NORML Report on U.S. Domestic Marijuana Production

1998 Marijuana Crop Report

An Evaluation of Marijuana Production, Value, and Eradication Efforts in the United States

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Executive Summary

Marijuana remains the fourth largest cash crop in America despite law enforcement spending an estimated $10 billion annually to pursue efforts to outlaw the plant. In many states, marijuana ranked as the top cash crop for farmers. United States marijuana growers harvested a minimum of 5.5 million pounds of saleable marijuana in 1997 worth $15.1 billion to growers and $25.2 billion on the retail market. Government crop yield estimates place the value of these 8.7 million harvested plants at approximately $26.3 billion to growers and a street value of $43.8 billion. The report based its findings on Drug Enforcement Administration marijuana eradication statistics, a survey of state police eradication results, and marijuana price reports published in High Times Magazine. NORML published previous reports documenting marijuana's national market value between 1982 and 1992.

I. Establishing Marijuana's Rank Compared to Other Cash Crops

Marijuana ranked fourth out of all United States cash crops in 1997, amassing a greater value to farmers than tobacco, wheat, or cotton. In several states -- Alabama, California, Connecticut, Hawaii, Kentucky, Maine, Rhode Island, Tennessee, Virginia, and West Virginia -- marijuana stands as the largest revenue producing crop. Marijuana ranks as one of the top five cash crops in 29 others. Nationally, marijuana growers reaped an estimated $15.1 billion on the wholesale market. Only corn, soybeans, and hay rank as more profitable cash crops.

Farmers harvested an estimated 8.7 million marijuana plants in 1997. If each plant yields an average of ten ounces (280 grams) of usable marijuana, growers produced a total of 5.5 million pounds of saleable marijuana worth $25.2 billion at street value prices. The authors assessed marijuana's value to growers at 60 percent retail value, or roughly $2,735 per pound. Had the authors calculated marijuana's total value to growers by street market prices rather than wholesale prices, marijuana would decidedly rank as America's number one cash crop.

It should be noted that law enforcement's model when estimating marijuana's weight and value differs from the above paradigm. Drug Enforcement Administration (DEA) officials have long argued that a typical marijuana plant grown to harvest yields one pound (454 grams) of marijuana. However, most experts argue that this estimate is highly unrealistic. For example, data gathered by the United States Sentencing Commission supported the conclusion that the actual average yield of marijuana plants is 100 grams. [1] Government-sponsored studies conducted at the University of Mississippi calculated the amount of dry, smokable material at a maximum of 177 grams for an indoor marijuana plant and 412 grams for an outdoor plant. [2] The ten ounce estimate used by The NORML Foundation in this report reflects this data as well as the premise that most U.S. marijuana is densely grown in gardens of nine square feet or less. Under such conditions, DEA publications admit that one marijuana plant will likely yield approximately 224 grams of marijuana. [3] Had the authors accepted the standard one pound per plant model, 1997's national marijuana crop would have been worth $26.3 billion to growers and $43.8 billion at street market prices. Using these figures, marijuana's approximate street value ranks as almost twice the value of America's leading legal cash crop, corn.

II. Establishing the Value of Marijuana

We can estimate a dollar amount for harvested marijuana by examining recent marijuana price quotes printed in High Times Magazine. In past years, government analysts and their critics have found these estimates credible. [4] This report averaged price quote data from November 1996 to April 1997, the period when the 1997 crop hit the market. Prices were determined for each of the five zones in the country to account for regional influences. The weighted average price of marijuana reported for this period is $288 an ounce or $4610 per pound. Although volume sales of multiple pound amounts of marijuana likely sell at far less than this index, sales to

individual consumers generally involve one ounce or less. Therefore, the ounce price is adopted as a moderate index for retail valuation of domestic production.

III. Establishing the Number of Marijuana Plants Grown in 1997

This report estimates that domestic marijuana growers planted 12.8 million plants for harvest in 1997. The authors further find that DEA, state and local law enforcement agencies seized 32 percent of these plants limiting growers to a total of 8.7 million harvested marijuana plants.

