

**Litter Collected in Island County
by Adopt-A-Road and Adopt-A-Highway,
2001-2004**

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I. Introduction

Adopt-A-Road and Adopt-A-Highway are two programs that recruit volunteer organizations to pick up roadside litter in Island County. Adopt-A-Highway (AAH), administered by Washington Department of Transportation, collects litter along SR 525 and SR 20 on Whidbey and along SR 532 east of Terry's Corner on Camano. Groups under Adopt-A-Road (AAR), administered by Island County Public Works Department, collect litter along adopted sections of many county roads.

This report analyzes the record of litter deliveries to Island County Solid Waste by AAR and AAH during the years 2001 through 2004 using weight records obtained from Island County Solid Waste Department.

II. Adopt-A-Road

Roadside litter collected in Island County by AAR groups in a year ranged from 3.43 tons in 2001 to 7.46 tons in 2002 (Table 1).

2001			2002		
	<u>Tons</u>	<u>Pounds</u>		<u>Tons</u>	<u>Pounds</u>
TOTAL	3.43	6,860	TOTAL	5.89	11,780
AVERAGE	0.06	118	AVERAGE	0.10	203
STD DEV	0.06	113	STD DEV	0.16	329
RANGE	0.01-0.30	20-600	RANGE	0.01-0.34	20-680

2003			2004		
	<u>Tons</u>	<u>Pounds</u>		<u>Tons</u>	<u>Pounds</u>
TOTAL	3.84	7,680	TOTAL	4.05	8,100
AVERAGE	0.08	167	AVERAGE	0.07	147
STD DEV	0.10	191	STD DEV	0.18	352
RANGE	0.01-0.49	20-980	RANGE	0.01-1.31	20-2,620

Table 1. Weight of Adopt-A-Road litter recorded each year, including the average, standard deviation and range among all records for that year.

AAR groups drop off their bagged litter at no charge at four disposal sites: Coupeville, Bayview, Oak Harbor and Camano (Tables 2a and 2b and Figure 1). Camano received the highest quantity (by weight) of litter in all years except 2001, even though Coupeville had many more dropoff dates per year than Camano (Table 3). This may be due in part to an island-wide cleanup day on Camano each spring. For example, on 1 June 2002, Camano recorded 22 weights totaling 2.48 tons. Overall, of the 18.8 tons of roadside litter collected by AAR in Island County from 2001 through 2004, 58% was on Whidbey and 42% on Camano.

Adopt-A-Road and Adopt-A-Highway, 2001 -2004

Annual Total (Tons)	Coupeville	Bayview	Oak Hbr	Camano	TOTAL
2001	1.59	0.77	0.00	1.07	3.43
2002	2.57	0.20	1.72	2.97	7.46
2003	1.69	0.11	0.17	1.87	3.84
2004	<u>1.70</u>	<u>0.14</u>	<u>0.25</u>	<u>1.96</u>	<u>4.05</u>
	7.55	1.22	2.14	7.87	18.78

Table 2a. Weight in tons of Adopt-A-Road litter dropped at the four collection sites each year.

Annual Total (Pounds)	Coupeville	Bayview	Oak Hbr	Camano	TOTAL
2001	3,180	1,540	0	2,140	6,860
2002	5,140	400	3,440	5,940	14,920
2003	3,380	220	340	3,740	7,680
2004	<u>3,400</u>	<u>280</u>	<u>500</u>	<u>3,920</u>	<u>8,100</u>
	15,100	2,440	4,280	15,740	37,560

Table 2b. Weight in pounds of Adopt-A-Road litter dropped at the four collection sites each year.

