

California Waste Tire Program Evaluation and Recommendations

Final Report
June 30, 1999

STATE OF CALIFORNIA

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Preface

Introduction

This report is prepared in response to the statutory requirements of AB 117 (Escutia), which extended the tire fee supporting the California Tire Recycling Management Fund and required the Board to submit to the Governor and the Legislature a report, no later than June 30, 1999, that includes:

“A status report with respect to waste tires in California, as well as an examination of programs needed to provide sustainable end uses for the waste tires generated in California and the reduction of existing waste tire stockpiles.”

AB 117 also required the Board to convene a working group of:

“...affected parties to assist the Board in the development of this report and any proposed recommendations for legislation.”

In response to this legislative mandate, the Board began a two-track process, which included researching and collecting data regarding past tire program activities undertaken by the Board, as well as soliciting recommendations from a stakeholder-based “Tire Legislative Working Group” regarding future programmatic changes.

Background

The Board is charged with overseeing recycling and disposal issues for numerous programs—from monitoring the recycled content of plastic trash bags to regulating compost facilities. The total budget of the agency in 1998-99 was \$83 million, with most of the revenue generated by the integrated waste management fee charged on landfilled municipal solid waste. In 1998-99, the Board had approximately 432.7 personnel years assigned to it.

The IWMB is one of the six State agencies that fall under the umbrella of the California Environmental Protection Agency (Cal/EPA), including the Air Resources Board, the Department of Pesticide Regulation, the State Water Resources Control Board, the Department of Toxic Substances Control, and the Office of Environmental Health Hazard Assessment.

AB 1843 (Brown), Chapter 35, Statutes of 1990, requires the IWMB to:

“Reduce the landfill disposal and stockpiling of used whole tires by 25 percent within four years of full implementation of a statewide tire recycling program and to recycle and reclaim used tires and used tire components to the greatest extent possible in order to recover valuable natural resources.”

AB 1843 also provided for a \$.25 per tire fee to finance the Board’s tire management activities, which generates approximately \$5 million annually. This revenue is directed

to the Board's Tire Recycling Management Fund and finances permitting, enforcement, and cleanup activities, as well as market development programs and administrative costs.

Despite the tire fund's small size in comparison to the Board's \$32 million Integrated Waste Management Account, the tire program is one of the Board's most visible and environmentally sensitive responsibilities. The Royster facility tire fire near Tracy in the summer of 1998, combined with the threatened sunseting of the tire fee on June 30, 1999, has brought the tire recycling issue to the forefront of issues facing the Board, the Governor, and the Legislature.

Programmatically, the Board divides the tire program into two components:

- Permitting, enforcement, and cleanup
- Market development

From the inception of the program in the early 1990s, program resources have totaled \$34.1 million, with the Board expending \$29.7 million to date on cleanup, enforcement, market development activities, and administration. Historically, resources have been relatively evenly divided between the two program components, with market development expenditures since 1990-91 totaling \$11.3 million and permitting and enforcement expenditures totaling \$13.2 million.

Executive Summary

Testimony received during the April 29, 1999 Board meeting stressed the immediate need to alleviate the environmental dangers posed by the numerous illegal tire piles within the state. Further, testimony before the Board and written inputs from several sources revealed the original draft report was deficient in addressing source reduction, the top of the waste reduction hierarchy. Accordingly, this report contains a highly ambitious two-year program to expedite the removal of illegal tire piles and an expansion of the original staff recommendations to more adequately address source reduction. The sample budget contained in Attachment 1 reflects the optimization of programs and the starting point for discussions on program fiscal requirements.

The evaluation of current Board programs and analysis of successful programs from other states lead to the conclusion that the current California waste tire program has most of the essential elements to be successful. While the correct mix of program elements are in place, there is insufficient funding to use these elements to the best advantage. Recommendations within this report are designed to improve what we already have, rather than impose any radical changes. Changes needed in program elements are as follows:

- Accelerate the remediation of the larger illegal waste tire piles.
- Improve enforcement through greater participation by local authorities.
- Expand market development activities.
- Most important, increase funding to support the overall program.

Cleanup of Large Illegal Tire Piles

To reduce the danger from uncontrolled burning of large illegal tire piles, this report recommends establishing the goal to eliminate all known major (over 5,000 tires) illegal waste tire piles within two years. Additionally, the report recommends reimbursing local governments for the cleanup of minor illegal tire piles (500-5,000 tires) within their jurisdictions.

Enforcement

Lack of statutory authority has resulted in delays in taking actions against those responsible for illegal tire piles. Stakeholders placed increased, timely enforcement at the top of their list of concerns. This report recommends statute modification to give the Board access and enforcement authority currently possessed by comparable regulatory agencies.

Early detection and local government participation are the keys to an effective enforcement program. Accordingly, this report recommends developing a program to encourage greater participation by local governments in a State-funded local enforcement program. This voluntary program would establish the goal of conducting an annual inspection of waste tire generators (up to 10,000 statewide) through the use of the Local Enforcement Agencies (LEA) and reimburse the LEAs for the cost of the inspections.

Market Development and Business Retention

Although illegal tire pile cleanup and regulatory enforcement are extremely important, the root cause of the tire problem is lack of markets to support the statutory hierarchy of scrap tire use. As long as there are insufficient markets for the tires generated, scrap tires will go to landfills, the lowest level on the hierarchy, or illegal disposal. This means that any long-term solution has to address the creation of sustainable markets to absorb the tires generated annually.

Accordingly, this report recommends market development efforts also be increased, using the statutory hierarchy, to develop industries that can put the waste tires to productive use. While there are developing markets for crumb rubber products (rubberized asphalt and molded rubber products) and tire shreds (lightweight road fill), the reality is that the primary options available into the immediate future are productive use as fuel for energy generation or cement production or, as a final option, landfilling.

To develop the businesses that can survive in the open marketplace, and to sustain those that are currently diverting tires, this report recommends an aggressive market development and business retention program and recommends specific goals for the major elements of the market development program.

Source Reduction

Recognizing that the best way to control waste tires is to prevent or reduce their generation in the first place, this report recommends a comprehensive public information program to encourage the purchase of longer lasting tires. The program would also educate the public on the environmental hazards presented by illegal disposal of scrap tires. The report further recommends the creation of a partnership with the tire manufacturing industry to conduct additional research on how to increase recycled content in the production of new tires.

The Tire Fee

With a \$.25 assessment on the purchase of each new tire, the \$5 million collected annually makes California's one of the lowest funded waste tire programs in the nation. As a comparison, Florida (\$12 million program) and Illinois (\$8 million program) jointly produce approximately the same number of new scrap tires annually as California. One impact of the minimal funding has been the relatively slow pace in cleaning up illegal tire piles, resulting in greater public exposure to the dangers associated with large tire fires. Since 1995, the Board has remediated approximately 10 million tires from illegal tire piles. In May of 1996, approximately 1.5 million tires burned at the Choperena waste tire site and 7 million tires are being consumed at the fire currently burning at the Royster facility (the fire has been burning for over 10 months). These two fires alone have consumed almost as many as have been remediated by the Board since the inception of the cleanup program.

This two-year objective to clean up major scrap tire piles, increase enforcement at the local level, and increase market development can only be accomplished through increasing funding for the tire program. Appendix 1 lays out the need for an optimum \$40 million per year overall tire program with adequate funding to address the deficient areas.

Report Content

Section 1, Infrastructure and Economics of California Waste Tires, contains an overview of how waste tires flow through the California commercial infrastructure.

Significant points are:

- There is a large number of scrap tire generators (tire dealers, dismantlers, etc.).
- Beyond the initial generators, profit margins are relatively small.
- The tire hauler market is dominated by two large companies, however, there are many small companies (900 permitted with 8,000 vehicles).
- Processing waste tires requires relatively expensive, heavy-duty equipment.
- A surplus of tires allows most processors and many end users to charge to accept scrap tires (tipping fees).

Section 2, Evaluation of the Board Waste Tire Program, contains analysis of current Board programs. Information and analysis for this section was primarily provided by an independent contractor, VITETTA, working in partnership with the Board staff. A contractor was used to assist staff with this portion of the report in order to provide objective analysis of the programs as well as help meet the short timelines required for the report. Many of the findings in this evaluation directly relate to internal Board procedures and policies and will be addressed through a rigorous review by the Board.

Significant points are:

- Approximately half the scrap tires generated and imported annually are landfilled, stored, or disposed of illegally.
- Flow of scrap tires within the free market is difficult to track and there are insufficient reliable data on the movement of tires, numbers of tires in illegal tire piles and location of many of the smaller tire piles.
- The Board does not have jurisdiction over many of the factors affecting the value of scrap tires.
- The Board staff is committed to finding and implementing long-term solutions.
- A majority of the tire recycling grants are ranked as “excellent” or “good.”
- There is a need to focus efforts on the use of rubberized asphalt concrete (RAC).
- The current tire manifest program does not provide a method to track the flow of tires from generation to end use.
- Local government cleanup matching grants are a cost-effective method of performing small to medium-sized cleanups.

- The Board-sponsored fire safety training program has been effective but needs to be updated.
- The work of the “Rubber Pavement Team” (IWMB, Caltrans, and Rubber Pavements Association) should be continued in order to increase the use of RAC by Caltrans.
- A Northern California RAC Technology Center should be established.
- The Department of General Services (DGS) has not purchased any retreaded automobile tires because none are on the market that meet requirements.

Section 3, Recommendations, is the core of the report. This section lays out recommended actions to improve the overall tire program and is organized according to three major functions: (1) enforcement and mitigation, (2) permitting, and (3) market development.

Significant recommendations are:

- Revise the amount and collection point of the tire fee.
- Create a permanent, voluntary, noncompetitive grant program to reimburse local jurisdictions for enforcement efforts.
- Initiate an aggressive two-year program to eliminate all known, illegal, major tire piles.
- Modify the current tire manifest system to better track the flow of tires.
- Change statute to release the Board from trespass liability and augment the ability to convert administrative penalty into a civil judgement.
- Change definitions in statute to make permitting process less demanding on facilities that present minimal environmental risks.
- Within one year, Caltrans must develop guidelines on use of RAC.

Section 4, Benchmark Study, compares the California waste tire program with those of Wisconsin, Florida, Illinois, and Arizona. This section develops lessons learned in other states that can be applied to our program.

Significant points are:

- California has program elements that have been successful in other states.
- Other states have greater relative funding per tire.
- Energy conversion is the most prevalent beneficial use of scrap tires.

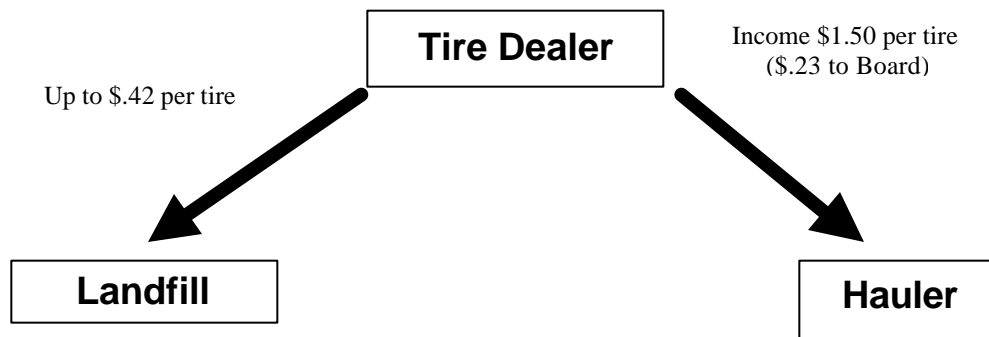
1. Infrastructure and Economics of Waste Tire Flow

To understand the issues relating to waste tires, it is necessary to have a basic understanding of the “flow” of waste tires through the system, which are the primary stakeholders, and the economics of the waste tire business. This section addresses those subjects.

The Dealer

The general flow of waste tires begins with the tire dealer. When a customer purchases new tires the dealer removes the old tires and charges the customer a fee for disposal. If a tire left with the dealer still has significant useful life, the dealer resells the tire as a “used tire” at the prevailing market rate. The tires with no remaining useful life must be disposed of in some manner. The most common means of disposal for the dealer are to haul the tires directly to a landfill or contract with a waste tire hauler for periodic removal. The economics of the transactions vary from time and location; but, as a representative sample, in the Los Angeles area a dealer charges approximately \$1.50 per tire to the customer for disposal. A dealer that self-hauls the whole tire to the Azusa landfill pays \$.42 for disposal. If the dealer hires a waste tire hauler to carry off the tire, the cost is around \$.65 per tire for removal from the business site.

Figure 1-1



The Landfill

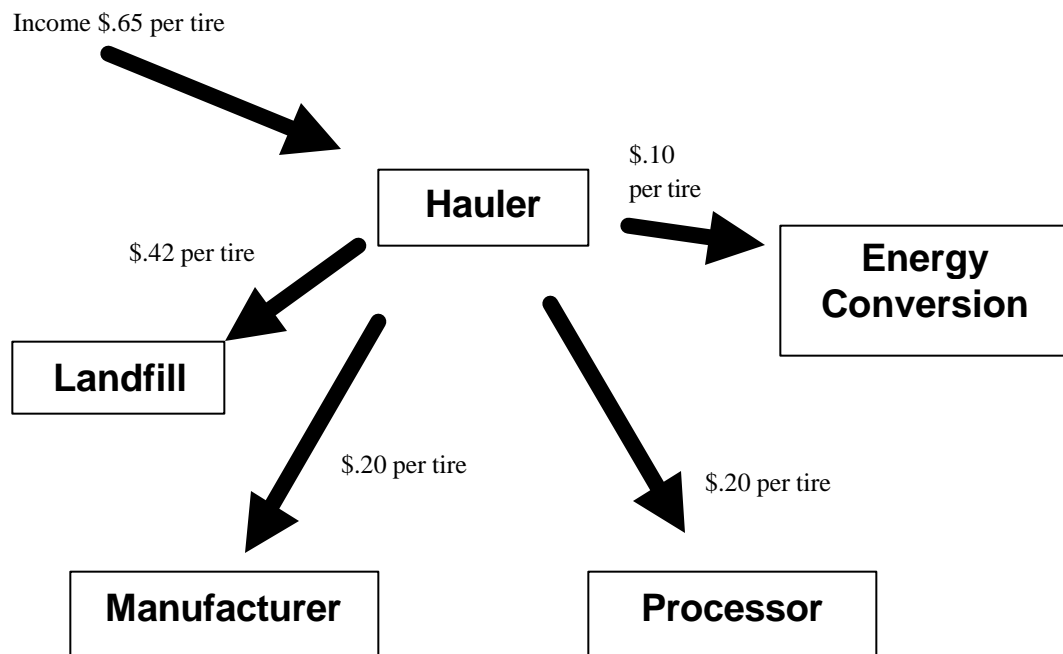
The landfill is the market of last resort for a waste tire; however, environmental groups question the wisdom of allowing landfilling. By statute, whole tires cannot be placed in California landfills so they must be processed (cut apart) in some manner before being deposited. By national standards, California has very low landfill disposal costs and critics claim that these low costs act as a barrier to the development of alternative markets. On the other hand, a lower landfill fee acts to reduce illegal dumping.

In 1998, Azusa Landfill accepted more tires than any other landfill in California with 10 to 12 million tires being deposited. Azusa Landfill charges up to \$.42 per whole tire and this includes the cost of shredding the tire prior to disposal. Haulers that deliver large volumes of altered tires may have special contractual arrangements with lower tipping

fees. Azusa is unique in that it is a tire monofill and does not accept standard municipal solid waste. On a case-by-case basis, other landfills do accept scrap tires with variable disposal costs (tipping fees).

Alternative daily cover has been a popular program for some communities as tires used for alternative daily cover are diverted at very low costs and also count toward the mandated waste diversion goals of AB 939. There is concern that this low-cost diversion can adversely affect the diversion of tires from more desirable uses as well as potentially cause fire dangers.

Figure 1-2



Waste Tire Hauler

The waste tire hauler is the glue that connects the different elements of the infrastructure. The hauler picks up the tires from the tire dealers and has the option of taking them to several legal destinations. Landfills are available for all processed waste tires. The hauler can also contract with a crumb rubber manufacturer to accept the waste tires. In some locations there are processors that accept tires and a few enterprising haulers have contracts with energy conversion (cement kilns and co-generation plants) facilities.

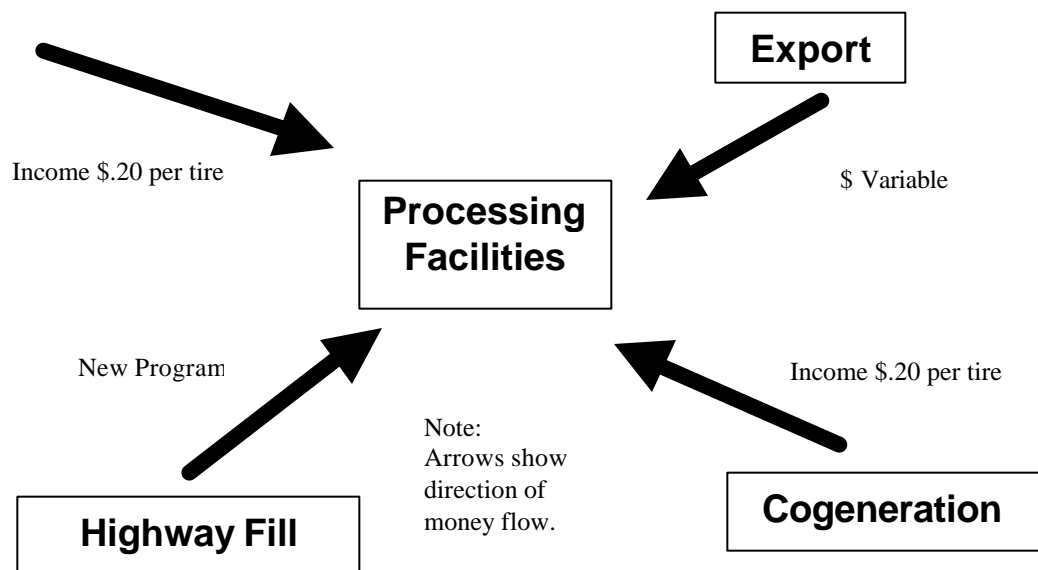
A very significant point is that the hauler must pay the recipient of the tires to take them and the hauler's profit is the difference between what the dealer pays for removal and what the end user charges to take the tires. The "per tire" numbers in the figure above are representative of costs in the Los Angeles area during January 1999. These costs vary throughout the state due to many factors (contractual arrangements, time of year, demand for tire shreds or crumb rubber, etc.) and are presented to give the reader a feel for the variations in the different options.

One dominant factor in determining where the hauler takes the tire is transportation distance. The low profit margin per tire dictates that, due to transportation costs, a nearby more costly market may be more desirable than a distant less expensive market. Also, there are more tires than the current market can absorb, so the hauler may have no option other than the landfill.

There are currently about 8,000 waste tire hauling vehicles registered with the IWMB. While the 900 waste tire hauler companies vary in size from one pick-up truck to a fleet of specialized vehicles, two companies, Lakin Tire of California and Oxford, dominate the market and transport about half of all waste tires in the state.

Because of the market conditions (low profit margins, limited legitimate end markets, and potentially expensive long hauling distances to legal end markets) some unscrupulous haulers have deposited their waste tire loads into illegal piles with low tipping fees, dumped them along roads, or created illegal piles on their own property. To track the flow of tires to ensure they go to legal facilities, the State has imposed a manifest system where the waste tire generators, the haulers, and end users must participate.

Figure 1-3



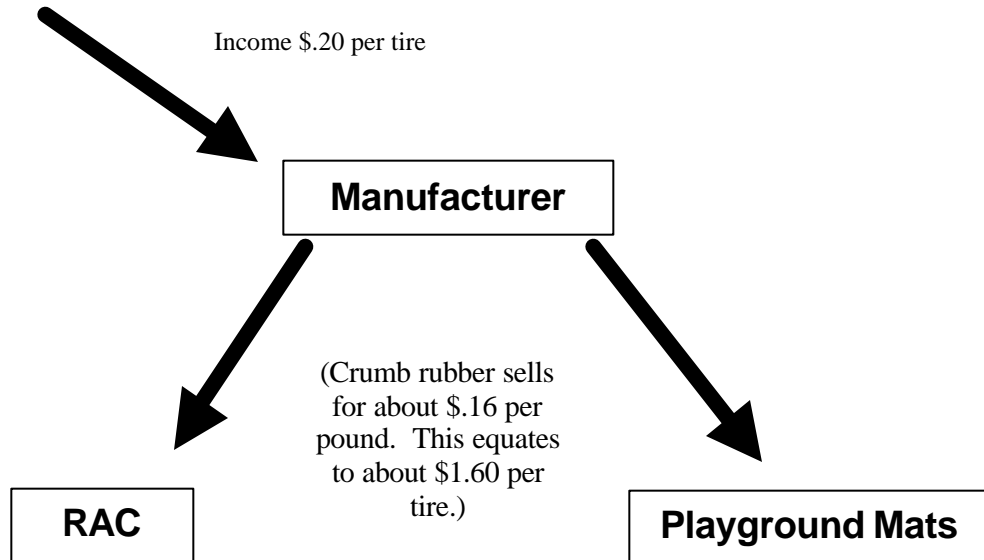
Processing Facilities

Processing facilities usually receive mixed loads of discarded tires. They separate out those that are reusable, and process those that are not suitable for further use as tires. There is a relatively high profit margin in selling used tires to local dealers or exporting them, primarily to Mexico. Again, dollar numbers in the figures are representative and actual numbers may vary according to size of tires, availability of markets, etc.

Processed tires (tire shreds) are sold to cogeneration facilities for use as supplemental fuel or, potentially, as fill material for highway construction. Processing facilities gain revenue from the input of waste tires (tipping fee) and sell their end products. Shredding tires requires investment in heavy equipment and the high use of energy. The revenue

stream comes from tipping fees and the sale of end products. Tipping fees must compete with landfill tipping fees and the end products must compete with low cost commodities (coal or gravel). For these reasons profit margins are small.

Figure 1-4

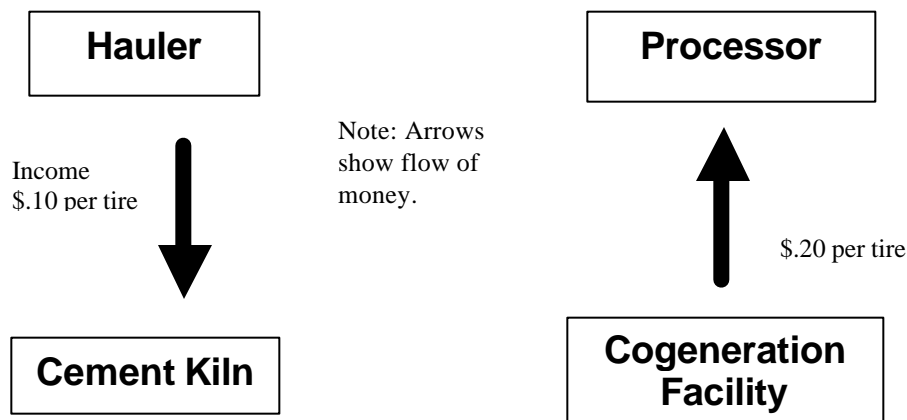


Manufacturer

Like the processor, the manufacturer receives tires from the hauler for a tipping fee. The manufacturer reduces the tire to a fine powder through either a freezing process or by shredding and grinding. The main product of the manufacturer is crumb rubber, a powdery material that can be used for molded products such as playground mats, soaker hoses and computer mouse pads.

Crumb rubber can also be mixed with asphalt during paving projects to form a material called rubberized asphalt concrete (RAC) which has proven to be a good surfacing material for roads. Board programs have encouraged the increased use of RAC and the development of markets for molded rubber products such as playground mats and wheelchair ramps, as this represents the largest profit end use of scrap tires.

