

# **Costs and benefits of government exotic pest control measures in California: A Summary Project Report**

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This project provides estimates of cost and benefits and expected rates of return for government measures to control invasive weeds and exotic pests and diseases affecting California agriculture. The project develops data on (1) costs of activities undertaken to exclude, detect, eradicate, contain and suppress exotic pests and diseases; (2) potential economic cost that would occur as a result of major pest or disease occurrences; and (3) provide an estimate(s) of the riskiness or probability of failure(s) of activities designed to control high cost event pest occurrences. The cost-benefit ratios are based on a brief but comprehensive survey of data sources, but nevertheless are approximations within ranged values.

We have identified government activities and costs attributable to pest management activities in California, including those by the California Department of Food and Agriculture and the federal government, including USDA-APHIS (Veterinary Services and Plant Protection and Quarantine). We also compiled a list of significant agricultural economic activities at risk, possibly a list of industry-pest combinations. Benefits of pest management activities and programs can be quantified to the extent these activities prevent occurrences of economic impacts. Industry pest combinations: Citrus Canker, Exotic Newcastle Disease and poultry, Foot and Mouth Disease and dairy, beef, and goats, glassy winged sharp shooter and grapes.

## **Summary of methodology**

We review the major pests facing California agriculture and the major commodities at risk. We relate these risks to the value of output (indicated by cash receipts) to determine the potential value of output affected. The potential loss in consumer and producer surplus is roughly proportional to the value of output depending on the relevant supply and demand elasticities. Gains to farmers, represented by producer surplus, depend on added costs of production including loss of output. Producer surplus is a share of the total revenue, but consumers gain an amount that is also a share of total revenue and the sum of producer and consumer surplus may be more or less than the value the total gross revenue. The more elastic the supply and demand curves the smaller the surpluses relative to the total revenues. For California crops or livestock industries as a whole, the supply is relatively inelastic meaning production falls relatively little if price declines. Demand facing California agriculture as a whole is also relatively inelastic. Producers gain from higher market prices, but consumers lose from these same price increases.

Some public outlays may be considered investments to reduce cost of future pest incursions, others outlays deal with current outlays. Past investments affect current

reduced probabilities of incursions or reduce their severity and are balanced by current investments that have future payoffs. Thus with a continuing stream of investments (assuming a steady state) we can consider the payoffs as a current stream of costs compared to the current stream of benefits.

The results of these considerations are that the benefits of government outlays have a relatively simple formulation and many complications may be relatively unimportant for broad approximations.

The value at risk and the proportional expected value of the loss can determine the potential losses if pest outbreaks occur for each pest. These calculations for specific commodity groups are currently underway based on data summarized in the appendix and in the tables below.

### **Sample Calculation**

As a summary of the methodology, we may consider the overall effects of public pest programs in summary. The total value of California agriculture was approximately \$28 billion in 2003. California state expenditure for pest exclusion, eradication and control was approximately \$127 million. State expenditure equal 0.45 percent of the value of output. Federal outlays related to California commodities are balanced by federal expenditure for commodities that originate from other part of the United States. Adding state and federal outlays totals approximately \$449 million. Total government outlays equals approximately 1.6 percent of the value of cash receipts for California agriculture.

If the total revenue approximates the potential losses, then pest invasions that reduce value by even  $\frac{1}{2}$  of one percent would justify the current levels of current state expenditures. We can decompose the potential loss as equal to the product of the magnitude of a potential pest outbreak times the probability of an occurrence. State outlays may reduce the expected value of losses by reducing either the likelihood of a pest incursion or the severity of an incursion, but it is the product of the two numbers that determines the payoff to public outlays.

Some major commodity groups such as poultry and cattle have current pest threats. Similarly crop commodities such as grapes and citrus face threats from ongoing pest potentials where eradication or exclusion efforts are important. Other industries are less threatened. Government outlays are generally aligned with the current and potential threats.

**Table 1: California agricultural cash receipts across commodity groups**

	Cash receipts	%
Total	27.8	100%
Dairy	4.0	14%
Beef & poultry	2.7	10%
Veg. & melons	7.2	26%
Fruit	5.2	19%
Tree nuts	2.1	8%
Other	6.6	24%

**Table 2: Direct public outlays related to exotic species in California, 2002/03**

California expenditure.	Federal expenditure.		Total
\$24.7 mil.	\$166.9 mil.	<b>Animal, pests and diseases</b>	\$191.6 mil.
\$103.3 mil.	\$154.5 mil.	<b>Plant, pests and diseases</b>	\$257.8 mil.

These totals are not split into exclusion, detection, and eradication.

Does not include monies (research or non research funds) to CSU and UC for Pierces Disease

Does not include CDFA's \$5 million annual assessment from Wine Grape Industry for Pierce's Disease research

**Table 3: Major pests and main commodities affected**

Pierces Disease	Grapes and many other horticultural crops
Classical Swine fever	Swine
Exotic Newcastle	Poultry
Curly Top Virus	Beets, tomatoes, peppers, beans, potatoes, spinach, cucurbits, ornamentals
Citrus Tristeza	Citrus
BSE	Cattle, sheep
Food and mouth disease	Cattle, sheep, goats, swine
Nematodes	Grapes, lettuce, cotton, beans and others
Citrus Canker	Citrus
Red Imported Fire Ant	Many livestock and crop activities and human land use in general
Karnal Bunt	Wheat, durum wheat, and triticale
Ash Whitefly	Olives, Apple, Plum, Pear
Avocado Thrips	Avocado
Persea Mite	Avocado
Rice Blast Disease	Rice
Yellow Starthistle	Beef and other livestock grazing