Federal and state law enforcement typically eradicate four to six million cultivated marijuana plants per year. The DEA defines cultivated marijuana as "hand tended, watered, and individually pruned" plants grown for personal consumption or eventual sale on the black market. [**5**] These plants are not to be confused with ditchweed, a wild, non-retail strain of marijuana eradicated by law enforcement in far greater amounts. DEA figures from the 1997 Domestic Cannabis Eradication/Suppression Program indicate that law enforcement eradicated just over four million cultivated marijuana plants last year. [**6**]

From 1982 to 1992, the DEA published estimates of the percentage of domestic cultivated marijuana eradicated by law enforcement. These estimates ranged from as low as 33 percent in 1989 to as high as 52 percent in 1983. The DEA based these estimations on a subjective appraisal of the success of federal and local state marijuana eradication efforts. The DEA calculated the number of harvested plants by using the following formula: eradicated plants/estimated eradication proportion - eradicated plants.

To calculate 1997 figures, this report applied independently derived state eradication success estimates to the DEA model. This data includes responses from 25 state police agencies regarding the amount of marijuana seized in their state, as well as an assessment on their rank as domestic marijuana producers. These states typify major, moderate, and minor marijuana producing states in the United States.

Traditionally, NORML estimates have been based on a baseline eradication level of 25 percent in each state and a state by state appraisal of whether the local eradication trends justify raising or lowering the percentage. This year's figures are based in part from prior years' eradications statistics, DEA data ranking the various intensity of state eradication efforts, and the various responses from law enforcement agencies. These state level estimates were then totaled to produce a national estimate of total, eradicated, and harvested plants. The authors compared these figures with past national DEA eradication estimates and evaluated them accordingly.

IV. Establishing the Annual Cost of Marijuana Prohibition

While there is a lack of information on the precise annual costs of marijuana prohibition in the available literature, it is possible to estimate this figure using the available data.

Annual federal government expenditures on the "war on drugs" average $15.7 billion annually. [7] In addition, state and local governments also spend $16 billion per year enforcing drug laws. [8] In 1996, nearly 642,000 of the total 1.5 million drug arrests in America were for marijuana offenses. [9] This figure constituted 43 percent of all U.S. drug arrests and demonstrates that a significant portion of state and federal anti-drug funds are used exclusively to enforce marijuana laws. Therefore, it is reasonable to assume that between 25 and 40 percent of the total $31 billion annual costs are related to marijuana prohibition. Using this basic calculation, marijuana prohibition costs the American taxpayers between $7.5 and $10 billion annually in enforcement alone.

A second way to quantify the costs of marijuana prohibition is to extrapolate national estimates from a California study that found the state saved an average 95.8 million dollars in criminal justice costs annually following the adoption of marijuana decriminalization. [10] Assuming that the state spent 50 percent of its criminal resources seeking and prosecuting recreational users, it is safe to assume that states similar in demographics to California spend at least 200 million dollars annually enforcing marijuana prohibition in criminal justice costs alone. [11]

While more sophisticated economic analysis is needed in this area, it is clear that the billions of dollars spent each year enforcing marijuana laws do little to prevent marijuana from consistently ranking as one of America's top cash crops.

V. Introduction to Exhibits

The accompanying exhibits illustrate marijuana eradication profiles for each of the fifty states. A second series of charts provides a state by state comparison of marijuana's value compared to other cash crops. National figures are listed separately.

The exhibits use data from the DEA, the United States Department of Agriculture, and estimates derived in the preparation of this report. Marijuana eradication figures were obtained from the DEA's Domestic Cannabis Eradication/Suppression Program monthly statistical report. Data on marijuana prices came from published reports in High Times Magazine. Figures regarding agricultural production and value for conventional crops were obtained from the USDA. Information regarding eradication percentages, marijuana production amounts, and total market values are estimates produced by this report.

VI. Notes on Ditchweed

Ditchweed, otherwise known as feral hemp, has no retail value or market value to farmers. Consequently, totals regarding ditchweed eradication and growth were not tabulated in this report. The majority of ditchweed plants are remnants from government subsidized plots grown during World War II's "Hemp for Victory" campaign. This strain of cannabis holds no market value because it contains too little THC, the chief psychoactive agent in marijuana, to intoxicate users.

DEA statistics indicate that law enforcement eradicated over 237 million ditchweed plants in 1997 compared to only four million cultivated marijuana plants. [**12**] Critics of federal marijuana eradication programs call the DEA's emphasis on ditchweed eradication misguided because the crop has no impact on the black market marijuana trade.

Had the authors assigned these additional plants any minimal wholesale or retail value, marijuana's overall value would far surpass any other American cash crop.

Conclusion

Domestic marijuana cultivation remains responsible for hundreds of millions of dollars of illegal trade in almost every state in the country despite decades of prohibition. Conservative estimates regarding marijuana's production and value place marijuana as the fourth largest cash crop in America while standard government estimates rank marijuana as the country's economic frontrunner. Although federal eradication efforts yield some success in reducing the domestic marijuana market, clearly these efforts fail to significantly reduce consumer demand or the plant's commercial value to farmers.

