

*HOW MUCH
Water
is in the
PEDERNALES?*

*Appendix B:
National Land Cover Database,
2011*

January 2017



THE MEADOWS CENTER
FOR WATER AND THE ENVIRONMENT
TEXAS STATE UNIVERSITY

Class \ Value	Classification Description
Water	
11	Open Water - areas of open water, generally with less than 25% cover of vegetation or soil.
12	Perennial Ice/Snow - areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover.
Developed	
21	Developed, Open Space - areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
22	Developed, Low Intensity - areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.
23	Developed, Medium Intensity -areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.
24	Developed High Intensity -highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.
Barren	
31	Barren Land (Rock/Sand/Clay) - areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.
Forest	
41	Deciduous Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.
42	Evergreen Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.
43	Mixed Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.
Shrubland	
51	Dwarf Scrub - Alaska only areas dominated by shrubs less than 20 centimeters tall with shrub canopy typically greater than 20% of total vegetation. This type is often co-associated with grasses, sedges, herbs, and non-vascular vegetation.
52	Shrub/Scrub - areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
Herbaceous	
71	Grassland/Herbaceous - areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
72	Sedge/Herbaceous - Alaska only areas dominated by sedges and forbs, generally greater than 80% of total vegetation. This type can occur with significant other grasses or other grass like plants, and includes sedge tundra, and sedge tussock tundra.
73	Lichens - Alaska only areas dominated by fruticose or foliose lichens generally greater than 80% of total vegetation.
74	Moss - Alaska only areas dominated by mosses, generally greater than 80% of total vegetation.

Planted/Cultivated	
81	Pasture/Hay -areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.
82	Cultivated Crops -areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively tilled.
Wetlands	
90	Woody Wetlands - areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
95	Emergent Herbaceous Wetlands - Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

URL: http://www.mrlc.gov/nlcd11_leg.php

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Summary of Land Cover Changes - 2001-2011

Gridcode	Land Cover	2001 (m2)	2011 (m2)	Change (m2)	Percent 2001	Percent 2011	Percent Change (meters)	2001 (acres)	2011 (acres)	Change (acres)	2001 (miles ²)	2011 (miles ²)	Change (miles ²)	
11	Open Water	9130349	9353681	223332	0.3%	0.3%	2.4	2256.15	2311.34	55.19	3.5	3.6	0.1	2%
21	Developed, Open Space	47544778	110174068	62629290	1.4%	3.3%	56.8	11748.55	27224.56	15476.01	18.4	42.5	24.2	57%
22	Developed, Low Intensity	7916863	10247913	2331050	0.2%	0.3%	22.7	1956.30	2532.31	576.01	3.1	4.0	0.9	23%
23	Developed, Medium Intensity	3107192	4617046	1509854	0.1%	0.1%	32.7	767.80	1140.90	373.09	1.2	1.8	0.6	33%
24	Developed, High Intensity	1062600	1654268	591668	0.0%	0.0%	35.8	262.57	408.78	146.20	0.4	0.6	0.2	36%
31	Barren Land	215680	1195295	979615	0.0%	0.0%	82.0	53.30	295.36	242.07	0.1	0.5	0.4	82%
41	Deciduous Forest	216866581.8	192792862.6	-24073719	6.5%	5.8%	-12.5	53588.82	47640.08	-5948.74	83.7	74.4	-9.3	-12%
42	Evergreen Forest	680820173	616143417	-64676756	20.5%	18.6%	-10.5	168234.07	152252.12	-15981.95	262.9	237.9	-25.0	-10%
43	Mixed Forest	873268	447324	-425944	0.0%	0.0%	-95.2	215.79	110.54	-105.25	0.3	0.2	-0.2	-95%
52	Shrub/ Scrub	1790920675	1801650629	10729954	54.0%	54.3%	0.6	442545.45	445196.88	2651.43	691.5	695.6	4.1	1%
71	Grassland/	455904292	462892943.6	6988652	13.7%	14.0%	1.5	112656.23	114383.16	1726.93	176.0	178.7	2.7	2%
81	Hay/ Pasture	25610736	24778419	-832317	0.8%	0.7%	-3.4	6328.54	6122.87	-205.67	9.9	9.6	-0.3	-3%
82	Cultivated Crops	75124880	79135887	4011007	2.3%	2.4%	5.1	18563.73	19554.87	991.14	29.0	30.6	1.5	5%

