

Correlation of reduction in nuisance black bear complaints with  
implementation of (a) a hunt vs. (b) a non-violent program

Final Report – Version 4

Presented in part at 9/21/05 New Jersey Public Hearing on the  
Comprehensive Black Bear Management Policy and at 8/8/07 Public  
Meeting on Black Bear Management at the New Jersey State Museum

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## INTRODUCTION

### Objective of proposed New Jersey Fish and Game Council policy:

The New Jersey Fish and Game Council issued a report on “Comprehensive Black Bear (*Ursus americanus*) Management Policy”.<sup>(28a)</sup> That document defines the New Jersey Fish and Game Council’s policies and recommendations regarding continued management of resident black bears in New Jersey. The Council noted that one of the *most important* factors that should be considered in determining which approaches to use for this management policy is “harmful human-bear interactions”, as dictated by the New Jersey Supreme Court opinion of February 28, 2005. That is, a primary objective of the Council policy is to use bear management approaches that will reduce human conflicts/complaints with black bears.

### One possible approach: Hunting

The Council suggested that “hunting” should be considered as one of the approaches to reduce the human conflicts/complaints. “Historically, the Council has adjusted hunting and trapping seasons to control these species [bears] in order to minimize agricultural, residential or environmental damage. . . the Council recognizes that the most cost effective method of population control for [bears] . . . is provided through regulated hunting and trapping seasons.” “Past history has shown that some problem bears are eliminated during such [regulated hunting] seasons, thereby reducing bear related problems. . .” “The Council recognizes that without a regulated sport hunting season . . . human-bear conflicts will continue to increase.” “The purpose of the 2003 hunting season was to . . . reduce the black bear population density . . . in order to reduce the associated human/bear conflicts . . .”

### Second possible approach: Non-violent program

The Council also supports an expanded non-violent program to meet this objective. This program includes educating the public about bear’s propensity to eat garbage, bear-proofing garbage containers, enforcing ordinances regarding garbage, etc. “The Council believes that there is a continued need to educate New Jersey residents and visitors on how to coexist with black bears. . . Especially emphasized is the importance of never feeding bears, either intentionally or unintentionally. . . In addition to the education necessary to ensure that human-related food sources and garbage do not unintentionally become a source of food for bears, the Council believes additional legislation and enforcement initiatives are necessary to minimize human-derived food sources.” “Although great strides have been made in educating citizens regarding garbage management, the expense of bear-resistant garbage cans and commercial containers has hampered their wide spread use. No municipalities have mandated bear-resistant garbage cans so use is strictly voluntary. In order to deter bears, entire communities will have to adopt such measures. Regulations, funding and coordination with local garbage contractors is necessary in order to implement a successful program.”

### Other approaches:

The Council also looks favorably upon aversive conditioning and possible future contraception.

### Scientific approach to determining which tool is the best approach to reducing human/bear conflicts/complaints:

“The Council believes it is necessary to . . . [scientifically] consider the proven efficacy of the . . . [approaches] and the experience of other states.”

### My role:

As mentioned above, the Council stated that it is necessary to consider the proven efficacy of the approaches and the experience of other states. The primary approaches discussed are (a) a bear hunt and (b) a non-violent program which includes educating the public about bear's propensity to eat garbage, bear-proofing garbage containers, enforcing ordinances regarding garbage, etc. (hereinafter referred to as the "non-violent program"). The Council and I are in agreement that data from other states should be studied to determine the direction of the Council's program. My role was to investigate these two approaches, by using data mainly from other states.

## **RESULTS**

The hunting approach was investigated by reviewing data from four U.S. states (Virginia, Pennsylvania, New York, Minnesota, as well as the province of Ontario, Canada). The non-violent program was investigated by reviewing data from three U.S. national parks (Yellowstone, Yosemite and Great Smoky) and three communities bordering national parks (Juneau [Alaska], Elliot Lake [Ontario, Canada] and the Lake Tahoe Basin [Nevada]), as well as the state of New Jersey. Due to great fluctuation in the data, least mean squares lines were used to help visualize trends. Some of the data used in this report are estimates from published graphs.

### I. Effect of hunting on human complaints/conflicts:

#### *Virginia*

Virginia's data from 1980 to 1998 show that there has been a bear hunt every year, with a generally increasing number of bears killed annually (figure 1). The number of complaints has correspondingly increased annually.<sup>(1)</sup>

#### *Pennsylvania*

The state of Pennsylvania has only collected two years of data. However, the regions of Pennsylvania have been collecting data longer-term. The Northeast region is the highest in Pennsylvania with regard to complaints as well as bears killed annually. Pennsylvania's Northeast region's data from 1998 to 2002 show that there has been a bear hunt every year, with a generally increasing number of bears killed annually (figure 2). The number of complaints has correspondingly increased annually.<sup>(2-4)</sup>

#### *New York*

New York's data from 1995 to 2004 show that there has been a bear hunt every year, with a generally increasing number of bears killed annually (figure 3). The number of complaints has correspondingly increased annually.<sup>(5,6)</sup>

#### *Ontario, Canada*

Ontario, Canada's data from 1989 to 2000 show that there has been a bear hunt every year, with a generally increasing number of bears killed annually (figure 4). The number of complaints has correspondingly increased annually.<sup>(7,8)</sup>

#### *Minnesota*

Minnesota's data from 1983 to 2004 show that there has been a bear hunt every year, with a generally increasing number of bears killed annually (figure 5)<sup>(9)</sup>. The number of complaints has correspondingly increased annually from 1983 to 1995 and then was precipitously reduced from 1995 to 2003. In the middle of the 1990's increased public education was implemented, especially on handling garbage, e.g., bear-proof containers.<sup>(10,11)</sup>

## II. Effect of “nonviolent program” on human complaints/conflicts:

### *Yellowstone*

Between 1931 and 1959 an average of 48 park visitors were injured by bears and an average of 138 cases of bear-caused property damage were reported each year (Figures 6 and 7, respectively). The garbage dumps were closed between 1968 and 1971.<sup>(12,13)</sup> In 1970 all garbage cans were made bear-proof.<sup>(14)</sup> In approximately 1996 the annual average was reduced to less than one bear-inflicted injury and twelve bear-caused property damages.

### *Yosemite*

Figure 8 shows an increasing trend of human complaints/conflicts in Yosemite National Park between 1989 and 1998. From 1998 to 2002 Yosemite experienced a decreasing trend in the number of incidents, corresponding to the effort outlined by the Human-Bear Management Program, which was, in essence, installation of “bear-proof” food storage lockers and the implementation and enforcement of food storage regulations.<sup>(15-17)</sup>

### *Great Smoky*

In Chimneys, a section of the Great Smoky National Park, the year before bear-proof garbage cans were used there were 32 instances of nuisance bears having been removed from the park (Figure 9). In 1991, after installation of bear-proof garbage cans, there were no bears removed.<sup>(18)</sup>

### *Juneau, Alaska*

In 2002, Juneau, Alaska created several ordinances requiring bear-proof dumpsters that have resulted in fewer conflicts (figure 10).<sup>(19,20)</sup>

### *Elliot Lake, Ontario*

The year before public education and bear-resistant containers were implemented there were 500 nuisance bears (figure 11) and three shootings (data not shown). In 2004 there were 87 nuisance bears and no shootings.<sup>(21)</sup>

### *Nevada (Lake Tahoe Basin)*

Complaints concerning bears were unacceptably high through 2000. Public education and bear-proof dumpsters have led to the first decline in complaints (figure 12). One hundred seventy-five complaints per year around the year 2000 were reduced to just over 100 in 2003.<sup>(22,23)</sup>

### *New Jersey*

Complaints from New Jersey<sup>(28)</sup> (data provided by the New Jersey Division of Fish and Wildlife) increased sharply from 1995 to 1999 (figure 13). At the end of 1999 or early in 2000 an aversive conditioning program began. In addition, the non-violent program involving educating the public, use of bear-proof garbage receptacles and ordinances was enhanced. The complaints/conflicts decreased from 1999 to 2005.\*

\*The data in figure 13 was provided by the New Jersey Division of Fish and Wildlife. Police report data were also available. These data were not combined with the Division data because they do not follow rules of meta-analysis (They do not cover the same time span, are fragmented, duplicative and appear to have used a different protocol for collecting data than collection of the Division data.).

