

## **CHAPTER 4**

### **ROLE OF THE LIVESTOCK INDUSTRY**

California's highest-value agricultural industry, livestock, has two major components, dairy and beef, as well as other smaller activities—hogs, sheep, goats, and exotic animals such as llamas. Compared to dairy and beef, the economic relevance of other species is small but they could play a role in the spread of a FMD outbreak.

In 1995, gross cash receipts from farm marketing of dairy products in California amounted to \$3.1 billion, and \$1.3 billion from cattle marketing (CASS). Recorded sales of hogs in the state that year were \$38 million, and sales of sheep, \$56 million. However, the actual value of hog and sheep sales was substantially larger because a large number of backyard operations do not enter formal commercial channels.

In addition to the direct effect on the state economy, the dairy and livestock industries have a large economic impact through backward linkages such as purchased inputs, supplies, and services used by farmers and forward linkages such as milk processing, meat preparation and processing. The dairy industry is a major supplier for the beef industry, selling live animals for fattening and slaughter as well as animal feed in the form of whole milk or by-products from milk processing. The pig and sheep industries involve a smaller number of linkages.

Although the total cattle inventory has remained almost constant in the last decade, its composition has changed. California's beef herd has been shrinking slowly, but this decline has been offset by expansion of the dairy industry. These trends have increased the risks associated with a FMD outbreak because dairy farms tend to form denser clusters than beef ranches, and dairy cows are confined in larger herds and smaller pens.

Various types of firms interact in the beef and dairy industrial chain—cow-calf operations, breeding stock ranches, stocker operations, feedlots, dairy farms, heifer ranches, milk processing plants, saleyards, slaughterhouses, custom-kills, beef packers, trucking companies, input suppliers and service providers such as veterinarians and AI technicians. All these are potentially important in case of a FMD outbreak.

The state dairy and livestock industries are undergoing substantial changes due to new technologies, demographic shifts and stricter environmental regulations. These changes affect the options in dealing with a FMD outbreak. Because the new technologies have important economies of scale, the average size of dairy herds has increased while the number of dairies has fallen. Similar trends occur in the cattle and hog industries (Perez, 1994). Decreasing transportation costs encouraged interstate

cattle movement to take advantage of seasonal pastures. A few examples are feeder cattle imported at the start of the winter to take advantage of California's mild climate and re-exported to other states in the spring; feeder pigs imported into the state for finishing and slaughter; and sows exported to other states for slaughter. Since the receiving states also have important livestock industries, it seems unlikely that a FMD outbreak would be restricted to California. Meanwhile, the growth of California's population has had two effects on the livestock industry: (1) interstate and international trade in livestock products has increased to satisfy a growing urban demand for meat and dairy products, and (2) as the price of land has been raised by the expansion of urban areas, farms have been forced to relocate. As a consequence of this relocation, animal densities in the destination areas are rising.

Detailed descriptions of California's beef, dairy, swine and sheep industries are in Appendix A.

### **Significant facilities**

*Saleyards.* Even though saleyards generally handle all types of cattle, in any particular day they specialize in one type. Most of the cattle sold in the South Valley (Fresno, Kings, Tulare and Kern counties) come from local dairies and ranches, and are sold to local buyers. A small number of animals, however, originate in or are sold to farmers as far away as the East Coast. Some heifers are sold to dairymen from the Chino Valley. Usually the animals arrive to the saleyard on the same day of the sale; some stay overnight after the sale. Milking cows are milked in a milk barn adjacent to the main facilities and this milk is used to feed calves. Animals sold or bought locally are generally transported by the farmer, but in some cases a trucking company delivers animals to different local dairies in the same trip. Multiple deliveries occur when the dairies belong to the same owner, or the owners are linked by family ties. Specialized transportation companies may be used to move large lots of animals either locally or to distant locations. Animals raised in youth programs and not sold at fairs are usually sent to saleyards.

