

Response For USDA Listening Session on April 5, 2012 from
Marty Irby, President of The Tennessee Walking Horse Breeders' & Exhibitors'
Association (TWHBEA).

Good morning, my name is Marty Irby, President of the Tennessee Walking Horse Breeders' and Exhibitors' Association, headquartered in Lewisburg, Tennessee.

TWHBEA is the oldest and most prestigious organization devoted to the promotion and protection of the breed. Founded in 1935, the breed registry was established to record the pedigrees of the Tennessee Walking Horse. Its goal is to maintain the purity of the breed, to promote greater awareness of the Tennessee Walking Horse and its qualities, to encourage expansion of the breed and to help assure its general welfare. TWHBEA's current membership is comprised of some 10,100 members from all 50 states, and a number of foreign countries.

TWHBEA was the only breed registry in the United States of America to show membership growth in 2011. This above all breed registries including AQHA, Paint Horse Association, Arabians, Morgans, and many more. All other breed registries showed substantial declines. This lends credibility to TWHBEA's position, and shows strength within our industry to represent the interests of all members from all factions.

TWHBEA is the only National and International Organization whose membership is represented by states and regions, that elect representatives from each area to represent members on our International Board of Directors.

TWHBEA stands firmly against ANY reduction in weight or size of the current pads or action device. The survival of our registry relies mainly on the performance horse. As the performance horse market has declined over the past 6 years, our annual budget has

decreased from \$5,000,000+/- to less than \$2,000,000 annually. Our breed, horse, and registry will not survive at its current level without the existence of our great performance horse.

Response to Questions Provided by USDA

1. Congress passed the Horse Protection Act in 1970 to eliminate the cruel and inhumane practice of soring horses. How close are we to achieving the goal?

For the five (5) predominate certified HIOs which inspect both performance and pleasure horses (PRIDE, WHOA, SHOW, KY AND HOA), the average compliance rate was 98.56%. In 2011 alone, there were a total of 53,783 horses inspected by these five (5) HIOs with a total of 955 violations found. In light of the fact that the USDA is able to attend only 6% of affiliated events, HPA self-regulation through these and other certified HIOs has provided massive strides in effectuating the Act and its regulations since the Act was passed in 1970. Additionally, the HIO system has provided for immediate disqualification from competition of horses found to be non-compliant as well as industry-imposed penalties for violators.

This question posed by the APHIS begs the question "by what standard do you measure success in 'eliminating the cruel and inhumane practice of soring horses'"? In considering this question as it relates to the HPA enforcement, it must be kept in mind that the enforcement process involves not one (1), but two (2), levels of subjectivity. HPA enforcement pursuant to its regulations involves the inspection of large animals by unfamiliar humans who conduct manual palpation in an environment that is unfamiliar to the animal being examined, *i.e.*, large, crowded,

dusty and noise horse shows. The OIG Audit of 2011 recognized that “Because inspections are performed by hand their quality and results can vary greatly.”

By way of example, based on publicly reported numbers generated by the USDA, its Food Safety and Inspection Service (FSIS) branch reports an approximately 98% compliance rate for 2010 and 2011. The inspections performed by FSIS are to ensure the nation’s commercial supply of meat, poultry and egg production is safe in order to protect human health and safety. FSIS inspections are based upon objective standards enforced by USDA FSIS inspectors yet the USDA is only able to report an approximately 98% compliance rate on these issues directly affecting human health and safety.

2. Can the industry achieve a consensus on how to carry out a self-regulatory program to enforce the Horse Protection Act in a consistent way?

In November 2011 the industry formed a “Unity Committee” with the goal of achieving consensus on industry issues, including HPA enforcement. The Unity Committee is comprised of representatives from the four (4) major industry organizations: The Walking Horse Trainers Association, The Walking Horse Owners Association, The Tennessee Walking Horse Breeders and Exhibitors Association and the Tennessee Walking Horse National Celebration. The Unity Committee has also involved certified HIOs in their process to best address HPA enforcement. Pursuant to recommendations flowing from the Unity Committee effort, the HIOs have begun work to standardize rulebooks, shoeing and showing standards, and are considering

other items such as common inspection training sessions. In addition, the current Unity Committee is in the process of formalizing a unified effort under the name Tennessee Walking Horse Alliance. Dr. Chester Gipson of the APHIS Division of the USDA came to speak to our groups in the later part of the Fall of 2011 to warn us of the forces at work against the padded performance horse. We have made great strides in a short period of time in unity efforts. The “one voice” concept for the performance horse was brought to us by Gipson, and we believe we can come to some consensus.

A major current problem today is the segment of our industry which chooses to participate in events which are unaffiliated with any HIO, thereby rendering the industry incapable of regulating these events because it lacks any legal authority to do so. Consequently, all horses shown at these events are completely unregulated and the industry has no mechanism to ensure these horses are shown in accordance with the HPA. The industry is faced with issues associated with unaffiliated events over which it has no control, but must instead rely upon the USDA to take steps to ensure HPA compliance at such events which, to date, has not occurred.

The USDA has long-recognized that this unregulated segment of the breed constitutes a significant number of events at which a significant number of horses compete. USDA statistics associated with the 1976 HPA Amendments estimate that 75% of all shows are in fact unaffiliated. Additionally the USDA has rarely attended any of these events. As long as non-compliant individuals are given the option of showing at events which are virtually ensured to be unregulated, the breed as a whole can never achieve complete consistency regarding HPA compliance due to the

industry's lack of authority. The USDA has failed miserably in this area and should immediately move full speed ahead in identifying, visiting, and inspecting these unaffiliated shows. These unaffiliated shows cripple our industry and have long been a problem that must finally be resolved.

3. What responsibilities should USDA-certified Horse Industry Organizations (HIOs) have within the industry?

USDA-certified Horse Industry Organizations should, and do, have the responsibility of the consistent enforcement of rules which are consistent with the HPA and its regulations to ensure the welfare of the horse and the integrity of the events they affiliate. Given the number of horse events annually and the budgetary restraints of the USDA, HIOs provide an invaluable ability to ensure compliance with the Act where, otherwise, there would be absolutely no oversight. Since, according to the OIG Audit of 2011, APHIS was able to attend **only six (6)%** of horse shows between 2005 - 2008, HIOs are able to fill what otherwise would be a huge void in HPA enforcement.

4. How can the industry reconcile its inherent competition aspect with ensuring compliance with the Horse Protection Act?

Legitimate competitors, whether in sport or in for-profit businesses, all desire a level playing field upon which to compete. The role of the regulatory body, whether public or industry-driven, is to ensure that level playing field. The

Tennessee Walking Horse Industry is no different from any other profit-driven industry which self-regulates.

As discussed previously, the inspections performed by the FSIS division of the USDA based upon **objective** standards have not resulted in a 100% rate of compliance – despite the direct impact on human health and safety. In fact, the compliance rates reported by the FSIS for 2010 – 2011 are almost identical to those for the Walking Horse industry, approximately 98% compliant.

Incorrectly, the USDA seems to be focusing on the competition aspect as it relates to competitors in individual classes or shows. As stated above, such competitors should desire a level playing field each time they enter the ring. The more damaging competitive aspect as it relates to HPA compliance is the competition which now exists between individual horse shows for entry numbers and between certified HIOs for affiliations. As addressed by Dr. DeHaven, former Deputy Administrator for APHIS, in his 2000 article, horse shows have an incentive to either not affiliate or to affiliate with less stringent HIOs in order to increase their number of entries, thereby increasing their profits. Dr. DeHaven stated the following:

“A DQP program stays in business by having horse shows affiliate with them to provide on-site inspections. Because horse show managers seek to maximize the number of entries at their respective shows, they may be less likely to affiliate with a DQP program having a reputation for stringent enforcement of the HPA.”

HIOs with a more stringent inspection process are left at a severe financial disadvantage as horses affiliate with less-stringent HIOs thereby jeopardizing the existence of the HIOs which best effectuate the purpose of the Act.

Additionally, one of the issues raised by the 2011 OIG Audit was the conflicts of interest possessed by some industry DPQs. The USDA and the industry should require that all DQPs do not operate under such conflicts of interest by requiring disclosure of any potential conflicts and oaths taken that no such conflicts exist.

5. What can the USDA do now (and in the future) to ensure compliance?

First, in order ensure compliance, the USDA must form a true public/private partnership with those within the industry who are trying to do the right things to ensure the welfare of the horse and compliance with the HPA. The USDA-certified HIOs which are actually enforcing the HPA and its Regulations must be rewarded through a constructive VMO supervision program. The HIOs which are not enforcing the purposes of the Act must be punished by the USDA and decertified, if necessary. The failure of the USDA to focus on less compliant and/or less stringent HIOs results in the elimination of the HIOs which best effectuate the purposes of the Act.

Secondly, the elimination of DQP conflicts of interest must be made a priority for the USDA and HIOs. The USDA should develop a Point of Interest beginning with the 2012 show season requiring HIOs to eliminate all DQP conflicts of interest from their programs.

USDA representatives have mentioned on numerous occasions the amount of “rumors” they hear concerning HPA compliance issues. Simply put, no one has the ability to fix a problem that has not been brought to their attention. The USDA and the certified HIOs should develop a system whereby an HIO is given the opportunity to investigate and address, if necessary, any legitimate issues raised through alleged “reports” made directly to the USDA. Most certified HIOs have in place a system to address such “reports”, however, the system is rarely, if ever, utilized. Instead, most such allegations are, apparently, made directly to USDA representatives. A system should be put in place to allow any HIO which is potentially involved to be made aware and given the opportunity to address issues in order to ensure compliance and to encourage a level of trust between the USDA and its certified HIOs.

6. What responsibilities should USDA have within the industry with respect to enforcement and what hinders oversight of the HIOs and/or industry?

The HIO system of industry self-regulation dictates that the USDA perform supervision and oversight at HIO-affiliated events and to attend unaffiliated events to enforce the HPA. As discussed above, the industry is required to rely solely on the USDA for HPA enforcement at unaffiliated events. The USDA’s limited resources to attend unaffiliated events and to, instead, focus on HIO affiliated events handcuffs the industry and provides a safe-haven for noncompliant individuals to function.

The lack of a true public/private relationship breeds distrust and adversarial attitudes on both sides of the fence. A true partnership between the USDA and its HIOs with the singular goal of HPA compliance would eliminate many of the issues

currently facing the industry such as competition between HIOs and the increased number of entries at unaffiliated events.

7. Should there be a prohibition of all action devices?; (7-9 All answers below)

8. Should there be a prohibition of pads?; and

9. Currently the Horse Protection regulations have a shoe and weight limit on yearlings. Should there now be shoe and weight limit for all aged horses?

Scientifically accepted studies and data indicate that the current regulations concerning action devices and pads do not in any way cause harm to the horse. A copy of the Auburn Study has been attached hereto. To consider amendment of the Horse Protection Act Regulations currently in place regarding the action device and pads would be to take action to address a problem which simply does not exist with no scientific proof to the contrary.

Any attempt to eliminate the pads would impact not only the Tennessee Walking Horse industry, but also those breeds which utilize similar pads in their training, showing and therapeutic treatment. For example, the Saddlebred, Morgan, Racking and others would all be affected by any attempt to eliminate the use of pads.

THERMOGRAPHY IN DIAGNOSIS OF INFLAMMATORY PROCESSES IN HORSES IN
RESPONSE TO VARIOUS CHEMICAL AND PHYSICAL FACTORS

(Summary of the Research From September 1978 to December 1982)

SUBMITTED TO THE US DEPARTMENT OF AGRICULTURE

By: Dr. Ram C. Purohit
Associate Professor
Department of Large
Animal Surgery and
Medicine School of
Veterinary Medicine
Auburn University, AL
36849

THERMOGRAPHY IN DIAGNOSIS OF INFLAMMATORY PROCESSES IN HORSES IN
RESPONSE TO VARIOUS CHEMICAL AND PHYSICAL FACTORS

To study the effects of acute and chronic inflammatory responses of the horse's thoracic (front) and pelvic (hind) limbs, several studies were done over a seven year period at the School of Veterinary Medicine, Auburn University, Alabama.

Phase I. Normal Thermographic Pattern of the Horse Over 100 horses were used to establish normal thermographic patterns of both thoracic and pelvic limbs. There is a high degree of right leg to left leg symmetry to the infrared emission of the horse, which has also been shown in humans. But in the horse, there is also a high degree of symmetry between the front and rear legs from the carpus and tarsus distally. After exercise, the temperature patterns of lower legs remained very similar to normals obtained before exercise. Even though there was an overall increase of temperature due to exercise thermal patterns remained the same.

Phase II. Chemically Induced Acute Inflammation of the Thoracic (Front) Limbs and the Use of Anti-inflammatory Compounds in Horses Thirteen ponies were used to inject 1.25 ml of 1.9% iodine solution (hypodermin R) around the distal portion of the lateral left front splint. This was done to create an area of acute inflammation. Twenty-four hours after iodine injection, ponies were divided into four groups. Group 1 was control with no medical treatment. Group 2 was treated with Benzydamine Hydrochloride ointment. Group 3 was

treated with intramuscular injection of Benzy- damine Hydrochloride and Group 4 received intravenous injection of Phenylbutazone BID (twice a day). All treatments were done for 5 days and ponies were evaluated by clinical examination for heat, swelling, pain, and physical soundness, and thermographic evaluation was done before and after exercise. The objective of this study was to evaluate thermography as a means of quantitative determination of acute inflammation and therapeutic effectiveness of the anti-inflammatory compounds. The induced inflammation was readily shown with thermography while comparing control, nontreated and treated with anti-inflammatory compounds. Anti-inflammatory compounds like benzydamine and phenylbutazone decreased inflammation when compared to nontreated inflamed animals. Thermography was very effective in the diagnosis of inflammatory responses and healing processes.

Phase III. Thermographic Evaluation of Tennessee Walking Horses, Using Various Chemical and Physical Factors (A Field Trial) A

one week extensive field study was performed on seven Tennessee Walking Horses, owned by various owners and trainers. This study was performed at Murfreesboro, Tennessee. Seven horses from various areas were brought and housed at University Camps of Murfreesboro, Tennessee. Each horse was individually handled by their trainers to provide field condition. Some of these horses were young and some were old. All had been shown at various Walking Horse shows in the nation. At one time or another these horses were considered to be sore according to the conversations with trainers and owners. Our objective for this phase of study was not to document how and when they were sore, but to evaluate these horses for a period of five to six days. Horses were given a thorough physical examination and pertinent data were recorded for information. Various thermographic views of all four legs were obtained pre-exercise and thereafter at 15, 75, 135, 255 minutes respectively for 5 to 6 days in each horse. In some horses 18 oz. chains were used for one day during exercise and then 10 oz. chains were used during exercise the other day. All horses were exercised by the trainer of a horse or by a trained horse rider hired on the research grant during the 6 day study period. With a few exceptions, most horses having old callouses will modify the thermographic patterns. But the effects of soring and the use of heavy chains can be differentiated from old callouses by comparing thermographic pictures with physical evaluation and location of the callouses. Thermographic pictures obtained 15 minutes after exercise in normal horses could be differentiated from the horses who were sore due to chemical or physical factors. This field trial produced results similar to those obtained by Dr. Nelson at Ames, Iowa.

Phase IV. Subclinical Diagnosis of Osteoarthritis by Thermographic Technique

Thermographic and radiographic evaluations of the tarsus (hock) were done in 20 horses, prior to and after exercise at 3

consecutive six week intervals. All horses were from the same stable, receiving identical care and training under equivalent schedules and conditions. . Normal thermographic patterns were established for preexercise and postexercise workouts. These patterns corresponded to the underlying tarsal vasculature. Postexercise thermal patterns were generally warmer, and the increases were uniform. Abnormal thermal patterns were more localized and did not conform to the normal underlying vascular distribution. The results of this study suggest the four horses that were unable to race professionally suffered sufficient discomfort in their hocks to cause reduced performance and inability to meet minimum track qualifying times. These horses were clinically sound but all exhibited positive thermal changes of the medial aspect of their right hocks with no radiographic evidence of inflammation in the corresponding surfaces. It is my opinion that the medial aspect of the right hock bears more weight and stress when horses racing counterclockwise make the turns of the track, and is consequently prone to traumatization and early degeneration. Only one horse exhibited clinical lameness, supported by radiological findings as well as abnormal thermal patterns within the same area. It may then be concluded that abnormal thermal increases may be detected in the subclinical stages where only slight discomfort produces reduced performance. This study did determine that thermographic changes can be detected prior to radiologic changes and that these thermal increases were correlated with discomfort that presumably resulted in reduced performance. Standardbred horses were used in this study.

Phase V. Thermographic Evaluation of Sore Horses

Objectives of this study were: to evaluate chemical soring without use of action devices; to determine the pressure at six different areas of the foot below the fetlock joint in response to chemical soring; and to evaluate thermographic pictures along with the gait of horses using videotape recording. Normal thermographic patterns, before and after exercise were similar to those reported previously (Phase I) in all three horses. Application of detergent soap and leg wraps for two days produced an increase in IR-emission pattern of the treated legs. This increase in temperature varies from 2-4 degrees C warmer than the non-treated legs. Following use of detergent soap, same legs were used for application of mustard oil. After second application of mustard oil, horses showed obvious signs of pain and discomfort. Horses were also very sensitive to touch. Thermographic evaluation of affected foot showed increase in IR-emission pattern and consisted of about 5-7 degrees C rise in temperature when compared to the non-treated legs. Three to five days after the last application of mustard oil there was gradual decrease in temperature, but did not return to normal level for 3 to 4 weeks. Rectal temperature along with temperature recording from the pastern area of the foot also increased following treatment with mustard oil. Thereafter, there

was a gradual decline in both rectal temperature and the temperature in the pastern area of the foot. Rectal temperature was between 99 to 101 degrees F before soring. Seventy-two hours after second application of mustard oil rectal temperature averaged about 105.5 degrees F (preexercise). Immediately after exercise, in sore horses there was a slight decrease in body temperature, whereas non-sored horses had an increase of body temperature of 1 to 2 degrees F. Six point pressure (SPI) below fetlock joint were recorded in all horses. In clinically normal horses before exercise, a mean pressure of 36 to 37 lbs. were recorded, prior to the flinching response. Fifteen to 30 minutes after exercise the pressure dropped to a mean value of 31 psi. Application of detergent soap followed by wrapping of the leg for 24 to 48 hours caused slight inflammation. This inflammation was obvious on thermographic evaluation. When these horses were tested for pressure response on the treated foot there was a marked reduction in pressure recording. Thus, point pressure obtained indicated the presence of inflammation. After the second application of mustard oil, treated legs were sore and inflamed to the extent that horses will not tolerate point pressure above 5 to 10 psi in the affected areas. Whereas non-sored legs of the same horse will withstand a pressure ranging from 24 to 40 psi. Thus one could conclude that along with physical examination and thermographic evaluation, point pressure of affected areas could also determine the inflammatory responses which can be quantitated by using point pressure recording. Increase in body temperature could also be used in acute cases of active inflammation, but further studies are needed in this area with the speculation that in response to chronic pain, body temperatures may not stay elevated in all horses.

Phase VI. Determination of Thermographic Patterns in Response to 10 oz. chains

The objectives of this study were to determine the effects of 10 oz. chains on normal horses, before and after exercise for a duration of two weeks and to use pressure testing device along with thermography and photographic documentation of any lesions produced by 10 oz. chains. Three horses (Nos. 3, 4, and 6) were exercised without chains for several days to obtain normal thermographic patterns and pressure data. Thereafter, the horses were exercised with 10 oz. chains for 10 consecutive work days (given weekends off) and pressure data were collected along with thermography and photography documentation. Horse No. 4 had 10 oz. chains on both pasterns whereas Horse No. 3 had a chain on the left pastern and Horse No. 6 had a chain on the right pastern. The chains were fitted according to the USDA, APHIS, Veterinary Services regulations so that the chain struck the pastern at least one inch above the coronary band. Results of this study provided evidence that by day 7 of exercise with chains lesions can be produced on a horse's legs. By the 10th day of exercise with chains, these lesions were more obvious and were present on the anterior and

posterior areas of both right and left pasterns. The anterior lesions were about 1 to 2 cm in diameter and about 0.5 cm deep with the presence of edema, exudate and some bleeding. The posterior lesions were less deep, covered a larger area and had an appearance more like an abrasion. Thermographically, horses exhibited altered thermal patterns as early as day 2 of exercise with chains. These altered thermal patterns persisted as long as chains were used. After 10 days of experimentation with chains the horses were exercised without chains, and it took about 20 days in recovery to obtain normal thermal patterns. Scars formed by using chains continued to show altered thermal patterns compared to the normal areas. Horse No. 6 was exercised with a 10 oz. chain on the right leg only so it could be compared to the left leg. The right pastern area developed inflammation and edema by day 8 and visible lesions by the 10th day. Alterations in thermal patterns of the right leg were present as early as day 3 after exercise with chains. Recovery in this horse was parallel to that of the other horses. It was concluded that the use of 10 oz. chains for 10 days without use of chemical soring produces lesions in the areas of the pastern which can be seen visually after 8 to 10 days and altered thermography patterns can be seen in 2 to 3 days. If animals are allowed to recover without use of anti-inflammatory treatment it would take 3 to 5 weeks for their thermal patterns to return to normal. Extent of soreness due to chains only are less dramatic than the chemical soring.

Phase VII. Simultaneous Use of Chemical and Chains for Soring Horses

The objectives of this study were to determine the effects on forefeet of horses of detergent, mustard oil and chains, before and after exercise for a duration of two weeks and to determine if pressure readings from the forefeet of sored horses will correlate with the thermographic findings. Three horses (Nos. 3, 5 and 6) were exercised several days in a normal fashion and the animals were monitored to establish pre-treatment physical condition of the forefeet. Data were obtained by pressure testing, thermography and by taking rectal temperature. Liquid detergent was liberally applied to the pasterns of the forefeet and they were then wrapped in plastic and cloth bandages. The next day the bandages were removed and # 3 was exercised 15 minutes with chains on both feet, # 5 with a chain on the right forefoot and # 6 with a chain on the left forefoot. Ten ounce chains were used. The next day 18 drops of oil of mustard were applied to each pastern after the horses had been exercised in chains as previously described. Plastic and cloth wraps were applied and left on overnight. Wraps were removed the next day and the horses exercised in chains for 15 minutes each day (except weekends) for 8 more days. The horses were then exercised in a normal manner 5 times during a 10 day recovery period. Results of this study showed that the combination of detergent, chains, and mustard oil caused the clinical signs of a sored horse described by Nelson (1975). Horse # 3 (chains on both

legs) and # 6 (chain on left leg) had some bleeding in the pasterns 8 days after detergent was applied. Horse # 5 did not bleed but had swollen and scabby pasterns. Thermal patterns of the foot were altered by the treatment with chemicals and mechanical devices but since detergent and mustard oil were applied to both pasterns of the forefeet of all three animals, and in 2 horses chains were used either on left or right foot, unchained feet were only sores chemically, were similar to the one with both chemical and chains. Thus inflamed area with or without chains showed similar results on thermography. Rectal temperatures were slightly higher during the period of treatment than for periods of non-treatment. The combined use of detergent, chains and mustard oil on the pasterns of horses causes lesions and tissue damage visible to the naked eye. They also cause alterations of the horse's behavior that are predictable. The pressure device is consistent in charting trauma caused to the feet of Tennessee Walking Horses. There is a wide margin between the pressures that an unsored horse will tolerate compared to those a sored horse can endure.

Phase VIII. Effects of Tranquilizers and Vasoactive Drugs on the Pattern of The Normal and Neurectomized Fore Legs of Horses

The objectives of this study were to determine the prolonged effects of neurectomies on the circulatory patterns of the legs of horses, and to determine the effects of epinephrine, norepinephrine, acetylpromazine and propranolol on the circulatory patterns of normal and neurectomized legs of horses. Four horses were used in this study. Normal patterns of the thoracic limbs were similar to those reported previously. To determine the effect of acetylpromazine, epinephrine, norepinephrine and propranolol, horses were injected with these drugs and thermographic patterns were determined for an extended period. Thereafter, posterior digital neurectomies were done and drug effects were evaluated again. Low and high volar neurectomies were also done. In 3 other horses the effects of local nerve blocks, high and low volar nerves and posterior digital nerve were studied to evaluate the circulatory patterns: Intravenous injection of acetylpromazine (0.06 mg/kg) caused increased thermal patterns of both the thoracic and pelvic limbs in horses. Similarly, epinephrine and propranolol caused vasodilatation and increased thermal patterns. Norepinephrine caused vasoconstriction and decreased temperatures of both pelvic and thoracic limbs (for reference see publication # 5). Following neurectomies in either the pelvic or thoracic limb at various sites there was increased heat in the areas supplied by these nerves. Within 3 to 6 weeks neurectomized areas had a readjustment of their local blood supply, and it was difficult to differentiate between the normal and neurectomized areas on thermography. Administration of acetylpromazine (0.06 mg/kg IV) caused increased heat in the non-neurectomized areas of the opposite limbs, whereas no effect was seen on the neurectomized limbs. Results obtained with low and high volar neurectomies were similar to those of a posterior digital

neurectomy. Thermographic evaluation of the thoracic and pelvic limbs were also done before and after local nerve blocks of both pelvic and thoracic limbs. Responses varied according to the site of injection. Nerve blocks only persisted for a short duration because carbocane is a short-acting local anesthetic. It was concluded that the thermography can be effectively used to evaluate vasoconstrictive and vasodilatory drugs in horses. Neurectomized areas can also be detected by thermographic techniques.

Phase IX. Thermographic Evaluation of Chemically (Amphotericine B) Induced Arthritis of the Carpus and Tarsus Joints Along With or Without Injection of Steroids in the Joint

The objectives of this study were to chemically induce intercarpal and tibiotarsal arthritis by injection of amphotericine B and to evaluate the effects of corticosteroids in the treatment of induced arthritis. Both thermography and radiography were used to evaluate the above stated objectives. Twelve ponies were used consisting of 48 joints to be evaluated. Eight joints were used as controls, 8 were injected with dextrose for a positive control 8 joints were used for amphotericine B injection only and of the other 16 joints, 8 were injected with methylprednisolone before amphotericine B and the other 8 were injected with methylprednisolone 24 hours after amphotericine B. Ponies were evaluated physically, thermographically and by radiography. Results of this study showed that the corticosteroid treatment of intra-articular injection in the joints was effective in alleviating the pain and clinical signs of lameness when compared to the induced arthritis non-treated joints. Even after the clinical signs of arthritis disappeared thermography still showed the presence of inflammation up to 30 to 40 days after the injection of amphotericine B. Radiographic evidence also provided that arthritis persisted longer than it was evident on physical exam. Present and previous studies from this clinic show that thermography can diagnose subclinical inflammation and it can be used to evaluate the healing processes. (See publication for more details).

Phase X. Use of 8 and 10 Ounce Chains on Scarred Horses

This study consists of two parts. In the first part of the experiment two horses were scarred using chain and mustard oil. Along with these, two scarred horses were bought. The second part of the study consisted of using 8 and 10 ounce chains and 14 ounce rollers on the scarred horses to evaluate their effect on the scar.

Part 1 of Phase X, Scarring Processes: Two horses were used to produce scars using 16 or 14 oz. chains with clinical scarring described previously. It took an unpleasant 2 months of detergent, mustard oil and chain use to produce minimal scarring of two horses. Bleeding of pasterns first occurred in about 7 to 8 days, while

exercising in chains. Evidence of inflammation of the pasterns was noted on thermovision the day after presoring and chain use, particularly after exercise. The thermal pattern became more diffuse and abnormal as the study proceeded. Drop in pressure readings occurred with continued use of chemicals and chains. The animals displayed many signs of discomfort and distress during the use of chemicals and chains. Some were stiffness, trotting instead of gaiting, lying down in the stall, reluctance to move, vagueness as to surroundings, bearing more weight on hind feet, stumbling, falling, hanging the head, wobbling, altered facial expression, and a peculiar stance when standing. Although the horses were seldom exercised in chains more than 15 minutes per day and were not exercised each day because of rain, thrown shoes and weekends, it was apparent that 14 and 16 oz. chains inflict more trauma than 10 oz. chains. Scars can be produced on pasterns with chemicals and chains but despite 2 months of efforts to do so they were small scars and barely discernible in one horse. Thermograms and pressure readings readily distinguish a normal, unsore horse from one being treated with chemicals on the pastern and exercised in chains.