## **DISCUSSION**

What is the best approach to reducing the complaints/conflicts? The Council recommends a combination approach consisting of (a) a hunt and (b) a non-violent program (educating the public about bear’s propensity to eat garbage, bear-proof garbage containers, enforced ordinances regarding garbage, etc. The Council also recommends scientifically examining these two approaches. “The Council believes it is

necessary to . . . [scientifically] consider the proven efficacy of the . . . [approaches] and the experience of other states.” My report does exactly what the Council suggests.

*Consideration of the efficacy of the hunting program via experiences of other states:*

The data from Virginia, Pennsylvania, New York, Ontario and Minnesota (Minnesota data 1983 to 1995) show that there was a bear hunt every year. One would have expected that the decrease in the bear population resulting from the hunts should have resulted in a decrease in the number of consumer complaints/conflicts. In addition, the bear harvest increased significantly from year to year which certainly would have been expected to result in a decrease in human complaints/conflicts. However, the human complaints/conflicts did *not* decrease. In fact, the human complaints/conflicts actually *increased* - *in every single state*. What does this mean with regard to the hypothesis that bear hunting results in a decrease in human complaints/conflicts? It means that the data do not support this hypothesis.

What about the effect of *not* hunting? In 1999 the government of Ontario, Canada, canceled its annual spring hunt for ethical reasons.<sup>(26)</sup> An evaluation of the data in 2003 showed that cancellation of the hunt did *not* result in a significant increase in nuisance bear activity.<sup>(27)</sup>

Altogether, the data indicate that neither hunting nor the absence of hunting seems to have an effect on the presence of nuisance bear complaints/conflicts. Do these data prove that bear hunting does not cause any reduction in complaints/conflicts? No, because there are many variables in the data, variables which might have overcome a small effect. One of these variables is an increase in human population on the peripheries of bear habitats. An increase in human population would be expected to result in an increase in complaints/conflicts. One would expect, however, that if hunting has a meaningful effect it would have overcome the other variables. The fact that complaints/conflicts *increase* in every state, however, strongly suggests that if hunting does cause a reduction in complaints/conflicts, its effect is extremely small.

The Minnesota study (Fig. 5) is particularly interesting because of a precipitous change in 1995. This change occurred during the enhanced implementation of the non-violent program. The number of nuisance bear complaints registered from 1990 through 1995 averaged 1,277 complaints annually. In 1996, however, 337 complaints were registered, which generally decreased each year to a mere 75 complaints recorded in 2004. This study allows us to directly compare the effect of the non-violent program to the effect of hunting. Both of these approaches occur concurrent with other variables such as an increase in human population on the habitat peripheries. Yet it appears that the effect of hunting was too small to overcome these other variables, while the effect of the non-violent program strongly overcame these other variables.

Why is the effect of hunting so weak? One possible explanation might be related to where the hunting takes place vs. where the nuisance bears reside. Hunting is required to take place in the interior of a habitat, away from human population. However, nuisance bears reside on the periphery of a habitat, at the interface with the human population. Therefore, it's possible that hunting kills the "good" bears, while the "bad" bears continue to thrive. Yet another possible explanation of why the effect of hunting is so small is related to the possible dominant factor of the quantity of garbage available to the bears. Perhaps the quantity of nuisance bears eating garbage is a function only of the quantity of garbage and not the quantity of bears. Hence, decreasing the bear population would have no effect on the number of nuisance bears.

*Consideration of the efficacy of the non-violent program via experiences of other states:*

Bears locate food using their incredible sense of smell. They are primarily vegetarians. About 90 percent of their diet consists of skunk cabbage, berries and nuts. In New Jersey, however, their easiest source of food is garbage. Bears have discovered that garbage is widely available, regularly replenished and a nutritious source of food. Why wander around the woods looking for berries when high calorie and quality food awaits at every house? Visits by black bears to resident homes result in complaints/conflicts between humans and bears. The data from Yellowstone, Yosemite and Great Smoky National Parks, as well as the data from communities of Juneau, Elliot Lake and Lake Tahoe Basin, and the state of New Jersey, consistently and without exception demonstrate that implementation of the non-violent program results in substantially reducing the number of human complaints/conflicts. This is not surprising as removal of the cause of bears interfacing with humans would be expected to result in less bears interfacing with humans and a corresponding reduction in human complaints/conflicts.\*

\* A reportedly outstanding model for a non-violent program is the "Bear Wise" program in Ontario, Canada, initiated in 2004<sup>(21,24)</sup> Ontario consulted broadly, taking the best they learned and adapting it for use throughout the province.<sup>(25)</sup>

## **CONCLUSION**

The New Jersey Fish and Game Council issued a report on "Comprehensive Black Bear (*Ursus americanus*) Management Policy". That document defines the New Jersey Fish and Game Council's policies and recommendations regarding the continued management of resident black bears in New Jersey. A primary objective of the Council policy is to use bear management approaches that will reduce human conflicts/complaints regarding black bears. The primary approaches being considered to meet this objective are (a) a hunt and (b) a non-violent approach (educating the public about bear's propensity to eat garbage, bear-proofing garbage containers, enforcing ordinances regarding garbage, etc.). Data from three national parks, three local communities, five states (including New Jersey) and one Canadian province were studied to determine the effects of these two approaches on the reduction of human complaints/conflicts. The results demonstrate that at every site in which the hunting approach was evaluated no effect in reducing the human complaints/conflicts was observed while at every site in which the non-violent program was evaluated, the non-violent approach was demonstrated to be markedly effective in reducing human complaints/conflicts,. It is particularly important to note that in the state of New Jersey the number of complaints has been statistically significantly declining over the last seven years, consistent with using the non-violent approach. It is recommended that the New Jersey Department of Environmental Protection consider revision of the proposed policy of the New Jersey Fish and Game Council so as to enhance the non-violent approach to managing New Jersey's black bears, an approach that has already been proven to be successful in New Jersey and elsewhere, and concurrently terminate the hunting option, an approach that has been proven not to be effective.

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# Virginia Harvests vs. Complaints

