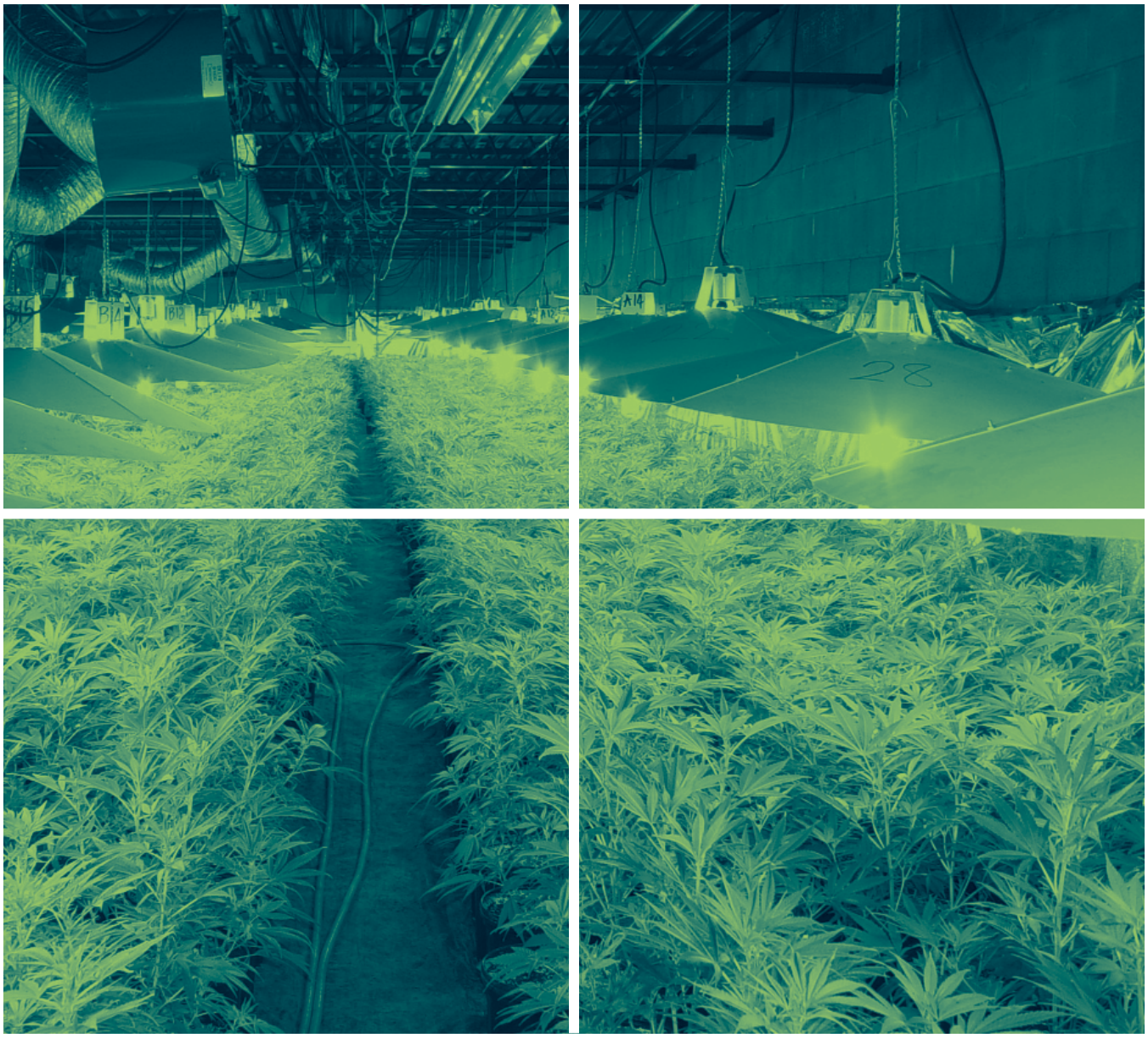
GREEN TIDE

INDOOR MARIHUANA CULTIVATION AND ITS IMPACT ON ONTARIO



Caveat

The estimated and projected trends in this document do not necessarily account for all external influences, such as the resources that law enforcement allocates toward investigating and dismantling indoor marihuana growing operations.

Table of Contents

Figures and Tables 01

I. Executive Summary 02

II. Background 03
The Typical Grow Op 04
It's Not "Just Marihuana" 05

III. The Scope of Grow Ops in Ontario 07
The Number of Grow Ops 07
Annual Historical Trends 07
Weekly Historical Trends 08
Forecasted Trends 09
Estimating the Actual Number of Grow Ops 10
Quantity of Marihuana Produced and Housed in Grow Ops 11
Estimating the Actual Quantity of Marihuana and Related Product 13
Size of Grow Ops 14
Value of Marihuana Produced and Housed in Grow Ops 16

IV. The Socio-Economic Impact of Grow Ops on Ontario 18
Economic Costs 18
Theft of Hydro Power 18
Insurance Costs 22
Law Enforcement Costs 25
Costs to the Justice System 25
Costs to Cross-Border Trade 27
Total Economic Costs 28
Societal Costs 29
Environmental and Human Health Hazards 29
Fires, Electrocutions, and Explosions 31
Defensive Measures 33
Violence 35
A Threat to Ontario's Children and Communities 35

V. Summary and Conclusions 38
Summary 38
Conclusions 39

Selected References 41

Appendix: Description of the Time-Series Forecasting Model 42

Endnotes 53

Figures and Tables

Figure 1 A typical grow-op dwelling
Figure 2 Historical trend for reported number of dismantled grow ops in Ontario
Table 1 Availability of weekly data by year
Figure 3 Weekly trend, January 1st, 2000 through June 7th, 2003
Figure 4 Forecast of dismantled grow ops through December 31st, 2003
Figure 5 Estimating the number of grow ops active in Ontario
Table 2 Grow op seizure data
Figure 6 Estimated number of plants seized
Figure 7 Seizures of harvested marihuana and related product
Figure 8 Total marihuana and related product produced and housed in grow ops
Figure 9 Estimated average crop yields
Figure 10 Estimated average total marihuana yields
Figure 11 Large-scale grow op
Table 3 Estimated retail and wholesale value of marihuana plants seized/produced
Table 4 Value of estimated and projected amount of marihuana (plants, harvested marihuana, and related product) produced and housed in grow ops
Figure 12 Hydro bypass
Figure 13 Hydro bypass
Figure 14 Monthly hydro theft based on $1,500 estimate
Figure 15 Monthly hydro theft based on $2,000 estimate
Figure 16 Repair and administrative costs to hydro utilities
Figure 17 Structural damage to grow-op dwelling
Figure 18 Aftermath of Durham Region grow-op fire
Figure 19 Aftermath of York Region grow-op fire
Figure 20 Fire-related costs based on $36,000 per fire
Table 5 Total grow-op related payments from a single insurance company in Ontario
Figure 21 Law enforcement costs based on $8,500 per grow op
Table 6 Costs of CDSA(7) incarceration sentences
Table 7 Costs of CDSA(7) conditional sentences
Table 8 Costs of CDSA(7) probation sentences
Figure 22 U.S. Customs Service seizures at Canadian land borders
Table 9 Total estimated and projected economic costs
Figure 23 Mould damage in grow op
Figure 24 Chemicals used in grow op
Figure 25 Modified furnace pipe in grow op
Figure 26 Hazardous situation – chemicals in close proximity to open wiring
Figure 27 Aftermath of Boucherville, Quebec explosion
Figure 28 Electrical booby trap
Figure 29 “Mousetrap”
Table 10 Number of children estimated and projected to be living in grow ops
Figure 30 Schools and grow ops in close proximity in Peel Region
Table 11 Data employed for, and generated by, ARIMA time-series model
Figure 31 Histogram of estimated weekly reported dismantled grow ops
Figure 32 Histogram of logged values of estimated weekly reported dismantled grow ops
Figure 33 Trend of logged transformed series
Figure 34 Trend of differenced and logged transformed series
Figure 35 Autocorrelation Function (ACF) plot for differenced and logged transformed series
Figure 36 Partial Autocorrelation Function (PACF) plot for differenced and logged transformed series
Table 12 Results of ARIMA (0,1,1) time-series model
Figure 37 Autocorrelation Function (ACF) plot for model errors
Figure 38 Partial Autocorrelation Function (PACF) plot for model errors

I. Executive Summary

Indoor marihuana growing operations – or, grow ops – appear to have proliferated in Ontario during the last three to five years, engendering sizeable economic losses and significant societal threats. Law enforcement widely suspects that organized crime is behind the emergence of this grow op activity.

Between 2000 and 2002, the number of grow ops in Ontario is estimated to have increased by over 250 percent. In 2002 alone, there may have been as many as 15,000 grow ops active in Ontario.

In 2003, the number of grow ops is projected to diminish by 24 percent. However, the projections also indicate that in the latter half of 2003, the number of grow ops may climb once again – a trend that could carry over to 2004.

By the end of the 2000-2003 period, it is possible that Ontario police could seize over 1.2 million plants from grow ops. In this same period, grow ops could produce and house as much as 1.2 million kilograms of marketable marihuana and related product. The revenue generated from grow ops is estimated to be potentially as high as $12.7 billion for the period under review.

The economic ramifications from this burgeoning phenomenon are mounting. Grow ops may cost Ontario as much as $260 million over the 2000-2003 period. In 2002 alone, grow ops are estimated to have cost Ontario nearly $100 million. As much as 85 percent of these financial losses stem from the large amounts of electricity that grow house operators routinely steal from Ontario's electrical utilities.

Grow ops also represent a serious threat to public and officer safety. The likelihood of fire in a grow-op dwelling may be as much as 40 times greater than the likelihood of fire in a typical private dwelling in Ontario. Although there have been no reported explosions or electrocutions tied to grow ops in Ontario, such incidents have been reported in other provinces. The potential for violence in and around grow-op dwellings is also very real: in York Region there have been at least two homicides directly related to grow ops. Finally, human health risks can result from the mould sometimes associated with marihuana hydroponic cultivation, the chemicals used to foster plant growth, and the relatively high concentration of carbon dioxide (CO_2) and carbon monoxide (CO) suspected to exist in some grow-op dwellings. Many of these safety concerns are exacerbated by the fact that grow ops are generally located in highly populated regions.

Children are at risk from grow op activity, as the families of "crop sitters" sometimes live in grow ops to add an air of legitimacy to the operation. As many as 10,000 children may have resided in grow-op dwellings over the 2000-2003 period. Children can sometimes also be indirectly exposed to harms from grow op activity. In 2002, in the York, Peel, and Waterloo regions combined, 17 percent of grow ops were located within 500 metres of a primary or secondary school.

II. Background

The nature of commercial marihuana cultivation in Ontario has changed markedly in the last decade, with the most dramatic developments occurring in the last three to five years.[1] Throughout much of the 1970s, 80s, and 90s, marihuana was primarily cultivated outdoors by independent operators. In the last decade, however, marihuana is increasingly grown indoors, and organized crime is widely suspected to be the principal perpetrator.[2] In addition, technological developments introduced in the last decade have substantially increased marihuana potency. Prior to the mid-1980s, marihuana generally possessed a Delta-9-tetrahydrocannabinol (THC) content below two percent. Marihuana currently grown in Ontario typically possesses a THC content of six percent, and it is not uncommon to find marihuana with a THC content in the mid to high teens.[3]

The remarkable developments in Ontario are an extension of those in British Columbia during the 1990s.[4] Law enforcement widely asserts that, by the mid-1990s, organized crime had established control over marihuana cultivation in BC and was beginning to focus in particular on indoor cultivation.[5] The Organized Crime Agency of British Columbia (OCABC) estimates that organized crime currently controls 85 percent of the marihuana cultivation and distribution in British Columbia.[6]

By the late 1990s, events in BC had been replicated in Ontario. Projects conducted by law enforcement in the last two years confirm that grow ops are abundant in southern Ontario. For instance, the Ontario portion of three national grow op enforcement projects in 2002 alone yielded $8.4 million worth of growing equipment, over 100,000 plants, and 353 arrests.[7]

Moreover, evidence suggests organized crime involvement with grow ops in Ontario. For instance, a recent project conducted by the Ontario Provincial Police (OPP) found that, in the first few months of 2003, a group of persons systematically shipped over 385 kilograms of marihuana by rail from British Columbia to Ontario. OPP information indicates that the marihuana was ultimately destined for the United States. Two semi-automatic pistols, a TEC-9 machine pistol, and $1.3 million in cash were also seized by the OPP in related raids.[8] The presence of organized crime is further suggested by the large amounts of cash routinely discovered inside grow-op dwellings.[9]

Despite existing evidence linking organized crime to indoor marihuana cultivation, more police investigations are required to confirm the breadth and depth of these connections. For example, the percentage of grow ops that are controlled by organized crime in Ontario, although believed to be high, is not firmly established. In addition, the nature of the connections between organized crime and grow ops is not well understood. For instance, the extent to which proceeds from grow ops are used to finance other organized crime activity remains largely unknown.[10]

THE TYPICAL GROW OP

Police reports on grow ops are largely consistent. Typically, a person – usually with suspected ties to organized crime – will purchase or lease a residential dwelling in an urban centre with over 2,000 square feet and a price of $200,000 to $500,000. The dwelling will have an unfinished basement to facilitate wiring, a fireplace to vent the powerful odour of the marihuana, and an attached garage to conceal vehicles used to transport the harvested crops.[11] Figure 1 shows a typical grow-op dwelling in a suburban neighbourhood in Ontario.

Figure 1: A typical grow-op dwelling

Source: York Regional Police Service

Once the dwelling is purchased or leased, a renovation crew makes structural changes to the dwelling, and installs heating systems, venting systems, and an electrical bypass to facilitate the theft of the electricity required for growing plants. Next, the growing equipment is moved in and set up. The growing equipment typically includes, among other things, multiple ballasts to boost electrical power, 1000-watt lights to grow the plants, fans to cool the electrical circuitry, and litres of liquid nutrients, fertilizers, pesticides, and fungicides.

Once the operation is set up, a "crop sitter" – often a recent immigrant – with little or no knowledge of the rest of the operation is paid a nominal wage to water the plants and generally tend to the daily upkeep. To avoid eliciting suspicion by neighbours, the crop sitter will sometimes have his or her entire family live in the dwelling. Periodically, a crew is sent in to harvest the marihuana and prepare it for sale and distribution.[12]

The typical grow op is a highly profitable venture. A grow op, initially endowed with $25,000 in growing equipment and related paraphernalia, can easily generate 600 plants with a retail value of roughly $600,000 in a single year. If the marihuana is destined for the U.S., the retail value may be more than twice as high.[13]

IT'S NOT "JUST MARIHUANA"

Although marihuana has been illegal in Canada since 1923, it has widely been accepted in the country as a relatively benign recreational drug.[14] Public support for the recent federal government initiative to decriminalize possession of small amounts of marihuana is high. A May 2003 Ipsos-Reid poll found that 63 percent of Canadians believe that persons caught in possession of less than fifteen grams of marihuana should be fined rather than charged with a criminal offence.[15]

Regardless of whether or not marihuana is a relatively benign drug that warrants decriminalization, there are two factors that complicate the picture surrounding this drug. First, organized crime entities that likely control (at least part of) the marihuana trade are not marihuana enthusiasts: they are criminal and have seized on a particular commodity because trade in this commodity is highly profitable, the risk of capture by law enforcement is low, and sentencing by the justice system is very lenient. Profits from the sale of marihuana may be used by organized crime to fund other illegal activities, such as cocaine and Ecstasy trafficking.

Second, the cultivation and sale of marihuana exacts a heavy toll on Ontario's economy and society. This paper attempts to gauge that impact. It concludes that grow ops may cost Ontario as much as $260 million over the 2000-2003 period. In 2002 alone, grow ops are estimated to have cost Ontario nearly $100 million.[16]

Moreover, grow ops represent a serious threat to public and officer safety. The likelihood of fire in a grow-op dwelling may be as much as 40 times greater than the likelihood of fire in a typical private dwelling in Ontario. Although there have been no reported explosions or electrocutions directly tied to grow ops in Ontario, such incidents have been reported in other provinces. The potential for violence in and around a grow-op dwellings is also very real: York Region has already experienced two homicides directly related to control over the marihuana trade. Officers and other first-responders face an additional risk: roughly two percent of grow ops are booby-trapped. Finally, human health risks can result from the mould sometimes created in grow ops, the chemicals used to foster plant growth, and the relatively high concentration of carbon dioxide (CO_2) and carbon monoxide (CO) suspected to exist in some grow-op dwellings. Many of these safety concerns are exacerbated by the fact that grow ops are generally located in highly populated regions.

Children are at risk from grow op activity, as the families of "crop sitters" sometimes live in grow ops to add an air of legitimacy to the operation. As many as 10,000 children may have resided in grow-op dwellings over the 2000-2003 period. Children can sometimes also be indirectly exposed to harms from grow op activity. In 2002, in the York, Peel, and Waterloo regions combined, 17 percent of grow ops were located within 500 metres of a primary or secondary school.