About the Authors

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Footnotes

1. "The one plant = 100 grams of marihuana equivalency used by the Commission for offenses involving fewer than 50 marihuana plants was selected as a reasonable approximation of the actual yield of marihuana plants taking into account (1) studies reporting the actual yield of marihuana plants ... (2) that all plants regardless of size are counted for guideline purposes while, in actuality, not all plants will produce useable marihuana ...; and (3) that male plants, which are counted for guideline purposes, are frequently culled because they do not produce the same quality of marihuana as do female plants." *Federal Register* 60 (May 10, 1995): 25078

2. Research conducted by James E. Urbanek, B.B.A., Research Professor and Assistant Director, Research Institute of Pharmaceutical Sciences, School of Pharmacy, University of Mississippi. Studies cited in the written statement of attorney Jaralyn E. Merritt on behalf of the National Association of Criminal Defense Lawyers (NACDL) before the Judiciary Committee of the United States House of Representatives Subcommittee on Crime, March 6, 1996.

3. *1992 Domestic Cannabis Eradication/Suppression Program Report*, Washington, D.C.: Drug Enforcement Administration (1993).

4. A. Chalsma et al., *Marijuana Situation Assessment*, Washington, D.C.: Office of National Drug Control Policy (1994): 38-40.

5. Domestic Cannabis Eradication/Suppression Monthly Report Terminology as it appeared in the *State Auditor's Report on the Domestic Cannabis Eradication Suppression Program* and the *Edward Byrne Memorial Grant*, Montpelier, Vermont (1998).

6. 1997 Domestic Cannabis Eradication/Suppression Program Monthly Summary Statistics, Washington, D.C.: Drug Enforcement Administration (1998).

7. Office of National Drug Control Policy, *National Drug Control Strategy*, 1997, Washington, D.C.: ONDCP (1997).

8. Office of National Drug Control Strategy, *State and Local Spending on Drug Control Activities, Report from the National Survey on Local and State Governments*, Washington, D.C.: ONDCP (1997).

9. Federal Bureau of Investigation, *Crime in the United States, 1996, FBI Uniform Crime Report*, Washington, D.C., U.S. Government Printing Office (1997). 213-214.

10. M. Aldrich et al., "Savings in California Marijuana Law Enforcement Costs Attributable to the Moscone Act of 1976 -- A Summary," *Journal of Psychoactive Drugs*, January/March, 1988.

11. These costs fail to calculate taxpayer expenses such as state-sponsored marijuana research and education programs, specific law enforcement operations that target marijuana such as CAMP (Californians Against Marijuana Planting), etc.

12. 1997 Domestic Cannabis Eradication/Suppression Program Monthly Statistical Report, Washington, D.C.: Drug Enforcement Administration (1998).

1997 Top 50 U.S. Cash Crops
(Rankings Exclude Fresh Vegetables)

Rank	Crop	Unit	Planted Area [1] (000) Acres	Harvested Area [1] (000) Acres	Yield [1] Per Acre	Production [1] (000) Units	1997 Street Price Per Unit [2,3] Dollars	Value of Production ($1000)
1	Corn for Grain	Bu	80,227.00	73,720.00	127	9,365,574	2.6	$24,350,492
2	Soybeans for Beans	Bu	70,850.00	69,884.00	39	2,727,254	6.5	$17,727,151
3	Hay, All	Ton	N/A	60,815.00	2.5	152,120	102.5	$15,592,300
4	**Marijuana [4]**	Lb	N/A	N/A	N/A	5,476	2765.19	$15,142,203
5	Wheat, All	Bu	70,989.00	63,577.00	39.7	2,526,552	3.45	$8,716,604
6	Cotton, Upland	Lb	13,566.00	130,325.00	679	8851200	0.669	$5,921,453
7	Tobacco, All	Lb	N/A	79727	2,106.00	1,678,821	1.803	$3,026,914
8	Grapes, All	Ton	N/A	77742	8.79	6,836	420	$2,871,120
9	Sorghum for Grain	Bu	10,108.00	9,391.00	69.5	653,106	4	$2,612,424
10	Potatoes, All	Cwt	1,362.00	13,255.00	347	459,912	5.68	$2,612,300
11	Apples, All Commercial	Lb	N/A	45422	22,500.00	10,226,600	0.22	$2,249,852
12	Oranges, All	Box	N/A	8418	352	296,620	6.41	$1,901,334
13	Rice, All	Cwt	3,056.00	3,034.00	5,896.00	178,896	9.75	$1,744,236
14	Sugarbeets [5]	Ton	14,592.00	14,278.00	20.9	29,874	45.4	$1,356,280
15	Almonds	Lb	N/A	420	1,790.00	750,000	1.55	$1,162,500
16	Peanuts for	Lb	1,429.00	14,058.00	2,522.66	3,546,360	0.261	$925,600