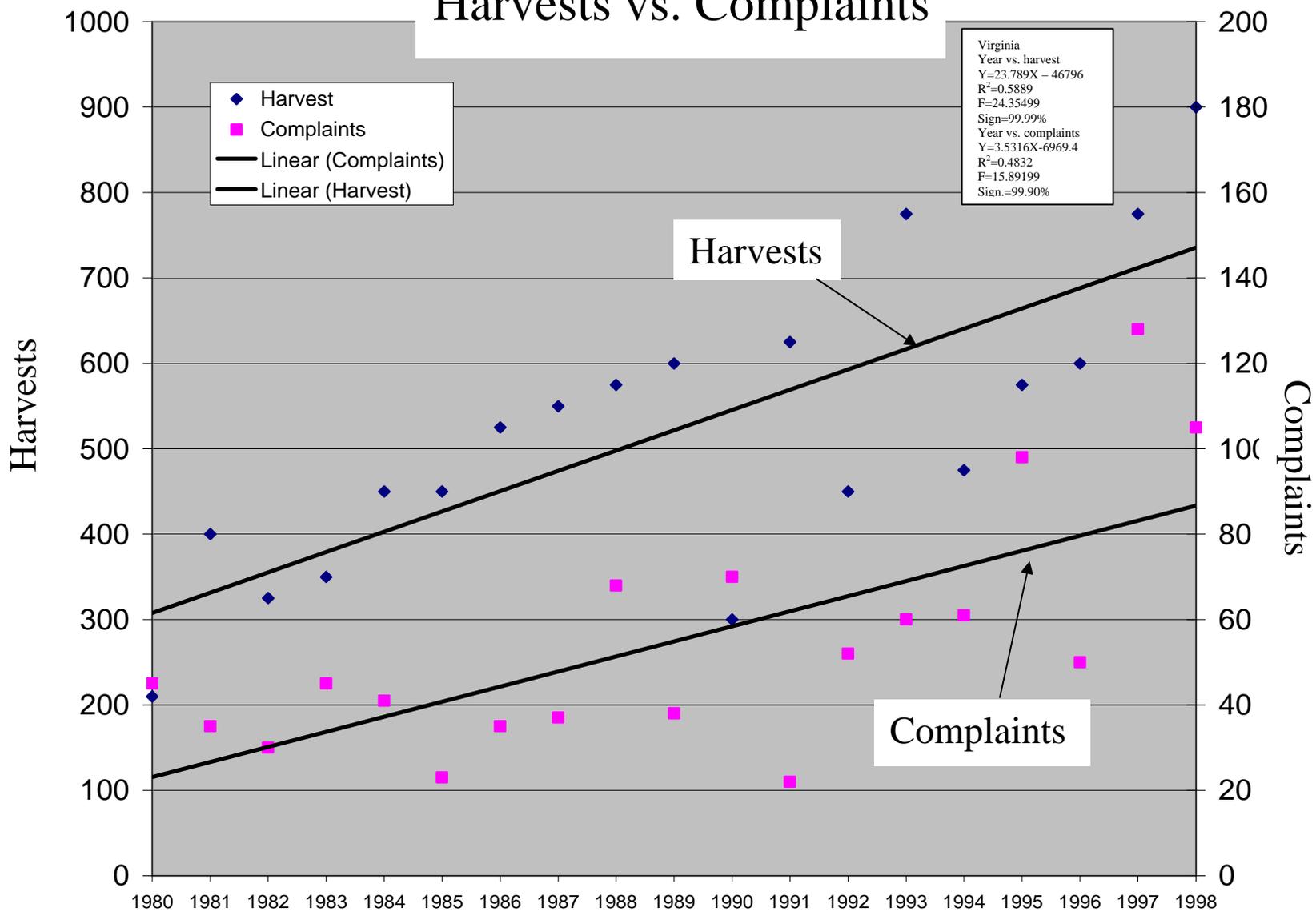


Figure 1

# Pennsylvania NE Region Harvests vs. Complaints

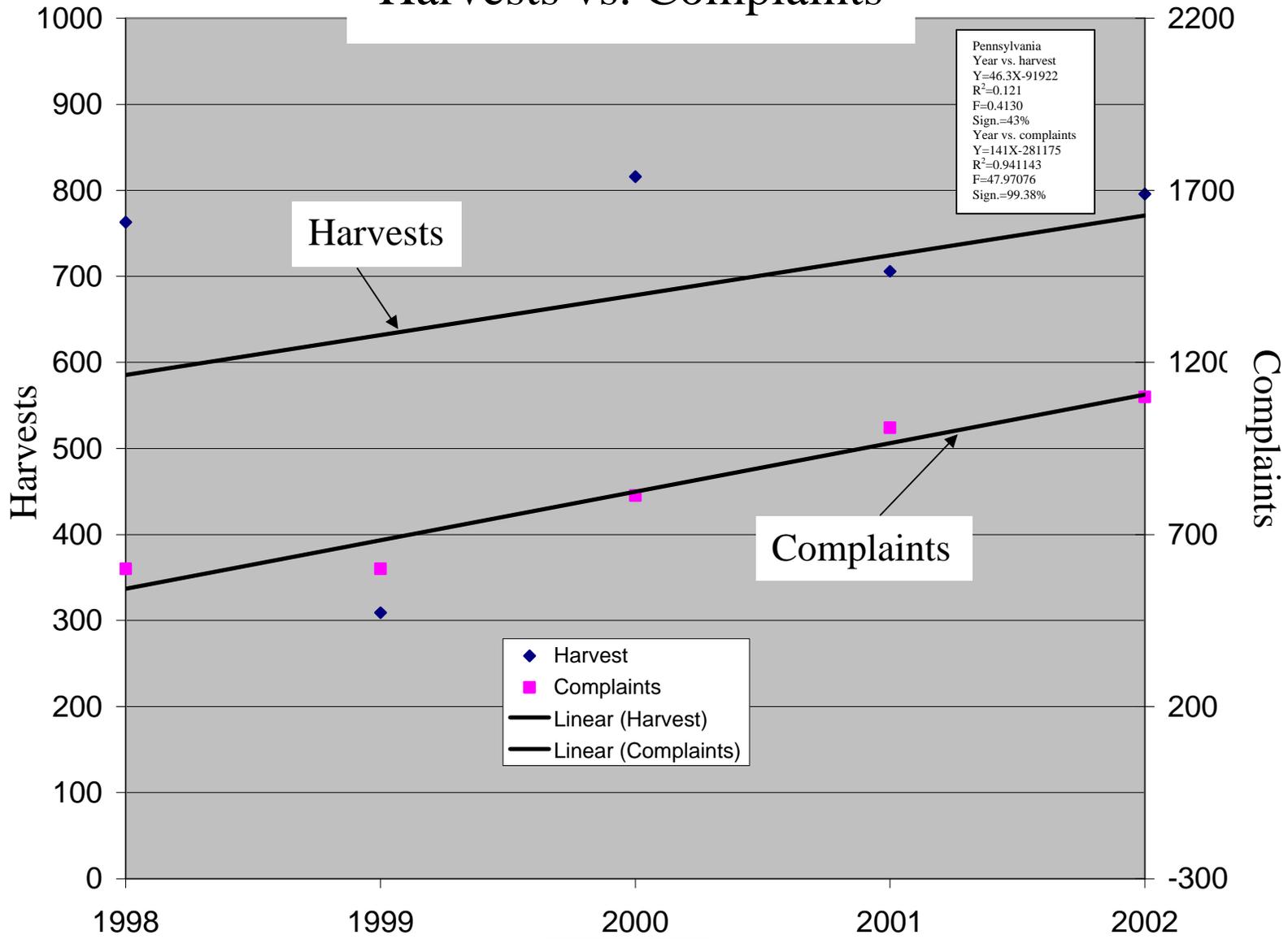


Figure 2