It is not economically feasible to have a veterinarian inspect all animals upon arrival to the saleyard. Some dairy heifers are checked for pregnancy by a veterinarian. In most cases, a state livestock inspector and a brand inspector check incoming animals, and determine whether they have to be checked more closely in the slaughterhouse. Saleyard employees help the inspectors identify sick animals. Saleyards generally impose voluntary quarantines on premises suspected of being infected because they cannot afford to be seen as careless about the health of the animals they sell. Many saleyard employees have other employment in close contact with susceptible animals.

Cull dairy cows are generally sold to slaughterhouses, but a few (less than 5%) are bought by other milk producers, some in the Chino Valley. Between 15% and 20% of cull cows are sold to slaughterhouses in the Los Angeles basin. About 90% of heifer buyers and 70% of sellers are located within 50 miles of Tulare. Most of the remaining customers are located within 100 miles. Less than 2% travel more than 100 miles.

Two saleyards in the South Valley specialize in smaller livestock, but on auction days some dairy cows are on the premises. Because these sales occur on Fridays, very sick cows are common; producers cull them rather than run the risk of the cow dying during the weekend. Small hog producers send their animals to the saleyard in Dinuba, from where they are shipped to the slaughterhouses. Traditional buyers of small animals (other than pigs) are custom-kill operators and backyard operations, including small commercial premises, youth program participants and families. Sanitary controls on these premises are practically nonexistent.

Saleyards would have no problems in returning to business after eradication of an outbreak of FMD.

*Fairs and shows.* During the spring and summer, a number of fairs and shows congregate breeding stock and animals of various species raised in youth programs. There is no sanitary control of participating animals. Small trucks offer their services to the fairs, and usually stop at several ranches. Many 4H members buy their animals directly from farms (sometimes out of state), raise them at home or in livestock facilities owned by family or friends, and sell them at fairs. Participants in youth programs generally do not use veterinary services.

The number of species involved and the lack of sanitary controls make the risk posed by fairs and shows relatively high. The risk is compounded by the fact that these events are the only place where animals raised in backyard operations come into contact with breeding stock that return to commercial operations. Measures to increase sanitary controls in fairs and shows should be evaluated. In particular, a requirement that all animals be checked by a veterinarian upon arrival should be considered. This would provide minimum health coverage to producers who generally have no bio-sanitary controls. A complementary program could target preventive information to participants in youth programs.

The fairs and shows would have no problem in returning to business after an outbreak of FMD because they serve primarily local producers.

*Slaughterhouses.* Because of strict quality specifications in beef markets, slaughterhouses tend to specialize in particular types of animals. Slaughterhouses are controlled by either federal or state inspectors to insure that they comply with technical and sanitary standards. In 1996, 26 federally-inspected plants in California killed 1.02 million head of cattle and 17 such plants killed 270,400 calves. The total number of state-inspected plants in that year was 45 (NASS).

The largest slaughterhouse in the South Valley is now expanding its processing capacity to 1,500 head per day. There are two other relatively large facilities in the area, each with a capacity of about 800 head per day. The slaughter capacity of all slaughterhouses and custom-kills in the South Valley is about 4,800 animals per day. In the course of this study a number of livestock concentration points and plants processing livestock products were visited. None had a contingency plan to deal with an outbreak of a foreign disease. In a few cases, particularly in those sectors of the industry closer to the

consumers, some measures were taken to deal with perceived threats such as bovine spongiform encephalopathy (BSE).

Large lots of cattle (38 to 40 head) are hauled for slaughter in trucks owned by the slaughterhouses. Smaller lots (10 to 20 head) are hauled by private trucking companies. These trucks generally stop in more than one premise but do not enter the pens. Trucks generally make three to four trips a day and are washed every night. Slaughterhouses are also cleaned every night.

In one large slaughterhouse, about 5% of the animals slaughtered traveled less than 10 miles, 25% less than 50 miles, 75% less than 100 miles, and 25% came from out of state.