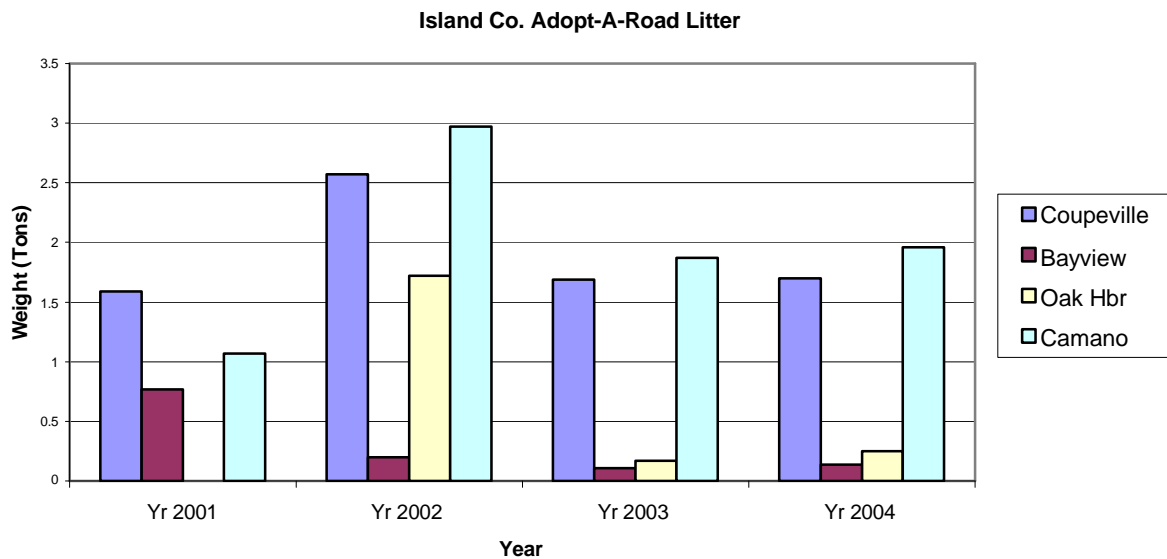


Figure 1. Litter collected by Adopt-A-Road volunteers in Island County in 2001-2004.

At the Coupeville and Camano disposal sites, vehicles are weighed on entry and again on exit, the difference being the weight of the litter. The scale records weights in 20-pound increments; 0.1 tons is 20 pounds (1 ton being 2,000 pounds). The Bayview and Oak Harbor disposal sites do not have scales, so the litter is put in cans and the unit of measure is volume, with weight calculated based on the number of cans at an estimated 50 pounds per can.

The months reflecting the highest number of litter cleanups by AAR groups were March, April, May and October (Table 3).

	2001				2002				2003				2004				TOTALS
	Coupeville	Bayview	Oak Hbr	Camano	Coupeville	Bayview	Oak Hbr	Camano	Coupeville	Bayview	Oak Hbr	Camano	Coupeville	Bayview	Oak Hbr	Camano	
Jan	0	0		2	1	0		0	0	0		0	0	0		1	4
Feb	0	0		4	3	0		1	1	0		1	1	0		3	14
Mar	2	2		1	1	1		0	4	0		0	7	1		0	19
Apr	3	1		1	5	0	2	0	4	0		2	4	0		0	22
May	5	1		0	7	0		1	3	0		1	2	0		1	21
Jun	0	0		2	2	0		1	1	0	1	2	3	2		1	15
Jul	2	1		1	1	0		0	2	1		0	1	0		1	10
Aug	6	1		1	1	1		1	2	0		0	1	0		0	14
Sep	0	0		1	2	0		0	3	1		2	1	0		1	11
Oct	7	0		1	7	0	1	1	4	0		2	7	0	1	1	32
Nov	1	0		0	1	0		1	3	0	1	1	2	1		0	10
Dec	0	0		2	1	0		0	0	0		1	1	0		0	5
Total	26	6	0	16	32	2	3	6	26	2	2	12	30	4	1	9	177

Table 3. Number of drop-off dates at each site each month of the year. All drop-offs on a single date were counted as one event unless marked as two separate groups

In trying to determine whether the varying quantities of litter reflect the amount of volunteer effort or the actual amount of litter on the roadsides, I examined the data two ways for correlations between volunteer effort and quantity of litter collected. The first is to consider each spreadsheet row (i.e., each trip across the weigh scale) as a separate record (Table 4).

Number of records	Coupeville	Bayview	Oak Hbr	Camano	TOTALS
2001	38	6	0	16	60
2002	45	2	3	27	77 ¹
2003	29	3	2	12	46
2004	<u>41</u>	<u>4</u>	<u>1</u>	<u>9</u>	<u>55</u>
	153	15	6	64	238

¹ (22 of these were on 1 June 2002 on Camano)

Table 4. Number of records for each site per year.

However, a single pickup event often includes several records because multiple vehicle loads pass over the scale. Table 5 combines multiple records on the same date at the same location into a single number, on the assumption that all records on the same day are likely to represent a single volunteer group's pick-up. (An exception was made in a few cases where an attendant's notation specified two different groups on the same date.)

Number of dates	Coupeville	Bayview	Oak Hbr	Camano	TOTALS
2001	26	6	0	16	48
2002	32	2	3	6	43
2003	26	2	2	12	42
2004	<u>30</u>	<u>4</u>	<u>1</u>	<u>9</u>	<u>44</u>
	114	14	6	43	177

Table 5. Number of dates for each site per year.

Some cautions must accompany the combining of records by date.