Figure 1.5

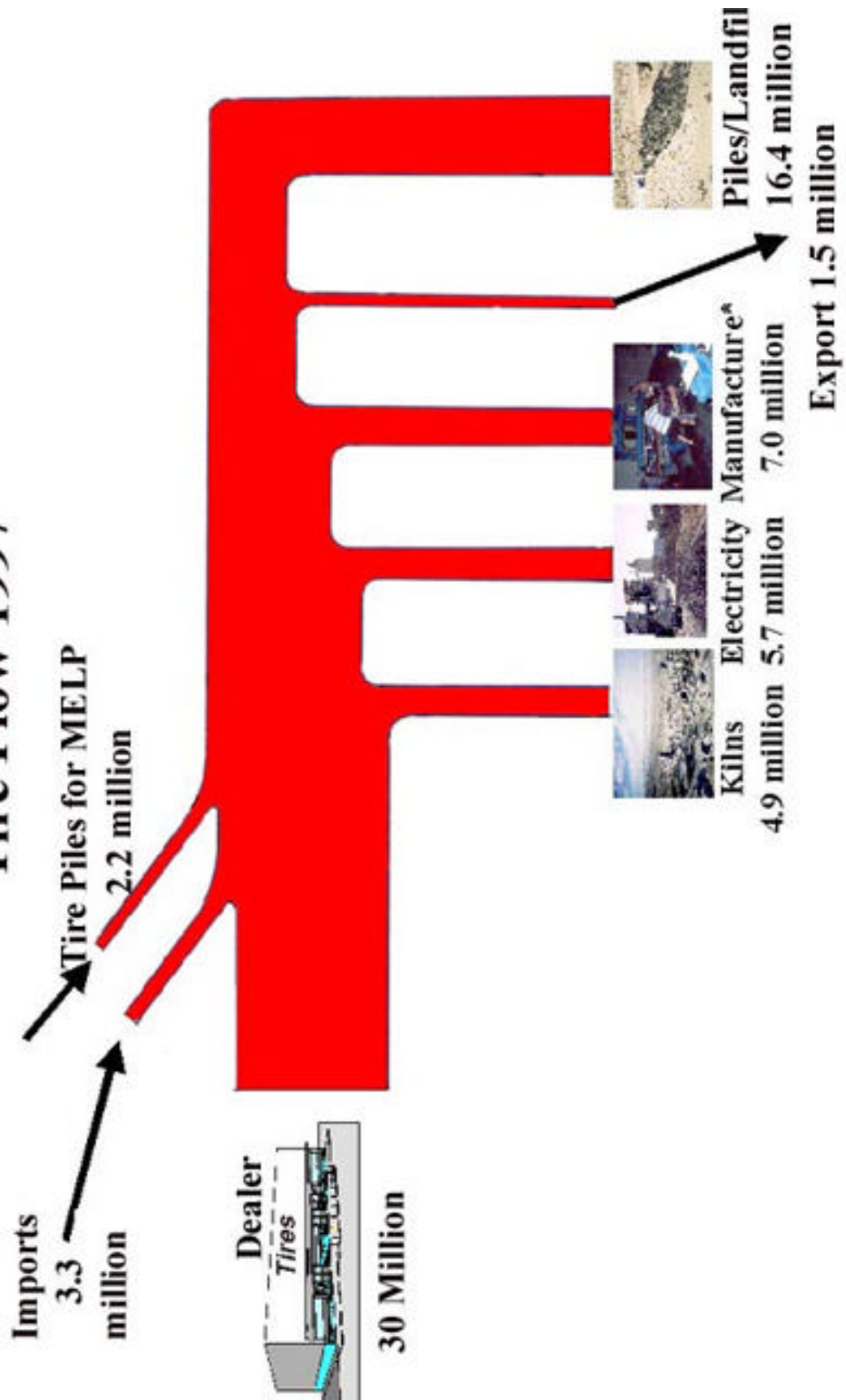


Energy Conversion Facilities

Most cement kilns and cogeneration facilities that burn coal are able to modify their combustion processes to accept tires and/or tire shreds. The more modern cement plants are able to burn whole tires and receive tires directly from contract haulers. Because there is no processing of tires required and there is a glut of tires to be diverted, the kilns receive a tipping fee for consuming the tires. With the cogeneration facilities, the picture is somewhat different in that the combustion processes require the tires to be shredded prior to burning. Because of the required processing, the co-generation facilities pay the processors for the tire shreds.

Following the national trend, energy recovery currently represents the single largest market for scrap tires. Because of environmental concerns, tire-burning facilities have come under especially close scrutiny during the environmental permitting process.

Tire Flow 1997



2. Program Evaluation

Scope of the Evaluation

For this study, the contractor, VITETTA, focused generally on the effect that Board market development and permitting/enforcement programs have had on the flow of tires, specifically:

- Increasing the commodity value of tires (or those tires put to “productive end use”).
- Trends regarding landfilling and stockpiling tires (legal and illegal).
- Reduction of stockpiles (legal and illegal).

Elements reviewed include:

Permitting and Enforcement

- Major and minor waste tire facility permits.
- State-funded cleanup activities.
- Tire hauler program.
- Enforcing tire facility regulations.
- Local Government Cleanup Matching Grant Program.
- Local government Enforcement Grant Program.
- Fire safety training efforts.

Market Development

- Rubberized asphalt concrete (RAC) programs.
- RAC use by Caltrans.
- The Los Angeles RAC Technology Center.
- Tire Recycling Grant Program.
- State Agency Buy Recycled Program (specifically relating to the purchase of tire-derived products).
- Public education programs.

Situation Analysis

In 1997, there were approximately 30 million “new” scrap tires produced in California. Additionally, the Board estimates that currently there are approximately 15 million tires stockpiled across the state. Each year, the annual production of “new” scrap tires appears to be increasing by approximately one-half million.

The two-tiered challenge this situation creates was highlighted by the Scrap Tire Management Council in 1997:

“All parties involved in scrap tire management understand that there are actually two separate but interrelated aspects to sound scrap tire management. The first aspect is dealing with the

newly generated scrap tires, the 266 million or so...created [in the nation] by the normal process of use of tires.

The second problem is dealing with the legal and illegal stockpiles of tires which are the residue of past (and some current) methods of handling scrap tires.”

Of the end uses currently available in California, the Board estimated that in 1997, transformation utilized the greatest proportion of scrap tires—nearly 10.5 million tires were used in cement kilns or energy recovery facilities—almost 30 percent of the state’s annual flow. Board statistics indicate that landfilling and stockpiling consumed more than 16.4 million tires. It should be noted that different sources provide slightly different figures.

However, it is clear that the number of new tires produced is increasing, the number of scrap tires imported continues to increase and the number of tires put to productive end use has increased since the inception of the program.

Table 2-1: Scrap Tire Uses in California, 1997

Production	
Waste tires produced annually in California (estimated)	30 million
Diversion rate (estimated by staff)*	40%
Import/Export	
Waste tires imported	3.3 million
Waste tires exported (includes used tires and retreadable casings)	1.5 million
Stockpiles (legal and illegal)	
In 1990 (before State tire program was initiated) (estimated)	45 million
In 1998 (estimated)	15 million
End uses (unless noted, all tires are “new” waste tires)	
Landfilled, stored or illegally disposed	16.4 million
Cement kilns	4.9 million
Energy recovery (production of electricity from waste tires)	5.7 million - 2.2 million legacy tires
Crumb for road construction, reuse/retread, manufacturing of other recycled products	7 million

1. Source: IWMB.
2. All figures are for 1997-98 unless otherwise noted.
3. *Recycling rate equals tires used as TDF in cement kilns and electricity generation, reused/retreaded, made into crumb for a specific end use, minus legacy tires used to produce electricity and the 3.3 million imported tires (12.1 million/30 million).

When a tire on a vehicle becomes a “scrap” tire (no longer suitable for its original intended use), there are a number of options available, as detailed in Table 2-2, below.

Table 2-2: Scrap Tire Use Options

	Stockpile/Disposal	Commodity Use (productive end use)
Stockpiled tire (in legal or illegal waste tire facility) (est. 15 million)	Actions available: <ul style="list-style-type: none">• Remains on legal stockpile• Remains on illegal stockpile• Moves from illegal to legal pile• Moves from stockpile to disposal	Actions available: <ul style="list-style-type: none">• Removed from legal stockpile and put to “productive end use”• Removed from illegal stockpile and put to “productive end use”
“New” scrap tire (30 million annually)	Actions available: <ul style="list-style-type: none">• Goes to legal stockpile• Goes to illegal stockpile• Goes to disposal	Actions available: <ul style="list-style-type: none">• Put to “productive end use”

For the purpose of this study, “productive end use” and “reuse” include all uses except landfilling, monofilling, and stockpiling. Examples of reuse as used in this study include tire-derived fuel, crumb for use in product manufacturing, and use of crumb in rubberized asphalt concrete.

The majority of the “new” scrap tires in this state are directed toward landfilling or stockpiling. One of the goals of the Board’s waste tire program has been to move more tires from disposal and stockpiling to productive end use.

There are unique challenges associated with remediating stockpiled tires versus ensuring that “new” scrap tires enter the commodity stream. Stockpiled tires are generally exposed to the elements and therefore can be dried out, dirty or contain contaminants, such as vectors or chemicals. This means that the longer they remain stockpiled, the less economic value they retain. Therefore, the challenge with “new” scrap tires is ensuring their entry into the commodity market before they are stockpiled and lose value.

Table 2-3: Defining the Scrap Tire Challenge

	Monitoring Challenges	Strategic Response Considerations
Stockpiled tire (in legal or illegal waste tire facility) (est. 15 million)	<p>Difficult to identify permitted and unpermitted waste tire facility pile location and size</p> <p>Piles tend to be dynamic rather than static in number of tires present at any one time</p> <p>Enforcement of waste tire facilities necessary to ensure compliance</p> <p>Control of vectors and fire hazard</p> <p>Annual estimation of stockpile growth</p>	<p>Condition of the tire, including degree of contamination and suitability for end use</p> <p>Potentially high processing costs, depending on degree of contamination</p> <p>Transportation costs incurred by moving tire to site where it will be disposed or reused</p> <p>Low landfilling tip fees compared to productive end uses</p> <p>Changing market value of tires</p> <p>Legal and illegal stockpiles grow by amount of tires in “new” scrap flow that are not diverted to productive end use</p>
“New” scrap tire (30 million annually)	<p>Difficult to monitor haulers</p> <p>Enforcement of tire retailer facilities necessary to ensure compliance</p> <p>Small piles may be created as a result of consumers wishing to avoid the fee</p>	<p>“Capturing” new scrap tire before it is stockpiled, contaminated and loses value</p> <p>Transportation costs incurred by moving tire to site where it will be disposed or reused</p> <p>Low landfilling tip fees compared to productive end uses</p> <p>Changing market value of tires</p>

The legislatively established goal is to decrease the amount of tires going to landfills and stockpiles by 25 percent. Achieving that goal means that the Board must decrease the number of scrap tires going to landfills or stockpiles and increase the number of tires put to productive end use.

Of the 30 million “new” scrap tires produced in 1997, diversion programs succeeded in increasing the productive end use of scrap tires—from 9.2 million in 1990 to 24.2 million in 1997 (see Table 2-4). Additionally, existing legacy tire piles have been reduced from 45 million to 15 million.

However, the dynamic, two-tiered nature of the tire challenge means tires that are not recycled or reused end up in stockpiles or landfills. In other words, there are currently 15 million stockpiled tires in need of remediation and annually there are more than 16 million tires stockpiled or landfilled that could be put to productive end use.

Landfilling and Stockpiling Reductions Required by Law

As stated previously, AB 1843 requires the Board to reduce the landfill disposal and stockpiling of used whole tires by 25 percent within four years of full implementation of

a statewide tire recycling program. Additionally, statute requires the Board to recycle and reclaim used tires and used tire components to the “greatest extent possible.”

Since 1990, landfilling and stockpiling of “new” scrap tires has been reduced 25 percent, from 66 percent in 1990 before the program began, to 40 percent in 1997 (figures were not available for 1998). Legacy piles have been reduced by 67 percent, from 45 million tires stockpiled when the program began in 1990 to 15 million tires stockpiled today.

Table 2-4: California’s Tire Flow

	1990	1991	1992	1993	1994	1995	1996	1997
New generation (Board est.)	27	27.5	28.2	28.5	29	29.5	30	30.4
Imported	0	.4	.6	.3	.2	.6	1.5	3.2
Total renewable scrap tire flow	27	27.9	28.8	28.8	29.2	30.1	31.5	33.6
Less combusted imports (est.)	0	.4	.6	.3	.2	.6	1.5	3.2
Less tires put to other productive end uses	9.2	10.7	11.8	13.6	18.2	17.6	16.7	17.2
Remaining (stockpiled/landfilled)	17.8	16.8	16.4	14.9	10.8	11.9	13.3	13.2
Percent of new scrap tire flow stockpiled or landfilled	66%	60%	57%	52%	37%	40%	42%	39%
Percent of new scrap tire flow put to productive end use	34%	40%	43%	48%	63%	60%	58%	61%

1. Source: IWMB.
2. All figures are in millions except where otherwise indicated.
3. Tires diverted determined by the sum of reused, retreaded, exported, combusted for energy production (including all imported tires).
4. It is unclear from the data examined whether the tires put to productive end uses includes tires from legacy piles—data regarding this is inconsistent.

Statute also requires the Board to recycle and reuse scrap tires to the greatest extent possible. Based on Table 2-4, it appears that the percentage of tires put to a productive end use increased from 1990 to 1993, then leveled off at approximately 60 percent from 1994 through 1997.

Findings

Finding #1: The Board is meeting the landfill and stockpile reduction requirements in statute.

Landfilling and stockpiling (combined) have decreased from 66 percent of the “new” scrap tire stream in 1990 to 39 percent in 1997. Additionally, based on the Board’s own figures, legacy piles decreased by 67 percent, from 45 million tires stockpiled in 1990 to 15 million stockpiled today. From these figures, the Board’s tire program has met a portion of the statutory goals.

The statute also requires that tires be recycled to “the greatest extent possible.” It is not possible at this time to determine whether the Board has met this nonspecific and less measurable statutory requirement. However, VITETTA determined that productive end uses have increased 27 percent from 1990 to 1997.

Finding #2: The Board is now faced with three primary challenges.

Having reduced the amount of landfilled and stockpiled tires by 25 percent and increased the number of tires put to productive end use by 27 percent, the Board is now faced with three challenges:

- Remediating the 15 million stockpiled tires that are currently “on the ground” in the state.
- Increasing the rate of productive end use for scrap tires, pursuant to the guidance of the statute and equal to new scrap tire annual flow.
- Preventing new stockpiles from accumulating by enforcing the law and regulations regarding scrap tires.

Finding #3: Flow of scrap tires within the free market is difficult to measure and track.

The flow of scrap tires into, out of and within the free market in California is extremely difficult and costly for the Board to track for two reasons:

- The mobility of the commodity—tires can be transported relatively easily which makes it difficult to track the eventual end use of each individual tire.
- The activities of the industry players are governed by the free market (including the value of tires on an interstate, intrastate, and national basis) meaning the Board has limited ability to intervene and affect the flow of tires towards disposal or productive end use.

Additionally, tire flow figures, including “new” scrap tires generated, disposed, recycled, imported and exported are estimated by the Board based on information provided by processors, tire haulers and others involved in the market and may not accurately reflect the activities of the industry. All of these factors make it difficult to accurately track the Board’s impact on the flow of tires towards disposal or productive end use.

Finding #4: Average cost of State-funded cleanups is \$.54 per tire, median cost is \$1.27.

The average cost of State-funded cleanups is \$.54 per tire. However, that figure is heavily weighted due to the economies experienced in the largest cleanup projects. The median figure of \$1.27 per tire is likely more illustrative of the “typical” cost of State-funded cleanups.

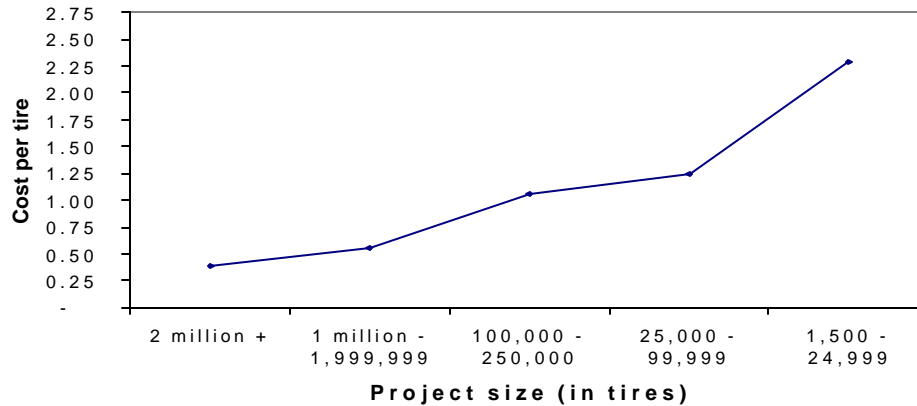
Finding #5: Current tire fee does not cover cost of least expensive cleanup effort.

The current \$.25 per tire fee does not cover the least expensive cleanup effort—State-funded cleanup at \$.54 per tire. Enforcement, surveillance and compliance activities cost significantly more per tire; thus, the current tire fee is insufficient to cover these activities. Further, the larger truck and off-road vehicle tires create the greatest disposal challenges, yet do not contribute to the fund.

Finding #6: Cleanup costs increase as size of pile decreases.

For piles between one and 2.5 million tires, the average cost of cleanup per tire is \$.48. Since most of the largest piles in the state have been cleaned up, the Board should expect that marginal cleanup costs will increase as the cleanup program focuses on medium and smaller piles, which are more decentralized across the state.

Table 2-5: Cleanup cost by pile size



Finding #7: There is no long-term strategic plan for the tire program.

The Board and staff have undertaken several efforts to set long-term program goals and priorities and define a program mission statement. In 1991, the Office of Environmental Protection issued a scrap tire policy proposal, which recommended that Board staff and other environmental agency staff draft a comprehensive agency work plan to deal with the state's tire challenges. In 1995, the Board attempted to devise a long-term plan for certain aspects of the tire program. Despite these repeated efforts to develop a long-term strategic plan for the tire program, there is currently no plan in place.

In the absence of a long-term strategic plan, the Board continues to regulate, monitor, and involve itself in the tire market without specific long-term or short-term goals. This results in inconsistency in program content, policy implementation and program evaluation, making it difficult for the Board to measure the impact of tire programs against specific benchmarks. It also hinders future efforts to re-examine less successful programs or enhance successful ones.

Finding #8: California's tire challenge is two-pronged.

The Board is faced with two challenges:

1. The annually renewable flow of 30 million tires that are at the end of their value as passenger tires.
2. The proper disposal or recycling of the approximately 15 million tires that are estimated by the Board to be in legacy piles throughout the state.

This dual challenge calls for different solutions:

1. Preventing “new” scrap tires from being stockpiled or landfilled requires intervention while the tire still has useful properties and is not contaminated, which increases processing costs.
2. Finding and cleaning up stockpiled tires which may have decreased in value.

Finding #9: Efforts must be expanded to reduce stockpiled tires.

The generation and importation of tires created a flow of approximately 34 million scrap tires in California last year. If it is assumed that an estimated 17 million of those tires will be put to some productive end use, there still remains approximately 17 million tires added to the growing stockpiles, landfills, or monofills. Existing program efforts will need to be expanded if this number is to be reduced.

Finding #10: There are diverse market and regulatory forces outside the Board's control.

The Board does not have jurisdiction over many of the market or regulatory forces affecting the value of scrap tires, including the following:

1. Tire design is determined by tire manufacturers in response to the demands of the tire-purchasing public; the life span of a tire should be expected to continue to increase to 90,000 and 120,000 miles per tire and beyond. This should stabilize or reduce the number of tires generated in relation to the number of cars. However, it keeps the cost of processing scrap tires high.
2. Environmental concerns stem from on-going differences of opinion regarding the amount and types of emissions created by transformation and use of tire-derived fuel. This may reduce the number of options available for productive end use.
3. The Board has little legal jurisdiction over transformation facilities. Air quality permitting is handled by local air districts with input from the State Air Resources Board. Local governments have jurisdiction over facility siting issues and traffic flows to and from the facilities. The Board is simply an “interested party” in relation to the impact that these regulatory agencies have on the siting and operation of transformation facilities. However, any of these variables can effect the availability of productive end uses.
4. The Energy Commission, the Public Utilities Commission, and local utilities govern energy policies, which affect the cost of energy. The world supply of oil also affects the price of energy. Changes in these variables affect the marketability of scrap tires.
5. Programs outside of this state may encourage haulers to import tires into California, increasing the number of scrap tires in the state.

Therefore, the Board is working within an environment where it has little direct control over the number, price or value of scrap tires.

Finding #11: The Board's internal environment is dynamic.

The Board and staff also work within a dynamic political environment. During each year's budget process, the Board requests that staff makes recommendations regarding program priorities and funding for those priorities. Staff must respond with a tactical plan that changes annually based on:

- Advances in tire recycling and disposal technologies.
- Environmental priorities.
- Legislative mandates.
- Priorities of the Governor, the Legislature, and the Board.
- Political influence from both government and the industry.

Additionally, the governance structure of the Board has resulted in changing program priorities in the absence of a long-term plan.

Finding #12: Board staff is committed to long-term solutions.

VITETTA has found that the Board staff is committed to finding and implementing long-term solutions to California's waste tire pile challenge. Despite the recent tire fire at Royster, significant organizational challenges and rapidly changing program priorities, Board staff members maintain enthusiasm for the tire program and its projects.

Finding #13: Program accountability is segregated.

The Board tire program is separated by task rather than program. Business development activities related to tires are initiated and supervised by the Waste Prevention and Market Development Division; tire site permitting and cleanup are overseen by the Permitting and Enforcement Division. Legal staff handle issues related to access to illegal piles and prosecution for violations of the Public Resources Code. There is no centrally responsible party—short of the Board Executive Director—for the tire program. This decentralization can decrease accountability for program and project outcomes.

Finding #14: Long-term impacts are difficult to measure.

VITETTA was able to measure the short-term impacts of a number of the Board's tire programs on increasing the commodity value of scrap tires and remediating stockpiles.

However, across the spectrum of programs examined, it was difficult to measure long-term impacts (and, in some cases, short-term impacts) of many of the elements of the tire program for one or more of the following reasons:

- *The programs are relatively new and, therefore, the program data is incomplete.* In the case of local government enforcement grants, 1996-97 was the first year of the program. Therefore, there was limited data available to review and evaluate.
- *The program goals were established but were not tracked.* For example, in 1997, the Los Angeles RAC Technology Center established evaluation criteria. However, while Center staff is tracking some information, they are

not tracking program outcomes or performance elements that would help determine whether they are meeting the goals established in 1997.

- *Program data related to performance or program outcomes is not being tracked.* In many cases, staff is tracking different types of information for numerous reasons, but was not specifically tracking the program data required to determine program performance. In other cases, the management information systems used hindered the ability of staff to provide information. For example, in the case of the tire hauler program, the database used did not track historical data before 1997. Other data collection efforts by staff involve budget and financial reports that do not track program outcomes.

Finding #15: Data regarding illegal waste tire facilities, including location and number of tires at the facility, is not collected in a consistent or systematic fashion.

The data on the location of illegal waste tire facilities is fragmented, and not collected in a consistent or systematic fashion. This prohibits the Board from accurately tracking illegal piles and taking enforcement action, as well as assessing success in remediating illegal sites.

Finding #16: Data regarding number of tires at permitted and unpermitted minor and major waste tire facilities is not readily available.

The Board cannot easily provide data regarding the number of tires at permitted or unpermitted minor and major waste tire facilities. This inhibits the Board's ability to track the results of its illegal waste tire facility enforcement efforts and also makes it difficult to determine the actual number of tires legally and illegally stockpiled in the state.

Finding #17: The majority of tire recycling grants are ranked as "excellent" or "good."

For the years 1992-93 through 1994-95 (years for which final grant reports are available), VITETTA ranked local government, business development and innovative research grants based on criteria including goal achievement, use of cleaned up tires and future marketability of products. Based on this ranking, the majority of the grants were either ranked as "excellent" or "good."

Finding #18: Costs of local government amnesty day cleanups are consistent with costs of other cleanup programs.

From 1992-93 to 1994-95, approximately 438,253 tires were collected as a result of Local Government Amnesty Grants from the Tire Recycling Grant Program.

Table 2-6: Comparison of cleanup costs across cleanup programs

Program	Average cost per tire
Local government amnesty programs (funded by the Tire Recycling Grant Program)	\$1.82
Local government cleanup matching grants	\$2.26
State-funded cleanups	\$1.27 (median)

Source: IWMB

The average cost to remediate a tire in this program was \$1.82. This figure is approximately \$.54 per tire above the median cost for State-funded cleanups. However, this higher cost is consistent with the \$2.29 average per tire cost for State-funded cleanups of piles 25,000 tires or less. It is also a reasonable figure compared to the average cost of remediation under the Local Government Cleanup Matching Grant Program and State-funded cleanups.