Slaughterhouses could have severe problems in regaining lost markets after eradication of a FMD outbreak. Most difficult would be regaining access to foreign markets, because of the increased competition from other suppliers and the reluctance of importers to buy from a recently infected country.<sup>6</sup> Difficulties in the domestic market would depend on the extent of the outbreak. If other states are also affected, it should be easier for California slaughterhouses to sell out of the state than if the outbreak is contained in the state. Even in the latter case, it should be possible to sell the meat in-state, given that California has a large beef deficit.

*Milk processing plants.* Milk processing plants generally specialize in broad groups of dairy products (fluid milk, dry milk, cheeses of a certain type, etc.). In 1997, 20 plants were registered to process milk in the South Valley. Their combined capacity is not sufficient to process all the milk produced in the region; a substantial volume of milk is shipped to facilities in the Chino Valley (Butler, 1992).

Milk processing plants in the South Valley cooperate to process additional milk when one plant cannot operate normally; these milk transfers, however, are expected to last one or two days at most. It is expected that in the case of a FMD outbreak these arrangements would not allow processing of all milk produced in the area in the first days of the quarantine. The reason is that production of certain products (e.g., dry milk) would have to cease completely. The remaining plants would have to absorb an increased volume until the disease or depopulation reduces milk production to manageable levels. The problem would be compounded because shipments into the Chino valley would be halted unless that region is also quarantined.

*Custom-kills and backyard operations.* A small number of animals are slaughtered in custom-kills inspected by state inspectors. In some cases the inspector owns the premises and rents them to the animal owner who does the killing. The inspector insures that the animals are healthy and that the premises are clean. A smaller but unknown number of animals—small ruminants and hogs in particular—is slaughtered without inspection in backyard operations. These are not subject to sanitary

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<sup>6</sup> For instance, Fuller, Fabiosa and Premakumar (1997) estimated that it could take Taiwan 10 years to become a major pork exporter again.

controls nor are the remains disposed of with appropriate procedures. These animals, however, pose relatively low risk to the rest of the livestock industry because they have very little contact with commercial premises— except when they are owned by an employee of a commercial livestock operation. Still, the role that backyard operations could play in a FMD outbreak should be further investigated.

Some small custom-kills have cattle, pigs, sheep and goats on the premises. Even though these do not use veterinary services, they are forced by their customers to maintain high quality standards. In a few cases, the animals are brought directly by the customer. These are inspected at the entrance and allowed in only if they are healthy. Rejected animals are taken back by their owners and disposed of without any sanitary controls. Occasionally, healthy pigs are lent by the operator of the custom-kill to persons in Asian communities who use the animals for religious ceremonies. After the ritual, the animals are returned to the custom-kill.

Custom-kills operate for a very small and selective clientele. If the disease outbreak is widespread, affecting a large number of establishments, it should be easy for these small operations to return to business. However, it might be difficult to regain customers who have experienced the convenience of prepackaged meats for several months.

*Rendering services.* Dead livestock in the South Valley generally are collected by rendering trucks, which make an average of 30 stops in each trip and pick up all species except sheep. On average, the trucks operate within 100 miles of the rendering plant. Carcasses are picked up wherever producers leave them—the trucks may go into the pens or remain at the entrance. In a few cases, producers take the carcasses to the rendering plants; when the plants are closed, carcasses may be dumped at the gate. Truck drivers refuse to collect from premises with an abnormally large number of carcasses unless the cause of death has been determined by a veterinarian. Even though the carcasses may not be picked up for several hours, or a couple of days during weekends, very few are eaten by wild animals.

*Veterinary services.* As the size of dairy and beef herds has increased, the nature of veterinary services demanded has shifted from emergency attention to preventive plans and reproductive checks—a trend that has also been observed in Europe (Dijkhuizen, Renkema, and Stelwagen, 1991). The animals are routinely vaccinated, and antibiotics are given as a preventive measure. To avoid medicine and veterinary costs, and the risk of having a milk load rejected because of antibiotic residues, producers tend to cull animals at the early signs of sickness. Generally the dairies receive two veterinary visits per week for pregnancy checks and health management.

