STUDENT EXEMPLARY WORKS

TEXAS A&M UNIVERSITY
COLLEGE OF AGRICULTURE AND LIFE SCIENCES

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A Journal of Undergraduate Student Writing

UNDERGRADUATE STUDENT WRITING EXAMPLES

FROM

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BUT WORDS ARE THINGS, AND A SMALL DROP OF INK,
FALLING LIKE DEW, UPON A THOUGHT, PRODUCES
THAT WHICH MAKES THOUSANDS, PERHAPS MILLIONS, THINK;
'TIS STRANGE, THE SHORTEST LETTER WHICH MAN USES
INSTEAD OF SPEECH, MAY FORM A LASTING LINK
OF AGES; TO WHAT STRAITS OLD TIME REDUCES
FRAIL MAN, WHEN PAPER - EVEN A RAG LIKE THIS - ,
SURVIVES HIMSELF, HIS TOMB, AND ALL THAT'S HIS.

-LORD BYRON

DeVries, Ellen. Somerset Pumpkin Patch. 2007. Private Collection, College Station, Texas.

INTRODUCTION AND ACKNOWLEDGEMENTS

The success of last spring's first edition of the *Student Exemplary Works Publication* prompted dialogue, between departments, in the College of Agricultural and Life Sciences. What started out as a small publication celebrating the past terms' excellent writing, in only Agricultural Economics courses, is now broader in scope and accepting writing samples from other COALS disciplines. This is an exciting development because it gives us an opportunity to showcase a wider variety of student academic talent. We especially are proud of the diversity of these papers. Each student has his or her unique voice that they bring to this publication and to our university. We are pleased to present to you this second edition of exemplary works. Congratulations to all of our authors for their hard work and dedication in their course of study.

THANK YOU TO ALL COLLEGE OF AGRICULTURAL AND LIFE SCIENCES FACULTY WHO PARTICIPATED IN THE STUDENT WRITING PUBLICATION PROGRAM

- CLAY CAVINDER
- TED FRIEND
- GARY W. WILLIAMS
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SPECIAL THANK YOU FOR SUPPORT

The editors and authors would like to thank to Dr. John Nichols, Head of the Agricultural Economics department, for his generous financial support and encouragement of this student writing publication project.

STUDENT EXEMPLARY WORKS PUBLICATION
SPRING 2007

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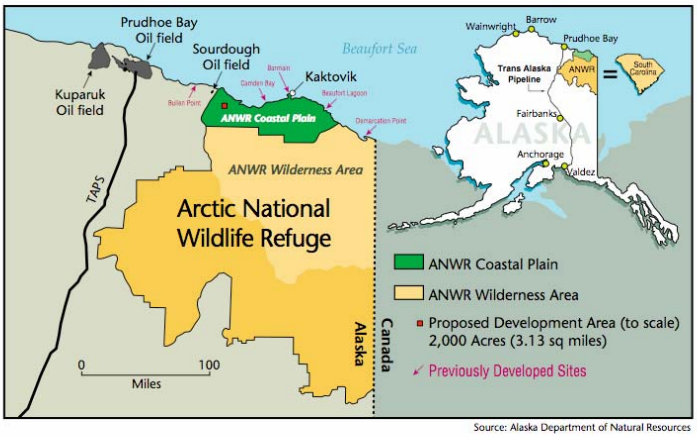
JONATHAN BAROS
AGRICULTURAL ECONOMICS
DEBATE IN THE ARCTIC NATIONAL WILDLIFE REFUGE

INTRODUCTION

The Arctic National Wildlife Refuge (ANWR) located in northeastern Alaska is home to a more abundant variety of plant and animal life than any other refuge in the Arctic Circle. However, for all its natural beauty, the flora and fauna are not what have made ANWR a household name. Instead, the refuge is known for the debate raging over whether the land should be opened for oil drilling, or maintain in its current state as an undeveloped wildlife refuge.

The Arctic National Wildlife Refuge (ANWR) consists of 19 million acres in northeast Alaska.[1] The land is managed by the "Fish and Wildlife Service in the Department of the Interior".[2] The Refuge is home to over forty-five species of land and marine mammals, thirty-six species of fish, and more than 180 species of birds; all



Source: Alaska Department of Natural Resources

[1] ANWR, *Making the Case for ANWR D*

[2] ANWR, *Making the Case for ANWR L*

existing free from human interference.[3] Biologists frequent the area, as it provides an unbroken range of arctic and sub arctic ecosystems. The Wildlife Refuge is free from roads and most of the refuge is accessible only by aircraft. Although considered an undeveloped area, ANWR is home to a native population of about 260 residents at Kaktovik, a village on Native owned lands at Barter Island.

The Arctic National Wildlife Refuge is located in an area of Alaska known for its oil producing capabilities. In fact, Prudhoe Bay North America's largest oil field is located fewer than 100 miles west of ANWR. Because of its proximity to Prudhoe Bay, it is commonly believed that the coastal plain of ANWR could rival Prudhoe in terms of petroleum potential. The coastal plain of ANWR is about 100 miles across and about 30 miles deep.[4] To put this in perspective, this is slightly larger than the state of Delaware.[5]

The Arctic National Wildlife Refuge was originally protected in 1960 as the 8.9 million acre Arctic National Wildlife Range. In 1980, the Refuge underwent a name change and the protected area was expanded as part of the Alaska National Interest Lands Conservation Act (ANILCA).[6] ANILCA also provided for wildlife studies and oil and gas assessment in the coastal plain area of the Refuge. These studies, conducted by the Department of the Interior, ultimately recommended that the coastal plain region be opened for oil production due to the discovery of large reserves. With the results of this study in mind, Congress approved the development of the coastal plain as part of the balanced budget act in 1995.[7] However, President Clinton vetoed the entire measure and in 1997 he signed the National Wildlife Refuge System Improvement Act, reaffirming the country's commitment to preserving the natural integrity ANWR. Since that time, the fate of the coastal region of ANWR has become a highly debated and politically charged issue.