There is a connection between the extent to which organized crime orchestrates grow ops and the socio-economic toll that marihuana cultivation exacts on Ontario. Currently, law enforcement in Ontario attempts to mitigate the socio-economic impact of grow ops by dismantling as many operations as possible. But if, as suspected, organized crime is largely behind the emergence of grow ops, then it will have the resources to absorb current efforts by law enforcement and continue to expand the number of grow ops – with all of their attendant socio-economic impacts. In order to more seriously stem the flow of grow ops, law enforcement will have to attack the root cause of the problem: namely, organized crime.

This paper presents an analysis of the grow op situation in Ontario. Section III assesses the scope of grow ops in Ontario, examining historical trends since 2000 and generating forecasts for the remainder of 2003. Section IV details the economic and social impact of grow ops over the 2000-2003 period. These costs are quantified wherever possible, but sometimes only qualitative assessments can be made. Finally, in Section V, the paper recaps the main findings and argues that more resources are required to develop a comprehensive picture of the linkages between organized crime and grow ops. The appendix provides details on the forecasting method employed in the paper.

III. The Scope of Grow Ops in Ontario

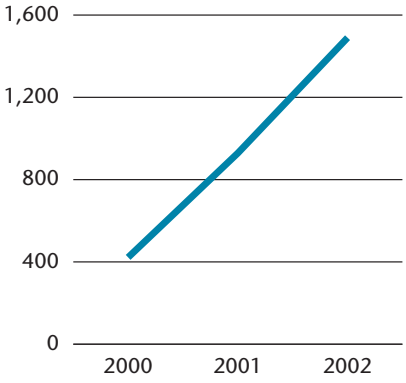
Historical patterns relating to the number of grow ops in Ontario are analyzed in this section and used to generate short-term forecasts. In addition, this section attempts to gauge the amount of marihuana being produced by grow ops, trends in operation size, and the value of the marihuana produced by grow ops.

THE NUMBER OF GROW OPS

Annual Historical Trends

Ontario has experienced a dramatic rise in the number of indoor grow ops dismantled by police. Figure 2 depicts this trend.

Figure 2: Historical trend for reported number of dismantled grow ops in Ontario



2000	422
2001	929
2002	1,490
Total	**2,841**

Figure 2 illustrates a 253 percent increase in the number of dismantled grow ops between 2000 and 2002. It is important to acknowledge that the trend depicted in Figure 2 does not account for the resources that law enforcement in Ontario has devoted towards grow ops. Resources impact the ability of police to initiate projects, follow up on leads, purchase equipment, etc. The increase in the number of marihuana grow ops dismantled between 2000 and 2002 may, in part, be a function of an increase in law enforcement resources devoted to this problem.

This caveat notwithstanding, evidence suggests that the majority of police investigations into grow ops are not initiated by proactive police efforts. In BC, between 1997 and 2000, only five percent of dismantled grow ops were taken down as a result of police projects aimed specifically at this crime.[17] Similar statistics are not available for Ontario, but discussions with drug enforcement officers in Ontario reveal that the situation does not differ markedly from that of BC.

Weekly Historical Trends

In order to forecast the potential number of grow ops yet to be dismantled in 2003, a statistical technique called "time-series" is employed.

Weekly numbers of dismantled grow ops from January 1st, 2000 through June 7th, 2003 were used to generate predictions for the period beginning June 8th, 2003 through December 31st, 2003. It was possible, due to exact-date reporting, to group 44 percent of the 2,841 grow ops reported dismantled over the 2000-2002 period into weekly time intervals. Ratios were then used to approximate an accurate *weekly* distribution of the *annually* reported dismantled grow ops (from Figure 2). For 2003 data, 100 percent of cases were appropriately dated and collected into weekly time intervals, generating no need for ratio transformations. Table 1 reports the number of reported grow op discoveries for each year, the number of reported grow op discoveries for which specific dates (and therefore, weekly intervals) are available, and the ratios used to change the annual data to weekly data (ratios are rounded in Table 1 for ease of presentation).

Table 1: Availability of weekly data by year

	2000	*2001*	*2002*	*2003* *(Jan. 1st – June 7th)*
Reported number of dismantled grow ops	422	929	1490	488
Number of dismantled grow ops for which specific dates are available	157	279	987	488
Annual/monthly ratio (rounded)	1:2.7	1:3.3	1:1.5	1:1

Figure 3 illustrates the weekly distribution of both the dated reported dismantled grow ops and the annual reported dismantled grow ops that were redistributed to a weekly scale. The two trends dovetail through 2002, because the annual data was based on ratios, and then merge in 2003 where no ratio transformation was employed. From this point forward, the focus of this paper will be on the annual number of reported dismantled grow ops that were redistributed to a weekly scale.

Figure 3: Weekly trend, January 1st, 2000 through June 7th, 2003

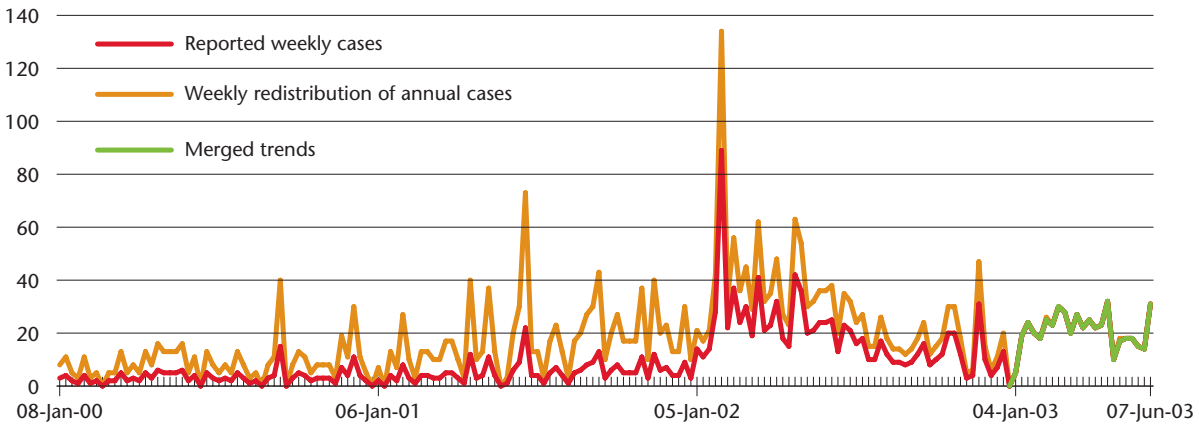
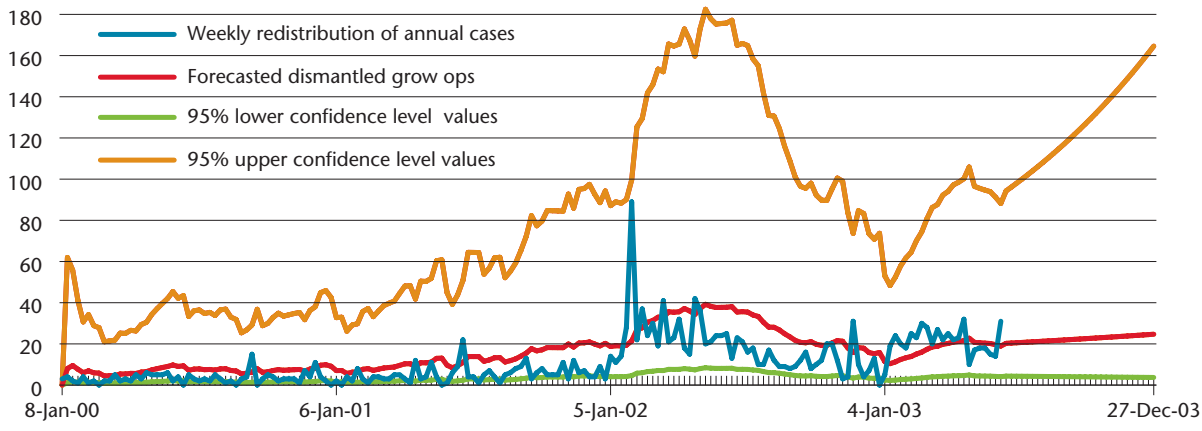


Figure 3 is noteworthy because it reveals a trend that is masked by the annual data provided in Figure 2. Notice that the number of reported dismantled grow ops declines markedly between April and December 2002. Thus, although the overall number of reported dismantled grow ops increased by 60 percent between 2001 and 2002, the number of reported dismantled grow ops declined steadily for most of 2002.[18] (Again, this trend may be a function, in part, of a decrease in police resources devoted toward the problem of grow ops, as much as a possible reflection of a declining number of grow ops or a consolidation from many, small operations to fewer, larger operations.) Regardless, the weekly data also reveal that the number of reported dismantled grow ops increases again beginning in January 2003, suggesting that the problem may not be on the wane.

Forecasted Trends

The time-series analysis projects that, from June 8th through December 31st, 2003, police in Ontario will dismantle 650 grow ops.[19] Figure 4 graphically displays this projection. Ontario police dismantled 488 grow ops from January 1st through June 7th, 2003. Therefore, all told, it is projected that 1,138 grow ops will be dismantled by Ontario police in 2003.

Figure 4: Forecast of dismantled grow ops through December 31st, 2003



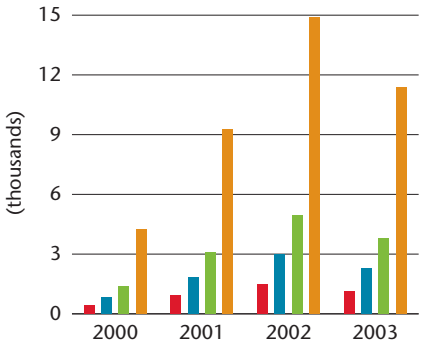
If the projection is accurate, the number of grow ops dismantled in 2003 will decline by 24 percent from 2002. Nevertheless, the time-series analysis does not suggest that the problem of grow ops is vanishing. In fact, the time-series model indicates that the number of grow ops to be dismantled will increase steadily from June 8th through December 31st, 2003.

Estimating the Actual Number of Grow Ops

So far, the figures for grow ops have been discussed as a function of the number of operations dismantled (or projected to be dismantled) by law enforcement. Clearly, however, police are unable to dismantle every active grow op in Ontario, because not all operations are brought to their attention and because they lack the resources. Police estimate that between only 10 and 50 percent of grow ops are ever dismantled.[20]

Consequently, three scenarios are presented in order to provide a more realistic estimate of the actual number of grow ops active in Ontario. In the first, the annual number of reported/projected dismantled grow ops is augmented by a factor of 2 (which assumes that only 50 percent of grow ops are ever dismantled). In the second scenario, the annual number of reported/projected dismantled grow ops is augmented by a factor of 3.33 (which assumes that only 30 percent of grow ops are ever dismantled). And in the third scenario, the annual number of reported/projected dismantled grow ops is augmented by a factor of 10 (which assumes that only 10 percent of grow ops are ever dismantled). The results of these three scenarios are presented graphically in Figure 5, and will be the basis for a number of estimates to follow.

Figure 5: Estimating the number of grow ops active in Ontario



Year	Reported no. of grow ops dismantled	Scenario 1: 50% dismantled	Scenario 2: 30% dismantled	Scenario 3: 10% dismantled
2000	422	844	1,405	4,220
2001	929	1,858	3,094	9,290
2002	1,490	2,980	4,962	14,900
2003	1,138	2,276	3,790	11,380

Asserting that police were able to dismantle only 10 percent of grow ops, then Figure 5 indicates that there could have been as many as 14,900 active grow ops in Ontario in 2002. It is projected that, in 2003, based on the 10 percent dismantle rate, there may be as many as 11,380 grow ops active across Ontario.

QUANTITY OF MARIHUANA PRODUCED AND HOUSED IN GROW OPS

A second dimension of the scope of grow ops in Ontario relates to the amount of marihuana being produced and housed. This can be calculated by analyzing marihuana seizures by law enforcement in the province.

Although police agencies reported their total annual number of dismantled grow ops, plant seizure information is only available for those reports that were sufficiently detailed. As above, ratios are used to extrapolate from the number of plants seized as recorded in detailed reports to the total number of plants that might otherwise have been seized annually from dismantled grow ops.

It is important to acknowledge that seizure information in 2000 was available for only 18 of the 422 dismantled grow ops, by only four of the 19 police agencies reporting at least one grow op dismantled in that year. Because seizure information is available in so few cases, and because so few agencies reported, it is possible that factors such as characteristics of the grow op problem in the agency's area may affect how well that seizure information applies to the other reporting agencies. Therefore, the estimated seizures for 2000 may not be accurate. Table 2 provides details on the quantity of plant and marihuana product seized. Figures 6 and 7 illustrate some of the annual trends reported in Table 2.

Table 2: Grow op seizure data

Reported dismantled grow ops for which seizure data is available

	2000	*2001*	*2002*	*2003* *(Jan. 1st – June 7th)*	***Total***
Grow ops	18	258	964	286	**1,526**
Grow ops in which at least one plant is seized*	15	224	863	278	**1,380**
Number of plants seized	2,999	71,030	345,171	95,835	**515,035**
Amount of marihuana seized in plant form, in kg**	300	7,103	34,517	9,584	**51,504**
Number of grow ops in which at least 0.5 g of harvested marihuana or related product was seized	3	48	179	58	**288**
Harvested marihuana and related product seized, in kg	9	188	909	207	**1,313**
Total annual amount of marihuana in plant form, harvested marihuana and related product seized, in kg	309	7,291	35,426	9,791	**52,817**

* Cases in which no plants were found are still considered a grow op if police found evidence of marihuana cultivation – such as growing lights or ballasts.

** Assuming 100 g per plant.

Table 2: Grow op seizure data (continued from previous page)

Annual reported dismantled grow ops (and projections for 2003)

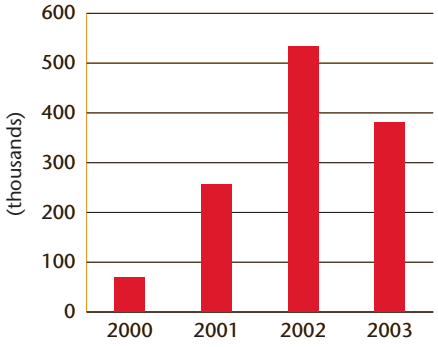
	2000	*2001*	*2002*	*2003*	***Total***
Grow ops	422	929	1,490	1,138	**3,979**
Ratios used to convert reported seizure data to estimated annual seizures†	1:23.4	1:3.6	1:1.5	1:4.0	
Estimated number of plants seized based on ratios	70,309	255,763	533,511	381,329	**1,240,912**
Estimated amount of marihuana seized in plant form, in kg, based on ratios	7,031	25,576	53,351	38,133	**124,091**
Estimated amount of harvested marihuana and related product seized, in kg, based on ratios	209	676	1,405	824	**3,114**
Total amount of marihuana in plant form, harvested marihuana and related product, seized in kg, based on ratios	7,240	26,252	54,756	38,957	**127,205**

† Ratios are rounded.

Marihuana was seized in various forms. Most was seized in plant form. Police seized plants – in various stages of growth – in 90 percent of cases, or 1,379 of the 1,526 dismantled grow ops for which seizure data is available from January 1st, 2000 through June 7th, 2003. But harvested marihuana, and marihuana-related products such as hashish, were also seized from grow ops. Police seized harvested marihuana and related product in 19 percent of cases – or 288 of the 1,526 dismantled grow ops for which seizure data is available from January 1st, 2000 through June 7th, 2003. The two percentages sum to more than 100 because sometimes police found both marihuana plants and related product in grow ops.[21]

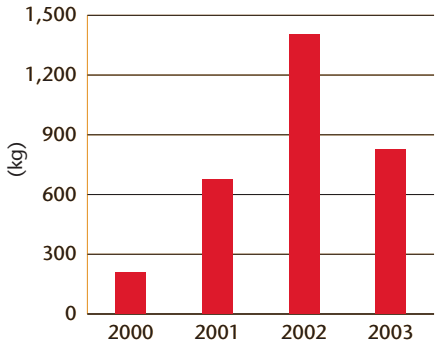
Figure 6 illustrates the estimated number of plants seized from grow ops between 2000 and 2002, as well as the projected number for 2003. Figure 7 provides totals for the kilograms of harvested marihuana and related product seized.

Figure 6: Estimated number of plants seized



2000	70,309
2001	255,763
2002	533,511
2003	381,329
Total	**1,240,912**

Figure 7: Seizures of harvested marihuana and related product (in kg)



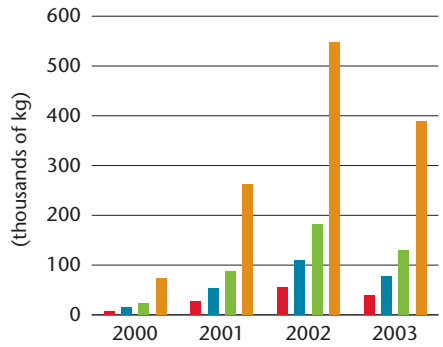
2000	209
2001	676
2002	1,405
2003	824
Total	**3,114**

The estimations and projections in Figures 6 and 7 (as well as Table 2) indicate that, over the 2000-2003 period, police may seize as much as 1,240,912 plants and 3,114 kilograms of harvested marihuana and related product in Ontario.