Part 2 of Phase X, Effects of Action Devices on Scars:
The objective of the 2nd part of the study was to determine if legal action devices are injurious to the feet and legs of horses bearing scars in that area. Three Tennessee Walking Horses (#11, 13, and 14) with bilateral scars about the pasterns were subjected to studies in which legal action devices were affixed to their pasterns. Fourteen ounce aluminum rollers were used on # 11, 10 oz. chains on # 13 and 8 oz chains on # 14. Horse # 11 had less scar tissue than the other two. He was scarred on the premises with 14 oz. chains prior to this study. The other two horses were purposefully acquired with the scars. Horse # 11, a gelding, was exercised 7/28/80 .8/1/80 without action devices for the purpose of monitoring his physical condition under normal circumstances. From 8/4 .8/15 he was exercised 9 times for 20-22 minutes each time in 14 oz. rollers with vaseline as lubricant. From 8/18 .9/15 he was exercised and monitored seven times to record data on his recovery. Horse # 13, a gelding, was exercised 6/26/80 .7/11/80 without action devices for monitoring normal conditions. From 7/14 .7/25 he was exercised and monitored for 15-30 minutes each time in 10 oz. chains. Vaseline was used as a lubricant. From 7/28 .9/15 he was exercised and monitored 10 times during the recovery period. Horse # 14, a stallion, was exercised and monitored 8 times 9/15/80 .9/19/80 without action devices to establish normal physical conditions. He was exercised and monitored nine times 9/22 .10/3 in 8 oz. chains for 15 minutes each exercise period. Vaseline was used as a lubricant. From 10/6 .10/22 he was exercised and monitored 12 times during the recovery period. Results of this study showed that all three horses developed raw lesions on the scarred pasterns when exercised in action devices and lubricant. The lesions bled on horses #13 and 14 that exercised in chains. Abnormal thermal patterns developed on the pasterns of the three horses during the

period of exercise in action devices and the drop in pressure readings occurred. Thermal patterns became more regular in appearance and pressure readings increased during the recovery period when the horses were exercised without action devices. Fourteen ounce rollers and 8 and 10 ounce chains will cause raw lesions on scarred pasterns of horses when the horses are exercised 15-30 minutes per day in the devices. Lesions occur in less than 2 weeks, even when the horses are not exercised on weekends. The action devices cause irregular thermal patterns detectable by thermovision, increased sensitivity to pressure on the pasterns, and discomfort and altered gaits visible to observers.

Phase XI. Use of 2, 4 and 6 Ounce Chains

The objectives of this study were to evaluate the use of 2, 4 and 6 ounce chains in Tennessee Walking Horses, without using any other chemical or mechanical technique to induce inflammation. Use of 2, 4 and 6 oz. chains did not cause any detectable pain, tissue damage. Thermographic and pressure evaluation did not change significantly. Thus, it was concluded that the use of 2, 4 and 6 oz. chains for a duration of 2 to 3 weeks did not produce any harmful effects to the horses' legs, with exception to some loss of hair from 6 oz. chains in the pastern areas.

Phase XII. Use of Non-Steroid Anti-inflammatory Compounds (Phenylbutazone Flunixin-Meglumine) to Enhance Healing after Soring with Mustard Oil and Chains

In this study horses were sored using mustard oil and 10 oz. chains described previously. Following soring one group of horses were treated with phenylbutazone twice a day and the other group was treated with Flunixin-Meglumine for 5 days. Steroid ointment was also applied locally in the area of inflammation for 5 days. Then treatments were discontinued. Normally it took about 3 to 6 weeks for complete healing after initial induction of inflammation without any treatment with anti-inflammatory compounds. But the use of phenylbutazone (IV) and local application of steroid ointment enhanced healing. Horses on phenylbutazone healed in about 10 days, whereas use of Flunixin-Meglumine use took about 15 days for complete recovery. Enhanced healing effects could actually be seen within 48 to 72 hours after initiation of treatment with anti-inflammatory drugs.

Phase XIII. Evaluation of Dimethyl Sulfoxide (DM50) Alone and In Combination with Gibson's Linament, Applied to Limbs of Horses

To determine if DM50 alone or mixed with linament would mask soring or otherwise interfere with thermography so that thermal patterns associated with sored feet and legs would not be detected. Two horses were used in this study. Gibson's linament, 90% strength

DMSO, and oil of mustard were applied to determine the effects on the forelegs of horses. Thermovision, a Micron, a Carillon pressure device, a rectal thermometer were used to evaluate the effect of above stated compounds. DMSO and Gibson's linament were applied alone and in combination of 1:1 and 1:2 linament-DMSO. Amounts painted onto the legs and feet ranged from 10 to 20 cc. Rear legs and feet were used to increase the number of tests. Ten drops of oil of mustard were applied to the right leg of one horse. Fifteen cc of a 1-2 mixture of linament-DMSO was applied the next day after thermovision confirmed an elevated temperature pattern. Horses were exercised for 4 days and physical condition monitored in a routine manner. The horses were monitored and exercised 7 more times during an 18 day recovery period. Preliminary studies conducted revealed that DMSO, Gibson's linament, and mixtures of the two caused inflammation that was detectable by thermography and that caused a decline in pressure measurements. A study on one horse with DMSO-linament mixture yielded basically the same results. The heat pattern caused by oil of mustard did not subside when DMSO, linament or mixtures were applied. There were no detectable distortions of patterns that might confuse thermographic findings in sore horses.

Phase XIV. Use of Seven Commercial Compounds to Determine if they Can Mask Soring

Studies were done to determine if preparations containing silicone can alter or cover up thermal patterns obtained by thermography. Several Large Animal Clinic horses were used over a period of 5 days to determine the effects of various dilutions of silver nitrate and 5 hair sprays and a boat water-proofing liquid containing silicone. Normal thermal patterns were obtained before the preparations were applied as a spray or with a dauber to the legs and feet. The limbs were observed at different time intervals during the day with a thermovision camera and the next day before the material was washed off. Mustard oil was used on several feet to cause an abnormal thermal pattern. None of the compounds used masked or altered normal or mustard-oil-induced abnormal thermal patterns. Thus it was concluded that silicone containing substances and silver nitrate used in this study did not mask or alter thermal patterns in horses.

Phase XV. Preliminary Studies to Evaluate the Effects of Change in the Heel to Toe Ratio

The objectives of this study were to determine if deviation of hoof angle will alter the gait of Tennessee Walking Horses and to determine if tendonitis or other inflammation were caused by deviation of hoof angle. Two horses, # 22 and # 23 were placed under observation on 4/9/81 and monitored before and after 15-20 minutes of exercise with thermography, pressure device, Micron, rectal thermometer and visually by rider, technician and

and other assets not economically justifiable for most other agricultural enterprises. In addition, these activities create additional tourism and recreational expenditures. Perhaps harder to quantify are the contributions from educational services and the institutional support provided by agricultural and veterinary schools for equine production and care (Offutt and Korb, 2006; Whiting, Molnar, and McCall, 2006).

Increasing the knowledge and awareness of Tennessee's current equine industry will aid in shaping its future. Thus, this document is structured along the following theme: First, an overview of Tennessee's equine industry is presented. Tennessee's rank in the United States, county ranking within the state, and total sales information, based on 2007 Agriculture Census data, are discussed. Next, a review of the state's top five equine breeds, along with their primary usage, is presented. Tennessee's equine associations and shows are discussed in the next section. Further, a brief overview of other states breeder incentive programs is presented. Finally, the remaining part of the document evaluates the economic impacts and importance of the equine industry for the state.

Two types of economic impacts will be estimated. The first will use expenditure information for owning equines from the study conducted by Kenerson and Moore (2004), along with an input-output model to determine direct impacts on related input industries and impacts through resulting expenditures by households and institutions at the state level. The second set of impacts will use event/show survey expenditure information from an Alabama study conducted by Whiting, Molnar, and McCall (2006), along with the input-output model. The impacts are provided for four major indicators: total industry output (economic activity), employment, labor income, and value-added. Direct and total economic impacts results are summarized.

Overview of Tennessee's Equine Industry

Based on the 2007 Census of Agriculture statistics, Tennessee ranks sixth in the United States for the number of horses and ponies (142,003) and second for the number of mules, burros, and donkeys (18,350) on farms (Tables 1 and 2). The number of farms that have horses and ponies is 21,914, giving Tennessee a fifth place ranking in the U.S. There are approximately 6,264 mule, burro, and donkey farms, giving the state a second place U.S. ranking (Figures 1 through 4) (USDA-NASS, 2007).

Within the state, Bedford County has the largest number of horses and ponies at 5,611, followed by Williamson County (4,762), Greene County (4,456), Wilson County (4,145), and Rutherford County (3,899). Greene County has the largest number of horse and pony farms at 724, followed by Wilson County (614), Giles County (568), Lawrence County (563), and Bedford County (562). For mules, burros, and donkeys, Wilson County has the largest number at 619; followed by Greene County (592), Giles County (547), Maury County (520), and Washington

Table 1. Top Ten Horse and Pony States, 2007

State	Number of Head	State	Number of Farms
United States	4,028,827	United States	575,942
1. Texas	438,827	Texas	70,728
2. California	180,723	Oklahoma	26,371
3. Kentucky	175,503	Missouri	24,495
4. Oklahoma	165,555	Kentucky	22,242
5. Missouri	149,165	Tennessee	21,914
6. Tennessee	142,003	California	20,270
7. Florida	120,614	Wisconsin	18,711
8. Wisconsin	120,040	Ohio	18,275
9. Ohio	119,198	Pennsylvania	17,836
10. Colorado	119,040	Colorado	14,690

Source: USDA-NASS, 2007

Table 2. Top Ten Mule, Burro, and Donkey States, 2007

State	Number of Head	State	Number of Farms
United States	283,806	United States	99,746
1. Texas	60,790	Texas	21,070
2. Tennessee	18,350	Tennessee	6,264
3. Oklahoma	13,332	Oklahoma	4,803
4. Missouri	11,985	Kentucky	4,244
5. Kentucky	11,813	Missouri	4,126
6. Alabama	10,841	Alabama	3,336
7. Pennsylvania	9,762	Georgia	3,233
8. Georgia	8,952	North Carolina	3,051
9. North Carolina	8,546	Arkansas	2,781
10. Arkansas	7,663	Pennsylvania	2,603

Source: USDA-NASS, 2007

County (496). Greene County also has the largest number of mule, burro, and donkey farms at 232, followed by Wilson County (188), Maury County (175), Giles County (167), and Washington County (164) (Figures 5 through 8).

For 2007, total sales² for Tennessee's equine industry were \$31.2 million, or 1.2 percent of total sales from all agriculture commodities for the state (\$2.6 billion). Compared with other states, Tennessee is ranked 11th in the U.S. in terms of market value of its equine industry (Table 3) (Figure 9), and 7th in the percentage of market value of its equine industry compared to total sales from all agriculture commodities (USDA-NASS, 2007).

² Gross market value before taxes and production expenses of all agricultural products sold or removed from the place in 2007 regardless of who received the payments (USDA-NASS, 2007).

veterinarian. Horse # 22 was shod from 'barefoot status to wedges, pads and shoes on 4/13. Horse # 23 had been shod similarly before 4/9/81. On 4/29 the heels of both horses were raised 8 degrees, before exercise and monitoring. On 5/11 the heels were dropped 12 degrees by removing wedges and the horses exercised and monitored. Horses were then exercised and monitored on 10 separate days during the period of 5/12 .6/1. No action devices or chemicals were applied to the feet or legs during the study. Thermography study suggests that shoeing of the forefeet in pads and wedges from a barefoot status (horse # 20) causes a 1-2 degree rise in temperature in the superficial and deep flexor tendon area. Similarly, inflammation in this area was observed on thermography when the angle of the hoof was raised or lowered (both horses). When the heels were lowered on 5/11 and observed until 6/1 there was a gradual decrease of inflammation in the flexor tendon area. Pressure readings taken at the usual 6 points on the foot fluctuated to a minor degree, reaching their lowest levels 2 days after the heels were elevated 8 degrees in both horses. Raising the heels 8 degrees caused both horses to stumble and tire easily. They did not regain a sound gait for about 7 days. When the heels were dropped 12 degrees the horses gaited more soundly although there was swelling in the flexor tendons for about 7 days. Raising or lowering the heels of Tennessee Walking Horses and shoeing one with wedges and pads from barefoot status causes thermal patterns in the flexor tendon area that can be distinguished on thermography. These changes cause less fluctuation in pressure readings than the use of action devices or chemicals. Inflammation subsides about one week after the heels are raised or lowered 8 and 12 degrees respectively. Raising the heel causes a more observable change in the horses' gait than lowering the heel after it has been raised.

Phase XVI. Pressure Shoeing

Two horses were used for pressure shoeing technique. Horses' gaits can be altered by pressure shoeing. The degree of soreness from pressure shoeing depended on the techniques used. Soreness from pressure shoeing was not detectable in the pastern areas by physical examination or by thermographic technique in all cases, because pads obscure the solar surface of the foot. But obtaining thermographs of the sole after removal of pads, soreness was obvious due to inflicted inflammation to the solar surface of the foot.

Phase XVII. Comparison of Pressure Data Between Pelvic and Thoracic Limbs Before and After Exercise for 5 Continuous Days

The studies were done to evaluate the six point pressure data of the coronary band and pastern areas of both pelvic (hind) and thoracic (front) limbs in 6 horses to determine the variation in the front and back legs. there were no significant differences in pressure

data from the front to the back legs of these horses. Pressure values averaged between 30 to 40 psi, before and after exercise in all normal horses. Whereas in horses where acute inflammation was induced by chemical or physical means significant decrease in pressure values were recorded.

Phase XVIII. A Field Trial with 8 Horses in Murfreesboro, Tennessee, to Evaluate the Pressure Device, Micron Temperature along with Thermography

This study was done using 8 Walking Horses brought during the month of June, 9-11, 1981. Horses were brought in by owners and/or trainers for this study. A 3 day trial was performed in which all horses were examined before and after exercise by 3 veterinarians and 1 DQP. In some cases as many as 4 to 5 veterinarians may have examined these horses. Each individual was requested to submit his own report without consultation with others, to Dr. Purohit for final compiling of the data. After examination by the DQP and veterinarians, thermographic evaluation was done before and after exercise. The pressure data on the pastern area were collected, and a hand-held infrared gun was used to determine the temperature of the legs. Owners were allowed to use 10 oz. legal chains, but they were asked not to notify us if they used any chemical or other technique to sore the horse. During the 3 days of this study, 3 horses at one time or another did show sensitivity to the physical examination and the same horses were classified as having inflammatory reaction on thermography and pressure device. Whereas 4 horses were not considered sore by all criteria used in' this study. Thermography technique was able to detect inflammation, on 2 horses even before they were exercised on day 1. Of the 3 sored horses 2 showed only selected areas of inflammation. One horse by day 3 showed acute inflammation on thermography. This horse was used with 10 oz. chains. Of the 8 horses, 1 horse in this study was very difficult to handle and several veterinarians and 1 DQP had considerable difficulty in examining this animal. The difficulty extended even to the point of the horse not allowing the use of the infrared Mikron thermometer. This horse had normal pressures on day 1 before exercise, with exception to the pocket and bulb of the heels, which were sore both on pressure and thermography technique. There was an excessive drop in pressure after exercise on day 1. Thereafter, the only sensitive areas noted were the backs of both front legs, especially in the pocket and the bulb of the heels. It was concluded that 3 of the 8 horses were sore, 1 was questionable, and 4 were considered not sore. There were some discrepancies among veterinarians, but after overall evaluations, only 1 horse which was questionable created the controversy, due more to the behavior of the horse.

REFERENCES: 1. Purohit RC, Bergfeld II WA, McCoy MD, Thompson WM, Sharman RS: Value of clinical thermography in veterinary medicine. Auburn Vet 33: 104-108, 1977.

2. Purohit RC, McCoy MD: Thermography in the diagnosis of inflammatory processes in the horse. Am J Vet Res 41: 1167-1174, 1980.
3. Vaden MF, Purohit RC, McCoy MD, Vaughan JT: Thermography: a technique for subclinical diagnosis of osteoarthritis. Am J Vet Res 41: 1175-1179, 1980.
4. Purohit RC, McCoy MD, Bergfeld WA: Thermography diagnosis of Homer's syndrome in the horse. Am J Vet Res 41: 1180-1182, 1980.
5. Purohit RC: The diagnostic value of thermography in equine medicine. Proc Am Assoc Equine Pract 26: 317-326, 1980.
6. Bowman KE, Purohit RC, Ganjam VK, Pechman RD, Vaughan JT: Thermographic evaluation of corticosteroid efficacy in amphotericin B induced equine arthritis. Am J Vet Res 44: 51-56, 1983.

This Assumption is based on total # of registered horses and registered horses with show records in the data base of TWHBEA by State in the year 2007

# of Registered Horse Per State 20 year history	Show Records by State		
	2007	Pasture	Training
AK 96	-0-	3,477,216	
AL 16125	2337	9,415,148	89,261,715
AR 3,476	21	125,143,555	802,095
AZ 960	0	34,772,160	
CA 3924	256	132,858,628	9,777,920
CO 1538	0	55,707,898	
CT 85	0	3,078,785	
DC 12	0	434,652	
DE 47	0	1,702,387	
FL 3839	661	115,110,338	25,246,895
GA 8294	827	270,462,207	31,587,265
HI 30	0	1,086,630	
IA 1123	0	40,676,183	
ID 1685	0	61,032,385	
IL 3754	62	133,727,932	2,368,090
IN 4223	44	151,367,559	1,680,580
KS 857	0	31,041,397	
KY 32789	133	1,186,455,076	5,079,935 **
LA 2969	213	99,797,516	8,135,535
MA 139	0	5,034,719	0
MD 583	0	21,116,843	0

of Registered Horse Per State Show Records by State

This Assumption is based on total # of registered horses and registered horses with show records in the data base of TWHBEA by State in the year 2007

20 year history	2007	Pasture	Training
ME 171	0	6,193,791	0
MI 2934	0	106,272,414	0
MN 1168	0	42,306,128	0
MO 8344	153	296,686,211	5,843,835
MS 10182	1633	309,653,329	62,372,435
MT 1845	0	66,827,745	0
NC 8827	23	318,889,684	878,485
ND 174	0	6,302,454	0
NE 189	0	6,845,769	0
NH 97	0	3,513,437	0
NJ 319	0	11,554,499	0
NM 289	0	10,467,869	
NV 398	0	14,415,958	
NY 557	0	20,175,097	
OH 7333	371	252,170,602	4,170,345
OK 1536	0	55,635,456	0
OR 2176	73	76,172,763	2,788,235
PA 2524	0	91,421,804	0
PR 9	0		
RI 67	0	2,426,807	
# of Registered Horse Per State 20 year history	Show Records by State 2007	Pasture	Training

This Assumption is based on total # of registered horses and registered horses with show records in the data base of TWHBEA by State in the year 2007

SC 4028	597	124,274,251	22,802,415
SD 177	0	6,411,117	0
TN 52509	9396	1,561,595,973	358,880,220
TX 6999	435	238,116,854	16,232,875
UT 906	42	31,294,944	1,604,190
VA 6594	627	216,130,770	23,948,265
VT 105	0	3,803,205	0
WA 3335	0	120,797,035	0
WI 1444	289	41,835,255	11,038,355
WV 4432	48	158,792,864	1,833,360
WY 682	0	24,702	
Total 216,898	18,312		
Total For Pasture By State:		5,422,273,	
Total for Show Horse By State:			689,333,045

Average total cost of 1 horse @ home/pasture \$ 36,220.66

Average total cost of 1 horse in training \$ 38,195.00

**Based on show results received by TWHBEA - May not include all HIO'S on the show horse figures

Average Impact Assumptions For Horses Boarded or Trained

For the purposes of this study, no capitol purchases or depreciated real property was included in this study.

Amateur, Owned & Trained for Florida, Trained for GA and Trainer for Texas all calculations are based one 1 horse.

Avg Board: \$ 325.00 x 3,900.00 Per Year

Avg Cost of Training: \$ 440.00x12 = \$ 5,280 Per Year

Avg Cost of Shoeing: 133.33 x 12 = \$ 1,600 Per Year

Avg Cost of Vet Expenses: \$ 1,286.00 Per Year

Avg Cost of Dentist: \$ 150.00 Per Year

Avg Cost of Tack: \$ 1,000.00 Per Year

Avg Cost of Insurance: \$ 2,400.00 Per Year

Avg Cost of Wormer: \$ 1,533.00 Per Year

Avg cost of Horse Clothing: \$ 318.00 Per Year

Avg Cost of Assoc Fees: \$ 238.00 Per Year

Avg Cost of Entry Fees: \$ 1,613.00 Per Year

Avg Cost of Reg/Transfers: \$ 90.00 Per Year

Avg Cost of Transportation Cost: \$ 1,725.00 Per Year

Avg Cost of Tipping: \$ 930.00 Per Year

Avg Cost of Show Prep: \$ 467.00 Per Year

Avg Cost of Amateur Card: \$ 135.00 Per Year

Avg Cost of Sponsorships: \$ 5,433.00 Per Year

Avg Cost of Box Seats: \$ 1,037.00 Per Year

Avg Cost of Parking & Trailer Cost: \$ 315.00 Per Year

Avg Cost of Food & Travel Expense: \$ 3,270.00 Per Year

Avg Cost of Hotel's: \$ 5,167.00 Per Year

Avg Cost of Advertising: \$ 4,208.00

Average Impact Assumptions for Pasture/ at Home Horses

Florida is based on a horse kept in barn amateur owned not shown- Georgia is a gelding kept in pasture - TX is a broodmare kept in pasture

Average cost of grain per mo = $126.00 \times 12 = \$ 1,512.00$ Per Year

Average cost of hay per mo = $115.00 \times 12 = \$ 1,380.00$ Per Year

Average cost of Vet/Medication per year = \$ 670.00

Average cost of shoeing/trimming per year \$ 852.00

Average cost of transportation/maintenance per year \$ 2,500.00

Average cost of Insurance(homeowners/farm) per year \$ 4,066.00

Average cost of truck & trailer insurance per year \$ 1,800.00

Average cost of property taxes per year \$ 9153.00

Average cost of wormers & supplements \$ 504.00

Average cost of farm upkeep- Fertilizer: \$ 1,533.00

Fence Maintained: \$ 833.00

Manure Control \$ 200.00

Equipment/Maintained\$ 1,500.00

Repairs/Maintained \$ 1,400.00

Water/Electric \$ 2,160.00

Fuel \$ 1,000.00

Pest Control \$ 1,000.00

Horse Clothing	\$	100.00
Dentist:	\$	150.00
Grooming:	\$	241.00
Labor:	\$	3,666.66

Total # of registered TWH to 2007 = 216,898

Total # of registered TWH with Show records in 2007= 18,312
8.4% of the registered TWH are shown

of Registered Walking Horses by State =%

Al - 96=1.9



Institute of Agriculture

Department of Agricultural Economics

April 2010

Tennessee's Equine Industry: Overview and Estimated Economic Impacts



by

R. Jamey Menard, Kaelin W. Hanks, Burton C. English and Kim L. Jensen

**Institute of Agriculture
Department of Agricultural Economics
Agricultural Experiment Station
The University of Tennessee
Knoxville**

Jamey Menard is a Research Associate. Burton C. English and Kim Jensen are Professors of Agricultural Economics. Kaelin Hanks is an Associate at Entira, Inc.



Please visit the Department's web site at <http://economics.ag.utk.edu/>.

Additional copies of this report may be obtained from:

**Department of Agricultural Economics
The University of Tennessee
2621 Morgan Circle
Knoxville, TN 37996-4518
(865) 974-7231**

Staff Paper SP10-01

Funding for this study was provided in part from USDA's Cooperative State Research, Education, and Extension Service (CSREES), through Hatch Project TEN00382.

Equine photos from Microsoft Office Online Clip Art.



Executive Summary

According to the 2007 Census of Agriculture, Tennessee ranks sixth in the United States for the number of horses and ponies (142,003) and second for the number of mules, burros, and donkeys (18,350) on farms. Within Tennessee, Bedford County has the largest number of horses and ponies at 5,611; Wilson County has the largest number of mules, burros, and donkeys at 619. For 2007, total sales for Tennessee's equine industry were \$31.2 million, or 1.2 percent of total sales from all agriculture commodities for the state (\$2.6 billion). Compared to the United States, Tennessee is ranked 11th in terms of market value of its equine industry.

Increasing the knowledge and awareness of Tennessee's current equine industry will aid in shaping its future. Thus, this document is structured along the following theme: First, an overview of Tennessee's equine industry is presented. Tennessee's rank in the United States, county ranking within the state, and total sales information, based on 2007 Agriculture Census data, are discussed. Next, a review of the state's top five equine breeds, along with their primary usage, is presented. Tennessee's equine associations and shows are discussed in the next section. Further, a brief overview of other states breeder incentive programs is presented. Finally, the remaining part of the document evaluates the economic impacts and importance of the equine industry for the state.

The top five equine breeds in Tennessee are the Tennessee Walker, Quarter Horse, Donkey, Mule and Spotted Saddle. The primary usages of equine in Tennessee, depending on the breed, are pleasure/sport, competition, breeding, and other (used for work, teaching, retired equine, etc.). Based on responses to a 2009 informal survey, Tennessee has roughly 26 equine associations (if geographic distinctions for the same equine associations are included, for example, East Tennessee Hunter Jumper Association and West Tennessee Hunter Jumper Association). For 2008, the Hunter Jumper Association had 24 shows, followed by 15 shows for the National Spotted Saddle Horse Association, and 14 shows for the Walking Horse Owners Association.

An analysis of other states' policies indicated a broad variety of breeder incentive programs. These financial assistance policies are funded from state tax revenues or purses from races designed to support horse breeding and ownership and differ in the allocation of payments to the breeders and owners of state-bred horses that win or place in races or shows. The type of state incentives include breeder awards, stallion awards, restricted race purses, owner awards, and "other" awards and have different policies regarding the administration, levels of funding and distribution of payments through some or all five alternative incentive policies.

Tennessee's equine industry supports a variety of activities and businesses. Based on a 2003 survey, the estimated direct annual economic impacts for total industry output for Tennessee equine ownership expenditures were \$715.3 million (2010\$). This level of expenditures financed over 14,500 jobs. Total value added and indirect business taxes were estimated at \$360.3 million and \$28.9 million, respectively. Total impacts to the state's economy from equine expenditures were estimated at \$1,396.3 million in total industry output. Estimated total number of jobs was over 20,000, with total value added estimated at over \$746.0 million. Indirect business taxes from equine expenditures were estimated at \$61.2 million. Using equine event/show survey expenditures from a 2006 Alabama survey, the direct economic impacts for equine shows/events for Tennessee were estimated at \$22.0 million for total industry output (2010\$) with total impacts estimated at \$45.3 million.

Table of Contents

	Page
Executive Summary	iii
Table of Contents	iv
List of Tables	v
List of Figures	v
Introduction	1
Overview of Tennessee’s Equine Industry	3
Top Tennessee Equine Breeds and Primary Usage	10
Tennessee Equine Associations and Shows	13
Other States Horse Breeder Incentive Programs	14
Estimated Economic Impacts of Tennessee’s Equine Industry	15
Discussion	21
References	23
Appendix A: List of Equine Associations	26
Appendix B: Letter Requesting Information	27
Appendix C: List of Equine Shows	28
Appendix D: Equine Breeder Incentive Programs	30
Appendix E: Economic Impacts Methodology/Description	33

List of Tables

	Page
Table 1. Top Ten Horse and Pony States, 2007	3
Table 2. Top Ten Mule, Burro, and Donkey States, 2007	4
Table 3. States with the Largest Total Sales for the Equine Industry, 2007	9
Table 4. Equine Expenditures for Tennessee, 2003	16
Table 5. Estimated Annual Economic Impacts for Equine Ownership Expenditures for Tennessee, 2003	18
Table 6. Tennessee Livestock Facilities Hosting Equine Events	19
Table 7. Categorical Proportion of Expenditure Totals for Major Alabama Horse Shows and Circuits, 2005	20
Table 8. Estimated Economic Impacts for Equine Events/Shows	20

List of Figures

Figure 1. Number of Horses and Ponies in the United States, 2007	5
Figure 2. Number of Horse and Pony Farms in the United States, 2007	5
Figure 3. Number of Mules, Burros, and Donkeys in the United States, 2007	6
Figure 4. Number of Mule, Burro, and Donkey Farms in the United States, 2007	6
Figure 5. Number of Horses and Ponies in Tennessee, 2007	7
Figure 6. Number of Horse and Pony Farms in Tennessee, 2007	7
Figure 7. Number of Mules, Burros, and Donkeys in Tennessee, 2007	8
Figure 8. Number of Mule, Burro, and Donkey Farms in Tennessee, 2007	8
Figure 9. Market Value of Equine Products Sold, 2007	9
Figure 10. Top Tennessee Equine Breeds and Primary Usage	10

Introduction

Little documentation exists on the importance of the equine industry in Tennessee – its size, character, issues affecting growth/expansion, plus the magnitude of economic contributions to the state’s economy. Since most agricultural statistics primarily focus on-farm food or fiber commodities (Agricultural Census¹ data for example), the number of equines for pleasure horses or for other purposes on non-farms is lacking. Available data is not updated frequently and must be drawn from a variety of sources. One of the more recent applicable sources of equine information is from a survey conducted in 2004 by Kenerson and Moore. From this survey the authors generated a report providing detailed information concerning equine statistics (inventory, number of operations, sold, and value of sales) at state and county levels, expenditures for the state, and breed information (Whiting, Molnar, and McCall, 2006; Kenerson and Moore, 2004, USDA-NASS, 2007).