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[3] FWS, *Arctic National Wildlife Refuge 2* (Jan. 2000).

[4] Baldwin, Pamela, *The Next Chapter, The Arctic National Wildlife Refuge,* (2001).

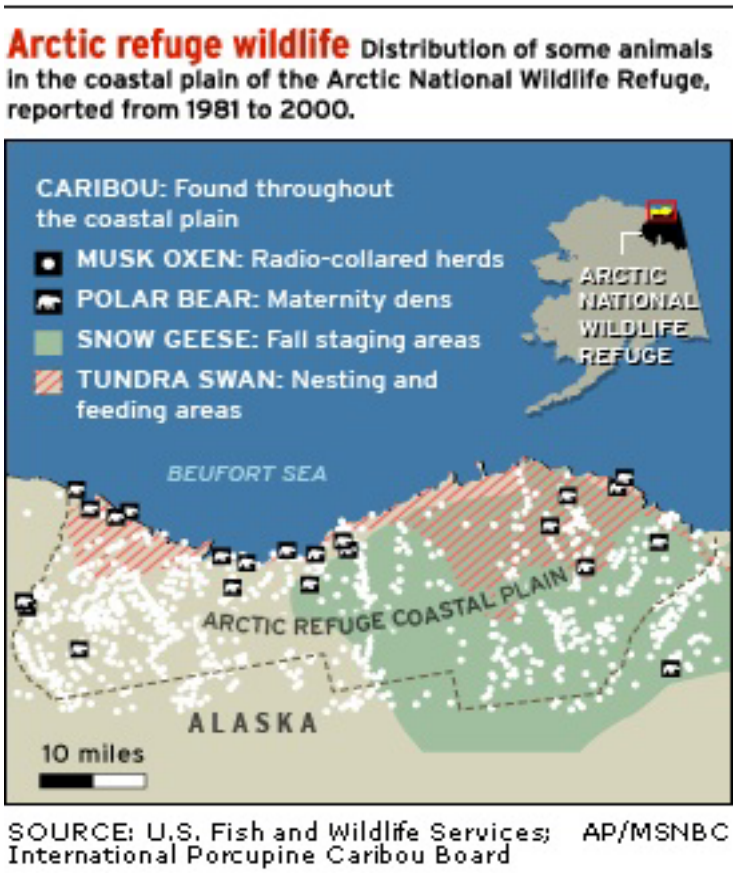
[5] ANWR, *Making the Case for ANWR Development, The Artic National Wildlife Refuge,* (2007).

[6] ANWR, *Making the Case for ANWR Development, The Artic National Wildlife Refuge,* (2007).

[7] Chance, Norman, *A Special Report: The Artic National Wildlife Refuge.* (2001).

PROBLEM STATEMENT AND STATEMENT OF OBJECTIVES

The issue at hand involves whether or not congress should open the Arctic National Wildlife Refuge for oil drilling purposes. While this seems to be a cut and dry issue when speaking in economic terms, there is an element of emotion that has prevented any decision from being made. It is the purpose of this paper is to illustrate the economic, ecological, and sociological concerns associated with the development of ANWR.



LITERATURE REVIEW

In her article, *Challenging Boundaries: The Arctic National Wildlife Refuge and International Environmental Law Protection*, Bonnie Docherty suggests international law be used as a means to help preserve ANWR.[8] International law is an argument under utilized by anti-drilling activists.[9] Instead, most environmentalists approach the topic from scientific, economical, and/or moral standpoints. Docherty brings to light the fact that while drilling for oil would only be beneficial to the United States, the preservation of ANWR would be beneficial to many other nations. She encourages the use of international law in defending the preservation of ANWR as its location, the applicability of several treaties, and the trend toward globalization all

[8] Docherty, Bonnie, *Challenging Boundaries: The Arctic National Wildlife Refuge and International Environmental Law Protection,* vol. 10, N.Y.U. Environmental Law Journal, (2002).

[9] Docherty, Bonnie, *Challenging Boundaries: The Arctic National Wildlife Refuge and International Environmental Law Protection,* vol. 10, N.Y.U. Environmental Law Journal, (2002).

favor safeguarding the refuge. The location of the Refuge is of particular importance, ANWR borders international waters to the north and Canada to the East.[10] The refuge encompasses habitats that extend into Canada and many species migrate to other countries at some point in the year. The joint concern for the welfare of these migratory species is one of the reasons that the United States has embarked in treaties with other nations. For example, the Porcupine Caribou Agreement between the United States and Canada provides for the protection of a migratory caribou herd. This herd travels from Canada to its calving grounds on the Coastal Plain of ANWR every year.[11] Another international treaty is the Polar Bear Agreement. This agreement, between the United States, Canada, Denmark, Norway, and the USSR, protects the polar bears that den within the disputed region of ANWR.[12] The Refuge is also subject to several migratory bird treaties, intended to conserve the many indigenous and foreign species that journey through the area. Most all of the treaties state that maximum effort will be made to conserve the habitat of the species mentioned in the treaty. Any drilling in the Coastal Plain region would violate these treaties by compromising the natural environment of these species.[13]