Estimating the Actual Quantity of Marihuana and Related Product

Recall the assumption that police are able to dismantle only between 10 and 50 percent of active grow ops. Figure 8 estimates the *total* kilograms of marihuana plants, harvested marihuana and related product, produced and housed in grow ops, based on the three scenarios that assume only 50 percent, 30 percent, or 10 percent of actual marihuana and related product is ever seized by law enforcement. It is estimated that a single plants yields 100 grams of marketable marihuana.[22]

Figure 8: Total marihuana and related product produced and housed in grow ops (in kg)



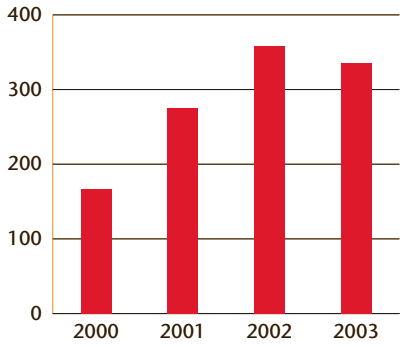
Year	*Total*	*Scenario 1: 50% seized*	*Scenario 2: 30% seized*	*Scenario 3: 10% seized*
2000	7,240	14,480	24,109	72,400
2001	26,252	52,504	87,419	262,520
2002	54,756	109,512	182,337	547,560
2003	38,957	77,914	129,727	389,570
Total	**127,205**	**254,410**	**423,592**	**1,272,050**

Based on estimations and projections in Figure 8 and using the assumption that law enforcement finds only ten percent of marihuana and related product, grow ops in Ontario may produce and house between approximately 127,000 and 1.2 million kilograms of marketable marihuana and related product over the 2000-2003 period.

SIZE OF GROW OPS

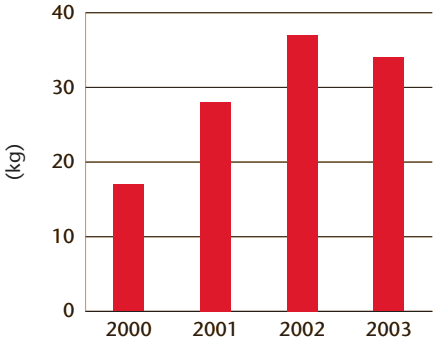
The preceding analyses reveal another important pattern: namely, average crop yields have increased substantially since 2000.[23] Similarly, the average total amount of marihuana and related product seized in grow ops has increased substantially since 2000. These trends are depicted in Figures 9 and 10, respectively.

Figure 9: Estimated average crop yields (number of plants per grow op)



2000	167
2001	275
2002	358
2003	335

Figure 10: Estimated average total marihuana yields (kg of harvested marihuana and related product)



2000	17
2001	28
2002	37
2003	34

Figures 9 indicates that average crop yields increased by 114 percent between 2000 and 2002. The average crop yield is projected to decline by six percent between 2002 and 2003, which may indicate that the trend is leveling off. Similarly, Figure 10 indicates that the total amount of marihuana and related product seized from grow ops increased by 117 percent between 2000 and 2002. Again, a modest decline of eight percent is projected between 2002 and 2003, indicating that this trend may also be leveling off.

Another indication that average crop yields have increased since 2000 but are now leveling off is that police reported an increasing number of grow ops yielding over 1,000 plants between 2000 and 2002, while the number of such large-scale grow ops is projected to remain constant between 2002 and 2003. In 2000, there were no reported grow ops yielding over 1,000 plants. In 2001, police reported seven such operations, which, when extrapolated to annual totals, indicates that 25 grow ops with over 1,000 plants were dismantled. In 2002, the reported number of large-scale dismantled grow ops jumped to 49, which indicates that over 1,000 plants were seized in 76 of the annually reported dismantled operations. In 2002, for instance, the OPP dismantled an operation with 10,000 plants. Through June 7th, 2003, 19 grow ops with over 1,000 plants were reported dismantled, which indicates that 76 of the annual dismantled grow ops will be large-scale – the same number of large-scale grow ops estimated for 2002. Figure 11 shows a typical large-scale grow op.

Figure 11: Large-scale grow op

Source: Peel Regional Police Service

VALUE OF MARIHUANA PRODUCED AND HOUSED IN GROW OPS

The market value of marihuana varies depending on a number of factors, including the quantities in which it is sold (retail or wholesale), the quality of the product, and the location of the sale (domestic or international). A conservative estimate puts the retail or "street" value at $1,000 per plant (or, $10,000 per kilogram) and the wholesale value at $500 per plant (or $5000 per kilogram). Given these figures, Table 3 provides estimates and projections on the retail and wholesale value of marihuana plants produced in grow ops over the 2000-2003 period.[24]

Table 3: Estimated retail and wholesale value of marihuana plants seized/produced (in dollars)

Retail value ($1,000 per plant)

	2000	*2001*	*2002*	*2003*	***Total***
Value of estimated and projected number of plants seized from grow ops	70,309,000	255,763,000	533,511,000	381,329,000	**1,240,912,000**
Scenario 1: Value of plants, if 50% seized	140,618,000	511,526,000	1,067,022,000	762,658,000	**2,481,824,000**
Scenario 2: Value of plants, if 30% seized	234,128,970	851,690,790	1,776,591,630	1,269,825,570	**4,132,236,960**
Scenario 3: Value of plants, if 10% seized	703,090,000	2,557,630,000	5,335,110,000	3,813,290,000	**12,409,120,000**

Wholesale value ($500 per plant)

	2000	*2001*	*2002*	*2003*	***Total***
Value of estimated and projected number of plants seized from grow ops	35,154,500	127,881,500	266,755,500	190,664,500	**620,456,000**
Scenario 1: Value of plants, if 50% seized	70,309,000	255,763,000	533,511,000	381,329,000	**1,240,912,000**
Scenario 2: Value of plants, if 30% seized	117,064,485	425,845,395	888,295,815	634,912,785	**2,066,118,480**
Scenario 3: Value of plants, if 10% seized	351,545,000	1,278,815,000	2,667,555,000	1,906,645,000	**6,204,560,000**

Based on the estimations and projections in Table 3, the retail value of marihuana plants produced in grow ops could total between approximately $1.2 and 12.4 billion over the 2000-2003 period.

When reporting the value of grow op seizures, it is useful to include not only the plant value but also the value of harvested marihuana and related product. Estimating the value of harvested marihuana and related product housed in grow ops is less straightforward because values vary from product to product. Hashish, for instance, can be worth more than harvested marihuana. Reporting on this issue varied: some police reports, for instance, indicated the exact quality and grade of marihuana and related product; others, however, were less specific.

Nevertheless, assuming that harvested marihuana and related product have retail and wholesale values equivalent to marihuana plants – that is, $10,000 per kilogram retail and $5,000 per kilogram wholesale – then the value of harvested marihuana and related product housed in grow ops can be estimated and added to the plant value for the 2000-2003 period. Table 4 reports on these figures.

Table 4: Value of estimated and projected amount of marihuana (plants, harvested marihuana, and related product) produced and housed in grow ops (in dollars)

Retail value ($10,000 per kg)

	2000	*2001*	*2002*	*2003*	***Total***
Kg of marihuana seized	72,400,000	262,520,000	547,560,000	389,570,000	**1,272,050,000**
Scenario 1: Value of plants, harvested marihuana, and related product, if 50% seized	144,800,000	525,040,000	1,095,120,000	779,140,000	**2,544,100,000**
Scenario 2: Value of plants, harvested marihuana, and related product, if 30% seized	241,092,000	874,191,600	1,823,374,800	1,297,268,100	**4,235,926,500**
Scenario 3: Value of plants, harvested marihuana, and related product, if 10% seized	724,000,000	2,625,200,000	5,475,600,000	3,895,700,000	**12,720,500,000**

Wholesale value ($5,000 per kg)

	2000	*2001*	*2002*	*2003*	***Total***
Kg of marihuana seized	36,200,000	131,260,000	273,780,000	194,785,000	**636,025,000**
Scenario 1: Value of plants, harvested marihuana, and related product, if 50% seized	72,400,000	262,520,000	547,560,000	389,570,000	**1,272,050,000**
Scenario 2: Value of plants, harvested marihuana, and related product, if 30% seized	120,546,000	437,095,800	911,687,400	648,634,050	**2,117,963,250**
Scenario 3: Value of plants, harvested marihuana, and related product, if 10% seized	362,000,000	1,312,600,000	2,737,800,000	1,947,850,000	**6,360,250,000**

The estimations and projections in Table 4 indicate that, over the 2000-2003, period, grow ops will house marihuana and related product with an estimated retail value of between $1.3 billion and $12.7 billion.

IV. The Socio-Economic Impact of Grow Ops on Ontario

It is clear from Section III that the scope of grow ops in Ontario is large. In 2002 alone, there may have been as many as roughly 15,000 grow ops operating in Ontario, potentially producing and housing over 500,000 kilograms of marihuana and related product, and possibly generating as much as $5 billion in revenue.

But what are the ramifications of this activity? This section attempts to gauge the impact of grow ops on Ontario, beginning with economic costs and concluding with the societal costs. The impact of grow ops is quantified whenever possible; but figures are not available for some costs, and others are simply too nebulous to be quantified. It should be kept in mind as well that, although for analytical purposes a distinction is made between economic and societal costs, these factors are not easily disentangled in reality.

ECONOMIC COSTS

A variety of economic costs are discussed in this section, including theft of hydro power, insurance costs, law enforcement costs, justice system costs, and costs to cross-border trade with the United Sates.

Theft of Hydro Power

Grow ops require large amounts of electricity to power the high-wattage lights that accelerate plant growth. Smaller grow ops can use electric generators or even pay for hydroelectric power. But for larger operations, these options are often not feasible.[25] Larger operations often steal electricity by tampering with hydrometers, or, more commonly, divert electricity from a main supply line with a "hydro bypass." Figures 12 and 13 depict typical hydro bypasses.

Figure 12: Hydro bypass

Source: York Regional Police Service

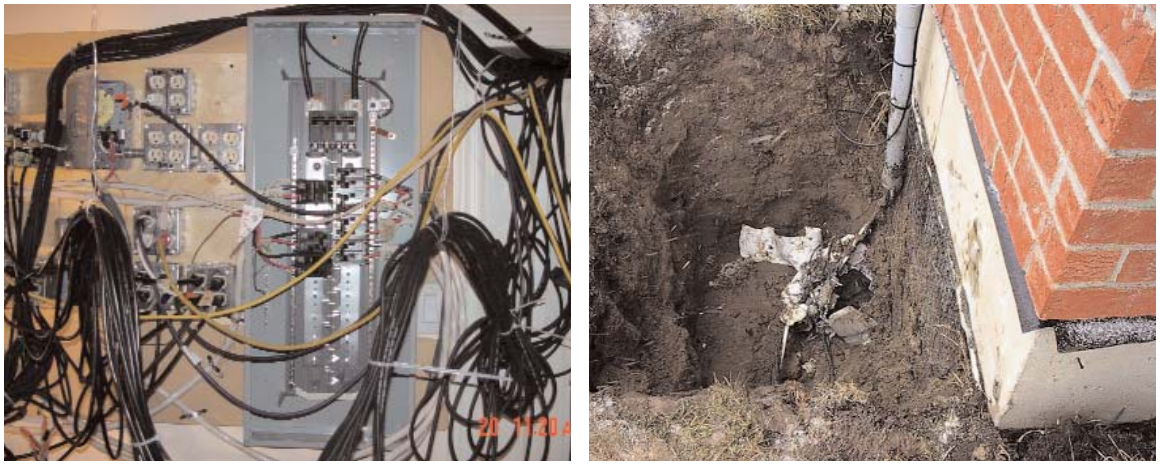
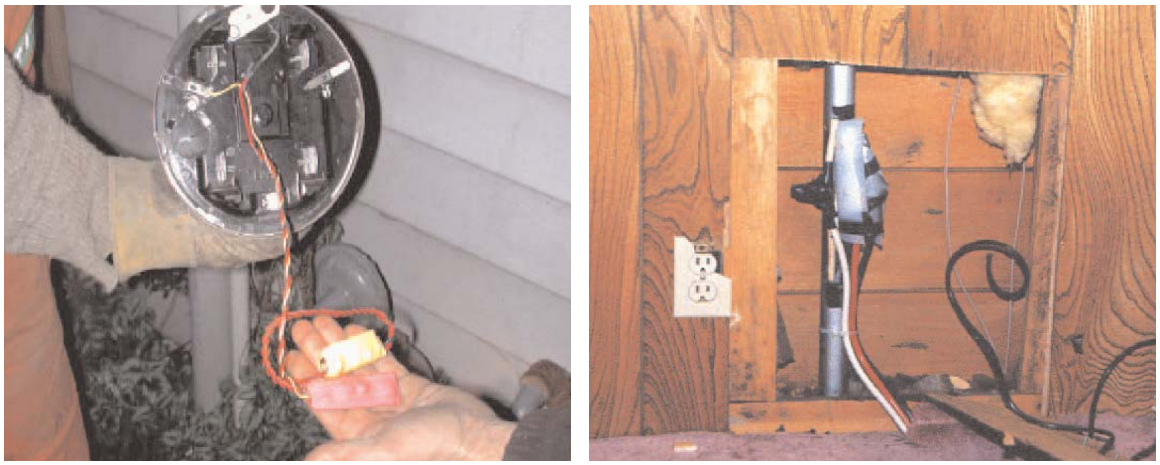


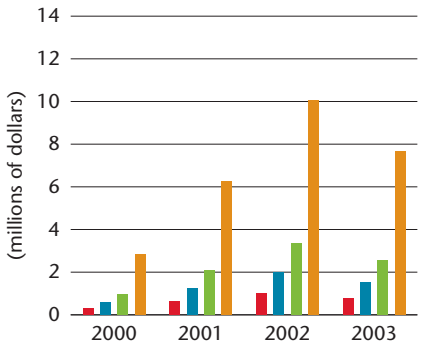
Figure 13: Hydro bypass

Source: Royal Canadian Mounted Police (RCMP)



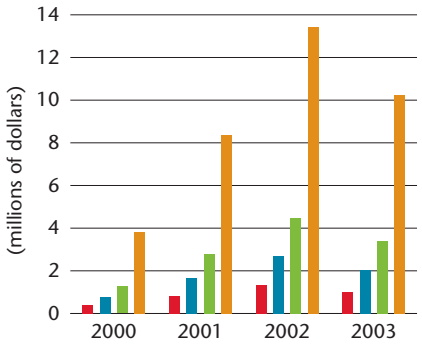
Approximately 45 percent of grow ops dismantled over the 2000-2003 period stole electricity with a hydro bypass (694 of 1,526 police reports indicate a bypass).[26] Hydroelectric companies in Ontario estimate that each operation set up with such a bypass steals between $1,500 and $2,000 per month. Given this estimate, the total amount of electricity stolen per month can be calculated for the period under review.[27] These figures are graphically illustrated below, based on projections assuming that 50 percent, 30 percent, and 10 percent of grow ops are ever dismantled by law enforcement. The results presented in Figure 14 are based on the more conservative $1,500 estimate, while Figure 15 uses the $2,000 estimate.

Figure 14: Monthly hydro theft based on $1,500 estimate (in dollars)



Year	Hydro theft based on 45% theft rate from reported dismantled grow ops	Scenario 1: 50% dismantled	Scenario 2: 30% dismantled	Scenario 3: 10% dismantled
2000	284,850	569,700	948,551	2,848,500
2001	627,075	1,254,150	2,088,160	6,270,750
2002	1,005,750	2,011,500	3,349,148	10,057,500
2003	768,150	1,536,300	2,557,940	7,681,500
Total	**2,685,825**	**5,371,650**	**8,943,799**	**26,858,250**

Figure 15: Monthly hydro theft based on $2,000 estimate (in dollars)



Year	Hydro theft based on 45% theft rate from reported dismantled grow ops	Scenario 1: 50% dismantled	Scenario 2: 30% dismantled	Scenario 3: 10% dismantled
2000	379,800	759,600	1,264,734	3,798,000
2001	836,100	1,672,200	2,784,213	8,361,000
2002	1,341,000	2,682,000	4,465,530	13,410,000
2003	1,024,200	2,048,400	3,410,586	10,242,000
Total	**3,581,100**	**7,162,200**	**11,925,063**	**35,811,000**

Figures 14 and 15 indicate that, in 2002 alone, the cost of hydro theft to hydro companies could have ranged between approximately $1 and 13.4 million *per month*. Total theft estimated and projected for the 2000-2003 period amounts to between approximately $2.7 and 35.8 million *per month*.

Beyond monthly figures, it is difficult to assess the annual cost stemming from hydro theft because the duration for which a typical grow op runs, before dismantling by police or its operators, is unknown. In addition, the amount of "down time" between growing cycles may vary. Hence, it is not known how many months worth of electricity a typical grow op will steal over a given year. However, it is known that a typical grow op cycle is estimated at three months. Assuming conservatively that a typical operation averages two cycles per year and steals $1,500 per month, then grow ops will have stolen between approximately $16 and 160 million over the 2000-2003 period.[28] Based on the same conservative assumptions, grow ops are estimated to have stolen between approximately $6 and 60 million in 2002 alone.[29]

Evidence from several utilities (or, Local Distribution Companies) in Ontario corroborates these estimates and suggests that the high-end figures may be more accurate.