Finding #19: There is a limited benefit of one-time grants

The Board currently administers three one-time grants to local governments:

- Tire Recycling Grants (mainly amnesty days and crumb rubber product procurement cost-offsetting)
- Cleanup Matching Grants
- Enforcement Grants

These programs are effective for one-time purposes. For example, amnesty day programs provide a cost-effective, one-time opportunity for local governments to clean up smaller, decentralized piles. However, ongoing programs (i.e., surveillance and tire retailer education) may not be as effective if funded on a one-time grant basis.

Finding #20: Efforts to use rubberized asphalt concrete (RAC) are fragmented and inconsistent

RAC is the second largest potential use for scrap tires in the state, behind transformation. Current efforts to increase RAC are divided between Caltrans and local agencies. Efforts to promote the use of RAC are divided between the Rubber Pavement Team's (IWMB, Caltrans and the Rubber Pavements Association) efforts, Tire Recycling Grant program allocations and the LA RAC Technology Center at the local level.

Use of this approach is fragmented regionally and requires a "RAC champion" within each agency. Therefore, the current ability to maintain a consistent focus on increasing RAC usage is limited.

Finding #21: According to VITETTA's five-state benchmark study, California's tire challenge—both new tire flow and stockpiled tires—is significantly larger than any other state

California's 30 million annual scrap tire flow is approximately 30 percent larger than Florida's—the second largest scrap tire-producing state in the nation. Since 1990,

California has remediated approximately 30 million stockpiled tires; all four comparative states combined have remediated approximately 38 million

California's program generates \$5 million annually—less than both Florida (\$12 million) and Illinois (\$8 million). Together, Illinois and Florida annually produce approximately the same number of new scrap tires as California.

The scale of California's tire challenge—both new flow and stockpiles—is unparalleled in the nation. However, the results of California's Tire Program achieved within the \$5 million annual budget are significant in comparison to the budgets and challenges faced by the four comparative states.

3. Recommendations

Tire Fee

California generates more scrap tires than any other state yet its program ranks at the bottom in funding. With \$.25 assessment at the purchase of a new tire, the \$5 million collected annually makes California's one of the lowest funded waste tire programs in the nation. As a comparison, Florida (\$12 million program) and Illinois (\$8 million program) combined annually produce approximately the same number of new scrap tires as California. One impact of the minimal funding has been the relatively slow pace in cleaning up illegal tire piles, resulting in greater public exposure to the dangers associated with large tire fires

To reduce the danger from uncontrolled burning of large illegal tire piles, this report recommends setting the goal to eliminate all known major (over 5,000 tires) illegal waste tire piles within two years. This two-year objective can only be accomplished through increasing funding for the tire program. Appendix 1 lays out the need for a \$40 million per year overall tire program for the first two years, with adequate funding for major pile cleanups by the State and smaller pile cleanups by local governments.

Although illegal tire pile cleanup and regulatory enforcement are extremely important, the root cause of the tire problem is lack of markets to reclaim and recycle scrap tires. As long as there are insufficient markets to reclaim and recycle the tires generated, scrap tires will continue to flow to landfills, the lowest tier of the statutory hierarchy, or illegal disposal. This means that any long-term solution has to address the creation of sustainable markets to absorb the tires generated annually. Accordingly, this report recommends goals for specific market development efforts be established to develop industries that can put the waste tires to productive use.

While there are developing markets for crumb rubber products (rubberized asphalt and molded rubber products) and tire shreds (lightweight road fill), the reality is that the primary options available into the immediate future are energy conversion and the lowest level of the hierarchy, landfilling. To develop the businesses that can survive in the open marketplace, and to sustain those that are currently diverting tires, an aggressive market development and business retention program is necessary to provide options.

Appendix 1 proposes an optimum \$40 million annual program to meet the recommended goals to eliminate the major tire piles, set up a local enforcement element, and provide a viable market development/business retention program for reclaiming or recycling scrap tires.

Recommendation #1

Increase funding to the tire program by assessing a pass-through fee of \$2.00 per tire upon the first entity within California to take title or possession of the tire for use or sale. Fees collected should be placed within the California Tire Recycling Management Fund and this account be continuously appropriated. [Accomplished by a statute change. Estimated cost savings of \$85,000].

The current collection of fees at the retail level is very inefficient, as evidenced by the \$484,000 cost to collect \$5,000,000 in 1998. The \$40 million optimized program identified in Appendix 1 can be satisfied by assessing a \$2.00 fee in the same manner currently used to collect the fee for the used oil program. By requiring the first entity within California that takes title or possession of the tire to pay the pass-through fee, collection is moved to the wholesale level, minimizing the number of collection points.

Not only would moving the fee greatly simplify collection, but the fee would be tied to the public creating the waste tires. By collecting the fee within the tire distribution chain, those individuals purchasing new tires with relatively short tread life would pay more than the consumers who select longer wearing tires and have to purchase tires less often. Further this collection increases the participation of the tire manufacturing industry through their distribution chain and, in effect, increases manufacturer's participation in the waste tire program. Another consideration is one of equity. Currently those who purchase tires wholesale, such as fleet vehicle operators, do not pay any disposal fees.

The Board considered other options for fee collection but believes collection at the wholesale level is preferred. For example, the fee collection could be moved to the Department of Motor Vehicles (DMV) and an assessment for passenger and commercial vehicles made in conjunction with the annual vehicle registration. There were 22,131,524 passenger and commercial vehicles registered in California in 1998. A \$1.80 fee would cover the cost of the \$40 million optimized program. However, it would separate the fee from the tire purchasing chain and force those with minimal contribution to the scrap tire problem (low mileage drivers and purchasers of long-wearing tires) to pay a disproportionate share in the program.

The Board also considered retaining the current collection system—using tire retailers. This system has two distinct disadvantages. First of all, as mentioned previously, collection from the 7,000 retail locations is very inefficient and expensive. Again, by collecting the fee at the retail level, wholesale purchasers, such as fleet vehicle operators, escape paying fees. This is something of a double-edged sword, where those using the larger tires, which are more costly to handle in the waste stream, escape payment of the fees used to clean up illegal disposal piles.

Continuous appropriation authority is necessary because Public Resources Code, Sections 42885-42889, provides that money in the California Tire Recycling Management Fund shall be available for cleanup activities only upon appropriation by the Legislature. Due to the nature of the incoming money, i.e. the tire fee, interest earnings, legal recovery, fines etc., it is often difficult to project the cash reserves to accurately raise and lower the appropriation authority during the arduous budget cycle.

It is also difficult to determine when a health and safety issue surrounding the illegal storage or dumping of tires will need immediate action by the board. As a permit requirement, tire facilities are required to submit evidence of financial assurances that are adequate to cover damage claims to cover the cost of closure if that becomes necessary. The financial assurance can be a trust fund, surety bond, letter of credit, insurance, or any other financial arrangement acceptable to the board. This is also a potential source of money for the fund, however, would not be available to be spend for cleanup of a site until appropriated.

Currently, the Tire Fund has a reserve of \$5,301,000. During the economic hardship of the early 1990s many of the special funds were used to meet the State's minimum budgetary needs. In 1996-1997, the Tire Fund reserve increased by \$2.5 million due to a control section transfer, which reimbursed the fund for expenditures, related to those needs. Also, as the economy has improved, revenues to the Tire Fund have increased.

Thus, in 1997-98 the revenues were approximately \$1.5 million higher than anticipated due to increases in revenue (\$446,000), surplus money investment income (\$108,000), penalties and interest (\$121,000), expenditure savings (\$457,000), and prior year adjustments (\$356,000). This, in addition to the continued increase in revenue in the current year, has increased the reserve to a level that enables the Board to take some one-time and ongoing actions. It also provides funds to allow for bridging between the current program and, selectively, those recommended in this report.

Enforcement and Mitigation

During the meetings with stakeholders involved in the diversion of waste tires, the main concerns voiced were the need for increased enforcement of the rules and elimination of illegal stockpiles. It was pointed out that failure to enforce, or inconsistent enforcement, creates major problems for legitimate businesses. Law-abiding businesses have difficulty competing with those that willfully ignore the rules and thereby avoid costs associated with the regulatory process.

Failure to enforce waste tire hauling and storage rules directly leads to the creation of illegal waste tire storage piles. The creation of illegal tire piles has led to many different environmental problems, including mosquito and vector outbreaks, and worst of all, long-lasting, uncontrolled tire fires such as that seen near Tracy in August, 1998. The prime objectives of the following recommendations are to effectively ban tire piles at unpermitted facilities and create an enforcement program to deter the formation of new illegal piles.

Current statutes give the Board the authority and responsibility to administer the entire waste tire program. In many respects, consolidation has been advantageous in that there is one entity accountable for the development of policy, setting of goals, and enforcing statutory requirements. The AB 117 workshops and written inputs from stakeholders have pointed out, however, that the program could benefit from greater participation from local governments.

Individual tire facilities and illegal waste tire piles are usually well known to local authorities. The relative environmental, social, and economic issues associated with problem facilities and illegal tire piles are also best known and understood by local officials. In contrast, the movement of tires between facilities and into illegal piles raises issues that can fall outside the knowledge and authority of local officials. Expressed another way, local authorities know the problem tire piles and unlawful operators within their jurisdictions, but have limited knowledge of businesses that operate statewide and take tires to and from sites in several different jurisdictions.

A more effective program would take advantage of local government's knowledge and understanding of the elements of the waste tire infrastructure within their borders. An effective program would also maximize State government's ability to identify and track

the movement of tires between jurisdictions. The Board currently has the authority to delegate functions and authority to local governments and has awarded grants to jurisdictions that have shown interest in becoming involved in the State program. There has not been widespread local government interest in current grant programs, reportedly due to the administrative costs to pursue relatively small grants offered.

Recommendations No. 2 through No. 7 are designed to:

- Encourage local governments to more actively participate in the enforcement program.
- Clean up existing illegal tire piles and ban the creation of new ones.
- Improve the tire manifest system in order to monitor the movement of waste tires.
- Speed up the identification and apprehension of those willfully operating outside the law.
- Prevent waste tire pile fires and deal with those that do occur.
- Improve the ability of the Board to administer the waste tire program.

Recommendation #2

Create a permanent, voluntary, noncompetitive grant program to reimburse local jurisdictions for inspection of scrap tire generators and initiation of necessary enforcement actions. [Accomplished through reallocation of tire funds. Estimated cost \$1,000,000 per year].

This recommended program could use the existing Local Enforcement Agencies (LEA) to inspect tire generators within their individual jurisdictions. Costs associated with periodically visiting waste tire facilities and seeking out illegal waste tire piles would be reimbursed from a permanently dedicated portion of the California Tire Recycling Management Fund. To make certain the regulated community has the needed information, those regulated need to be identified and specific information provided to them on compliance requirements. Since many of those affected are small independent businesses, a concerted effort could be made through local enforcement agencies, such as building and fire inspectors and LEAs.

The question of delegation of authority to local officials surfaced during the AB 117 stakeholder meetings and in the written comments. Statute currently allows the Board to delegate certain authority to local governments, so this is not a barrier. It was the consensus that portions of an enforcement program could be done most efficiently by local government, however, political will and finances are the big barriers in local government taking over such programs.

The State currently has a grant program for LEAs to assist in identifying illegal piles and performing the initial enforcement steps. Participation in the program has not been universal for a variety of reasons (not enough money, tire problem not a significant local problem, lack of staff, etc.). What did come out was that local governments would be more enthusiastic for such a program if greater outside funding, training, and legal

assistance could be provided. There was also agreement that there may be value in developing a model waste tire ordinance which local governments could adopt.

The enforcement actions taken on an illegal or unpermitted site follow a specific course, which is:

- A “Letter of Violation” is issued. The facility is usually given up to six weeks to submit a plan on how it will come into compliance.
- A “Warning Letter” is issued if a compliance plan is not received within the time limit. This letter grants additional time for plan submission (three weeks).
- The Board issues a “Cleanup and Abatement Order” requiring compliance. Approximately three months is allowed for submitting a compliance plan.
- An “Administrative Complaint” is initiated and the case is referred to the Office of Administrative Hearings (approximately two months to accomplish).
- A “Criminal Report of Investigation” is prepared and the case is referred to the District Attorney for action.
- The final step in the process is cost recovery of funds awarded through administrative and legal processes. This is a time-consuming process that can last an indefinitely.

Under this recommendation, participating LEAs would periodically visit waste tire generators and examine the facilities to insure compliance with State minimum standards. During these visits they would also verify the number of waste tires on site and spot-check the waste tire manifests on file. The Board would create an education program to support local enforcement agencies and create a model ordinance that can be used by local governments.

For noncompliance with State minimum standards, the LEA would issue Letters of Violation and Warning Letters, as appropriate. If the problem could not be remedied through a Warning Letter, the violator would be referred to the Board for issuance of a “Cleanup & Abatement Order” or any further administrative or legal actions necessary. The Board would work with local authorities in pursuing cases through any necessary administrative and judicial actions.

A report of each visit would be sent to the Board to verify the number of waste tires on site and identify any significant problems with the waste tire manifests. Board enforcement staff would pursue identified manifest problems.

For those jurisdictions opting not to participate in the program, the current process would remain in effect. Participation in the program should be contingent upon the local jurisdiction adopting a model local ordinance or equivalent. Since this program would be an essential element in the overall waste tire enforcement program, it should be acknowledged as a fixed expense in the annual waste tire budget.

The program should begin with a pilot program of approximately four to six jurisdictions for the first year to determine the necessary funding and most optimum sharing of responsibilities between the State and local governments. The Board would evaluate whether this grant program could absorb other current grant programs (Tire Recycling Grants, Local Government Cleanup Grants, and Local Amnesty Days) to reduce administrative costs.

Recommendation #3

The Board should initiate an aggressive two-year program to eliminate all known major illegal waste tire piles and develop a program to help local governments find and eliminate the remaining minor illegal tire piles. [Accomplished through reallocation of tire funds. Estimated cost \$8,575,000 per year to clean up large piles; \$6,500,000 per year for local cleanup of small piles.]

Remediating existing tire piles is a challenge. The costs associated with remediation are considerable and property owners and operators are many times reluctant to expend the money for major cleanup operations. Industry considers remediation to be second only to enforcement in priority. The legal process to compel cleanup is quite lengthy and expensive and is initiated only after direct negotiations fail and the Board has exhausted its administrative enforcement actions against the property owners.

The problem is compounded because many times the tire piles are located on economically undesirable land and cleanup costs exceed the value of the land itself, making land seizure a hollow threat. In other cases the property owners are victims of unscrupulous operators (tenants) and do not have the necessary resources to pay for cleanup. In any case, the rationale for the Board to step in to clean up the site is a simple one—due to the fire threat, waste tire sites pose a significant threat to public health and safety and it costs less to clean up a site before a tire fire than it does afterwards.

The Board should initiate an aggressive two-year cleanup program to eliminate all known major illegal waste tire piles (over 5,000 tires in size). Completely eliminating the largest illegal piles will greatly reduce the major environmental dangers associated with waste tires and will provide a positive message to the public that progress is being made toward an overall solution.

Finding and eliminating the remaining minor illegal tire piles can more efficiently be accomplished at the local level. The Board should develop a voluntary program to reimburse local detection and cleanup programs addressing the minor (500-5,000 tires) tire piles. To be eligible for reimbursement under this program, the enforcement process described in Recommendation No. 1 would have to be followed and approval from the Board received prior to commencing cleanup.

Recommendation #4

Continue the current manifest system with five modifications. These modifications are:

- *“Close the loop” on accountability, i.e. have copies of each manifest returned to the Board for monitoring.*
- *Account for imported scrap and used tires.*

- *Provide for “one time hauls” to support amnesty days and individual cleanup of small tire piles.*
- *Increase from five to ten the maximum number of waste and used tires that can be transported without having to obtain a waste tire hauler permit.*
- *Develop a process to allow a hauler to temporarily substitute a replacement vehicle for a permanently registered vehicle.*

[Accomplished through a change in statute. Additional cost to recipient of out-of-state tires to prepare manifest. Local costs to set up one-time-haul program. Cost to Board \$400,000 per year for staff to monitor manifests].

The enforcement of the registered waste tire hauler and waste tire manifest regulations has been minimal at best. The main focus of the Board’s enforcement program has been on the legacy piles and illegal dumping.

Recently, Board staff has been directed to increase efforts in enforcement of registration/manifest regulations. The California Highway Patrol is initiating a waste tire hauler enforcement training program using a Board-funded video. Recent inspections by Board staff of waste tire facilities, waste tire haulers, tire dealers and disposal facilities show that, in many cases, either the manifest isn't used to transport waste tires from one location to another or it isn't filled out correctly. The Board has the enforcement tools to remedy the problems in that it can take administrative action against generators not using licensed haulers, it has the authority to revoke the permits of licensed haulers, and it can revoke the permits of end users accepting tires from unlicensed haulers.

There are several issues relating to the tire hauler program. The newly instituted manifest system is just being implemented and there is some confusion throughout the industry on process and requirement. There have been comments that the program is unenforceable, onerous to the regulated community, and rife with unnecessary requirements. AB 117 meetings and written input from the stakeholders do not support these allegations of deficiency. It is apparent that the regulated community needs additional training and information on the new requirements and enforcement needs to be increased to deal with the illegal haulers. The Board is currently in the process of mailing out thousands of pamphlets to affected businesses. This training would be expanded to the local enforcement agencies

“Close the loop” on accountability. Currently the scrap tire generator, hauler, and legal end user must make entries on the manifest forms and retain copies. With this system, it is virtually impossible to do any sort of audit to assure tires are flowing correctly through the system. Tracking a particular shipment currently requires the auditor to pull three sets of files at as many as three separate locations.

The proposed change would require the tire generator, hauler, and the end user of a shipment to forward a copy of the tire manifest to the Board confirming the number of tires shipped and the number of tires received in a specific transaction. The manifest would have sufficient copies to allow the generator, hauler, and end user to retain individual copies. The Board would develop a system (such as the use of bar coded stick-ons for participant identification, and postage-paid forms) to make the system a minimal administrative and financial burden on the industry. Such a manifest system

would allow the Board to track the flow of tires by comparing beginning and end point documentation for tire shipments.

Account for imported scrap and used tires. There is currently no method to accurately determine the number of scrap and used tires being imported into the state, nor are they controlled through the manifest system. To provide accountability for the imported scrap and used tires, the first recipient within the state should prepare a modified manifest and forward a copy to the Board.

This means that if a cement kiln receives a tire shipment directly from an out-of-state source, the kiln is responsible for preparing the final section of a manifest and forwarding a copy of that manifest directly to the Board. Similarly, if a hauler picks up a shipment of scrap and/or used tires from outside California and takes them to a central processing facility, the processing facility must prepare the final section of the manifest and forward it to the Board.

Provide for one-time hauls. The lack of a procedure to allow for one-time haul has been flagged as a problem by virtually everyone and immediate correction is needed. There is currently no process by which an individual can haul relatively small numbers of tires from his/her own property to a legal end-use facility. The legal end use facility could provide an authorization document and/or a display placard to an individual for a one-time haul.

For example, if John Doe wanted to clean up the waste tires dumped on his property, he could call or visit the facility to which the haul is to be made and get a one-day haul permit to take waste tires to the specific receiving site. Such a procedure could be publicized in the same manner communities currently use to inform the public of recycling programs (inserts in utility bills etc.). This system can also be used on amnesty days where local governments could issue the authorizations. This process would have to be closely monitored to insure that a hauler does not use the process to bypass the hauler permitting process.

Increase the number of tires that can be transported without a permit. The current limit of five tires is overly restrictive and acts as a disincentive for individuals to clean up minor piles on their own property. Several other states have found that a 10-tire limit is appropriate.

Develop a process to allow a temporary substitute vehicle. A tire hauler currently cannot use a rental or substitute vehicle to temporarily replace a registered vehicle. A regulatory change is necessary to accommodate this necessary business practice.

Recommendation #5

The Board should be given release from trespass liability when inspecting problem sites, and statute should be amended to clarify and augment the Board's ability to convert an administrative penalty into a civil judgement in superior court without having to involve the Attorney General. Haulers that illegally dispose of tires at unpermitted or noncompliant sites should have their permits revoked. [Accomplished through a change in statute. No cost].

One issue in assessing and cleaning up illegal waste tire sites is that the Board cannot get permission from owners/operators for site access. Initially, the Board attempts to obtain voluntary site access. However, if this fails the Board must pursue site access through the Attorney General's office, which, in turn, would obtain access through the courts.

This gives the Board permission to go onto a site for health and safety reasons; however, the statute giving the authority does not relieve the Board from trespass liability. This lack of relief from trespass liability greatly reduces the Board's incentive to go onto a potential problem site. In contrast, it was stated that the Department of Toxics and Substance Control has enforcement authority similar to the Board, however, they have been given immunity from trespass liability. This release from liability is necessary for the program to move efficiently through the legal system.

Additionally, statute should be amended to clarify and augment the Board's ability to convert an administrative penalty into a civil judgement in superior court, without having to involve the Attorney General. Currently, the Board must pursue a two-step process to recover civil penalties and this extends the time required to mitigate problem sites. Giving the Board the ability to convert an administrative penalty will bring the Board's authority in line with that of the State Water Resources Control Board and Department of Toxics and Substance Control.

After receiving two violations of hauling tires without a permit, an offender should have the message that such a permit is required. On the third violation the Board should have the authority to seize the vehicle of the "scofflaw" operator.

Recommendation #6

To prevent waste tire pile fires and deal with those that do occur, the Board should work with the Office of the State Fire Marshall to update the tire fire curriculum, work with appropriate State agencies to develop a tire fire protocol, and work with the Western Fire Chiefs Association to update and amend the Uniform Fire Code. The Board should also take the lead in making certain the most current information is available on the nature of tire fires. [Accomplished through Inter-Agency Agreements and contracts. Estimated cost one time cost of \$350,000].

Training is a key element for both waste tire fire prevention and suppression. In 1993, the Board entered into an interagency agreement (IAA) with the Office of the State Fire Marshal (OSFM) to develop a tire fire training curriculum for the state's local fire authorities. This IAA included the development of a textbook and video called *Rings of Fire*, an instructor's manual, and a slide program. The OSFM then trained instructors around the state, who would then in turn train local fire authorities.

The continued interest in the program is evidenced by the fact that the majority of the 3000 *Rings of Fire* student textbooks printed under the first IAA had been distributed as of October 1996. This program has been well received by the local fire authorities, and as noted by Michael Blumenthal of the Scrap Tire Management Council at the September 1996 Tire Workshop, this program has represented one of the best uses of the State's Tire Fund.

Planning involves the standards under which waste tire facilities must comply and the procedures for suppressing a waste tire fire in the event one occurs. Current regulations

allow a local fire authority to set requirements for a particular facility that are different from the standards presented in the regulations. The training discussed above aids local fire authorities in setting requirements for storing waste tires, as well as developing fire suppression plans with the operators.

Some waste-tire storage facilities have had a tendency to exceed their storage requirements in a short period of time. Therefore, it is important that these facilities be inspected on a regular basis. Thus, the training that local fire authorities receive in this area will impress upon them the importance of regulating waste tire storage. With the combined effort of local fire authorities, local enforcement agencies, and Board staff, most waste tire facilities should conform to the waste tire statute and regulations.

The Board should contract with the OSFM or a private consultant to update the State Fire Marshall's tire fire curriculum utilizing current information regarding prevention and suppression of waste tire fires and advanced methods for delivering the program. In 1997, the Board entered into such an agreement with the OSFM, but the agreement was terminated when it was decided that an additional study on the air emissions and health effects from tire fires should be performed first.

A tire fire protocol should be developed with the Office of Emergency Services (OES) along with the California Department of Forestry and Fire Protection (CDFFP) and OSFM. This effort would be done under a memo of understanding with OES and funded through the California Tire Recycling Management Fund.

Even though the Board does not take a direct role in the initial suppression of a waste tire fire, it is aware of the need for improved coordination during the initial hours of the fire. For example, a decision may have to be made at the onset of the waste tire fire as to what action needs to be taken regarding residents or businesses located in the path of the smoke plume. Those agencies that may need to coordinate their efforts at the onset of a large waste tire fire include the local health department, the Air Quality Management District, the Regional Water Quality Control Board, Cal/EPA, U.S. EPA, and other agencies.