ANALYSIS/DISCUSSION OF ISSUE

Opening the Arctic National Wildlife Refuge for drilling has become a politically charged, high profile debate. Both pro and anti-drilling supporters make compelling, fact based, arguments. For all the controversy, the heart of the issue is one simple question. Do the benefits of opening ANWR for drilling outweigh the costs? Advocates of opening the Arctic National Wildlife Refuge for drilling, cite economic benefits as the greatest advantage. It is estimated that between six and sixteen billion barrels of oil could be recovered from ANWR.[14] Drilling advocates state that this amount of oil could help bolster the economy and allow the United States to become less dependent on foreign oil. This is certainly true, however, these facts are based on no more than

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[10] Docherty, Bonnie, *Challenging Boundaries: The Arctic National Wildlife Refuge and International Environmental Law Protection,* vol. 10, N.Y.U. Environmental Law Journal, (2002).

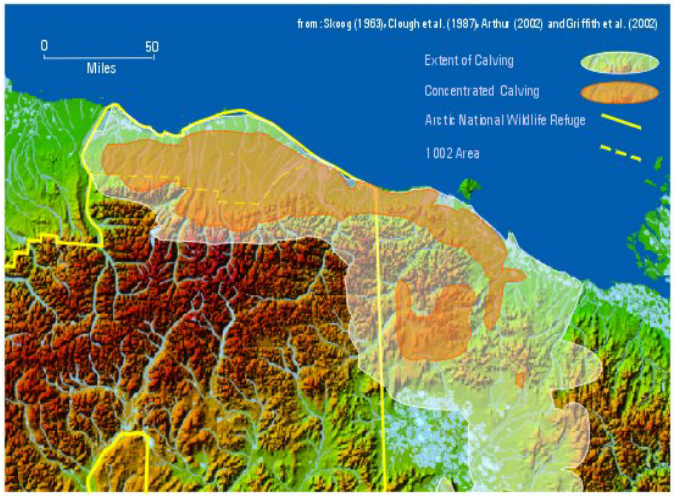
[11] Docherty, Bonnie, *Challenging Boundaries: The Arctic National Wildlife Refuge and International Environmental Law Protection,* vol. 10, N.Y.U. Environmental Law Journal, (2002).

[12] Docherty, Bonnie, *Challenging Boundaries: The Arctic National Wildlife Refuge and International Environmental Law Protection,* vol. 10, N.Y.U. Environmental Law Journal, (2002).

[13] Docherty, Bonnie, *Challenging Boundaries: The Arctic National Wildlife Refuge and International Environmental Law Protection,* vol. 10, N.Y.U. Environmental Law Journal, (2002).

[14] ANWR, *Making the Case for ANWR Development, The Artic National Wildlife Refuge,* (2007).

estimates. The only way to be sure of how much oil is present is to drill, and once this process has begun, it will be impossible to erase the effects it will have on the ecosystem. Anti-drilling supporters argue that it is not worth taking the risk when there is the chance that the oil reserves located inside the boundaries of ANWR will amount to a tiny addition to current production. Those opposed to drilling believe that even if ANWR were to produce huge amounts of oil, it is still only a temporary fix to a long term problem.[15] Once oil and gas is extracted from the land it will be gone forever; scientists consider oil to be a nonrenewable resource because the process of replenishing the oil resource is over thousands and thousands of years.[16] It has been stated that there are other ways of being less dependent on foreign oil. One of these is for the government to increase the standard fuel efficiency for motor vehicles.[17] There is also a momentous push for the development of renewable energy sources. Developing new energy sources and leaving ANWR undisturbed will be more beneficial to the United States in the future than compromising the Refuge for the sake of an unknown amount of oil.[18]



One of the largest objections to drilling is the fact that it will disrupt the natural ecosystem, which will decrease the population of some of the world's most distinctive creatures. ANWR has been called the "American Serengeti" because it carries habits for some of the world's most magnificent creatures such as caribou, polar bears, grizzly bears, wolves, migratory birds, and many other species.[19]

The fate of the Alaskan Caribou is of particular concern as ANWR is home to several migrating herds, which calve in the areas targeted for development. Opening the Coastal Plain for drilling will force the

[15] Baldwin, Pamela, *The Next Chapter, The Arctic National Wildlife Refuge,* (2001).

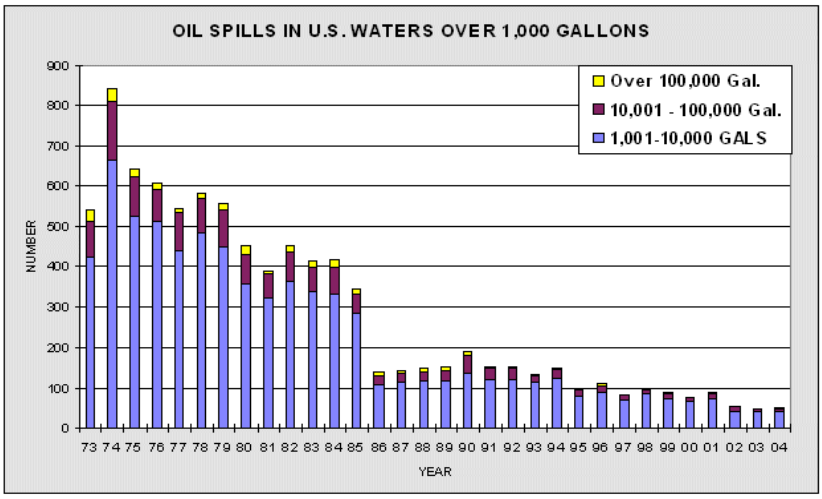
[16] ANWR, *Making the Case for ANWR Development, The Artic National Wildlife Refuge,* (2007).