Sources of income from the equine industry – horse breeding, sales, events/shows, recreation, stabling equines, and training – all contribute to the state’s economy. Although horse racing in other states has contributed to the industry’s popularity, recent growth has come largely from equestrian sports and recreation (i.e., show jumping, field hunting, driving, cutting, roping, eventing, dressage, and endurance). Equine owners/operations have to purchase equipment and services (clothing, tack, and trainers) to carry out these activities. In addition, like livestock operations, equine operations have to purchase equipment (i.e., tractors, trucks, trailers, farm structures, and fencing), purchase feed and hay, and require the services of veterinarians and farriers. The breeding of equine requires investment in farmland

¹ According to the 2007 Census of Agriculture, a farm is any place from which \$1,000 or more of agricultural products were produced or sold, or normally would have been sold, during the census year (NASS, 2007)

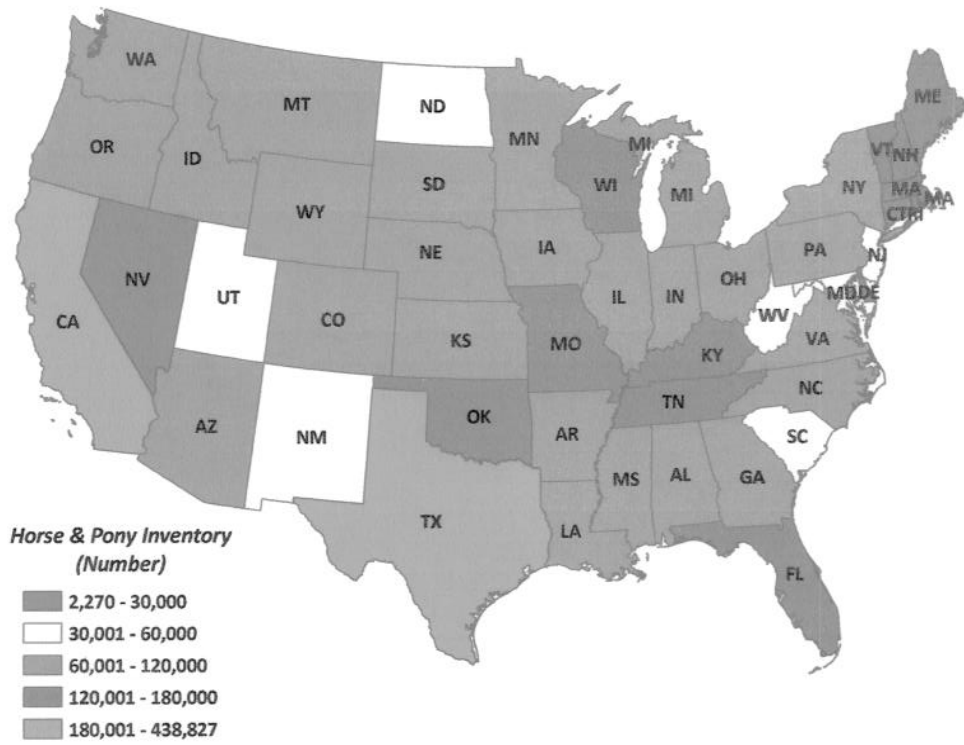


Figure 1. Number of Horses and Ponies in the United States, 2007

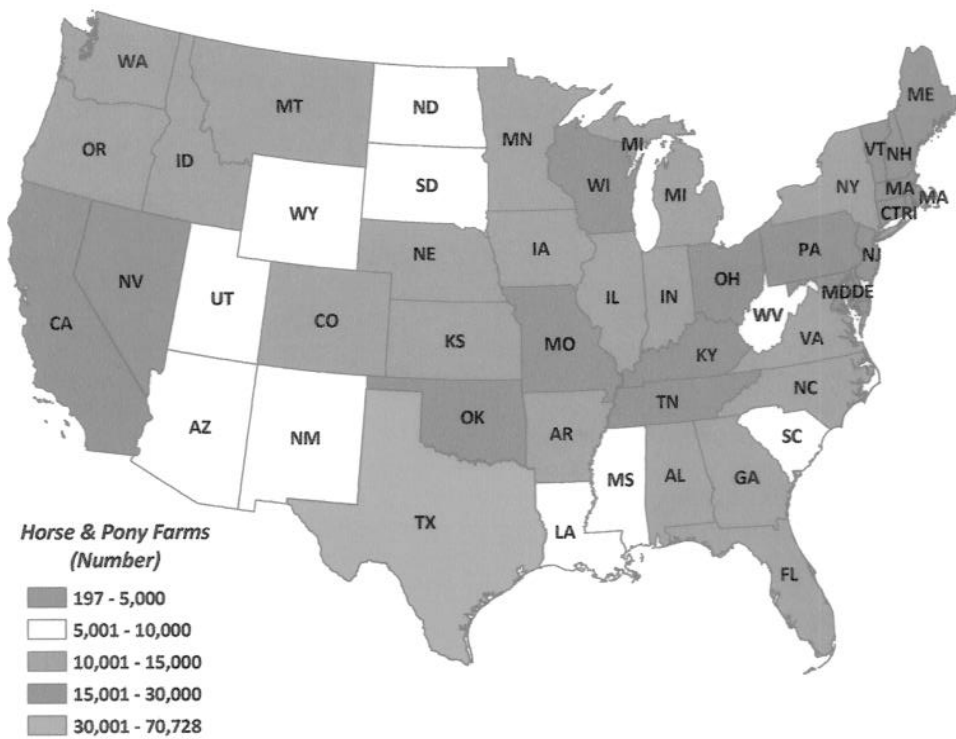


Figure 2. Number of Horse and Pony Farms in the United States, 2007

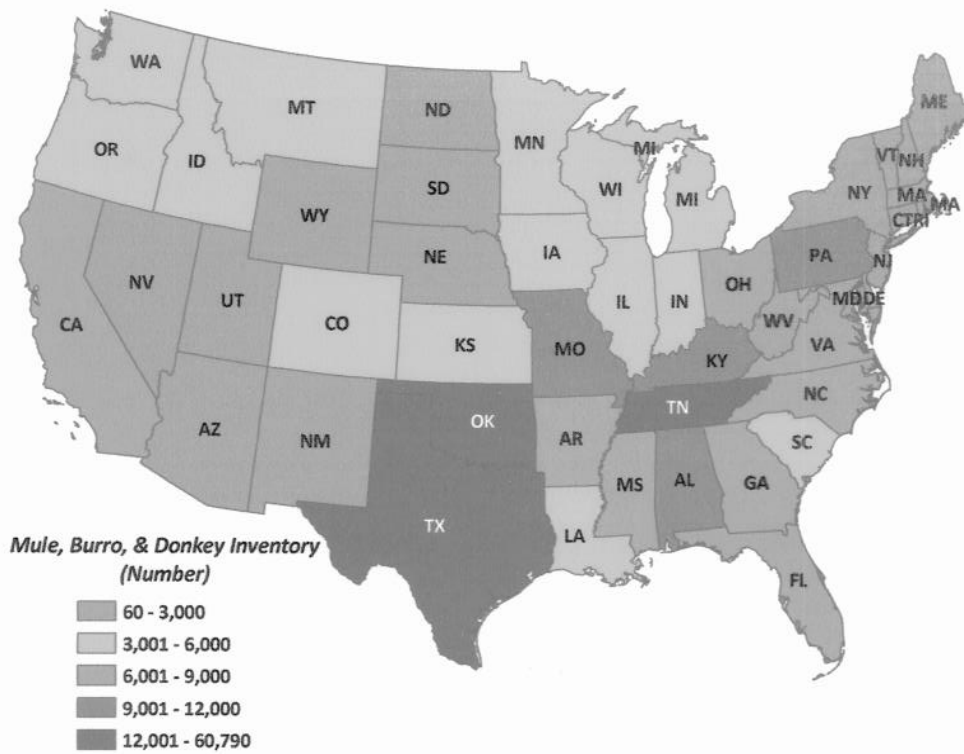


Figure 3. Number of Mules, Burros, and Donkeys in the United States, 2007

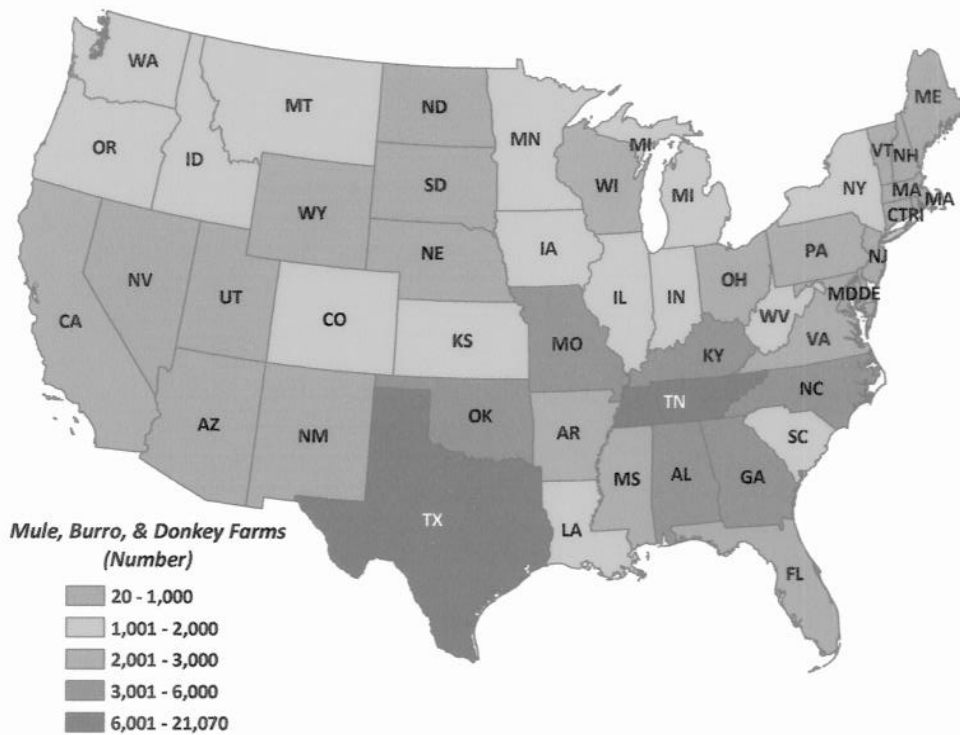


Figure 4. Number of Mule, Burro, and Donkey Farms in the United States, 2007

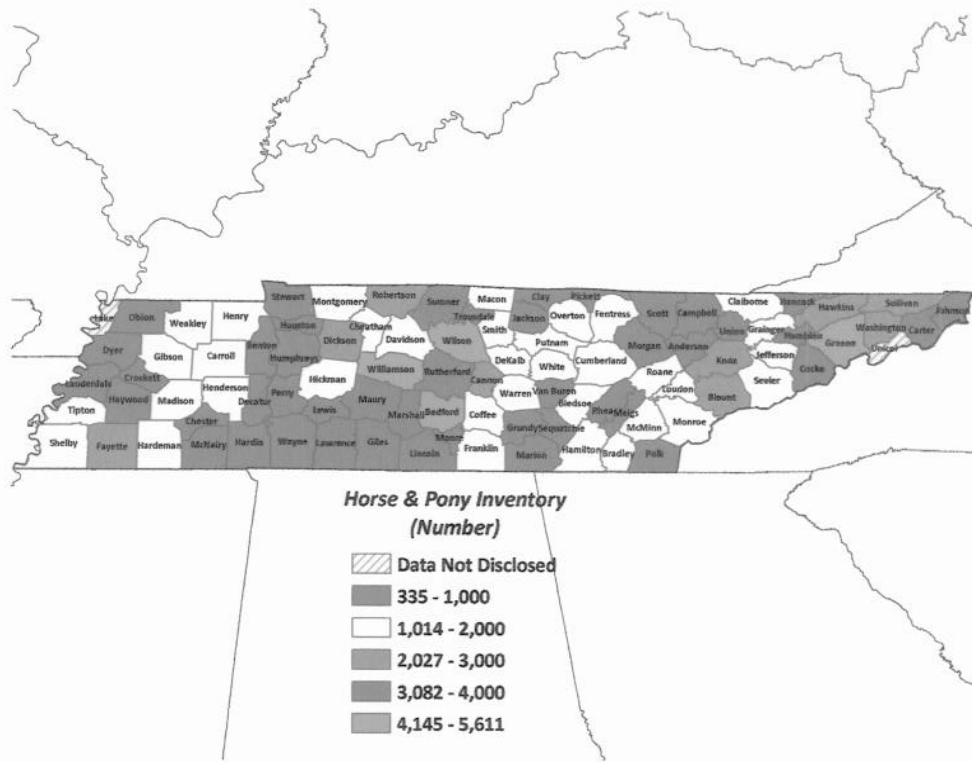


Figure 5. Number of Horses and Ponies in Tennessee, 2007

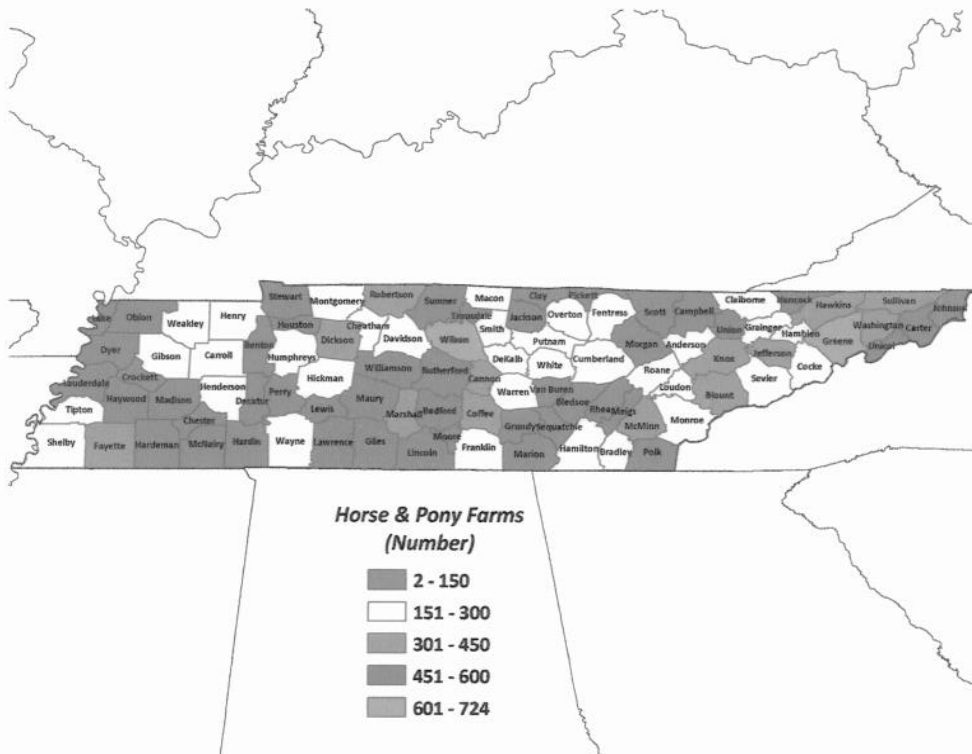


Figure 6. Number of Horse and Pony Farms in Tennessee, 2007

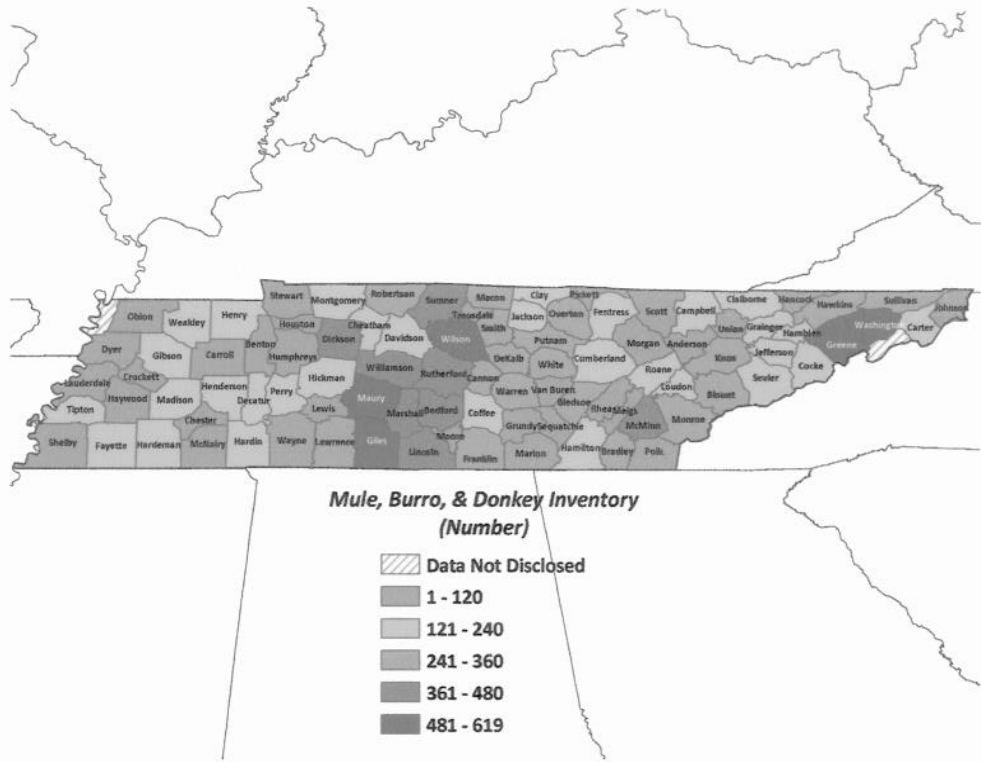


Figure 7. Number of Mules, Burros, and Donkeys in Tennessee, 2007

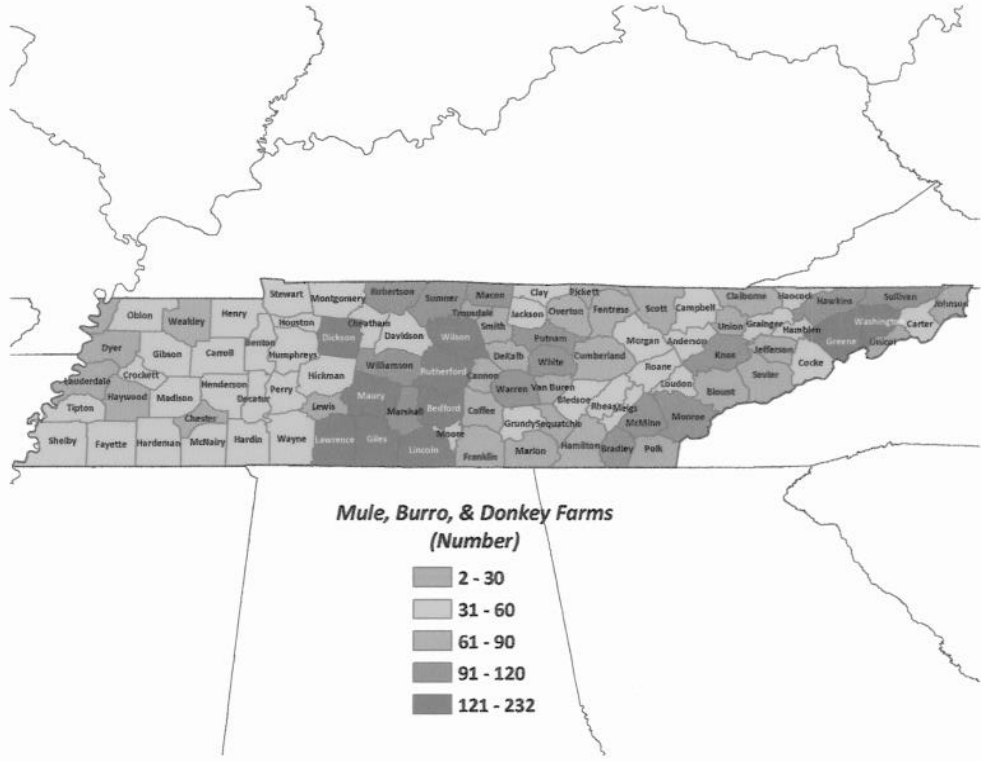


Figure 8. Number of Mule, Burro, and Donkey Farms in Tennessee, 2007

Table 3. States with the Largest Total Sales for the Equine Industry, 2007

State	Value \$1,000	State	% of Total Sales
United States	\$297,220,491	United States	0.7
1. Kentucky	\$952,384	Kentucky	19.7
2. Florida	\$167,784	New Jersey	3.4
3. Texas	\$117,744	Florida	2.2
4. California	\$72,433	Wyoming	2.1
5. New York	\$50,616	Maryland	1.7
6. Pennsylvania	\$49,320	Virginia	1.6
7. Virginia	\$46,876	Tennessee	1.2
8. Oklahoma	\$36,191	Massachusetts	1.2
9. New Jersey	\$33,732	New York	1.1
10. Maryland	\$31,815	South Carolina	0.9
11. Tennessee	\$31,212	Connecticut	0.9

Source: USDA-NASS, 2007

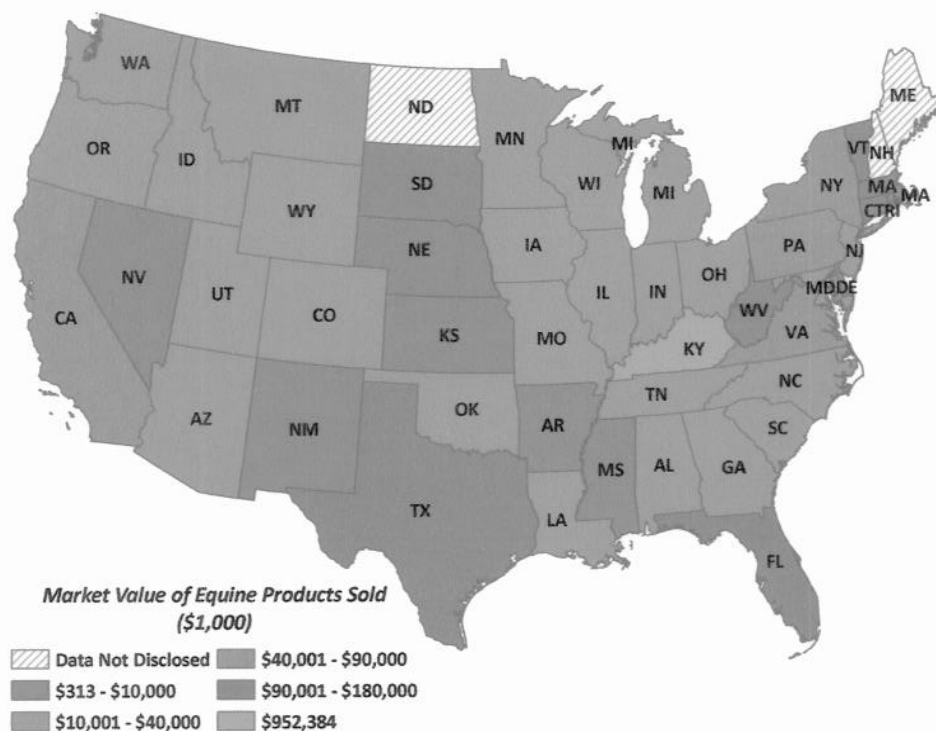


Figure 9. Market Value of Equine Products Sold, 2007

Top Tennessee Equine Breeds and Primary Usage

The top five equine breeds in Tennessee are the Tennessee Walker, Quarter Horse, Donkey, Mule and Spotted Saddle (Figure 10). Primary usage categories for these equine breeds are pleasure/sport, competition, other (work, teaching, retired, etc.), or breeding (Kenerson and Moore, 2004).

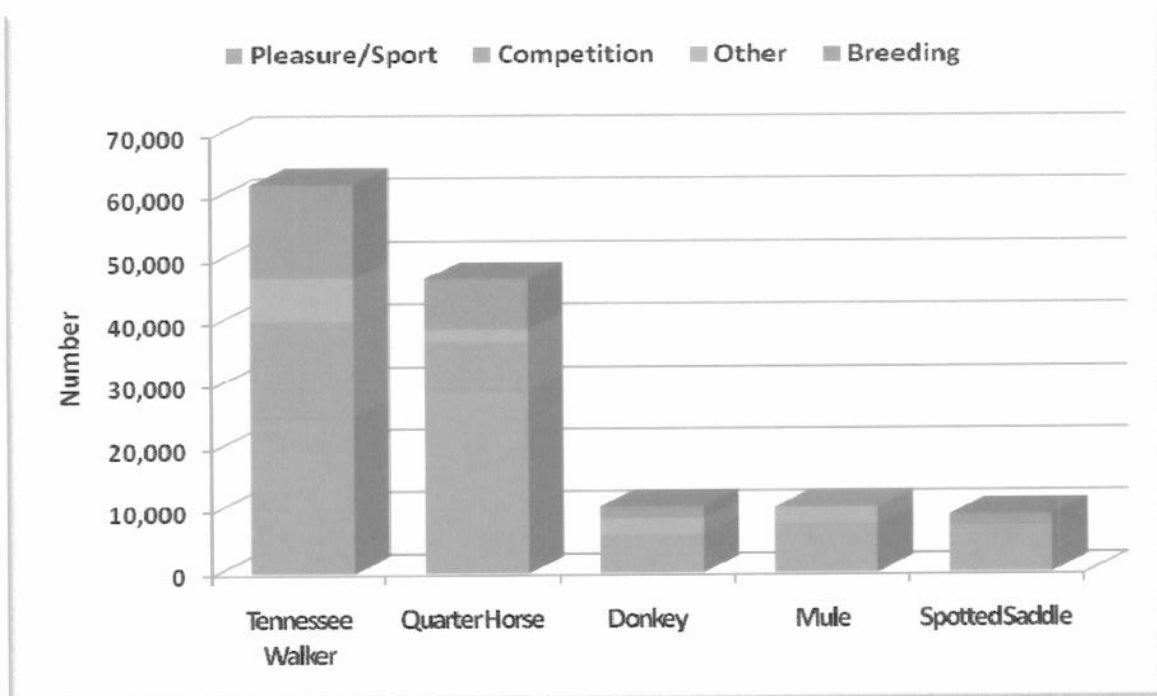


Figure 10. Top Tennessee Equine Breeds and Primary Usage

Source: Kenerson and Moore, 2004

The Tennessee Walking horse originated from the Narragansett Pacer and the Canadian Pacer. In the early 1800's, these two breeds were combined by Tennessee breeders who were looking for a horse that could handle the mountainous terrain of the area. Breeders later added Thoroughbred, Standardbred, Morgan, and American Saddlebred blood to refine and add stamina to the gaited horse. The Tennessee Walker is known for its calm, obedient temperament, combined with naturally smooth and easy gaits, making this a very popular breed in the state. The horses are generally black, chestnut, sorrel, bay, or champagne in color,

generally range from 14.3 to 17 hands³ and weigh 900 to 1,200 pounds. The Tennessee Walking horse has a definitive head with small and well placed ears. The horse has a long sloping shoulder, a long sloping hip, a fairly short back. The Tennessee Walking horse was named the official state horse by Public Chapter 596 of the 101st General Assembly in 2000 (Tennessee Walking Horse Breeders and Exhibitors Association, 2009). In 2004, there were 62,000 Tennessee Walking Horses accounted for in the state of Tennessee. The primary usage for the breed was for pleasure/sport at 24,900, followed by competition (15,500), breeding (14,900), and other (6,700) (Kenerson and Moore, 2004).