Local fire departments rely heavily on the Uniform Fire Code, which comes under the jurisdiction of the Western Fire Chiefs Association. This code needs to be updated and amended to reflect the latest body of knowledge associated with tire fires. This can be accomplished by the Board entering into an interagency agreement with the Western Fire Chiefs Association.

The response to a waste tire fire is a function of training, coordination, and resources available. Most local fire authorities participate in mutual aid agreements, whereby they have access to manpower and equipment from neighboring local fire authorities. However, certain types of equipment and material, such as foam in large enough quantities, may not be readily available.

Tire fires present unique problems to the firefighter. There is virtually no substance available to suppress the fire once it starts. Neither water nor standard foams have been consistently effective in stopping fires in large piles. Similarly, there is limited knowledge as to what toxic substances are present in fumes from tire fires, which could create serious problems for those having to fight such fires. The Board should take a lead

role in determining whether there is adequate research in this area and, if not, initiate the appropriate studies.

Recommendation #7

The Board should perform a thorough evaluation of waste tire program staff organization, planning, data collection, and contracting procedures. [Accomplished through internal review. Costs included in recommended additional administrative staff.].

An independent evaluation of Board programs identified multiple areas where improvements can be made in the administration of the waste tire program. The Board needs to review these recommendations and make appropriate adjustments.

For example, several members of the stakeholder group have a strong feeling that there is a need to change Board waste tire pile remediation contracting procedures. A specific recommendation from the Scrap Tire Legislative Working Group for revising the scrap tire remediation contracts follows:

1. Establish a regular (every 1-2 years) prequalification period for companies or teams of companies to be approved as potential contractors for tire remediation projects. All of those companies meeting the full requirements would then be identified as pre-qualified contractors.
2. Offer each tire remediation project separately or in logical geographic groups to all pre-qualified contractors.
3. For each tire remediation, identify the project-specific priorities, i.e., time frame vs. cost vs. final destination of the tires. Also for each project, any unique restrictions such as operating times, routings, etc. should be clearly identified in each request for bid.
4. Develop a standardized form required for all prequalified contractors to use when submitting bids. Bids should be evaluated by an objective point system considering cost, timeliness, and legal final destination options. The Board should encourage end use of illegal tires when it makes sense, by offering additional points to bidders opting to utilize the tires versus landfilling them.
5. Open and record all bids in a public setting immediately following the bid deadline.
6. The remediation division and the contractor should complete regular reports and a final performance evaluation for presentation to the Board Members.

A recent tire facility permitting hearing brought out a potential problem with financial assurance regulations. Current regulations allow an operator to accumulate the necessary financial assurance trust fund over a period of five years. With a permit, a facility can accumulate the maximum number of allowed scrap tires immediately. This leads to a potential problem of having a facility in operation for several years without having adequate financial assurance to cover all the scrap tires on site. This problem can be resolved through a change in regulations.

Permitting

Stakeholders found little fault with the current permitting process other than who should be covered. The withdrawal of regulatory exclusions has created considerable concern that there are many inappropriately covered by the permitting process. The following recommendations are designed to:

- Make the permitting process more efficient.
- Make the permitting process better reflect health and safety dangers.

Recommendation #8

Change definitions in statute to make the permitting process less demanding on facilities that present minimal environmental risks. [Accomplished through a change of statute. No cost].

Current statutes state: “waste tire” means a tire that is not on the wheel of a vehicle and is not suitable for its original intended use due to wear, damage, defect or deviation from the manufacturer’s original specifications; this includes all used tires, altered waste tires, recappable casings and scrap tires.”

By including used tires and recappable tires in the definition of “waste tire,” thousands of tire dealers throughout the state now fall under the full regulatory purview of the Board. Permitting of these facilities has placed significant new requirements on individual dealers and has posed a significant challenge to the permitting and enforcement sections of the Board.

Further, the inclusion of processed tires in the definition technically extends the Board’s authority well down the line of beneficial use. For example, a playground that opts to use tire shreds as a ground cover to minimize the impact of a child’s fall could theoretically be required to obtain a waste tire facility permit.

The inclusion of used tires and recappable tires in the definition of a waste tire has caused considerable consternation with the tire dealers and they have consistently taken the position that used and recappable tires are not waste but are part of the economic mainstream. The tire dealers make the point that legitimate tire dealers do not contribute to the health and safety problems associated with waste tires (uncontrolled tire piles, roadside dumping, etc.) and they should not be forced into a burdensome regulatory program.

In a similar vein, tires-to-energy facilities maintain that the tire shreds they store on site are feedstock and not waste. They also believe that they should not be subject to regulations and controls designed to regulate uncontrolled tire piles and excessive concentrations of tires and tire parts. The exclusion currently provided to cement kilns that burn tires is recognition that there should be special consideration using tires for fuel.

The challenge is to create a regulatory system that protects the public from health and safety dangers associated with the storage of non-new tires. At the same time the system should not add an unnecessary regulatory burden on responsible commercial enterprises dealing with non-new tires.

It is recommended statute be changed to reflect the following definitions:

- “Altered Waste Tire” means a waste tire that is no longer whole, including but not limited to, waste tires that have been shredded, chopped, or split apart. Altered waste tires include baled tires, but do not include crumb rubber.
- “Baling” means mechanically compressing and securing whole waste tires into a bale.
- “Crumb Rubber” means rubber granules derived from waste tires that are less than or equal to 1/4 inch in diameter.
- “Passenger Tire Equivalents (PTE)” means the total weight of whole and altered tires in pounds, divided by 20.
- “Permitting of Waste Tire Facilities.” For the purposes of permitting of waste tire facilities the number of waste tires stored at the facility shall be computed as the aggregate sum of the PTE for all waste tire storage units at the facility.
- “Repairable Tire” means a worn, damaged, or defective tire that is retreadable, recappable, or regrooveable, or that can be otherwise repaired to return it to its originally intended purpose.
- “Scrap Tire” means a tire that is not repairable.
- “Tire-Derived Product” means material that (1) is derived from a process using whole tires as a feedstock, and (2) has been sold and removed from the processing facility. The process using the whole tires could be, but is not limited to shredding, crumbing, or chipping.
- “Tire Storage Unit” means piles, stacks, or other organizational units of stored tires where 10 percent or more PTEs are derived from waste tires.
- “Used Tire” means a tire that is no longer mounted on a vehicle but is still suitable for use as a vehicle tire. Used tires must meet the requirements of the California Vehicle Code, and those of Title 13, California Code of Regulations. Used tires are organized for inspection and resale by size in racks or stacks, but not in piles, in a manner as approved by the local fire marshal and vector control authorities or the State minimum standards.
- “Used Tire Dealer” means a business operating under the terms and conditions of a local use permit or business license, the primary purpose of which is to sell used tires for profit.
- “Waste Tire” means a tire that is no longer mounted on a vehicle and is no longer suitable for use as a vehicle tire due to wear, damage, defect, or deviation from the manufacturer’s original specifications. Waste tires include repairable tires, scrap tires, and altered waste tires; waste tires do not include tire-derived products crumb rubber, or properly stored, as defined, used tires.

Recommendation #9

Develop a tiered permitting system for waste tire facilities and operations that takes multiple factors into consideration and issues different levels of permits. [Accomplished through a change of regulations. Costs included in recommended additional administrative staff].

The Board has an established tiered permitting process that was developed to account for the variations in health and safety risks associated with facilities and operations in different functional areas. For example, there are currently tiered regulations in place for transfer stations and compost facilities.

In a tiered system, other factors that could be considered in determining the regulatory oversight necessary for a particular business could include:

- Measure the inventory turnover of a business. A business that is turning its inventory will probably not be storing excessive numbers of scrap tires. This issue was very important to industry.
- Storage methods can be considered. Inside storage, storage in roadworthy trailers or dedicated covered bins, size segregated used tire stacks, etc., do not pose the same dangers as a commingled pile of tires of random sizes and shapes.

It would be necessary, and desirable, to go through a complete rule-making process to develop the regulations to implement a tiered program.

Recommendation #10

Remove tire-derived products from the permitting process after the products have been sold and removed from the manufacturing facility. [Accomplished through a change of statute. No cost].

It has been stated that any tire product that was reduced to a size less than 10 mesh is definitely not a waste. Clearly, the cost of processing to get the tire to a significantly reduced size is sufficient to remove it from the waste category. It is also a concept that waste tires and processed tires should be considered to have economic value if they are purchased by an end user, or if they provide a beneficial end use by replacing a product of value (example: tires and shreds that replace coal in energy production). To implement this option to the fullest, the Board needs more discretion to determine exclusions.

Recommendation #11

Determine permitting requirements for a facility or operation by using a “passenger tire equivalent” (PTE) method. [Accomplished through a change of statute. No cost].

The accumulation and final disposition of waste tires has been the subject of much discussion. In the area of how to measure the impact of a tire storage area, there were two schools of thought. One group advocated the counting of individual tires as a determining factor for permitting. Another group advocated the use of PTEs where every 20–25 pounds of tire rubber count as one tire. The “count individual tire” group more

closely follows precedents found in other states, while the PTE group maintains that this approach better reflects economic and environmental impact reality.

It is recommended that PTEs be used to determine permitting requirements for waste tire storage areas. Potential cleanup costs and environmental hazards (fire, vector control, etc.) are factors of the mass of tire rubber involved, not the number of tires. For example, a fire at a site with 1,000 giant earthmover tires poses a much greater risk than a fire at a site with 1,000 automobile tires. Since regulatory control should reflect the danger to the public interest, the use of PTEs appears the better course. The formula used to determine PTEs at a storage site would be developed during the rulemaking process.

Market Development

Virtually everyone agrees that market development is the ultimate solution to the waste tire problem. If markets were strong enough there would be no tire piles or illegal dumping. Agreement soon wavers, however, when the discussion shifts to how to address individual elements of the market. Economic factors are the driving influences that determine the flow of scrap tires.

Section 1 of this report, “Infrastructure and Economics,” discussed how the different segments handle scrap tires. One of the critical elements in the system is the decision of the hauler as to the final destination of the tires. Since there are few paying end users to take the tires off the hauler’s hands, the hauler looks for the least expensive method of getting rid of the tires. This economic fact greatly complicates the Board’s efforts to implement the desire of the Legislature to utilize the scrap tires in a particular hierarchy.

To assist in the discussion of market development, it is necessary to review the priorities and hierarchy established in statute for waste management practices. While Public Resource Code Section 40051 does not specifically address waste tires, it does relate to the entire waste stream, including tires. This general guidance is the basis for discussions on hierarchy.

PRC 40051. In implementing this division, the board and local agencies shall do both of the following:

(a) Promote the following waste management practices in order of priority:

(1) Source reduction.

(2) Recycling and composting.

(3) Environmentally safe transformation and environmentally safe land disposal, at the discretion of the city or county.

(b) Maximize the use of all feasible source reduction, recycling, and composting options in order to reduce the amount of solid waste that must be disposed of by transformation and land disposal. For wastes that cannot feasibly be reduced at their source, recycled, or composted, the local agency may use environmentally safe transformation or environmentally safe land disposal, or both of those practices.

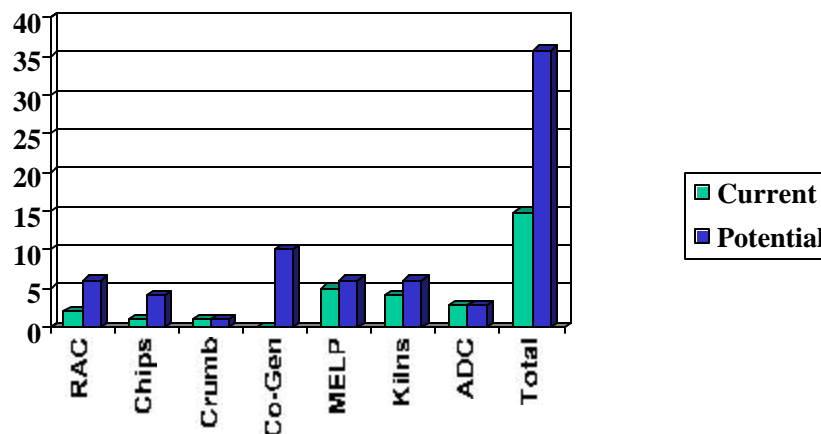
And specifically relating to tires:

PRC 42861.(d) . Used tires represent a valuable state resource which should be reclaimed and recycled whenever possible. An abundance of tire recycling alternatives exist which have been demonstrated to be environmentally safe. These alternatives need to be promoted in order to achieve the maximum use of used tires.

In applying the general AB 939 statutory guidance to the major waste tire markets, the following is a priority listing of market elements and current efforts noted:

- 1) Source reduction
 - a) Extend useful life of tires
 - i) Design life—industry moving toward longer lasting tires
 - ii) Reuse—extend useful life of tire by encouraging used tire dealers and exporters
 - iii) Recap—commercial tire recappers are already established
- 2) Recycling
 - a) Civil engineering uses such as:
 - i) RAC—RAC Technology Center and working group with Caltrans
 - ii) Chips for lightweight road fill—working with Caltrans
 - iii) Levee reinforcement—demonstration project in progress
 - iv) Leach fields—demonstration project in progress
 - v) Landfill gas collection systems—research completed
 - b) Additional beneficial uses include:
 - i) Crumb rubber production and molded rubber products—mats, mouse pads, etc.
 - ii) Specialty items—door mats, swings, tarp retaining systems, etc.
 - iii) Alternative daily cover—2.8 million tires in 1998
- 3) Transformation and land application
(relative priority based on degree of recovery of resources and relative environmental impact)
 - a) MELP—currently consuming approximately 5 million tires per year
 - b) Cogeneration—minimal current consumption; primarily engaged in permitting process and startup
 - c) Cement Kilns—permitted capacity of approximately 6 million tires; consuming large numbers of imported tires
 - d) Monofill—approximately 12 million tires in 1998
 - e) Landfills

Table 3-1: Current Market Status



In implementing any market development programs, it is anticipated that the Board would give due consideration to the hierarchy and priorities in statute.

During the early years of the market development program, 1991-1994, the Board funded grant programs to identify and develop technologies to develop markets primarily in the area of “high end” users. While several promising technologies were identified, with the exception of rubberized asphalt concrete and playground surfacing, there was general lack of success in having the commercial investors come forward to develop major new markets. The chief barriers to developing “high end” uses for tire derived products are purely economic. Low landfill disposal fees and the relatively high costs to produce the crumb rubber necessary for most of the end products are the factors driving tire diversion.

In recent years, 1995 to present, emphasis has shifted to projects that have the potential to consume large numbers of tires. Here the emphasis on levee reinforcement, landfill leachate and gas collection, and low-density highway fill projects have been given more attention. There was discussion that the cost per tire should be the driving factor in supporting market programs, but it has been pointed out that high initial costs can lead to expanded programs and reduction in disposal cost over time, so using the cost per tire as the sole criteria for assistance is short-sighted.

In the balance between funding market development and enforcement (including tire pile cleanup) the Board has attempted to maintain an even distribution.

Following are recommendations for specific programs:

Civil Engineering

In Maine, the use of tire shreds in civil engineering projects has provided a very large market for scrap tires. Such an end-use market has not yet been established in California. The recommended goal for the use of tire shreds in civil engineering highway projects is to increase usage, over a 3-year period, to 4 million tires per year.

Recommendation #12

The Board should provide instruction and grants to State and Local agencies to encourage the civil engineering use of waste tire products. A second technology center should be established to service Northern California. [Accomplished through budget process. Estimated cost of \$2,770,000 first year; \$2,600,000 per year thereafter].

This element should follow the lead of the Rubberized Asphalt Concrete (RAC) Technology Center administered by Los Angeles County and should include training and assistance for all civil engineering uses (light-weight fill, septic drain fields, levee reinforcement, RAC, etc.). The efforts currently being expended to expand the use of RAC and other civil engineering uses could be administered through the same staff element via contracts with specialists. The Board has expressed support for a second Technology Center to be established for support of local communities in Northern California.

Rubberized Asphalt Concrete (RAC)

This is a technology of special interest because it has the potential of diverting a large volume of tires to a very beneficial end use. There have been numerous suggestions that the use of RAC should be mandated upon Caltrans to guarantee increased usage. The Rubber Pavements Association, Caltrans, and at least one major crumb rubber producer all oppose such a mandate because they believe that rubberized asphalt is a good product and should be accepted on its own merits.

Recommendation #13

The Board should continue to support the work of the Rubber Pavement Team. [Accomplished through staff assignments. No cost].

There is currently a working group (Rubber Pavement Team) with representatives from Caltrans, Rubber Pavements Association, NCAPA, and the Board. This group is working to forge the necessary partnerships to resolve answer issues relating to the technical aspects of using RAC, specifically in the areas of application guidelines and the use of warranties.

Recommendation #14

Caltrans should be directed to develop guidelines for the use of RAC within one year. The guidelines should be developed in consultation and cooperation with the rubber and regular asphalt producers and based on thorough analysis of previous Caltrans projects using RAC. [Accomplished through statute. Estimated one time cost of \$20,000.]

RAC has been used in California since 1980, and specifications have been published, yet there are no established guidelines for its use. In order for RAC to be more widely accepted by the engineering community of Caltrans, there must be an analysis made of prior projects, lessons learned must be publicized, and definitive guidelines published. This requires an analysis of prior projects to determine the cause of any prior failures.

It is generally recognized that RAC is not suitable for all paving projects and until guidelines are developed, there will be a justifiable reluctance on the part of many Caltrans engineers to use the product. The recommended goal for the use of RAC by Caltrans is a minimum of 20 percent of asphalt projects in FY 2000/2001, a minimum of

30 percent in 2001/2002, and a minimum of 40 percent in years beyond. The goal for RAC use by local jurisdictions is to reach 4 million tons per year by the end of calendar 2002.

Molded Rubber

It is recognized that molded rubber products do not consume large numbers of waste tires at this time, however, the potential for developing a significant end-use market for a multitude of products does exist and should be nurtured.

As an example, the Board has made 43 grants to school districts and local governments for a total of \$720,000 for the purchase of playground mats made from scrap tires. The Americans With Disabilities Act (ADA) legislation requires playgrounds to provide wheelchair access and there are a variety of methods this can be done. Board grants have provided assistance to some jurisdictions to comply with ADA and publicize the possibility of using scrap tires in this manner.

Manufacturers using scrap tires to produce mats have indicated that general markets are growing and the 15-20 per cent of their production related to Board grants have been contributory to the market growth. The goal in this area is to retain the current level of usage and support research to develop additional uses.

Recommendation #15

The Board should continue to modestly fund loans and grants to specific projects and monitor developments of molded rubber products. [Accomplished through staff assignments, grants, and contracts. Estimated cost of \$1,500,000 per year.]

State and Local Procurement

For any product to be recycled, someone must buy the end product containing the recycled material. With tires this is particularly challenging and the Board should work with government purchasing agents to make them aware of opportunities. For waste tires to be recycled, they usually have to be recapped or processed in some manner—shredded or crumbed.

The State's use of recapped tires has been minimal due to a shortage of tires that can meet the necessary quality criteria. For shredded tires, applications are primarily in the area of civil engineering. For crumb rubber there are many options for use. The State gives a 5 percent preference to State agencies for purchase of products made from recycled tires. The products include, but are not limited to, retreaded tires, asphalt rubber, floor tile, playground mats, carpet underlay, oil, natural gas, carbon black, mats, drainage pipe, and garbage cans. See also the discussion for RAC.

Advertising of products made from recycled rubber has not been a high priority and there is not a particularly good record of State and local procurement officials giving preference to materials made from recycled tire rubber. Suppliers have compounded this problem by failing to certify the recycled content in their products.

Increasing the use of materials manufactured from crumb rubber would result in minor diversion when contrasted to the massive potential diversion of rubberized asphalt, fuel use, and civil engineering applications. Additional efforts could be made in this area to

increase the purchases of State and local governments and increase public awareness of the recyclability of tires.

Recommendation #16

The Board should work with the Scrap Tire Management Council to develop a California version of a Scrap Tire Products Catalog. [Accomplished through staff action. Add to current listing of available recycled products].

The Scrap Tire Management Council currently puts out a nationwide catalog of products made from scrap tires. California could expand its current listing and distribute such a catalog to government and private industry procurement officers and/or put the information on the Board web page. Special emphasis could be placed on working with the Federal procurement system as well, since it also has guidance to use recycled materials. It would also be possible to have a special section added to the Board's current listing of recycled materials and the California Materials Exchange (CalMAX).

Recommendation #17

The Department of General Services should be required to promote the purchase of products made from recycled tires through the State Contract Register and inclusion of contracts providing such products on the new DGS computer system (California Statewide Procurement Network). [Accomplished through interagency agreement with DGS. No cost.]

This is the new method of communicating with contractors. The system can provide contractors opportunities to buy materials containing recycled tire rubber and needs to be accentuated.

Recommendation #18

Retreaded passenger car and truck tires should be purchased through a statewide contract. [Accomplished through an interagency agreement with DGS. No cost].

A statewide contract could focus on recapped tires and achieve savings through economy of scale.

Source Reduction

From statutory guidance, source reduction is the highest priority waste management practice. One of the most direct ways of accomplishing source reduction is to educate and inform the population on the impacts of certain actions and suggest alternatives that are more environmentally acceptable. In this vein, education of the general population on the importance of proper maintenance and the proper disposal of tires is necessary to increase useful tire life and decrease the illegal dumping of discarded tires.

Recommendation #19

A broad based information/education program, similar to that of the waste oil program, could be established to stress the desirability of purchasing long wearing tires, proper disposal of waste tires, and proper maintenance of tires currently in use (rotation, proper inflation, etc.). Further, a partnership could be formed with the tire manufacturers to explore the development of techniques to use higher recycled content in the production of

new tires. [Accomplished through staff assignment. Estimated cost \$6,000,000 per year for information/education program and \$500,000 for two years to do cooperative research with the tire industry].

This program can be accomplished in partnership with the tire dealers and manufacturers and build upon work done with local government grant projects. A multimedia program using radio and TV would be very beneficial in passing the messages on the desirability of purchasing long wearing tires and encouraging proper tire care and maintenance. A professional public relations firm would be hired to develop the presentations of the Board messages and time would be purchased on radio and TV channels to transmit the messages.

The education program could also support local amnesty days funded by the tire program. In conjunction with the notification of these days, informational materials can be distributed along with fliers notifying the public of the amnesty day dates. It is also important to introduce information on environmental impacts of tires (fires, rodents, mosquitoes, etc.) into school programs along with other information provided on environmental issues.

Reuse of tire rubber in the production of new tires could provide a significant new market scrap tires and reduce the number going into the waste stream. Accordingly, it would be beneficial to explore forming a partnership with the tire industry to develop methods and techniques to use more recycled content in the production of new tires.

Transformation

Transformation of tires presents a range of complex issues. The use of tires as an energy source is one of the few economical uses available at this time and accounts for well over one-half of the current diversion. In effect, the options currently facing us are to either dispose of most tires through controlled burning for energy recovery or burial in landfills.

Recommendation #20

The Board should continue to provide technical information on tire uses as an energy source and, if requested, to partner with interested industry segments to assist in examining environmental aspects (air emissions and ash characteristics) at specific sites. [Accomplished through laboratory services contract. Estimated cost up to \$300,000 per year].

Since the 1970s, tires and tire derived fuel have been burned in a variety of energy recovery units. Advocates point to extensive regional and national testing that bears out the position that tires, in a properly run facility, generally burn cleaner than the coal fuel they usually displace. There are still environmental groups that express concern for the burning of tires and the current process of permitting such facilities is very rigorous.

Given the extreme public health danger associated with the uncontrolled burning of illegal tire piles, such as the recent fire near Tracy, it has become a high priority that diversion of waste tires be increased immediately and illegal tire piles remediated. The fact that approximately one-half of California's diverted waste tires currently go to energy conversion facilities [cement kilns, Modesto Energy Limited Partnership (MELP),

cogeneration plants) makes it important that consumption be accomplished with full environmental consideration.

The goal for this area would be to achieve the utilization of the permitted capacity for the energy conversion facilities (cogeneration, MELP, and cement kilns) within five years.

End Use Incentives

It is acknowledged that tires from other states have been in the past (Oregon) or are being currently (Utah) imported into California because of financial incentives provided by these states. It is also probable that some California tires are being displaced in the market because of these imported tires. It has been suggested that California should provide financial incentives comparable to those provided by other states to “level the playing field” with imported tires.