[17] ANWR, *Making the Case for ANWR Development, The Artic National Wildlife Refuge,* (2007).

[18] ANWR, *Making the Case for ANWR Development, The Artic National Wildlife Refuge,* (2007).

[19] Baldwin, Pamela, *The Next Chapter, The Arctic National Wildlife Refuge,* (2001).

caribou from their natural calving grounds, disrupting their ancient migration patterns and upsetting the balance of the entire ecosystem.[20] Not only will developing this land displace caribou, it will also destroy many plant species that other wildlife depend upon. Developing land will also violate international treaties, developed to protect the migratory animals that inhabit the area.[21] Proponents for opening the area to drilling, claim that precautions such as oversized tires along with advancements in technology allow for machinery to be used without disturbing the wildlife around the drill sight.[22] Oil producers argue that one of the most beneficial technological advancements is horizontal drilling. Horizontal drilling, also referred to as directional drilling, "wells are often more efficient than other access methods and can replace a vertical well network by maximizing the zone of influence for remediation technologies. Horizontal wells also can be located beneath surface obstacles and can reduce disruption at a site".[23] Even with minimally invasive drilling procedures, the delicate balance of the ecosystem is sure to be disturbed. Advocates also cite the fact that only "1.5 million of the 19 million acres is being considered for development. This means that 92% of the refuge will remain permanently closed for development".[24] To add to this advantage, if oil is discovered, less than 2000 acres of the over 1.5 million acres of the Coastal Plain would be affected. This means that half of one percent of the total acres in the boundaries of ANWR would be used for production development.[25]



Loss of what seems to be a tiny portion of the Refuge will have a ripple effect across the rest of the

[20] Chance, Norman, *A Special Report: The Artic National Wildlife Refuge.* (2001).
[21] Docherty, Bonnie, *Challenging Boundaries: The Arctic National Wildlife Refuge and International Environmental Law Protection,* vol. 10, N.Y.U. Environmental Law Journal, (2002).
[22] ANWR, *Making the Case for ANWR Development, The Artic National Wildlife Refuge,* (2007).

[23] ANWR, *Making the Case for ANWR Development, The Artic National Wildlife Refuge,* (2007).

[24] Chance, Norman, *A Special Report: The Artic National Wildlife Refuge.* (2001).

[25] ANWR, *Making the Case for ANWR Development, The Artic National Wildlife Refuge,* (2007).

protected area and can result in irreversible damage to both plant and animal life. Those in favor of drilling have not taken into account the fact that this area is of vital importance to the wildlife in the area. This portion of land is not simply interchangeable for another.

Above all, no matter how safe advocates promise to be, accidents still occur. We have witnessed the damage that accidents can incur. For example, the Exxon-Valdez oil spill in 1989 which "was one of the largest manmade environmental disasters ever to occur at sea, seriously affecting plants and wildlife".[1] This event proves that even when precautions are taken accidents can still occur which can lead to catastrophic damages to both animals and plants. Although there have been significant improvements in reducing the number of large oil spills, several smaller oil spills have already occurred in Prudhoe Bay, the area adjacent to ANWR. The oil field even had to be shut down in August of 2006 due to corroded pipelines which had not been properly managed.[2] These spills do not portend the promise to preserve the integrity of the area.

Drilling wouldn't only affect plants and animals, but human life as well. Part of ANWR is home to the Inupiat Eskimo of Kaktovik, Alaska. Archeologists believe this area has been occupied for more than 11,000 years.[3] Those in favor of drilling argue that seventy-five percent of Alaskans favor drilling. While this is fact, it does not take into account the fact that the Alaskans native to the ANWR area, namely the Gwich'in tribe, who strongly oppose any development.[4] The Gwich'in tribe has existed of the migratory caribou herds that frequent the area for hundreds of years.[5] Drilling practices are sure to have unfavorable effects on these caribou, and ultimately, the Gwich'in tribe itself.

For those opposing drilling in ANWR it is glaringly obvious that there are far too many risks associated with the development of the Artic National Wildlife Refuge. Destruction of one of the world's few remaining pristine natural habitats, the chance of devastating oil spills, and risking the culture of native peoples are not worth sacrificing to drill for an unknown amount of oil.

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[1] Corbisier, Robert, *The artic Nation Wildlife Refuge, Correlative Rights, and Sourdough: Not Just for Bread Anymore*, 19 Alaska Law Review 393.

[2] Chance, Norman, *A Special Report: The Artic National Wildlife Refuge.* (2001).

[3] ANWR, *Making the Case for ANWR Development, The Artic National Wildlife Refuge,* (2007).

[4] Chance, Norman, *A Special Report: The Artic National Wildlife Refuge.* (2001).

[5] Chance, Norman, *A Special Report: The Artic National Wildlife Refuge.* (2001).

CONCLUSIONS AND POLICY IMPLICATIONS

In order for the Arctic Natural Wildlife Refuge to remain in its current, unaltered condition, Congress must not allow for drilling to occur in its Coastal Plain region. There have been some steps in the right direction. The Udall-Eisenhower Arctic Wilderness Act (H.R. 567 / S/ 261) which would designate the Coastal Plain region of ANWR as wilderness was introduced in February of 2005.[31] This bill was never made into law, despite the best efforts of Representative Ed Markey and Senator Joe Lieberman. It is essential that similar efforts continue and a bill eventually be signed into law.[32] If a policy such as this were implemented, the Refuge, along with its inhabitants will be indisputably protected.