# New York Harvests vs. Complaints

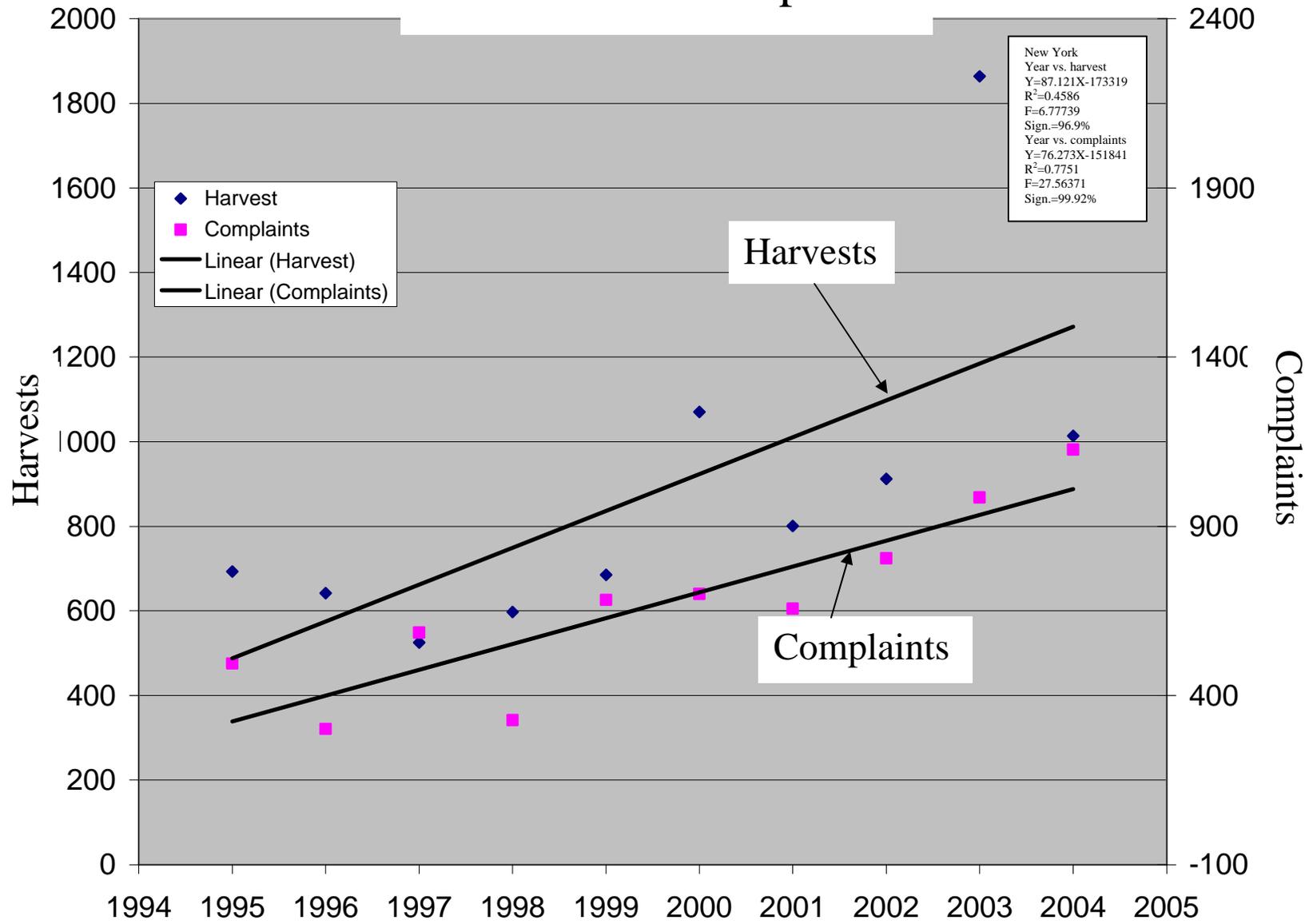


Figure 3

# Ontario Harvests vs. Complaints

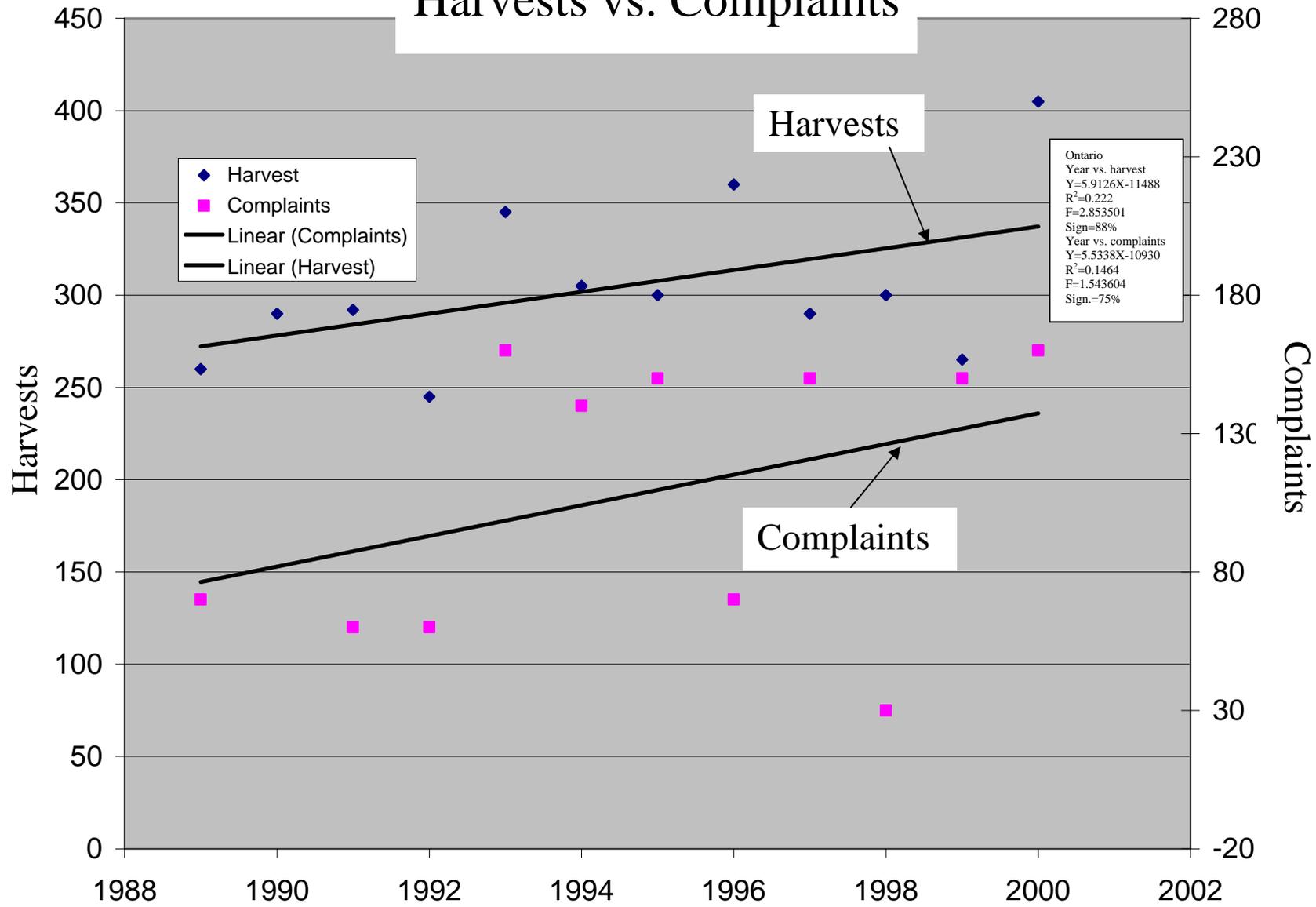
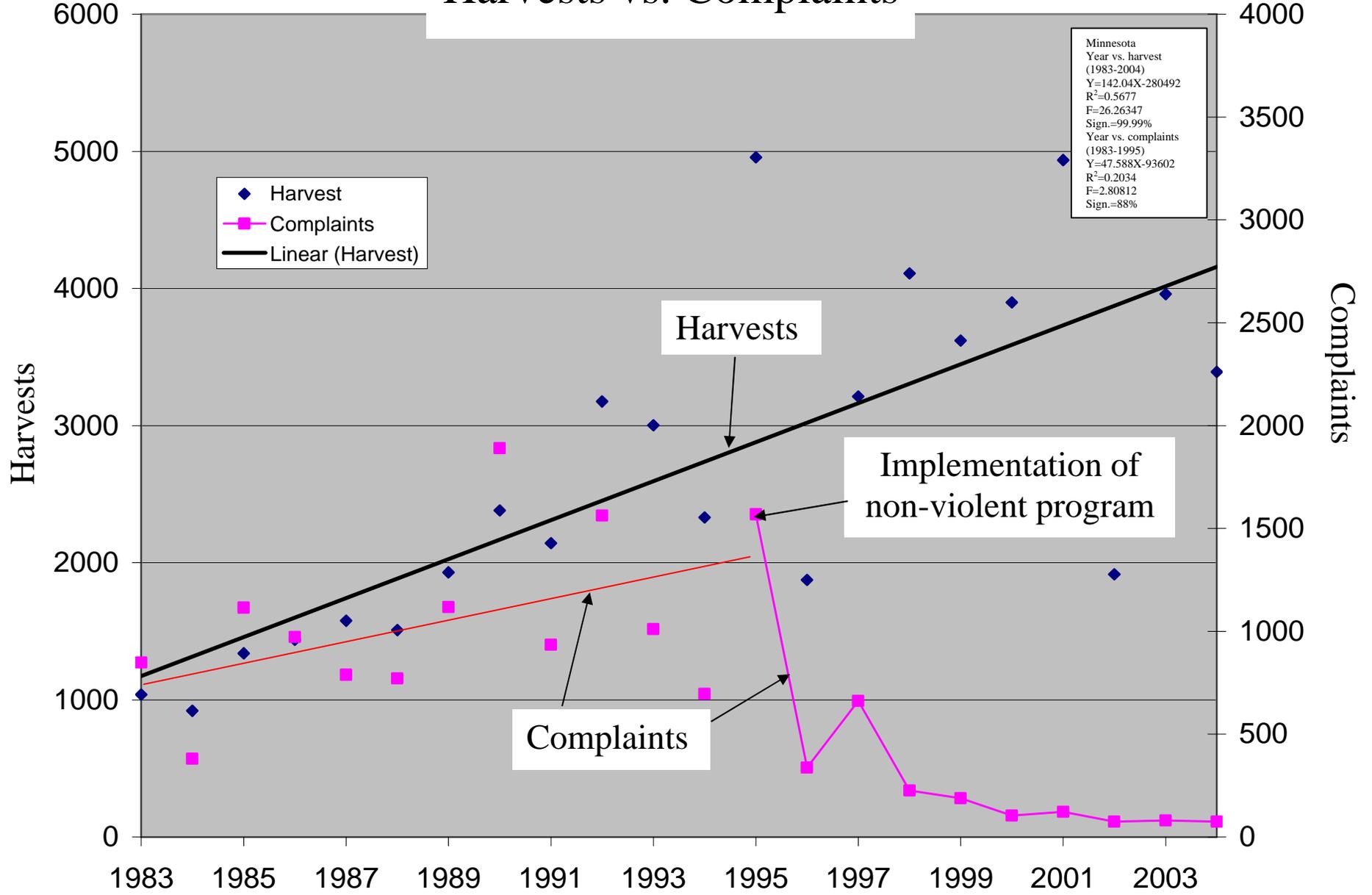