1. In the majority of cases the volunteer group was not recorded on the data sheet, thus some of the records lumped may represent more than one group collecting on the same day.

2. Some groups may drop off litter from a single clean-up event on multiple days. For example in 2001 litter is recorded from Coupeville Lions on May 18 and 19, and on October 4, 12 and 15. It is unclear whether these represent two collection events, five collection events, or something between.

To examine whether there may be a correlation between amount of effort and quantity of litter collected in a year, the following charts compare total weight of litter collected in a year with number of scale records for that year (Figure 2), and number of drop-off days for that year (Figure 3). The graphs use the data in Table 6.

Year	Tons	No. Records	No. Dates
2001	3.43	60	48
2002	7.46	77	43
2003	3.84	46	42
2004	4.05	55	44

Table 6. Number of records versus number of separate days reflected in litter totals recorded for Adopt-A-Road in 2001-2004

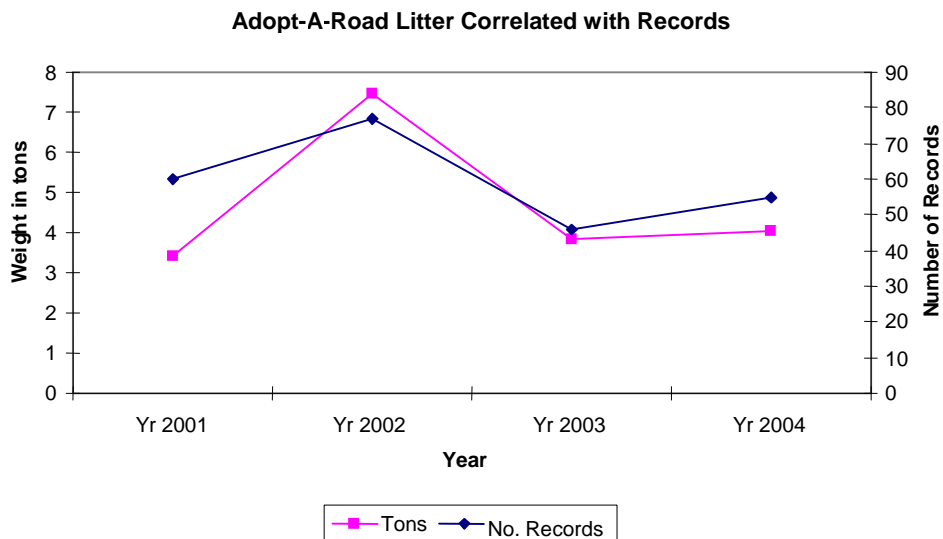


Figure 2. Weight of litter collected by AAR each year compared with number of weight records that year.

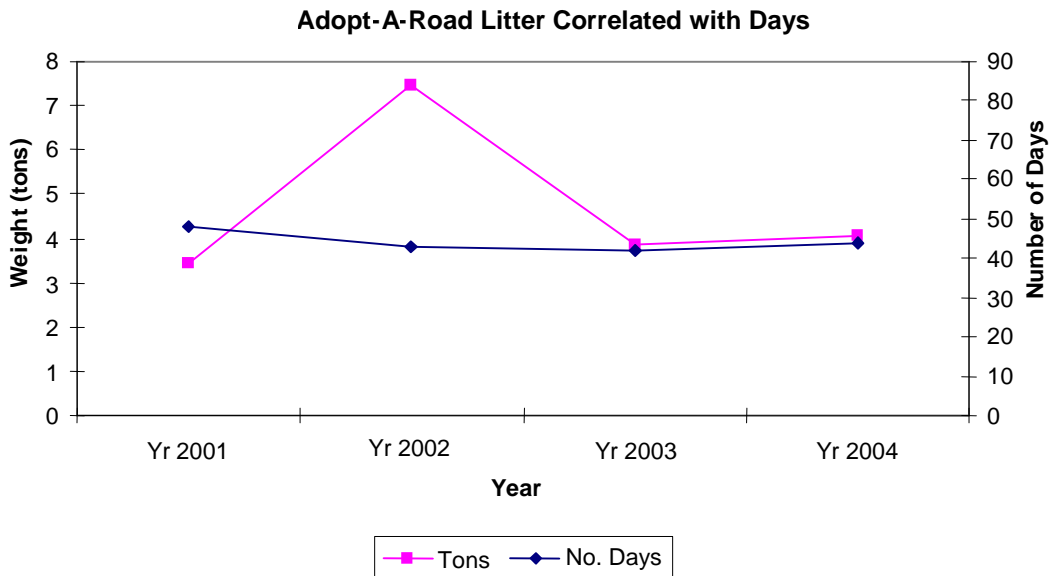


Figure 3. Weight of litter collected by AAR each year compared with number of drop-off days that year.