[31] Scarlett, Lynn, *An Address to the Natural Resource Under the Bush Administration Symposium,* vol. 14:2, Duke Environmental Law & Policy Forum.

[32] Scarlett, Lynn, *An Address to the Natural Resource Under the Bush Administration Symposium,* vol. 14:2, Duke Environmental Law & Policy Forum.

PAM HUNT
WILDLIFE AND FISHERIES SCIENCES

SLAUGHTERING THE ICON OF THE AMERICAN WEST

INTRODUCTION

As of 2002, there were around 7 million horses in the United States. The horse industry impacts the U.S. economy about $112 billion dollars annually (American Horse Council 2002). Horses have played a key role in the domestication of America; carrying settlers west and even assisting in the defense of America, as a free nation, in battles such as the war for independence and the First World War. Horses such as Seabiscuit, Black Beauty, Funny Cide and even Barbaro have been immortalized in American culture, fueling the American adoration of equines. Horse ownership entails considerable expenditures. According to one estimate, horses live upwards of 30 years and cost between $1825 and $5000 per year to maintain, that's between $54,750 and $150,000 to support a horse for its lifetime (American

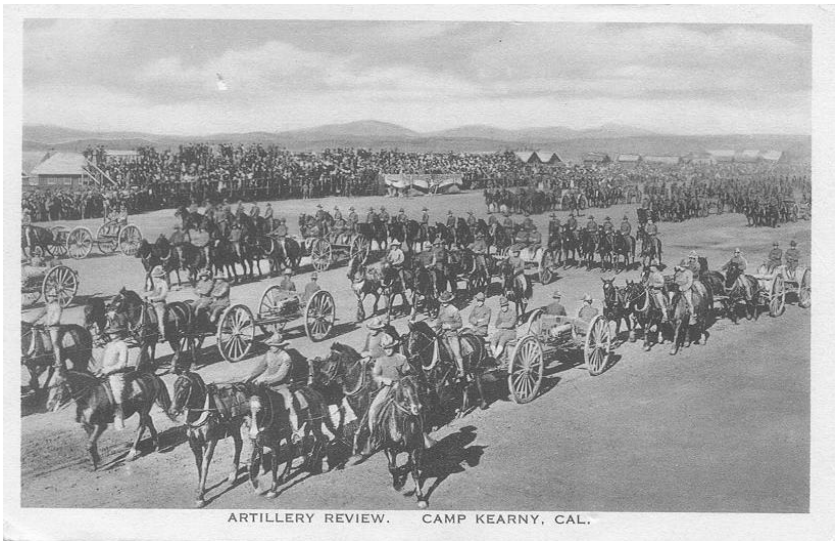


Figure 1: Cavalry artillery review, 1910. Photo courtesy of the Library of Congress.

Association of Equine Practitioners [AAEP] 2002). Regardless of the cost, people enjoy horses throughout the United States as lifelong companions.

Unfortunately horses grow old, suffering from poor health and disease. Some horses are retired to loving homes as companion animals and are lovingly cared for until their demise. Not all geriatric equines suffer this fortune; some are sold at public auction to be purchased by individuals who then ship them off to one of America's three equine slaughterhouses. Approximately 80,000 unwanted horses were sent to slaughter in 2004, of which 8,400 were wild mustangs and burros deemed un-adoptable by the Bureau of Land Management (BLM) as well as 20,000 surplus mares and foals from the pregnant mare urine (PMU) industry (AAEP 2002). Although the consumption of horse meat in America was prohibited by the Horse Protection Act of 1973, the slaughter of American horses for human consumption abroad is still legal. Unlike dogs and cats, horses are very difficult to dispose of due to their sheer body mass. There is no "pound" for horses as there are for dogs and cats, in which owners may surrender their unwanted animal, or abandoned animals are collected for adoption. After a period of time, animals that have not been re-homed are euthanized. This leads to a question of exactly what are we to do with these unwanted large animals, such as horses?

Figure 2: Emaciated horse, seized by the Houston SPCA due to neglect. Photo courtesy of the Houston SPCA.

PROBLEM STATEMENT & OBJECTIVES

Initially introduced on February 1, 2005, the Horse Protection Act (HPA) Amendment H.R. 503 would make it illegal to transport, sell or possess any horse destined for slaughter for human consumption. Should H.R. 503 pass, 80,000 horses will require placement in suitable homes for the duration of their life or alternative disposal methods. Several issues must be addressed to adequately formulate a policy on H.R. 503. Specifically, the following issues must be evaluated. First, if a ban on horse slaughter takes place, what alternatives are available for the horses? Secondly, how much will the alternative disposal of these animals cost? Finally, what are the environmental impacts of horse slaughter and its alternatives?

The objectives of this study are to 1) evaluate the alternative equine disposal methods, 2) determine

the approximate cost of the alternative disposal methods, 3) evaluate the environmental impacts of the practice of equine slaughter, and 4) evaluate the environmental impacts of the alternative disposal methods.