Figure 4

# Minnesota Harvests vs. Complaints



Minnesota  
Year vs. harvest  
(1983-2004)  
 $Y=142.04X-280492$   
 $R^2=0.5677$   
 $F=26.26347$   
 $Sign.=99.99\%$   
Year vs. complaints  
(1983-1995)  
 $Y=47.588X-93602$   
 $R^2=0.2034$   
 $F=2.80812$   
 $Sign.=88\%$

Figure 5

# Yellowstone Visitor Injuries

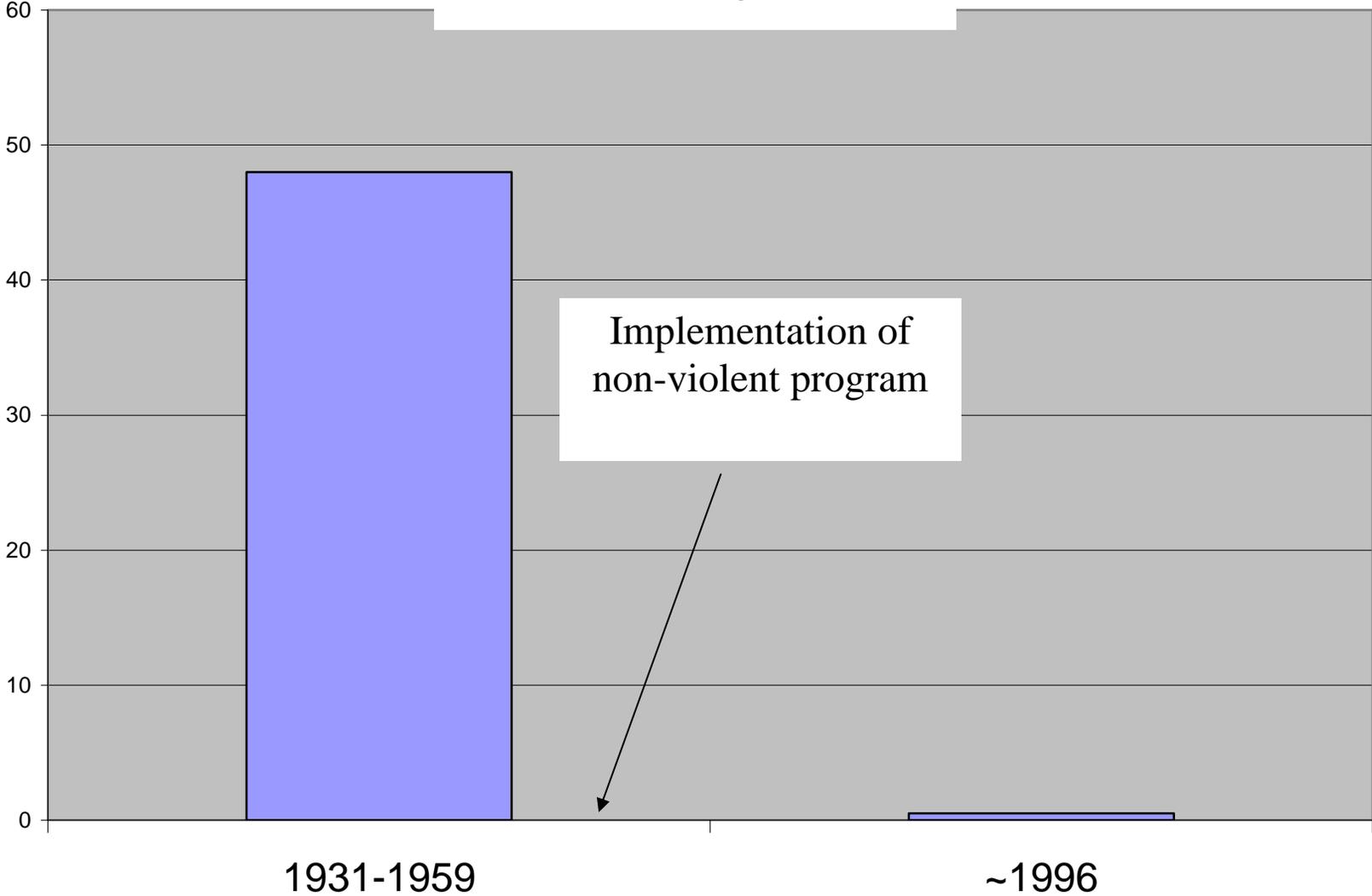


Figure 6

# Yellowstone Bear-Caused Damage

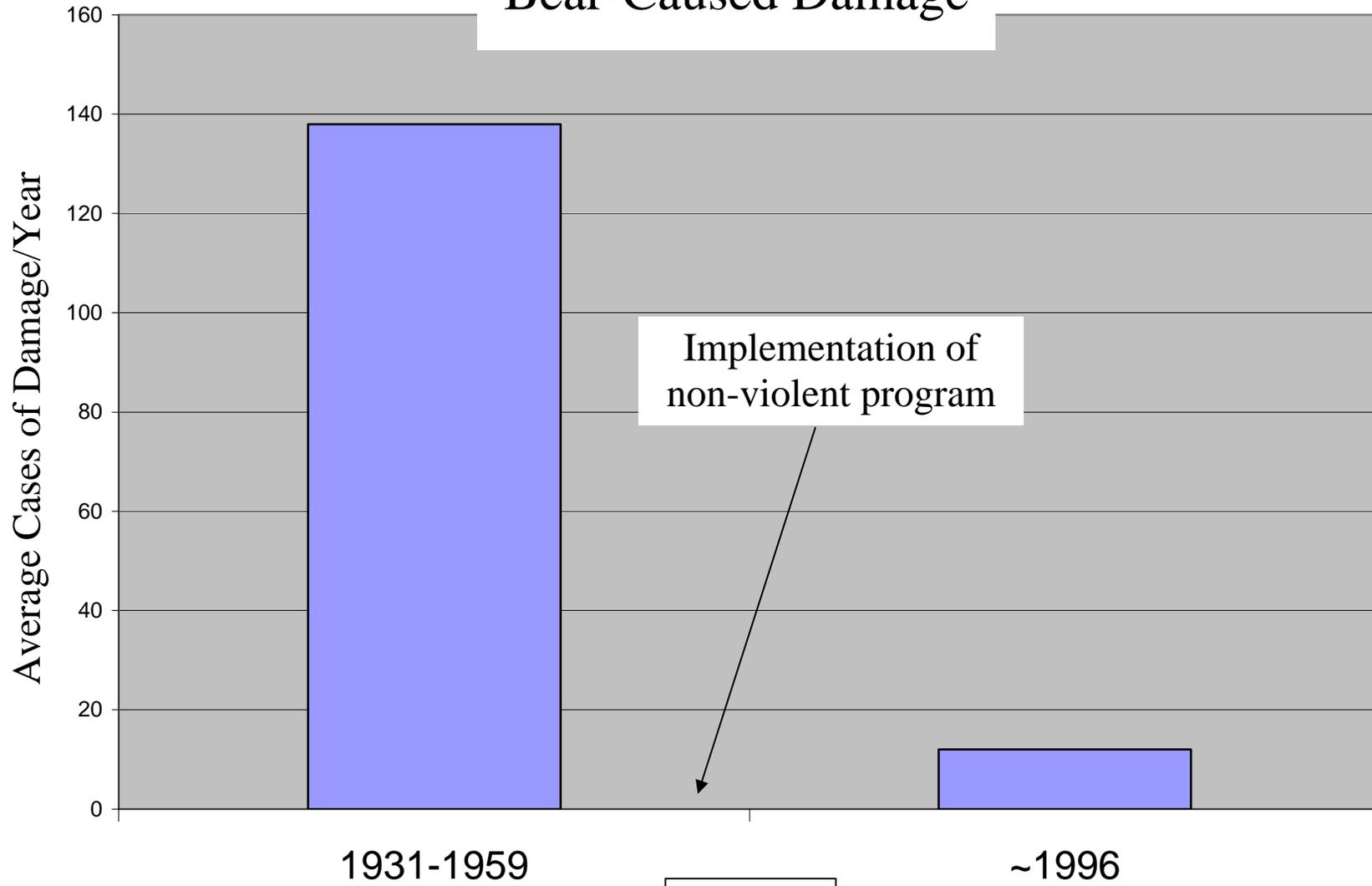


Figure 7

# Yosemite Complaints/Conflicts

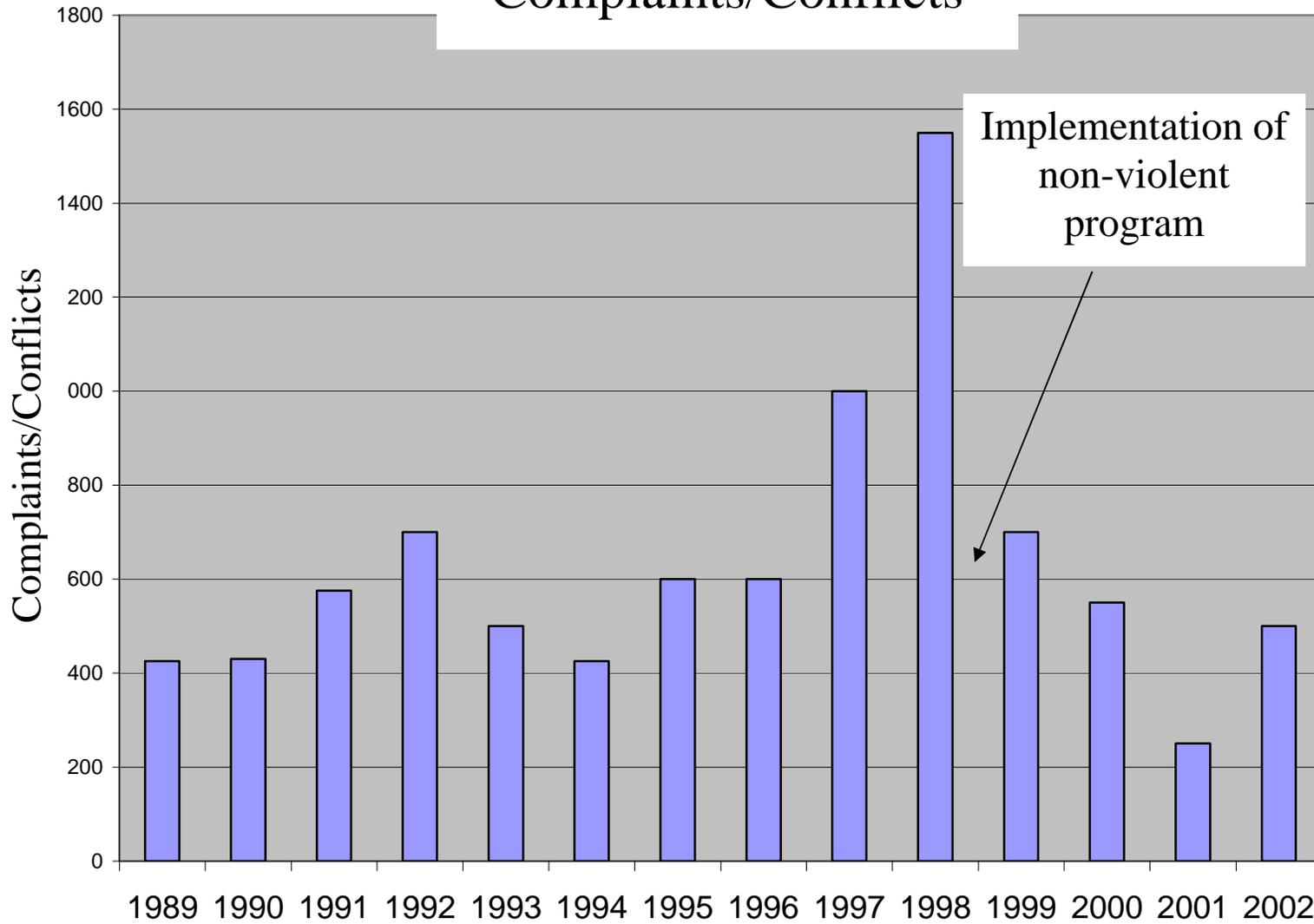


