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Cities, Towns, the Connecticut DEP and the Conservation of Inland Wetlands

Contents

- I. Difference in Wetlands Regulation Between Towns with Separate Wetlands Commissions and Those Where Wetlands is Combined with Zoning P. 2
- II. The Performance of Non-reporting Towns in Protecting Wetlands in 2005 P. 3
- III. Failure to Report to the DEP as Related to Town Size P. 4
- IV. Statewide Inland Wetlands & Watercourses Activity Reporting Form P. 5
- V. Difference in Performance Between Trained and Untrained Commissions. P.6-10

Note to Reader

The data in these analyses were drawn from the DEP's files and municipal records. The analyses were designed to identify trends accurately even if the data contain a few inaccuracies. The lists of municipalities that are "untrained," for example, is believed to have one or two inaccuracies (for the reasons explained below), and some of the towns listed as "non-reporting" have submitted data recently for the missing years. The report's emphasis is on the numerical trends, not the individual towns. Much of the text in this document is in draft or "notes" form.



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October 1, 2008

I. The difference in wetlands regulation between towns with independent wetlands commissions and those where the wetlands is combined with the zoning commission

The following table lists the nine towns in Connecticut in which there are combined In-land Wetlands and Planning and Zoning commissions. The data below suggest that combined commissions are allowing significantly more wetlands to be altered.

Town	# of Permits		Acres Altered		Acres Altered per Permit**		# of Denials	
	2004	2005	2004	2005	2004	2005	2004	2005
Bridgeport	11	4	0.91	0.029	0.0827	0.0073	0	1
Farmington	7	5	1.135	0.082	0.1621	0.0164	3	0
Hartford	1	2	0	0.06	0	0.0300	0	0
Manchester	18	11	1.103	0.232	0.0613	0.0211	0	1
Mansfield	27	4	0.3	"X"	0.0111	"X"	1	0
New Haven	2	3	0.054	0.284	0.0270	0.0947	0	2
Ridgefield	29	41	1.084	1.572	0.0374	0.0383	1	3
Union	2	3	0.1	0.009	0.0500	0.0030	0	0
West Hartford	29	32	1.968	2.66	0.0679	0.0831	3	0
<i>Totals/Averages</i>	<i>126</i>	<i>105</i>	<i>6.654</i>	<i>4.928</i>	<i>0.0528*</i>	<i>0.0469*</i>	<i>8</i>	<i>7</i>

"X" indicates missing data; was not included in the computed average for the year.

*Averages of Acres altered per Permit for both 2004 and 2005 far exceeded the state averages of 0.0220 and 0.0250, respectively.

II. The performance of non-reporting towns in protecting wetlands in 2005

The two charts below show that non-reporting towns are not having problems protecting their wetlands:

A. Acres Altered per Permit for the five towns visited of the thirteen chronic non-reporting towns

Town (population)	Trained?	# Applications	Total Acres Altered	Acres Altered per Permit** (State average =0.025)
Marlborough (6,321)	Yes	22	0.0300	0.00136
Durham (7,358)	NO	16	0.0195	0.00122
Brooklyn* (7,815)	Yes	8	0.4810	0.06013
Berlin (20,137)	NO	22	0.2004	0.00911
South Windsor (26,030)	NO	27	0.0718	0.00266

*If the one permit of 0.48 acres altered is taken out, Brooklyn only has 0.001 total acres altered with 0.000125 acres altered per permit, far below the state average and the four other states above

**The average acres altered per permit for the five towns combined was 0.0084, well below the state average.

B. % Applications Denied & Town Population

The chart below shows that, among non-reporting towns, the more populous towns denied a larger percentage of applications in 2005. The two smallest towns did not deny any applications but they did have a significant amount of applications withdrawn before the process was completed, a practice that applicants have used to avoid being denied while also giving them a chance to modify their plans so they will be more likely to be approved.

Town (Population)	% Applications denied (2005)	Town Population	% Applications denied (2005)
Marlborough (6,321)	0.000%	Berlin (20,137)	0.137%
Durham (7,358)	0.000%	South Windsor (26,030)	0.148%
Brooklyn (7,815)	0.125%		

Although Marlborough and Durham had no applications denied during 2005, a number of cease and desist orders were given, especially in Durham where they gave out six in 2005.