Recommendation #21

A universal end-use incentive program should not be established and the current 30 percent incentive to find markets for tires from cleanups should be discontinued. The Board should have the option of providing specific incentives to individual projects (such as paying a premium price for tire shreds to insure a constant supply for the levee pilot project) on a case by case basis. [Accomplished through Board action. Estimated cost \$3,000,000 per year.]

The preponderance of the California waste tire industry opposes the creation of a broad based end-use incentive program. There are several valid reasons of this opposition. To insure equity and avoid favoring one segment of the market over another, all segments of the market would have to be supported, making the program very expensive. Further, such incentives foster the creation of marginal businesses that compete with and threaten the viability of existing, established businesses. Accordingly, end-use incentive programs created in other states have not provided sustainable markets for used tires and, to the contrary, have actually damaged the existing permanent infrastructure.

Scrap Tire Supply for End Use Markets

Currently 15 million scrap tires are going into landfills (approximately 12 million into monofills, 2.8 million into ADC). To move the flow of scrap tires from landfills to more productive uses in recycling or energy conversion, the current market must be effected in some manner to “free up” tires for alternative uses. Today it is generally most cost-effective for a hauler to take a whole or shredded scrap tire to a landfill or monofill for disposal.

The Infrastructure and Economics section of this report highlights the interaction of the different elements of the system. Currently, the hauler is paid when he takes possession of the tires from the generator. Since the current market has very few end users willing to pay for the tires, the hauler looks for the least expensive tipping fee when he is ready to get rid of the tires. Since the whole system flow is driven by the hauler looking for the lowest tipping fee, there is considerable competition among those taking the tires.

As long as the landfill is available as the least expensive disposal option for the haulers, there is a severe restriction on the ability to develop alternative markets for productive end uses, as there will be a shortage of a dependable supply of scrap tires to feed the

expanding market. In an ideal market, which we may eventually approach, users would have to pay for the scrap tires they use and low disposal costs at landfills would no longer be a significant factor in the market.

To make the issue even more complicated, there are geographic factors that must be considered. For example, in Southern California there is a very active program to use rubberized asphalt in city and county highway work, and there are several crumb rubber producers operating. To arbitrarily encourage the creation of another crumb producer in this area would potentially damage the existing infrastructure. On the other hand, in Northern California there is only one crumb producer and the local road maintenance organizations are starting to gear up to use more rubberized asphalt in road work. In this case, it could make sense to encourage the creation of another producer in order to reduce the costs for the local market and encourage even greater use of crumb rubber in the region.

There are many possible approaches to the issue of tire supply for alternative markets. Options include, but are not limited to the following:

- Do nothing and allow the free market to decide when, and if, tires should be diverted from landfills.
- Implement a time phased regional ban or restriction on landfilling, as the Board determines alternative regional markets are available.
- Require all scrap tires going into landfills to be used as alternative daily cover and to meet regulatory specifications.
- Set up an escalating surcharge at monofills and landfills to “level the playing field” between landfilling and alternative uses.
- Cap the number of tires allowed in landfills (for example, 1 percent of total waste permitted at an individual landfill).
- Provide a tax incentive to haulers, keyed to where they take tires. Tires going to uses higher on the hierarchy would receive a greater incentive than those going to lower levels on the hierarchy.
- Provide a direct subsidy to haulers, based on where they take tires.
- Provide a direct subsidy to end users, based on a hierarchy of use.

This issue of scrap tire availability for alternative markets is very complex and affects many segments of the infrastructure. While there are many possible methods to influence the flow of scrap tires, the Board can perhaps best exert influence on the market through support of end use businesses’ capital investments to increase the use of scrap tires.

The Board can exert influence through commercialization loans and grants; considering a combination of use hierarchy, geographic market deficiencies, and requested loan/grant need for capital investment assistance. By helping a business reduce capital costs, debt service overhead is reduced and a business would have more funds available to allow for reduction of tipping fees for scrap tires. While this is an indirect method of influencing the flow of tires, it may be the least disruptive on the overall market.

4. Benchmark Study

Five-State Benchmark Study Methodology

VITETTA and Board staff worked together to determine the comparative states. Criteria for state selection included the following:

- **Number of tires generated annually.** In order to provide a complete comparison, it was decided that two of the four states should have relatively large waste tire flows (Florida is #2 in the nation, behind California and Illinois is #5). The other two states should have mid- to smaller-sized flows (Wisconsin and Arizona).
- **Fee is charged and goes towards tire program.** Some states—like Pennsylvania—have a tire fee but then spend it on issues unrelated to tires. This criterion requires that all the comparative states have a tire fee that is dedicated to tire activities.
- **Method of fee collection varies.** While California collects its tire fee from the tire retailer, at least one of the states (Wisconsin) should collect the fee in a different manner.
- **State-sponsored rebate for end users.** In order to get a full picture of the ramifications of rebates, at least one of the comparative states should have a rebate program in place for users of waste tires. Wisconsin was specifically chosen because its rebate program was designed by the state's legislature to intervene temporarily into the tire market—the rebate program sunsetted in 1997.
- **Number of tires recovered/recycled.** All of the states included in the study should have recycling rates as high or higher than California.
- **Method of scrap tire utilization.** There should be a variety of end uses for scrap tires in the comparative states. In this case, Florida proved to have the most diverse end uses, with Arizona's end use primarily focused on crumb and the Midwestern states on transformation.
- **Centralization vs. decentralization.** The goal was to include in the study states that fell across the spectrum of State versus local government responsibility. In this case, Arizona was the most decentralized, with Florida being the second most decentralized. Both Wisconsin and Illinois have very centralized programs.

Based on discussions with experts at the federal level and in other states, as well as a review of literature (including a 1996 Board report and a recent national survey conducted by the IWMB Market Development Division), VITETTA and the Board determined the comparative states.

Neither Texas nor New York, #3 and #4 in annual scrap tire production in the nation, were chosen for the study. Texas was not chosen because, according to discussion with experts, Texas' rebate program resulted in large stockpiles of crumb rubber for which there are no immediate end uses. New York has no tire fee and therefore did not meet criteria #2.

A survey was drafted by VITETTA with input from the Board's Market Development Division and Permitting and Enforcement Division. This survey, with a cover letter and a copy of the IWMB's October 1998 tire report, was sent to the comparative states. A copy of the survey is included in the Appendix. During January and February 1999, VITETTA conducted follow up telephone interviews with state officials and additional research, as necessary.

Benchmark Study Findings

Finding #1. All states reviewed have lower annual "new" scrap tire flow and smaller stockpiles than California.

All of the states examined have significantly lower scrap tire flow and stockpile figures than California. While that can likely be expected because of California's large population, the magnitude of California's tire challenge—in both annual flow and stockpiled tires—is significantly larger than any of the other states reviewed.

Additionally, most states reviewed have significantly reduced their stockpiles since the inception of the tire program in that state.

Table 4-1: New scrap tire flow and stockpiling among states reviewed

	California	Wisconsin	Florida	Illinois	Arizona
"New" scrap tire annual flow	30 million	5 million	19.9 million	12 million	4 million
Stockpiled tires prior to tire program inception	45 million (in 1990)	15.2 million (in 1986)	18 million (in 1989)	Unknown	10 million (in 1991)
Stockpiled tires (currently estimated)	15 million	Less than 350,000	3 million	Less than 5 million	Approximately 2 million
Percentage stockpiles reduced	67%	97%	83%	N/A	80%

Source: VITETTA survey

Finding #2. All comparative states reviewed have higher tire fees than California.

All four of the other comparative states reviewed had higher tire fees than California. Additionally, three of the four comparative states levy their tire fee on new car tires, in contrast to California and Illinois where new car tires are exempt from the tire fee.

Furthermore, the fee in both Florida and Illinois generated more revenue for the tire program than was generated by California's fee. Wisconsin's fee sunsetted in 1997 but generated \$2.5 million in 1996-97. Arizona's fee is a percentage of the tire purchase price, rather than a flat fee, up to \$2 per tire and generates approximately \$5 million annually for that state.

Table 4-2: Tire fee and revenues generated

	California	Wisconsin	Florida	Illinois	Arizona
Fee	.25	\$2/tire, \$10/ total (expired in 1997)	\$1.00/tire	\$1.00/tire	2% of tire price, up to \$2/tire
Fee levied on new car tires	No	Yes, levied at time new car is registered	Yes	No	Yes
Revenues generated by the fee, 1997-98	Approx. \$5 million	\$2.5 million (1996-97)	\$12 million	\$8 million	\$5 million

Source: VITETTA survey

Finding #3. The method of tire fee collection appears to affect the cost of collection. In California, Florida, Illinois, and Arizona, the tire fee is collected at the time a new tire is purchased. Wisconsin is the only state that collects the fee at the point of vehicle registration (when a new vehicle is registered) and has the lowest collection cost of the five states.

California's cost of collection is consistent with the two of the three comparative states that collect the fee via the tire retailer. Arizona officials report that the state Department of Revenue does not track the cost to collect the fee from the state's 1,300 tire retailers and that any costs for collection are covered by the department's budget. Wisconsin's fee collection costs were significantly less (less than \$50,000 annually) than any of the other states reviewed.

Table 4-3: Point of fee collection and cost of collection

	California	Wisconsin	Florida	Illinois	Arizona
Point of collection	Tire retailer	New vehicle registration	Tire retailer	Tire retailer	Tire retailer
Cost of collection (annual)	\$484,000	Less than \$50,000	\$520,000	N/A	N/A

Source: VITETTA survey

Finding #4. California's per tire cleanup costs appear to be consistent with other states reviewed.

For all of the states reviewed (with the exception of Arizona), average cost per tire for cleanup varied between \$1 and \$2. California, with a median cleanup cost of \$1.27, falls nearly in the middle of the spectrum. Arizona Department of Environmental Quality doesn't track cleanup costs since cleanups are the responsibility of the counties but officials there anticipate that cleanup costs would vary by county and based on the eventual end use of the tire.

Table 4-4: Average cleanup costs across states reviewed, 1997-98

	California	Wisconsin	Florida	Illinois	Arizona
Average per tire cleanup costs	\$1.27 (median cost)	Approx. \$1 per tire	\$.85 to \$2 per tire	Approx. \$1.10 per tire	Not available— all cleanups done by counties

Source: VITETTA survey

Finding #5. The degree of local government responsibility for the tire program varies. In Wisconsin and Illinois, local governments have little or no role in the state's scrap tire management program. In Arizona, local governments have the primary responsibility for the tire program. California and Florida generally fall in the middle of the spectrum of local agency responsibility.

In California, some local governments have taken on the responsibility (through the Board grant programs) of limited-term inspection, compliance and surveillance activities. Florida administers local government grants that can be directed toward:

- Tire processing
- Site cleanup and abatement

- Mosquito control
- Technology and market development
- Establishing collection centers
- Purchasing products made with waste tires

In Arizona, counties have complete responsibility for waste tire cleanup and collection and ensuring disposal or end use of the tires cleaned up, but the state is responsible for permitting and enforcement activities.

By delegating additional responsibilities to local agencies, the opportunity for program variation (i.e., enforcement, disposal, recycling) increases. For example, in Arizona, some counties choose to export all tires collected while others landfill their tires. Because each county is required to handle the tires collected at its collection facility, counties often contract with one or more hauler/processor, resulting in tires from one county being put to a different end use than tires in another county.

Finding #6. Use of transformation as an end use varied.

Every state reviewed had higher recycling rates than California when transformation was included in the recycling rate calculation. In Wisconsin and Illinois, almost all of the scrap tires are used as tire-derived fuel (TDF). Florida transforms nearly 9 million of its 19 million annual tire flow, or nearly 50 percent.

Arizona currently has no transformation facilities using tire-derived fuel. Of the 4 million scrap tires produced annually in Arizona, 3 million are processed into crumb that is used for RAC. The other million tires are either exported to California or landfilled.

Finding #7. States that have local government tire programs generally fund them through the tire fee.

In Arizona, counties get nearly all of the \$5 million collected annually through the tire fee. In Florida, block grants are made to counties based on the county's population. In Arizona, local agencies can raise revenues to pay for tire programs but, according to Arizona state officials, generally choose not to and, instead, pay for any extra costs out of the county general fund.

Table 4-5: Local government programs and funding, 1997-98

	California	Wisconsin	Florida	Illinois	Arizona
Amount allocated to local governments	Approximately \$1 million	None	\$8.3 million	None	Nearly \$5 million
Percentage of the total tire program budget	25% (aggregate)	0	66%	0	98%
Programs executed by local governments	- Cleanup - Market development - Inspection, compliance and surveillance	None	- Cleanup - Market development - Mosquito control - Establishing collection centers - Purchasing waste tire products	None	- Cleanup - Establishment of collection centers - Coordination of collection, hauling and processing
Degree of local discretion with funds	Some discretion, based on grants applied for	Not applicable	Total local government discretion with block grant funds	Not applicable	Responsibilities articulated in state statute

Source: VITETTA survey

Finding #8. Responsibility for market development activities varies.

While both California and Florida have market development programs at both the state and local levels (local market development is funded through state tire fund monies in both states), most of the market development activity in Wisconsin and Illinois occurred at the state level. In both these states, state officials sought out new uses and aggressively court them to locate in the state. No market development activities occurred at the local level.

In the beginning of Arizona's program, the state contracted with a single tire processor to encourage that processor to locate in the state. The state of Arizona currently oversees no market development programs. According to officials there, it is unlikely that local governments are undertaking any market development activities with tire fee revenue.

Finding #9. All states ban landfilling of whole scrap tires, while only one state bans tires completely from landfills.

Since 1995, Wisconsin has prohibited the landfilling of scrap tires. Arizona, Florida and California ban the landfilling of *whole* scrap tires and require that scrap tires be shredded into smaller pieces prior to being landfilled. Illinois allows processed tires to be landfilled under certain circumstances.

Appendix A. Budget

Table A-1: Sample Optimum Waste Tire Program Budget
(in thousands of dollars)

Function/Fiscal Year	2000/01	2001/02	2002/03
General			
Program Support	\$3,258	\$3,258	\$3,258
Fee Collection	400	400	400
Laboratory Services	300	300	300
Research and Development	2,000	2,000	1,500
Information and Education	6,000	6,000	6,000
Subtotal	11,958	11,958	11,458
Enforcement and Remediation			
California Highway Patrol	500	500	500
Fire Training	350		200
Local Cleanup	6,500	6,500	6,825
Local Enforcement	1,000	1,000	1,000
Major Pile Cleanup	8,575	8,575	0
Subtotal	16,925	16,575	8,525
Market Development			
Civil Engineering	2,770	2,600	2,600
Commercialization	4,000	4,000	4,000
Market Incentives	3,000	3,000	3,000
Procurement	1,500	1,500	1,500
Subtotal	11,270	11,100	11,100
Total	\$40,053	\$ 39,633	\$31,083

Budget Comments

Program Support. Includes five new positions for enforcement and remediation added through 1998-1999 BCP and 10 new positions (two for enforcement, two for market development, four for waste tire manifest management, and two for public affairs to administer the public information/education program).

Fee Collection. Estimate of cost of fee collection from 400 wholesalers.

Laboratory Services. This is an on-demand contract to be used for miscellaneous projects (leachate measurements, specific environmental concerns, etc.)

Research and Development. \$500,000 for 00/01 to measure environmental impacts of major tire fires. \$500,000 in 01/02 to measure ability to recycle rubberized asphalt. \$1,000,000 per year for development of new technologies to break down tires (debeader, pyrolysis, devulcanization, etc.). \$500,000 in 00/01 and 2001/02 to support a partnership with the tire manufacturers to develop techniques to increase the use of recycled rubber in new tire production.

Information/Education. Includes \$350,000 for public school educational materials on dangers of illegal disposal and proper tire maintenance. \$150,000 for annual tire conference. \$500,000 for development of multimedia messages on tire maintenance and illegal disposal. \$1,500,000 radio air time to broadcast message. \$3,000,000 for TV time to air message. \$500,000 for amnesty days.

California Highway Patrol. Enforcement of hauler regulations through use of off-duty patrol officers, special road blocks, search for illegal tire piles, and sting operations.

Fire Training. \$350,000 in 00/01 to update training materials. \$200,000 in 02/03 to do continuation training for the fire community.

Local Cleanup. Cost for reimbursing local governments for cleaning up local tire piles of 500-5000 tires. For 2000/01 and 2001/02 assumes 2,000,000 tires per year at a disposal cost of \$3.25 per tire. $2,000,000 \times 3.25 = \$6,500,000$.

For 2002/03 and beyond, the assumption is that 12 percent of tires are illegally disposed of and half of these require local government remediation: $35,000,000 \times .12 \times .50 = 2,100,000$. Remediation costs are $2,100,000 \times \$3.25 = \$6,825,000$.

Local Enforcement. Cost for LEAs to inspect tire generators to check compliance with minimum standards, number of scrap tires stored, and tire manifests. 10,000 generators to be visited each year at \$100 per visit.

Major Pile Cleanup. Cost to clean up the 35 illegal tire piles larger than 5,000 tires as well as funding for piles currently in the program.

Tires on current remediation list	7,900,000	
Tires in 35 stockpiles	4,100,000	
Additional funds needed to remediate sites on current list		\$2,900,000
Funds needed to remediate 35 stockpiles ($\$2.50 \times 4,100,000$)		\$10,250,000
Funds to remediate Oxford		\$4,000,000
Total		\$17,150,000

To clean up piles in 2 years: $\$17,150,000 \div 2 = \$8,575,000$ per year

Civil Engineering. \$2,500,000 per year for Northern and Southern California civil engineering centers (\$1,250,000 each). \$250,000 for development of highway uses for tire shreds, \$20,000 for Caltrans RAC guidelines in 00/01; \$100,000 for levee project and \$100,000 for septic field project in 01/02, 02/03.

Commercialization. To be used for grants or loans, as determined by the Board, to aid transition of technologies and/or products from research into full production. Can also be used to aid expansion of existing commercial enterprise. Example: development of a tire debader to remove bead from auto tires so they can be processed for cogeneration facilities.

Market Incentives. To be used to “level the playing field” in cases where short term market conditions threaten the viability of key waste tire processors or end users. Example: provide temporary assistance for a producer of a product that directly competes with a product being subsidized by another state or nation.

Procurement. Direct assistance in the purchase of products. Example: Joining with state agencies to defray the costs of purchasing wheelchair ramps and mats made from ground up tires.

Appendix B: Manufacturer's Programs

The tire manufacturers have expressed their interest in the scrap tire issue by establishing the "Scrap Tire Management Council." This council is an outgrowth of the Rubber Manufacturers Association and speaks for the industry in this area. Following is background information directly quoted from a handout from the council.

Scrap Tire Management Council Background Information

"The Scrap Tire Management Council was organized in 1990 by the North American tire manufacturing industry to be its public voice on matters dealing with scrap tires. The Council was organized as a part of the Rubber Manufacturers Association, the principal U. S. trade association representing manufacturers of tires and other rubber products. In establishing the Council, the tire industry sought to create an organization that would have the expertise to assist in building strong end user markets for scrap tires, would assist in developing responsible scrap tire regulation, and would promote remediation of scrap tire stock piles.

"The tire industry had been active in the years preceding 1990 when many states were enacting scrap tire laws, or were actively considering such laws. The tire industry came to appreciate, however, that there was no organization that could assist the states implement these laws, or to help the growing scrap tire industry determine the best ways to market scrap tires as a raw material for other end uses. This concern led to the establishment of the Scrap Tire Management Council to be this organization.

"The Council has always had a strategic goal, originally set at developing sound end use markets for 50 percent of annually generated scrap tires within five years. As the markets for scrap tire have expanded since 1990, this strategic goal has also been modified. The current statements of the Council's strategic goals are:

(1) The sound management of 100 percent of all new scrap tires generated annually; (2) The growth of sound end use markets for as many scrap tires as possible; and (3) Remediation of existing stockpiles in as short a period of time as is practical.

"Operating with limited staff, the Council has focused its efforts on those market segments that appear to have the best opportunity to utilize large volumes of tires. These end use markets must also be environmentally sound and economically cost effective. The key markets that have been identified are the use of tire derived fuel in appropriate kilns and boilers, the use of scrap tire material in civil engineering applications, and the use of scrap tire derived material in further manufacture, principally as ground rubber. The Council also recognizes that not all tires will have markets, either now or in the future, for a variety of factors. In these cases, the Council promotes sound management of scrap tires to eliminate the adverse consequences of improper disposal.

"The Council's major activities are in the area of market development. It also works on education and communication, information development, legislative liaison, industry liaison and monitoring new technology.

“Over the years, the Council has undertaken many projects and promoted several ideas that are designed to help expand all sound scrap tire markets. Just a few of these projects are listed on a separate page.

“A key feature of the Scrap Tire Management Council's activities from its inception has been to work with State regulatory agencies both to develop sound and effective scrap tire regulations, and to promote effective markets. States both large and small have sought out the Council's assistance and it has tried to be as responsive as possible.

“As always, the Scrap Tire Management Council is directed in its activities by the constant guidance and leadership of its member companies. The tire manufacturing companies are the true heart of the Council, and oversee all aspects of its programs. Council programs and initiatives reflect the consensus judgement of the tire industry.

“The tire industry through the Council will continue to assist all segments of the scrap tire industry until the need for that effort has subsided.”

Scrap Tire Management Council Activities in California

The following were submitted as specific efforts of the Council in California.

“1. California Integrated Waste Management Board staff members were invited to, and participated in the first Scrap Tire Management Council national conference held in Arlington, VA in late 1991. This was an invitation only conference for state scrap tire program administrators. Representatives from 38 states participated.

“2. IWMB staff members also participated in the second STMC Conference in Dallas in 1992. Again, participation was on an invitation only basis.

“3. Scrap Tire Management Council representatives have been invited to, and have made, presentations at all three of the statewide scrap tire conferences that the IWMB has sponsored.

“4. STMC was invited to, and made, presentations at both of the Crumb Rubber Workshops sponsored by the IWMB in 1997.

“5. STMC organized the scrap tire recycling program segment at the California Resource Recovery Association's 1997 annual meeting in Monterey, CA.

“6. STMC staff provided technical assistance to the California Fire Marshall's office during the development of the scrap tire fire fighting training program, "Rings of Fire."

“7. STMC provided access to all its files of air emissions test results to Dames & Moore, the contractor who conducted the latest study of Tire Derived Fuel air emissions for the IWMB. STMC files provided the majority of the technical data used for that study.

“8. STMC has provided on-site seminars for several California cement kilns interested in using scrap tires as supplemental fuel, including California Portland Cement, Mojave; Mitsubishi Cement, Lucerne; Riverside Cement, Riverside. In addition, air emissions data

was provided to Southwestern Portland, Victorville, and to the Mojave AQMD. STMC also participated in a public hearing held by the Mojave AQMD.

“9. STMC has regularly been invited to provide comments on proposed legislation and regulations dealing with scrap tires. STMC staff has regularly participated in meetings and hearings of the IWMB and various committees dealing with scrap tire issues.

“10. The tire industry, through the STMC, has participated extensively in the work of the current Task Force, and has provided extensive industry comments.”

Appendix C: Specific Program Evaluations

Permitting and Enforcement

Major and Minor Waste Tire Facility Permits (since 1991-92)

Program Summary

One goal of the tire program is to stabilize and monitor the storage of tires. The purpose of the Board permitting program is to identify and classify waste tire facilities (WTF).

State law requires any person storing more than 500 waste tires to comply with state regulations governing tire storage and obtain a WTF permit from the Board. All facilities must meet Board-specified standards for fire safety and vector control. There are two types of permits, based on the number of tires stored:

- Minor waste tire facilities—those with between 500 and 4,999 tires.
- Major waste tire facilities—those with 5,000 or more tires. In addition to a permit, a major waste tire facility must establish financial assurance mechanisms for closure, liability insurance for environmental pollution and a closure plan.

Waste tire facilities can have one of the following three classifications:

- Permitted (has obtained a waste tire facility permit from the Board).
- Excluded.
- Unpermitted (illegal facility that is not currently permitted by the Board).

Today Board regulations and State statutes provide six types of exclusions from the permitting requirements:

- Sealed, movable containers (commonly a truck or trailer).
- Tire dealers and auto dismantlers (with less than 1,500 stored tires).
- Less than 5,000 tires stored (but unable to hold water) for agricultural purposes.
- Permitted solid waste disposal facilities.
- Cement kilns.
- Tire retreaders with less than 3,000 stored tires.