The Quarter Horse originated in the 1600's by colonists who began to cross imported English Thoroughbred horses with a "native" horse, such as the Chickasaw horse, which developed into the Quarter Mile Horse. Then in the 1800's, pioneers heading west needed a hardy and willing horse so they crossed the Mustang with the Quarter Mile Horse, which developed the Quarter Horse. In 1940, a registry was formed to preserve the breed, which officially became the American Quarter Horse Association. There are 16 recognized colors of American Quarter Horses, including the most prominent color of sorrel (brownish red), bay, black, brown, buckskin, chestnut, dun, red dun, gray, grullo, palomino, red roan, blue roan, bay roan, perlino and cremello. The Quarter Horse is a heavily muscled, compact horse that runs a short distance faster than any other horse, and averages 15 hands tall (American Quarter Horse Association, 2009). The breed's disposition and athletic abilities made it versatile for a variety of purposes in the state. The state of Tennessee accounted for 47,000 American Quarter Horses in 2004. The primary usage for the Quarter Horse in Tennessee was for pleasure/sport

³ One hand equals four inches

at 28,900, followed by competition (8,100), breeding (8,000), and other (2,000) (Kenerson and Moore, 2004).

The Donkey was brought to the New World in 1495 by Christopher Columbus on his second voyage. This voyage included four jacks (males) and two jennies (females). The wild ancestor of the donkey is the African Wild Ass. Some special characteristics of the donkey are large ears; tough, compact hooves that can handle sand and rock; woolly hair to insulate heat and cold; a lean body mass; and a digestive system that can break down almost inedible roughage while at the same time extracting and saving moisture in an arid environment.

Donkeys come in various colors and sizes. They range in size from below 36 inches to 56 inches (Tennessee Donkey Association, 2009). For 2004, the donkey is among the top five breeds in Tennessee with 10,500. Pleasure/sport was the primary usage of donkeys at 6,000, followed by other (2,500), breeding (1,900), and competition (100) (Kenerson and Moore, 2004).

The Mule is a cross between a donkey stallion (called a jack) and a female horse (called a mare). They were first bred in America in the 1700's and became important in agriculture and the settlement of the west. The median weight range for a mule is between 800 and 1,000 pounds. Mules range from below 36 inches to as tall as 17 hands. Common colors are sorrel, bay, black, grey, white, roans, palomino, dun, and buckskin (The American Donkey and Mule Society, 2009). In 2004, there were 10,300 mules in the state of Tennessee, with pleasure/sport being their primary usage at 7,500, followed by other (2,700) and competition (100) (Kenerson and Moore, 2004). Mule Day has been a popular Columbia, Tennessee tradition since the 1840s. It began as "Breeder's Day", a single day livestock show and mule market event held on the first Monday in April. Over time, "Mule Day" evolved from a single day event into a multi-day festival, attracting thousands of attendees, lasting almost a week.

The heavy involvement of Maury County in the mule industry has caused the event to grow over time into one of the largest livestock markets in the world (Mule Day, 2009).

The Spotted Saddle Horse can trace its roots back to the history of horses that escaped from ships on our shorelines. These horses were often spotted, naturally gaited and possessed the strength and stamina necessary for war use. By the end of the Civil War, many imported "gaited" types of horses were present in the U.S. Spanish American type spotted ponies, with other established gaited breeds, mainly Tennessee Walking Horses, resulted in the production of the smooth-gaited, colorful horse that came to be known as the Spotted Saddle Horse. It generally is medium size and weight, ranging in height from 14.3 to 16 hands and weighing from 900 to 1,100 pounds. This horse has a long sloping shoulder, a long sloping hip, and a fairly short back. The color pattern is any recognized horse color with white in a spotted pattern, with color above the hock, other than facial markings (Spotted Saddle Horse Breeders and Exhibitors Association, 2009). In 2004, there were 9,500 spotted saddle horses accounted for in Tennessee. The primary usage for the Spotted Saddle Horse was for pleasure/sport at 6,800, followed by breeding (1,900), competition (300), and other (100) (Kenerson and Moore, 2004).

Tennessee Equine Associations and Shows

With assistance from the Tennessee Department of Agriculture, the University of Tennessee developed a listing of equine associations (Appendix A) and contacts (Tennessee national breed organizations, local associations, and equine event/sport organizations). In 2009, contacts from the list of equine related associations were mailed a letter requesting information on the number of shows for 2008 within the state (Appendix B). Following the letter, an e-mail or personal phone call was made to gather additional information on the

number of entries, number of equines, and number of participants. For the contacts responding, a listing of the number of shows for each association is presented in Appendix C.

Based on responses to the 2009 informal survey, Tennessee has roughly 26 equine associations, if geographic distinctions for the same equine associations are included (for example, East Tennessee Hunter Jumper Association and West Tennessee Hunter Jumper Association). Based on the information received from the contacts who responded in 2009, the Hunter Jumper Association had 24 shows, followed by 15 shows for the National Spotted Saddle Horse Association, and 14 shows for the Walking Horse Owners Association. The number of equine, entries, and event days totaled 1,072, 42,437, and 103, respectively.

Other States Horse Breeder Incentive Programs

Of interest is the type of incentive programs other states have to support horse breeding and ownership. Incentive programs are financial assistance policies funded from state tax revenue or purses from races designed to support these activities. Other state's horse breeder incentive programs – financial assistant policies funded from state tax revenues or purses from races designed to support horse breeding and ownership – differ in the allocation of payments to the breeders and owners of state-bred horses that win or place in races or shows. The type of incentives state's provide – breeder awards, stallion awards, restricted race purses, owners awards, and "other" awards – have different policies regarding the administration, levels of funding and distribution of payments through some or all five alternative incentive policies. A list of states and their individual incentive programs offered can be found in Appendix D.

Studies show how incentive programs affect the economic impact of a states agri-business sector using multiple regressions. Neilbergs and Thalheimer (1999) developed an

prized Tennessee Walker, used for national competition or breeding, will more than likely require greater care (veterinarian/health, insurance premiums, etc.) compared to a pleasure horse. The study by Kenerson and Moore (2004) provides estimates of the direct expenditures for owning equine in Tennessee (Table 4). These expenditures totaled to \$597.2 million (2003\$). Using appropriate inflators, these data were inflated to 2006 values (data for the model is for 2006).

Table 4. Equine Expenditures for Tennessee, 2003

Item	Expenditures in:	
	2003\$	2006\$
		Million \$
Equipment Purchases	\$123.9	\$137.6
Feed & Bedding	\$82.9	\$87.9
Capital Improvements	\$70.6	\$75.5
Boarding	\$51.3	\$56.1
Purchases of Equine	\$36.5	\$43.0
Veterinarian/Health	\$34.1	\$37.3
Labor (excluding contracted)	\$33.3	\$36.3
Taxes	\$23.5	\$25.2
Farrier	\$21.2	\$23.2
Training Fees	\$15.4	\$16.9
Tack	\$14.7	\$14.9
Travel & Lodging	\$13.7	\$14.9
Maintenance & Repair	\$12.9	\$15.9
Breeding Fees	\$10.4	\$11.4
Insurance Premiums	\$10.3	\$11.6
Utilities	\$10.1	\$10.9
Miscellaneous	\$7.4	\$8.4
Grooming Supplies	\$7.1	\$7.2
Other Contracted Labor	\$4.4	\$4.8
Advertisement	\$4.1	\$4.3
Professional Fees	\$3.3	\$3.6
Rent & Lease	\$3.1	\$3.2
Other	\$3.0	\$3.3
Total	\$597.2	\$653.4

Sources: Kenerson and Moore, 2004; Isaacs *et al*, 2006

The input-output model, IMPLAN, was used to determine the economic impacts on related input industries and impacts through resulting expenditures by households and

institutions at the state level. Once the expenditures from Kenerson and Moore's study were incorporated into the model and inflated to 2006 dollars, the expenditures totaled to \$653.4 million (Table 4). For those expenditure categories broadly defined (equipment purchases, feed and bedding, capital improvements, and utilities), Kentucky equine budgets (Isaacs *et al*, 2006) were used to help proportion the expenditures to the proper IMPLAN sectors (for example, *feed and bedding* included grain, hay, seeds, straw, other bedding, fertilizers, feed additives, vitamins, minerals, and pasture maintenance).

The estimated annual economic impacts from Tennessee's equine expenditures for 2003 are shown in Table 5 (reported in 2010\$). The estimated level of direct related expenditure for total industry output was \$715.3 million, which financed over 14,500 jobs. Total value added and indirect business taxes were estimated at \$360.3 million and \$28.9 million, respectively. Total impacts to the state's economy from equine expenditures were estimated at \$1,396.3 million in total industry output. Estimated total number of jobs was over 20,000, with total value added estimated at over \$746.0 million. Indirect business taxes from equine expenditures were estimated at \$61.2 million.

Types of Expenditures Effects on Economy

Expenditures for goods and services, land, labor, and other materials enhance both the local and state economies and tax base. Economic benefits garnered by an economic region from the activities can be measured in terms of the number of jobs created and the amount of personal income accruing to residents. These impacts can be further broken down into *direct*, *indirect*, and *induced (or ripple)* effects.

Total economic impacts attributable to increased economic activity are computed as the sum of the direct, indirect, and induced effects (for a more detailed description, please see Appendix A). *Direct* effects are those attributed specifically to the new expenditures in a region (i.e., farmers' expenditures). *Indirect* effects arise from expenditures on raw materials, supplies, and other operating expenses, which help to support jobs in other local businesses. *Induced, or ripple* effects, are created as the new income generated by the direct and indirect effects is spent and re-spent within the local economy. These impacts are measured for total industry output (a measure of economic activity), employment, total value added, and indirect business taxes.

Table 5. Estimated Annual Economic Impacts for Equine Ownership Expenditures (2010\$) for Tennessee, 2003

Economic Indicator	Units	Direct ^a	Indirect ^a	Induced ^a	Total ^a
Total Industrial Output ^b	Million \$	\$715.3	\$200.0	\$481.0	\$1,396.3
Total Value Added ^c	Million \$	\$360.3	\$103.7	\$282.5	\$746.5
Indirect Business Taxes ^d	Million \$	\$28.9	\$8.3	\$24.0	\$61.2
Employment ^e	Number	14,561	1,674	4,074	20,309

^aSee page 17, “Types of Expenditures Effects on Economy” section for further information or Appendix E for a more detailed discussion

^bTotal Industrial Output — annual dollar value of goods and services that an industry produces

^cTotal Value Added — estimated employee compensation, proprietary income, other income, and indirect business taxes

^dIndirect Business Taxes — consists of excise taxes, property taxes, fees, licenses, and sales taxes paid by businesses

^eEmployment — estimated number of total wage and salary employees (both full- and part-time), as well as self-employed

For the economic indicator, total industry output, the estimated multiplier is 1.95. Thus, for every dollar of equine ownership related expenditures, an additional \$0.95 was generated throughout the state. Likewise, the employment multiplier was estimated at 1.39. For every job created based on equine ownership expenditures, an additional 0.39 jobs are created in other industries throughout the region.

For indirect impacts, the top five industries impacted were wholesale trade, real estate, truck transportation, architectural and engineering services, and management of companies and enterprises. Likewise, owner-occupied dwellings, wholesale trade, real estate, health care professionals (physicians, dentists, etc.), and hospitals were the top five industries impacted for induced impacts.

Facilities that can handle livestock shows (Table 6) encourage equine activities in the state, which includes spectator entertainment expenditures. Tennessee Walking horse shows, Mule Day, etc. demand breed specific equine for these activities. All equine events impact Tennessee’s economy via goods and services purchased to accomplish these activities. Whiting,

Table 6. Tennessee Livestock Facilities Hosting Equine Events*

Name	Location	Stall Capacity
Calsonic Arena	Shelbyville	1,700
Agricenter International Show Place Arena	Memphis	600
Tennessee Miller Coliseum	Murfreesboro	492
Walters State Great Smoky Mountains Expo Center	White Pine	408
East Tennessee Agricultural Exposition Center	Harriman	300
Tri-State Exhibition Center	Cleveland	208
West Tennessee Ag Pavilion/Smith Livestock Center	Martin	182
Hyder-Burks Agricultural Pavilion	Cookeville	133

*List is not exhaustive

Molnar, and McCall (2006) provide expenditure information for showing horses, including tourism expenditures, for Alabama. Expenditure categories included entry fees; other fees (stall, admission, parking, and program fees); trainer fees; lodging; meals; local purchases; and fuel, along with the number of entries and event days for major Alabama horse shows and circuits in 2005. Expenditures for all events totaled \$10.1 million, with the number of event days totaling 54, or \$188,113 per event day. From the informal Tennessee survey conducted to acquire equine associations and shows (Appendix C), the number of event days totaled 103. The calculated direct expenditure total was \$19.3 million ($\$188,113 \times 103$). Next, this total was proportioned to the respective expenditure categories from the study by Whiting, Molnar, and McCall (Table 7) and then assigned to proper IMPLAN sectors.

For Tennessee's equine events/shows, and based on this methodology, the estimated direct related expenditure for total industry output was \$22.0 million (reported in 2010\$) (Table 8). Direct employment was estimated at over 300 jobs. Total value added and indirect business taxes were estimated at \$13.7 million and \$1.8 million, respectively. Total impacts to the state's economy from equine event/show expenditures were estimated at \$45.3 million.

Table 7. Categorical Proportion of Expenditure Totals for Major Alabama Horse Shows and Circuits, 2005

Category	Percent	Value (2005\$)
Entry Fees	6.4	\$12,122
Other Fees	20.1	\$37,809
Trainer Fees	3.5	\$6,601
Lodging	22.3	\$42,033
Meals	24.5	\$46,107
Local Purchases	6.0	\$11,209
Fuel	<u>17.2</u>	<u>\$32,232</u>
Total	100.0	\$188,113

Source: Whiting, Molnar, and McCall (2006)

Estimated total number of jobs was over 500, with total value added estimated at close to \$27.0 million. Indirect business taxes from equine event/show expenditures were estimated at \$2.9 million.

Table 8. Estimated Economic Impacts for Equine Events/Shows (2010\$)

Economic Indicator	Units	Direct ^a	Indirect ^a	Induced ^a	Total ^a
Total Industrial Output ^b	Million \$	\$22.0	\$7.1	\$16.2	\$45.3
Total Value Added ^c	Million \$	\$13.7	\$3.7	\$9.5	\$26.9
Indirect Business Taxes ^d	Million \$	\$1.8	\$0.3	\$0.8	\$2.9
Employment ^e	Number	313	55	140	508

^aSee page 17, "Types of Expenditures Effects on Economy" section for further information or Appendix E for a more detailed discussion

^bTotal Industrial Output — annual dollar value of goods and services that an industry produces

^cTotal Value Added — estimated employee compensation, proprietary income, other income, and indirect business taxes

^dIndirect Business Taxes — consists of excise taxes, property taxes, fees, licenses, and sales taxes paid by businesses

^eEmployment — estimated number of total wage and salary employees (both full- and part-time), as well as self-employed

The estimated multiplier for total industry output was 2.06. For every dollar of equine related event/show expenditures, an additional \$1.06 was generated throughout the state. The employment multiplier was estimated at 1.62. For every job created based on equine event/show expenditures, an additional 0.62 jobs are created in other industries throughout the region.

The top five industries impacted for indirect impacts were real estate, wholesale trade, sport show promoters, independent performers, and management of companies and enterprises. Owner-occupied dwellings, wholesale trade, real estate, state and local education, and health care professionals (physicians, dentists, etc.) were the top five industries impacted for induced impacts.

Discussion

This analysis presented an overview of Tennessee's equine industry in the United States and within the state. Tennessee's top equine breeds and their primary usage were discussed, including equine organizations and shows in Tennessee based on information from an informal survey. Also presented were other states horse breeder incentive programs to support horse breeding and ownership. Finally, projected state level economic impacts from Tennessee equine expenditures were provided along with the estimated economic impacts for Tennessee equine events/shows.

From annual expenditures by Tennessee's equine industry for equine ownership, the estimated economic impact was \$715.3 million (2010\$). When considering the multiplier effects of these expenditures on the state's economy, the economic impacts from equine expenditures were \$1,396.3 million in total industry output. Estimated direct number of jobs was over 14,500 with over 20,000 estimated with the multiplier effects. From equine event/show expenditures based on an Alabama study and a Tennessee survey, the estimated direct economic impact was \$22.0 million (2010\$). When considering the multiplier effects of these expenditures on the state's economy, the economic impacts from equine event/show expenditures were \$45.3 million in total industry output. Estimated direct number of jobs was over 300 with over 500 estimated with the multiplier effects. Although economic activity

generated by equine enthusiasts has a significant impact on Tennessee's economy and creates thousands of jobs, other benefits to note include providing recreation resources.

It is important to note that a study of this type has certain limitations. First, from the values used to develop the equine economic impacts to be modeled. Little expenditure information exists concerning Tennessee's equine industry. The most recent directly related information for equine ownership is from a survey conducted in 2004 by Kenerson and Moore. In addition, a 2006 Alabama study was used to derive horse show/event expenditures. Plus, there is an art in adequately modifying the input-output model to reflect the scenario analyzed. For example, not all the net effects may be captured.

Increasing the knowledge of the size and character of Tennessee's current equine industry is critical to help shaping its future. Input-output modeling is useful for evaluating and analyzing information on the interrelationships of a regional economy and impacts of changes on that economy. The model is a useful planning tool for policy-makers in evaluating potential impacts of their decisions concerning agriculture and forestry industries for the state.

generated by equine enthusiasts has a significant impact on Tennessee's economy and creates thousands of jobs, other benefits to note include providing recreation resources.

It is important to note that a study of this type has certain limitations. First, from the values used to develop the equine economic impacts to be modeled. Little expenditure information exists concerning Tennessee's equine industry. The most recent directly related information for equine ownership is from a survey conducted in 2004 by Kenerson and Moore. In addition, a 2006 Alabama study was used to derive horse show/event expenditures. Plus, there is an art in adequately modifying the input-output model to reflect the scenario analyzed. For example, not all the net effects may be captured.

Increasing the knowledge of the size and character of Tennessee's current equine industry is critical to help shaping its future. Input-output modeling is useful for evaluating and analyzing information on the interrelationships of a regional economy and impacts of changes on that economy. The model is a useful planning tool for policy-makers in evaluating potential impacts of their decisions concerning agriculture and forestry industries for the state.

References

- American Quarter Horse Association. 2009. "The American Quarter Horse." Available at <http://www.aqha.com/association/who/thehorse.html> (Assessed on March 17, 2009).
- Arizona Thoroughbred Breeders Association (ATBA). 2009. "Arizona Bred Certification." Available at <http://www.atba.net/azbred.html> (Assessed April 2, 2009).
- Arkansas Thoroughbred Breeders & Horsemen's Association. 2009. "Rules and Regulations." Available at <http://www.atbha.com/home> (Assessed on April 2, 2009).
- Campbell, M., D. Reed, A. Schweigardt, R. Sherman, S. Tanner, and P. Tobin. 1999. "Analyzing Breed Incentive Programs." University of Arizona Race Track Industry Program. Available at http://www.ua-rtip.org/students/research/99_student_research/analyzing_breed_incentive_programs.pdf (Assessed April 2, 2009).
- Colorado Horsemen's Legislative Coalition. 2008. "Colorado Horse Breeders Incentive Fund." Available at <http://www.coloradohorsecoalition.com/Breeders%20Incentive%20Fund.pdf> (Assessed April 2, 2009).
- Florida Thoroughbred Breeders and Owners Association. 2009. "Incentives." Available at <http://www.ftboa.com/index.php/whyflbred/whyflbred> (Assessed April 2, 2009).
- Illinois Department of Agriculture. 2009. "Horse Racing – Illinois Thoroughbred Breeders Fund Program." Available at <http://www.agr.state.il.us/HorseRace/thoroughbredprogram.pdf> (Assessed April 2, 2009).
- Isaacs, S., R. Nagy, S. Goode, K. Burdine, D. Trimble, and R. Coleman. 2006. "Equine Enterprise Budgets." University of Kentucky, Cooperative Extension Service, Departments of Agricultural Economics and Animal Science, AEC 2006-03. Available at <http://www.ca.uky.edu/agecon/index.php?p=207>.
- Kansas Thoroughbred Association. 2009. "Kansas Bred Programs." Available at <http://www.kansasthoroughbred.com/kansasbred.htm> (Assessed April 3, 2009).
- Kenerson, D., J. Moore. 2004. "A Tennessee Tradition Equine 2004." Nashville, TN: U.S. Department of Agriculture, Tennessee Agricultural Statistics, August. Available at <http://www.docstoc.com/docs/6061227/A-Tennessee-Tradition-Equine-Tennessee-Agricultural-Statistics-PO-Box>.
- Kentucky Horse Racing Commission. 2009. "Kentucky Breeders' Incentive Fund." Available at <http://www.khrc.ky.gov/breedersincentive/> (Assessed March 17, 2009).

- Maryland Thoroughbred. 2009. "Maryland Fund." Available at <http://www.marylandthoroughbred.com/> (Assessed April 2, 2009).
- Massachusetts Thoroughbred Breeders Association. 2009. "About the MTBA." Available at <http://www.massbreds.com/about.htm> (Assessed April 2, 2009).
- Michigan Thoroughbred Owners and Breeders Association. 2009. "Michigan Bred Programs – Owners Awards." Available at http://www.mtoba.com/owners_awards.htm (Assessed April 2, 2009).
- Minnesota IMPLAN Group, Inc. IMPLAN System (data and software), 1725 Tower Drive West, Suite 140, Stillwater, MN. Available at <http://www.implan.com>.
- Minnesota Thoroughbred Association. 2009. "Breeders Fund." Available at http://www.mtassoc.com/index.jsp?page=BREEDERS_FUND (Assessed April 2, 2009).
- Mule Day. 2009. "About Mule Day." Available at <http://www.muleday.com/about.cfm> (Assessed March 17, 2009).
- Nebraska Thoroughbred Breeders Association, Inc. 2009. "Rules." Available at http://www.nebraskathoroughbredbreeders.com/ntba_registration_rules.html (Assessed April 1, 2009).
- Neibergs, S., and R. Thalheimer. 1999. "An Economic Analysis of The Effectiveness of Thoroughbred Breeder/Owner Incentive Polices." *Agricultural and Applied Economics* 31(3): 581-592.
- New Mexico Horse Breeders Association. 2009. "Member Resources – NM Bred Incentive Fund." Available at <http://www.nmhorsebreeders.com/Member%20Resources%20Page.html> (Assessed April 1, 2009).
- New York Breeding and Racing Program. 2009. "Incentives." Available at http://www.nybreds.com/frames/FS_incentives.html (Assessed April 1, 2009).
- Offutt, S., and P. Korb. 2006. "More Women Turning to Horse Farming." Washington DC: United States Department of Agriculture, Economic Research Service, Amber Waves, September. Available at <http://www.ers.usda.gov/AmberWaves/September06/DataFeature/>.
- Ohio Quarter Horse Association. 2009. "Events – Breeders Incentive Program." Available at http://www.oqha.com/oqha/index.php?option=com_content&task=view&id=83&Itemid=104 (Assessed April 1, 2009).
- Oklahoma Horse Racing Commission. 2009. "Oklahoma Bred Program." Available at <http://www.ohrc.org/okb.html> (Assessed April 1, 2009).

- Olson, D. and S. Lindall. 1999. "IMPLAN Professional Software, Analysis, and Data Guide." Minnesota IMPLAN Group, Inc., 1725 Tower Drive West, Suite 140, Stillwater, MN. Available at <http://www.implan.com>.
- Oregon Thoroughbred Owners and Breeders Association. 2009. "Incentive Programs." Available at <http://www.oregontoba.com/incentiveprograms.html> (Assessed April 2, 2009).
- Pennsylvania Horse Breeders Association. 2009. "Why Pennsylvania Bred." Available at <http://www.pabred.com/whyPA/whyPA.php> (Assessed April 2, 2009).
- Smith, M. 1999. "Breeding Incentive Programs and Demand for California Thoroughbred Racing: The Tradeoff between Quantity and Quality." Prepared for the American Agricultural Economics Association Annual Meeting, Nashville, August 8-11, 1999. Available at <http://ageconsearch.umn.edu/bitstream/21711/1/sp99sm01.pdf> (Assessed April 2, 2009).
- Spotted Saddle Horse Breeders and Exhibitors Association. 2009. "About the Breed." Available at http://www.sshbea.org/About%20the%20Breed/About_the_Breed.htm (Assessed March 17, 2009)
- Tennessee Donkey Association. 2009. "Donkey Trivia." Available at <http://www.tennessee-donkeys.com/DonkeyTrivia.html> (Assessed March 17, 2009).
- Tennessee Walking Horse Breeders and Exhibitors Association. 2009. "The Breed." Available at <http://www.twhbea.com/breed/history.php> (Assessed March 17, 2009).
- The American Donkey and Mule Society. 2009. "What is a Mule?" Available at http://www.lovelongears.com/about_mules.html (Assessed March 17, 2009).
- Thoroughbred Breeders Association of New Jersey. 2009. "Incentives." Available at <http://www.njbreds.com/incentives-nutshell.shtml> (Assessed April 2, 2009).
- United States Department of Agriculture, National Agricultural Statistics Service. 2007. "2007 Census of Agriculture." Available at <http://www.agcensus.usda.gov/Publications/2007/index.asp>.
- Whiting, K., J. Molnar, and C. McCall. 2006. "Alabama Equine Industry: Inventory, Impacts, and Prospects." Alabama Agricultural Experiment Station, Bulletin 662, Auburn University. Available at <http://www.ag.auburn.edu/aaes/communications/bulletins/bull662.pdf>.
- Wyoming Pari-Mutuel Commission. 2009. "Wyoming Bred Information." Available at <http://parimutuel.state.wy.us/wyomingbred.htm> (Assessed April 2, 2009).

Appendix A

List of Equine Associations

American Paint Horse Association
Arabian Horse Association, Region 12
Central Tennessee Dressage Association
East Tennessee Draft Horse and Mule Association
East Tennessee Hunter Jumper Association
Hunter Jumper Association
Middle Tennessee Hunter Jumper Association
National Barrel Horse Association
National Spotted Saddle Horse Association
Pleasure Walking Horse Association of Tennessee
Spotted Saddle Horse Breeders and Exhibitors Association
Tennessee Donkey Association
Tennessee Miniature Horse Volunteers
Tennessee Quarter Horse Association
Tennessee Reining Horse Association
Tennessee State Appaloosa Horse Club
Tennessee Valley Paso Fino Association
Tennessee Walking Horse National Celebration
Tennessee Walking-Horse Breeders and Exhibitors Association
Tennessee Walking-Horse Owners Association
Tennessee Walking-Horse Trainers Association
United Racking Horse Owners & Exhibitors Association
United States Eventing Association – Area 3
Volunteer Morgan Horse Club
Walking Horse Owners Association
West Tennessee Hunter Jumper Association

Appendix B
Letter Requesting Information

Kaelin Hanks
University of Tennessee
Department Agricultural Economics
2621 Morgan Circle
302 Morgan Hall
Knoxville, TN 37996-4518

January 13, 2009

Association Name
Contact name
Address
City, State zip code

Dear Contact name:

I am writing to request information about shows that the {Association Name} hosts in the state of Tennessee. The University Of Tennessee Department Of Agricultural Economics is conducting a study on the economic impact of equine in Tennessee.

Please send me information regarding the number of shows, the location of each show, and the dates.

Please send this information to me at the address listed above. If you have questions about my request, please contact me by phone at 865-974-3716 or by e-mail at kwillis5@utk.edu.

Thank you for your assistance. I look forward to receiving this information.