III. Failure to report to the DEP as related to town size

<u>Town (Population)</u>	<u>Failed to Report 2004-2007</u>	<u>Town (Population)</u>	<u>Failed to Report 2004-2007</u>
Small (<15,000)		Medium (15,001 - 40,000)	
Cornwall (1,489)	2004-2007	Ansonia (18,650)	2001, 2003-2007
Sprague (2,986)	2003-2007	Berlin (20,137)	2000-2007
Salisbury (4,047)	2000-2007	Watertown (22,347)	2000-2002, 2004-2007
Marlborough (6,321)	2000-2007	South Windsor (26,030)	2004-2007
Killingworth (6,438)	2002-2007	Glastonbury (33,077)	2002-2007
Westbrook (6,617)	2000, 2003-2007		
Durham (7,358)	2004-2007		
Brooklyn (7,815)	2000-2007		

NOTE: Glastonbury, and perhaps other towns on this list, recently submitted reports for the years indicated (after the completion of the Council's study).

IV. Statewide Inland Wetlands & Watercourses Activity Reporting Form



State of Connecticut-DEP, Inland Water Resources Division
 79 Elm Street, 3rd Floor
 Hartford, CT 06106-5127
www.ct.gov/dep

GIS CODE# _____
For DEP Use Only

Statewide Inland Wetlands & Watercourses Activity Reporting Form

Please note: complete, print, sign and mail this form in accordance with the instructions above

PART I: To Be Completed By The Municipal Inland Wetlands Agency Only

1. DATE ACTION WAS TAKEN (use drop-down box): Year 2008 Month June
2. ACTION TAKEN (use drop-down box):
3. WAS A PUBLIC HEARING HELD (Select one only)? Yes No
4. NAME OF AGENCY OFFICIAL VERIFYING AND COMPLETING THIS FORM:
 (print) _____ (signature) _____

PART II: To Be Completed By The Municipal Inland Wetlands Agency Or The Applicant

5. TOWN IN WHICH THE ACTION IS OCCURRING: _____
 Does this project cross municipal boundaries (Select one only)? Yes No
 If Yes, list the other town(s) in which the action is occurring: _____
6. LOCATION: [USGS Quad Map Name](#)(see hyperlink): _____ AND [Quad Number](#) (see hyperlink): _____
 Subregional Drainage [Basin Number](#) (see hyperlink): _____
7. NAME OF APPLICANT, VIOLATOR OR PETITIONER: _____
8. NAME & ADDRESS/LOCATION OF PROJECT SITE: : _____

- Briefly describe the action/project/activity: Temp. Permanent

9. ACTIVITY PURPOSE CODE (Use drop-down box):
10. ACTIVITY TYPE CODE(S) (Use drop-down box) 12 . 4 . 1 . 12
11. WETLAND / WATERCOURSE AREA ALTERED [must be provided in acres or linear feet as indicated]:
 Wetlands: _____ acres Open Water Body: 0 acres Stream: 0 linear feet
12. UPLAND REVIEW AREA ALTERED [must be provided in acres as indicated]: 0 acres
13. AREA OF WETLANDS AND / OR WATERCOURSES RESTORED, ENHANCED OR CREATED: _____ acres
 [must be provided in acres as indicated]

DATE RECEIVED:	PART III: To Be Completed By The DEP	DATE RETURNED TO DEP:
FORM COMPLETED: YES NO		FORM CORRECTED / COMPLETED: YES NO

V. Difference in Performance Between Trained and Untrained Commissioners. (Excerpted from a regression analysis done for the CEQ by Carmel Zahran, a CEQ intern from Trinity College)

Methodology:

Using archived Activity Reporting Forms held by the DEP, 427 reports were pulled at random between the years 2001 and 2006. The information contained in these reports was entered into SPSS, a statistical analysis software, which helped to answer trends regarding inland wetlands.

Conclusions:

Training, road construction, and home improvement were the only independent variables to show any statistical significance in their impact towards area of wetland and upland review area altered. Therefore, the following results will focus on these variables.

In The Wetland Area:

Training: The size of the coefficient is -.036, which means that on average, the presence of a trained commissioner is associated with the alteration of .036 fewer wetland acres of wetland for each permit granted for wetland alteration.