Any tire pile containing less than 500 tires is not considered to be a waste tire facility and does not need to obtain a permit. In June 1998, the Board changed the regulations governing permit exemptions because, according to a Board memo:

“Many of the facilities operating with these [recycling business, indoor storage, and general exclusion] types of exclusions are not meeting the conditions for their regulatory exclusions.”

As estimated by Board staff for 1998-99, there are 280 identified major and minor waste tire facilities: 80 major waste tire facilities and 200 minor facilities. Of the 80 major tire facilities, seven are permitted (8.8 percent) and eight (10 percent) are excluded. The remaining facilities (65 facilities, or 81 percent) are applying for permits or subject to enforcement action by the Board.

Of the 200 minor facilities, 25 (12.5 percent) are permitted and 25 (12.5 percent) are excluded; the rest (150 facilities, or 75 percent) are applying for permits or subject to enforcement action by the Board.

Despite the small percentage of permitted facilities reported by the Board, generally the number of exclusions has decreased since 1994-95, while the number of permitted waste tire facilities has increased (or held constant). As of January 1999, only 33 major and minor waste tire facilities had exclusions.

State-Funded Cleanup Activities (since 1995-96)

Program Summary

On August 31, 1994, the Board implemented the State-funded tire pile cleanup program, officially known as the Waste Tire Stabilization and Abatement Program, with the goal of eliminating tire piles that pose a threat to public safety or the environment. After the responsible party fails to comply with a Board order to clean up the tire pile, State law allows the Board to spend Tire Fund monies to abate tire piles. The Board contracts for the cleanup of its sites.

Findings

Since 1995, the Board has removed over 9.8 million tires from 28 sites at an unweighted average removal cost of \$.54 per tire, for a total cost of nearly \$5.5 million.

The total number of tires remediated through this effort represents 21 percent of the estimated 45 million tires stockpiled throughout the state when the State created the tire program in 1990. The cost per tire removal varies greatly between sites; generally, the more tires removed from a single site, the lower the cleanup cost per tire, as detailed in the table below.

Table C-1: Average cost per tire for abatement, based on project size

Number of tires remediated	Average cost per tire
2 million and up	\$.38
1 million to 1,999,999	\$.56
100,000 to 250,000	\$1.06
25,000 to 99,999	\$1.25
1,500 to 24,999	\$2.29

To date, the most expensive site to abate in terms of cost per tire was the South Valley View #1 and #2 Waste Tire Facility in San Bernardino County, in 1998, at \$5.77 per tire. The least expensive cleanup was the 2 million tires removed in 1995 from the Choperena Waste Tire Facility at a cost of \$.35 a tire.

The largest site remediated is the current, two-stage cleanup of the Oxford Waste Tire Facility. Since 1998, the State has sponsored cleanup at Oxford WTF at a cost per tire of \$.40 per tire (2.5 million tires in 1997) and \$.49 per tire (1.7 million tires, 1998 to date) for a total of 4.2 million tires removed. The smallest site cleanup, Wilson Waste Tire Site in 1995, was the second most expensive at a cost of \$2.81 per tire for the 1,600 tires removed.

The majority (66 percent) of the sites remediated in the last three years each cost less than \$100,000. It is unknown what role the geographic relationship between sites and the eventual end use of the tires helped to reduce the cost of abatement. While the number of sites remediated each year has remained almost constant, the cost of cleanup has varied significantly depending on the number of large projects undertaken that year.

Table C-2: Annual cost per tire for remediation, 1995-98

Year	Number of Sites	Remediation Cost	Total # Tires Removed	Avg. Cost per Tire per Year
1995	6	\$870,832	2,154,400	\$.40
1996	6	\$389,487	411,436	\$.95
1997	9	\$1,367,760	2,832,916	\$.48
1998	7	\$2,726,196	4,488,325	\$.61
Total	28	\$5,354,275	9,887,077	\$.52

Source: IWMB

The figures for total tires removed represent an anticipated outcome rather than an actual outcome. In its October 1998 *Overview of California's Waste Tire Program*, the Board reported:

“...the Board has allocated \$4.9 million for its waste tire stabilization and abatement program. Of this amount, over \$2.6 million has been spent on the cleanup of nearly 5 million tires at 26 sites around the state. The remaining \$2.3 million is encumbered and will be used to support future cleanup efforts.”

Of the 9.8 million removed since 1995, 84 percent went to a productive end use and 16 percent to landfills. With the exception of 1996, most, if not all, abated tires have been sent to productive end uses.

In Table C-3, tires removed from the State-sponsored cleanups either went to “productive end use” or to “disposal.” Productive end use means the tires were combusted for fuel or energy supplement, recycled or otherwise reused; disposal means the tires were landfilled.

Table C-3: End use for tires removed as a result of State cleanup, 1995-98

Year	Productive end use (%)	Disposal (%)	Total # of tires removed
1995	93%	7%	2,154,400
1996	0%	100%	411,436
1997	99%	1%	2,832,916
1998	78%	22%	4,488,275
Total (1995-98)	84%	16%	9,887,027

Source: IWMB

While the goal of the Board program is to stabilize all unsafe or environmentally hazardous tire piles until abatement can be completed, two large tire pile fires and several small blazes have occurred since the beginning of the program.

In May of 1996, approximately 1.5 million tires burned at the Choperena waste tire site and 7 million tires have been consumed at the fire currently burning at the Royster facility. These two fires alone consumed an estimated 8.5 million tires, almost as many as were remediated by the Board since the inception of the cleanup program. Together, State-funded cleanup and tire fires eliminated 18.39 million tires from state stockpiles.

Tire Hauler Program (since 1995)

Program Summary

The purpose of the waste tire hauler program is to track the flow tires from waste tire facilities to productive end use or disposal. The goal of the program is to prevent illegal stockpiling or dumping of tires. The program began in 1995.

State law requires every person who transports five or more scrap tires to hold a valid tire hauler registration, post a \$10,000 bond and observe the requirements of the waste tire hauler manifest system. Registered tire haulers must register annually with the Board, possess manifests during transport, transport only to authorized facilities and return the completed manifest to the generator of the scrap tires, if requested. State law requires persons receiving tires from unregistered haulers to report the hauler to the Board.

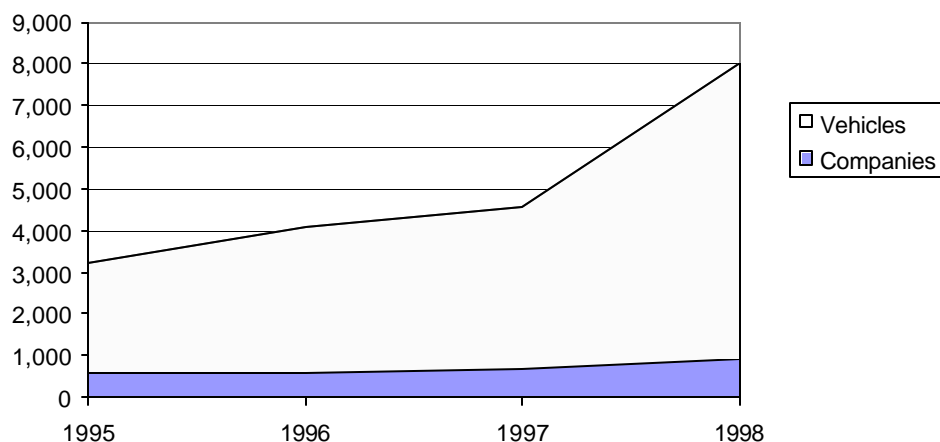
Findings

The hauler program consists of two separate components: registration and enforcement.

IWMB Permitting and Enforcement Division staff was able to provide program information for 1997 and 1998; however, aggregated data for 1995 and 1996 is not available because the information system used to keep the records did not store historical data.

For example, if a hauler had registered in 1995 and renewed the registration in 1996, the computer would replace and erase the 1995 registration with the 1996 record. According to Board staff, hauler registrations are now kept on a new system capable of storing historical data.

Table C-4: Waste tire hauler registration, 1995-98



The number of companies registering vehicles increased from 579 to 900, and the number of registered vehicles increased from 3,209 to 8,000 over the four years of the program. The large increase in registrations between 1997 and 1998 was due to the registration of several fleet haulers with large numbers of trucks.

Table C-5: Tire hauler program outcomes, 1995-98

Year	# of annual registered haulers	# of annual hauler vehicle registrations	# of renewals cancelled or denied	# of unreg. haulers reported	# of investigated unreg. haulers	# of stops by CHP
1995	579	3,209	N/A	Unknown	Unknown	Unknown
1996	586	4,059	Unknown	Unknown	Unknown	Unknown
1997	660	4,567	180 [60]	85	85	13
1998	900 (800)	8,000	171	150	150	50
Total	2,725	19,835	N/A	> 3,000	235	63

Notes:

1. Source: IWMB
2. Waste tire hauler registrations are renewed each January. "Total" represents the cumulative number of registered companies and vehicles, in recognition that one individual company most likely registered every year.

Enforcement of the tire hauler program requirements resulted in the cancellation of 133 permits. 70 renewals were cancelled.

In 1997 and 1998, 235 unregistered haulers were reported and investigated. The Board sent "Notice of Violation" letters to all reported unregistered haulers along with applications for registering as a waste tire hauler. The Board could not provide an estimate for the total number of unregistered haulers or the overall number of persons who reported receiving tires from unregistered haulers.

A review of the Board's 1998 *Overview Report California's Waste Tire Program* found that more than 3,000 persons had reported receiving tires from unregistered haulers since 1995.

In 1997-98, the Board entered into a \$200,000 interagency agreement with the California Highway Patrol (CHP) to conduct training for all 6,500 CHP officers statewide, as well as local peace officers. Between 1997 and 1998, CHP stops of tire haulers increased from 13 to 50, but the figure is likely underreported and the effect of CHP activity is unknown.

In 1998, the Board provided the CHP with a videotaped training session and brochures about the tire hauler program. Board staff anticipates that the training video and brochures will increase enforcement activity by the CHP.

Generally, activity in terms of the increased number of registrations and enforcement of the tire hauler program requirements is rising.

Enforcing Tire Facility Regulations (since 1991-92)

Program Summary

In addition to the identification and classification of tire storage sites, the Board is also charged with the responsibility of inspecting identified facilities and enforcing certain safety regulations governing facilities. The goal of the inspection and enforcement programs is to bring all tire storage facilities into compliance with State regulations.

The inspection process includes the determination of the number of tires at each facility, site security and access, fire prevention measures and vector control measures.

For violators of the tire facility requirements, the Board's process of enforcement has six steps:

Step 1: A "Letter of Violation" is issued and the facility is given six weeks to submit a plan on how it will come into compliance.

Step 2: After six weeks, a "Warning Letter" is issued and the facility is given three weeks to submit a compliance plan.

Step 3: A formal "Cleanup and Abatement" order is made by the Board and three months are granted for submitting a compliance plan.

Step 4: If the facility still has not complied, the case is referred to the Office of Administrative Hearings.

Step 5: The case against the noncompliant facility is referred to the District Attorney and a criminal report of investigation is prepared. Before the case against a facility is handed over to the District Attorney, steps one through four usually take a total of five months and one week to complete.

Findings

VITETTA found no data on the Board's inspection and enforcement activities before 1994. Generally, information regarding the number of sites inspected was fragmented and difficult to gather.

Since 1994, both Board and local enforcement agencies (LEA) inspected 342 sites. More sites in Northern California (225) were inspected than in Southern California (117).

A site inspector is now permanently located in Southern California. Until October 1998, both site inspectors were based in Northern California. Over the last five years, an average of 73 percent of the facilities inspected complied with State storage requirements. As measured by Board, the annual rate of compliance dropped to 68 percent in 1997. Overall, sites inspected by LEAs had a lower rate of compliance than those inspected by State inspectors did.

While criminal complaints remain steady, administrative complaints rose in 1997 and then leveled off in 1998. The number of cleanup and abatement orders issued by the Board increased at a faster rate between 1994-1998 than administrative complaints issued by the Office of Administrative Hearings.

Between December 30, 1996 and January 8, 1998, 44 tire penalties in the amount of \$731,868 were assessed for judgements. As of January 1999, only \$17,900 of the tire

penalties has been paid to the State. This reflects the unique problems associated with scrap tires. Many of the smaller operators are virtually without resources and unable to pay any fines. There is also often a problem even finding the individual against whom there is a judgement—flight is a common occurrence. Finally, there is the problem of inadequate legal authority to convert the administrative award into a property lien.

The largest penalty levied by the courts was \$228,250 against Wenbury Environmental Company, Ltd. of which no amount has been paid to the State; the smallest penalty was \$200 against Timothy Fisher, which has been paid in full. Prosecution of tire penalty cases is dependent on the time, resources, and the willingness of the district attorney to pursue the case.

As a result of Board inspection enforcement activities, approximately 3.6 million tires were removed. However, the number of tires is an aggregate figure for the five years of data kept on the inspection and enforcement program.

Approximately 1 million tires are removed as a result of direct enforcement each year. However, Board staff could not produce more exact annual estimates. Although 3.6 million is an estimate of the total number of tires removed since 1994, the number of tires removed may be as high as 4 million. In 1998, Board staff estimated that 333,000 tires had been removed from January through October of 1998.

Local Government Cleanup Matching Grants(since 1996-97)

Program Summary

The goal of the cleanup matching grant program is to create local partnerships to facilitate the removal, transport, and disposal/reuse of waste tires from legacy tire piles and piles exceeding 500 tires.

Generally, grant participants “match” the Board contribution by 50 percent (either through revenue payments or in-kind services). All recipients of the cleanup matching grants must also be recipients of a waste tire enforcement grant in order to ensure that the jurisdiction’s tire issues are being approached at both points in the process—production of “new” scrap tires and cleanup of stockpiled tires.

Findings

In 1996-97, the only grant awarded was to the County of Sonoma, which was subsequently canceled, with no money allocated to the grantee.

In 1997-98 (effectively, the first year of the program), the Board allocated \$174,754.69 for eight cleanup grants to local governments, with the total grant program budget estimated at \$267,453 (see Table C-6).

Local government “matches” (either in-kind services or cash) totaled \$96,168.64. Board staff projects that the local government cleanup grants will result in a total of 118,110 tires remediated.

Estimated cost per tire cleaned up varies by grant, with a high of \$17.70 per tire (Yuba-Sutter Regional Waste Management Authority) and a low of \$1.01 (Acacia Tire Site). Average cost per tire is projected to be \$2.26. This is more than both the local

government amnesty grant cleanups (average cost per tire \$1.82) and State-funded cleanups (\$1.27 median per tire cleanup cost).

However, because the local government cleanup matching grants were generally used for smaller piles (average estimated cleanup in 1997-98 was 14,000 tires), it is reasonable to expect slightly higher per tire cleanup costs. When compared to smaller cleanup projects by the State (average cost of five projects less than 10,000 tires was \$2.90), the cost of the cleanup funded by the grant program is reasonable.

Table C-6: Local government cleanup matching grant program participants, 1997-98

Applicant	Projected # of tires to be removed	Local match	Board contribution	Total project budget	Projected% local match	Cost per tire (estimated)
City of Rialto	2,000	\$2,876	\$2,876	\$5,752	50%	\$2.87
City of Bakersfield	10,000	\$28,940	\$28,940	\$57,880	50%	\$5.87
Plumas-Sierra Fairground	5,000	\$7,319	\$8,400	\$15,719	47%	\$3.14
Acacia Waste Tire Site	75,000	\$25,905	\$50,000	\$75,904	34%	\$1.01
Public Works Dept., Loyalton landfill	20,000	\$3,505	\$38,952	\$42,457	8.2%	\$2.12
Yuba-Sutter WMA	1,660	\$6,250	\$23,132	\$29,381	21.3%	\$17.70
City of Modesto	2,050	\$15,875	\$8,300	\$24,175	66%	\$11.80
Hesperia Fire Protection District	2,400	\$5,499	\$14,154	\$16,185	33%	\$6.74
Totals	118,110	\$96,169	\$174,754	\$267,453	38.6% (avg. local match - estimated)	\$2.26 (avg. cost per tire - estimated)

Notes:

1. Source: IWMB
2. Local match includes both cash and in-kind services

Cost per tire depends on a number of variables, including distance the tires must be transported to be disposed or recycled, difficulty of reaching the site, number of personnel needed and pay rate (i.e., use of local conservation corps staff versus use of a professional contractor).

Because final reports for the 1997-98 grants will not be available until later in 1999, all amounts in Table C-6 are estimated by the Board. However, based on the projected figures, the average cost per tire of remediation is estimated to be between \$1 and \$5 per tire. Therefore, based on projections, this program appears to be a reasonably cost effective method of performing small to medium-sized cleanups. Upon final reconciliation of the projected amounts awarded with the actual amount paid and the actual amount of tires remediated, the Board can determine how close the actual totals are to estimates.

In 1997-98, all of the jurisdictions included evaluation as a component in their applications, with many of them listing the following evaluation criteria:

- Removal of tires from a targeted site.
- Legal disposal of tires cleaned up.

Some project applicants expanded their scope of evaluation to also include:

- Reduction of illegal tire dumping in the area.
- Number of citizen complaints regarding illegal dumping of waste tires.

Local Government Enforcement Grants (since 1996-97)

Program Summary

Over the past two years, the Board has awarded \$225,000 for a total of 14 waste tire enforcement grants. This grant program provides local governments with the resources to monitor and take certain enforcement action against persons stockpiling tires illegally. The intent of these grants is to provide short-term, one-time funding for surveillance, inspection and compliance.

There are two grant options available to local governments:

Option #1, Inspection and Compliance, involves inspections of waste tire facilities (WTF) that accept or store more than 500 waste tires at one location. The intent of the inspection and compliance activities undertaken by the grantee is to develop and implement an effective inspection and compliance program at the local enforcement agency (LEA) level which will provide guidance to facility operators regarding operating requirements. Additionally, Option #1 includes the responsibility for the local government to, if necessary, take the initial enforcement action necessary to remediate threats to the public health and safety and the environment. If a local government chooses Option #1, it must also perform the activities in Option #2.

Option #2, Surveillance, involves local government grantees conducting WTF surveys of tire dealers and auto dismantlers which accept or store waste tires on site. The intent of this activity is to reinforce tire dealers' and auto dismantlers' responsibility to use registered waste tire haulers for waste tire removal and to maintain waste tire manifests that document waste tire removal. In addition to providing to the Board those tire dealers and auto dismantlers that are or are not in compliance with requirements, the grantee will also identify and report sites that may be in violation of WTF permit requirements. The Board provides survey sheets for local personnel to gather information at the WTF sites.

Findings

1996-97 Grant Recipients

Four applicants applied, all of which were awarded 1996-1997 local enforcement grants for a total of \$110,031. The notice of funds available (NOFA) was sent to approximately 14 LEAs throughout the state. Board staff determined to which LEAs the NOFA should be sent.

Of the four applicants, two completed surveillance/compliance and inspection activities (Tulare County LEA and Riverside County LEA), while two completed surveillance activities only (Imperial County LEA and Yuba-Sutter LEA).

Table C-7: Results of local government enforcement grants, 1996-97

Evaluation Criteria	Yuba-Sutter LEA	Tulare County LEA	Riverside County LEA	Imperial County LEA
Grant amount	\$4,970	\$50,000	\$46,790	\$8,271
Total # of tires remediated	N/A	1,425	2,100	N/A
Option #1: Inspection and compliance		X	X	
Inspection of WTFs		YES		
(inspected 106 WTF sites)	YES			
Provide guidance to WTF operators		YES	YES	
Take initial enforcement action		YES		
(1 notice of violation issued)	YES			
Option #2: Surveillance	X	X	X	X
Identify WTFs and establish database	YES	YES		
(updated list for a total of 106, down from 138 on original list)	YES			
(added 200 WTFs to original list of 250 for total of 450 sites identified)	YES			
Conduct WTF survey	YES	N/A	YES	YES
Educate WTF operators regarding legal requirements	YES	YES	YES	YES
Report to BOARD WTFs not in compliance	YES	N/A	YES	N/A
Audit/change	N/A	N/A	N/A	N/A
Cost/tire	N/A	\$35/tire	\$22.28 per tire	N/A

Source: IWMB

Review of the final reports from the 1996-97 grantees indicated that, in some cases, it is unclear whether certain grantees completed all of the tasks outlined in the original grant description mailed to applicants.

A number of the 1996-97 grantee final reports indicate that certain facilities, including tire dealers, were referred to the Board for further enforcement activity. All of the referrals from LEAs have been entered into the Board's computerized solid waste tracking system and are receiving appropriate follow up action from Board staff.

1997-98 Grant Recipients

In 1997-98, the Board awarded a total of \$412,014 to 10 cities, counties and LEAs. In 1997-98, the NOFA was sent to all local jurisdictions. Board staff expects to begin to receive final reports on these grants in early 1999.

A preliminary review of the 1997-98 grants with Board staff indicates that only one grant—to the San Diego County LEA for \$95,460 for inspection/compliance and surveillance—was problematic. Because of staff changes at San Diego County, the grant became less of a priority for the county. The funds continue to be available for the next three years, although Board staff is unsure whether San Diego County will begin its grant-related activities within that period of time.

Table C-8: Local government enforcement grant program recipients, 1997-98

Applicant	Total Budget (projected)	Activity
Butte County LEA	\$29,480	S
City of Rialto	\$2,307	S
San Bernardino County LEA	\$43,139	S
Stanislaus County	\$30,000	S
City of Bakersfield	\$72,075	I, S, C
City of Sacramento	\$66,350	I, S, C
City of San Bernardino	\$11,474	I, S, C
San Diego County LEA	\$95,460	I, S, C
Tulare County LEA	\$50,851	I, S, C
Yuba County LEA	\$9,590	I, S, C
TOTAL	\$410,726	

Notes:

1. *Source: IWMB*
2. *Key: I= inspection, S= surveillance, C= compliance*

Feedback From Grantees

As part of their final reports, the grantees included suggestions for improving the tire program, including recommending that the Board:

Inform the LEAs that problems with non-complying regional tire dealers (that cover multiple jurisdictions) can be forwarded to the Board for assistance or action.

Provide a formal training at the onset of the program so that every jurisdiction implements the [grant] program in similar manner. Most LEAs do not routinely work with the waste tire hauler registration regulations.

Additionally, a number of grant recipients expressed the importance of ongoing inspection to ensure compliance.

Fire Safety Training Program (since 1993-94)

Program Summary

In fiscal year 1993-94, the Board entered into a \$350,000 interagency agreement with the Office of the State Fire Marshall (OSFM) to develop a tire fire training program for the state's local fire authorities (including paid and volunteer forces at the city and county levels). The goal of the training was to provide local fire personnel with an understanding of the unique technical approaches to tire pile fires.

Generally, local fire agencies handle smaller tire fires, with larger pile fires requiring the coordination of "mutual aid" (including human resources and equipment). This coordination generally occurs through the Office of Emergency Services (OES), which coordinated the response to the Royster tire pile fire in Tracy.

The 1993-94 training program budget of \$350,000 was expended for:

- A research project with UC Berkeley to determine the appropriate separation distance between scrap tire piles.
- Production of a 40-minute training video regarding fighting tire pile fires distributed to registered tire fire instructors.
- Drafting, designing and publishing 3,000 training manuals for local agency fire officials.
- A survey of the fire service community identifying illegal tire pile storage sites.
- Ten train-the-trainer classes delivered across the state regarding optimal methods of handling tire pile fires.
- OSFM staff time.

In 1996-97, the Board allocated an additional \$100,000 to the OSFM for purposes of updating the original training curriculum and conducting additional training for fire officials who participated in the original training program. The IWMB then decided to temporarily suspend the grant, pending additional research on the impact of tire fire smoke on air quality. That research was never undertaken and the tire fire safety training effort was not revisited.

Both the International Association of Fire Chiefs and the Federal Emergency Management Agency have produced information regarding scrap tire storage and scrap tire fires, neither of which is as extensive as the training funded by the Board.

Findings

The OSFM provided a final report to the Board on October 1, 1994. The interagency agreement (IAA) between the Board and the OSFM did not contain provisions for long-term evaluation of the training program.