Summary of Land Cover Changes - 2001-2011 Continued

Gridcode	Land Cover	2001 (m2)	2011 (m2)	Change (m2)	Percent 2001	Percent 2011	Percent Change (meters)	2001 (acres)	2011 (acres)	Change (acres)	2001 (miles ²)	2011 (miles ²)	Change (miles ²)	
90	Woody Wetlands	1521136	1541363	20227	0.0%	0.0%	1.3	375.88	380.88	5.00	0.6	0.6	0.0	1%
95	Emergent Herbaceous Wetlands	5915	0	-5915	0.0%	0.0%	-100	1.462	0.00	-0.141	0.0	0.0	0.0	0%
Totals			3316625117	-2	100%	100%	19.33	819554.65	819554.65		1280.6	1280.5		

Lumped Land Cover	Acreage Lumped 2001	Acreage Lumped 2011	2011-2001	Percent Change	2011 (miles ²)	Change (miles ²)
Developed	14735.23	31306.55	16571.32	53%	48.9	25.9
Forest	222038.67	199892.20	-22146.48	-11%	312.3	-34.6
Shrubland	442545.45	445196.88	2651.43	1%	695.6	4.1
Grassland/Herbaceous	112656.23	114383.16	1726.93	2%	178.7	2.7
Planted/Cultivated	24892.27	25677.74	785.47	3%	40.1	1.2
Other	2685.33	2606.70	-78.63	-3%	4.1	-0.1
Totals	819553.19	819063.24	-489.95			

BARREN LAND

Land Gained				
2001 Land Cover Type	2011 Land Cover Type	m2 gained	Acres gained	% of total
Deciduous Forest	Barren Land	124852.5	30.9	12.2
Evergreen Forest	Barren Land	255593.7	63.2	24.9
Grassland/Herbaceous	Barren Land	200108.3	49.4	19.5
Open Water	Barren Land	22205.7	5.5	2.2
Pasture/Hay	Barren Land	6300	1.6	0.6
Shrub/Scrub	Barren Land	416516.8	102.9	40.6
Totals		1025577	253.4	100

Land Lost				
2001 Land Cover Type	2011 Land Cover Type	m2 lost	Acres lost	% of total
Barren Land	Developed, Medium Intensity	5756	1.4	13.6
Barren Land	Developed, High Intensity	17068	4.2	40.4
Barren Land	Grassland/Herbaceous	19387	4.8	45.9
Totals		42211	10.4	100

Total Land Gained or lost (acres): 243.0

CULTIVATED CROPS

Land Gained				
2001 Land Cover Type	2011 Land Cover Type	m2 gained	Acres gained	% of total
Deciduous Forest	Cultivated Crops	9396	4.0	0.1
Evergreen Forest	Cultivated Crops	80281	34.3	1.3
Grassland/Herbaceous	Cultivated Crops	1686034	720.1	26.8
Shrub/Scrub	Cultivated Crops	4518767	1930.0	71.8
Totals		6294478	2688.4	100

Land Lost				
2001 Land Cover Type	2011 Land Cover Type	m2 lost	Acres lost	% of total
Cultivated Crops	Developed, Open Space	6300	1.6	0.9
Cultivated Crops	Developed, Medium Intensity	1800	0.4	0.3
Cultivated Crops	Developed, High Intensity	4500	1.1	0.6
Cultivated Crops	Grassland/Herbaceous	615592	152.1	86.4
Cultivated Crops	Pasture/Hay	84527	20.9	11.9
Totals		712719	176.1	100.0

Total Land Gained or lost (acres): 2,512.3

DECIDUOUS FOREST

Land Gained				
2001 Land Cover Type	2011 Land Cover Type	m2 gained	Acres gained	% of total
Evergreen Forest	Deciduous Forest	38435	9.5	34.4
Grassland/Herbaceous	Deciduous Forest	20951	5.2	18.8
Open Water	Deciduous Forest	3956	1.0	3.5
Shrub/Scrub	Deciduous Forest	48365	12.0	43.3
Totals		111707	27.6	100.0