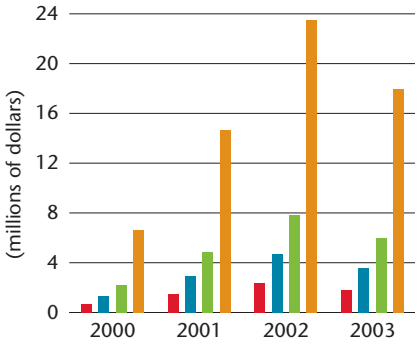
In 2002, Markham Hydro disconnected electrical service from 191 grow op dwellings that stole $1.3 million in electricity. Based on the percentage of transformers that were inspected to discover theft from these grow op dwellings, Markham Hydro estimates that approximately 450 grow ops in the region stole $3.1 million of electricity in 2002. Whitby Hydro estimates that in 2002, 45 grow op dwellings consumed $500,000 of stolen electricity. Based on the assumption that only one in six grow ops are detected, Enersource Hydro Mississauga estimates that annual theft from grow op dwellings may be as high as ten million. In the first seven months of 2003, Hydro Vaughan Distribution Inc. estimates that nearly 70 grow ops stole almost $500,000.[30]

Of the 95 utilities across Ontario, the Electricity Distributors Association – an umbrella group for utilities in Ontario – estimates that at least 30 may be experiencing losses en par with Markham Hydro, Whitby Hydro, and Enersource Hydro Mississauga, and Hydro Vaughan Distribution Inc. If average losses in 2002 for each of these 30 utilities is estimated at two million, then total losses amount to $60 million – a figure that is equivalent to the high-end estimate for 2002, provided above.

Grow op hydro theft has become so systemic that hydro companies in Ontario have reassigned employees to deal directly with the problem. For instance, specialized personnel are trained and employed to disconnect hydro services, repair structural damage, and recover lost revenue.

Based on figures from Markham Hydro and Whitby Hydro, a discovered grow op costs $3,500 in administration and repair costs. Based on this figure, total repair and administration costs can be calculated for the period under review. These estimations are provided in Figure 16.

Figure 16: Repair and administrative costs to hydro utilities (in dollars)



Year	*Administration and repair costs based on 45% theft rate from reported dismantled grow ops*	*Scenario 1: 50% dismantled*	*Scenario 2: 30% dismantled*	*Scenario 3: 10% dismantled*
2000	664,650	1,329,300	2,212,875	6,646,500
2001	1,463,175	2,925,900	4,873,050	14,631,750
2002	2,346,750	4,693,500	7,815,150	23,467,500
2003	1,792,350	3,584,700	5,969,250	17,923,500
Total	**6,266,700**	**12,533,400**	**20,870,325**	**62,669,250**

Based on Figure 16, grow ops will cost electrical utilities in Ontario between $6.6 and 62.7 million in administrative and repair costs for the period under review. In 2002 alone, these costs amount to between $2.3 and 17.9 million.

Ultimately, costs borne by hydro utilities are passed on to consumers through higher rates. Markham Hydro claims that in 2002, each paying customer paid an additional $50 to cover the utility's losses from hydro theft, repair costs, and administrative fees.

Although grow ops are often equipped with hydro bypasses, police in certain regions report that operators are increasingly foregoing this tactic and simply paying for electricity in order to avoid detection. Despite this trend, grow ops remain a concern for both hydro utilities and the general public. According to the Electrical Distributors Association, grow ops consume upwards of 300 kilowatt hours (KWH) per day, or roughly ten times the average electricity consumption.[31] Transformers are often unequipped to handle these high loads of electricity. Moreover, the Electrical Safety Authority – an organization that oversees electrical safety issues in Ontario – warns that grow op may seriously exacerbate chronic summer-time shortages of electricity in Ontario and raise the risk of "brownouts" (a reduction in available voltage) or even blackouts such as the one experienced throughout much of Ontario and eastern portions of the US in mid-August, 2003.

Insurance Costs

The process of establishing and running a grow op can inflict significant structural damage on the dwellings in which the operation is housed. For instance, in order to bring wires from a hydro bypass into a dwelling, the foundation of the house is often compromised. Similarly, in order to install a basement-to-roof ventilation system, operators will sometimes haphazardly cut through the floors of a dwelling. As well, the large amounts of electric power required to operate the high-wattage grow lights can deteriorate the wiring in a dwelling, rendering it unsafe for normal usage. Finally, the high degree of humidity and moisture produced by a grow op can engender significant amounts of mould development on the walls and ceilings. Figure 17 illustrates the type of structural damage typically found in grow-op dwellings.

Figure 17: Structural damage to grow-op dwelling

Source: Office of the Fire Marshal (OFM)

In addition to structural damage, grow ops experience relatively large numbers of fires. Figures 18 and 19 show the aftermath of two grow op fires.

Figure 18: Aftermath of Durham Region grow-op fire

Source: The Toronto Star

Figure 19: Aftermath of York Region grow-op fire

Source: York Regional Police Service

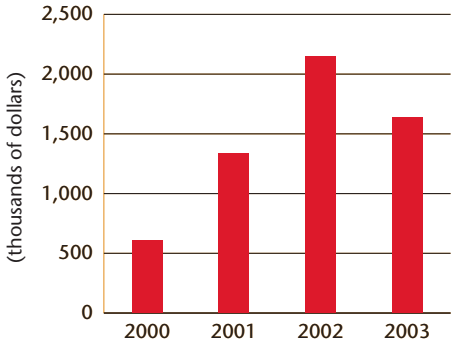
Approximately four percent of grow-op dwellings (1 in 25) in Ontario experienced fire in 2001-2002.[32] This is consistent with fire rates in BC, where 3.5 percent of grow ops reportedly experienced fire in the 1997-2000 period.[33]

Although this figure may not appear alarmingly high, it is in fact disconcerting when compared with an estimate of the overall probability of a private dwelling in Ontario catching on fire. In 2001 in Ontario, there were 4,183 fires in private dwellings and a total of 4,556,240 private dwellings.[34] The general probability of fire in a private dwelling in Ontario, in 2001, may be approximately .09 percent (1 in 1,089 houses).[35]

Thus, assuming 2001 is a typical year with regard to fire rates, *the likelihood of fire in an Ontario grow op could have been as much as 40 times greater than the likelihood of fire in a typical private dwelling in Ontario*.

It is possible to estimate the economic impact of fire-related damage based on the knowledge that the typical economic loss stemming from a residential fire amounts to approximately $36,000, and using previous figures on reported/projected annual dismantled grow ops and the estimate that four percent of grow ops in a sample of Ontario cities experienced fire in 2001-2002.[36] Figure 20 reports on these costs.

Figure 20: Fire-related costs based on $36,000 per fire (in dollars)



2000	607,680
2001	1,337,760
2002	2,145,600
2003	1,638,720
Total	**5,729,760**

Based on Figure 20, fire from grow ops may cost Ontario as much as $5.7 million over the 2000-2003 period. In 2002 alone, the cost of fire is estimated to be as high as $2 million. The majority of this cost will likely be borne by insurance companies, and, ultimately, passed on to the general public through increased premiums.

It is also possible to gauge the costs of both structural and fire-related damage combined by examining the case of a single insurance company.[36] Based on statistics from one insurance company operating in Ontario, 79 claims were filed between January 2001 and May 2003. Table 5 reports on the total payouts resulting from these claims.

Table 5: Total grow-op related payments from a single insurance company in Ontario (in dollars)

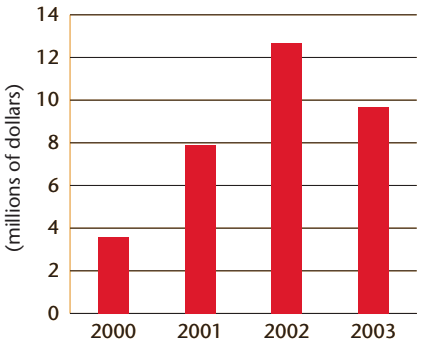
	2001	*2002*	*2003 (Jan.through May)*	***Total***
Structural damage	1,058,057.24	2,258,855.20	242,363.55	**3,559,275.99**
Fire damage	97,770.48	91,818.00	106,466.79	**296,055.27**
Total	**1,155,827.72**	**2,350,673.20**	**348,830.34**	**3,855,331.26**

Table 5 indicates that between January 2001 and May 2003, this single insurer paid out almost $4 million in structural and fire-related damage compensation stemming from grow ops.

Law Enforcement Costs

According to the OPP, a typical grow ops costs approximately $8,500 to investigate and dismantle.[38] This figure is used, in conjunction with the annual reported/projected number of dismantled grow ops, to estimate and project law enforcement costs in Figure 21.

Figure 21: Law enforcement costs based on $8,500 per grow op (in dollars)



2000	3,587,000
2001	7,896,500
2002	12,665,000
2003	9,673,000
Total	**33,821,500**

Based on Figure 21, police services in Ontario may spend more than $12.6 million investigating and dismantling grow ops in 2002 alone. Over the 2000-2003 period, police services could spend as much as $33.8 million investigating and dismantling grow ops.

Taxpayers, of course, are likely to ultimately bear the cost of this public expenditure.

Costs to the Justice System

Costs to the justice system associated with marihuana cultivation include costs of incarcerating persons sentenced to jail/prison time, as well as costs of monitoring persons given conditional sentences and sentences involving probation.

Data restrictions prevent an analysis of costs to the justice system incurred solely by indoor marihuana cultivation. Costs discussed below relate to persons charged under Section 7 of the Controlled Drugs and Substances Act (CDSA), "Production of Substance." In addition to indoor marihuana cultivation, costs relate to persons convicted of cultivating marihuana outdoors, as well as persons convicted of producing other illegal drugs such as Methamphetamine (Meth) or Ecstacy. Justice system personnel indicate that since 2000, an increasing majority of CDSA(7) cases involve indoor marihuana grows. These justice system costs, presented in Tables 6, 7, and 8, are nevertheless excluded from the calculation of total economic costs (see p.28).[39]

Table 6: Costs of CDSA(7) incarceration sentences

	2000	*2001*	*2002*	*2003* *(Jan. through mid-June)*	***Total***
Number of days sentenced	28,710	23,412	37,928	22,931	**112,981**
Per diem cost of incarceration[40]	$144.61	$151.86	$159.45	$167.43	
Total	**$4,151,753**	**$3,555,346**	**$6,047,620**	**$3,839,337**	**$17,594,056**

Table 7: Costs of CDSA(7) conditional sentences

	2000	*2001*	*2002*	*2003* *(Jan. through mid-June)*	***Total***
Number of days sentenced	37,109	59,972	84,132	47,523	**228,736**
Per diem cost of conditional sentences[41]	$3.83	$3.83	$3.83	$3.83	
Total	**$142,127**	**$229,693**	**$322,226**	**$182,013**	**$876,059**

Table 8: Costs of CDSA(7) probation sentences

	2000	*2001*	*2002*	*2003* *(Jan. through mid-June)*	***Total***
Number of days sentenced	64,270	76,337	78,756	58,506	**277,869**
Per diem cost of probation sentences[42]	$3.83	$3.83	$3.83	$3.83	
Total	**$246,154**	**$292,371**	**$301,635**	**$224,078**	**$1,064,238**

Based on Tables 6, 7, and 8, justice system costs, for January 2000 through mid-June 2003, total $19.5 million for persons convicted of producing illegal drugs. In 2002 alone, justice system costs amount to $6.7 million. Again, justice system costs associated with persons convicted of cultivating marihuana indoors are believed to constitute a significant and increasing portion of total justice system costs associated with producing illegal drugs, but exact figures are unknown.

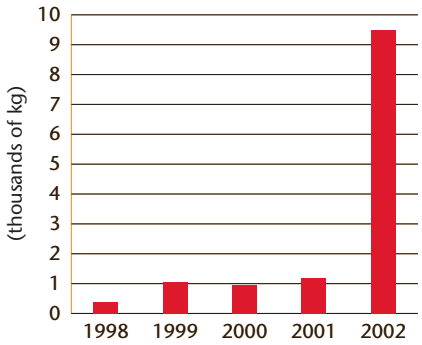
Costs to Cross-Border Trade

Perhaps the most devastating economic cost to Ontario from grow ops could stem from a potential chill in relations with the province's largest trading partner, the United States. In 2002, 93 percent of Ontario's exports went south to the U.S., while 73 percent of the province's imports came north from the United States.[43] It is well recognized that the U.S. has declared a "war on drugs," and may be willing to accept international trade limitations in the name of securing its perimeters against the importation of illicit drugs.

Law enforcement officials in both Canada and the U.S. believe that the vast majority of marihuana being produced in grow ops in Canada is destined for export to the United States. Marihuana produced in Canada is often exchanged for cocaine, which is then brought to Canada for resale.[44]

Statistics from the U.S. Customs Service show a dramatic increase in the amount of marihuana making its way into the United States from Canada. During 1998, 369 kilograms of marihuana were seized at United States/Canada land borders. The amount seized in 2002 skyrocketed to 9,477 kilograms – a number that likely reflects increased border vigilance following the September 11th, 2001 attacks, as well as the magnitude of the marihuana traffic problem. Figure 22 illustrates the increase in marihuana land border seizures between 1998 and 2002.

Figure 22: U.S. Customs Service seizures at Canadian land borders (kg of marihuana seized)



1998	369
1999	1,043
2000	938
2001	1,202
2002	9,477

Senior U.S. lawmakers have already hinted that the United States would not hesitate to impose trade sanctions or seriously restrict border traffic if Canada decriminalizes marihuana.[45] (U.S. officials believe that decriminalization could increase the number of grow ops and hence, increase the amount of marihuana shipped to the United States from Canada.) Although this economic cost may be substantial, it is also the most difficult to quantify, and remains a *potential* rather than an *actual* cost.

Total Economic Costs

Table 9 provides total estimated economic costs for the 2000-2003 period. These totals, of course, are based solely on calculable costs and exclude, among other things, insurance costs resulting from structural damage to houses, justice system costs, and potential costs to cross-border trade.

Table 9 includes costs stemming from theft of hydro (using the $1,500 estimate and the assumption that a typical grow op will run two, 3-month cycles during the year). The ten percent grow op discovery scenario is used for hydro theft costs because evidence from individual hydro utilities in Ontario suggest that this is the most likely of the three scenarios. Also included in Table 9 are repair and administration costs incurred by hydro utilities (using the ten percent grow op discovery scenario), fire-related costs incurred by insurance companies, and law enforcement costs.

Table 9: Total estimated and projected economic costs (in dollars)

	2000	*2001*	*2002*	*2003*	***Total***
Hydro theft costs (based on 10% grow op discovery scenario)	17,091,000	37,624,500	60,345,000	46,089,000	**161,149,500**
Hydro repair and administration costs (based on 10% grow op discovery scenario)	6,646,500	14,631,750	23,467,500	17,923,500	**62,669,250**
Fire-related costs	607,680	1,337,760	2,145,600	1,638,720	**5,729,760**
Law enforcement costs	3,587,000	7,896,500	12,665,000	9,673,000	**33,821,500**
Total	**27,932,180**	**61,490,510**	**98,623,100**	**75,324,220**	**263,370,010**

Based on Table 9, grow ops are estimated to cost Ontario as much as $98.6 million in 2002 alone. Over the 2000-2003 period, it is possible that grow ops may cost Ontario as much as $263.4 million.

SOCIETAL COSTS

As seen above, grow ops exact a heavy toll on Ontario that can be quantified. But the impact of grow ops also extends to the societal level where the costs are often more nebulous. A variety of societal costs are identified below that relate to public safety as well as the safety of law enforcement and other first-responders.

Environmental and Human Health Hazards

Because grow-op dwellings contain a high level of relative humidity, they are prone to the build-up of various moulds. At high concentrations, these moulds can be damaging to human health, causing and/or exacerbating immunological diseases such as hay fever, allergies, and asthma, as well as causing infections and even cancer.[46] Figure 23 depicts the mould buildup that can occur in grow-op dwellings.

Figure 23: Mould damage in grow op

Source: York Regional Police Service

Residents of active grow-op dwellings risk being exposed to the type of mould depicted. Mould is also considered to be a pernicious problem because neither police nor any other authorities remove the mould after a grow op has been dismantled. Unscrupulous landlords or other owners can easily plaster or paint over the mould and expose unwitting renters and buyers to this hazard.

In addition to the problem of mould, grow ops also raise the specter of toxic smoke as well as land and groundwater contamination. Operators often store large quantities of chemicals such as liquid nutrients, pesticides, and fungicides on the premises. Hyper-oxygen, diazinon, and malthion are examples of chemicals found at grow ops. If ignited, some of these chemicals could engender toxic smoke. If spilled in the grounds surrounding a dwelling, the liquid nutrients and fertilizers could engender land and water pollution. Figure 24 shows the array of chemicals typically contained in a grow op.