However, based on the final report, the following occurred as a result of the program:

- A total of 52 classes were scheduled or delivered by OSFM personnel, with 10 train-the-trainer classes delivered and five additional conference workshops conducted.
- 115 local fire personnel participated in the training classes.
- 66 local fire personnel who completed the train-the-trainer program registered with OSFM to teach the class to other local fire personnel.
- 136 State and local fire service organizations had at least one member attend an OSFM tire fire presentation.
- 976 fire departments were provided the survey, with 289 responding.
- As a result of the survey, an additional 116 illegal tire pile sites were identified.
- Distribution of the tire fire manual to approximately 2,800 fire personnel

Local fire agencies can adopt national or State standards as local ordinances that then bind activities within their jurisdiction. The Board has promulgated regulations and requirements for local fire officials to follow when they inspect tire piles. However, local fire agencies have no legal requirement to enforce the Board regulations and, instead, generally rely on either the Uniform Fire Code (copyrighted by the Western Fire Chiefs Association) or the National Fire Protection Association (NFPA) requirements related to tire pile storage.

It is unclear whether:

- The training program impacted the way that local governments deal with tire pile fires.
- If local enforcement of tire pile fire codes are more strictly enforced as a result of the training program.
- The initial local fire officials who attended the training, in turn trained local personnel.

Market Development

Rubberized Asphalt Concrete (RAC) (since 1991)

Program Summary

The Board has funded a number of rubberized asphalt concrete (RAC) projects since 1991, many of them out of the Market Development Division's Tire Recycling Grant Program. The goal of RAC projects is to create a productive end use for scrap tires. RAC is one of the largest potential users of scrap tires in the state.

The Market Development Division has partnered with both State and local agencies to facilitate the use of RAC, as follows:

Table C-9: Board-funded RAC projects

Year	Item	Allocated	Actual	Number of Tires Used
1991	Caltrans Equipment purchase Air quality testing at RAC project sites Board staff resources loaned to Caltrans for RAC project Database development		\$300,000 \$200,000 \$25,000	Not Applicable
1992-93	Tire Recycling Grants City of Huntington Beach City of Los Angeles Caltrans Highway 16 test strip		\$32,400 \$34,950 \$500,000	1,750 Not Available 14,500
1993-94	Tire Recycling Grant TAK Consulting Engineers		\$65,340	Not Available
1994-95	Tire Recycling Grants City of Calabasas ECOPave TAK Consulting Engineers		\$14,000 \$61,882 \$75,000	16,888 Not Applicable 18,000
1995-96	Tire Recycling Grants City of Garden Grove Cyclean City of Cerritos City of Agoura Hills TAK Consulting Engineers	\$100,000 \$100,000 \$100,000 \$100,000 \$39,000		8,300 15,000 6,000 16,500 Not Applicable
1996-97	Tire Recycling Grants San Francisco City and County Sacramento County City of Sacramento City of Richmond	\$50,000 \$50,000 \$40,000 \$40,000		Not Available 4,100 Not Available Not Available
1997-2000	Los Angeles RAC Technology Center	\$850,000	250,000	725,550
Total		\$1,469,000	\$1,558,572	816,588

Sources: IWMB, LA RAC Technology Center, Caltrans

Findings

The majority of the Tire Recycling Grants to local governments and private businesses were for the construction or re-surfacing of roads with RAC or experimental uses of RAC. In 1996-97, grants to local governments included uses of RAC in the Great Highway in San Francisco as well as repaving of the American River Parkway Bicycle Trail in Sacramento.

Tires remediated per project are available for grant years 1992-93 through 1994-95 (indicated by the shading in Table C-8). RAC grant projects undertaken after 1994-95 may result in significant numbers of scrap tires used, but final reports were not available for grants after 1994-95.

To date, the Board has awarded a little over \$1,000,000 to Caltrans for four projects. In 1991, the Board funded the purchase of a rheometer by Caltrans, which is designed to test the liquid RAC binder material to determine which binder will have the highest performance. No tires were remediated as a direct result of the purchase of the equipment, although the rheometer may help facilitate the use of RAC by Caltrans.

There continue to be concerns about the air quality effects of RAC application on workers as RAC is applied at higher material temperatures than conventional asphalt paving material. In order to address these concerns, the Board allocated, in 1991, allocated \$200,000 to Caltrans to work with the Air Resources Board to conduct ambient air quality testing at RAC sites. The study was never conducted because Caltrans failed to choose a testing site prior to the expiration of the grant funds. Caltrans later conducted some smaller ambient air testing at RAC sites but those tests were “not comparable” to the proposed State Air Resources Board (ARB) study, according to Board staff.

In 1992-93, the Board “loaned” a Board staff person to Caltrans for 14 months who was charged with compiling a database of all RAC projects (funding for this project was authorized by the Board in 1991-92). The purpose of the database was to give Caltrans a more accurate assessment of the success or failure of RAC projects to date and the circumstances which contributed to success or failure.

The database was compiled and included all Caltrans RAC projects constructed through 1992 and information such as the project’s RAC supplier, rubber contractors, project contractor, temperature at the project site during application and number of workers at the site.

In 1992-93, the Board allocated \$500,000 to Caltrans to fund the application of RAC test sections on State Route 16 near Woodland. The purpose of the test was to allow Caltrans to study the performance, costs and benefits of using different types of RAC mixes over a period of time. Caltrans installed the test section on July 7, 1993.

The only report on file with the Board from Caltrans is dated June 5, 1995, which states that “annual review reports” will be submitted to the Board from Caltrans. At the time of this study, Board staff did not have on file any other reports from Caltrans regarding the RAC project. Caltrans was to observe the test sections until the sections failed, and then determine what caused the failure.

The Los Angeles RAC Technology Center (\$1,000,000) is discussed and evaluated later in this report.

Caltrans Use of Rubberized Asphalt Concrete (since 1991-92)

Project Summary

Caltrans and local officials use RAC for repaving and resurfacing because it is, according to the LA RAC Technology Center:

“Cost effective when used appropriately, provides a long lasting, durable pavement surface that resists reflective cracking, has excellent skid resistance, reduces tire noise and retains a “new” look longer than conventional asphalt concrete.”

The Board is interested in RAC because it is one of the largest potential “recycling” uses for scrap tires in California - a 2-inch thick RAC resurfacing project can use more than 2,000 scrap tires per lane mile.

RAC has been used in California since the 1960s. The Federal Highway Administration has previously required states to use asphalt paving materials containing recycled rubber and other recycled materials, as mandated by the Intermodal Surface Transportation Efficiency Act (ISTEA). In 1993-94, the U.S. Senate declared a moratorium on the RAC mandate because of concerns over utilizing RAC in areas of the country that experience extreme temperatures.

Findings

Caltrans has been using RAC since 1980 and, from 1980 through 1998, the agency used a total of 2,458,930 tons of RAC. Based on the formula developed by the Rubber Pavements Association, this translates into approximately 4.5 million scrap tires recycled. The use of RAC by Caltrans has changed over time. In 1996, the greatest amounts of projects were undertaken, with a total of 44 projects, 12 of them in District 10 alone. Overall, Districts 11 and 12 had the highest number of RAC projects—62 and 29, respectively. Districts 11 and 2 had the greatest amount of RAC used over all their projects, with a total of 1.85 million tires recycled out of a total of 4.5 million tires recycled total.

Table C-10: Use of RAC by Caltrans, 1980–May 98

District	# of projects	# of tires recycled
District 1	4	114,848
District 2	21	718,521
District 3	17	79,346
District 4	22	534,614
District 5	7	256,003
District 6	10	369,648
District 7	18	144,429
District 8	13	145,818
District 9	16	323,676
District 10	29	518,847
District 11	62	1,137,213
District 12	10	206,053
Total	230	4,549,020

Source: Caltrans

Numerous legislative attempts to mandate the use of RAC by Caltrans have been made since the early 1990s, including AB 375 (Firestone) in 1997 and AB 2718 (Bornstein) in 1994. Neither bill was approved by the Legislature.

Both the Rubber Pavements Association and Caltrans object to RAC use mandates. The Rubber Pavements Association objects on the basis that mandating RAC calls into question the integrity of the product; Caltrans objects because the agency does not want to be required to use a product when its use might not be appropriate. Caltrans estimates that RAC is currently used in 10 to 12 percent of its projects. According to the Rubber Pavements Association, Caltrans could potentially use RAC in up to 40 percent of its projects.

The Rubber Pavements Association, the Board, and Caltrans have formed a Rubber Pavement Team which is working to promote RAC within Caltrans through workshops and other educational programs for Caltrans employees.

Los Angeles RAC Technology Center (since 1997)

Program Summary

The Rubberized Asphalt Concrete Technology Center was founded on July 1, 1997. The mission of the center is to promote the use of crumb rubber from scrap tires in roadway rehabilitation projects as a cooperative effort by the County of Los Angeles and the Board.

Center program goals include:

- Increasing the use of crumb rubber from scrap tires by providing information and services to public agencies within California at no charge.

- Undertaking outreach services, such as regional workshops and one-on-one conferences to acquaint city and county officials with the advantages of RAC.

The Center is undertaking a two-pronged approach to its goals:

1. Continuing general education efforts targeted at local government decision-makers to influence their use of RAC in local projects.
2. Implementing two local government grant programs which provide a total of \$400,000 (\$200,000 each) to provide locals with the resources to hire consultants or use in-house staff to provide the necessary expertise regarding:
 - The costs of undertaking deflection testing (to ensure that RAC is appropriate for the job the local government is considering).
 - Monitoring quality control in relation to RAC application at the job site.

Lynn Nicholson, a retired County of Los Angeles engineer, serves as the part-time program director. Staff resources from within the County of Los Angeles are utilized on an as-needed basis (i.e., to provide marketing and administrative assistance). Office space and equipment are provided by LA County and costs for these items are reimbursed by the Board.

Santa Clara County, a jurisdiction that the Center staff has worked with, recently adopted a policy requiring a determination of whether RAC is appropriate for resurfacing projects. On projects where it appears cost effective to use RAC, RAC is to be included as an alternative bid by each contractor.

Findings

To date, the center has received two \$500,000 allocations from the Board, for a total of \$1,000,000 in funding for the period July 1, 1997 to July 1, 2000. Of the \$1 million allocated to the center by the Board, \$350,000 has been spent to date with a total of \$650,000 currently encumbered (see Table C-10).

Table C-11: LA RAC Tech Center expenditures and encumbered funds as of 12/98

Item	Spent to date	Encumbered	Unencumbered and unspent	Total Board allocations to project
Personnel and overhead	\$280,000			
Other expenses (including Web site development, workshop production)	\$70,000			
Local government grants				
Deflection testing grants				
Quality assurance/quality control grants		\$400,000		
			\$250,000	
Total	\$350,000	\$400,000	\$250,000	\$1,000,000

Source: LA RAC Technology Center

Table C-12: LA RAC Technology Center results based on evaluation criteria established in 1997

Evaluation criteria	July 1997- December 1998
Number of agencies that have received information on rubberized asphalt from the center	1600
Number of agencies that have initiated a rubberized asphalt project as a result of the center	See Table 20
Increased use of crumb rubber as a result of the center	Unknown
Number of agencies that have continued the use of rubberized asphalt as a result of the center	Unknown

Source: LA RAC Technology Center

Center staff has extensive contact with local government personnel through workshops, conferences and telephone queries. Based on this contact, center staff estimates that the agencies in the following table have indicated that they have used, or are planning to use, RAC in their resurfacing program.

Table C-13: Local governments that have used or are planning to use RAC, sorted geographically

Type	# of jurisdictions
Northern California cities	6
Northern California counties	3
Southern California cities	33
Southern California counties	1
Total	43

Source: LA RAC Technology Center

Between the 43 jurisdictions, center staff estimates that 241,850 tons of RAC was used, resulting in more than 725,550 tires recycled.

It appears that center staff is reaching many more city staff than county staff. Of the city staffs reached, the vast majority are in Southern California. Of the county staff influenced, three of the four are Northern California counties. Therefore, the center appears to be reaching more cities than counties and more counties in Northern California than Southern.

Tire Recycling Grant Program (since 1992-93)

Program Summary

The tire recycling grant program is administered by the Waste Prevention and Market Development Division and is the Board's main method of providing funding for projects related to tire recycling or reuse. While the Board-designated grant categories have changed slightly since the early 1990s, the grants can generally be divided into the following categories:

- **Local government grants**, including grants for amnesty day/public education, (in the beginning of the grant program) market development plans, and the purchase of molded rubber products by school districts. Local conservation corps grants are also included in the category of “local government grants” for the purposes of this study. Generally, local conservation corps grants are directed towards cleanup of smaller piles in rural areas.
- **Business development grants** are targeted towards businesses that recycle tires. Some examples of these efforts include grants for playground safety surface product development and a market analysis for the uses of crumb rubber.
- **Innovative research grants** are directed towards new and “untested” methods of tire recycling. These grants were designed to be on the “cutting edge” of tire reuse and recycling. Some examples of grants awarded under this category include funding the development of residential roofing shake products and a tire mussel reef demonstration project.

According to the IWMB’s 1997 tire program evaluation:

“It is important to remember that these research and business development projects were not expected to recycle many, if any, waste tires. The program was designed as an innovative and aggressive attempt to assist new recycling businesses and begin or continue research into product development and new technologies. The IWMB recognized that...research and development efforts were needed to find new solutions, and although the IWMB closely scrutinized potential recipients, it recognized that, as with all research and development programs, some of the research would not be successful.”

At the end of the grant cycle, the grantee submits to the Board a final report that details the activities undertaken pursuant to the grant agreement. These reports are summarized by Board staff and a “tire recycling grant abstracts report” is completed. Because the grant cycle is three years, these reports were only available for VITETTA’s review through the year 1994-95.

Findings

The Waste Prevention and Market Development Division has been providing tire recycling grants since 1992-93. Over the past seven years, the Board has allocated a total of \$6.6 million on these grant programs, with most of the funding directed towards local governments, particularly since 1994-95. With only data from 1992-93 through 1994-95 available, the Board has spent a total of \$3,279,755 over the first three years of the program.

A total of 180 grants have been awarded, with the majority of those (133) being local government and local conservation corps grants (combined).

Table C-14: Tire Recycling Grants—Funds allocated and spent 1992/93 through 1997/98

Grant program	Total paid (1992/93–1994/95)	Total allocated (1995/96–1997/98)
Local government grants	\$1,092,782	\$1,688,190
Local conservation corps grants	\$0	\$361,423
Business development grants	\$717,086	\$338,619
Innovative research grants	\$1,469,884	\$0
Total	\$3,279,752	\$2,388,232

Source: IWMB

As evident from the table below, grant priorities have changed since the inception of the program. For the first three years of the program, funding was roughly evenly divided between the three grant categories. However, since 1995-96, the overwhelming funding emphasis has been on local government grants, with no funds allocated for innovative research grants and less than 15 percent of the total funding allocated for business development grants.

**Table C-15: Tire Recycling Grants—
Overview of types of grants awarded, 1992/93–1997/98**

Year	Total # of grants awarded	# of business devel. grants	# of local govt. grants	# of innovative research grants	# of local conser- vation corps grants	Total amount allocated	Total amount paid	# of tires remed- iated	Cost per Tire (avg.)
1992-93	45	8	23	14	0	\$1,944,390	\$1,494,796	137,156	\$10.90
1993-94	22	6	11	5	0	\$1,000,000	\$717,532	146,348	\$4.90
1994-95	31	5	21	5	0	\$1,357,023	\$1,067,427	252,972	\$4.54
1995-96	21	4	6	0	11	\$1,019,991	N/A	N/A	N/A
1996-97	24	0	24	0	0	\$530,079	N/A	N/A	N/A
1997-98	37	0	30	0	7	\$838,162	N/A	N/A	N/A
Total	180	23	115	24	18	\$6,689,645	\$3,279,755	536,179	\$6.11

Notes:

1. Source IWMB
2. All numbers for 1995-96 through 1997-98 are projected since grant cycles are three years and final reports for 1995-96 grants will be received later this year.

Tire recycling grants from 1992-93, 1993-94 and 1994-95 had short-term results of remediating 473,976 tires (tires cleaned up from an illegal pile, landfilled or put to a productive end use) at a total cost of \$3,279,754.

This resulted in an average cost per tire of \$6.11. The majority of the tires remediated came from local government grants, particularly grants for local government amnesty

programs. Between the business development and innovative research grants, approximately 18,000 tires were remediated, all of which were consumed by TAK Consulting Engineers during the course of constructing a demonstration project involving RAC together, local government amnesty day grants had the lowest cost per tire remediated at \$1.82. Overall, all local government grants remediated 518,476 tires at an average cost per tire of \$2.10.

Table C-16: Number of tires remediated as a result of tire recycling grants, 1992/93–1994/95

Grant type	Total funds paid 1992/93–1994/95	Total number of tires remediated in the short-term (duration of the 3-year grant)	Cost per tire
Local government grants	\$1,092,782	518,476	\$2.10
Business development/innovative research grant	\$2,525,589	18,000	\$140

Source: IWMB

However, evaluating the effectiveness of the tire recycling grants based on the cost per tire of cleanup does not provide the entire picture. The original intent of the tire recycling grant program was not to provide low-cost cleanup; rather, it was to develop, promote, and encourage the development of scrap tire recycling methods. For example, the development of roof shingle material made from recycled scrap tires.

Therefore, it is helpful to consider the effectiveness of the program based on both the end use and other goals specified in the grantee's objectives. Based on the information in the grant abstract, VITETTA has compiled the following evaluation criteria for local government, business development and innovative research grants:

Table C-17: Local government grant evaluation criteria

		Goal Achievement	
End Use for Tires		Low	High
	Low	<i>Low</i>	<i>Modest</i>
	High	<i>Good</i>	<i>Excellent</i>

Source: VITETTA

“End use for tires” ranked as “low” includes disposal or landfilling. High uses are all other uses (including transformation, recycling, retreading, etc.). Goal achievement (low and high) was ranked based on the narrative in the grant abstracts, which describes the objective of the grantee and the grantee's results. This may include a goal of recycling a specific number of tires.

Table C-18: Business development and innovative research grant evaluation criteria

		Goal Achievement	
		Low	High
Marketability	Low	<i>Low</i>	<i>Modest</i>
	High	<i>Good</i>	<i>Excellent</i>

Source: VITETTA

“Marketability” is based on the likelihood of the product being used at a future date. Goal achievement (low and high) was ranked based on the narrative in the grant abstracts, which describes the objective of the grantee and the grantee’s results.

Table C-19: Tire recycling grants ranked by year, 1992/93–1994/95

Year	Total # of grants awarded	Low	Modest	Good	Excellent	Terminated	Not completed
1992-93	45	3	14	1	19	5	3
1993-94	22	1	3	3	12	3	0
1994-95	31	4	10	2	13	1	1
Total	98	8	27	6	44	9	4

Source: IWMB

Slightly less than the majority of the grants (44 out of 98) were ranked as “excellent.” Fifty-one percent of the grants ranked as “good” or excellent. Only 13 grants ranked as “terminated” or “not completed.” The majority of the local government grants were ranked as “excellent” (29 out of 55), while only three of the 24 innovative research grants ranked as “low.” Terminated grants were concentrated in the local government grants with a total of four.

While the grant abstracts contain a plethora of useful data (i.e., grant amount allocated, grant amount paid, a general description of the result of the grants), to date no formal evaluation of the grant results has been undertaken by staff. Additionally, only immediate results (those occurring during or directly after the grant tasks were completed) are available for the grants. Staff is not currently undertaking long-term tracking of the grant program results.

Retreaded Tires (since 1990)

Program Summary

Public Resources Code section 42410 requires the IWMB to

“Evaluate current state and federal quality standards for retreaded tires and identify the obstacles for an increased market for retreads. The results of this evaluation and the activities that the Board will undertake to increase the use of

retreaded tires shall be included in the reporting requirements...”

Further, the Public Resources Code requires the Department of General Services and the Board, in consultation with representatives of the retreading industry, to adopt specifications of the purchase of retreaded tires by the State of California.

It is unclear whether specifications for retreaded tire purchases were promulgated. Based on the information collected under the “State Agency Buy Recycled Campaign” section, VITETTA believes that DGS has not purchased any retreaded tires since the inception of the campaign because there are currently no retreaded tires on the market that meet DGS’ requirements.

State Agency Buy Recycled Campaign (since 1989)

Program Summary

The Legislature and the Governor created the State Agency Buy Recycled Campaign (SABRC) in 1989 with the goal of creating and stabilizing the market for recycled materials, including processed scrap tires. Increasing the recycling of scrap tires through programs like SABRC increases the number of tires diverted from landfills and stockpiles.

In 1993, the Legislature directed the Board to assist the Department of General Services (DGS) with information and outreach activities related to the SABRC. Although DGS is statutorily responsible for the State procurement system and SABRC implementation, State agencies submit their recycled-content product procurement reports to the Board.

State law requires all State agencies to plan, track and report annual purchases of recycled content products (RCP). State law mandates that, by January 1, 2000, at least 50 percent of procurement expenditures by each State agency in each of the 11 product categories, including tires and tire-derived products, be of recycled content product purchases; an increase from the January 1, 1998 goal of 30 percent.

Feedback From State Agencies

In its 1998 report to the Legislature on SABRC, State agencies and Board staff suggested several ways to increase RCP procurement:

- Increase the availability of RCPs, especially through State contracts.
- Mandate the purchase of reputable and price-compatible RCP products.
- Get the word out about SABRC to vendors and State agencies using the Internet, workshops, and other outreach mechanisms.
- The State should publicize its demand and certification requirements for RCPs to vendors.
- State agencies should share with other agencies information on RCP quality and vendors.
- Automate and update procurement systems to better tracking RCP purchases.

- Focus efforts on State agencies with the largest procurement budgets.

Findings

In 1996-97 only 57 of 137 (about 42 percent) State agencies self-reported they had met the 1998 RCP procurement goals. Overall State agencies spent 42 percent of their total dollar purchases on all RCPs. However, expenditures on tires or tire-derived RCPs were less than 1 percent of all RCP purchases. This percentage has remained constant.

To meet the year 2000 statutory procurement goals, each State agency will need to purchase RCP tires (of at least 50 percent recycled content) for all day-trip fleet vehicles and allocate 50 percent of their total dollar purchases to RCP tire-derived products.

The California State University system was consistently the largest purchaser of RCP tire or tire-derived products as a percentage of all tire or tire-derived product purchases. In contrast, DGS nondelegation purchases (purchases made by DGS for distribution or “sale” to other State agencies) has never reported the purchase of an RCP tire or tire-derived product over the three fiscal years of reporting.

DGS has never purchased a RCP tire because no RCP tires meet DGS’ product standards.

Conferences, Workshops, and Public Education (since 1992-93)

Program Summary

Since 1992-93, the Board has been funding education programs, including conferences, workshops, and public education efforts associated with amnesty days. In this case, the goal of the Board’s tire program public education effort have been to change behavior by:

- Making the public aware of the need to dispose of tires properly and compel the public to do so.
- Making purchasing agents aware of the availability of products made from scrap tires and encouraging them to purchase these products.

These public education efforts support the Board’s efforts to decrease the amount of tires in stockpiles and increase the number of tires that are used as a “commodity” rather than disposed of as “waste.” According to a 1993 IWMB report,

“The Board should help with development of the secondary materials market for waste tires by:

- *Acting as a central network for sharing market information on costs, barriers, and successful products.*
- *Educating the public to become aware of products made from waste tires.”*

The Tire Recycling Grants classified as having an education component include only those grants that were provided to local governments to fund amnesty days and public education efforts concurrent with those amnesty days.

The Biennial Tire Recycling Conferences were held as follows:

- 1993—Los Angeles
- 1995—Sacramento
- 1998—Santa Clara

The purpose of the recycling conferences was to provide attendees with up-to-date information on recycling, market development and management strategies, as well as solicit from attendees their input on developing recommendations to solve the State's scrap tire problem through the Board's tire recycling program. Between 100 and 200 people attended each of the three conferences.

The RAC and Crumb Rubber Products Workshops were held in Monterey on May 23, 1997 and Anaheim on May 30, 1997. The workshops were designed to provide participants with information needed for making sound decisions regarding the purchase of products containing crumb rubber. Between 50 and 100 people attended each of the two workshops.

Findings

Since 1992-93, the Board has spent more than \$820,000 on public education efforts.