Figure 8

# Great Smoky Nuisance Bears Removed

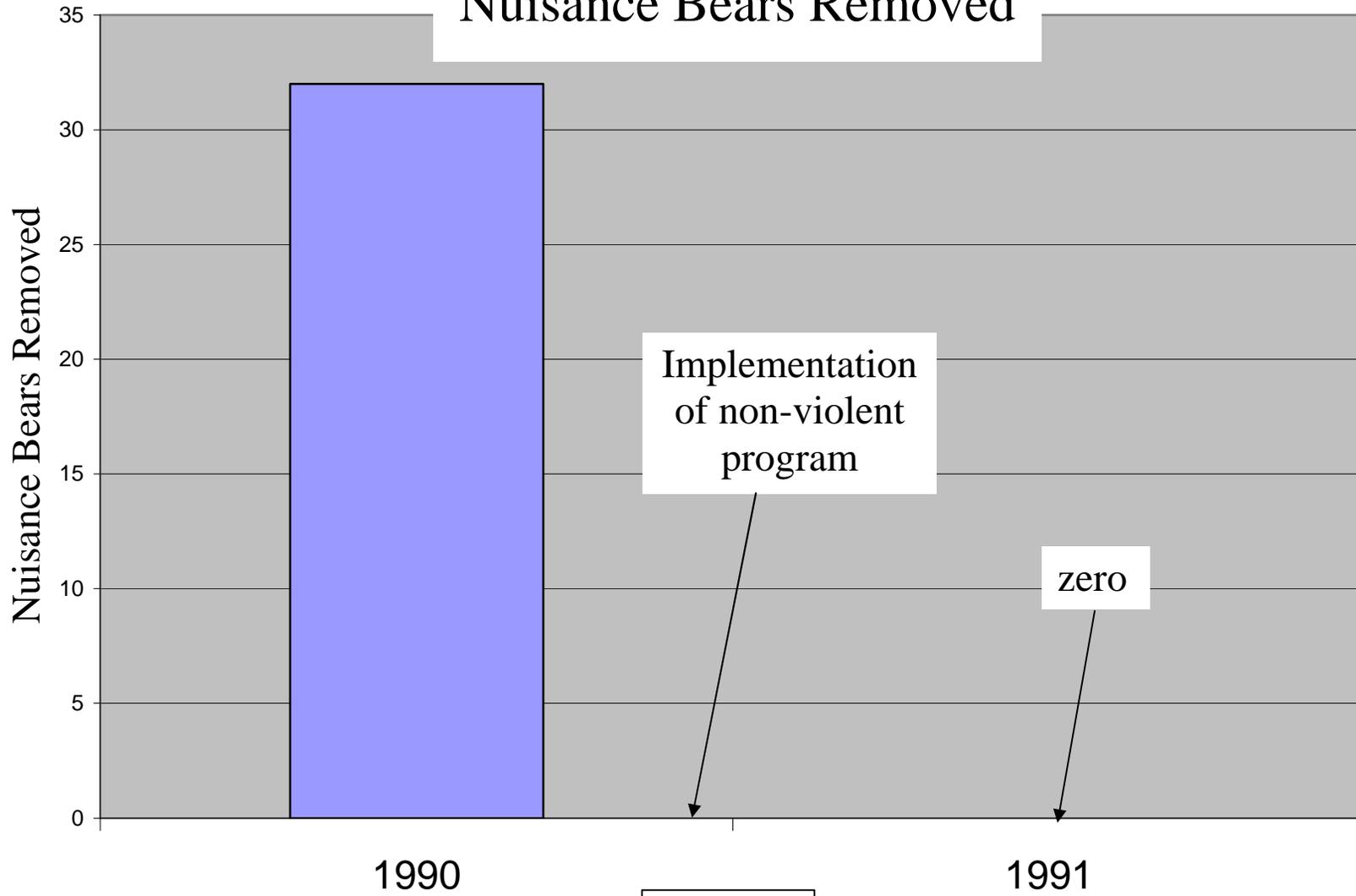


Figure 9

# Juneau, Alaska Complaints

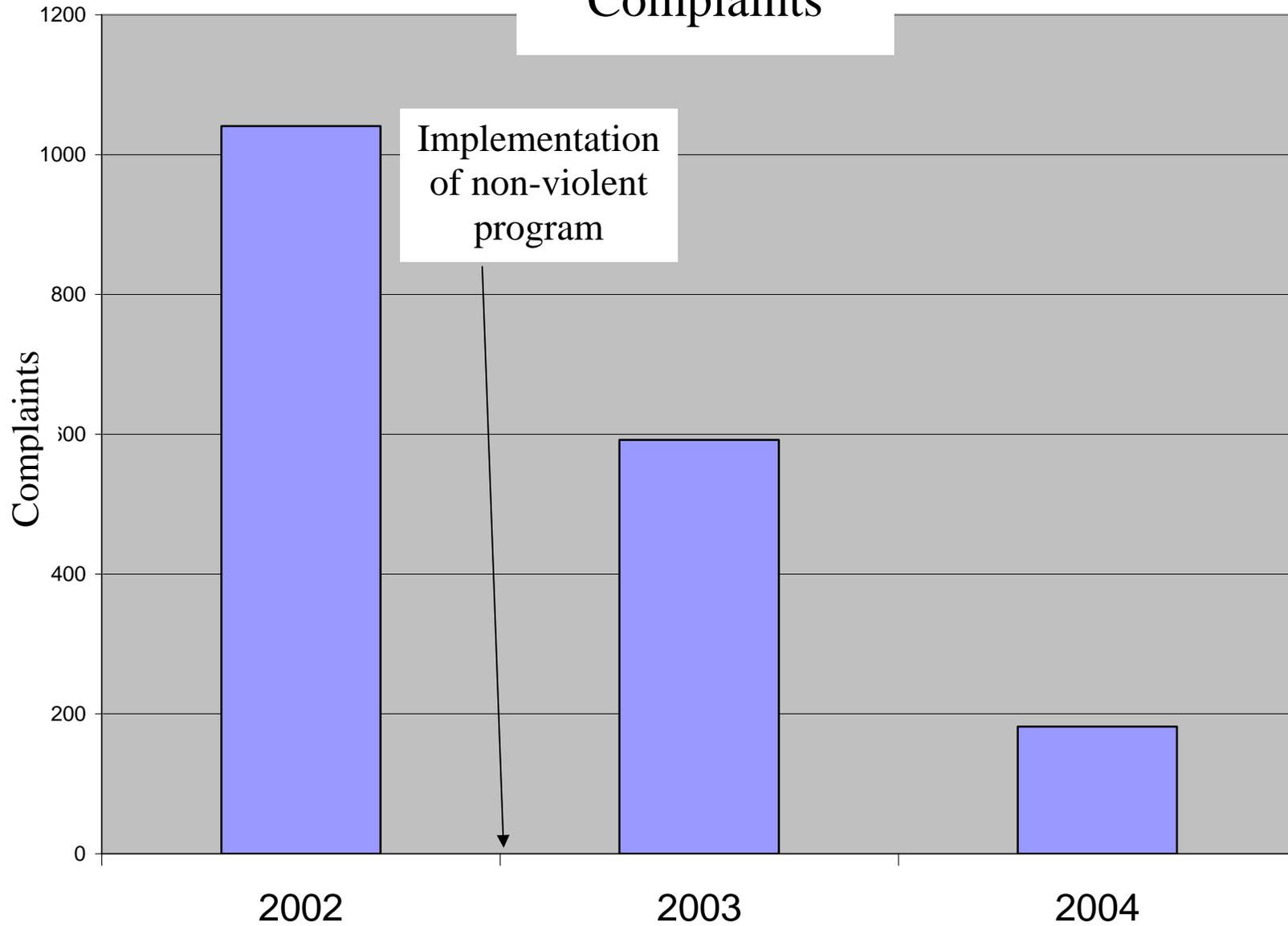


Figure 10

# Elliot Lake, Ontario Complaints

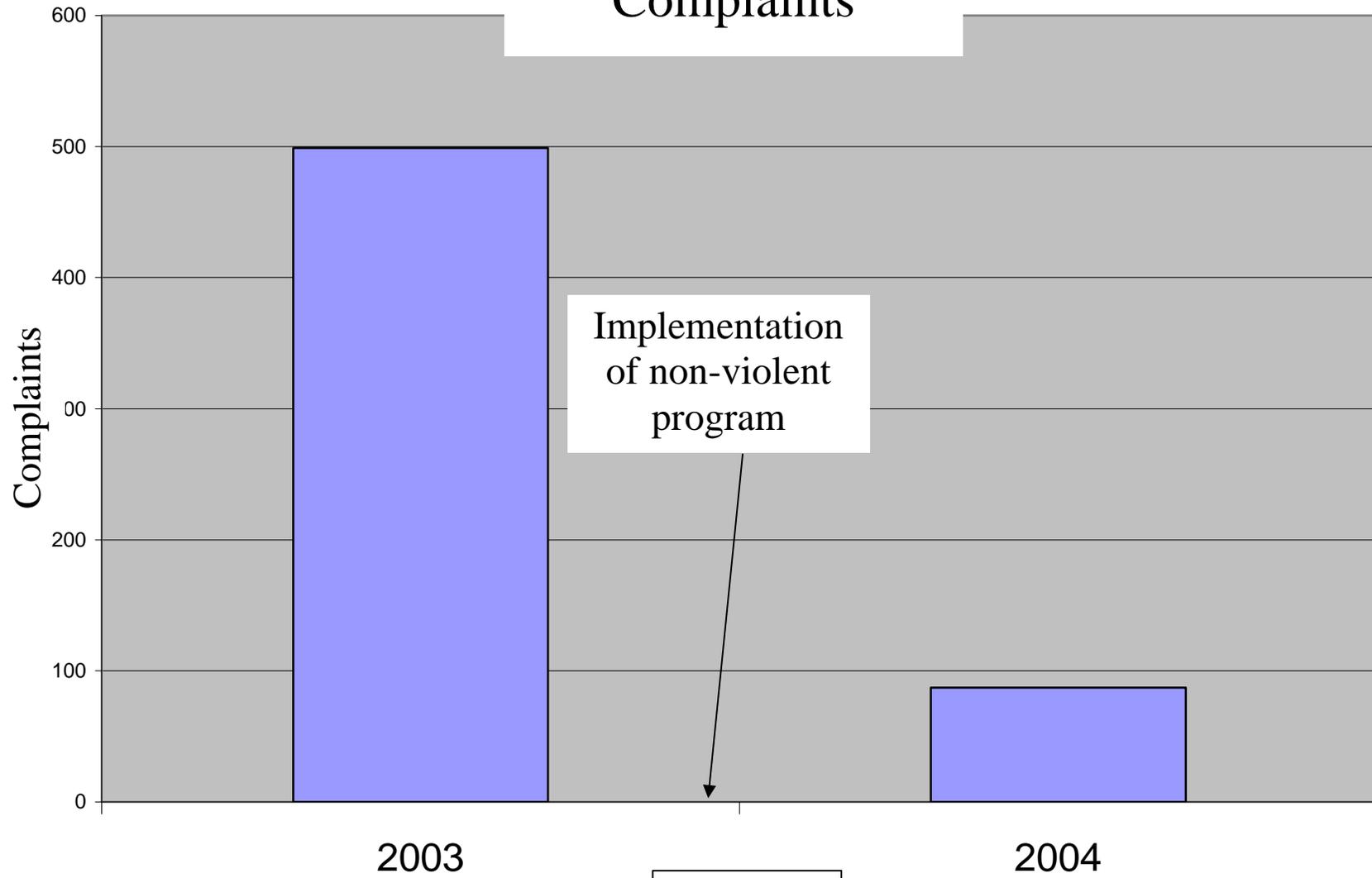