Figure 24: Chemicals used in grow op

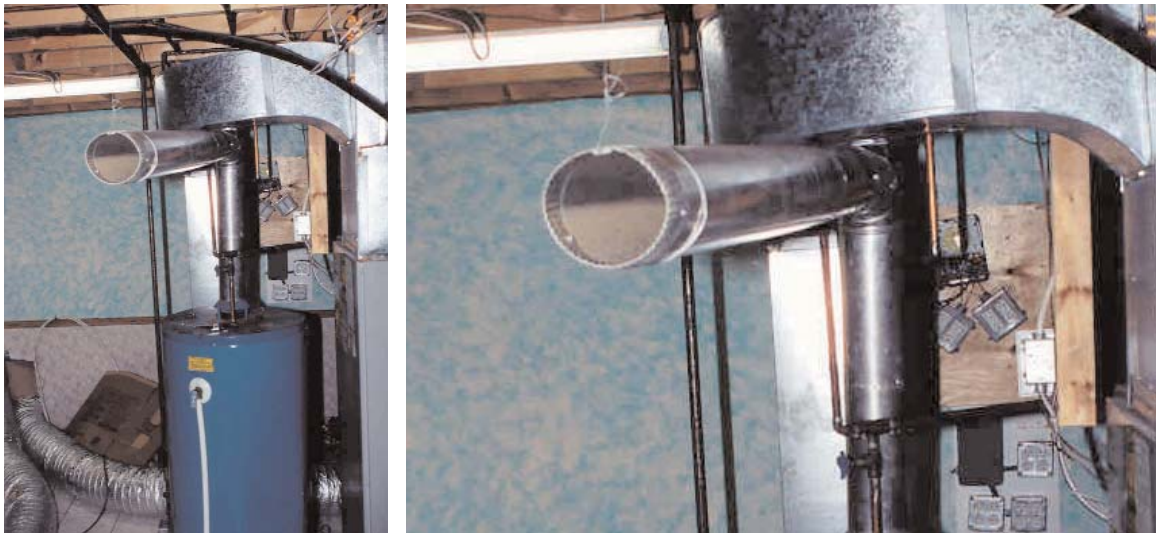
Source: Office of the Fire Marshal (OFM)

As well, carbon dioxide (CO_2), which is sometimes used to enhance plant growth, can have serious human health risks. CO_2 is naturally present in the atmosphere at levels of approximately .035 percent. Short-term exposure to CO_2 at levels below two percent has not been reported to cause harmful effects. Higher concentrations can affect respiratory function and cause excitation followed by depression of the central nervous system. High concentrations of CO_2 can displace oxygen in the air, resulting in lower oxygen concentrations for breathing. Therefore, effects of oxygen deficiency may be combined with effects of CO_2 toxicity.[47]

Finally, in order to vent the pungent smell of the marihuana plants, operators sometimes purposely disconnect furnace piping, unwittingly allowing the emission of carbon monoxide (CO). They also sometimes erroneously believe that CO emitted by furnaces fosters plant growth. Naturally, this raises the possibility of CO poisoning. Figure 25 depicts a modified furnace from a grow op.

Figure 25: Modified furnace pipe in grow op

Source: Office of the Fire Marshal (OFM)



The magnitude of the aforementioned environmental threats is largely unknown at the current time. For instance, it is not known exactly what types of moulds are produced in grow-op dwellings, what percentage of grow-op dwellings exhibit mould, or at what concentration these moulds are found. Similarly, the typical concentrations of CO_2 and CO in grow-op dwellings is unknown.

Although the environmental risks are largely unknown, some police services, such as the Toronto Police Service (TPS), require officers involved in dismantling grow ops to wear special protective equipment to safeguard against health hazards.

Fires, Electrocutions, and Explosions

As noted above, the threat of fire in a grow-op dwelling can be substantially higher than an average home. Based on some sampled Ontario municipalities, and assuming 2001 is a typical year with regard to fire rates, grow-op dwellings can be as much as 40 times more likely to experience fire than the typical private dwelling in Ontario.

In addition to the specter of fire, grow ops also pose a threat to public safety and the safety of first-responders in various other ways. First, the potential for electrocution is very real, despite the fact that no such occurrences have been reported to date in Ontario. In British Columbia, between 1995 and 2000, an estimated fifteen electrocutions were reported to be related directly to grow ops.[48]

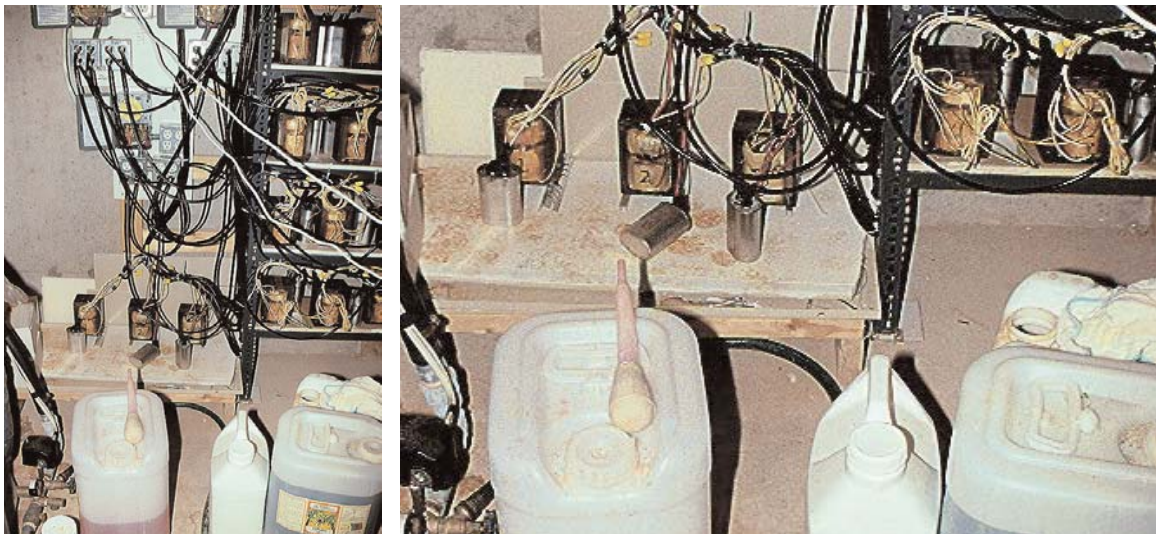
In the process of crafting a hydro bypass, operators dig out and expose a 10,000-watt wire that is attached to the hydro meter. Ballasts are then used to convert this 10,000-watt wire into the 60,000 watts often required to run growing lights. Because the wire is exposed outside of the dwelling and is not grounded, it can charge the surrounding grounds – making them dangerous and even lethal to innocent persons passing by, police officers called in to dismantle the grow op, or firefighters responding to a fire in the dwelling.

Despite the fact that firefighters usually cut the hydroelectric power in a dwelling before responding to a call, the interior of the dwelling may still pose a serious risk because the ballast and capacitor used to boost the wattage and regulate the flow of current may retain electrical charge even after being disconnected. Moreover, it is unlikely that firefighters would be aware of the grow op related to the house fire, making it difficult for them to avoid this potential hazard.[49]

Finally, depending on the types and quantities of material perpetrators use, the manner in which dwellings are restructured, and the overall care that operators take, grow ops pose the risk of explosion. Four initial conditions required for an explosion are sometimes found together in grow ops. First, a high volume of oxygen sometimes exists because operators will artificially increase the amount of this gas in order to maximize plant growth. Second, a high volume of nitrogen, which operators use to fertilize plants, may be present. Third, an accelerant such as propane is sometimes found in grow-op dwellings. Propane tanks are sometimes used to cook in grow-op dwellings because operators will disconnect the kitchen stoves in order to use the 220-volt power supply for the growing lights. Propane is also sometimes used to fuel the CO_2 generators used to enhance plant growth.[50] Fourth, and finally, a spark from a badly wired hydro bypass can easily be produced inside a grow-op dwelling. Figure 26 shows a typical scenario in a grow op whereby flammable chemicals are found alongside dangerously wired installations.

Figure 26: Hazardous situation – chemicals in close proximity to open wiring

Source: York Regional Police Service



Although there have been no explosions reported to date in Ontario stemming directly from grow ops, several explosions have been reported at "extraction labs" where marihuana is converted into liquid hashish using highly explosive chemicals. Police report that extraction labs have been found in grow-op dwellings in Ontario.[51] An example of an explosion from such an extraction lab occurred in Boucherville, Quebec, in May 2000. The explosion demolished the residential dwelling in which the extraction lab was located and caused extensive damage to nearby residences. One man died in the explosion and several were injured. Figure 27 depicts the aftermath of the Boucherville, Quebec explosion.

Figure 27: Aftermath of Boucherville, Quebec explosion

Source: Royal Canadian Mounted Police (RCMP)

Defensive Measures

Another potential threat awaits police officers and first-responders arriving at grow-op dwellings. Because grow ops constitute a sizeable investment on the part of operators, dwellings are sometimes protected from being wantonly vandalized or stolen by other criminal actors or organizations.

Consequently, operators sometimes use defensive measures or "booby traps" to protect grow-op dwellings. For instance, in October 2001, Peel Regional Police Service officers attending a recently vacated grow op in Mississauga, discovered homemade booby traps attached to all doors and windows of the dwelling. The perpetrators had manipulated electrical plugs and attached wires and coat hangers to outlets and entry points with the intent of rendering electrical shocks to anyone entering the dwelling.[52] This booby trap appears in Figure 28. A similar booby trap was discovered by Peel Regional Police Service officers at a Brampton area grow op in July 2003.

Figure 28: Electrical booby trap

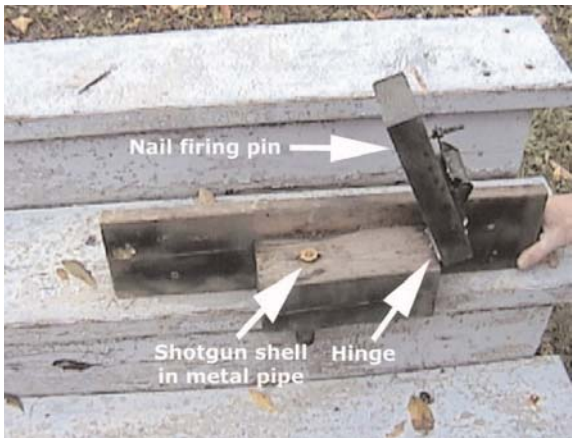
Source: Peel Regional Police Service

In another incident, in November 2001, officers from the Hamilton Police Service Drug Squad discovered a grow op that was rigged to release isopropyl alcohol and other noxious compounds if anyone entered the dwelling. The main door of the dwelling was also rigged to generate an electrical shock when pushed open, and jars of nitric acid were strategically located to spill on intruders.[53]

Figure 29 depicts yet another booby trap discovered by the OPP – a so-called "mousetrap" – in which a plank of wood and some metal parts were rigged to detonate a shotgun shell if tripped.

Figure 29: "Mousetrap"

Source: Ontario Provincial Police (OPP)



A reliable figure for the number of instances in which defensive measures are used is not available for Ontario. However, police widely believe that the experience in Ontario is not radically different from BC, where approximately two percent of all grow ops searched between 1997 and 2000 contained hazards such as booby traps and explosives.[54]

Violence

If grow ops are indeed largely run by organized crime, the potential exists for importing violence to the residential neighbourhoods where grow ops are so often located. In York Region alone, there have been at least two homicides – one in 2001, the other in 2002 – directly related to marihuana cultivation and AOC.[55] Of course, because marihuana cultivation is an illegal activity, episodes of internal violence amongst rival organized crime groups are likely to be highly underreported.[56]

An indicator of the increasing potential for violence is the number of guns police seize when dismantling grow ops. No guns were seized by police in 2000. Twenty-eight weapons were seized in 2001 from two separate grow ops. In 2002, eighteen guns were seized from nine distinct grow ops. Through June 7th, 2003, police have already seized 30 guns from eighteen separate grow ops.[57]

A Threat to Ontario's Children and Communities

The aforementioned threats to public safety are especially poignant when considered in light of the dangers they pose to Ontario's children and communities.

Children are *directly* exposed to some hazards discussed above – such as chemicals, mould, electrocution, and fire – because children sometimes inhabit grow-op dwellings. As noted, crop sitters may bring their families to live in these residential dwellings in order to avoid suspicion from inquisitive neighbours.

Previous enforcement initiatives indicate that, for every four grow ops, one child will reside in a grow-op dwelling (although a single dwelling, of course, may contain multiple children).[58] Based on this estimate, the reported/projected number of dismantled grow ops, and the estimated number of grow ops given the 50 percent, 30 percent, and 10 percent discovery scenarios, Table 10 provides estimations and projections for the number of children that may have resided in grow-op dwellings over the 2000-2003 period.

Table 10: Number of children estimated and projected to be living in grow ops

	2000	*2001*	*2002*	*2003*	***Total***
Number of children residing in grow ops based on number of reported dismantled grow ops	106	232	373	285	**995**
Scenario 1: Number of children residing in grow ops, if 50% dismantled	211	465	745	569	**1,990**
Scenario 2: Number of children residing in grow ops, if 30% dismantled	351	773	1,240	947	**3,313**
Scenario 3: Number of children residing in grow ops, if 10% dismantled	1,055	2,323	3,725	2,845	**9,948**

Based on Table 10, the number of children residing in grow-op dwellings may have been between approximately 995 and 10,000 for the 2000-2003 period. In 2002 alone, it is estimated that as many as 3,700 children may have resided in these dwellings.

If some children are directly exposed to the aforementioned hazards of grow ops, many other children and citizens, as well as sensitive institutions such as hospitals and schools, are indirectly exposed. This is because grow ops are generally housed in areas with high population and dwelling counts.

It is estimated that the typical grow op in Ontario is located in a region with a population density of 3,510 persons per square kilometre.[59] By way of comparison, the average population density in Ontario in 2001 was twelve persons per square kilometre.[60] Similarly, the typical grow op is housed in a region with a dwelling density of 1,168 dwellings per square kilometre.[61] Again, by way of comparison, the average dwelling density in Ontario in 2001 was five private dwellings per square kilometre.[62]

As well, according to the Toronto Police Service, multiple grow ops are increasingly being housed within the same apartment building. The proximity of residences within an apartment building obviously raises concerns in light of the public safety risks described above.[63]

For the 2000-2002 period, only .02 percent of grow ops were housed in industrial locations, and only .13 percent were housed in rural locations. Conversely, 85 percent of grow ops were housed in urban locations.[64]

In such densely populated regions, it is evident that some citizens not directly impacted by grow ops will nevertheless be faced with risk. For instance, the less distance existing between dwellings, the greater the chance that fire will spread from one dwelling to an adjacent one. In apartment buildings, there is a risk that re-circulated air containing mould spores could spread to neighbouring residences. There is also the potential for violent episodes, which could prove lethal for innocent bystanders. Quite simply, the more densely populated the area, the greater the threat to citizens in the immediate region.

Figure 30 helps gauge the proximity of grow ops to schools in Ontario.

Figure 30: Schools and grow ops in close proximity in Peel Region

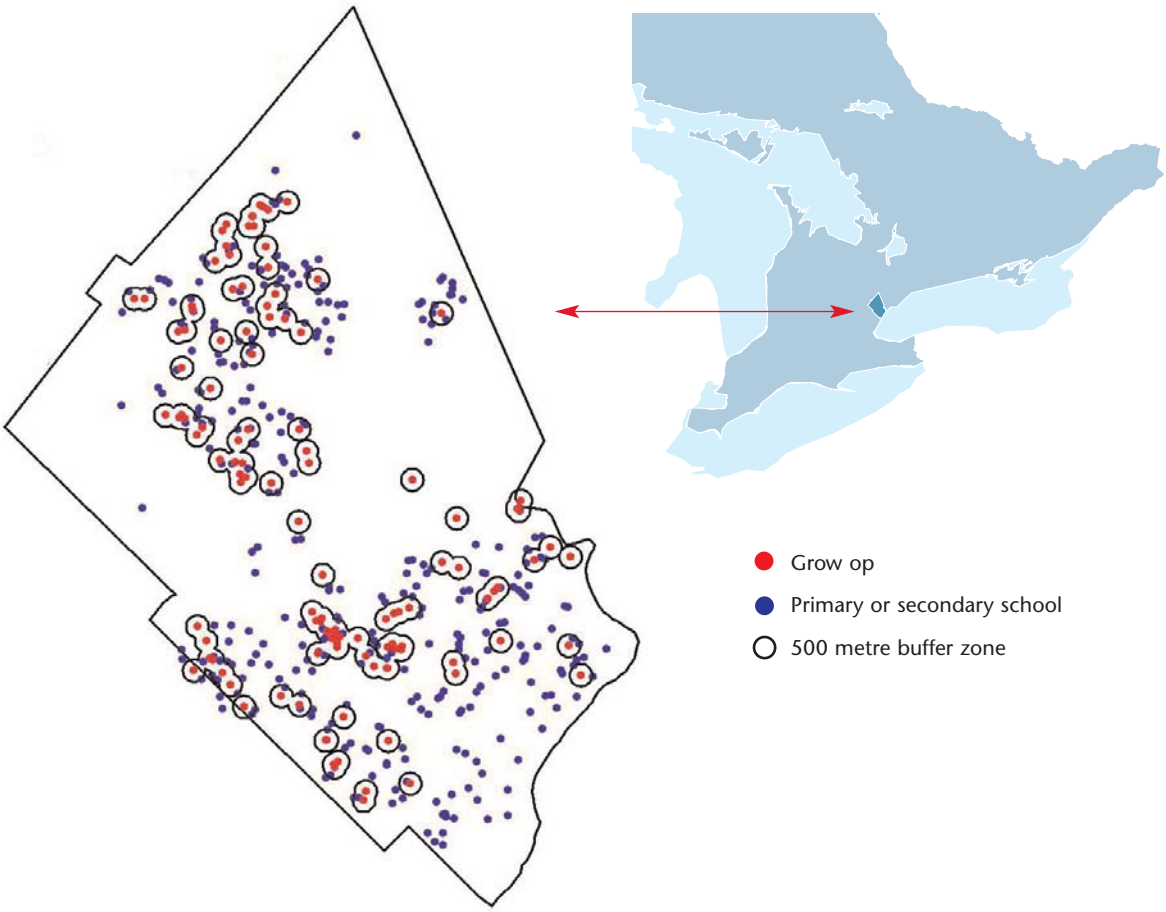


Figure 30 indicates that 73 of the 332 primary and secondary schools (22%) in Peel Region were located within 500 metres of a grow op in 2002. In York Region, 38 of the 249 primary and secondary schools (15%) were located within 500 metres of a grow op in 2002. And in Waterloo, 15 of the 178 primary and secondary schools (8%) were located within 500 metres of a grow op in 2002. In the three regions combined, seventeen percent of primary and secondary schools were located within 500 metres of grow op in 2002.[65]

Given the threats to public safety identified above – such as the potential for electrocution and fire – these figures point to what may be a precarious situation.