Table C-20: Tire program public education activities since 1992-93

Program	Year	Cost	# of tires remediated	Cost per tire
Tire Recycling Grants	1992-93	\$119,703	39,156	\$3.05
	1993-94	\$200,504	133,300	\$1.50
	1994-95	\$338,660	177,682	\$1.91
Biennial Tire Recycling Conferences	1993	\$36,700	Unknown	Unknown
	1995	\$35,000	Unknown	Unknown
	1998	\$50,000	Unknown	Unknown
RAC and Crumb Rubber Products Workshops	1997	\$40,000	Unknown	Unknown
Total		\$820,567	350,138	

Source: IWMB

Most of the public education efforts undertaken by local governments included distributing flyers and running newspaper advertising and radio public service announcements. The local government amnesty programs were the only public education efforts to which specific numbers of remediated tires could be attached.

Generally, based on analyzing the participant evaluations from the conferences and workshops, the events were generally ranked by participants as "excellent" or "very good."

Table C-21: Overview of conference evaluations

	Evaluation Criteria			
Year and activity	Met my expectations (excellent or very good)	Conference was valuable (strongly agree or agree)	Conference facilities (excellent or good)	Conference format (excellent or above average)
1993 Conference	N/A	98%	N/A	N/A
1995 Conference	89.66%	N/A	100%	82.15%
1998 Conference	92.30%	N/A	42.9%	92.30%
1997 Workshop (Monterey)	69.20%	N/A	53.9%	53.80%
1997 Workshop (Anaheim)	66.60%	N/A	75.0%	75.0%

Source: IWMB

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Appendix E: Individual State Programs

Florida

Summary

Under Florida state law, a waste tire means a tire removed from a motor vehicle that has not been retreaded or grooved, including used and processed tires.

In 1988, Florida initiated its waste tire program. At the time the waste tire program was created, Florida had an estimated 18 million tires stockpiled. Today, approximately 3 million tires remained stockpiled around the state. However, Florida officials report the last site with over one million tires was abated under state cleanup contract last year. The largest remaining stockpile is 148,000 tires; the second largest contains 50,000 tires.

In Florida, the largest industrial use of waste tires is transformation in cement kilns or energy recovery (9.1 million); however, the production of crumb, retreaded and used tires, septic drain fields, RAC, and die cut parts, when combined, are greater than the number of scrap tires transformed (9.15 million). Florida prohibits the landfilling of whole waste tires; however, waste tires may be cut into small pieces, as defined by state law, and deposited or used as cover for landfills.

In 1997-98, the state tire program had a budget of approximately \$12 million. The Division of Waste Management (DWM) within the state's Department of Environmental Protection (DEP) administers the tire program that has four main components:

- Annual county grants.
- Mosquito control.
- Florida Department of Transportation (FDOT) research and development.
- Waste tire abatement.

Since 1989, total funding for these four programs has surpassed \$121 million, about 23 percent of all appropriations made from the Solid Waste Tire Management Trust Fund.

Fee

Florida's waste tire program is funded by the state's Solid Waste Management Trust Fund which receives revenues from the \$1/tire fee on all new tires, a .2 percent sales tax collection allowance and an annual sales tax registration fee.

Exempted from the \$1 tire fee are tires intended for agriculture uses, used, and retread tires. In 1997-98, the fee generated revenues of \$17.4 million.

Market Development

DEP provides annual grants to counties, based on county population. In 1997-98, counties received a total of \$8.43 million in tire grants. The Waste Tire Grant program to counties is the state's second largest solid waste grant program, just behind the state's

\$10.13 million Recycling and Education Grant Program (not tire-related). An additional \$2 million is expended by the state annually on mosquito control related to waste tire abatement from the Solid Waste Management Fund.

Counties may use the funds for a wide range of efforts related to waste tire disposal and recycling, including:

- Processing
- Site cleanup and abatement
- Mosquito control
- Technology development
- Establishing collection centers
- Purchasing products made with waste tires

The Solid Waste Fund also finances research and development for Florida's Department of Transportation (FDOT). FDOT uses about 10 percent of the 19.9 million waste tire generated annually in Florida in asphalt pavement applications. FDOT is not mandated to use RAC but, according to Florida officials, the department uses the product because of its performance and economic benefits. FDOT has jurisdiction over half of all of the roadways in Florida and uses RAC for all its resurfacing projects in the state.

Through its Department of Management Services, Florida has a statutorily mandated procurement plan for recycled content products. Florida also has a price preference for recycled products, including an elective 10 percent price preference, plus an additional 5 percent if the product is made from Florida-recovered materials.

Additionally, procurement officers may consider the lifecycle cost of a product when comparing recycled content products and virgin products. Florida requires all state agencies to spend a percentage of expenditures on recycled content products and to report their procurement activity through a uniform reporting mechanism. Statutory goals for purchasing recycled content paper were established for 1995 to 1998.

In 1993, Florida created a Recycling Market Advisory Committee to review and make recommendations to improve the state's recycling market development activities. To advertise the state's demand for recycled products, Florida has published a list of recycled content products (RCP) to heighten these products' visibility to state procurement officials.

Florida has also produced an on-line service that consolidates participating state RCP information into a single searchable database and has designed a streamlined procurement process for environmentally friendly products. The state's Recycling Committee has also sponsored workshops for vendors, recycling manuals for citizens and studies related to recycling market development.

Finally, staff reports the state's prison industry program has a retread manufacturing shop that produces tires for public agency use. The facility also provides job training for inmates and operates a statewide consulting service on tire selection for state vehicles.

Permitting and Enforcement

The primary emphasis of Florida's tire remediation program is cleaning up stockpiles not addressed by responsible parties or site owners. Under the original program, state law allowed DEP to contract for waste tire cleanup if the owners cannot or will not abate them.

Florida law allows tire generators, including commercial retailers and dismantlers, to stockpile up to 1,000 tires without a permit. However, non-generators must obtain a collection center permit (\$500 to obtain, renewable every 5 years), and any facility storing over 1,000 tires must obtain a processing facility permit (\$1,250 to obtain, renewable every five years).

Although DEP did not track all private tire site abatements and end uses of these waste tires, department personnel estimate that an estimated 4.5 million tires have been removed through private efforts since 1997. Since 1988, combined state-sponsored and privately funded efforts remediated over 10 million tires from 96 sites. In 1998, Florida reported the last of its million-tire sites was abated under state contract, amounting to the additional disposal of 5 million tires.

Like California, Florida regulates waste tire haulers. All collectors and transporters of waste tires must obtain an annual, \$35 permit from DEP to be affixed to vehicles transporting tires. Additionally, scrap tire generators must maintain records of the location, date, quantity, registration number of the collector, and name of the driver for review by DEP or law enforcement officers.

DEP's 1998 Annual Solid Waste Report recommended that Florida dedicate funds generated from the waste tire fee to waste tire programs and encourage the industry to use tire derived fuel through the development of incentives.

Noteworthy Tire Program Elements:

VITETTA found the following programs in Florida noteworthy:

- *High use of RAC by FDOT.* This use of RAC is entirely voluntarily and, according to Florida officials, RAC is so widely used by FDOT because of the performance and economics of the product.
- *Relatively decentralized tire program.* Florida's tire program is relatively decentralized compared to the Midwestern states examined. While not as decentralized as Arizona, Florida provides opportunities for county involvement through block grants which counties spend as they choose within a range of tire-related program. Additionally, the state delegates the cleanup of smaller tire piles (100,000 or less) to local governments.
- *Prison industry involvement.* Florida's prisons are involved in the tire program through the establishment and maintenance a retread manufacturing shop that produces tires for public agency use and provides job training for inmates.

Illinois

Summary

As defined in Illinois law, a waste tire is a used tire that has been disposed of; a used tire means a worn, damaged or defective tire that is not mounted on a vehicle.

In 1990, Illinois established the Used Tire Management Program designed to clean up tire stockpiles, develop markets for tire-derived products, control mosquitoes in tire piles and provide financial assistance to local governments.

Illinois estimates it generates slightly over 16 million waste tires annually and recycles 100 percent of these tires, primarily through energy recovery (13 million). An additional 2 million scrap tires are used in cement kilns, resulting in over 93 percent of Illinois' scrap tires being transformed for reuse. According to the DCCA estimates, Illinois imports 5 million tires and exports 1 million annually.

Although prohibited by state law, Illinois reports 500,000 tires were stored or illegally disposed of in landfills in 1997-98. If Illinois's recycling rate is adjusted to measure non-transformation and nonlandfill uses, about 3 percent of the state's tires annually go into recycled tire products.

Although the size of stockpiles was unknown when the program began, Illinois now estimates that less than 5 million tires remain stockpiled throughout the state. Last year, Illinois reports the state spent \$2 million for the permitting, enforcement and cleanup of more than 650,000 tires.

The total budget for Illinois' tire related programs, including market development programs, was approximately \$8 million for 1997-98.

Illinois' market development programs are administered the Department of Commerce and Community Affairs (DCCA). The permitting and enforcement programs are administered by the Illinois Department of Environmental Protection (IEPA), but the Illinois Department of Public Health (IDPH) and Department of Natural Resources (DNR) also administer small segments of the state's tire programs.

Fee

The vehicle transfer fee originally funded Illinois' tire program. However, in 1991, Illinois established a \$1 per tire fee, collected by retail tire dealers. Retreads, mail order tires, tire on vehicles (i.e., tires on new cars) and tires on non-motorized vehicles are exempt from the fee. Each year, the fee generates about \$8 million in revenues. DEPA and DCCA receive about 80 percent of these revenues and the remaining 20 percent go to the other state agencies.

Market Development Activities

Illinois state law authorizes about \$1.8 million annually for market development activities related to tires. The state administers several competitive grant programs, each with a variety of objectives including:

- Solid waste research

- Increasing the content of recycled material in products.
- Improving solid waste collection.
- General market development
- Waste diversion projects for end-product manufacturers

DCCA's Used Tire Recovery Unit provides grant and loan assistance to public, nonprofit, and private efforts to put tires to a productive end use. According to DCCA, the mission of the program is to create self-sustaining markets for Illinois' scrap and waste tires. In 1997-98, the largest grant given by DCCA was \$500,000 to tire processors and end users for equipment purchase.

Illinois also funds cleanup, including conducting 21 one-day amnesty days at the request of local governments throughout the state. The annual cleanups allow county residents, excluding commercial trucking companies or retailers, to bring up to 1,000 waste tires to designated collection points with no tipping fee. According to IEPA, in 1996, more than 500,000 waste tires were collected at 31 sites. Collections were scheduled for 21 sites in 1997 but total collection figures were not yet available.

Similar to California's Buy Recycled Campaign, Illinois requires state agencies, colleges, and universities to meet statutory procurement goals for purchasing of recycled content products (RCP).

Permitting and Enforcement

Illinois does not require a permit to stockpile tires; however, stockpiles must meet certain management standards and stockpiles of 5,000 or more tires must have a financial assurance mechanism or a tire removal agreement.

Illinois exempts tire retailers from the storage requirements if their tire inventory turns over every 90 days and the retailer has less than 250 tires stored outside and fewer than 1,300 tires stored inside.

Illinois state law charges the IEPA with permitting and enforcement authority for the tire program. If the owner of the property or responsible party refuses to remove and properly dispose of waste tires, the IEPA can perform the cleanup and recover the cost of the cleanup. A separate fine may also be levied against the owner, equal to double the cost of cleanup.

Like California, Illinois regulates tire haulers and prohibits the transport of more than 20 waste tires without being registered with IEPA and displays the appropriate placard. All tire hauler registrations are effective for two years and are renewable.

Noteworthy Tire Program Elements

The following tire program elements in Illinois are noteworthy:

- *Exemption for turnover.* Illinois exempts tire retailers from storage requirements if their inventory "turns over" within 90 days. This encourages retailers to turn over their scrap tire inventory quickly.

- *Haul up to 20 tires without a permit.* Illinois allows citizens transporting tires to haul up to 20 without a permit from the state. California currently limits to four the number of tires that can be hauled without a permit.
- *Number of state agencies involved.* There are four state agencies directly involved in tire-related program in Illinois, more than in any other state reviewed by VITETTA
- *Degree of centralization.* Like Wisconsin, Illinois' tire program is extremely centralized. Almost all of the tire program-related activity (with the exception of local cleanup days that the state runs and funds) occur independently of local government activities.

Wisconsin

Summary

As defined in Wisconsin law, a waste tire means a tire that is no longer suitable for its original purpose because of wear, damage or defect.

During the fall of 1986, a tire fire began at one of Wisconsin's largest stockpiles. By the time the fire extinguished itself, an estimated 2 million tires had been burned. This fire highlighted to the state legislature the potential environmental and public health risks associated with uncontrolled tire storage and disposal of scrap tires.

In 1988, Wisconsin imposed a fee on vehicle tires and promulgated regulations regarding the storage of scrap tires. In 1990, Wisconsin established the Waste Tire Removal and Recovery Program within the state Department of Natural Resources (DNR), with the intent of establishing a temporary rebate program, which sunsetted in 1997, to encourage the productive end use of scrap tires. Wisconsin banned all scrap tires from landfills in 1995, but DNR has the authority to waive the ban in certain cases.

Wisconsin officials estimate 5 million scrap tires are produced annually in the state and that nearly 100 percent of these tires are put to productive end use through energy recovery (4.5 million) and the production of crumb, reuse/retread, manufacturing of other recycled products (0.5 million).

Less than four million tires are imported annually, with less than 2.5 million exported. If Wisconsin's recycling rate is adjusted to measure non-fuel uses, about 10 percent of the state tires annually are put to productive end use.

Over the past nine years of the program, Wisconsin cleaned up over 89 percent of the sites containing Wisconsin's 15 million stockpiled tires. In a 1998 program report, DNR estimated approximately 350,000 tires remain in stockpiles, mostly in small (less than 500 tires) sites throughout the state.

In total, Wisconsin's program collected, reused, or otherwise properly disposed of 33 million tires (both "new" flow and stockpiled) over the nine-year course of the program, at an estimated cost of \$.64 per tire through private, local, and state funded cleanup efforts.

Wisconsin's program had three main elements:

- Waste tire reimbursement grant program.
- Waste tire management and recovery grant program.
- Waste tire stockpile cleanups.

Wisconsin's Rebate Program

State law authorized \$1 million annually for two grant programs under the Waste Tire Removal and Recovery Program:

- Reimbursement to users of scrap tires grants (allocated 75 percent of the fund annually) in the amount of \$.20 per tire for transformation and \$.40 per tire for other productive end uses.
- Scrap tire management and recovery grants (allocated 25 percent of the fund annually).

Table E-1: Expenditures for Wisconsin's waste tire removal and recovery program since program inception (1988-1997)

	Total expenditures over the course of the program
Reimbursement grants	\$8.5 million
Management grants	\$1.4 million
Recovery grants	\$1.1 million
Stockpile cleanups	\$10 million
Total	\$21 million

Source: Wisconsin tire program officials

Reimbursement grants were designed to compensate end users and processor of scrap tires for the cost of developing and operating waste tire recovery activities.

Over the past six years of the reimbursement grant program, 106 grants were awarded to 33 recipients, totaling \$8.5 million. These grants financed the collection and productive end use of more than 33 million tires. The overwhelming majority of the rebates (96 percent) were awarded to transformation facilities, with a small portion (4 percent) allocated for highway improvements and other product development.

The largest total grant given by DNR during the course of the program was \$1.6 million to Wisconsin Power and Light for use of tire-derived fuel.

Rebate-eligible end uses, as defined in Wisconsin state law, included:

- Energy recovery
- Pyrolysis
- Highway improvements

- Manufacture of new products

End uses not eligible for rebate included:

- Landfill disposal.
- Reuse as a vehicle tire or erosion control.
- Other uses of whole or split tires such as for barriers or fencing.

Under the scrap tire management and recovery grant program, DNR awarded a total of nearly \$2.5 million for 116 management and recovery grants over the course of the program. Most management grants went to local governments to assist with routine or annual waste tire cleanups. Recovery grants were generally awarded to private organizations for research and development activities. Grant awards were limited to 50 percent or 75 percent of the eligible costs, with a maximum award of \$50,000.

Permitting and Enforcement

Wisconsin law allows tire retailers and removal businesses to stockpile up to 500 tires without a permit and completely exempts auto dismantlers from solid waste storage licensing requirements for waste tire storage.

Although DNR was authorized by state law to spend \$2 million annually for state-sponsored cleanup, it also works with private parties to ensure cleanup of illegal piles. DNR can ask that the Attorney General sue the responsible party for stockpile cleanup costs and legal expenses related to cleanup. In its 1998 report, DNR had recovered about 9 percent of the total cleanup costs through settlements and court awards.

While the tire program has expired, Wisconsin officials report that tire-related permitting and enforcement activities continue to be carried out by solid waste field staff at DNR.

Fee Collection

The \$2 per tire fee (\$10 total per vehicle) was collected by the state Department of Transportation at the first-time registration of a new, on-road vehicle (used and off-road vehicles exempted).

Annual revenues generated from the fee varied between \$2 million and \$3 million annually. In 1996-97, the last year of the program, the program's total budget was \$2.5 million and with total revenues of \$2.75 million.

Termination of the Program

On June 30, 1997, Wisconsin's program sunsetted and the fee was eliminated. Two years prior to the termination of the program, DNR reported that all tire stockpiles were nearly eliminated and that the market for "new" flow tires was relatively stable.

No additional funding was provided for the tire program subsequent to the termination of the program and fee.

State lawmakers are expected to revisit the issue of tire end uses within the next five years. Since the termination of the reimbursement grant program, six months prior to the

sunset of the entire program, several energy recovery facilities stopped accepting crudely processed tires, and several facilities terminated operations.

According to Wisconsin officials, nine transformation facilities were operating during the course of the rebate. Since the rebate expired on January 1, 1997, six facilities have either closed or stopped using tire-derived fuel, leaving three transformation facilities in Wisconsin today.

Wisconsin officials also report that environmental groups are now raising air quality issues associated with transformation. Additionally, the remaining transformation facilities are concerned about the economics of tire-derived fuel.

Currently, the market for tire-derived fuel is stable and economically feasible, but the use of other cleaner-burning fuels, like natural gas, may soon strongly compete with tire-derived fuel. As older transformation facilities, like pulp factories, replace older machinery with new cleaner-burning machines, Wisconsin officials expect the demand for tires to decrease.

However, Wisconsin solid waste personnel believe that a high volume, end use alternative other than transformation, such as roofing material or highway construction, may eventually need to be developed as an alternative end use for the state's annual 5 million scrap tire flow. Unless an alternative to transformation is identified, officials there believe that the state may have to consider a partial repeal of its landfill ban to permit the disposal of processed tires.

Noteworthy Tire Program Elements

Noteworthy tire program elements in Wisconsin:

- *Wisconsin's fee collection method.* Collection of the fee at the point of new vehicle registration resulted in low cost of fee collection (less than \$50,000), compared to California and Florida where the fee is collected by at the tire retail level and the estimated cost of collection is about \$500,000.
- *A property tax rebate to tire-related businesses administered by the Department of Commerce.* The Departments of Commerce and Natural Resources offer long-term, low-interest loans to private entities to fund the acquisition of new technology related to productive end use of scrap tires.

Arizona

Overview

Under Arizona law, a waste tire is defined as a tire that is no longer suitable for its original intended purpose because of wear, damage, or defect. "Waste tire" does not include tires used for agricultural purposes as bumpers on agricultural equipment or as ballast to maintain covers at an agricultural site.

Arizona generates approximately 4 million scrap tires annually. Of these, three million are diverted to a crumbing facility that processes tires to be used in road construction, most of which is used in Arizona state roads. The remaining million "new" annual flow

tires are either exported to California (to the Azusa monofill or the BAS crumb rubber processing facility) or landfilled in a new county solid waste facility in La Paz County.

Two cement kilns currently have permits to use tire-derived fuel. However, according to Arizona officials, neither is currently using tire-derived fuel, mostly because of public opposition to transformation. State law requires the Arizona Department of Environmental Quality to permit cement kilns to use tires as fuel if the facility can demonstrate that it will result in emissions equal to or lower than that produced by other types of fuel.

From 1990 to 1993, responsibility for Arizona's tire program was divided relatively evenly between the state and the counties. In the early 1990's the state executed a contract with a processor to build a crumbing facility and process all of Arizona's scrap tires. Arizona Department of Environmental Quality (ADEQ) kept 5 percent of the program revenues for administration and divided the remainder between Baker Rubber (55 percent) and the counties (45 percent).

In 1993, Arizona's 15 counties became fully responsible for the state's scrap tire management program, and 13 counties joined together to form a consortium led by the largest county, Maricopa. The county consortium contracted with a tire retreading and recycling company to build a pyrolysis plant on an Indian reservation. The company began collecting tires in anticipation of the construction and operation of the plant and eventually had 4 million tires stockpiled on site. The company filed for bankruptcy and in 1995 each of the counties became free to contract with the tire processor of its choice.

Currently, each county is required by state law to maintain a collection facility and take tires from tire retailers at no charge. Counties then pay tire processors a per tire fee to haul the tires and dispose or process them. All parties other than tire retailers with manifests and county residents with five or fewer tires must pay a tipping fee when depositing tires at the county collection facilities.

According to state officials, many counties are currently storing hundreds of thousands of scrap tires at the tire collection facilities. Counties do this in order to maximize their financial relationship with tire processors. If counties stockpile tires and have tire processors haul the tires away once per year it costs less than more frequent removals.

Because Arizona counties pay processors to haul and process all the tires left at the collection facility, some in the industry characterize Arizona's system as providing a "rebate" for tire processors. However, Arizona differs from Wisconsin in that it doesn't provide a payment for each tire used. Rather, counties pay one or more processors to help the county deal with the tires deposited at county collection facilities.

Essentially, Arizona has placed the counties as the "middle men" between tire retailers and tire processors. In California, tire retailers contract directly with tire processors and/or tire haulers and pay to have tire removed from their retail facilities.

Arizona provides a free "outlet" for tires from retailers and, instead, "passes through" the county to the tire processor the tire fee paid by the consumer at the time of purchasing a new tire. According to ADEQ officials, counties generally pay an average of \$93 per ton to processors to haul and dispose/recycle the collected scrap tires.

Fees

In 1990, the Arizona Legislature passed a law establishing a 2 percent fee on the sales price of new tires. The fee is capped at \$2 per tire sold (average fee paid is \$1.10 per tire) and is collected by the retail seller of the tire. The fee is collected by the Arizona Department of Revenue and retailers are allowed to keep \$.10 to cover administrative expenses. ADEQ is the administering state agency for the tire program. According to ADEQ officials, the Department of Revenue does not retain a portion of the tire fee collected to cover the costs of collection but, instead, covers these costs through the department's general budget.

Market Development

According to Arizona officials, ADEQ currently has no market development program. State officials believe that any market development undertaken by a county would likely be funded out of the county's general fund.

Permitting and Enforcement

Despite shifting responsibility for the tire program to the counties, ADEQ continues to provide tire facility permitting and enforcement throughout the state. Arizona has scrap tire storage requirements, as follows:

- Storage facilities with less than 500 tires have to be stored in compliance with local zoning and fire codes.
- Storage facilities with 500 to 4,999 tires must be registered with ADEQ as a waste tire collection site and tires must be stored in accordance with state statute. No financial assurance is required.
- Storage facilities with over 5,000 are classified as the state as a "solid waste facility" and must be permitted as such, including providing financial assurance and a cleanup plan.

Arizona does not currently regulate tire haulers.

Noteworthy Tire Program Elements

The following elements in Arizona's program are noteworthy:

- Degree of decentralization. Arizona's tire program is the most decentralized of all the states reviewed. Responsibility for tire collection and disposal rests with the counties. Counties also receive almost all of the tire fee revenue collected, with the state maintaining a small portion to cover administrative, permitting and enforcement costs. While decentralization can allow new partnerships and ideas to be generated, there is also a danger in decentralization, as evidenced by the county consortium experience in 1993.
- Allowing tire retailers to dispose of tires for free and county residents to dispose of five or fewer tires annually for free. In Arizona, tire retailers with manifests can dispose of tires at county collection facilities with no tipping fee. In California, tire retailers generally contract with a tire hauler or processor and must pay for tires to be hauled and processed. This creates an economic incentive for certain tire retailers to dispose of their scrap tires

illegally and thus avoid paying the tip fee. Allowing county residents to dispose annually of a small number of tires without a tip fee may also help decrease the number of smaller, illegal piles.

- Amount of tires stored at tire collection facilities. Arizona state officials noted that a number of counties, for economic reasons, opt to have tires hauled away once per year, resulting in potentially large number of tires stockpiled.

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