- In other words, if 100 permits were approved to alter wetlands by a trained commissioner as opposed to an untrained commissioner, the alteration of 3.6 acres of wetland will be avoided.
- In 19 out of 20 cases (i.e. the 95% confidence interval), a trained commissioner will prevent the alteration of .011 to .061 acres of wetland compared to similar cases handled by an un-trained commissioner.
- The estimated total amount of avoided wetland alteration between 2001 and 2006 due to the presence of trained commissioners is 132.53 acres¹.

Road Construction: The size of the coefficient is .02, which means that the average effect of road construction is the alteration of an additional .02 acres of wetland compared to permits granted without road construction.

- In other words, for every 100 permits approved to alter wetlands for road construction, an additional 2 acres of wetland alteration will occur.
- In 19 out of 20 cases in which road construction is a permitted activity, the estimated range of additional wetland alteration is between .002 and .042 acres.
- The estimated total amount of acreage altered due to permitted road construction between 2001 and 2006 is 73.63 acres.
- The effects of other land-altering activities such as a drainage improvement did not rise to the level of statistical significance and were thus excluded from the discussion of results.

Home Improvement: The mathematical model used in this study compares the alteration of wetlands for home improvement to the average acreage of wetland altered for other purposes. The regression coefficient is -.02, which means that the average acreage of wetland altered due to home improvement is .02 fewer acres than the average for all other purposes combined. The results do not infer that home improvement prevents the alteration of wetland. Rather, they demonstrated that, in comparison to other allowed purposes, home improvement requires comparatively less wetland disturbance.

This result is not surprising as home improvements can be small in scale opposed to larger purposes such as commercial or home development. However, this is still meaningful from a policy perspective because it indicates that there are ways to improve homes without altering wetlands. In other words, study results suggest that wetland laws do not prevent people from improving their homes.

In The Upland Review Area:

The upland review model followed the same trends as the wetland model. However, in nearly all cases, the area of alteration is significantly greater for the upland review area.

¹ Calculation: (average acreage of the dependent effected by the independent) x (total number of permits issued between 2001-2006) x (percentage of the independent in terms of the dependent)

Training: Training does not have a statistically significant effect on the acreage of upland review area altered.

Road Construction: The size of the coefficient is .841, which means that the average effect of road construction alters .841 more acres of upland review area than permits granted without road construction.

- In other words, if 100 permits were approved to alter uplands for road construction, 84.1 acres will be lost.
- In 19 out of 20 cases in which road construction is an activity, the estimated range of upland alteration is between .257 and 1.425 acres.
- The estimated total amount of upland review area altered due to permitted road construction between 2001 and 2006 is 12,260.34 acres.
- The effects of other land-altering activities such as a drainage improvement did not rise to the level of statistical significance as road construction and were thus excluded from the discussion of results.

Home Improvement: The coefficient is -.653, which means that the average acreage of upland review area altered due to home improvement is .653 fewer acres per permit than the average of all other purposes combined. As noted above, the results do not infer that home improvement prevents the alteration of upland review areas. Rather, they demonstrate that, in comparison to other allowed purposes, home improvement requires comparatively less land disturbance. The inference for policy makers is, as above, enforcement of wetlands laws does not appear to conflict with home improvement.

Explanation of Research Methods and Sampling Protocol:

Data for this study were taken from wetlands permit reports submitted to DEP between the years 2001 and 2006. DEP files the reports in order of the permit submitted. Regression model data are based upon a stratified random sample of the permit numbers, as filed numerically and by year. Using the ‘random function’ of Microsoft Excel, I multiplied this function by the total number of permits DEP had filed for each year. The list of numbers generated corresponds with the numbers labeling specific permits. For each year, I pulled 13 different permits randomly and recorded data for this permit as well as the following five permits in numerical order, skipping permits for ‘map amendments’ and those with obvious flaws, continuing with the next permit in order.

The information recorded includes:

Town Name	Activity Type Code
GIS Code	Wetland Altered
Action Taken	Open Water Body Altered
Public Hearing	Stream Altered
Municipal Boundaries	Upland Altered
Activity Purpose Code	Wetlands Restored

CEQ research on which towns had trained commissioners was also entered in the dataset. This dataset is available in Microsoft Excel format, but was converted into SPSS for statistical analysis. All variables entered into SPSS² are given a numerical value. Each permit is identified by an eight digit number, the first four digits reflecting the year the permit was submitted and the remaining four digits referring to the GIS number assigned by DEP. Each town is given a number that corresponds to the order in which it falls alphabetically. Similarly, the purpose values correspond to a corresponding letter in the alphabet (i.e. a purpose code of 1 = A). For all variables with a 1 or 0 value, a 1 means the action happened, a 0 means the action did not happen. This is referred to as a dummy variable.