LITERATURE REVIEW

Several publications pertaining to the slaughter of horses are published by the American Association of Equine Practitioners (AAEP). Surprisingly, the AAEP, an organization dedicated to the protection of the health and welfare of the horse, has taken a pro-slaughter stand. The first flyer produced by the AAEP is the "Frequently Asked Questions about Unwanted Horses in the United States". This publication defines exactly what unwanted horses are, approximately how many unwanted horses are in the United States, factors contributing to unwanted horses, welfare of unwanted horses, the impact of equine rescue groups and retirement facilities and finally this article addresses other options for unwanted horses. The second AAEP publication is a position statement by the AAEP titled "Position on the Transportation and Processing of Horses". The article briefly describes conditions under which humane slaughter is a suitable alternative to unwanted horses. The Third AAEP statement is "The Unwanted Horse and H.R. 503: An Equine Veterinary Perspective". This critique evaluates the flaws in H.R. 503, including the long-term placement of affected horses, funding and care for unwanted horses, and language in the bill itself. Most concerning is the language of the bill itself, in one instance it could ban transportation of all horses for *any* reason if taken literally.

Census information pertaining to equines and equine ownership was gleaned from the American Horse Council's "Horse Industry Statistics" webpage. This webpage is a synopsis of a four volume economic impact study available for purchase. The horse industry has an approximate $112 billion impact on the US economy, with about 7 million horses involved in the industry as of 2002.

In 1998 California passed legislation banning the possession, transfer, reception or holding of any horse, pony, burro or mule with intent to having it killed for human consumption. Carolyn L. Stull's paper *California and the "Unwanted" Horse* evaluates the subsequent impact of the passage of a horse slaughter ban.

Mary W. Craig's article "Just Say Neigh: A Call or Federal Regulation of By-product Disposal by the Equine Industry" reviews two issues in the equine industry which cause excess waste of equine lives. First, the pregnant mare urine (PMU) industry in which urine from pregnant mares is collected where hormones are extracted and refined to be used in hormone replacement therapy for menopausal women. Secondly, the Jockey

Club, the official registrar of Thoroughbred horses, has banned the transfer of embryos to a surrogate mare.

Figure 3: PMU production by-products, baby horses. Photo courtesy of Spring Hill Rescue.

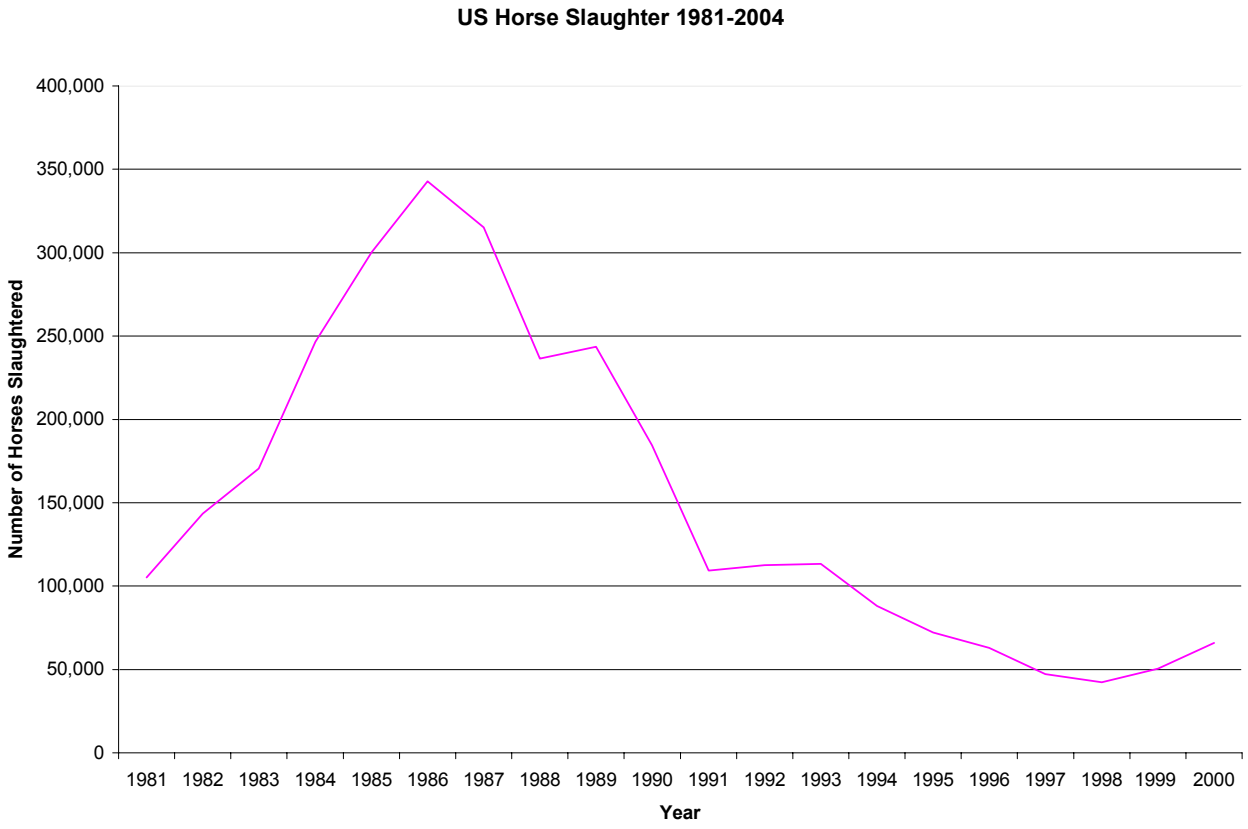
This leads to owners of high-dollar race mares being bred, carry a foal to term and then having a "nurse" mare brought in who also has a foal of the same age. The Thoroughbred foal is swapped for the nurse mare's foal, where the nurse mare's foal is then either bottle fed by a rescue organization or euthanized.