Land Lost				
2001 Land Cover Type	2011 Land Cover Type	m2 lost	Acres lost	% of total
Deciduous Forest	Cultivated Crops	9396	4.0	0.0
Deciduous Forest	Barren Land	124852	30.9	0.5
Deciduous Forest	Evergreen Forest	7200	1.8	0.0
Deciduous Forest	Developed, Open Space	112588	27.8	0.5
Deciduous Forest	Developed, Medium Intensity	23400	5.8	0.1
Deciduous Forest	Developed, High Intensity	1800	0.4	0.0
Deciduous Forest	Developed, Low Intensity	82601	20.4	0.4
Deciduous Forest	Grassland/Herbaceous	4394684	1085.9	18.8
Deciduous Forest	Shrub/Scrub	18596959	4595.4	79.6
Totals		23353480	5772	100

Total Land Gained or lost (acres): -5,744.8

EVERGREEN FOREST

Land Gained				
2001 Land Cover Type	2011 Land Cover Type	m2 gained	Acres gained	% of total
Deciduous Forest	Evergreen Forest	7200	1.8	7.5
Grassland/Herbaceous	Evergreen Forest	18391	4.5	19.3
Open Water	Evergreen Forest	8100	2.0	8.5
Shrub/Scrub	Evergreen Forest	61838	15.3	64.7
Totals		95529	23.6	100.0

Land Lost				
2001 Land Cover Type	2011 Land Cover Type	m2 lost	Acres lost	% of total
Evergreen Forest	Barren Land	255594	63.2	0.4
Evergreen Forest	Cultivated Crops	82081	35.1	0.1
Evergreen Forest	Deciduous Forest	38435	9.5	0.1
Evergreen Forest	Developed, Open Space	371424	91.8	0.6
Evergreen Forest	Developed, Low Intensity	272442	67.3	0.4
Evergreen Forest	Developed, Medium Intensity	101727	25.1	0.2
Evergreen Forest	Developed, High Intensity	7776	1.9	0.0
Evergreen Forest	Woody Wetlands	49132	12.1	0.1
Evergreen Forest	Shrub/Scrub	52119644	12879	84.8
Evergreen Forest	Pasture/Hay	49193	12	0.1
Evergreen Forest	Open Water	73506	18	0.1
Evergreen Forest	Grassland/Herbaceous	8010586	1979	13.0
Totals		61431540	15195	2

Total Land Gained or lost (acres): -15,171.2

OPEN SPACE

Land Gained				
2001 Land Cover Type	2011 Land Cover Type	m2 gained	Acres gained	% of total
Cultivated Crops	Developed, Open Space	6300	1.6	0.6
Deciduous Forest	Developed, Open Space	112588	27.8	10.3
Evergreen Forest	Developed, Open Space	371424	91.8	34.0
Grassland/Herbaceous	Developed, Open Space	235501	58.2	21.5
Open Water	Developed, Open Space	10800	2.7	1.0
Shrub/Scrub	Developed, Open Space	356749	88.2	32.6
Total		1093362	270.2	100

Land Lost				
2001 Land Cover Type	2011 Land Cover Type	m2 lost	Acres lost	% of total
Developed, Open Space	Developed, Low Intensity	361123	89.2	24.3
Developed, Open Space	Developed, Medium Intensity	897149	221.7	60.5
Developed, Open Space	Developed, High Intensity	225423	55.7	15.2
Totals		1483695	366.6	100

Total Land Gained or lost (acres): -96.5

LOW INTENSITY DEVELOPMENT

Land Gained				
2001 Land Cover Type	2011 Land Cover Type	m2 gained	Acres gained	% of total
Deciduous Forest	Developed, Low Intensity	82601	20.4	6.4
Developed, Open Space	Developed, Low Intensity	361123	89.2	27.9
Evergreen Forest	Developed, Low Intensity	272442	67.3	21.0
Grassland/Herbaceous	Developed, Low Intensity	159575	39.4	12.3
Open Water	Developed, Low Intensity	13500	3.3	1.0
Shrub/Scrub	Developed, Low Intensity	405275	100.1	31.3
Totals		1294516	319.9	100