A linear regression estimates the average effects of an independent variable on a dependent variable. Ordinary least squares (OLS) is the appropriate regression technique because the dependent variable is measured in acres and OLS can estimate the effects of independent variables that are measured as either

² SPSS is a computer program used for statistical analysis licensed for student use by Trinity College, Hartford, CT

present or not (i.e. dichotomous or dummy variables coded as ones or zeros). The two dependent variables examined in this study are wetland altered and upland review area altered. Other potential dependent variables include open water body area altered, stream altered, and wetland area restored. However, the sample did not include enough cases for OLS to reliably estimate relationships between the independent variables and the omitted dependent variables. Therefore, these measures were not included in the study. The independent variables included in the final regression are:

- Drain improvement
- Training
- Hearing
- Road construction
- Home improvement
- Single Family Home Development
- Commercial Purpose

Table 1: Regression Estimates of Factors that Influence Wetland Alteration

Regression:

Acreage of Wetland Altered= A + b1 (Drain improvement) + b2 (Training) + b3 (Hearing) + b4 (Road Construction) + b5 (Home Improvement) + b6 (Single Family Development) + b7 (Commercial Development)

R-Square: .053

Note: The Dependent Variable is the area of Wetland Altered.

Independent Variable	Coefficient (std error)	T-statistic
Constant	0.058 (.014)	4.022
Drainage Improvement	0.012 (.013)	0.929
Training	-0.036*** (.013)	-2.848
Hearing	0.013 (.015)	0.866
Road Construction	0.02* (.011)	1.772
Home Improvement	-0.02* (.011)	-1.8
Single Home Development	-0.003 (.014)	-0.254
Commercial Purpose	0.002 (.016)	0.142

*** $P < .01$ * $P < .10$

Source: Data taken from a sample of DEP permits dated 2001-2006 on file in 79 Elm Street, Hartford, CT 06106. Records accessed by the author at November, December, 2007.

Table 2: Regression Estimates of Factors that Influence Upland Review Alteration

Regression:

Acreege of Upland Review Area Altered= A + b1 (Drain improvement) + b2 (Training) + b3 (Hearing) + b4 (Road Construction) + b5 (Home Improvement) + b6 (Single Family Development) + b7 (Commercial Development)

R-Square: .102

Note: The Dependent Variable is the area of Upland Review Area Altered.

Independent Variable	Coefficient (std. error)	T-statistic
Constant	0.936 (.383)	2.442
Drainage Improvement	0.656 (.411)	1.596
Training	-0.346 (.313)	-1.106
Hearing	-0.161 (.387)	-0.415
Road Construction	0.841*** (.297)	2.832
Home Improvement	-0.653** (.302)	-2.162
Single Home Development	0.247 (.359)	0.688
Commercial Purpose	-0.198 (.413)	-0.479

*** P < .01 ** P < .05

Source: Data taken from a sample of DEP permits dated 2001-2006 on file in 79 Elm Street, Hartford, CT 06106. Records accessed by the author at November, December, 2007.

Table 3: List of CT Towns with Untrained Commissioners (at time of study)

Ashford	Franklin	Scotland
Berlin	Hamden	Sharon
Bridgeport	Hampton	Somers
Bridgewater	Hartland	South Windsor
Burlington	Madison	Sprague
Canaan	Middlebury	Strafford
Colebrook	Montville	Stratford
Columbia	Morris	Union
Cornwall	New Britain	Voluntown
Durham	New Haven	Warren
Eastford	North Canaan	West Haven
East Granby	Preston	
Farmington	Prospect	

Table 4: List of CT Towns that did not report for more than 2 out of the 6 years between 2000 and 2005

Ansonia	Marlborough	Sprague
Berlin	Meriden	Vernon
Bethel	Middletown	Watertown
Brooklyn	Norfolk	West Haven
Chester	North Branford	Westbrook
Derby	North Canaan	Woodstock
Glastonbury	Preston	
Granby	Salisbury	
Hartland	Scotland	
Killingworth	Shelton	

Please see note on page 4 regarding recent changes to these lists.