Nat T. Messer IV, DVM of the University of Missouri College of Veterinary Medicine addresses issues of the unwanted horse in his paper "The Plight of the Unwanted Horse: Scope of the Problem". This paper highlights the need for further information regarding the demographics of unwanted horses, and the critical necessity for a solution to the growing number of unwanted horses.

A few legal articles were also cited. First was the 2005-2006 Legislative Review, edited by Sunrise Cox. This review briefly outlines each development in state and federal animal-related legislation in the 2005-2006 year. Second are Senate bill 311 and H.R. 303, both identical bills proposed on January 17, 2007. These bills are to amend the Horse Protection Act in order to restrict the trade of horses intended for human consumption. Third is the Horse Protection Act, the act that is proposed to be amended by S.311 an H.R. 303.

ANALYSIS AND DISCUSSION

Approximately 80,000 horses were sent to slaughter in 2004, which comes to about 1% of the US horse population (AAEP 2002). According to the AAEP, the minimum cost of maintaining a horse for one year, not including veterinary expenses is $1825. In order to house these horses for one year would require $146 million, annually for the remainder of their lives. Furthermore, consider that there are approximately 80,000 horses per year, every year that are unwanted.



Conventional euthanasia and disposal is also a pricey alternative to slaughter. According to the AAEP, the average cost of euthanasia is $66. However, the carcass disposal can range from $75 to $250 for rendering, up to $2000 for incineration. Horses that are euthanized with barbiturates must be properly handled, as the barbiturates remain in the body after death, posing environmental hazards to scavenging animals and groundwater resources. Not only could conventional euthanasia be costly, but also taxing on the owner because of making the ultimate decision to end their pet's life, and then having to deal with the remaining carcass. When owners have the option of sending their animal to an auction facility, there is a possibility that the horse

will be purchased by another individual rather than a slaughterhouse buyer. The body may also be "digested", with specialized machinery such as the Agri-lyzer. This machine washes a solution over the flesh until it is completely gone from the bone. The bone is then crushed and can be sold to fertilizer companies for the calcium.

Figure 4: Resulting matter from a WR^2 Tissue Digester, the basket once held the bodies of several horses. Picture courtesy of WR^2.

CONCLUSIONS AND POLICY IMPLICATIONS

Undeniably there are at least 80,000 surplus horses per year in America (AAEP 2002). The minimal cost of maintaining those horses would be $146 million, do not forget that this number compounds annually with another 80,000+ unwanted horses entering the question. There are several options to consider.

First, equine slaughter for human consumption could be legalized. This would resolve the issue of unwanted horses as well as regulate the horses entering into the human food chain. Consider the stringent regulations on beef cattle, swine and poultry; what medications the animal may and may not be given, and a definite withdrawal period. No such regulations apply to equines, as they are not "technically" being slaughtered for human consumption. Almost every equine medication or ointment is labeled "not for use on horses intended for food", however these animals still enter the food chain. Legalizing slaughter for human consumption would shift the industry to USDA inspection and regulation, resulting in a substantially safer product for the consumer.

Fura-Zone Ointment
Squire Labs/Neogen

Description

Contains 0.2% nitrofurazone in a water-soluble base for the treatment and prevention of surface bacteria on wounds, burns and coetaneous ulcers. Apply directly on the lesion or first place on a piece of gauze. Federal law prohibits the use of this product in food producing animals.

Figure 5: A popular product used for wound treatment in equines, demonstrating the prohibition of use on animals intended for food. Courtesy of American Livestock Supply, Inc.

This does not mean that we would suddenly go to Outback Steakhouse® and find Black Beauty on the menu. As with dogs and cats, the consumption of horse flesh within the United States would be illegal; however the slaughter of horses for human consumption *outside* of the United States would be legalized. A possible downfall of this could be a possible increase of horse theft, considering this change in law would cause the market to go up, drive the price of horses up, and thus could possibly lead to an increase in horse thefts.

A second option is to levee a tax on all equine-related apparel in order to offset the cost of maintaining unwanted horses for the remainder of their lives, or having the horses euthanized and disposed of. A wonderful example of this scenario is demonstrated by the Pittman-Robertson Wildlife Restoration Act of 1937. This Act placed an 11% tax on rifles, shotguns, handguns, archery equipment and ammunition in which all the funds go towards wildlife conservation and restoration programs. All of Texas' wildlife management areas, hunter education programs, landowner's assistance programs and wildlife research are funded by the Pittman-Robertson Act. The annual funding amounts to approximately $9 million. Considering the number of horse owners country-wide, this is a viable solution even if implemented on a state-wide level. Considering that the horse industry had a $112 billion impact on the US economy in 2002, a 10% excise tax would have yielded $11.2 billion towards unwanted equine placement.

Simply banning the slaughter of horses will not resolve the unwanted horse quandary. If the citizens of the United States wish to eliminate the slaughter of equines, they first must open their wallets either voluntarily or otherwise, and pony-up the dough to adequately care for the displaced equines. Also consider that the majority of these equines are unwanted to some reason, weather mean, wild, terminally ill, maimed or

otherwise. These equines would require highly trained and specialized individuals to care for them, at a significant cost. Currently, the most cost effective method of equine disposal is thru a processing facility. Possibly this method is caustic to the morale of our culture, however it is yet to be so damaging to our emotions that we are willing to allow pillaging to our wallets instead.