V. Summary and Conclusions

SUMMARY

This paper has examined the scope of grow-op activity in Ontario and its socio-economic impact for the 2000-2003 period.

Between 2000 and 2002 the number of grow ops in Ontario is estimated to have increased by over 250 percent. In 2002 alone, there may have been as many as 15,000 grow ops active in Ontario.

In 2003, the number of grow ops is projected to diminish by 24 percent. However, the projections also indicate that, in the latter half of 2003, the number of grow ops may climb once again – a trend that could carry over to 2004.

By the end of the 2000-2003 period, it is possible that Ontario police may seize over 1.2 million plants from grow ops. In this same period, grow ops could produce and house over 1.2 million kilograms of marketable marihuana and related product. The revenue generated from grow ops is estimated to be potentially as high as $12.7 billion for the period under review.

The economic ramifications from this burgeoning phenomenon are mounting. It is possible that grow ops could cost Ontario as much as $260 million over the 2000-2003 period. In 2002 alone, grow ops are estimated to have cost Ontario nearly $100 million.

Moreover, grow ops represent a serious threat to public and officer safety. Assuming that fire rates for 2001 were typical, the likelihood of fire in a grow-op dwelling may be as much as 40 times greater than the likelihood of fire in a typical private dwelling in Ontario. Although there have been no reported explosions or electrocutions directly tied to grow ops in Ontario, such incidents have been reported in other provinces. The potential for violence in and around a grow-op dwellings is also very real: York Region has already experienced two homicides directly related to control over the marihuana trade. Officers and other first-responders face an additional risk: roughly two percent of grow ops are booby-trapped. Finally, human health risks can result from the mould sometimes created in grow ops, the chemicals used to foster plant growth, and the relatively high concentration of carbon dioxide and carbon monoxide suspected to exist in some grow-op dwellings. Many of these safety concerns are exacerbated by the fact that grow ops are generally located in highly populated regions.

Children are at risk from grow op activity, as the families of “crop sitters” sometimes live in grow ops to add an air of legitimacy to the operation. As many as 10,000 children may have resided in grow-op dwellings over the 2000-2003 period. Children can sometimes also be indirectly exposed to harms from grow op activity. In 2002, in the York, Peel, and Waterloo regions combined, seventeen percent of grow ops were located within 500 metres of a primary or secondary school.

CONCLUSIONS

It is unlikely that grow ops can be entirely eliminated from Ontario. However, there are measures that can be taken in order to lessen the scope of grow op activity, along with its attendant socio-economic impact, including: (1) developing avenues to increase the effectiveness and efficiency of law enforcement's approach to grow ops; (2) enhancing lines of communication and sharing of intelligence between police and other key stakeholders – such as insurance companies, real estate agencies, and banks; and (3) educating persons in the justice system on the issue of grow ops so that sentencing more accurately reflects the severity of the crime.

The first and third recommendations can be explored in light of the fact, discussed previously, that law enforcement in Ontario and across Canada widely assert that organized crime is involved in grow ops.

First, if organized crime groups are behind grow-op activity in Ontario, the number of grow ops may continue to rise along with their socio-economic impact. Currently, law enforcement largely attempts to mitigate grow ops by simply dismantling as many operations as possible. In BC, under the GROW-BUSTERS Project, police often do not even lay charges against persons found in grow-op dwellings.[66] However, if the preponderance of grow-op activity is in fact dominated by organized crime, this method of mitigating the problem will be only marginally effective. Quite simply, organized crime possesses the resources to absorb current efforts by law enforcement and continue to expand the number of new grow ops. In order to more seriously stem the flow of grow ops – to turn back the "green tide" – law enforcement will have to attack the root cause of the problem.

Second, until the link between grow ops and organized crime is better understood, sentencing by the Canadian criminal justice system for the crime of marihuana cultivation will continue to be unreflective of the severity of this illicit activity. Of those persons convicted under CDSA(7) – Production of Substance – between January 2000 and mid-June 2003, only one-third of sentences involved incarceration.[67] The balance of convictions included conditional sentences, probation, or fines. For the 777 persons sentenced to jail/prison time under CDSA(7) during this time period, the average (mean) sentence was 145 days, or just under five months.[68]

Lenient sentencing for marihuana cultivation is hardly unique to Ontario. In BC between 1997 and 2000, sentences involving incarceration were handed down in only eighteen percent of cases with an average sentence of 4.5 months.[69] To put these sentences in perspective, persons found guilty of marihuana cultivation in the U.S. receive between 33 and 87 months in a federal institution, depending on criminal history.[70]

Even if criminal justice system personnel are educated as to the socio-economic impact of grow ops, sentencing will continue to be lenient until a *comprehensive* picture of the link to organized crime is firmly established. This is because the socio-economic impact of grow ops is only apparent at an aggregate level. Individually, each grow op appears relatively harmless. But collectively, the effects of grow ops, as this paper has attempted to demonstrate, can be substantial. If guilty parties continue to be treated as criminal entrepreneurs responsible for only one or two grow ops, then sentencing will continue to be relatively lenient. Indeed, as noted above, law enforcement widely believes that organized crime hires outsiders to tend to the daily upkeep of crops. The persons convicted of marihuana cultivation are often genuinely ignorant of the level and sophistication of the operation, and the lenient sentences may not be entirely unjustified (although lenient sentences are undesirable if they fail to act as a deterrent).

If, on the other hand, law enforcement target those organized crime figures responsible for orchestrating grow ops, then prosecutors will be able to link these persons to multiple operations as well as the distribution and sale of marihuana. If this occurs, sentences will likely become markedly less lenient.

In sum, investigations that further law enforcement's understanding of the connection between organized crime and grow ops are required. This will allow police to target the root cause of grow ops and encourage justice system personnel to seek tougher sentences.

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Appendix: Description of the Time-Series Forecasting Model

This appendix provides specifications and a step-by-step explanation of the diagnostics for an ARIMA (Autoregressive Integrated Moving Average) time-series model used to forecast the number of grow ops that may be dismantled from June 8th, 2003 through December 31st, 2003.

Table 11 displays the raw data, the transformed data, and the resulting data from the ARIMA model.

Table 11: Data employed for, and generated by, ARIMA time-series model

Date	Reported dismantled grow ops	Weekly distribution of annual cases based on ratios reported in Table 1 (eight cells changed from 0 to 1)	Log base 10 of weekly distribution of annual cases	Value of series when differenced and logged	Model fit	Errors in fit of model	95% lower confidence values	95% upper confidence values
8-Jan-00	3	8	2.08		.	.	.	.
15-Jan-00	4	11	2.4	0.32	8.05657	0.31141	1.04738	61.97187
22-Jan-00	2	5	1.61	-0.79	9.49282	-0.6411	1.61399	55.83299
29-Jan-00	1	3	1.1	-0.51	7.67516	-0.93938	1.43739	40.98257
5-Feb-00	4	11	2.4	1.3	6.0298	0.60118	1.18565	30.66551
12-Feb-00	1	3	1.1	-1.3	6.92884	-0.83708	1.40191	34.24523
19-Feb-00	2	5	1.61	0.51	5.94626	-0.17332	1.22523	28.8582
26-Feb-00	0	1	0	-1.61	5.81229	-1.75997	1.21238	27.86474
4-Mar-00	2	5	1.61	1.61	4.42528	0.1221	0.93095	21.03551
11-Mar-00	2	5	1.61	0	4.53865	0.09681	0.9606	21.44435
18-Mar-00	5	13	2.56	0.96	4.63427	1.03147	0.98512	21.80083
25-Mar-00	2	5	1.61	-0.96	5.37801	-0.07288	1.14685	25.21938
1-Apr-00	3	8	2.08	0.47	5.36354	0.39982	1.14643	25.09314
8-Apr-00	2	5	1.61	-0.47	5.69143	-0.12952	1.21859	26.58182
15-Apr-00	5	13	2.56	0.96	5.63698	0.8356	1.20844	26.29468
22-Apr-00	3	8	2.08	-0.49	6.3122	0.23696	1.35443	29.41749
29-Apr-00	6	16	2.77	0.69	6.54902	0.89327	1.40617	30.50099
6-May-00	5	13	2.56	-0.21	7.37269	0.56717	1.58378	34.32075
13-May-00	5	13	2.56	0	7.96577	0.4898	1.71176	37.06909
20-May-00	5	13	2.56	0	8.52201	0.4223	1.83172	39.64827
27-May-00	6	16	2.77	0.21	9.03979	0.57095	1.94332	42.05051

3-Jun-00	2	5	1.61	-1.16	9.76407	-0.66927	2.09924	45.41498
10-Jun-00	4	11	2.4	0.79	9.05977	0.19405	1.94794	42.13643
17-Jun-00	0	1	0	-2.4	9.34276	-2.2346	2.00886	43.45113
24-Jun-00	5	13	2.56	2.56	7.16309	0.59601	1.54021	33.31355
1-Jul-00	3	8	2.08	-0.49	7.75745	0.03079	1.66801	36.07778
8-Jul-00	2	5	1.61	-0.47	7.84166	-0.45001	1.68609	36.46985
15-Jul-00	3	8	2.08	0.47	7.47605	0.06774	1.60745	34.77009
22-Jul-00	2	5	1.61	-0.47	7.59124	-0.41756	1.63219	35.30657
29-Jul-00	5	13	2.56	0.96	7.26625	0.58171	1.56228	33.79587
5-Aug-00	3	8	2.08	-0.49	7.85413	0.0184	1.68863	36.53102
12-Aug-00	1	3	1.1	-0.98	7.92739	-0.97171	1.70434	36.87264
19-Aug-00	2	5	1.61	0.51	7.09383	-0.34979	1.5251	32.99626
26-Aug-00	0	1	0	-1.61	6.84657	-1.92375	1.47191	31.84686
2-Sep-00	3	8	2.08	2.08	5.45726	0.38249	1.1732	25.385
9-Sep-00	4	11	2.4	0.32	5.7574	0.64741	1.2377	26.78162
16-Sep-00	15	40	3.69	1.29	6.27278	1.85266	1.34847	29.17954
23-Sep-00	0	1	0	-3.69	7.91242	-2.06843	1.70092	36.80734
30-Sep-00	3	8	2.08	2.08	6.1972	0.25534	1.33218	28.82879
7-Oct-00	5	13	2.56	0.49	6.43773	0.70277	1.38387	29.94811
14-Oct-00	4	11	2.4	-0.17	7.0613	0.44327	1.5179	32.84932
21-Oct-00	2	5	1.61	-0.79	7.5048	-0.40611	1.61322	34.9129
28-Oct-00	3	8	2.08	0.47	7.19393	0.1062	1.54638	33.46702
4-Nov-00	3	8	2.08	0	7.33891	0.08625	1.57753	34.14177
11-Nov-00	3	8	2.08	0	7.46868	0.06872	1.60541	34.74574
18-Nov-00	1	3	1.1	-0.98	7.58458	-0.9275	1.63031	35.28512
25-Nov-00	7	19	2.94	1.85	6.82404	1.02399	1.46683	31.74712
2-Dec-00	4	11	2.4	-0.55	7.78294	0.34596	1.67293	36.20835
9-Dec-00	11	30	3.4	1	8.17452	1.30018	1.75709	38.03026
16-Dec-00	4	11	2.4	-1	9.6414	0.13183	2.07239	44.85479
23-Dec-00	2	5	1.61	-0.79	9.86638	-0.67969	2.12074	45.90162
30-Dec-00	0	1	0	-1.61	9.14843	-2.21358	1.96641	42.56165
6-Jan-01	2	7	1.95	1.95	7.04019	-0.00572	1.51325	32.75346
13-Jan-01	0	1	0	-1.95	7.08504	-1.95799	1.52289	32.96222
20-Jan-01	4	13	2.56	2.56	5.62431	0.83785	1.20891	26.16642
27-Jan-01	2	7	1.95	-0.62	6.27115	0.10995	1.34794	29.17583
3-Feb-01	8	27	3.3	1.35	6.40045	1.43947	1.37573	29.77741
10-Feb-01	3	10	2.3	-0.99	7.67784	0.26425	1.6503	35.72039
17-Feb-01	1	3	1.1	-1.2	7.98445	-0.97888	1.7162	37.14691
24-Feb-01	4	13	2.56	1.47	7.13911	0.59936	1.5345	33.21411

3-Mar-01	4	13	2.56	0	7.73279	0.51948	1.6621	35.97616
10-Mar-01	3	10	2.3	-0.26	8.29492	0.18694	1.78292	38.59145
17-Mar-01	3	10	2.3	0	8.54551	0.15718	1.83679	39.75737
24-Mar-01	5	17	2.83	0.53	8.7719	0.66166	1.88544	40.81063
31-Mar-01	5	17	2.83	0	9.57355	0.57421	2.05775	44.5403
7-Apr-01	3	10	2.3	-0.53	10.33802	-0.03324	2.22207	48.09696
14-Apr-01	1	3	1.1	-1.2	10.36915	-1.24022	2.22876	48.24182
21-Apr-01	12	40	3.69	2.59	8.98153	1.49371	1.9305	41.78602
28-Apr-01	3	10	2.3	-1.39	10.8453	-0.08115	2.3311	50.45711
5-May-01	4	13	2.56	0.26	10.81482	0.18403	2.32455	50.31532
12-May-01	11	37	3.61	1.05	11.13761	1.20059	2.39393	51.81708
19-May-01	4	13	2.56	-1.05	12.97817	0.00168	2.78954	60.38023
26-May-01	0	1	0	-2.56	13.07262	-2.57052	2.80984	60.81963
2-Jun-01	1	3	1.1	1.1	9.63303	-1.16659	2.07053	44.81716
9-Jun-01	6	20	3	1.9	8.41892	0.86525	1.80957	39.16858
16-Jun-01	9	30	3.4	0.41	9.41847	1.15852	2.02441	43.81895
23-Jun-01	22	73	4.29	0.89	10.91898	1.89996	2.34693	50.8
30-Jun-01	4	13	2.56	-1.73	13.85202	-0.06348	2.97736	64.44581
7-Jul-01	4	13	2.56	0	13.84277	-0.06281	2.97537	64.40279
14-Jul-01	1	3	1.1	-1.47	13.83466	-1.52856	2.97363	64.36503
21-Jul-01	5	17	2.83	1.73	11.57066	0.38474	2.487	53.83193
28-Jul-01	7	23	3.14	0.3	12.21021	0.63322	2.62447	56.80741
4-Aug-01	4	13	2.56	-0.57	13.28012	-0.02132	2.85444	61.78509
11-Aug-01	1	3	1.1	-1.47	13.33943	-1.49211	2.86718	62.06101
18-Aug-01	5	17	2.83	1.73	11.20601	0.41676	2.40862	52.13539
25-Aug-01	6	20	3	0.16	11.87151	0.52159	2.55167	55.23161
1-Sep-01	8	27	3.3	0.3	12.73777	0.75127	2.73786	59.26183
8-Sep-01	9	30	3.4	0.11	14.05406	0.75829	3.02079	65.38582
15-Sep-01	13	43	3.76	0.36	15.51961	1.0191	3.33579	72.20422
22-Sep-01	3	10	2.3	-1.46	17.68985	-0.57041	3.80226	82.30115
29-Sep-01	6	20	3	0.69	16.62191	0.18501	3.57272	77.33264
6-Oct-01	8	27	3.3	0.3	17.12006	0.45559	3.67979	79.65024
13-Oct-01	5	17	2.83	-0.46	18.22255	-0.06945	3.91676	84.77953
20-Oct-01	5	17	2.83	0	18.19719	-0.06805	3.91131	84.66155
27-Oct-01	5	17	2.83	0	18.17494	-0.06683	3.90653	84.55805
3-Nov-01	11	37	3.61	0.78	18.15542	0.71195	3.90233	84.46722
10-Nov-01	3	10	2.3	-1.31	19.93608	-0.68995	4.28507	92.75167
17-Nov-01	12	40	3.69	1.39	18.4624	0.77314	3.96832	85.8954
24-Nov-01	6	20	3	-0.69	20.42449	-0.021	4.39005	95.02394