Sincerely,

Kaelin Hanks
Project Researcher

Appendix C
List of Equine Shows

Association	Show	Equine	Participants	Entries ^a	Classes
				Number	
<i>American Paint Horse Association</i>					
3/22/08	American Paint Horse Association Show	66	--	254	--
5/10/08	American Paint Horse Association Show	70	--	311	--
8/9-10/08	American Paint Horse Association Show	132	--	445	--
9/27/08	American Paint Horse Association Show	--	--	229	--
<i>Hunter Jumper Association</i>					
2/29/2008	Alderwood I Germantown, TN	--	--	569	162
3/21/2008	Alderwood II Germantown, TN	--	--	520	117
4/4/2008	Alderwood II Germantown, TN	--	--	408	113
4/9/2008	Springtime Dixie	--	--	1,419	184
4/23/2008	Brownland Farm Spring I	--	--	3,314	253
4/30/2008	Brownland Farm Spring I	--	--	2,941	252
5/2/2008	Alderwood IV	--	--	675	119
5/7/2008	Memphis In May	--	--	1,158	199
5/14/2008	Memphis Blues Classic	--	--	1,027	210
5/28/2008	Nashville Country	--	--	1,942	234
6/4/2008	Nashville Classic	--	--	2,313	250
7/2/2008	Brownland Summer	--	--	1,838	230
7/9/2008	Mid South Classic	--	--	2,138	267
8/15/2008	Alderwood V	--	--	409	113
8/21/2008	Alderwood Festival	--	--	1,038	219
8/28/2008	Tennessee Hunter Jumper Classic	--	--	994	183
9/10/2008	Brownland Fall I	--	--	2,759	242
9/13/2008	Alderwood VI	--	--	542	116
9/17/2008	Brownland Fall II	--	--	2,815	264
10/2/2008	Smoky Mountain Fall Gathering I	--	--	1,187	177
10/9/2008	Smoky Mountain Fall Gathering I	--	--	1,030	160
11/13/2008	Harvest Time	--	--	1,338	189
11/21/2008	Alderwood VIII	--	--	298	99
12/5/2008	Alderwood IX	--	--	361	111
<i>National Spotted Saddle Horse Association</i>					
4/19/08	CCWHA Remembrance Trail Ride	--	--	--	--
5/10/08	Auburntown Beta Club NSSHA Show	--	--	--	--
5/16-17/08	NSSHA Spring Show	--	--	--	--
5/24/08	CCWHA Memorial Trail Ride	--	--	--	--
6/7/08	NSSHA St Jude Children's Hospital Benefit	--	--	--	--
6/14/08	CCWHA/NSSHA Trail Ride	--	--	--	--
6/21/08	Belfast Fire Dept. NSSHA Show	--	--	--	--
6/28/08	NSSHA Youth & Amateur Committee Show	--	--	--	--
7/12/08	Rock Island Volunteer Fire Dept. Show	--	--	--	--
7/19/08	CCWHA July Trail Ride	--	--	--	--
7/25-26/08	19th Annual NSSHA Mid Season Show	--	--	--	--
8/16/08	NSSHA Show	--	--	--	--

Association	Show	Equine	Participants	Entries^a	Classes
8/30/08	CCWHA Labor Day Trail Ride	--	--	--	--
9/17-20/08	NSSHA World Grand Championship	--	--	--	--
10/25/08	CCWHA Halloween Trail Ride	--	--	--	--
<i>Pleasure Walking Horse Association of Tennessee</i>					
6/21/08	Waterfall	91	--	342	42
8/3/08	Celebration	90	--	226	42
9/12/08	Hoofbeats	54	--	197	42
10/25/08	Oktoberfest	56	--	197	42
<i>Spotted Saddle Horse Breeders & Exhibitors Association</i>					
6/7/08	LAHA Sport Horse Event	--	--	--	--
6/21/08	East TN Spotted Saddle Horse Show	--	--	347	48
7/12/08	Cannon Co "Reach" after School Program Show	--	--	286	59
7/25-26/08	3rd Annual SSHBEA Mid Season Show	--	--	44	11
8/9/08	Metro Moore Co. Fire Dept & Project Graduation	--	--	156	40
8/16/08	SSHBEA "Ladies Auxillary" Show	--	--	146	72
9/6/08	8th Annual Cannon Co 4-H Spotted Show	--	--	164	42
9/20/08	Sport Horse Championship Trail Ride & Hunting	--	--	112	34
9/29-10/4/08	24th Annual SSHBEA World Championship	--	--	--	--
11/7-8/08	15th Annual Sport Horse World Championship	--	--	159	42
<i>Tennessee Donkey Association</i>					
4/5/08	Annual Mule Day Mini Mania Show	--	--	61	20
7/26/08	Annual Bedford Co Fair Donkey Show	23	--	71	16
8/17/08	1st Annual Wilson Co. Fair Donkey Show	29	--	90	19
9/13/08	4th Annual TN State Fair Donkey Show	58	--	181	18
<i>United States Eventing Association-Area 3</i>					
4/19-20/08	River Glen Horse Trails	154	--	154	--
10/11-12/08	Middle TN Pony Club Horse Trials	147	137	147	--
11/1-2/08	River Glen Horse Trails	102	--	102	--
<i>Walking Horse Owners Association</i>					
1/19/08	WHOA/TWHBEA Academy Show	--	--	166	--
2/16/08	WHOA/TWHBEA Academy Show	--	--	221	--
3/15/08	WHOA/TWHBEA Academy Show	--	--	215	--
3/22/08	WHOA/TWHBEA Academy Championship	--	--	194	--
3/29/08	WHOA/TWHBEA Academy Show	--	--	352	--
5/17/08	WHOA Versatility Show	--	--	154	--
5/25/88	WHOA Versatility Show	--	--	365	--
6/15/08	WHOA Versatility Show	--	--	225	--
7/6/08	WHOA Versatility/Game Show	--	--	265	--
7/26/08	Montverde Academy Youth & Amateur	--	--	181	--
7/26-8/2/08	International Grand Championship Show	--	--	1,653	--
9/24/08	International Novice Night	--	--	113	--
9/25-27/08	International Grand Championship Show	--	--	559	--
11/29/08	Walking For the Children	--	--	320	--

^aDefined as one enters a class at a competition

Appendix D

Equine Breeding Incentive Programs

State	Description	Source
Arizona	Arizona Bred certification allows breeders and/or owners to receive awards. Breeders receive up to 36% of the winner's share of the purse. As an owner, you may collect 15% - 25% of the winning purse. Thus as a breeder/owner you may be awarded up to a 51% in additional monies of the winner's purse.	Arizona Thoroughbred Breeders Association (2009)
Arkansas	0.5% of all monies wagered shall be paid to the Commission for deposit in the Arkansas Racing Commission Purse and Awards Fund to be used for purse supplements, breeder's awards, owner's awards and/or stallion awards.	Arkansas Thoroughbred Breeders and Horsemen's Association (2009)
California	A breeding programs that consist of four components; breeder awards, owner awards, stallion awards and restricted purses. Revenues that support that support the breeding incentive program come from pari-mutuel handle takeout.	Smith, M. (1999)
Colorado	A program that consists of five components: purse supplements, added money, breeders awards, owner awards, stallion awards and other financial awards. The funding comes from 3% of the net revenue from Advanced Deposit Account Wagering and 2% from net revenue from Instant Racing.	Colorado Horsemen's Legislative Coalition (2008)
Florida	The administrators pay out to the Breeders' and Stallion Owners' Awards, Pari-mutuel legislation designates the source of revenue for the breeders' incentive program as a percentage of the daily pari-mutuel handle. Under the provision of Florida statutes, a percentage of the combined on-track and inter-track pari-mutuel handle and a percentage of the income from the outgoing interstate simulcasts will be allocated to the breeders' incentive program.	The Florida Thoroughbred Breeders & Owners Association (2009)
Illinois	The Illinois Thoroughbred Breeders Fund Program is administered by the Illinois Department of Agriculture. There are seven different awards for this program: 1) one of the richest breeding and racing programs, 2) stake races, 3) Illinois sire incentive program, 4) owners awards program, 5) county fair races, 6) convenient racing locations, and 7) off-track locations.	Illinois Department of Agriculture (2009)
Kansas	There are two programs within the Kansas Bred Program: The Racing Program and The Breeding Program. The racing program pays Purse Supplements to registered Kansas Bred horses when they run in races in the state of Kansas. The breeding program pays Stallion and Mare Awards to eligible horses whose offspring have raced and earned "race points" in the state of Kansas.	Kansas Thoroughbred Association (2009)
Kentucky	Kentucky has a racing breeding incentive fund and a non-racing incentive fund. Both incentive plans are funded by money from sales taxes paid on stallion stud fees.	Kentucky Horse Racing Commission (2009)
Maryland	There are seven categories: 1) purse money, 2) awards for owners, 3) awards for breeders, 4) awards for stallions, 5) purse premiums for owners, 6) bonus awards for the highest-earning 2 and 3-year-olds, and 7) allocation for Maryland Million purses. A percent of the total mutuel handle and breakage from major tracks allocate the funds.	Maryland Thoroughbred (2009)

Massachusetts	Breeder's awards are paid for horses that finish 1, 2, or 3. 25% to the breeder, 30% to the owner (except in restricted Mass-Bred races), 15% to the stallion owner. A percentage of the monies wagered at Suffolk Downs is allocated to the MTBA fund.	Massachusetts Thoroughbred Breeders Association (2009)
Michigan	The Michigan Department of Agriculture pays the breeder of a Michigan bred winner an award of 10% of the gross purse from a licensed thoroughbred pari-mutuel track located in the state of Michigan. The overall revenue is generated by pari-mutuel racing under the Michigan Bred Owners Award. A premium is paid to a certified Michigan bred that finishes first, second or third in a non-restricted or open company race in Michigan.	Michigan Thoroughbred Owners and Breeders Association (2009)
Minnesota	The Breeder's Fund Tax is monitored by the Minnesota Racing Commission in the form of purse supplements, breeder's awards and stallion awards. Purses are a result of a fixed percentage taken from revenues generated by the live racing handle. From this the Breeders Fund is distributed in three percentages with 62% going to purses, 31% going to the breeders of Minnesota thoroughbreds, and 7% going for stallion awards.	The Minnesota Thoroughbred Association (2009)
Nebraska	The Nebraska Thoroughbred Breeders Association pays bonus money to the breeders, stallion owners and owners of Nebraska Bred who ran in life-time condition races. The money is funded through the races.	Nebraska Thoroughbred Breeders Association, Inc (2009)
New Jersey	The association administers a New Jersey-bred incentive program for breeders, stallion owners and race horse owners. The funds for the program are allocated through the races held in New Jersey.	Thoroughbred Breeders Association of New Jersey (2009)
New Mexico	This program is based on races in New Mexico. First place will get 63% of the incentive money. Second place will get 24% of the incentive money. Third place will get 13% of the incentive money. The money generated for this program will come from the gaming portion of the overnight purses. The money also is excluded from the 10% Breeders Awards monies.	New Mexico Horse Breeders Association (2009)
New York	The Fund promotes Thoroughbred breeding and racing in New York State. The revenue is derived from a small percentage of every dollar bet on Thoroughbred Racing in New York State both on and off-track, and also from a percentage of the breakage.	New York Breeding and Racing Program (2009)
Ohio	Ohio Quarter Horse Breeders Incentive Fund money will be determined by results from the Eastern Ohio, Northern Ohio and Southern Ohio Quarter Horse Association Futurities. Then points are received based on the results of each futurity. The total number of points earned in the program will then be divided by the \$35,000 purse to determine a per point value.	Ohio Quarter Horse Association (2008)
Oklahoma	Purse supplements, stallion and broodmare awards are paid to owners and breeders of qualifying accredited Oklahoma-bred horses through a system of restricted and open company races at Oklahoma racetracks. Funded by unclaimed tickets, breakage and a percentage of the exotic handle.	Oklahoma Horse Racing Commission (2009)
Oregon	Incentive programs include Owners' Bonus, Breeders' Award, and Purse Supplements. Funds for payment of the owners' bonus earned during the live Portland Meadows race meet will continue to accrue from all in-state wagers (simulcast or live) through June 30th. And the breeder's award is funded by 10% of wins in Oregon.	Oregon Thoroughbred Owners and Breeders Association (2009)

Pennsylvania	The Pennsylvania Breeding Fund is financed by a percentage of the state's total Thoroughbred pari-mutuel handle and slot revenues. It provides award payments (breeder and stallion awards), overnight races for PA-Bred, purse bonus supplements, PA-Bred stakes races, and reimbursement of expenses incurred by the Pennsylvania Horse Breeders Association	Pennsylvania Horse Breeders Association (2009)
Texas	Approximately two-thirds of its funds go to restricted purses. The remainder is allocated between owner, breeder, and stallion awards. Texas funds its program with 100% of the breakage, a percentage of the multiple exotics handle and a commission on out-of-state handle.	Campbell <i>et al</i> , 1999
Washington	Washington's program has only owner and breeder awards. The program is funded with a percentage of the exotics handle and a percentage of the total handle from qualifying tracks.	Campbell <i>et al</i> , 1999
Wyoming	The funds are allocated to owners, breeders, and owners of sires. Wyoming Pari-Mutuel Commission is associated and funds the Wyoming breed incentive program. The Wyoming-bred funds shall be distributed on a point basis.	Wyoming Pari-Mutuel Commission (2009)

Appendix E

Economic Impacts Methodology/Description

To estimate the economic impacts of Tennessee's equine industry, expenditures from Kenerson and Moore's (2004) and Whiting, Molnar, and McCall (2006) studies were incorporated into IMPLAN, an input-output model. Input-output models analyze the interdependence of industries in an economy through market based transactions. The model describes the transfer of money between industries and institutions and contains both market-based and non-market financial flows, such as inter-institutional transfers. Output from the model includes descriptive measures of the economy including total industry output (i.e., economic activity), value-added, indirect business taxes, and employment for over 500 industries in the study region's economy (the state of Tennessee). The model uses regional purchase coefficients generated by econometric equations that predict local purchases based on a region's characteristics. Not only can the model be used to describe a regional economy, but the model also can be used for predictive purposes, by providing estimates of multipliers.

Multipliers measure the response of the economy to change in demand or production. Multiplier analysis generally focuses on the effects of exogenous changes on: 1) output of the sectors in the economy, 2) income earned by households of the new outputs; and 3) employment (in physical terms) that is expected to be generated because of the new outputs. This study uses Type I and Type SAM (Social Accounting Matrix) multipliers. Type I multipliers are calculated by dividing direct plus indirect impacts by the direct impacts, where the Type SAM multipliers = (direct + indirect + induced impacts)/direct impacts. The Type SAM multipliers take into account the expenditures resulting from increased incomes of households as well as inter-institutional transfers resulting from the economic activity. Therefore, Type

SAM multipliers assume that as final demand changes, incomes increase along with inter-institutional transfers. As these people and institutions increase expenditures this leads to increased demands from local industries.

Direct effects, or impacts, are those attributable specifically to the new expenditure region. Economic impacts result because equine owners purchase goods or services from other industries (Direct impacts) (for example, veterinarian services, feed and bedding, etc.). This purchase represents the direct impact of the expenditure.

Indirect effects, or impacts, arise from businesses' expenditures on raw materials, services, supplies, and other operating expenses, which help to support jobs in other local businesses. For example, a landowner may expand hay production or feed and tack retailers begin offering equine supplies/equipment. Note that only the value added via the local production process, not the total retail sale, gives rise to additional economic benefits for the community. Only the portion of the expenditure actually retained by the local vendor can be used in the calculation of the firm's indirect income impact on the economy. It is for this reason that retail sales, in isolation, represent a poor measure of economic impact. Hence, when local businesses purchase merchandise for resale, most of the proceeds accrue to the community where the goods were manufactured. Thus, the size of a firm's indirect impact on local incomes depends primarily on the dollar value of locally purchased goods and services and whether or not these same goods and services are locally produced or imported into the community. In addition, the amount of indirect employment generated by the business firm will vary with the amount of under-utilization of workers and capacity existing in local businesses. Although the firm's payments to local vendors increase the amount of local

business activity, they will not translate to significant increases in employment if local firms are currently experiencing excess capacity. The model assumes that firms are operating at full capacity, so estimates of indirect effects may overstate economic impacts if firms were actually operating at less than full capacity. (“Full” capacity, in this sense, can be thought of as a “traditional” operating level, generally 70-80 percent of true plant capacity, thus allowing firms to expand operations in the short-run.)

Induced impacts, or ripple effects, are created as the new income generated by the direct and indirect effects is spent and re-spent within the local economy. For example, part of the wages received by a feed and tack retailer’s employees will be spent on housing. When this retailer employee rents an apartment in Tennessee, a portion of the rent payment will be used to pay local employees of the apartment complex. These employees will in turn spend a portion of their income in the local community on groceries, housing, etc., thus adding to the amount of local personal income attributable to the firm’s activities. However, during each of these subsequent rounds of spending, a large portion of the income generated leaks out of the state economy through taxes, savings, and spending outside the state or region, thereby diminishing the increment to state’s or region’s income attributable to these firms.

Tennessee's Equine Industry: Overview and Estimated Economic Impacts



**Institute of Agriculture
Department of Agricultural Economics
Agricultural Experiment Station
The University of Tennessee
Knoxville**

June 2011

HORSE WELFARE

Action Needed to Address Unintended Consequences from Cessation of Domestic Slaughter



G A O

Accountability * Integrity * Reliability

HORSE WELFARE

Action Needed to Address Unintended Consequences from Cessation of Domestic Slaughter

Why GAO Did This Study

Since fiscal year 2006, Congress has annually prohibited the use of federal funds to inspect horses destined for food, effectively prohibiting domestic slaughter. The U.S. Department of Agriculture (USDA) is responsible for overseeing the welfare of horses transported for slaughter.

Congress directed GAO to examine horse welfare since cessation of domestic slaughter in 2007. GAO examined (1) the effect on the U.S. horse market, if any, since cessation; (2) any impact of these market changes on horse welfare and on states, local governments, tribes, and animal welfare organizations; and (3) challenges, if any, to USDA's oversight of the transport and welfare of U.S. horses exported for slaughter. GAO analyzed horse price and shipping data, and interviewed officials from USDA, state and local governments, tribes, the livestock industry, and animal welfare organizations, and reviewed documents they provided.

What GAO Recommends

GAO suggests that Congress may wish to reconsider restrictions on the use of federal funds to inspect horses for slaughter or, instead, consider a permanent ban on horse slaughter. GAO recommends that USDA issue a final rule to protect horses through more of the transportation chain to slaughter and consider ways to better leverage resources for compliance activities. USDA agreed with GAO's recommendations and noted specific actions it will take to implement them.

View GAO-11-228 or key components. For more information, contact Lisa Shames at (202) 512-3841 or shamesl@gao.gov.

What GAO Found

Since domestic horse slaughter ceased in 2007, the slaughter horse market has shifted to Canada and Mexico. From 2006 through 2010, U.S. horse exports for slaughter increased by 148 and 660 percent to Canada and Mexico, respectively. As a result, nearly the same number of U.S. horses was transported to Canada and Mexico for slaughter in 2010—nearly 138,000—as was slaughtered before domestic slaughter ceased. Available data show that horse prices declined since 2007, mainly for the lower-priced horses that are more likely to be bought for slaughter. GAO analysis of horse sale data estimates that closing domestic horse slaughtering facilities significantly and negatively affected lower-to-medium priced horses by 8 to 21 percent; higher-priced horses appear not to have lost value for that reason. Also, GAO estimates the economic downturn reduced prices for all horses by 4 to 5 percent.

Comprehensive, national data are lacking, but state, local government, and animal welfare organizations report a rise in investigations for horse neglect and more abandoned horses since 2007. For example, Colorado data showed that investigations for horse neglect and abuse increased more than 60 percent from 975 in 2005 to 1,588 in 2009. Also, California, Texas, and Florida reported more horses abandoned on private or state land since 2007. These changes have strained resources, according to state data and officials that GAO interviewed. State, local, tribal, and horse industry officials generally attributed these increases in neglect and abandonments to cessation of domestic slaughter and the economic downturn. Others, including representatives from some animal welfare organizations, questioned the relevance of cessation of slaughter to these problems.

USDA faces three broad challenges in overseeing the welfare of horses during transport to slaughter. First, among other management challenges, the current transport regulation only applies to horses transported directly to slaughtering facilities. A 2007 proposed rule would more broadly include horses moved first to stockyards, assembly points, and feedlots before being transported to Canada and Mexico, but delays in issuing a final rule have prevented USDA from protecting horses during much of their transit to slaughtering facilities. In addition, GAO found that many owner/shipper certificates, which document compliance with the regulation, are being returned to USDA without key information, if they are returned at all. Second, annual legislative prohibitions on USDA's use of federal funds for inspecting horses impede USDA's ability to improve compliance with, and enforcement of, the transport regulation. Third, GAO analysis shows that U.S. horses intended for slaughter are now traveling significantly greater distances to reach their final destination, where they are not covered by U.S. humane slaughter protections. With cessation of domestic slaughter, USDA lacks staff and resources at the borders and foreign slaughtering facilities that it once had in domestic facilities to help identify problems with shipping paperwork or the condition of horses before they are slaughtered.

Contents

Letter		1
	Background	5
	U.S. Slaughter Horse Market Has Changed Since Domestic Slaughter Ceased in 2007	10
	Horse Welfare Has Reportedly Declined, Although the Extent Is Unknown, Straining the Resources of State and Local Governments, Tribes, and Animal Welfare Organizations	18
	USDA's Oversight of the Welfare of Horses Transported for Slaughter Is Complicated by Three Challenges	27
	Conclusions	42
	Matters for Congressional Consideration	44
	Recommendations for Executive Action	45
	Agency Comments and Our Evaluation	46
Appendix I	Objectives, Scope, and Methodology	47
Appendix II	Results of the Econometric Analysis of Horse Sale Prices	56
Appendix III	Comments from the U.S. Department of Agriculture	59
Appendix IV	GAO Contact and Staff Acknowledgments	61
Related GAO Products		62
Tables		
	Table 1: Estimates for Effect of Cessation of Slaughter and Economic Downturn on Horse Sale Prices by Sale Price Category, Spring 2004 through Spring 2010	18
	Table 2: Semi-log Coefficients for Hedonic Quantile Regression of Horse Prices	58

Figures

Figure 1: USDA Owner/Shipper Certificate to Document Horses' Fitness to Travel to a Slaughtering Facility	7
Figure 2: Number of Horses Slaughtered in the United States, 1990 through 2007	11
Figure 3: U.S. Exports of Horses Intended for Slaughter and Other Purposes, 2004 through 2010	12
Figure 4: Distribution of Horse Prices from the Horse Auctions Used in the Analysis, Spring 2004 through Spring 2010	15
Figure 5: Average Horse Prices Before and After Cessation of Horse Slaughter for Each Price Category, Spring 2004 through Spring 2010	16
Figure 6: Estimates of the Effect on Horse Prices from Closing Domestic Slaughtering Facilities and the Economic Downturn for Each Price Category, Spring 2004 through Spring 2010	17
Figure 7: A Band of Horses, Some of Hundreds That Have Been Neglected on Montana Ranchland and Seized by the County after the Collapse of Their Owner's Ranching Company	22
Figure 8: Wild Horse Herd on Degraded Land Owned by the Yakama Nation in Washington State	23
Figure 9: Slaughter Horse Transport Program's Budget Obligations, Fiscal Years 2005 through 2010	31
Figure 10: Sections of USDA Owner/Shipper Certificate to be Completed by Shippers or Canadian or Mexican Officials	34
Figure 11: Number of Investigation Cases and Alleged Violators of the Slaughter Horse Transport Program Regulation, Fiscal Years 2005 through 2010	39
Figure 12: Example of Transport of Horses to Slaughtering Facilities Before and After Domestic Slaughter Ceased	41

Abbreviations

APHIS	Animal and Plant Health Inspection Service
BLM	Bureau of Land Management
CFIA	Canadian Food Inspection Agency
FSIS	Food Safety Inspection Service
OIG	Office of Inspector General
SAGARPA	Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (Mexico)
TRAGIS	Transportation Routing Analysis Geographic Information System
USDA	U.S. Department of Agriculture

This is a work of the U.S. government and is not subject to copyright protection in the United States. The published product may be reproduced and distributed in its entirety without further permission from GAO. However, because this work may contain copyrighted images or other material, permission from the copyright holder may be necessary if you wish to reproduce this material separately.



G A O

Accountability * Integrity * Reliability

United States Government Accountability Office
Washington, DC 20548

June 22, 2011

The Honorable Herb Kohl
Chairman

The Honorable Roy Blunt
Ranking Member

Subcommittee on Agriculture, Rural Development,
Food and Drug Administration, and Related Agencies
Committee on Appropriations
United States Senate

The Honorable Jack Kingston
Chairman

The Honorable Sam Farr
Ranking Member

Subcommittee on Agriculture, Rural Development,
Food and Drug Administration, and Related Agencies
Committee on Appropriations
House of Representatives

Many countries consider horsemeat an appropriate part of human diets—and horsemeat was consumed in the United States as recently as the mid-1940s. However, the slaughter of horses for any purpose, especially for human consumption, is now a very controversial issue in the United States, stemming largely from differences in how the country's estimated 9 million horses are viewed. For example, some, including animal rights advocates, horse enthusiasts, and some state governments, oppose horse slaughter, citing the horse's iconic role in helping to settle the American West; its former importance as a work and transportation animal on farms and in rural communities; and its continued value as a show, racing, and recreation animal. Moreover, for many, horses are companion animals, similar to dogs, cats, or other domestic pets. In contrast, others, including the livestock and meatpacking industries and other state governments, support horse slaughter, noting a strong export market for horsemeat; the economic and employment benefits to local communities of horse slaughtering facilities; and limited alternative options for dealing with unwanted horses. Moreover, for many proponents of slaughter, horses are livestock, similar to cattle, sheep, swine, and other farm animals raised to produce commodities for human consumption. At present, horses are not slaughtered in the United States due to an annual prohibition on the use of federal funds to inspect horses at slaughter. However, horses may be purchased at auctions or other sales and exported for slaughter to Canada

and Mexico. Horse slaughtering facilities in these countries generally export the meat to consumer markets in Europe and Asia.

Aside from the question as to whether it is appropriate to slaughter horses for human consumption, both sides of this issue have raised concerns about unintended consequences of the cessation of domestic slaughter. For example, both sides note that horses intended for slaughter must now travel much farther distances to foreign slaughtering facilities, potentially, during some part of that trip, in conveyances designed for smaller animals and without adequate rest, food, and water. This controversy has also attracted media attention, with reports of the inhumane treatment of horses during transit or at foreign slaughtering facilities. For those who oppose horse slaughter, the solution is to ban both domestic horse slaughter and trade in horsemeat or horses intended for slaughter for human consumption, effectively ending the export of horses intended for slaughter. Bills were introduced in the 107th and 108th Congresses to create such a ban, but none were enacted into law. In contrast, for those who support horse slaughter, the solution is to reopen domestic slaughtering facilities. Although Congress has not acted to create an explicit ban on horse slaughter, starting in fiscal year 2006, it included language in annual appropriations bills that prohibits the use of federal funds for inspection by the U.S. Department of Agriculture (USDA) of horses in transit to slaughter and at slaughtering facilities.¹ In debating this provision in the House of Representatives, opponents argued that it would not end horse slaughter, but instead would move this slaughter across the borders, hurting horse welfare by increasing the distances horses would travel to slaughter. However, proponents of the provision countered that there was no evidence of decreased horse welfare in states that had banned slaughter.

As recently as 2007, three domestic horse slaughtering facilities—two in Texas and one in Illinois—continued to operate despite the prohibition on using federal funds for inspecting horses at slaughter. These facilities stayed open by paying for these inspections under a voluntary fee-for-service

¹Federal law requires that all U.S. horses slaughtered for human consumption and placed in commerce be inspected.

The total number of U.S. horses sent to slaughter in 2006, the last full year of domestic slaughter, was comprised of horses slaughtered domestically (i.e., 104,899, as shown in fig. 2) and those sent for slaughter in Canada or Mexico (i.e., 32,789, as shown in fig. 3)—for a total of 137,688 horses. Taken together, the 137,984 U.S. horses that were sent to slaughter in Canada or Mexico in 2010 is approximately equal to the total number of horses slaughtered in 2006.