Veterinarians usually visit more than one premise per day except when working on large herds where they stay the entire day. It is not customary for these professionals to thoroughly clean and disinfect equipment and clothes between visits on the same day.

Presently there is little formal interaction between veterinarians in private practice and Animal Health Branch (CDFA) or APHIS. Private practitioners may not be aware of official contingency plans to deal with an outbreak of a foreign disease.

### **The dairy industry: Risk factors**

The dairy industry in the South Valley is very vulnerable to FMD because it is geographically concentrated in extremely dense clusters of premises and animals. Dairies in this area are larger than the state average; the typical large dairy has about 1,500 lactating cows and the largest one has 8,000 cows. Because premises of this size are extremely specialized in milk production, they buy large quantities of inputs and services. A large number of movements in and out of a dairy are necessary to deliver them.

A second risk factor is that, in these conditions, an infection will spread very fast. The large number of infected animals will shed massive amounts of virus, which can be carried by wind, feral and domestic animals to neighboring herds. Finally, depopulation of herds this large pose major logistical problems which have not yet been studied (see Chapter 6, The Action Plan and Related Issues).

Depending on the dairy size and production practices, milk is collected up to three times a day. Trucks visit as many dairies as necessary to fill the tank. Approximately half of all collection trips stop at more than one dairy, most commonly at three. The trucks are washed daily or when a load is rejected. Non-commercial milk is picked up daily; these trucks visit about 10 dairies per day.

The truckers conduct an antibiotic residue test before unloading the milk at the milk processing plant. If the residues are above the acceptable level, the load is rejected and the producer of the rejected milk is financially responsible for the entire load. The number of rejections generally increases during the winter due to climatic conditions favoring development of mastitis and use of antibiotics. Approximately 300 trucks, with an approximate volume of 1.8 million gallons of milk, are rejected each year in the entire state. The number of rejected loads has been falling in recent years.

The trucking company or the producer may try to sell the rejected milk to livestock operators; only if a buyer cannot be found is the milk dumped. A market for rejected milk has developed; for example, the value of rejected milk in April, 1997, varied between \$0.25 and \$0.50 per gallon. Only relatively large livestock operations have the equipment to store a truckload of rejected milk. None of these are hog operations.

Rejected milk fed to animals could be a major source of diffusion of a FMD outbreak because large quantities of the virus are present in the milk up to four days before clinical signs appear. Considering the small volume of milk involved and the risk it creates, a ban on feeding rejected milk should be studied.

It is usual for dairies in the region to sell their bull calves to calf buyers, who visit the premises every day. On any day these buyers visit about 25 dairies. Heifer cows are sold to heifer buyers who also visit the dairies daily; each visits about 15 dairies per day. Hoof trimmers visit smaller dairies about twice a year, large dairies more often. They visit about two dairies per day. About 25% of the dairies use AI services. On average, AI technicians visit about three dairies every day; fewer in the case of larger herds.

All commercial dairies buy commercial feed, and the daily number of arriving feed trucks depends on the size of the dairy. Larger dairies receive about two visits per day. In some cases these trucks drive through the alleys, close to the pens. The trucks are not washed between visits. Inspectors also visit the dairies and get close to the cows or milking equipment. On average, dairies receive one inspector per week and each inspector visits five dairies per day. Once or twice a year manure is removed from the corrals. The usual manure removal team consists of a loader and three or four trucks; larger dairies have more than one team working simultaneously.

The number of movements in and out of a typical dairy in the South Valley during a two week period is close to 100. For dairies close to the milk plant they ship to, most of these movements are within 10 miles. Very few movements exceed a 100 mile radius. Sometimes a single owner owns more than one dairy, or several owners are linked by family ties. It is common for these operations to share equipment and facilities such as cattle trailers, calf ranches or hospital pens. About 15% of the dairies move cattle between their premises in this way. Cattle movements between non-linked dairies are very unusual.