1-Dec-01	7	23	3.14	0.14	20.51649	0.11427	4.40982	95.45197
8-Dec-01	4	13	2.56	-0.57	20.95046	-0.47721	4.5031	97.47103
15-Dec-01	4	13	2.56	0	19.90989	-0.42627	4.27944	92.62983
22-Dec-01	9	30	3.4	0.84	19.03851	0.45473	4.09214	88.57573
29-Dec-01	3	10	2.3	-1.1	20.26244	-0.70618	4.35522	94.27004
5-Jan-02	14	21	3.04	0.74	18.72764	0.11452	4.02533	87.12944
12-Jan-02	11	17	2.83	-0.21	19.12437	-0.11775	4.1106	88.97523
19-Jan-02	14	21	3.04	0.21	18.98599	0.10082	4.08086	88.33139
26-Jan-02	28	42	3.74	0.69	19.35594	0.77467	4.16037	90.05259
2-Feb-02	89	134	4.9	1.16	21.41697	1.83366	4.60337	99.64142
9-Feb-02	22	33	3.5	-1.4	26.95193	0.20245	5.79306	125.39258
16-Feb-02	37	56	4.03	0.53	27.81856	0.69965	5.97933	129.42452
23-Feb-02	24	36	3.58	-0.44	30.50135	0.16575	6.55597	141.90606
2-Mar-02	30	45	3.81	0.22	31.342	0.3617	6.73666	145.81715
9-Mar-02	19	29	3.37	-0.44	32.98192	-0.12866	7.08915	153.44681
16-Mar-02	41	62	4.13	0.76	32.69986	0.63976	7.02852	152.13455
23-Mar-02	21	32	3.47	-0.66	35.59343	-0.10643	7.65047	165.59674
30-Mar-02	23	35	3.56	0.09	35.38454	-0.01093	7.60557	164.62487
6-Apr-02	32	48	3.87	0.32	35.58747	0.29921	7.64919	165.569
13-Apr-02	18	27	3.3	-0.58	37.1662	-0.31956	7.98852	172.91395
20-Apr-02	15	23	3.14	-0.16	36.00339	-0.44812	7.73858	167.50404
27-Apr-02	42	63	4.14	1.01	34.33634	0.60693	7.38027	159.7482
4-May-02	36	54	3.99	-0.15	37.2259	0.37198	8.00135	173.19172
11-May-02	20	30	3.4	-0.59	39.22264	-0.26806	8.43053	182.48144
18-May-02	21	32	3.47	0.06	38.23405	-0.17799	8.21804	177.88208
25-May-02	24	36	3.58	0.12	37.68053	-0.04562	8.09907	175.30688
1-Jun-02	24	36	3.58	0	37.73718	-0.04713	8.11125	175.57043
8-Jun-02	25	38	3.64	0.05	37.78702	0.00562	8.12196	175.80228
15-Jun-02	13	20	3	-0.64	38.08022	-0.64396	8.18498	177.16641
22-Jun-02	23	35	3.56	0.56	35.46292	-0.01314	7.62241	164.98952
29-Jun-02	21	32	3.47	-0.09	35.65671	-0.1082	7.66407	165.89114
6-Jul-02	16	24	3.18	-0.29	35.43979	-0.38978	7.61744	164.88194
13-Jul-02	18	27	3.3	0.12	34.0393	-0.23168	7.31642	158.36621
20-Jul-02	10	15	2.71	-0.59	33.32836	-0.79836	7.16361	155.05861
27-Jul-02	10	15	2.71	0	30.46076	-0.70839	6.54725	141.7172
3-Aug-02	17	26	3.26	0.55	28.14592	-0.07931	6.0497	130.94757
10-Aug-02	12	18	2.89	-0.37	28.0731	-0.44444	6.03404	130.60876
17-Aug-02	9	14	2.64	-0.25	26.78522	-0.64879	5.75723	124.61695
24-Aug-02	9	14	2.64	0	24.9296	-0.577	5.35838	115.98376

31-Aug-02	8	12	2.48	-0.15	23.40584	-0.66808	5.03086	108.89457
7-Sep-02	9	14	2.64	0.15	21.73334	-0.43979	4.67137	101.11333
14-Sep-02	12	18	2.89	0.25	20.74802	-0.14208	4.45959	96.52919
21-Sep-02	16	24	3.18	0.29	20.53708	0.15582	4.41425	95.54779
28-Sep-02	8	12	2.48	-0.69	21.07767	-0.56331	4.53044	98.06283
5-Oct-02	10	15	2.71	0.22	19.8223	-0.27876	4.26061	92.22231
12-Oct-02	12	18	2.89	0.18	19.29758	-0.06961	4.14783	89.78107
19-Oct-02	20	30	3.4	0.51	19.27035	0.44263	4.14198	89.65437
26-Oct-02	20	30	3.4	0	20.47905	0.3818	4.40177	95.27778
2-Nov-02	12	18	2.89	-0.51	21.60326	-0.18247	4.64341	100.50814
9-Nov-02	3	5	1.61	-1.28	21.27892	-1.44828	4.5737	98.99915
16-Nov-02	4	6	1.79	0.18	17.97118	-1.09701	3.86273	83.61004
23-Nov-02	31	47	3.85	2.06	15.83951	1.08764	3.40455	73.69258
30-Nov-02	10	15	2.71	-1.14	18.2055	-0.19367	3.9131	84.70021
7-Dec-02	4	6	1.79	-0.92	17.90778	-1.09348	3.8491	83.31507
14-Dec-02	7	11	2.4	0.61	15.79041	-0.36151	3.394	73.46414
21-Dec-02	13	20	3	0.6	15.21861	0.27321	3.2711	70.80387
28-Dec-02	0	1	0	-3	15.84361	-2.76277	3.40543	73.71165
4-Jan-03	5	5	1.61	1.61	11.40535	-0.82465	2.45147	53.06287
11-Jan-03	19	19	2.94	1.34	10.39078	0.60352	2.2334	48.34261
18-Jan-03	24	24	3.18	0.23	11.26054	0.75675	2.42035	52.38914
25-Jan-03	20	20	3	-0.18	12.43247	0.47542	2.67224	57.84145
1-Feb-03	18	18	2.89	-0.11	13.26502	0.30524	2.85119	61.71488
8-Feb-03	25	26	3.26	0.37	13.86364	0.62883	2.97986	64.49994
15-Feb-03	23	23	3.14	-0.12	15.07038	0.42276	3.23923	70.11422
22-Feb-03	30	30	3.4	0.27	15.97702	0.63005	3.43411	74.33233
1-Mar-03	28	28	3.33	-0.07	17.37028	0.47744	3.73358	80.81442
8-Mar-03	20	20	3	-0.34	18.53807	0.07591	3.98458	86.24746
15-Mar-03	27	27	3.3	0.3	18.84216	0.35974	4.04994	87.66224
22-Mar-03	22	22	3.09	-0.2	19.82331	0.10418	4.26083	92.22702
29-Mar-03	25	25	3.22	0.13	20.21784	0.21231	4.34563	94.06255
5-Apr-03	22	22	3.09	-0.13	20.89295	0.05163	4.49074	97.20347
12-Apr-03	23	23	3.14	0.04	21.17312	0.08276	4.55096	98.50694
19-Apr-03	32	32	3.47	0.33	21.53838	0.3959	4.62947	100.20626
26-Apr-03	10	10	2.3	-1.16	22.75972	-0.82241	4.89198	105.88851
3-May-03	17	18	2.89	0.59	20.74075	-0.14173	4.45803	96.49534
10-May-03	18	18	2.89	0	20.53076	-0.13155	4.41289	95.51836
17-May-03	18	18	2.89	0	20.34804	-0.12261	4.37362	94.66826
24-May-03	15	15	2.71	-0.18	20.18886	-0.29708	4.3394	93.92771

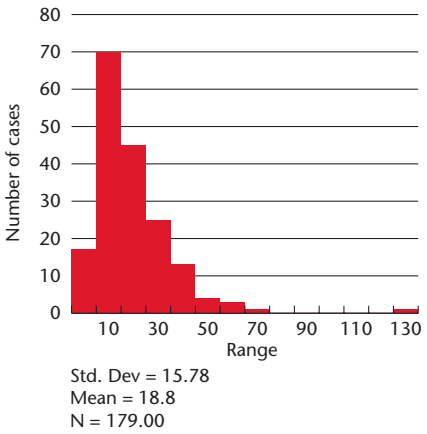
31-May-03	14	14	2.64	-0.07	19.61072	-0.33702	4.21514	91.23795
7-Jun-03	31	31	3.43	0.79	18.95691	0.49182	4.07461	88.19612
14-Jun-03 *(following figures projected)*		.	.		20.26673	.	4.35614	94.28999
21-Jun-03		.	.		20.41004	.	4.33272	96.14505
28-Jun-03		.	.		20.55437	.	4.30927	98.04022
5-Jul-03		.	.		20.69972	.	4.2858	99.97633
12-Jul-03		.	.		20.8461	.	4.2623	101.95424
19-Jul-03		.	.		20.99351	.	4.23879	103.97485
26-Jul-03		.	.		21.14196	.	4.21526	106.03905
2-Aug-03		.	.		21.29146	.	4.19173	108.14776
9-Aug-03		.	.		21.44202	.	4.1682	110.30192
16-Aug-03		.	.		21.59365	.	4.14467	112.5025
23-Aug-03		.	.		21.74635	.	4.12115	114.75047
30-Aug-03		.	.		21.90012	.	4.09764	117.04684
6-Sep-03		.	.		22.05499	.	4.07414	119.39264
13-Sep-03		.	.		22.21095	.	4.05067	121.78891
20-Sep-03		.	.		22.36801	.	4.02721	124.23673
27-Sep-03		.	.		22.52618	.	4.00379	126.73719
4-Oct-03		.	.		22.68548	.	3.98039	129.2914
11-Oct-03		.	.		22.84589	.	3.95703	131.90053
18-Oct-03		.	.		23.00745	.	3.93371	134.56572
25-Oct-03		.	.		23.17014	.	3.91043	137.28817
1-Nov-03		.	.		23.33399	.	3.88719	140.06911
8-Nov-03		.	.		23.49899	.	3.86399	142.90978
15-Nov-03		.	.		23.66516	.	3.84085	145.81146
22-Nov-03		.	.		23.83251	.	3.81776	148.77544
29-Nov-03		.	.		24.00104	.	3.79472	151.80305
6-Dec-03		.	.		24.17076	.	3.77174	154.89565
13-Dec-03		.	.		24.34168	.	3.74881	158.05463
20-Dec-03		.	.		24.51381	.	3.72595	161.28141
27-Dec-03		.	.		24.68715	.	3.70315	164.57744

Notice that the raw weekly data in Table 11 was transformed in various ways in order to provide more accurate projections. As noted above, the raw weekly data was adjusted to reflect the actual annual number of dismantled grow ops, based on the ratios reported in Table 1 (note that the ratios reported in Table 1 are rounded).

Also, because the raw data was not normally distributed, logged values were calculated. In order to do this, eight cells reporting 0 grow op discoveries were changed to 1s (because a log value of 0 cannot be calculated).

Figure 31 shows the distribution of the raw data, while Figure 32 shows the distribution of the data when logged. Notice that logged values in Figure 32 are more normally distributed than the raw values in Figure 31.

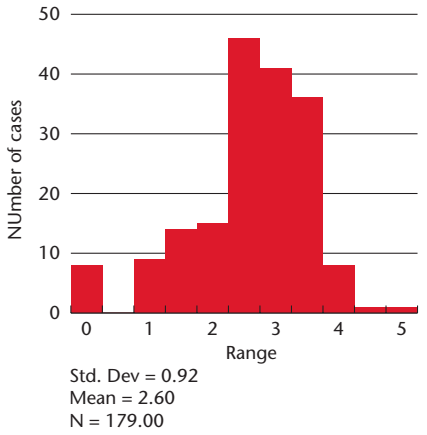
Figure 31: Histogram of estimated weekly reported dismantled grow ops



Range	*Number of cases*
(5) to 4	17
5 to 14	70
15 to 24	45
25 to 34	25
35 to 44	13
45 to 54	4
55 to 64	3

Range	*Number of cases*
65 to 74	1
75 to 84	0
85 to 94	0
95 to 104	0
105 to 114	0
115 to 124	0
125 to 134	1

Figure 32: Histogram of logged values of estimated weekly reported dismantled grow ops



Range	*Number of cases*
(.25) to .74	0
.75 to 1.24	9
1.25 to 1.74	14
1.75 to 2.24	15
2.25 to 2.74	46

Range	*Number of cases*
2.75 to 3.24	41
3.25 to 3.74	36
3.75 to 4.24	8
4.25 to 4.74	1
4.75 to 5.24	1

Finally, because the raw data was not "stationary" – that is, it contained a trend (a situation that can yield unstable ARIMA models) – the data was "differenced" by an order of one. Figure 33 shows the trend of the logged data, while Figure 34 shows the trend of the series when differenced by an order of one and logged.

Figure 33: Trend of logged transformed series

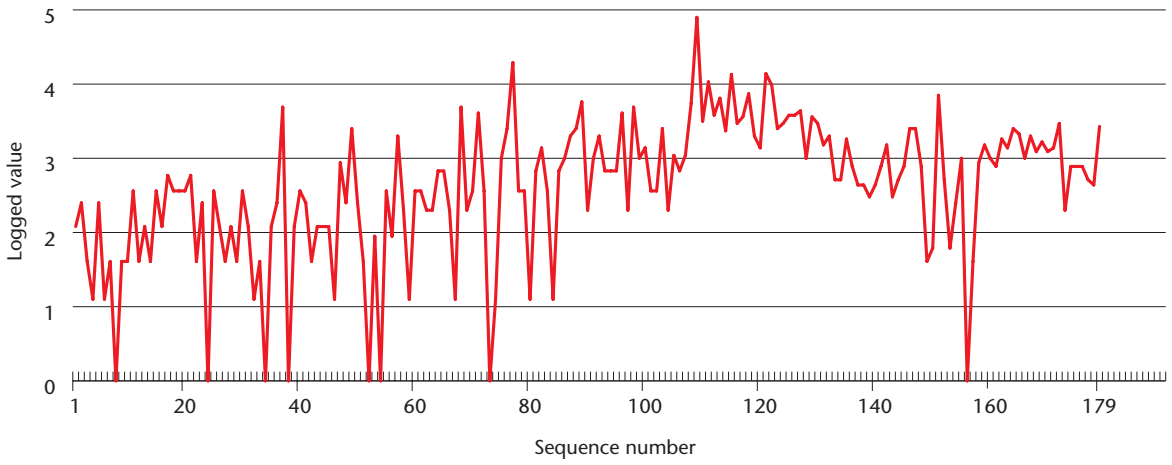
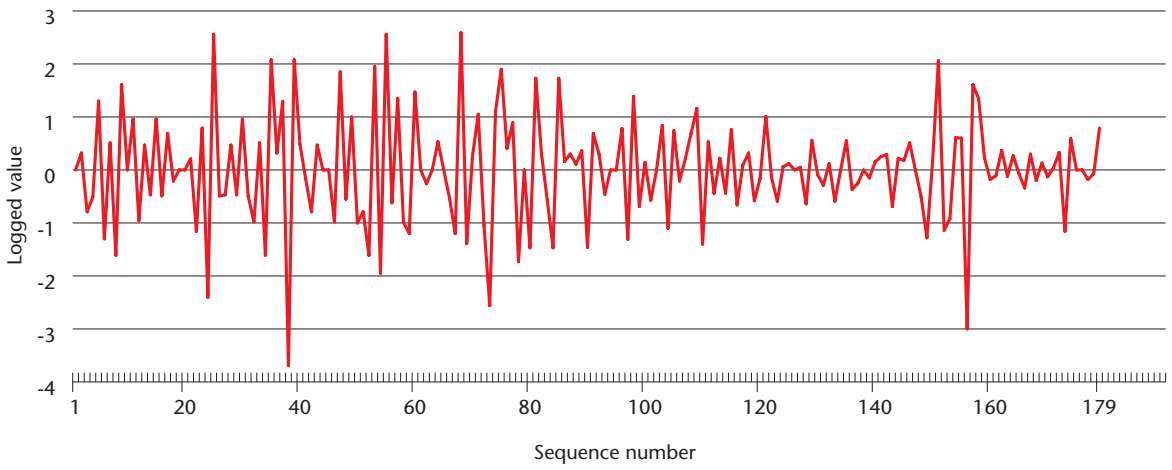


Figure 34: Trend of differenced and logged transformed series



Autocorrelation plots of the transformed data (when logged and differenced by an order of 1) were then examined in order to determine if there was an autoregressive component, a moving average component, or a combination of the two. Figure 35 shows the autocorrelation (ACF) plot, while Figure 36 shows the partial autocorrelation (PACF) plot.