Additional certification may affect Canadian and Mexican exports of horsemeat to Europe and, in turn, may affect the future export of horses intended for slaughter from the United States to these countries. In 2010, the European Union began prohibiting the importation of horsemeat from horses treated with certain drugs and requiring countries to document withdrawal periods for horses treated with other drugs before meat from such horses could be imported to the European Union. Those regulations precipitated similar regulations in Canada and Mexico. For example, Canadian requirements went into effect on July 31, 2010, banning specific medications, such as phenylbutazone—the most common anti-inflammatory medication given to horses—and requiring a 180-day withdrawal period for other medications, such as fentanyl, an analgesic. Also, since November 30, 2009, Mexico has required an affidavit by transporters that horses have been free from certain medications for 180 days prior to shipment. Furthermore, effective July 31, 2013, the European Union will require lifetime medication records for all horses slaughtered in non-European Union countries before accepting imports of horsemeat from those countries. According to APHIS and horse industry sources, these requirements could result in shippers certifying that their horses are free of medication residues without having first-hand knowledge or documentation of the horses' status for the previous 180 days.

Horse Sales and Prices Have Declined Since 2007, Especially for Lower-Valued Horses

With regard to sales, many of the State Veterinarians said that fewer horse sales have occurred and fewer auctions have operated within their states since 2007, in part, because of lower horse prices and sale commissions since the cessation of domestic slaughter. As a result, they said, horse owners have fewer options for getting rid of horses they no longer want. There also has been reduction in the number of commercial shippers doing business since the cessation of slaughter. In reviewing USDA documentation, we found that more than 110 shippers operated from 2005 through 2006—the 2 years prior to the cessation of domestic slaughter in 2007—and fewer than 50 shippers operated from 2008 through 2009. Some in the horse industry, as well as the State Veterinarians, generally attributed this decrease to the closing of horse auctions around the

country, reflecting a smaller market and the lower profit margins resulting from the increased costs of transporting horses intended for slaughter to Canada and Mexico.

Horse industry representatives also stated that the closing of domestic slaughtering facilities has dramatically affected the prices of horses. National data on horse prices do not exist, but data from individual auctions are available. For example, the Billings, Montana, horse auction, one of the nation's largest, which also sells horses purchased for slaughter, reported a large increase in the percentage of lower-priced horses sold—the type of horse that typically ends up at slaughter—and a general decrease in sale prices. In May 2005, approximately 25 percent of “loose” horses—less expensive horses that are run through the auction ring without a rider or saddle—sold for less than \$200 at that auction, whereas in May 2010, about 50 percent of loose horses sold for less than that amount.

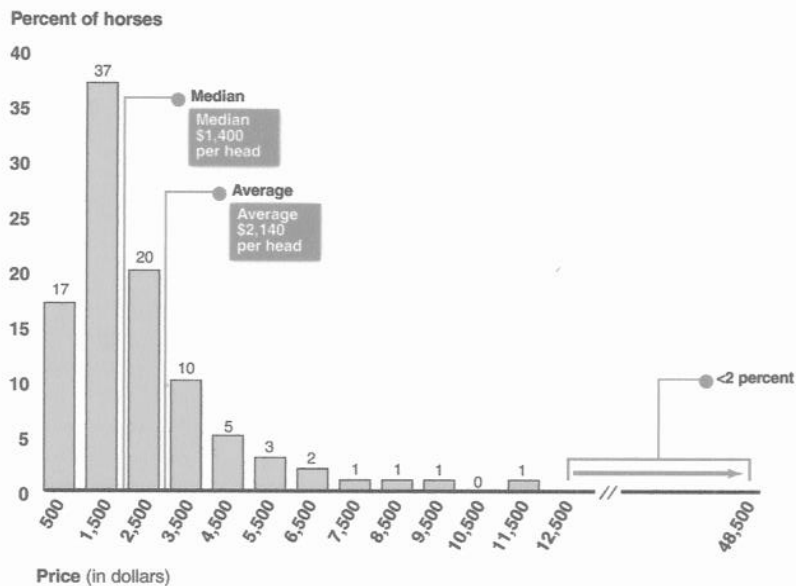
The economic downturn in the United States that started in December 2007 also likely affected horse prices, according to the academic experts and industry representatives we consulted. Since many U.S. horses are used for recreational purposes, they are generally thought to be luxury goods, and their ownership is sensitive to upturns and downturns in the general economy. Furthermore, some horse sellers could no longer afford to keep their horses, and potential buyers also were not able to offer as much to buy horses or were not in the market to purchase horses at all, according to some industry observers. In particular, a considerable number of horse owners are from lower-to-moderate income households and are less able to withstand the effects of a recession, according to academic experts. For example, one study estimated that up to 45 percent of horse owners have an annual household income of between \$25,000 and \$75,000.⁹ According to several State Veterinarians, those owners are more likely to have problems affording the care of their horses during an economic downturn.

To estimate the impact of the cessation of domestic slaughter on horse prices, we collected price data on more than 12,000 sale transactions from spring 2004 through spring 2010 from three large horse auctions located in the western, southern, and eastern United States. Our analysis of these

⁹Ahern, J., Anderson, D., Bailey, D., Baker, L., Colette, W., Neibergs, J., North, M., Potter, G., & Stull, C. (2006), “The Unintended Consequences of a Ban on the Humane Slaughter (Processing) of Horses in the United States,” Animal Welfare Council, Inc.

data controlled for the economic downturn and other factors that are auction- and horse-specific, such as a horse's breed/type, age, and gender, which may also affect prices.¹⁰ Horse sale prices ranged from a minimum of \$4 to a maximum of \$48,500, with most of these sales clustered at the lower end of the price range. Figure 4 shows the distribution of these sales prices, including the median and average price per head.

Figure 4: Distribution of Horse Prices from the Horse Auctions Used in the Analysis, Spring 2004 through Spring 2010



Source: GAO analysis of horse auction sales data.

Our analysis also shows a statistically significant reduction in average sale price across all price categories after the cessation of slaughter in 2007, as shown in figure 5.¹¹ For example, the average sale price for horses in the lowest price category (20th percentile), dropped by about \$110 per head (from \$433 to \$323), and the average price for the highest price category (80th percentile) dropped by about \$140 per head (from \$2,380 to \$2,241).

¹⁰The other variables that we considered included season of year of the auction, auction location, and percentage of “no sales” (horses that did not receive a bid acceptable to the seller) for each auction.

¹¹For the purpose of this discussion, we use the term “category” to refer generally to the quantiles of price from our analysis.

program implemented by USDA in February 2006.² However, in 2007, all three facilities closed when courts upheld state laws in Texas and Illinois prohibiting sale or possession of horsemeat and horse slaughter, respectively. New horse slaughtering facilities have, in effect, been prohibited from opening in other states since then because Congress has continued the annual prohibition on the expenditure of federal funds to inspect horses at slaughter, and it added a prohibition on the use of federal funds, beginning in fiscal year 2008, for implementation of the fee-for-service program as well. Although the domestic slaughter of horses for human food has stopped, USDA's Slaughter Horse Transport Program (transport program) continues to operate. The program, established in 2001, is intended to ensure that horses traveling to slaughter are fit to travel and handled humanely enroute. Among other things, the program collects and reviews shipping documents and inspects conveyances used to transport these horses. However, because of the prohibition on using federal funds for inspecting horses transported to slaughter, the transport program may not inspect the condition of horses designated for slaughter during their transport.

The Senate Committee on Appropriations directed that GAO examine the status of horse welfare in the United States since horse slaughter operations ceased in 2007.³ Our objectives to address this issue were to examine (1) the effect on the U.S. horse market, if any, since domestic slaughter for food ceased in 2007; (2) the impact, if any, of market changes on horse welfare and on states, local governments, tribes, and animal welfare organizations; and (3) challenges, if any, to USDA's oversight of the transport and welfare of U.S. horses exported for slaughter.

To address these objectives, we interviewed officials from USDA and other federal agencies, state and local governments, and tribes and representatives from the livestock industry and animal welfare organizations and reviewed the documents that they provided. We also reviewed published literature addressing issues related to the horse industry

²This program enabled slaughtering facilities to pay for inspections of horses prior to slaughter so that horses could continue to be processed for human consumption without the use of appropriated funds. It was established under the Agricultural Marketing Act, which authorizes a voluntary inspection service, on a fee-for-service basis, for agricultural products. USDA has used this authority to provide inspections for animals it deems exotic, including reindeer, elk, deer, antelope, and water buffalo. In 2006, USDA extended this authority to horses. Meat inspected and passed under this authority is branded with a USDA mark of inspection and can be sold interstate or exported.

³S. Rep. No. 111-39, at 44 (2009).

and slaughter. In addition, we visited border crossings, horse auctions, and tribal lands to observe how horses are handled and processed. More specifically, to examine the effect on the U.S. horse market since domestic slaughter ceased in 2007, we collected and analyzed horse trade data for fiscal years 2005 through 2010—to cover the 2 years before and after domestic slaughter ceased—from USDA and the Department of Commerce and horse sales data from three large, geographically dispersed, U.S. livestock auctions for spring 2004 through spring 2010. Using these data, along with other data, including economic data from the Department of Labor, we developed an econometric model to analyze the effect of the slaughter cessation on horse prices while controlling for other factors, such as the U.S. recession that began in December 2007. We selected five academic experts who have published studies of the horse industry to review our model specifications and results for any fatal flaws; they generally found the model and results credible. To examine the impact of horse market changes on horse welfare and states, local governments, tribes, and animal welfare organizations, we also used semi-structured interviews to systematically collect the views of the State Veterinarian in each of a sample of 17 states that generally have the largest horse populations and economies.⁴ In some cases, this official was joined by other state officials, such as members of the state livestock board, for these interviews. The results of the interviews are not generalizable to all State Veterinarians but provide information on the situations faced by these 17 states. We performed a content analysis of the results of these interviews to identify common themes and the frequency with which certain issues were raised regarding the impacts of changes in the horse market. Furthermore, to examine the challenges to USDA's oversight of the transport of U.S. horses exported for slaughter, we identified and analyzed a generalizable sample of about 400 horse shipping forms for fiscal years 2005 through 2009 that are maintained by the transport program. Each form represents one load or shipment of horses. Using the data from these forms and mapping software, we estimated distances that horses traveled to slaughter before and after domestic slaughter ceased. Appendix I provides further detail on our scope and methodology.

⁴These states are California, Colorado, Florida, Indiana, Kentucky, Louisiana, Maryland, Missouri, Montana, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Texas, and Wyoming. Each state has a State Veterinarian who is hired by the state government to oversee animal health matters within the state. The duties of the staff in a State Veterinarian's office may include monitoring herds and flocks of animals for disease, regulating the movement of animals within and across state lines, animal welfare, and, in some states, meat inspection.

We conducted this performance audit from April 2010 through June 2011, in accordance with generally accepted government auditing standards.

Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

The Federal Agriculture Improvement and Reform Act of 1996 (1996 Farm Bill) authorized USDA to issue guidelines for the regulation of the commercial transportation of horses and other equines for slaughter by persons regularly engaged in that activity within the United States. The statute gives USDA authority to regulate the commercial transportation of equines to slaughtering facilities, which the statute indicates include assembly points, feedlots, or stockyards. The authority to carry out this statute was delegated to USDA's Animal and Plant Health Inspection Service (APHIS). Pursuant to this authority, APHIS issued a regulation, "Commercial Transportation of Equines to Slaughter" (transport regulation), in 2001. In 2001, APHIS also established the transport program. This program seeks to ensure that horses being shipped for slaughter are transported safely and humanely. In addition, USDA's Food Safety Inspection Service (FSIS) carries out the Humane Methods of Slaughter Act and related regulations, which require the humane handling of livestock, including horses, in connection with slaughter.⁵

APHIS's transport regulation establishes a number of requirements that owners/shippers (shippers) must meet for horses transported to slaughter. The regulation states that shippers must (1) provide horses with food, water, and rest for at least 6 hours prior to loading; (2) provide horses adequate floor space in whatever conveyance (e.g., a trailer) is being used; (3) segregate all stallions and other aggressive equines; and (4) ensure that trailers are free of sharp protrusions, are not double-decked, and have adequate ventilation. If a trip is longer than 28 hours, horses must be unloaded and provided at least 6 hours of food, water, and rest before

⁵For more information on the Humane Methods of Slaughter Act, see GAO, *Humane Methods of Slaughter Act: Weaknesses in USDA Enforcement*, GAO-10-487T (Washington, D.C.: Mar. 4, 2010); *Humane Methods of Slaughter Act: Actions Are Needed to Strengthen Enforcement*, GAO-10-203 (Washington, D.C.: Feb. 19, 2010); and *Humane Methods of Slaughter Act: USDA Inspectors' Views on Enforcement*, GAO-10-244SP (Washington, D.C.: Feb. 19, 2010).

being reloaded. Horses cannot be shipped to slaughter unless they are accompanied by an “Owner/Shipper Certificate—Fitness to Travel to a Slaughter Facility” (owner/shipper certificate) certifying that the horses are fit for travel. The certificate must state that horses are over 6 months of age, are not blind in both eyes, can bear weight on all four limbs, are able to walk unassisted, and are not likely to foal (i.e., give birth) during transport. Figure 1 provides an example of this certificate. Shippers found to be in violation of the transport regulation can face penalties of \$5,000 per horse, per violation.

Figure 1: USDA Owner/Shipper Certificate to Document Horses' Fitness to Travel to a Slaughtering Facility

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0579-0150. The time required to complete this information collection is estimated to average 29 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. OMB NO 0579-0150

UNITED STATES DEPARTMENT OF AGRICULTURE ANIMAL AND PLANT HEALTH INSPECTION SERVICE VETERINARY SERVICES		OWNER/SHIPPER CERTIFICATE FITNESS TO TRAVEL TO A SLAUGHTER FACILITY <i>(Please type or print in ink)</i>	
TIME HORSES LOADED ON CONVEYANCE	DATE	CITY AND STATE WHERE HORSES WERE LOADED ON CONVEYANCE	
VEHICLE LICENSE NO. AND DRIVERS NAME		NAME OF AUCTION/MARKET	
CONSIGNOR (OWNER/SHIPPER) NAME		CONSIGNEE (RECEIVER/DESTINATION) NAME	
STREET ADDRESS		STREET ADDRESS	
CITY, STATE, AND ZIP CODE		CITY, STATE, AND ZIP CODE	
AREA CODE AND TELEPHONE NO.		AREA CODE AND TELEPHONE NO.	

CHECK THE BOX THAT INDICATES THE FOLLOWING IS TRUE FOR ALL THE HORSES ON THIS CERTIFICATE

Pregnant mares are not likely to foal (give birth) during the trip. Horses are able to bear weight on all 4 limbs. Horses are able to walk unassisted.

Foals are older than 6 months of age. Horses are not blind in both eyes.

	TAG PREFIX	TAG NO.	COLOR DESCRIPTION							BREED-TYPE					SEX	BRANDS Tattoo, etc.	REMARKS (include existing conditions)	
			Bay	Grey	Blk	Fino	Chest	Other	TB	QT	Draft	Pony	Other	Mare				Stee
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		

HORSES HAVE HAD ACCESS TO FOOD, WATER, AND REST FOR A MINIMUM OF 6 CONSECUTIVE HOURS IMMEDIATELY BEFORE LOADING INTO CONVEYANCE.

SIGNATURE	CANADIAN FOOD INSPECTION AGENCY (CFIA) EST. _____ DATE _____ TIME _____
I HEREBY AUTHORIZE THE CFIA TO DISCLOSE THIS DOCUMENT AND THE INFORMATION IN IT AS COMPLETED BY THE CFIA OR DGIF TO THE USDA. FALSIFICATION OF THIS FORM OR KNOWINGLY USING A FALSIFIED FORM IS A CRIMINAL OFFENSE AND MAY RESULT IN A FINE OF NOT MORE THAN \$10,000 OR IMPRISONMENT FOR NOT MORE THAN 5 YEARS OR BOTH (16 U.S.C. SECTION 1501).	DIRECCION GENERAL DE INSPECCION EN FRONTERAS (DGIF) EST. _____ DATE _____ TIME _____
SIGNATURE OF OWNER/SHIPPER (I certify that the information contained in this form is true and correct to the best of my knowledge.)	

VS FORM 10-13
MAR 2010

PREVIOUS EDITIONS ARE OBSOLETE.

PAGE 1 OF _____

Source: USDA's Animal and Plant Health Inspection Service.

As of fall 2007, the last three horse slaughtering facilities in the United States were closed following unsuccessful challenges to state laws banning the practice. According to USDA data, those facilities, two in Texas and one in Illinois, slaughtered almost 105,000 horses in 2006—the last full year of operations—and exported more than 17,000 metric tons of horsemeat, which was valued at about \$65 million at that time. Regarding the Texas facilities, in January 2007, the U.S. Court of Appeals for the Fifth Circuit ruled that a 1949 Texas law banning the sale or possession of horsemeat applied to them. They ceased operations in May 2007. Regarding the Illinois facility, the state enacted a law in May 2007 making it illegal to slaughter horses for human consumption. In September 2007, the U.S. Court of Appeals for the Seventh Circuit upheld this slaughter ban, and the Illinois facility ceased operations that month.

Since fiscal year 2006, Congress also has taken annual actions in appropriations legislation that have effectively prevented the operation of horse slaughtering facilities in the United States by prohibiting USDA's use of federal funds to (1) inspect horses being transported for slaughter and (2) inspect horses intended for human consumption at slaughtering facilities. The 1996 Farm Bill authorized the issuance of guidelines for the regulation of the commercial transportation of equines for slaughter as well as the conduct of any inspections considered necessary to determine compliance. The Federal Meat Inspection Act requires inspection of certain animals, including cattle, sheep, swine, goats, and horses, before they are slaughtered and processed into products for human food to ensure that meat and meat products from those animals are unadulterated, wholesome, and properly labeled. However, Congress prohibited USDA from using appropriated funds to pay for these inspections, effective 120 days after enactment of the fiscal year 2006 appropriations legislation on November 10, 2005.

Following the prohibitions, the three domestic slaughtering facilities open at that time petitioned USDA to create a voluntary fee-for-service inspection program for horses prior to slaughter, and USDA created such a program in early 2006, allowing required inspections, and, thus, domestic slaughtering, to continue. The congressional prohibition on use of appropriated funds continued in fiscal year 2007, but, as previously

discussed, the plants had already been shut down by state law that year.⁶ In fiscal year 2008, Congress renewed the prohibition on the use of appropriated funds for inspections on horses being transported to slaughter and at slaughtering facilities, and it added a new prohibition on the use of appropriated funds for implementation or enforcement of the fee-for-service program. These prohibitions were continued in fiscal years 2009 through 2011. These prohibitions notwithstanding, U.S. horses intended for slaughter are still allowed to be transported within the United States under the oversight of USDA's transport program and exported to slaughtering facilities in Canada and Mexico.

In September 2010, USDA's Office of Inspector General (OIG) reported, in part, on the operations of the transport program.⁷ The OIG found that APHIS needs to improve its controls for ensuring that horses being shipped to foreign facilities for slaughter are treated humanely. For example, APHIS does not deny authorization to shippers with a record of inhumanely transporting horses intended for slaughter from shipping other loads of horses, even if unpaid fines are pending for previous violations. The OIG also found deficiencies in how APHIS tags horses that have been inspected and approved for shipment to foreign slaughtering facilities. For example, the agency requires shippers to mark such horses with backtags, which are intended to allow APHIS to trace horses back to their owner and also to verify that horses have passed inspection by an accredited veterinarian. However, APHIS lacked an appropriate control to track individual horses by backtag number on approved shipping documents so that it could perform reconciliations, investigate violations, and initiate enforcement actions, as appropriate. In addition, the OIG noted that APHIS needs to obtain the resources necessary to adequately oversee the transport program and issue in final a proposed rule that would broaden the scope of the agency's regulation of horses being shipped to foreign slaughtering facilities. In its official response to the OIG report, APHIS concurred with the OIG's findings and recommendations

⁶Two plants in Texas were effectively closed when a court there upheld a state statute prohibiting the sale or possession of horsemeat. *Empacadora de Carnes de Fresnillo, S.A. de C.V. v. Curry*, 476 F. 3d 326 (5th Cir. 2007). A plant in Illinois closed after a court there upheld a state statute prohibiting horse slaughter. *Cavel Int'l v. Madigan*, 500 F. 3d 551 (7th Cir. 2007).

⁷U.S. Department of Agriculture, Office of Inspector General, *Animal and Plant Health Inspection Service Administration of the Horse Protection Program and the Slaughter Horse Protection Program*, Audit Report 33601-2-CK (Washington, D.C.: Sept. 30, 2010).

related to the transport program, and APHIS proposed specific actions and time frames for implementing the recommendations.⁸ For example, APHIS agreed to work with USDA's Office of General Counsel and complete by May 31, 2011, an evaluation of "the best options to revise regulations necessary that will establish an agencywide policy that those who have violated the humane handling regulations and failed to pay the associated penalties shall not receive endorsement of any subsequently requested shipping documents."

U.S. Slaughter Horse Market Has Changed Since Domestic Slaughter Ceased in 2007

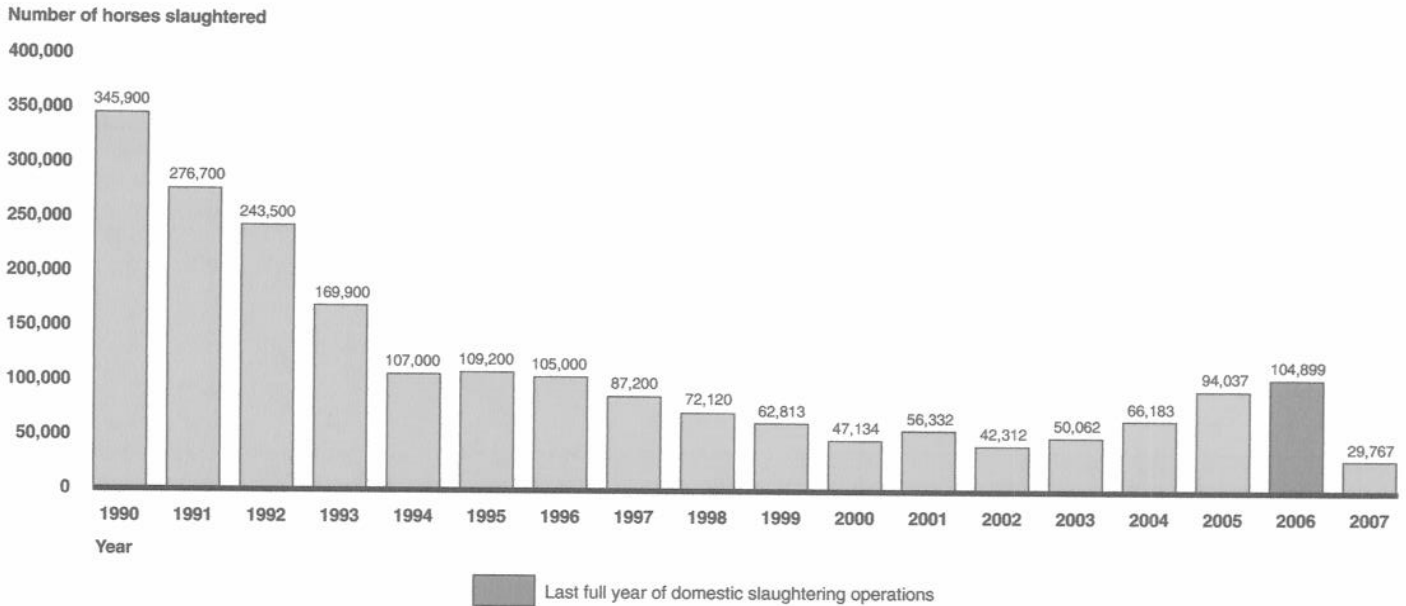
The U.S. slaughter horse market has changed since domestic slaughter for food ceased in 2007, particularly in terms of increased exports to Canada and Mexico and lower domestic sales and prices, especially for lower-value horses, according to our analysis of available trade data and horse auction sales data.

Horse Exports to Canada and Mexico Have Increased with the Cessation of Domestic Slaughter

The number of horses slaughtered in the United States decreased from 1990 (345,900 horses) through 2002 (42,312 horses), according to available data from USDA's National Agricultural Statistics Service. At the same time, the reported number of slaughtering facilities dropped from at least 16 U.S. facilities that operated in the 1980s to 7 facilities in 1994 to as few as 2 in 2002. Beginning in 2003, however, the number of horses slaughtered began rising through 2006, the last full year of domestic slaughtering operations, when nearly 105,000 horses were slaughtered in the United States. According to USDA officials, this increase can be explained, in part, by the reopening of a horse slaughtering facility in DeKalb, Illinois, in 2004 that increased domestic slaughtering capacity. This facility had been closed for 2 years following a fire set by anti-slaughter arsonists. Because all domestic slaughtering facilities closed by September 2007, however, the number of horses being slaughtered in the United States dropped to zero by the end of that year. Figure 2 shows the changes in the number of horses slaughtered in the United States from 1990 through 2007.

⁸APHIS's official response may be found at the end of the OIG report.

Figure 2: Number of Horses Slaughtered in the United States, 1990 through 2007



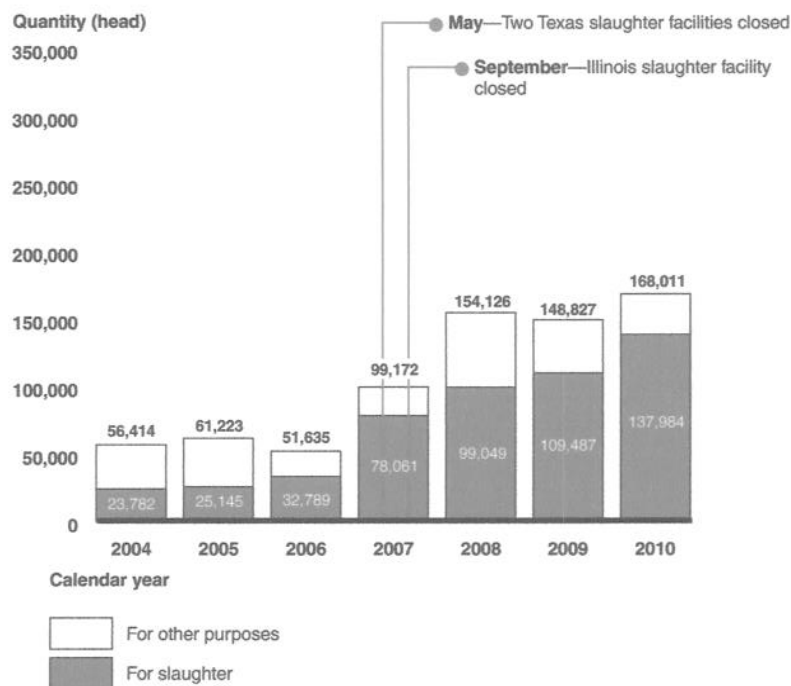
Source: GAO analysis of USDA's National Agricultural Statistics Service data.

Before 2007, horses were slaughtered in domestic slaughtering facilities only when the horsemeat was destined for consumption by humans or zoo animals. Currently, pet food and other products, including glue, may still be obtained from the corpses of horses that are hauled to rendering plants for disposal. The production of these products is not covered by the requirements of the Federal Meat Inspection Act and is therefore not affected by the current ban on the use of appropriated funds for the ante-mortem inspection of horses destined for human consumption. According to a transport program official, USDA is not aware of any domestic facility slaughtering horses for any purpose, including for zoos, as of the end of 2010. USDA identified at least three establishments—in Colorado, Nebraska, and New Jersey—that import horsemeat for repackaging and distribution to purchasers in the United States who feed the meat to animals at zoos and circuses.

With the cessation of domestic slaughter, U.S. exports of horses intended for slaughter increased to Canada and Mexico, the current locations of all North American horse slaughtering facilities. As of the end of 2010, Canada had four such facilities, and Mexico three, that were the principal destinations of U.S. horses exported for slaughter. According to USDA officials, this increase in exports began, in part, because shippers were

anticipating the closure of the three horse slaughtering facilities in the United States at that time. From 2006 through 2010, Canadian and Mexican imports increased by 148 percent and 660 percent, respectively, with the total number of horses imported from the United States for slaughter increasing from about 33,000 in 2006 to about 138,000 in 2010. In addition, the total number of horses exported for all purposes, including breeding and showing, also increased from 2006 through 2010, as shown in figure 3. According to USDA officials, some horses exported for purposes other than slaughter were likely “feeder” horses that were ultimately sent to slaughtering facilities at a later time. For example, feeder horses may be sent to a Canadian or Mexican feedlot for fattening before subsequently being sent to a slaughtering facility in that country. The extent to which horses are exported as feeder horses is unknown, according to USDA officials.