The identified high risk movements are:

- Cattle movements between dairies.
- Neighbor dairymen visiting the pens.
- Movements of dairy employees in close contact with the animals, particularly when they live with employees from other dairies.
- Movements of AI technicians (daily), veterinarians (approximately once a week), manure removal (once or twice a year), hoof trimmers (twice a year).
- Visits of milk trucks (once or twice a day), and feed trucks if they drive close to cows to reach the commodity barn (daily).
- Deliveries of supplies and repairs that get close to the cows (twice a week).
- Visits of calf buyers (daily), dairy inspectors and utilities personnel who work close to the cows.
- Cull cows sent to saleyards (weekly), and heifers sent to heifer ranches (weekly).

Low risk movements are:

- Visits of feed trucks if they do not drive close to cows (daily).
- Deliveries of supplies and repairs that do not get close to the cows (twice a week).
- Visit by milk tester (once a month).
- Cull cows sent directly to slaughterhouses (weekly).

The risk posed by rendering trucks (daily or every three days according to the season) depends on where the carcasses are picked up. If it is outside the dairy, the risk is low. However, in the few cases when the trucks drive into the premises to load dead animals, these movements pose a high risk.

A small percentage of dairies in the South Valley, in particular those of smaller size, have pigs in the premises. Most dairies have dogs and cats. Birds, rodents, stray dogs and a few coyotes visit the facilities. All of these could spread FMD. In the South Valley no other wild animals come in contact with dairy cattle.

### **Dairy market impacts**

It is difficult to anticipate the behavior of milk prices in the case of an outbreak of FMD. At the national level, reactions would be determined by the geographic extent of the outbreak. The U.S. supply of fluid milk would be severely disrupted and milk would have to be imported from outside the quarantine area, probably from other states and Canada. Due to location advantages, the industry in California should have no problem in eventually reentering the fluid milk market. The national supply of milk for processing would also be interrupted. The feasibility of returning to this market, however, would depend on the magnitude of the outbreak, the eradication policies implemented and the performance of the industry outside the quarantine area. The larger the area infected, the larger the impact on national dairy markets, but California's dairy processing industry would have less problems in retaining its market share.

Past federal support policies have induced dairy processors to produce mostly products purchased by the CCC. For California, this has meant butter, nonfat dry milk, and cheddar and mozzarella cheese. More recent changes in federal dairy support policies will likely induce some processors to shift to the production of other cheese varieties or other dairy products. This change in the state's output mix could have an impact in dealing with a FMD outbreak because the virus does not survive in cheddar and mozzarella cheeses but does in many other dairy products.

### **The beef industry: Risk factors**

There are four types of beef cattle operations in California: cow-calf, breeding stock, stocker and feedlot (Jensen and Oltjen).

Cow-calf operations maintain a breeding herd of cows, replacement heifers and bulls. The cow herds

tend to be located near low-cost forages. These ranches have little interaction with other premises in the South Valley. Most of their animal movements range between 30 and 50 miles and involve purchases and sales of animals. However, an increasing number of cow-calf operations are raising calves for dairy farms in the Valley. The herd is rotated on average twice a year. Visits by veterinarians and input suppliers are rare. Rendering trucks seldom visit the premises; sick animals are generally sold before they become too sick to travel.

Breeding stock (seedstock) production is a specialized cow-calf operation producing purebred or registered cattle. Seedstock are marketed as herd sires and replacement females to other seedstock producers or to cow-calf operators. Many of these ranches participate in fairs and shows, where they come into contact with backyard animals.