Figure 2 suggests there may be a correlation between collection effort and total weight of litter collected. It should be noted that it is influenced by the 22 records compiled in a single day on Camano in 2002 and there is less similarity between effort and weight when looked at by presumed collection event (Figure 3). Other considerations to keep in mind include:

1. The possibility that some volunteers take bags of trash to dispose at their home rather than bothering to drive to the transfer station.
2. With the scale in 20-pound increments, the lack of precision in measurement could be magnified. This data can only be used to form a general idea of the quantity of litter collected each year in Island County, not to make fine comparisons
3. Mistakes can be made at the scale house. As example, the original spreadsheet from Island Co. Solid Waste included an AAR entry for Coupeville on 21 November 2003 of more than 4 tons. This is far higher than any other single entry. Jo Hanson of Solid Waste thought it was probably a recording error at the scale house. Because the figure was an outlier that had a disproportionate effect on the data and was likely wrong, that record was deleted from the analysis.

III. Adopt-A-Highway

As volunteers for the county, Adopt-A-Road groups bring the litter they collect to the transfer station where it is measured and recorded, but they pay no fee. In contrast, Adopt-A-Highway groups leave their litter bagged on the roadside and Washington Department of Transportation (WDOT) personnel collect the bags and bring them to the Coupeville transfer station. WDOT is charged a disposal fee. All WDOT records are from the scale house in Coupeville. The state roadway on Camano ends at Terry's corner and I have not data for it.

WSOT has a single account with the County to which is charged all trash that WDOT vehicles bring across the scale. This includes not only AAH litter but also illegal dump cleanups, dead deer and other animals, and large items cleared from the roadways. Thus in the available WDOT numbers, the AAH contribution cannot be distinguished from other trash and clean-up efforts along SR 20 and SR 525.

The quantity of WDOT litter ranged in weight from 7.13 tons in 2001 to 18.13 tons in 2003 (Table 7). There were two outliers in 2003: two loads totaling 2.41 tons on March 21 and six loads totaling 2.97 tons on October 16. The highest single-day weight in other years is 0.99 tons, so these figures are greater by a factor of 3. These might be errors at the time of weighing at the scale house, but that is unlikely because WDOT is charged by weight and the driver would likely have noticed an outsize charge. More probably these figures reflect large items collected by the WDOT truck these days, such as an illegal dump or some appliances.

Year	Total Weight (tons)	Total Weight (pounds)	Average Weight	Standard Deviation	Range	Number of Records
2001	7.13	14,260	0.12	0.07	0.01-0.41	60
2002	10.59	21,180	0.13	0.13	0.01-0.90	84
2003	18.13	36,260	0.12	0.22	0.01-2.33	157
2004	13.12	26,240	0.10	0.07	0.01-0.38	130

Table 7. Weight of WDOT litter recorded each year, including the average, standard deviation and range among all records for that year.