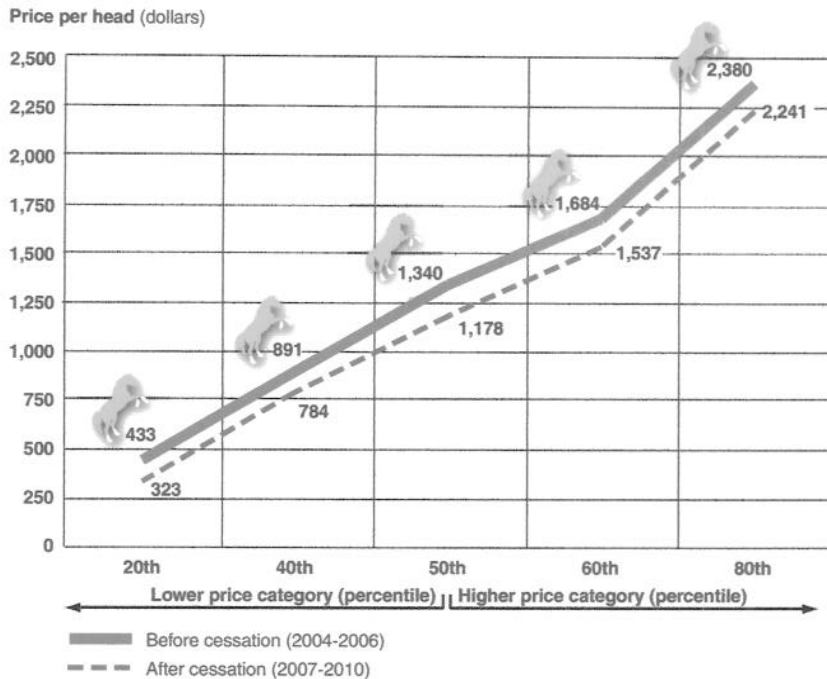
Figure 3: U.S. Exports of Horses Intended for Slaughter and Other Purposes, 2004 through 2010



Sources: GAO analysis of Department of Commerce Foreign Trade data and USDA Foreign Agricultural Service documents.

Note: U.S. exports of horses intended for slaughter are unofficial estimates because official U.S. export trade data do not specify the quantity or value of horses exported for slaughter. Thus, while official U.S. trade data can be used to determine total U.S. live horse exports (the sum of horses exported for slaughter or other purposes, such as breeding and showing), an estimate of horses intended for slaughter can only be determined using Canadian and Mexican official trade statistics.

Figure 5: Average Horse Prices Before and After Cessation of Horse Slaughter for Each Price Category, Spring 2004 through Spring 2010

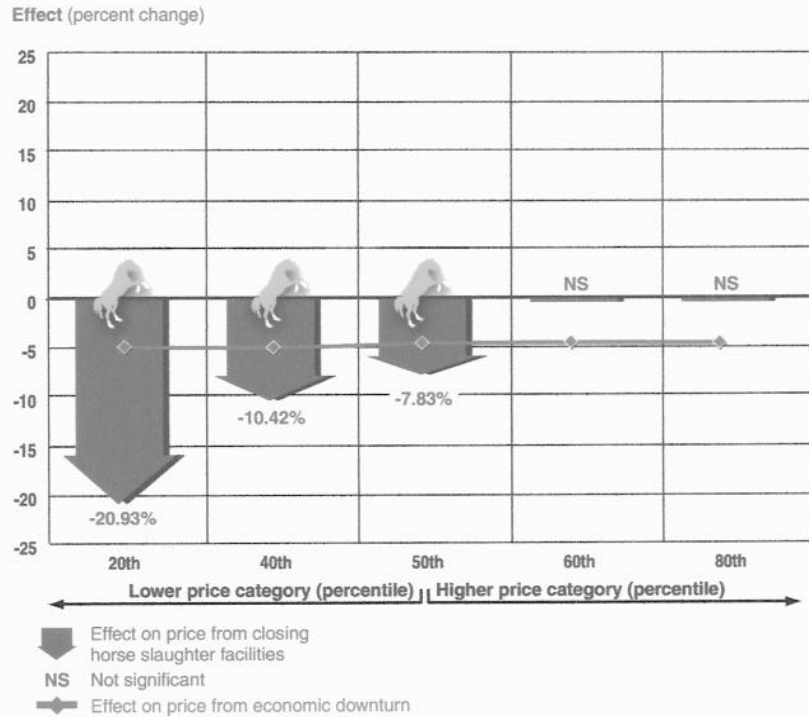


Source: GAO analysis of horse auction data.

Using these data and regression methods to isolate the impact on prices for specific variables, our analysis indicates that the cessation of domestic horse slaughter led to an 8- to 21-percent decline—depending on sale price—in the per head price of horses sold at those auctions.¹² As illustrated in figure 6, we estimate that price reductions were greatest, in percentage terms, for lowest-priced horses, gradually declined as prices increased, and became insignificant for horses in the higher price categories. For example, the average per head price decreased by nearly 21 percent for horses in the lowest price category (20th percentile) and about 8 percent at the median, whereas the price change per head was not statistically significant for higher price categories.

¹²Specifically, we used an econometric model and hedonic quantile regression methods. For a more detailed explanation, see appendix I.

Figure 6: Estimates of the Effect on Horse Prices from Closing Domestic Slaughtering Facilities and the Economic Downturn for Each Price Category, Spring 2004 through Spring 2010



Source: GAO analysis of horse auction data.

In contrast to the effects of closing slaughtering facilities—where the percentage decrease in prices for lower-priced horses was greater than that for higher-priced horses—our estimates show that the economic downturn (represented by the change in the average unemployment rate for the region where the auction was held) was associated with a consistent decline of about 5 percent in price across all price categories for those auctions. Table 1 provides our estimates of the price change per head (in dollars and percentage decline) associated with the cessation of slaughter and the economic downturn, along with the average sale price for each price category.

Table 1: Estimates for Effect of Cessation of Slaughter and Economic Downturn on Horse Sale Prices by Sale Price Category, Spring 2004 through Spring 2010

Variable	Type of change	Effect by sale price category (percentile)				
		20th	40th	50th (median)	60th	80th
Cessation of slaughter on horse prices (per head)	Price change	-\$125.61	-\$104.24	-\$109.58	^a	^a
	Percentage change	-20.93	-10.42	-7.83	^a	^a
Economic downturn on horse prices (per head)	Price change	-\$30.90	-\$52.26	-\$67.22	-\$82.09	-\$142.91
	Percentage change	-5.15	-5.23	-4.80	-4.69	-4.76
Upper bound for category (price per head)		\$600	\$1,000	\$1,400	\$1,750	\$3,000

Source: GAO analysis of data from selected horse auctions and the Department of Labor's Bureau of Labor Statistics.

^aThe effect on price was not statistically significant for that category.

These estimates suggest that the closing of domestic horse slaughtering facilities had a significant and negative impact on horse prices at the low-to-mid levels of price at these auctions, while relatively higher-priced horses appear not to have lost their value due to the cessation of slaughter. Appendix II provides further details on the results of our analysis.

Horse Welfare Has Reportedly Declined, Although the Extent Is Unknown, Straining the Resources of State and Local Governments, Tribes, and Animal Welfare Organizations

Horse welfare in the United States has generally declined since 2007, as evidenced by a reported increase in horse abandonments and an increase in investigations for horse abuse and neglect. The extent of the decline is unknown due to a lack of comprehensive, national data, but state officials attributed the decline in horse welfare to many factors, but primarily to the cessation of domestic slaughter and the U.S. economic downturn. Abandoned, abused, and neglected horses present challenges for state and local governments, tribes, and animal welfare organizations. In response, some states and tribes have taken several actions to address these challenges and the demand on their resources.

Cases of Horse Abandonments, Abuse, and Neglect Have Reportedly Increased Since 2007

In interviewing the 17 State Veterinarians, we asked whether the states had data for cases of horse abandonments, abuse, and neglect. Most veterinarians from these states, including some with the largest horse populations—California, Florida, and Texas—said they do not routinely collect such data because, in part, their resources are limited and jurisdiction of animal welfare is usually a local (e.g., county) responsibility. Nearly all the State Veterinarians, however, reported anecdotes indicating that cases of abandonments and abuse or neglect have increased in recent years. For example, several State Veterinarians, including those from California, Florida, and Texas, reported an increase in horses abandoned on private or state park land since 2007, although specific data quantifying those abandonments were not available.

In addition, states that do collect some data reported increases in abandonments or investigations of abuse and neglect since the cessation of domestic slaughter. For example, data from Colorado showed a 50-percent increase in investigations for abuse and neglect from 1,067 in 2005 to 1,588 in 2009. Similarly, data from Indiana indicated that horse abuse and neglect investigations more than doubled from 20 in 2006 to 55 in 2009. In addition, organizations representing localities, especially counties and sheriffs, have reported an increasing problem. For example, the Montana Association of Counties reported that the number of horses being abandoned by their owners has rapidly increased since horse slaughter for human consumption was halted in the United States, but the association did not have specific data. In addition, the National Association of Counties reported that the increasing abandonment problem is not exclusive to Montana or the West but is happening nationwide.

State Veterinarians Attributed Decline in Horse Welfare Primarily to Cessation of Slaughter and Economic Downturn, but Representatives of Animal Welfare Organizations Question Cessation's Impact

We also asked the 17 State Veterinarians whether horse welfare, in general, had improved, declined, or remained about the same in their states over the last 5 years. Without exception, these officials reported that horse welfare had generally declined, as evidenced by a reported increase in cases of horse abandonment and neglect. They most frequently cited two factors that contributed to the decline in horse welfare—the cessation of domestic slaughter in 2007 and the economic downturn—although they generally were careful not to pin the decline on any single factor. Other factors that they generally cited include poor weather conditions (e.g., drought in western states); the cost of horse disposal methods (e.g., veterinarian-assisted euthanasia); the increasing costs of feeding and caring for horses; and the lack of auction markets to sell horses.

Among the factors affecting horse owners, the State Veterinarians said a horse owner's decision to abandon a horse generally related to (1) cessation of domestic slaughter, (2) poor economic conditions, and (3) low horse prices or lack of sale opportunities. They also said the factors most often related to a horse owner's neglect of a horse were (1) poor economic conditions, (2) the cost of horse care and maintenance, and (3) lower horse prices. Several State Veterinarians pointed out that, in their professional experience, very few owners directly physically abuse their horses, which would be a crime. More common, however, were owners who neglected the feeding and proper care—such as providing farrier services (i.e., hoof care) and vaccinations—of their horses. Thus, based on the information these officials provided, the primary drivers for the increase in abandonment and neglect cases are the cessation of domestic slaughter, causing lower horse prices and difficulty in selling horses, and the economic downturn, affecting horse owners' ability to properly care for their animals. As discussed, our analysis also showed that the cessation of slaughter and the economic downturn generally reduced horse prices at our selected auctions; in particular, the cessation affected prices for the low-to-mid range priced horses that are more frequently abandoned and neglected. Furthermore, regarding neglect, some State Veterinarians, noting that people are more inclined to take care of that which has value, said that the drop in horse prices affected some owners' interest in caring for their animals, especially if their financial situation had declined.

With regard to the entities most affected by the increase in abandoned and neglected horses, the State Veterinarians generally said that counties, including sheriffs, bear the responsibility for investigating potential cases affecting horse welfare. Many State Veterinarians, particularly from western states, indicated that their offices did not have the resources to support the counties beyond providing expert veterinary advice regarding conditions of abandoned and neglected horses, such as opining on a horse's nutritional status (known as "body scoring").

State and Local
Governments, Tribes, and
Animal Welfare
Organizations Are Affected
by Neglected and
Abandoned Horses, as Is
the Federal Government

State and local governments, tribes, and animal welfare organizations, especially horse rescues, are facing growing pressures to care for abandoned and neglected horses at a time of economic recession and tight budgets. According to the State Veterinarians, counties and animal welfare organizations bear the costs of collecting and caring for abandoned horses, while county governments generally bear the costs of investigating reports of neglect. These officials said horse rescue operations in their states are at, or near, maximum capacity, with some taking on more horses than they can properly care for since the cessation of domestic slaughter. One State Veterinarian added that his office is reluctant to pressure horse rescues in his state to take on additional animals because of this problem, even though alternatives are lacking. Some State Veterinarians also described situations in which counties and sheriff departments were reluctant to investigate reports of abandoned or neglected horses because these jurisdictions lacked resources to deal with the consequences of finding such animals. In some cases, these officials said local jurisdictions may lack the resources even to initiate such investigations, let alone to take possession of and care for these animals. And in cases where an investigation results in horse seizures, local jurisdictions may have to appeal for the public's help in caring for the animals. For example, the Montana State Veterinarian and his staff described a recent situation in their state involving the seizure of hundreds of neglected horses, many of which had low body scores and would not have survived the winter without intervention. These horses were seized from a ranch owner near Billings, Montana, in January 2011 who was no longer able to afford their care. Because of the strain placed on state and county resources to care for so many animals, these jurisdictions had to seek private donations of hay to feed these horses. Figure 7 shows some of the horses seized in this case.

Figure 7: A Band of Horses, Some of Hundreds That Have Been Neglected on Montana Ranchland and Seized by the County after the Collapse of Their Owner's Ranching Company



Source: Larry Mayer/Billings Gazette. Photo used with permission.

Tribes also reported increases in abandonments on their land, exacerbating the overpopulation of horse herds on tribal lands. According to 2009 data from the Northwest Tribal Horse Coalition (now the National Tribal Horse Coalition), the number of horses on its tribal lands exceeded 30,000 horses. When we met with representatives of tribes in the western United States, they showed us significant degradation of their lands as a result of the over-grazing by large populations of wild horses, as shown in figure 8. They explained that the increase in abandoned horses on their lands has compounded the challenge of restoring native and religiously-significant species of plants to their land—an effort often paid for, in part, by the federal government. Moreover, domesticated horses abandoned on public lands generally have poor survival prospects, according to officials from the Department of the Interior's Bureau of Land Management (BLM). These horses are unfamiliar with which wild plants are edible and are likely to be shunned or hurt by wild horses. These abandoned horses may also introduce diseases to wild herds.

Figure 8: Wild Horse Herd on Degraded Land Owned by the Yakama Nation in Washington State



Source: GAO.

The effects of the increasing number of abandoned or neglected horses have been felt by local animal welfare organizations as well—in particular, the horse rescues and local societies for the prevention of cruelty to animals that work with local officials to place such horses, according to the State Veterinarians. The total number of rescues and their capacities is unknown because there is no national registry or association for horse rescues. However, both the National Association of Counties and the Unwanted Horse Coalition estimated that the nationwide capacity of rescue facilities is about 6,000 horses. They also reported that the vast majority of these facilities are already full. Some State Veterinarians told us that some rescue organizations have taken on more horses than they can properly care for, especially in an economic environment in which donations have declined; as a result, horses at some of these organizations' facilities have been seized. For example, it has been reported that horse rescues in California, Florida, New York, and West Virginia have recently

had their animals seized by local authorities because they were not properly caring for them, and others in New Hampshire and Pennsylvania closed due to financial difficulties.

In addition, the increase in unwanted domesticated horses available for sale or being abandoned on public lands is affecting the federal government's ability to manage wild horse and burro populations. Most of these wild animals are found on lands managed by BLM and USDA's Forest Service in the western United States.¹³ From 1971 through 2007, BLM removed over 267,000 wild horses and burros from these lands, and during the same period, approximately 235,700 of these animals were adopted by the public under a BLM program that promotes these adoptions. As we reported in 2008, BLM has, however, experienced a steady decline in adoptions in recent years, which agency officials attributed, in part, to the large number of domesticated horses flooding the market.¹⁴ More recently, BLM officials said that annual adoptions had fallen from about 8,000 in 2005 to about 3,000 in 2010. In an October 2010 Web message, the BLM Director estimated that the number of horses and burros on lands the agency manages exceeds by about 12,000 the number that would allow these lands to remain sustainable for other uses and species.¹⁵ According to BLM officials, in addition to natural reproduction in wild horse and burro herds, the increasing number of domesticated horses being abandoned on public lands has contributed to this overpopulation problem.

Other officials, including those from animal welfare organizations, questioned the relevance of the cessation of domestic slaughter to the rise in abandoned and neglected horses, which they attributed more to the economic downturn. For example, in March 2010, Animal Welfare Institute representatives said that since a 1998 California ban on dealing in horses intended for slaughter, their organization has offered a \$1,000 reward for

¹³BLM estimates, as of October 2010, that it is managing about 38,400 free-roaming wild horses and burros on these lands, and it also is holding about 37,000 additional horses and burros removed from these lands in short- and long-term holding facilities. BLM estimates its feeding and care of animals in holding facilities cost the federal government more than \$36 million annually, more than half the wild horse and burro program's budget in fiscal year 2010.

¹⁴GAO, *Bureau of Land Management: Effective Long-Term Options Needed to Manage Unadoptable Wild Horses*, GAO-09-77 (Washington, D.C.: Oct. 9, 2008).

¹⁵This Web message is available at http://www.blm.gov/wo/st/en/prog/wild_horse_and_burro/national/about/director.print.html.

notification of abandoned horses but has never received a tip. In addition, the Humane Society of the United States and the United Animal Nations reported that there has been no documented rise in abuse and neglect cases in California since the 1998 ban. United Animal Nations also reported there was no documented rise in abuse and neglect cases in Illinois following the 2-year closure of the horse slaughtering facility in that state in 2002. Furthermore, Humane Society of the United States officials said that owners who abandon horses are going to abandon them regardless of having the option for domestic slaughter, adding that there were instances of horse abandonment near domestic horse slaughtering facilities before they closed. These officials acknowledged that there are no good data on horse abandonments but noted an increase in abandonments of all kinds of domesticated animals as the economy worsened.

States and Tribes Have Taken a Variety of Actions Related to Horse Welfare and Slaughter

Some states took actions related to horse welfare and slaughter even before the cessation of domestic slaughter in 2007. For example, in 1998, California made it illegal to export horses for the purpose of having them slaughtered for human consumption outside the state. Specifically, California law makes it unlawful for any person to possess; to import into or export from the state; or to sell, buy, give away, hold, or accept any horse with the intent of killing or having another kill that horse, if that person knows or should have known that any part of that horse will be used for human consumption. Several state officials told us that this ban is difficult to enforce because it may be difficult to show when an owner knew or should have known that a buyer intended that animal for slaughter. For example, if an owner transports a horse to an auction in another state (e.g., Montana or Texas), it may be difficult to prove that the owner specifically intended to sell the horse for slaughter or should have known that the buyer of the horse intended to sell the horse for slaughter.

In addition, since 2007, states and tribes have taken a variety of legislative or other actions related to horse welfare or slaughter. For example, in 2009 Montana passed a law that allows horse owners to surrender horses that they cannot afford to maintain to the state at a licensed livestock market without being charged with animal cruelty. Also, Colorado authorized the inclusion of a checkbox on state income tax return forms allowing taxpayers to make a contribution to the Colorado Unwanted Horse Alliance. In authorizing the program, the Colorado legislature found that the number of unwanted horses is increasing; most horse rescue facilities are operating at capacity and have limited ability to care for additional horses; and incidences of horse abuse and neglect are rising. In

addition, Kentucky passed a law in the spring of 2010 creating the Kentucky Equine Health and Welfare Council and charged it with developing regional centers of care for unwanted, abused, neglected, or confiscated equines; creating a system of voluntary certification of equine rescue and retirement operations; and suggesting statutory changes affecting equine health, welfare, abuse, and neglect issues. Also, in 2009, the National Congress of American Indians and the Northwest Tribal Horse Coalition passed resolutions supporting domestic slaughter to manage overpopulated horse herds. A number of the 17 states that we examined have also enacted laws related to horse welfare and slaughter since the cessation of domestic slaughter. For example:

- Arkansas, Oklahoma, Utah, and Wyoming passed resolutions urging Congress to facilitate the resumption of horse slaughtering in the United States and oppose federal legislation that would ban domestic slaughter. North Dakota and South Dakota passed similar resolutions urging Congress to reinstate and fund federal inspection programs for horse slaughter and processing.
- Montana passed a law that would make it easier to establish a horse slaughtering facility by making it harder for those opposing such a plant to get an injunction against it while challenging various permits that the plant would need to operate. In his 2009 testimony in support of the bill, the chair of Montana's Farm Bureau cited rising numbers of unwanted horses and associated costs.
- Wyoming amended its existing law to provide that strays, livestock, and feral livestock, including horses, may be sent to slaughter as an alternative to auction or destruction. The legislative changes also provided that the state could enter into agreements with meat processing plants whereby meat from livestock disposed of by slaughter could be sold to state institutions or nonprofits at cost or to for-profit entities at market rate.

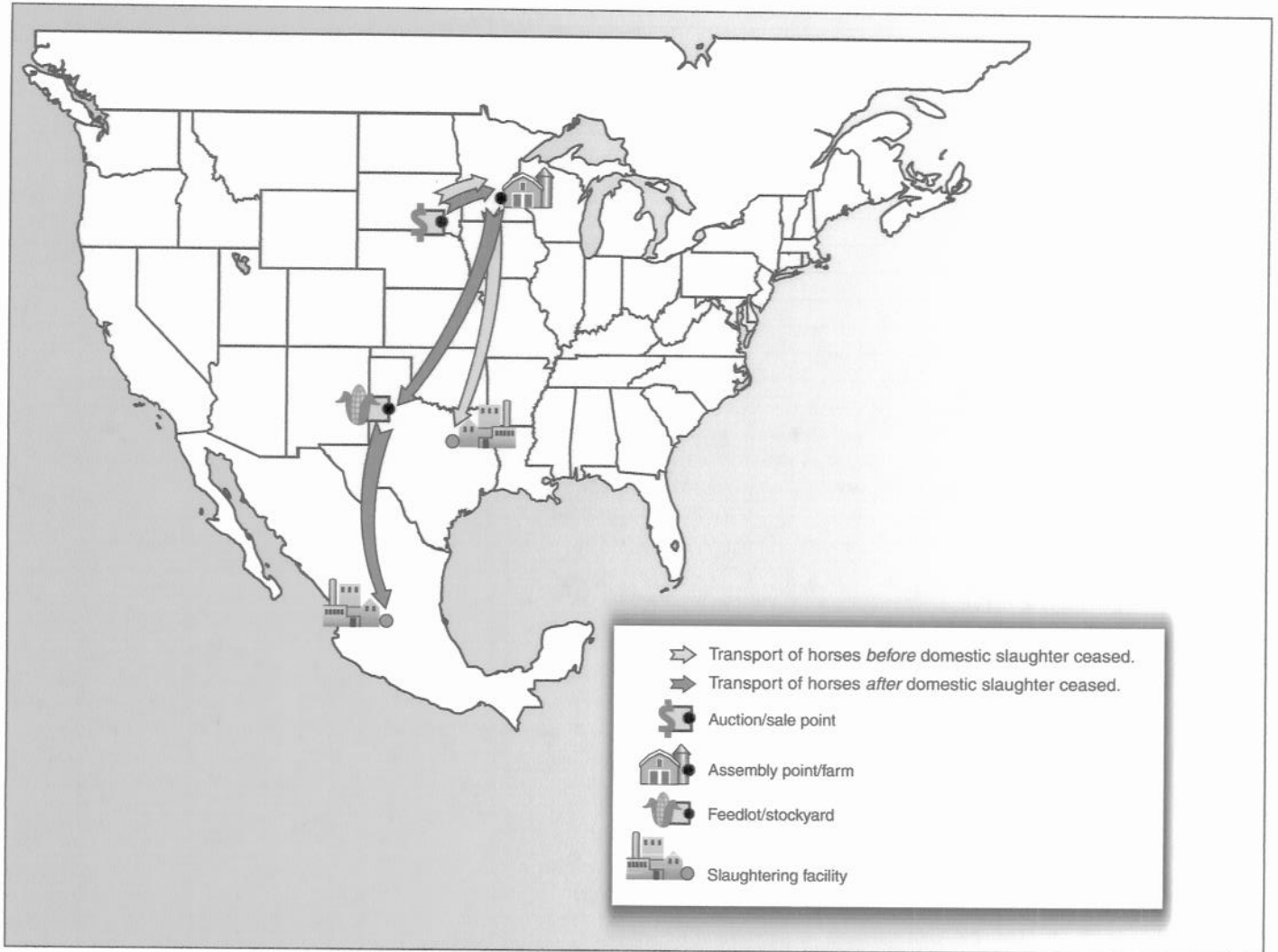
Several states are seeking to reopen domestic horse slaughter facilities, under a provision of the Food, Conservation, and Energy Act of 2008, which authorized USDA to establish a new voluntary cooperative program under which small state-inspected establishments would be eligible to ship meat and poultry products in interstate commerce. USDA recently finalized a rule to implement the program, but USDA officials said that the rule does not include horsemeat, because recent appropriations legislation has prohibited the use of federal funds for inspecting horses prior to slaughter. And although, under the proposed program, the inspections

well within the interior of the country. In addition, the conveyances that horses are transferred to for travel in Mexico are not subject to the requirements of the transport regulation.

Our analysis of a sample of owner/shipper certificates for 2005 through 2009 showed that, in 2005 and 2006, before domestic slaughter ceased, horses traveled an average of 550 miles after being designated for slaughter. In contrast, in 2008 and 2009, after domestic slaughter ceased, our analysis showed horses intended for slaughter traveled an average of 753 miles—an increase of about 203 miles.²⁸ (The actual distances that the horses traveled, on average, before and after the cessation is likely to be greater than what our analysis showed because some shippers were prone to designate horses intended for slaughter close to the slaughtering facility before cessation, or near the border after cessation.) Over the longer distances horses now travel to Canadian and Mexican slaughtering facilities, APHIS is less able to effectively implement the transport regulation to protect horse welfare. Figure 12 provides an example of contrasting shipping routes and relative travel distances from before and after domestic slaughter ceased.

²⁸The 95-percent confidence intervals for estimates of 550, 753, and 203 miles are 492 to 608, 691 to 815, and 117 to 288, respectively.

Figure 12: Example of Transport of Horses to Slaughtering Facilities Before and After Domestic Slaughter Ceased



Source: GAO analysis of USDA documents; Art Explosion (images); MapArt (map).

In addition, since the cessation of domestic slaughter, USDA has been less able to help BLM prevent the slaughter of wild horses and burros. Wild horses and burros may be adopted, but title does not pass to the adopter until 1 year after the adoption, upon a determination that the adopter has provided humane conditions, treatment, and care for the animal over that

period. Upon transfer of title, the animals lose their status as wild free-roaming horses and burros. As we reported in 2008,²⁹ from 2002 through the end of domestic slaughter in September 2007, about 2,000 former BLM horses were slaughtered by owners to whom title to the horses had passed.³⁰ When horses were slaughtered domestically, FSIS inspectors in slaughtering facilities watched for horses bearing the BLM freeze mark indicative of the wild horse and burro program. They would then alert BLM officials so that the title status of these animals could be checked to ensure that BLM horses were not slaughtered. As a result of FSIS's assistance during the same time period, at least 90 adopted wild horses that were still owned by the government were retrieved from slaughtering facilities before they could be slaughtered. However, now that the slaughter of U.S. horses occurs in Canada and Mexico, FSIS can no longer provide this assistance. Furthermore, shippers are not required to identify BLM horses on owner/shipper certificates, but in reviewing nearly 400 owner/shipper certificates, we found indications that six adopted BLM horses had been shipped across the border for slaughter. Because inspection officials in foreign slaughtering facilities have no obligation to check with BLM or other U.S. authorities before slaughtering these animals, it is unknown whether title for those animals had passed to the adopter or how many more BLM horses may have been shipped across the border for slaughter.

Conclusions

The slaughter of horses for any purpose, especially for human consumption, is a controversial issue in the United States that stems largely from how horses are viewed, whether from an historic, work, show, recreation, or commodity point of view. As a result, there is tension between federal law mandating the inspection of horses and certain other animals at slaughter (i.e., the Federal Meat Inspection Act) and annual appropriations acts prohibiting the use of funds to inspect horses at, or being transported to, slaughtering facilities.

What may be agreed upon, however, is that the number of U.S. horses that are purchased for slaughter has not decreased since domestic slaughter

²⁹GAO-09-77.