Stocker operations raise steers and/or heifer calves or yearlings on rangeland or other roughages. Generally, the cattle are purchased following weaning in the fall and are wintered on low quality feed until new grass can support them. An important, although undetermined, portion of these animals is imported from other states. Stocker operations also may buy young animals from dairy farms. Heavy stocker cattle are normally marketed or transported to feedlots at 650 lb.; light cattle may stay for one more feeding season or be moved to farms out of the state. Most of the sales occur at the end of the grazing season when the nutritional quality of the forage starts to decline. Some stockers also grow dairy heifers which are sold to dairies when they reach the appropriate weight. Cattle movements occur generally twice a year, most beyond 10 miles.

The number of feedlots in California has fallen over the years; their average size, however, has increased (in certain areas, air and water regulations limit potential growth of the industry). CCA listed 31 associated feedlots in 1996, with an average capacity of 23,300 head. They were concentrated in two areas—the Imperial Valley, ranging in size between 30,000 and 50,000 head, and the San Joaquin Valley, generally between 15,000 and 20,000 head. However, the largest single feedlot in the CCA list (80,000 head) as well as the smallest (210) both were located in the San Joaquin Valley. Animal Health branch (CDFA) has identified 15 feedlots in the South Valley. There is also a relatively large, but unknown, number of backyard operations with small herds of less than 20 head.

Larger heifer ranches have about 8,000 head, the smaller, 1,000. Many of these feedlots share personnel with dairies. Calves are brought in almost every day, while out-movements occur about twice a month. Many of these feedlots use colostrum from dairies to feed the calves. The premises are visited daily by several calf buyers.

From the disease standpoint, feedlots are the riskier beef cattle operations in the South Valley, due to the aerosols and contaminated waste water generated by the large number of animals on the premises. A feedlot receives about two feed trucks per day. Particularly high risk is posed by pen riders who work in more than one feedlot. About one inspector per week visits a premise; buyers, supply dealers, cattle trucks and veterinarians visit almost every day.

**Beef market impacts**

Should a FMD outbreak occur, domestic and foreign trade would be disrupted. The exposed animals that show no signs of infection can be consumed within the quarantine area but infected animals must be destroyed. As depopulation advances, there would be need to import more beef into California. After eradication, beef producers should be able to return to business in the state because of favorable growing conditions and large in-state demand. Reopening markets in other states would depend on whether FMD occurred in other states and the market gains made by non-infected states during the outbreak. Markets in FMD-free countries would be closed for at least two years after eradication of the last outbreak or cessation of vaccination, and it would be very difficult to return to them—at least in the medium term of about 10 years after elimination of the outbreak.

**The swine industry: risk factors**

Most hogs and pigs sold in the state are born in California. Inshipments, mostly feeder pigs and market pigs for slaughter, are less than 10% of the animals marketed. When culled, many sows are shipped to the Midwest for slaughter. In-state, culled sows are killed only in custom kills. In 1996 there were 16 federally inspected plants in California that killed almost 2 million hogs (NASS). The number of animals slaughtered without sanitary control has risen in recent years due to the increased demand from ethnic minorities. It is estimated that about 5% of the annual slaughter is carried out in backyard operations. The statewide swine industry is described in Appendix A.

A survey of facilities with pigs in the South Valley showed that 23 operations have more than 200 pigs each and several large operations have more than 2,000. A large number of small operations have less than 200. Many of these smaller premises specialize in raising animals for ethnic markets that demand special types of carcasses. There is also an unknown number of backyard operations with a few animals for self consumption or direct sale. In a recent survey, Animal Health Branch of CDFA identified 181 operations ranging from one to 200 pigs (it is believed, however, that the real number of backyard operations is much larger).

Some dairy employees raise a few pigs on the premises. Also, pigs are the most common project chosen in youth programs such as 4H; it is estimated that several thousand hogs are raised in these programs. A large number of children visit pig operations in a clear seasonal pattern coinciding with the start of youth projects. In buying a pig, 4H members usually visit more than one premise in a day.

In general, bio-security measures are tightly observed only in the larger operations. The medium sized operations have minimal observance and smaller operations take no precautions at all. The latter usually do not use veterinary services. Sick animals are sold in saleyards. In most cases dead animals are picked up within the premise by renderers.

