County	50	0	0	0	200	830	250	140	1230	1320
Newport News	0	3990	520	40	2139	1560	2416	10920	150	2955
Norfolk	10240	19617	20859	2602	6998	25333	26115	257539	1185	25215
Northumberland Cnty.	9507	212942	39900	4795	5397	30556	88607	161292	7433	34034
City of Petersburg	0	0	0	0	0	0	0	0	0	0
Prince George	0	0	0	0	0	0	0	0	0	0
Poquoson	2250	11839	555	150	2685	6223	8709	1549	439	6210
Portsmouth	3916	104020	500	2400	909	2200	13538	31411	12482	1976
Prince William County	0	100	0	4650	0	15252	1540	502340	0	0
Richmond City	0	0	0	0	0	0	0	7620	0	0
Richmond County	885	619	1390	450	229	995	12427	52524	1484	4253
Spotsylvania County	0	0	0	0	0	0	0	0	0	0
Stafford County	60	1635	6220	0	0	5634	1525	154570	200	2200
Suffolk County	2228	1900	625	270	9980	100	6816	570	755	2230
Surry County	0	0	0	0	0	0	900	720	1220	240
Virginia Beach	18725	99621	80107	14372	50905	204811	65088	81007	64926	41713
Westmoreland County	3291	13701	9851	3060	2808	32740	34328	64853	81221	37172
Williamsburg	550	200	0	0	0	400	100	0	0	0
West Point	300	0	0	500	0	0	0	0	600	0
York County	8670	6022	1122	1870	882	27185	3628	8633	795	24771
TOTAL	193534	767742	1805336	63837	1071559	727630	1096735	1750962	382708	641545

*Excerpted from Wetlands Program Technical Report Number 99-2, February 1999.

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Note:

Most of the publications listed at this address, (particularly the *Wetlands Technical Reports*, *Flora Reports*, *Virginia Wetlands Report*, and *Think Green*) are written for consumption by the general public. If you are interested in information pertaining to wetland functions and values, mitigation/compensation, wetland "critters," or just looking for an interesting place to visit, you may find some of these writings to be of interest.

Further information is available by calling (804) 684-7380.