Figure 11

# Nevada (Lake Tahoe Basin) Complaints

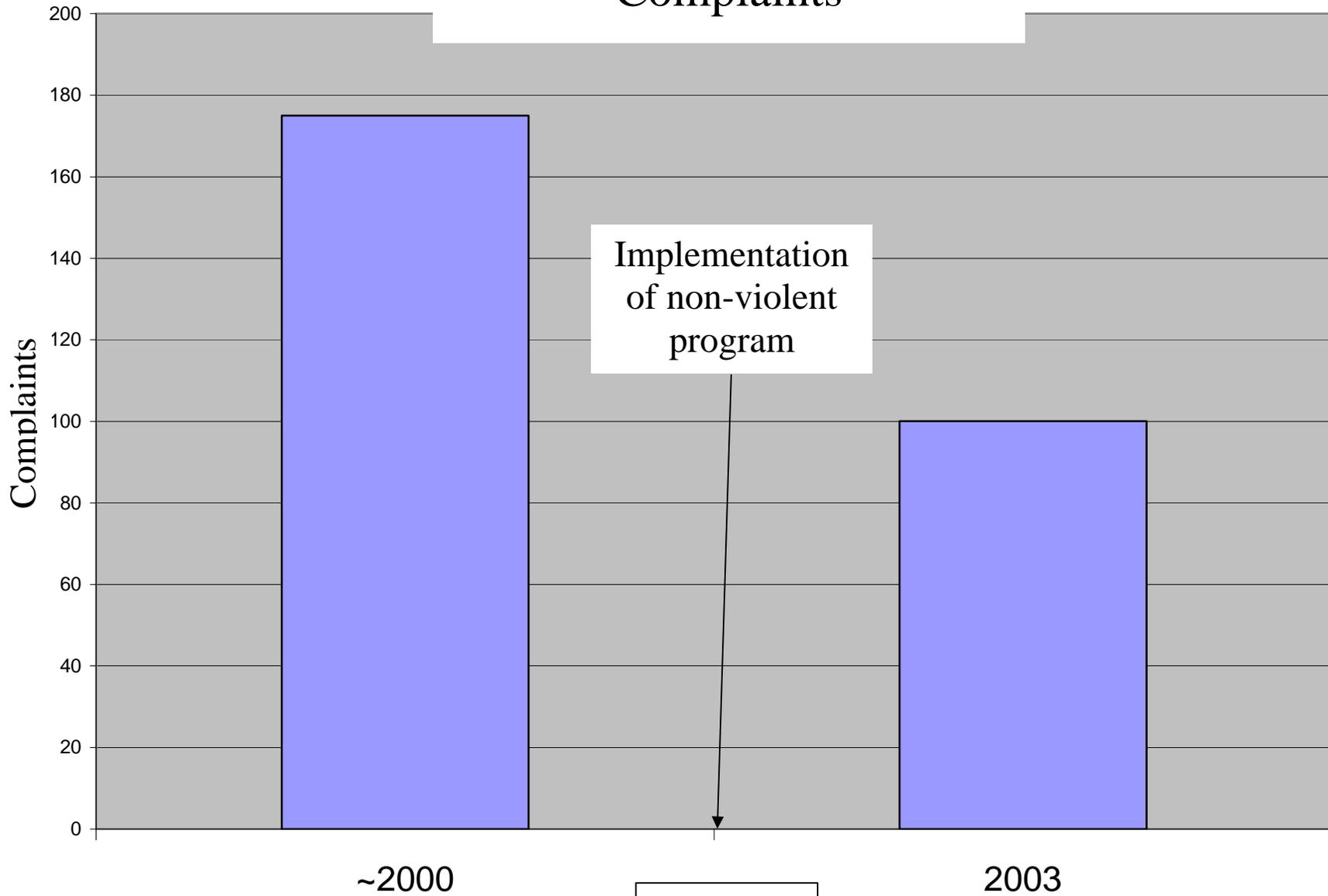


Figure 12

**BEAR COMPLAINTS NEW JERSEY 1995-2005**  
**DIVISION OF FISH AND WILDLIFE DATA\***

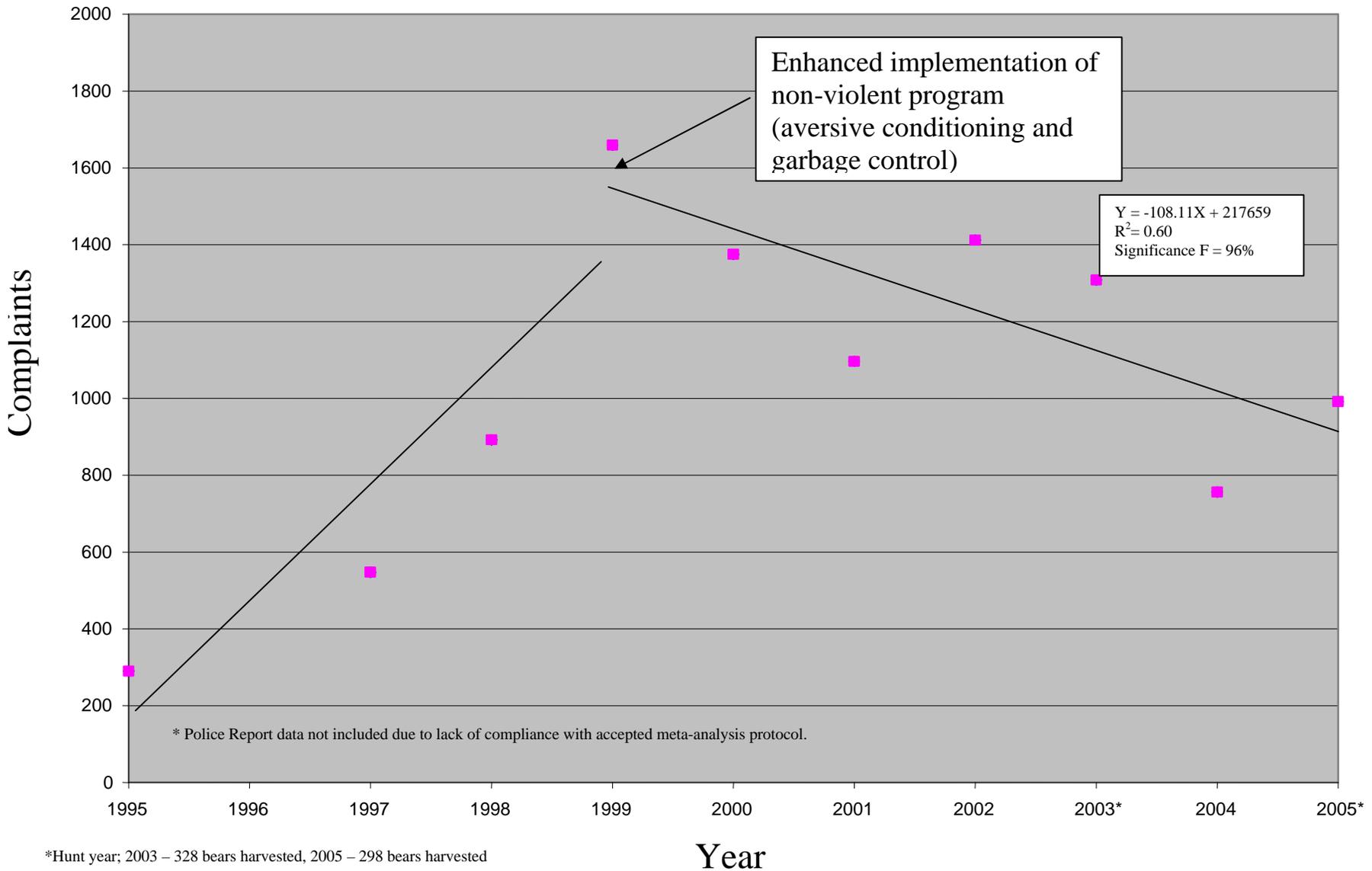


Figure 13