Commercial operations usually feed their pigs with commercial rations. Smaller operations use

commercial feed and also garbage from supermarkets and restaurants. Feed trucks usually visit the premises twice a month, dropping their load anywhere in the premises. Farms with more than a 100 sows usually sell pigs every week.

Garbage feeding is allowed in California only in licensed operations, which have an obligation to cook the garbage. These operations are monitored at least twice a month by state inspectors. However, these operations reportedly feed uncooked garbage when inspectors are not present. Presently there are 20 licensed operations. It is known also that unlicensed garbage feeders operate in the state. Considering the low efficiency of the licensing system and its high cost, termination of the program should be considered, freeing resources for more useful programs.

Occasionally a few hogs sent to slaughter have been diverted at the slaughterhouse to feeder operations. Even though only a small number of animals is involved, this practice could become a source of diffusion of FMD since the animals are not checked by a veterinarian before moving to the new premises.

Large hog producers ship directly to the slaughterhouses. The small producers sell in local saleyards, or directly on the premises to custom-kill operators and individuals.

The largest custom kills haul animals in their own trucks, which usually stop in several farms until the load is completed. In many cases, hogs imported from other states are gathered at collection points and sent directly to slaughterhouses in California. Some owners of smaller custom-kills buy pigs in the saleyards, haul them in small trucks—usually with other animal species—and keep them on the premises with cattle, sheep and goats. In a few cases, the animals are brought directly by the customer, inspected at the entrance and allowed in only if they are healthy.

The larger hog operations that sell to commercial slaughterhouses should not have problems in returning to the market after eradication of an outbreak of FMD. The smaller operations catering for ethnic minorities could permanently lose their customers if these become used to the convenience of prepackaged meats.

### **The sheep industry: risk factors**

Sheep in the South Valley can get very close to dairy herds when grazing in adjacent pastures. It is highly unusual, however, to find sheep actually on dairy farms. Thus, the number of direct contacts between dairy cows and sheep is small. Usually, sheep ranchers do not use veterinary services or commercial feed in a quantity that justifies the use of a truck. Very few rendering plants in the state collect sheep. Dead sheep are either taken to landfills, left in the fields or, in a few cases, taken to a diagnostic laboratory.

Slaughter of adult sheep ended in California in 1990; currently all adult sheep are exported for slaughter to Colorado, Texas or Mexico. A slaughterhouse in Dixon specializes in lambs. Even

though the registered slaughter of sheep and lambs in California in 1996 was just 600 head (NASS), it is estimated that the actual number is substantially higher. Very few sheep are slaughtered in custom-kills or illegally. The state's sheep industry is described in Appendix A.

### **The role of wildlife**

Wildlife poses two problems for the eradication of a FMD outbreak: (1) control of the disease in susceptible wild populations and (2) spread of the disease by non-susceptible wild animals that come into contact with livestock.

There are no susceptible wild species in the South Valley itself. In the foothills the main susceptible species are deer and wild pigs. Eradication of an outbreak is more complex when wild animals are involved because they must be tracked and killed. Although susceptible wild animals in the foothills should not play an important role in the diffusion of an outbreak, they could be a major problem in the eradication process. If a substantial number of wild animals is involved, eradication could require a large number of hunters, and pressure by animal rights and environmentalists might cause delays in the eradication.

Non-susceptible wild animals can spread the disease when they come in contact with susceptible animals. Thus, a number of wild animals in the South Valley could play a role in the spread of FMD — stray dogs, coyotes, rodents and birds. Domestic pets could also be vectors. In general these species are highly territorial and are not very abundant. It is expected that they would not play an important role in the spread of an outbreak.

The State Department of Fish and Game is in charge of control and monitoring of wildlife populations. The Department operates a comprehensive information management system that identifies clusters of wild animals and tracks their movements.