Figure 35: Autocorrelation Function (ACF) plot for differenced and logged transformed series

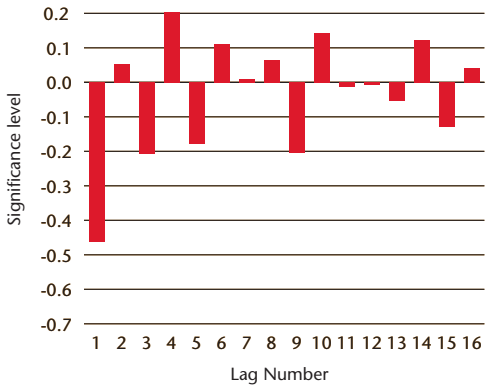
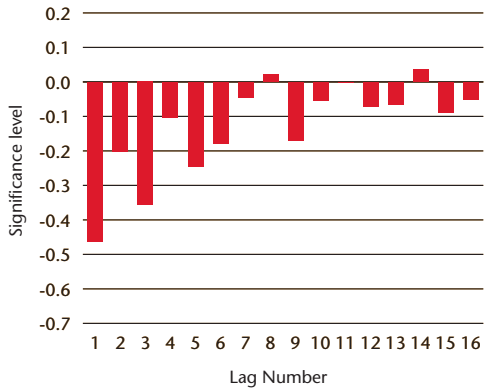


Figure 36: Partial Autocorrelation Function (PACF) plot for differenced and logged transformed series



In combination, the ACF and PACF plots exhibit the typical pattern of an ARIMA model with a moving average of one lagged period. The ACF exhibits a "spike" at "Lag 1", with a few marginally significant correlations – correlations with significant levels greater than .25 or less than -.25 – scattered through the rest of the plot, and the PACF exhibits declining values for the first few lags. Together, this indicates that current values of the dependent variable are influenced by earlier errors lagged one period.

Thus, an ARIMA (0,1,1) model was employed – that is, an ARIMA model with no autoregressive component, differenced by an order of one, and with a moving average component of one.

The most cogent results of the ARIMA (0,1,1) model are provided in Table 12. The MA1 (moving average lagged one period) variable has a high coefficient (.88) and is highly statistically significant (.00000). The constant is not statistically significant, which is desired since the differenced series should not be significantly different from zero.

Table 12: Results of ARIMA (0,1,1) time-series model

Final Parameters:

Number of residuals	178
Standard error	.77663484
Log likelihood	-207.30866
AIC	418.61731
SBC	424.98088

Analysis of Variance:

	DF	Adj. Sum of Squares	Residual Variance
Residuals	176	107.04109	.60316168

Variables in the Model:

	B	SEB	T-Ratio	Approx. Prob.
MA1	.87848050	.03702323	23.727821	.00000000
CONSTANT	.00704651	.00737985	.954831	.34097278

ACF and PACF plots of the series' errors were reexamined to ensure that the model had removed the pattern observed in the ACF and PACF plots, describe above. Figure 37 shows the ACF plot while Figure 38 shows the PACF plot.

Figure 37: Autocorrelation Function (ACF) plot for model errors

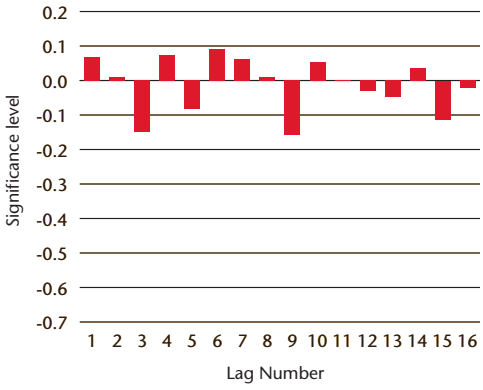
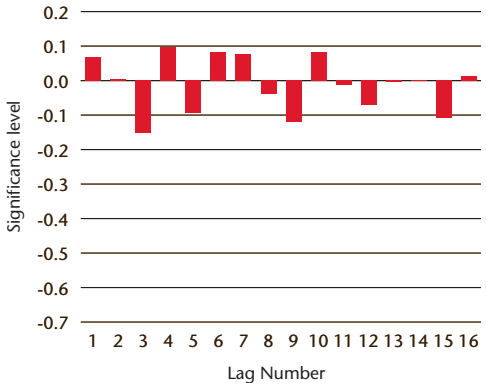


Figure 38: Partial Autocorrelation Function (PACF) plot for model errors



The errors in both plots appear to be random and statistically insignificant. This indicates that the model has successfully removed the pattern from the observed series.

Other minor variations of the ARIMA model were also tested. But the Schwartz Bayesian criterion (SBC) scores (provided above in Table 12) did not improve. Therefore, the ARIMA (0,1,1) model was chosen.

ENDNOTES

1 Commercial marihuana cultivation is distinguished here from small-scale operations in which marihuana is cultivated for personal consumption.

2 Royal Canadian Mounted Police (RCMP), November 2002. *Marihuana Cultivation in Canada: Evolution and Current Trends.* Project Serre II, pp.5-9. This finding is also based on numerous discussions with drug investigators and other law enforcement personnel in Ontario.

3 RCMP, November 2002, *Marihuana Cultivation,* pp.24-25. For an overview of recent technological developments, see pp.10-14.

4 Law enforcement widely believes that the grow op problem originated in British Columbia, and expanded to Ontario.

5 Organized Crime Agency of British Columbia (OCABC), 2002. *Annual Report 2001,* p.23.

6 OCABC, 2002. *Annual Report 2001,* p.23.

7 The three national marihuana enforcement projects were GREENSWEEP I, GREENSWEEP II, and GREENSWEEP III.

8 This information comes from conversations with OPP drug investigators. See also, Rob Lamberti, April 10, 2003. "Cops uproot pot brokers." *Toronto Sun,* p.12.

9 Over $1 million was found in grow-op dwellings in Ontario in the 2000-2003 period. The presence of large amounts of cash does not *necessarily* imply that organized crime is behind grow ops. But police believe that it does represent another indication of organized crime activity.

10 This information comes from numerous discussions with intelligence officers and drug investigators across the Province of Ontario.

11 RCMP, November 2002. *Marihuana Cultivation,* p.7.

12 RCMP, November 2002. *Marihuana Cultivation,* p.7

13 RCMP, November 2002. *Marihuana Cultivation,* p.5.

14 Canadian Broadcasting Corporation (CBC) News, September 5, 2002. "Pot less harmful than alcohol: Senate report." http://www.cbc.ca/stories/2002/09/04/pot_senate020904.

15 Full results of the Ipsos-Reid poll can be found at: http://www.ipsosreid.com/media/dsp_displaypr_cdn.cfm?id_to_view=1816.

16 See p.28 of this paper.

17 Darryl Plecas et al., May 2002. *Marihuana Growing Operations in British Columbia: An Empirical Survey (1997-2000).* Abbotsford, BC: Department of Criminology and Criminal Justice, University College of the Fraser Valley, pp.9, 12, 22-23.

18 Note an unusually high number of reported dismantled grow ops in the week of January 27th – February 2nd had a strong influence on the total number of grow ops dismantled in 2002.

19 Various ARIMA (AutoRegressive Integrated Moving Average) time-series models were tested against the data. In the end, an ARIMA (0,1,1) model was chosen. The appendix contains a full discussion on the diagnostics that were employed to choose the best ARIMA model, and provides specifics on the model's results.

20 Ten police services in Ontario were informally polled to provide an estimate as to the percentage of grow ops that are actually dismantled. Responses varied between 10 and 50 percent. The range of 10-50 percent is corroborated by recent attempts to measure the "Global Interception Rate" (GIR) – a measure of the percentage of drugs that are actually intercepted and seized by police. The GIR for cocaine and opiates ranged between 5 and 35 percent in the 1980-1994 period. See United Nations Office for Drug Control and Crime Prevention, 1999. *Global Report on Crime and Justice.* Oxford: Oxford University Press, p.180.

21 Note that cases in which no plants were found are still considered a grow op if police found evidence – such as growing lights and ballasts – of marihuana cultivation.

22 The figure of 100 grams per plant is debated and no consensus exists. Plecas et al. use the figure of 100 grams per plant. See Plecas et al., 2002. *Marihuana Growing Operations,* p.36. Four drug investigators in Ontario were consulted on this issue, and each confirmed the figure of 100 grams per plant. The RCMP gives a much more conservative estimate of 28 grams per plant, but readily acknowledges that the true figure may be much higher. See RCMP, 2002. *Marihuana Cultivation,* p.25.

23 Average crop yield was calculated by dividing the extrapolated number of plants seized annually by the annual number of reported dismantled grow ops.

24 Calculations of values are based on the number of estimated plants seized annually, as reported in Table 2.

25 There is, however, a recent trend whereby grow ops are paying for their electricity in order to avoid detection by hydro companies, and, ultimately, by police. This is discussed further on p.22.

26 Some police services, such as York Regional Police Service, report a much higher number of bypasses.

27 Monthly hydroelectric theft was calculated by multiplying annual reported/projected dismantled grow ops (see Figure 5) by the 45 percent theft rate, then by average monthly theft costs ($1,500 or $2,000).

28 Evidence from hydro utilities supports the assumption that grow ops operate for roughly half the year and steal between $1,500 and $2,000 per month of operation. For instance, Aurora Hydro recently discovered a grow op that operated for 152 days and stole $9,519.21 worth of electricity (or, approximately $1,900 per month).

29 Estimated hydro theft for the 2000-2003 period was calculated by multiplying annual reported/projected dismantled grow by the 45 percent theft rate, then by suspected annual theft costs ($1,500 per month x three month duration x two times per year).

30 The variation in estimates between utilities is like attributable to both differences in the prevalence of grow ops in the regions and differences in the size of the population that the utilities are serving. Enersource Hydro Mississauga, for instance, serves as many as three times the number of customers as Markham Hydro.

31 Electrical Distributors Association, June 4, 2002. News Release. "Electricity Distributors Association (EDA) and Local Electricity Distribution Companies Join with Regional Police Force in 'Operation York Connection'".

32 The figure of four percent is indicated by the experiences of the limited number of drug investigators and intelligence officers that could estimate this statistic. Information came from drug investigators and intelligence officers at Durham Regional Police, Hamilton Police Service, London Police Service, Niagara Regional Police Service, Ottawa Police Service, Peel Regional Police Service, Windsor Police Service, and York Regional Police Service. In 2001and 2002, these police services estimate a combined total of 56 fires directly related to grow ops, out of a total of 1,401 grow ops dismantled by these agencies. A fire is reported by police if they were called to the grow op because of the fire, or, if upon dismantling the grow op, investigators found evidence of a previous fire related to grow op equipment.

33 Plecas et al., 2002. *Marihuana Growing Operations,* p.41.

34 The number of private dwellings is reported by Statistics Canada in their 2001 Census. http://www12.statcan.ca/english/census01/products/standard/popdwell/Table-PR.cfm. The number of fires in private dwellings in Ontario is reported by the Office of the Fire Marshal (OFM), based on data supplied by fire departments to the OFM using the Standard Incident reports and information gathered through OFM investigations. Although, the OFM does not use "private dwellings" to group their data, only those fires that fit the Statistics Canada definition of a "private dwelling" were included in the analysis. For more on the Statistics Canada definition, see http://www.statcan.ca/english/census2001/dict/dwe009.htm. The Statistics Canada definition of "private dwelling" excludes, among other types of buildings, industrial buildings where marihuana grow ops could potentially be housed. However, because none of the fires reported by the above police agencies involved industrial buildings, this factor was not problematic for the analysis of fire rates.

35 It should be noted that the probability of fire in grow ops has been based on data from 2001-2002, while the probability of fire in residential dwellings was based only on data from 2001. It is acknowledged that fire rates may fluctuate annually, and rates cited here are only intended to reflect 2001.

36 This figure of $36,000 is calculated from statistics reported by the OFM. It reports that there were 4,183 fires in private dwellings in 2001 with a total estimated loss of $151,798,354. Thus, the average economic loss in 2001 is calculated at $36,289. Note that the vast majority of fire-related costs are likely borne by the insurance industry, and hence are considered here as insurance costs.

37 Unfortunately, current disclosure laws preclude an industry-wide analysis.

38 The OPP figure does not include court costs and the costs of storing equipment seized from grow operations. Costing from other police services appears to be consistent with OPP figures. For instance, Waterloo Regional Police Service estimate that it takes between 60 and 120 personnel hours to investigate and dismantle a grow op. At a typical wage of $35 per hour, this amounts to between $2,100 and $4,200 in personnel costs alone.

39 All figures reported in Tables 6, 7, and 8 come from the Statistical Services branch of Correctional Services, Ministry of Public Safety and Security.

40 See Adult Correctional Services Canada, 2000-2001. "Catalogue 85-211-XIE," p.17. The five percent increase reported between 2000 and 2001 was assumed between 2001 and 2002, as well as 2002 and 2003.

41 The current cost of $3.83 is assumed for the entire period under review.

42 The current cost of $3.83 is assumed for the entire period under review.

43 Ontario Ministry of Finance, December 2002. http://www.gov.on.ca/FIN/english/economy/factedec02.htm.

44 RCMP, November 2002. *Marihuana Cultivation,* p.vi.

45 Tim Harper, May 3, 2003. "Pot plan puts U.S. noses out of joint." *Toronto Star.* http://www.thestar.com/NASApp/cs/ContentServer?pagename=thestar/Layout/Article_Type1&call_pageid=971358637177&c=Article&cid=1051643367955. Erin Anderssen, July 13, 2002. "Would Softer Pot Laws Stir Wrath of U.S.?" *The Globe and Mail.*

46 Health Canada, June 1995. *Fungal Contamination in Public Buildings: A Guide to Recognition and Management.* Federal-Provincial Committee on Environmental and Occupational Health, Environmental Health Directorate.

47 Canadian Centre for Occupational Health and Safety. http://www.ccohs.ca/osaanswers/chemicals/chem_profiles/carbon_dioxide/health_cd.html

48 Alex Tyakoff, April 2000. *A Community Impact Statement of the Marihuana Grown Operation at 5570 Argyle Street.* Organized Crime Agency of British Columbia.

49 RCMP, 2002. *Marihuana Cultivation,* p.17.

50 RCMP, 2002. *Marihuana Cultivation,* p.15.

51 This information is based on informal discussions with drug investigators across Ontario. Waterloo Regional Police Service, for instance, have discovered two extraction labs in grow ops since January 2002.

52 Peel Regional Police Service, Operations Support Services, October 11, 2001. *Officer Safety Alert: Hydroponics Grow Operations.*

53 RCMP, 2002. *Marihuana Cultivation,* p.19.

54 Plecas et al., 2002. *Marihuana Growing Operations,* p.41. Note, however, that this figure also includes the presence of dangerous chemicals.

55 This information comes from discussions with police officers from the Homicide Division, York Regional Police Service.

56 RCMP, 2002. *Marihuana Cultivation,* p.18.

57 The trend indicated here may not be accurate, given the wide variation, between 2000 and 2003, in the percentage of reported dismantled grow ops for which relevant information was available. Relevant information was available in 18 of 422 reports for 2000, 258 of 929 reports for 2001, 964 of 1,490 reports for 2002, and 286 of 488 reports through June 7th, 2003.

58 This number was derived from intelligence information gathered during three GREENSWEEP raids conducted during 2002. In the 319 search warrants executed during GREENSWEEP I, GREENSWEEP II, and GREENSWEEP III, 77 children were removed from grow ops (roughly, one child for every four warrants).

59 This figure was established from a random sample conducted on addresses of grow ops provided in police reports. Statistics Canada tract level data was used to obtain the population density of geographical regions for the randomly sampled addresses. The number is considered accurate to within ± 1,166 persons per square kilometre, 95 percent of the time.

60 Statistics Canada, 2003. 2001 Census. http://www12.statcan.ca/english/census01/products/standard/popdwell/Table-PR.cfm?T=2&S=0&O=A.

61 This figure was established from a random sample conducted on addresses of grow ops supplied in police reports. Statistics Canada tract level data was used to obtain the dwelling density of geographical regions for the randomly sampled addresses. The number is considered accurate to within ± 404 dwellings per square kilometre, 95 percent of the time.

62 Statistics Canada, 2003. 2001 Census. http://www12.statcan.ca/english/census01/products/standard/popdwell/Table-PR.cfm?T=2&S=0&O=A

63 As the size of grow ops increase, however, law enforcement in Ontario report that there is also an increasing tendency for operators to use make use of industrial buildings in less densely populated areas.

64 These statistics are based on reports for which relevant information was available. 523 out of 1,289 reports completed between 2000 and 2002 contained the relevant information. Of the 523 completed, 9 were industrial, 70 were rural, and 444 were urban.

65 These statistics are based on grow op reports from York Regional Police Service, Peel Regional Police Service, and Waterloo Regional Police Service for 2002. These statistics likely underrepresent the problem because grow op reports were not completed for all of the grow ops dismantled by these agencies in the time period in question.

66 RCMP, 2002. *Marihuana Cultivation,* p.38.

67 Again, justice system statistics for indoor marihuana cultivation are not readily available. CDSA(7) convictions are used as an imperfect substitute. Nevertheless, law enforcement believe that a preponderance of CDSA(7) convictions relate to marihuana cultivation, and, increasingly, indoor marihuana cultivation.

68 Of the 2,167 CDSA(7) conviction between January 2000 and mid-June 2003, 777 included jail/prison time, 796 involved conditional sentences, and 594 involved probation. The number of sentences involving only fines is unknown. These figures are reported by Statistical Services branch of Correctional Services, Ministry of Public Safety and Security. These figures are corroborated by statistics obtained from the Strategic Planning and Information Unit, Corporate Planning Branch, which reports that 531 of the 1,534 CDSA(7) convictions – or, roughly one-third – involved incarceration for the 2000-2002 period.

69 Plecas et al., 2002. *Marihuana Growing Operations,* pp.62-67.

70 RCMP, 2002. *Marihuana Cultivation,* p.2.