	Nuts							
17	Barley	Bu	6,910.00	6,425.00	58.3	374,478	2.4	$898,747
18	Sugarcane, for Sugar [5]	Ton	N/A	8625	34.2	29,492	28.3	$834,624
19	Peaches, All	Lb	N/A	1679	15,790.00	2,651,100	0.247	$654,822
20	Beans, All Dry Edible	Cwt	18,518.00	17,202.00	1,695.00	29,156	17.7	$516,061
21	Sunflowers, All	Lb	2,949.00	2,852.00	1,319.58	3,763,428	0.113	$425,267
22	Cranberries	Bbl	N/A	349	157.3	5,489	65.9	$361,725
23	Walnuts	Ton	N/A	170	1.58	269	1,310.00	$352,390
24	Lemons	Box	N/A	604	374	22,600	13.01	$294,026
25	Pears, All	Ton	N/A	7011	14.9	1,044	276	$288,144
26	Oats	Bu	5,169.00	2,911.00	60.5	176,104	1.6	$281,766
27	Cherries, Sweet	Ton	N/A	4877	4.57	223	1,250.00	$278,750
28	Grapefruit, All	Box	N/A	1829	384	70,200	3.83	$268,866
29	Cotton, Amer-Pima	Lb	252	251	1,027.00	257,760.00	1.007	$259,564
30	Pecans	Lb	N/A	N/A	N/A	272,100	0.771	$209,789
31	Sweet Potatoes	Cwt	869	835	156	13,025	15.8	$205,795
32	Pistachio Nuts	Lb	N/A	654	2,750.00	180,000	1.13	$203,400
33	Berries, Cult. Blue	Lb	N/A	3912	4,340.00	172,970	0.833	$144,084
34	Peppermint	Lb	N/A	1363	75	10,256	13.2	$135,379
35	Hops	Lb	N/A	433	1,729.00	74,872	1.58	$118,298
36	Tangerines	Box	N/A	425	222	9,450	12.37	$116,897
37	Nectarines	Ton	N/A	371	7.12	264	375	$99,000
38	Pineapples	Ton	N/A	199	.	324	283	$91,692
39	Plums (CA only)	Ton	N/A	42	5.79	243	312	$75,816

40	Olives	Ton	N/A	337	3.09	104	642	$66,768
41	Berries, Red Raspberry	Lb	N/A	121	6,360.00	83,800	0.551	$46,174
42	Apricots	Ton	N/A	2189	6.3	138	332	$45,816
43	Cherries, Tart	Lb	N/A	3978	7,260.00	288,900	0.156	$45,068
44	Macadamia Nuts	Lb	N/A	192	3,020.00	58,000	0.75	$43,500
45	Peas, Dry Edible	Cwt	2936	2766	2,103.00	5,816	7.4	$43,038
46	Hazelnuts	Ton	N/A	2848	1.55	44	898	$39,512
47	Rye	Bu	1,433.00	341	26.1	8,912	3.6	$32,083
48	Maple Syrup	Gal	N/A	N/A	N/A	1,293	23.6	$30,515
49	Coffee	Lb	N/A	56	1,610.00	9,000	3.25	$29,250
50	Spearmint	Lb	N/A	245	98	2,403	12	$28,836

1. USDA, Crop Production. December 11, 1997.

2. National and State level prices obtained from USDA, Agricultural Prices - 1997 Summary, July 1998.

3. National Price used when State Price was unavailable.

4. Report Estimate, not based on USDA data.

5. 1996 Price Data.