³⁰BLM is not required to protect animals after ownership has passed to adopters or buyers. However, since the spring of 2005, BLM has required adopters to sign a statement that they do not intend to slaughter the animals to help address concerns by horse advocates about horses being slaughtered.

ceased in 2007. Furthermore, an unintended consequence of the cessation of domestic slaughter is that those horses are traveling farther to meet the same end in foreign slaughtering facilities where U.S. humane slaughtering protections do not apply. Their journey from point-of-purchase to slaughtering facilities in other countries, with multiple potential stops in-between at assembly points, feedlots, and stockyards, includes the possibility of being shipped in conveyances designed for smaller animals or confined in these conveyances for excessive time periods. The current transport regulation, the Commercial Transportation of Equines to Slaughter regulation, does not apply until a shipment is designated for slaughter, which can be the last leg of a longer journey. A 2007 proposed rule to amend the regulation, which would define “equines for slaughter” and extend APHIS’s oversight and the regulation’s protections to more of the transportation chain, has not been issued as final as of June 2011.

To adequately implement the transport regulation and oversee the welfare of horses intended for slaughter, the horse transport program must ensure that owner/shipper certificates are completed, returned, and evaluated for enforcement purposes. Many certificates are not now returned, and others are returned incomplete. Furthermore, because of limited staff and funding and these missing and incomplete certificates, the program is less able to identify potential violations of the transport regulation. The program also stopped automating certificate data. Even with the present limitations of incomplete and missing certificates, automating these data is important for management oversight of compliance with the regulation and to direct scarce program resources to the most serious problem areas. Moreover, in time, as corrective actions are taken, these data will likely become even more useful for oversight purposes. If the proposed rule to extend APHIS’s authority to more of the transportation chain is issued as final, the program’s credibility will be further challenged unless APHIS identifies ways to leverage other agency resources to ensure compliance with the transport regulation.

With U.S. horses now being shipped to Canada and Mexico for slaughter, APHIS depends upon cooperation with these countries, or state officials at the borders, to help it implement the transport regulation, but it does not have effective agreements that make clear each party’s obligations and that help ensure cooperation will continue as personnel change. APHIS developed an agreement with Canadian officials in 2002, but recently the agency has been receiving incomplete owner/shipper certificates from them, raising questions about the current agreement’s effectiveness and whether both APHIS and Canadian officials have the same understanding about the assistance APHIS seeks. Furthermore, APHIS does not have formal

cooperative agreements with its Mexican counterpart and the Texas Department of Agriculture—the entities that oversee most U.S. horses exported to Mexico for slaughter. APHIS has not received any owner/shipper certificates from either of these entities in more than a year.

Recent, annual congressional actions to prohibit the use of federal funds to inspect horses in transit or at slaughtering facilities have complicated APHIS's ability to implement the transport regulation, thus horses now travel longer distances to foreign slaughtering facilities. APHIS lacks jurisdiction in these countries, and it can no longer depend on the help it once received from other USDA officials present in domestic slaughtering facilities to catch potential violations of the transport regulation. Even after the recent economic downturn is taken into account, horse abandonment and neglect cases are reportedly up, and appear to be straining state, local, tribal, and animal rescue resources. Clearly, the cessation of domestic slaughter has had unintended consequences, most importantly, perhaps, the decline in horse welfare in United States.

Matters for Congressional Consideration

In light of the unintended consequences on horse welfare from the cessation of domestic horse slaughter, Congress may wish to reconsider the annual restrictions first instituted in fiscal year 2006 on USDA's use of appropriated funds to inspect horses in transit to, and at, domestic slaughtering facilities. Specifically, to allow USDA to better ensure horse welfare and identify potential violations of the Commercial Transportation of Equines to Slaughter regulation, Congress may wish to consider allowing USDA to again use appropriated funds to inspect U.S. horses being transported to slaughter. Also, Congress may wish to consider allowing USDA to again use appropriated funds to inspect horses at domestic slaughtering facilities, as authorized by the Federal Meat Inspection Act. Alternatively, Congress may wish to consider instituting an explicit ban on the domestic slaughter of horses and export of U.S. horses intended for slaughter in foreign countries.

would be done by state officials, federal law requires USDA to reimburse the state for at least 60 percent of the associated costs. However, as noted by USDA officials, the prohibition in appropriations legislation against using federal funds for inspecting horse at slaughter would preclude these reimbursements. USDA officials said the same issue would preclude tribal slaughtering facilities from shipping horsemeat in interstate or international commerce as well.

USDA's Oversight of the Welfare of Horses Transported for Slaughter Is Complicated by Three Challenges

USDA faces three challenges in its oversight of the welfare of horses during their transport for slaughter. First, APHIS faces several specific management challenges in implementing the transport program. Second, legislative prohibitions on using federal funds for inspecting horses prior to slaughter impede USDA's ability to ensure horse welfare. Third, the cessation of domestic slaughter has diminished APHIS's effectiveness in overseeing the transport and welfare of horses intended for slaughter.

Management Challenges Affect APHIS's Implementation of the Slaughter Horse Transport Program

Several management challenges are affecting APHIS's implementation of the transport program. These challenges include (1) delays in issuing a final rule to give the agency greater oversight over horses transported for slaughter to protect their welfare; (2) limited staff and funding that complicates the agency's ability to ensure the completion, return, and evaluation of owner/shipper certificates; and (3) a lack of current, formal agreements with Canadian, Mexican, and state officials whose cooperation is needed for program implementation.

APHIS Has Not Issued a Final Rule to Better Protect Horses Transported for Slaughter

APHIS's transport regulation sets minimum care standards to protect horse welfare, but it applies only when the horses are being moved directly to slaughtering facilities, at which point shippers designate the horses as "for slaughter" on an owner/shipper certificate and move the horses directly to slaughtering facilities. Consequently, the regulation does not apply to horses that are moved first to an assembly point, feedlot, or stockyard before going to slaughter. For example, a horse's journey to slaughter may have covered several states, from point-of-purchase at an auction to an assembly point, such as a farm; from the assembly point to a feedlot or stockyard; and from the feedlot or stockyard to a point near a slaughtering facility or a border crossing where the slaughter designation was first made.

In reviewing a generalizable sample of nearly 400 owner/shipper certificates from before and after cessation of domestic slaughter in 2007, we found that shippers usually designated horses as “for slaughter” on the final leg of their journey to a slaughtering facility, as allowed under the current regulation. For example, prior to cessation in 2007, shippers sometimes designated horses near the U.S. facility in which they would be slaughtered. Specifically, we found cases in which horses shipped to the slaughtering facility in DeKalb, Illinois, were designated for slaughter at a point just a few miles from the plant. Similarly, since cessation in 2007, shippers sometimes made this designation near border crossings with Canada or Mexico. For example, since cessation, we found shipments of horses being designated for slaughter in Shelby, Montana, about 36 miles from the border crossing into Canada and in El Paso, Texas, about 10 miles from where they cross the border into Mexico. According to APHIS officials, in virtually all of these cases, without a “for slaughter” designation, it is likely that before reaching these designation points, the horses already had traveled for long distances within the United States without the protection of the APHIS transport regulation to ensure their humane treatment. For example, some of the horses may have been transported in double-deck trailers intended for smaller livestock animals; as discussed, the APHIS transport regulation prohibits the use of this type of trailer after the designation for slaughter is made.

To address this issue, APHIS proposed, in November 2007, to amend the existing transport regulation to extend APHIS’s oversight of horses transported for slaughter to more of the transportation chain that these horses pass through. The proposed rule defines *equine for slaughter* as an equine transported to intermediate assembly points, feedlots, and stockyards, as well as directly to slaughtering facilities.¹⁶ The current regulation does not define equine for slaughter and only applies to those equines being transported directly to slaughtering facilities. APHIS has experienced repeated delays in issuing a final rule that would extend APHIS’s oversight of horses being transported for slaughter. According to USDA officials, the delay is the result of a number of factors, including, competing priorities and the need to address substantive, public comments on the proposed rule that resulted in reclassifying it as

¹⁶This proposed regulatory change is consistent with the definition of *equine for slaughter* in the Federal Agriculture Improvement and Reform Act of 1996.

significant under Executive Order 12866.¹⁷ As of June 2011, USDA officials said they anticipate issuing the final rule by the end of calendar year 2011.

APHIS officials noted that this change to the transport regulation could help address another issue as well. Specifically, the regulation currently does not apply to shippers transporting horses to Canada as feeder horses.¹⁸ As discussed, some U.S. horses exported for purposes other than slaughter (i.e., not designated for slaughter on an owner/shipper certificate) may be feeder horses that are ultimately sent to slaughtering facilities at a later time. According to APHIS officials, the number of feeder horses has likely grown with the increase in total horse exports to Canada since 2007. Because feeder horses are not designated for slaughter before crossing the border, they are not covered by the transport regulation at any point in their journey. If the transport regulation is amended, however, as APHIS has proposed, the designation “equine for slaughter” would apply to these animals during the leg of their trip from the U.S. auction where they were purchased to the border crossing, including any intermediate stops within the United States at assembly points, feedlots, and stockyards. Such a designation would place those animals under the protection afforded by APHIS’s oversight. APHIS officials also noted that the provision of the 1996 Farm Bill authorizing the transport regulation is the only federal statute that regulates the transportation of horses, and they commented on the irony that horses designated for slaughter are provided greater protection, under current federal law and the transport regulation, than other horses in commercial transit.

Limited Staff and Funding
Complicates Program
Implementation

Over the past 6 fiscal years, the transport program’s annual funding has varied, generally declining from a high of over \$306,000 in fiscal year 2005 to about \$204,000 in fiscal year 2010. This funding primarily provides for the salaries and expenses of two staff, one of whom is the national compliance officer, who inspects conveyances and owner/shipper

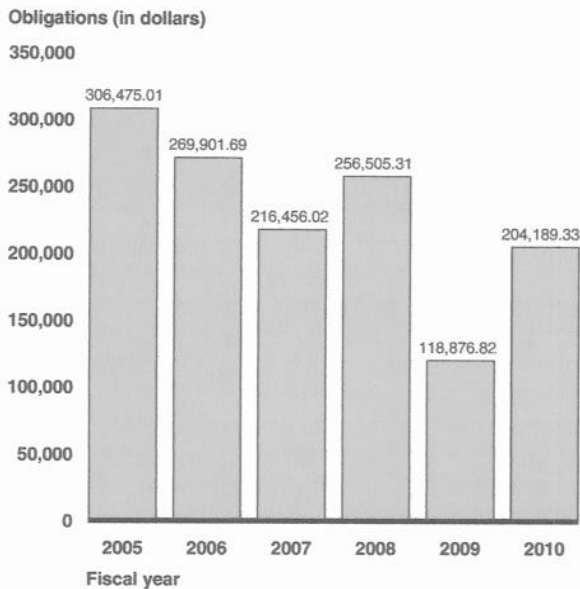
¹⁷Executive Order 12866 defines significant regulatory actions as those that are likely to result in a rule that may, among other things, raise novel legal or policy issues arising out of legal mandates, the President’s priorities, or the principles set forth in the order. Such rules require additional review by the Office of Information and Regulatory Affairs within the Office of Management and Budget.

¹⁸Shippers may send horses across the border as “feeder” horses to a feedlot to add weight to these animals, enhancing their slaughter value. Moreover, as a practical matter, because of the European Union’s new restrictions on drug residues in horsemeat, it may be necessary to hold U.S. horses at a Canadian feedlot for several months before slaughtering to ensure they are purged of drug residues.

certificates for compliance with the transport regulation, with the remainder going to travel costs.¹⁹ The two program officials stated that the program's limited funding, particularly for travel, has significantly curtailed their ability to provide coverage at border crossings and to work with shippers and inspectors in foreign slaughtering facilities to ensure compliance with the transport regulation. For example, with one compliance officer, the program cannot adequately cover the numerous border crossings on the Canadian and Mexican borders through which shipments of horses intended for slaughter move. In April 2011, transport program officials said they recently had begun training inspectors in APHIS's Western region and Texas area office to assist the program at southern border crossings by, in part, collecting owner/shipper certificates and returning them to APHIS headquarters. However, these officials said they did not have a written plan or other document that describes this initiative, including the number of staff to be involved, their anticipated duties to support the transport program, and the time frames for implementing the initiative. Hence, while this appears to be a positive step, we were unable to evaluate the potential usefulness of this initiative. Figure 9 provides information on the transport program's funding for fiscal years 2005 through 2010.

¹⁹The Compliance Officer's duties include inspecting paperwork and conveyances at U.S. border crossings and other inspection points and visiting auctions to work with owner/shippers to gain compliance with the regulation.

Figure 9: Slaughter Horse Transport Program's Budget Obligations, Fiscal Years 2005 through 2010



Source: USDA's Slaughter Horse Transport Program.

According to program officials, the reduction in funds in 2009 was the result of a cut in travel funds that were allocated to other APHIS programs. The program officials added that the seesaw nature of the program's funding, as well as the fact the program has just two staff, has affected their ability to ensure compliance with, and enforce, the transport regulation and contributed to year-to-year variations in the number of violations found. In addition, because of limited staff and funding, APHIS stopped entering information from owner/shipper certificates into an automated database in 2005. Agency officials said that the database was used in the early years of the transport program to document demographic information, such as the identity of shippers and origin of horses they shipped. However, after several years, this information was well established, and there was no need to continue to collect data for this purpose. They also said that the database did not provide beneficial information for protecting horse welfare that justified the cost of maintaining the database. Nonetheless, automating the certificate data would make it easier for the agency to analyze them to, for example, identify potential problem areas for management attention and possible enforcement action, such as patterns of violations or other problems associated with particular shippers, border crossings, or slaughtering facilities. It would also allow the agency to easily identify buying trends and common shipping routes. Furthermore, automating data

from the certificates on the number of horses in each shipment could potentially provide USDA a more accurate count of the number of U.S. horses exported for slaughter. At present, to estimate the number of horses exported for this purpose, USDA's Foreign Agricultural Service pieces together Canadian and Mexican data on horses imported for slaughter and makes certain extrapolations to arrive at an approximate number since no official U.S. trade data exist on horses exported for slaughter.

Federal internal control standards call for agencies to obtain, maintain, and use relevant, reliable, and timely information for program oversight and decision making, as well as for measuring progress toward meeting agency performance goals.²⁰ Furthermore, the Office of Management and Budget's implementing guidance directs agency managers to take timely and effective action to correct internal control deficiencies.²¹ APHIS's lack of a reliable means of collecting, tracking, and analyzing owner/shipper certificates constitutes an internal control weakness and leaves the agency without key information and an important management tool for enforcement of the transport regulation.

Uneven Cooperation with Canadian, Mexican, and State Officials Impedes Oversight

With the cessation of domestic slaughter and the transport program's limited staff and funding, APHIS relies on the cooperation of officials from Canada and Mexico working at border crossings and in their countries' slaughtering facilities to help the agency implement the transport regulation. APHIS has sought similar cooperation from officials working for the Texas Department of Agriculture regarding horses exported through Texas border crossings. The effectiveness of these cooperative arrangements has been uneven, in part because APHIS lacks current, formal written agreements with its foreign and state counterparts to better define the parameters of this cooperation and ensure continuity over time as the personnel involved change. We have previously reported that by using informal coordination mechanisms, agencies may rely on relationships with individual officials to ensure effective collaboration and that these informal relationships could end once personnel move to their next assignments.²²

²⁰GAO, *Standards for Internal Control in the Federal Government*, GAO/AIMD-00-21.3.1 (Washington, D.C.: November 1999).

²¹Office of Management and Budget, Executive Office of the President, OMB Circular No. A-123, *Management's Responsibility for Internal Control* (Dec. 21, 2004).

²²GAO, *National Security: Key Challenges and Solutions to Strengthen Interagency Collaboration*, GAO-10-822T (Washington, D.C.: June 9, 2010).

Regarding Canada, representatives of APHIS and the Canadian Food Inspection Agency (CFIA) signed a letter of intent in October 2002 outlining their shared responsibilities for enforcement of the transport regulation. Each country pledged to help the other enforce its regulations. For example, to assist APHIS, CFIA agreed to ensure, either at points of entry or slaughtering facilities, the following regarding shipments of U.S. horses to Canada for slaughter:

- health certificates for the horses are endorsed by USDA-accredited veterinarians within the 30 days prior to export;
- horses are clinically healthy, fit for travel, and transported humanely to the points of entry;
- owner/shipper certificates are properly completed, including the date, time, and location the horses were loaded;
- horses are listed correctly on the owner/shipper certificate, so that for example, the backtags on the horses match the backtags listed on the certificate;
- an ante-mortem inspection of each horse is performed;
- date and time the shipment arrived at the facility is noted on the certificate; and
- copies of all relevant documents (e.g., owner/shipper certificates) are returned to APHIS each month.

APHIS officials said they rely on owner/shipper certificates, properly completed by shippers and CFIA officials, as appropriate, and returned by CFIA to APHIS for compliance and enforcement purposes. For example, APHIS needs information on the timing of the loading and off-loading of a shipment of horses to assess whether a shipper complied with regulatory requirements related to the amount of time a shipment is in transit. Figure 10 highlights sections of the owner/shipper certificate that are to be completed by shippers or Canadian or Mexican officials.

In reviewing a generalizable sample of certificates returned by CFIA from 2005 through 2009, however, we found instances in which certificates were not properly completed by either the shipper or CFIA officials. Based on the results of our review, we estimate that about 52 percent of certificates were missing key information that should have been filled in by either the shipper (e.g., loading date and time, or certification that the horses were fit for transport) or CFIA (e.g., arrival date and time, or slaughtering facility identification). In addition, we estimate that about 29 percent of certificates returned to APHIS were missing some or all of the information to be provided by CFIA officials at the slaughtering facility.²³

Moreover, in our review of these certificates we noted that the extent to which they were returned incomplete from CFIA to APHIS increased over time. For example, from 2005 through 2006, the 2 years prior to the cessation of domestic slaughter in the United States, we estimate that about 48 percent of certificates were missing key information that should have been completed by either the shippers or CFIA officials. However, from 2008 through 2009, the 2 years after the cessation, we estimate that about 60 percent of certificates were missing key information.²⁴ This increase suggests that the growth in U.S. horse exports for slaughter since the cessation has been accompanied by an increase in problems with owner/shipper certificates needed by APHIS for enforcement purposes. However, APHIS and CFIA have not revisited this agreement since 2002 to reflect changes since the cessation of slaughter in 2007, when the volume of horses exported to Canada increased significantly and APHIS became more dependent upon cooperation from Canadian border officials and CFIA inspectors in slaughtering facilities.

Regarding Mexico, APHIS lacks a written agreement with its relevant counterpart, Mexico's Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA), to promote cross-border cooperation.²⁵ APHIS officials said that they drafted an agreement in 2002, similar to the one with CFIA, and that APHIS had contacts with SAGARPA

²³All estimates from our review of owner/shipper certificates are subject to sampling error. The 95-percent confidence intervals for our estimates of 52 percent and 29 percent are 44 to 61 percent and 21 to 36 percent, respectively.

²⁴The 95-percent confidence intervals for our estimates of 48 percent and 60 percent are 28 to 69 percent and 49 to 71 percent, respectively.

²⁵In English, this would be the Secretary of Agriculture, Livestock Production, Rural Development, Fishery, and Food; this is Mexico's agriculture department.

about finalizing it during 2002 and 2003. However, according to APHIS officials, the Mexican agency did not provide a response consenting to the agreement, and APHIS has not renewed the effort to get an agreement since 2003. Thus, these officials said, enforcing the transport regulation along the southern border is more difficult than along the northern border with Canada. Moreover, while shippers on the northern border can drive their conveyances directly into Canada, U.S. shippers generally are not insured to travel into Mexico. As a result, shippers unload their horses before crossing the border, where SAGARPA officials inspect the horses. The horses are subsequently loaded onto a Mexican conveyance for transport to a Mexican slaughtering facility.

In the absence of a formal, written agreement between APHIS and SAGAPRA or the Texas Department of Agriculture, APHIS does not receive official cooperation from Mexican or Texas officials. As a consequence, owner/shipper certificates may not be correctly filled out by the shippers and collected, completed, and returned to APHIS from either the border crossing or the Mexican slaughtering facility with information about shipment dates and times and horse conditions. In some cases, APHIS had an informal understanding with SAGARPA officials at a border crossing that they would collect and return the certificates to APHIS. In other cases, at Texas border crossings, employees of the Texas Department of Agriculture informally cooperated with APHIS by collecting and returning the certificates to the agency and alerting it to possible violations of the transport regulation. However, these informal arrangements have not been sustained over time and have not been sufficient to ensure the return of certificates to APHIS. For example, as of March 2011, APHIS transport program officials said they have not received any owner/shipper certificates from Texas border crossings in more than a year. Although some U.S. horses intended for slaughter are exported through a border crossing in New Mexico, the majority of horses bound for Mexico pass through the Texas crossings.²⁶ Thus, program officials said their ability to enforce the transport regulation for shipments of horses exported through these border crossings has been severely hampered.

In addition to the more recent problem with certificates not being returned from the Texas border crossings, we reviewed a generalizable sample of owner/shipper certificates returned from the southern border from 2005

²⁶Regarding the New Mexico border crossing, the transport program relies on the help of the APHIS Port Veterinarian to collect and return owner/shipper certificates.

through 2009 to determine the extent to which they were correctly completed by shippers and SAGARPA officials. Based on the results of our review, we estimate that about 48 percent of these certificates from 2005 through 2009 were missing key information to be provided by either shippers or SAGARPA officials. Moreover, about 54 percent of certificates from 2008 through 2009 were missing such information, suggesting an increase in problems associated with the recent increase in exports to Mexico of horses intended for slaughter. In addition, we estimate that about 39 percent of certificates returned to APHIS were missing some or all information, including the date and time the horses were unloaded at the border, to be provided by SAGARPA officials.²⁷

Legislative Prohibitions Impede USDA's Ability to Ensure Horse Welfare

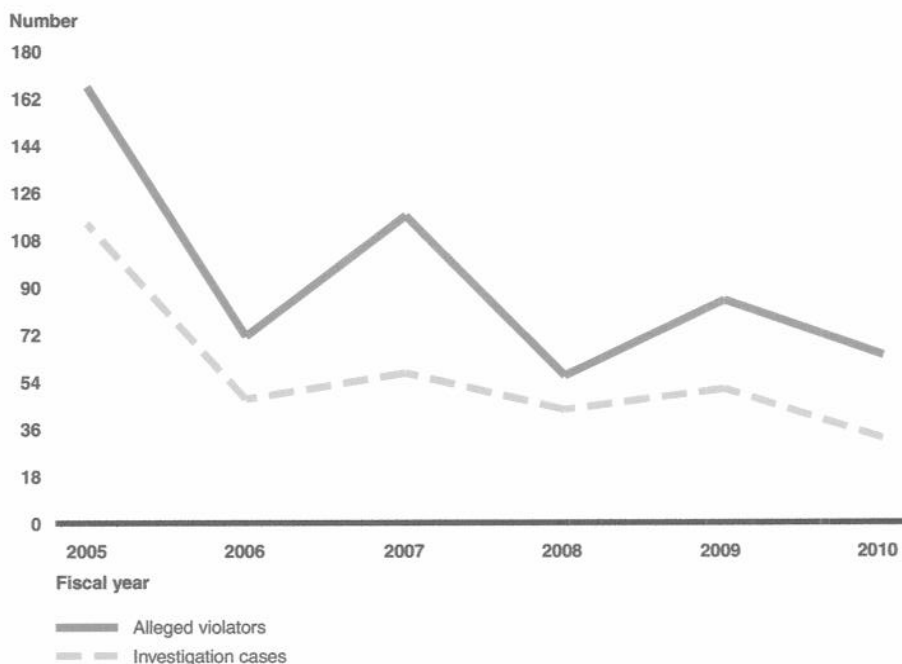
Legislative prohibitions have impeded USDA's ability to protect horse welfare since fiscal year 2006. First, as discussed, appropriations bills for fiscal years 2006 through 2010 have prohibited APHIS from using federal funds to inspect horses being transported for slaughter. As a result, according to agency officials, the transport program's compliance officer may only inspect the owner/shipper certificates associated with the shipment of horses and the conveyance on which the horses are transported. That is, only while inspecting these items may the officer also incidentally observe any potential violations of the transport regulation regarding the physical condition of the horses because of the annual prohibition on the expenditure of federal funds on inspecting horses. The compliance officer said this makes it difficult to ensure that horses are transported humanely to slaughter and to collect information on potential violations that is needed for APHIS to pursue enforcement actions. For example, while inspecting a conveyance being used to transport horses intended for slaughter in 2010, the compliance officer found that a mare in the shipment had given birth to a foal. Because the transport regulation requires shippers to verify that horses are not likely to give birth during shipment, the birth of a foal in transit represented a potential violation. However, because of the prohibition on using funds to inspect horses, the officer was unable to inspect the horses to determine which mare had given birth. Thus, the opportunity was lost to document a potential violation of the regulation by the shipper. Moreover, according to the officer, compliance probably has suffered because shippers are aware that transport program officials cannot

²⁷The 95-percent confidence intervals for our estimates of 48 percent, 54 percent, and 39 percent are 36 to 60 percent, 37 to 71 percent, and 27 to 50 percent, respectively.

inspect horses in transit to substantiate potential violations. According to APHIS officials, another impediment to their investigations of potential violations of the transport regulation is USDA's lack of subpoena authority to access the records of alleged violators or to compel persons to testify in administrative hearings and to produce documentary evidence for such hearings. Specifically, although USDA has such authority under several other APHIS-administered statutes (e.g., Animal Health Protection Act, Horse Protection Act, and Plant Protection Act), it does not have this authority under the authorizing legislation for the transport regulation—the 1996 Farm Bill. According to APHIS officials, the agency would welcome the addition of subpoena authority to promote enforcement of the slaughter horse transport regulation.

Second, USDA also has been prohibited from using federal funds to inspect horses prior to slaughter for human consumption at slaughtering facilities. As discussed, the Federal Meat Inspection Act requires inspection of all cattle, sheep, swine, goats, and horses before they are slaughtered and processed into products for human food and to ensure that meat and meat products from these animals are unadulterated, wholesome, and properly labeled. Prior to the appropriations prohibition, and before the cessation of domestic slaughter, FSIS officials in U.S. slaughtering facilities inspected the condition of horses before slaughter as well as the horsemeat after slaughter. The prohibition on the use of funds for required inspections has, in effect, banned the slaughter of horses for food in the United States, and, as a consequence, moved this slaughter to other countries where USDA lacks jurisdiction and where the Humane Methods of Slaughter Act does not apply. Therefore, USDA is less able to ensure the welfare of horses at slaughter. And, as was the case with horses in transit to slaughter, APHIS officials speculated that compliance with the transport regulation has suffered because shippers are aware that the program can no longer leverage the assistance of USDA personnel in slaughtering facilities to ensure the completion of shipping paperwork or note the condition of individual horses in a shipment. This view seems consistent with our analysis of shipping certificates which found, as discussed, a statistically significant increase in incomplete certificates after the cessation of domestic slaughter. In addition, these officials noted that the loss of FSIS's assistance in slaughtering facilities, as well as the prohibition on APHIS's inspections of horses in transit, has led to a general decline in investigation cases since 2007. Figure 11 shows the number of investigation cases and alleged violators for fiscal years 2005 through 2010.

Figure 11: Number of Investigation Cases and Alleged Violators of the Slaughter Horse Transport Program Regulation, Fiscal Years 2005 through 2010



Source: GAO analysis of USDA's APHIS data.

Note: According to APHIS officials, the number of alleged violators exceeds the number of investigation cases because some investigations may reveal that multiple violators were responsible for a single violation and some investigations do not substantiate that a violation occurred.

Cessation of Domestic Slaughter Has Diminished APHIS's Ability to Implement the Transport Regulation to Protect Horse Welfare

According to APHIS and animal protection officials, horse welfare is likely to suffer as a consequence of horses traveling significantly farther to slaughter since the cessation of domestic slaughter, including an increased possibility of injuries when horses are confined in a conveyance with other horses over longer transport distances and travel times. As these officials explained, horses are by nature fight or flight animals, and when grouped in confinement, they tend to sort out dominance. In the tight quarters of a conveyance, weaker horses are unable to escape from more dominant and aggressive animals and, thus, are more prone to sustaining injuries from kicks, bites, or bumping into other horses or the walls of the conveyance. Moreover, once a shipment of U.S. horses has crossed the border into Canada or Mexico, APHIS no longer has authority to oversee their welfare, and these animals may be in transit for long distances in these countries before reaching a slaughtering facility. For example, the slaughtering facilities in Mexico that process U.S. horses are located near Mexico City,