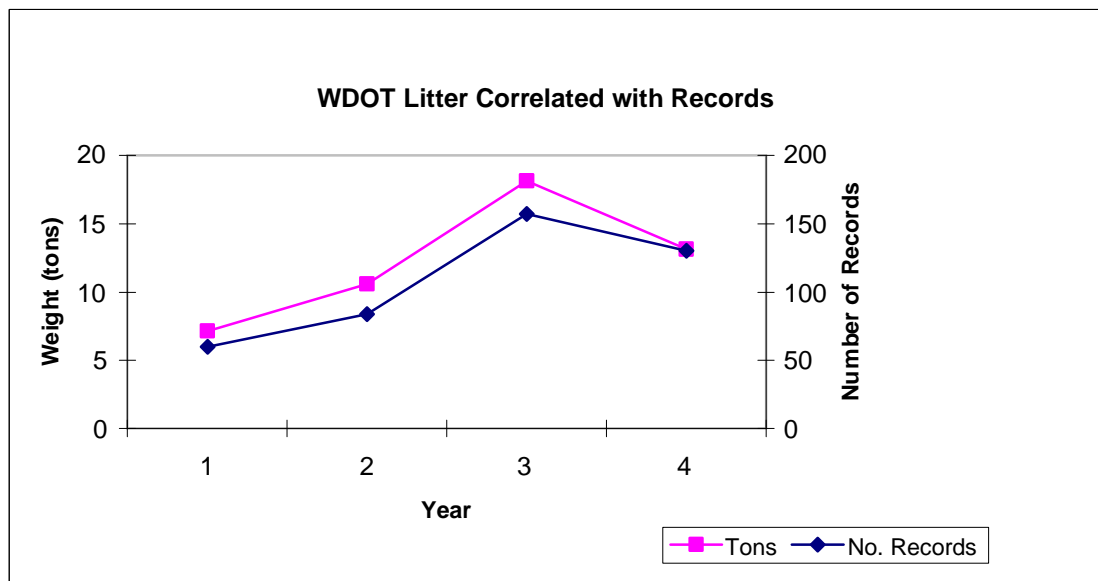


Figure 4. Weight of litter collected by WDOT each year compared with number of weight records that year (1-4 on the x-axis represents 2001-2004).

As with Adopt-A-Road, the data can be considered by total weight per record (Figure 4) or per day (Figure 5). Both graphs suggest a correlation between effort and quantity (weight) of trash collected.

Year	Total Weight (tons)	Total Weight (pounds)	Average Weight	Standard Deviation	Range	Number of Days
2001	7.13	14,260	0.15	0.12	0.01-0.56	47
2002	10.59	21,180	0.17	0.17	0.01-0.99	64
2003	18.13	36,260	0.17	0.37	0.01-2.97	105
2004	13.12	26,240	0.13	0.1	0.01-0.39	103

Table 8. Weight of WDOT litter recorded each year, including the average, standard deviation and range among all days for that year.

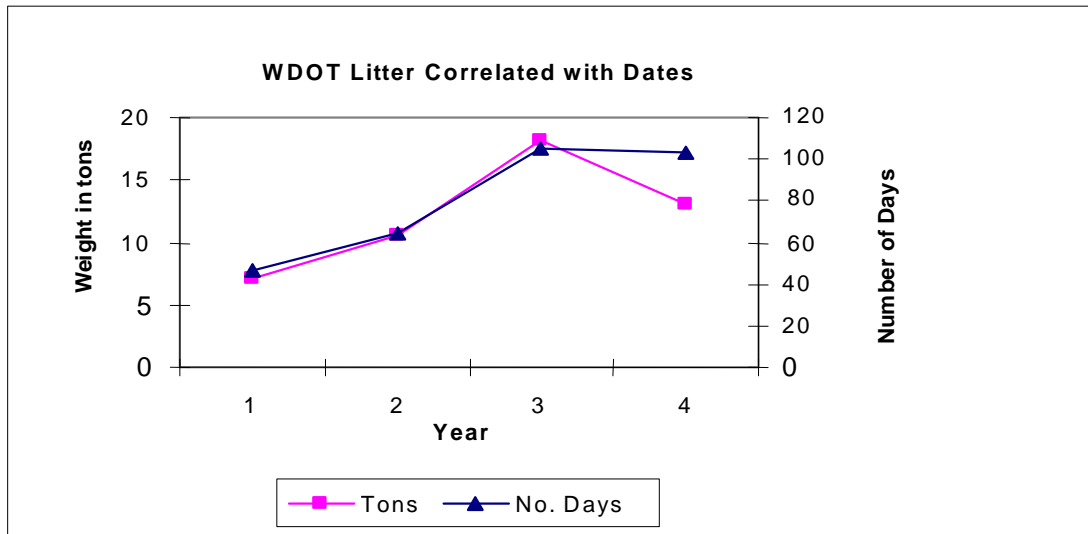


Figure 5. Weight of litter collected by WDOT each year compared with number of drop-off days that year (1-4 on the x-axis represents 2001-2004).

IV. Summary

Adopt-A-Road volunteers collected between 3.4 tons and 7.5 tons of litter per year along Island County roads between 2001 and 2004. WDOT recorded between 7.1 and 18.1 tons of trash per year collected from state highways on Whidbey Island, some significant proportion of which was from the volunteer work of Adopt-A-Highway groups. It is reasonable to conclude that more than 6 tons of roadside litter, and possibly double that or more, was collected by volunteers in Island County each year from 2001 through 2004.

In 2005 there are 40 registered Adopt-A-Road groups in Island County and 25 Adopt-A-Highway groups on Whidbey Island. Available data does not enable us to reconstruct how many groups were registered each year from 2001-2004 nor which fulfilled their full commitment of quarterly pickups, as scale house personnel often do not record the group name.

Total weight per year may be a poor measure of overall trends in roadside littering as it seems tied more to the amount of effort (i.e., number of delivery records) than to changing quantity of litter. When total weight is averaged by number of records (average weight), there is little difference among years, in spite of the high variability among individual records.