Land Lost				
2001 Land Cover Type	2011 Land Cover Type	m2 lost	Acres lost	% of total
Developed, Low Intensity	Developed, Medium Intensity	205481	50.8	55.4
Developed, Low Intensity	Developed, High Intensity	165751	41.0	44.6
Totals		371232	91.7	100

Total Land Gained or lost (acres): 228.1

MEDIUM INTENSITY DEVELOPMENT

Land Gained				
2001 Land Cover Type	2011 Land Cover Type	m2 gained	Acres gained	% of total
Barren Land	Developed, Medium Intensity	5756	1.4	0.4
Cultivated Crops	Developed, Medium Intensity	1800	0.4	0.1
Deciduous Forest	Developed, Medium Intensity	23400	5.8	1.6
Developed, Low Intensity	Developed, Medium Intensity	205481	50.8	14.1
Developed, Open Space	Developed, Medium Intensity	897149	221.7	61.5
Evergreen Forest	Developed, Medium Intensity	101727	25.1	7.0
Grassland/Herbaceous	Developed, Medium Intensity	87538	21.6	6.0
Open Water	Developed, Medium Intensity	3600	0.9	0.2
Shrub/Scrub	Developed, Medium Intensity	131477	32.5	9.0
Totals		1457928	360.3	100

Land Lost				
2001 Land Cover Type	2011 Land Cover Type	m2 lost	Acres lost	% of total
Developed, Medium Intensity	Developed, High Intensity	22500	5.6	100.0

Total Land Gained or lost (acres): 354.7

HIGH INTENSITY DEVELOPMENT

Land Gained				
2001 Land Cover Type	2011 Land Cover Type	m2 gained	Acres gained	% of total
Barren Land	Developed, High Intensity	17068	4.2	3.1
Cultivated Crops	Developed, High Intensity	4500	1.1	0.8
Deciduous Forest	Developed, High Intensity	1800	0.4	0.3
Developed, Low Intensity	Developed, High Intensity	165751	41.0	30.0
Developed, Medium Intensity	Developed, High Intensity	22500	5.6	4.1
Developed, Open Space	Developed, High Intensity	225423	55.7	40.7
Evergreen Forest	Developed, High Intensity	7776	1.9	1.4
Grassland/Herbaceous	Developed, High Intensity	67806	16.8	12.3
Open Water	Developed, High Intensity	1800	0.4	0.3
Shrub/Scrub	Developed, High Intensity	38953	9.6	7.0
Totals		553377	136.7	100

Land Lost				
2001 Land Cover Type	2011 Land Cover Type	m2 lost	Acres lost	% of total
	NONE			

Total Land Gained or lost (acres): None

GRASSLAND HERBACEOUS

Land Gained				
2001 Land Cover Type	2011 Land Cover Type	m2 gained	Acres gained	% of total
Barren Land	Grassland/Herbaceous	19387	4.8	0.1
Cultivated Crops	Grassland/Herbaceous	615590	152.1	2.2
Deciduous Forest	Grassland/Herbaceous	4394050	1085.8	15.6
Evergreen Forest	Grassland/Herbaceous	8010481	1979.4	28.4
Open Water	Grassland/Herbaceous	11811	2.9	0.0
Pasture/Hay	Grassland/Herbaceous	203527	50.3	0.7
Shrub/Scrub	Grassland/Herbaceous	14987966	3703.6	53.1
Woody Wetlands	Grassland/Herbaceous	900	0.2	0.0
Total		28243712	6979.2	100

Land Lost				
2001 Land Cover Type	2011 Land Cover Type	m2 lost	Acres lost	% of total
Grassland/Herbaceous	Barren Land	200109	49.4	8.1
Grassland/Herbaceous	Cultivated Crops	1686033	720.1	68.1
Grassland/Herbaceous	Deciduous Forest	20952	5.2	0.8
Grassland/Herbaceous	Evergreen Forest	18391	4.5	0.7
Grassland/Herbaceous	Developed, Open Space	235501	58.2	9.5
Grassland/Herbaceous	Developed, Low Intensity	159575	39.4	6.4
Grassland/Herbaceous	Developed, Medium Intensity	87538	21.6	3.5
Grassland/Herbaceous	Developed, High Intensity	67806	16.8	2.7
Total		2475905	915	100