1997 U.S. Marijuana Eradication and Production Profile

Year	**1997**
1995 Population [1]	262,532,000
Estimated 1997 Eradication	32%
Low Retail Estimate of Harvest	$25,231,922,000
High Retail Estimate of Harvest	$43,856,436,400
Low Farm Value Estimate of Harvest	$15,142,203,400
High Farm Value Estimate of Harvest	$26,279,317,072
Ounce Price (Weighted Retail Index) [2]	$288
Estimated Production Weight (lb.)	5,476,252
Outdoor Sites Closed [3]	69,665
Greenhouses Closed [3]	2,944
Total Plants Eradicated [3]	4,055,365
Wild Hemp Eradicated [3]	237,140,322

1. U.S. Census

2. Derived from data reported in High Times

3. Drug Enforcement Administration

1997 Marijuana Production Estimates: State By State Assessment

Rank	State	Eradicated Plants [1]	Eradication Estimate [2]	Harvested Plants	Production Weight [3] (Lb)	Value to Growers [4] ($1000)
1	**California**	693,603	25%	2,080,809	1,300,506	$3,870,000
2	**Tennessee**	1,117,522	50%	1,117,522	698,451	$1,810,000
3	**Kentucky**	453,886	35%	842,931	526,832	$1,370,000
4	**Hawaii**	602,161	60%	401,441	250,900	$747,000
5	**Florida**	108,178	20%	432,712	270,445	$701,000
6	**Alabama**	82,305	20%	329,220	205,763	$533,000
7	**Arkansas**	48,252	15%	273,428	170,893	$509,000
8	**Indiana**	45,242	15%	256,371	160,232	$408,000
9	**Ohio**	74,388	25%	223,164	139,478	$355,000
10	**Missouri**	53,336	20%	213,344	133,340	$339,000
11	**Oklahoma**	89,433	35%	166,090	103,806	$309,000
12	**Illinois**	9,756	5%	185,364	115,853	$295,000
13	**New York**	47,884	25%	143,652	89,783	$280,000
14	**West Virginia**	45,998	25%	137,994	86,246	$269,000
15	**Washington**	24,927	15%	141,253	88,283	$263,000
16	**Idaho**	115,834	45%	141,575	88,484	$225,000
17	**Georgia**	45,160	25%	135,480	84,675	$219,000
17	**Mississippi**	15,009	10%	135,081	84,426	$219,000
19	**Texas**	59,617	35%	110,717	69,198	$206,000
20	**Minnesota**	14,091	10%	126,819	79,262	$202,000
21	**Virginia**	21,463	15%	121,624	76,015	$197,000
22	**Oregon**	38,171	30%	89,066	55,666	$166,000
23	**Michigan**	24,340	20%	97,360	60,850	$155,000
24	**Colorado**	29,483	25%	88,449	55,281	$141,000
25	**Maine**	11,706	15%	66,334	41,459	$129,000
26	**Louisiana**	12,173	15%	68,980	43,113	$128,000

27	**North Carolina**	50,707	40%	76,061	47,538	$123,000
28	**Wisconsin**	8,268	10%	74,412	46,508	$118,000
29	**South Carolina**	12,356	15%	70,017	43,761	$113,000
30	**Arizona**	37,692	40%	56,538	35,336	$105,000
31	**Alaska**	7,278	15%	41,242	25,776	$76,700
32	**Pennsylvania**	6,298	15%	35,689	22,305	$69,600
33	**Montana**	4,119	10%	37,071	23,169	$58,900
34	**New Mexico**	4,941	15%	27,999	17,499	$52,100
35	**Vermont**	3,995	15%	22,638	14,149	$44,100
36	**Iowa**	1,423	5%	27,037	16,898	$43,000
37	**Utah**	1,377	5%	26,163	16,352	$41,600
38	**Kansas**	10,876	30%	25,377	15,861	$40,300
38	**Massachusetts**	2,298	10%	20,682	12,926	$40,300
40	**Maryland**	4,826	20%	19,304	12,065	$37,600
41	**Connecticut**	1,945	15%	11,022	6,889	$21,500
42	**Nebraska**	2,223	15%	12,597	7,873	$20,000
43	**Delaware**	5,226	35%	9,705	6,066	$18,900
44	**Nevada**	550	5%	10,450	6,531	$16,600
45	**Rhode Island**	870	10%	7,830	4,894	$15,300
46	**New Jersey**	2,515	25%	7,545	4,716	$14,700
47	**New Hampshire**	889	15%	5,038	3,149	$9,823
48	**South Dakota**	318	5%	6,042	3,776	$9,607
49	**North Dakota**	392	10%	3,528	2,205	$5,610
50	**Wyoming**	65	5%	1,235	772	$1,964
	United States	4,055,365	32%	8,762,002	5,476,252	$15,142,203

1. Drug Enforcement Administration
2. Report Estimate
3. Calculated on the basis of yield = 10 ounces/plant rather than on the DEA standard of 1 lb. /plant.
4. Calculated as 60% of retail value derived from regional price quotes in High Times.