Total Land Gained or lost (acres): 6,063.9

OPEN WATER

Land Gained				
2001 Land Cover Type	2011 Land Cover Type	m2 gained	Acres gained	% of total
Evergreen Forest	Open Water	73506	18.2	23.8
Grassland/Herbaceous	Open Water	124143	30.7	40.3
Shrub/Scrub	Open Water	110664	27.3	35.9
Totals		308313	76.2	100

Land Lost				
2001 Land Cover Type	2011 Land Cover Type	m2 lost	Acres lost	% of total
Open Water	Barren Land	22206	5.5	34.7
Open Water	Deciduous Forest	3956	1.0	6.2
Open Water	Evergreen Forest	8100	2.0	12.7
Open Water	Developed, Open Space	10800	2.7	16.9
Open Water	Developed, Low Intensity	13500	3.3	21.1
Open Water	Developed, Medium Intensity	3600	0.9	5.6
Open Water	Developed, High Intensity	1800	0.4	2.8
Totals		63962	16	100

Total Land Gained or lost (acres): 60.4

PASTURE HAY

Land Gained				
2001 Land Cover Type	2011 Land Cover Type	m2 gained	Acres gained	% of total
Cultivated Crops	Pasture/Hay	84526	20.9	11.5
Evergreen Forest	Pasture/Hay	49193	12.2	6.7
Grassland/Herbaceous	Pasture/Hay	240348	59.4	32.6
Shrub/Scrub	Pasture/Hay	364032	90.0	49.3
Totals		738099	182.4	100

Land Lost				
2001 Land Cover Type	2011 Land Cover Type	m2 lost	Acres lost	% of total
Pasture/Hay	Grassland/Herbaceous	203527	50.3	15.1
Pasture/Hay	Barren Land	6300	1.6	0.5
Pasture/Hay	Shrub/Scrub	1134455	280.3	84.4
Totals		1344282	332.2	100.0

Total Land Gained or lost (acres): -149.8

SHRUB SCRUB

Land Gained				
2001 Land Cover Type	2011 Land Cover Type	m2 gained	Acres gained	% of total
Cultivated Crops	Shrub/Scrub	861264	212.8	1.1
Deciduous Forest	Shrub/Scrub	18595679	4595.1	24.0
Evergreen Forest	Shrub/Scrub	52114721	12877.8	67.4
Grassland/Herbaceous	Shrub/Scrub	4633874	1145.1	6.0
Mixed Forest	Shrub/Scrub	9771	2.4	0.0
Open Water	Shrub/Scrub	12600	3.1	0.0
Pasture/Hay	Shrub/Scrub	1134457	280.3	1.5
Totals		77362366	19116.6	100

Land Lost				
2001 Land Cover Type	2011 Land Cover Type	m2 lost	Acres lost	% of total
Shrub/Scrub	Barren Land	416518.7	102.9	1.9
Shrub/Scrub	Cultivated Crops	4518769	1930.0	21.0
Shrub/Scrub	Deciduous Forest	48365	12.0	0.2
Shrub/Scrub	Evergreen Forest	61837	15.3	0.3
Shrub/Scrub	Developed, Open Space	356749	88.2	1.7
Shrub/Scrub	Developed, Low Intensity	405275	100.1	1.9
Shrub/Scrub	Developed, Medium Intensity	131477	32.5	0.6
Shrub/Scrub	Developed, High Intensity	38953	9.6	0.2
Shrub/Scrub	Grassland/Herbaceous	14987966	3703.6	69.8
Shrub/Scrub	Open Water	110664	27.3	0.5
Shrub/Scrub	Pasture/Hay	364032	90.0	1.7
Shrub/Scrub	Woody Wetlands	32397	8.0	0.2
Totals		21473002.7	6111.5	99.84912683

Total Land Gained or lost (acres): 13,005.2

WOODY WETLANDS

Land Gained				
2001 Land Cover Type	2011 Land Cover Type	m2 gained	Acres gained	% of total
Evergreen Forest	Woody Wetlands	49132	12.1	60.3
Shrub/Scrub	Woody Wetlands	32397	8.0	39.7
Total		81529	20.1	100.0

Land Lost				
2001 Land Cover Type	2011 Land Cover Type	m2 lost	Acres lost	% of total
Woody Wetlands	Grassland/Herbaceous	900	0.2	100.0