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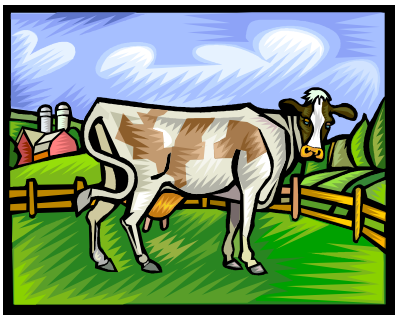

ADAM WOODLEY
ANIMAL SCIENCES

THE EFFECTS OF TAIL BENDING ON CALVES DURING HANDLING

INTRODUCTION

Being an efficient grazing species, beef cattle can function normally on large pastures without much intervention by humans. However, these animals are domesticated ungulates that are commercially raised for the meat they produce and must be handled by humans several times in their lives. Cattle producers have devised methods and tools to help gather and process their animals efficiently. Studies on the use of handling aides compared manual methods, oars or rattles, and electrical prods in terms of their effectiveness and the amount of adverse behavior they caused during handling (Croney et al., 2000). Also, studies on calves worked in squeeze chutes showed that some chutes can cause calves to move more than others, which increase the potential for injury. Grandin (1992) states this can cause a great amount of stress in the animal and increase chances of the same behavior occurring again the next time the animal is handled. Blindfolding calves can cause up to 50% less movement in calves while they are being worked (Mitchell et al., 2004). Many small cattle producers rely on these tools, but also perform a procedure known as tail bending when handling calves. If calves are being worked in a squeeze chute built for larger animals, then they may still have room to move their bodies even though their heads are caught in a headgate. Bending the tail of calves up and over their backs while they are being handled is considered to have a calming effect on the animal, making handling easier on both the calf and human (Woodley, 2007). The intention of this study was to test the tail bending method and discover if it does make calves, across sex classes, calmer during handling or if it is simply a quick

method of restraint. Stress in the cattle was quantified using respiration rate and number of kicking events while the cattle were being worked.

MATERIALS AND METHODS

Animals

Twenty (sixteen steers, four heifers) 3-month-old Angus X Hereford calves were obtained from a small cow-calf operation in Northeast Texas. The herd they belonged to (60 hd. total) had spent the winter on several ryegrass pastures ranging in size from fifty to sixty acres. These calves were not weaned from their dams and were making the transition from nursing to grazing. The steer calves had been castrated during a working session one week prior to the experiment.

Handling Procedure

The calves were brought to the handling facility by gathering them from their grazing pasture and herding them into a holding pen with the use of ATVs operated by the handlers. Once inside the holding pen, the handlers moved all of the cattle into the handling facility on foot without the use of equipment. Three handlers then proceeded to separate the calves from the rest of the herd. Using the gates of the handling facility, all twenty calves were separated from the herd in just less than five minutes. The cows and bull were then released back to the pasture to allow for more working room in the facility.

Once the calves were separated, they were maneuvered into the gathering pen in groups of four or five. Handlers then operated the wire sweep gate so that the calves would walk into the single file chute. This chute led them to the squeeze chute where the experiment took place. The calves were not separated by sex. Instead, the sex of each animal was recorded as they entered the squeeze chute to be worked, much like the process used on a small ranch. The owner of these cattle knew there were 20 calves and 4 of them were heifers. Therefore, the number of calves in each testing group could be determined without separating them beforehand.

The heifers were processed in one of two ways. Two of them were processed (vaccinated, ear notched, etc.) normally without a handler bending the tails, while the remaining two heifers were processed with their tails bent by a handler reaching into the squeeze chute. By alternating between non-tail bending and tail bending techniques, a control group and an experimental group were produced, each containing two heifers.

The steers were processed in the same manner as the heifers. Eight of them were processed (vaccinated, implanted, ear notched, etc.) without their tails bent, while the remaining eight steers were processed with their tails bent. Non-tail bending and tail bending techniques were alternated with each steer that came into the squeeze chute, giving a control and experimental group.

The squeeze chute was manufactured by Priefert Ranch Equipment and measured 67" tall and 28" wide. It featured a manually operated headgate and tailgate with solid- bottom side panels approximately 18" in height. The remaining portion of the side panels consisted of pipe sections on hinges that could be opened giving handlers access to bend the tail.

Data Collection and Analysis

The level of calmness in the calves was estimated by obtaining each of their respiration rates (breaths/minute) as they were being processed in the squeeze chute. Some calves did not breathe as intensely as others making their breaths too quiet to hear initially. In these cases, the data collector's hand was placed near the calf's muzzle. This allowed the collector to feel the breaths instead of hearing them. The breaths were counted for 15 seconds then multiplied by four to estimate a complete respiration rate. All of the collected rates were then loaded into Microsoft Excel in order to calculate averages for the control and experimental groups in each sex class.

In order to measure discomfort, the number of times a calf kicked while being worked was also recorded. Kicks were recorded every time a calf struggled enough to stop the handlers from processing it for a few seconds. The number of these kicking events for each calf was loaded into Microsoft Excel where averages for all groups were calculated.

RESULTS

Data from this experiment show some differences among the respiration rates of the calves studied. Table 1 shows the averages among the groups of each sex class as well as overall averages of the control and experimental group.

Table 1. Average respiration rates

	Control (Breaths/Min.)	Tail Bend (Breaths/Min.)
Heifers	59	60
Steers	49.5	47.5
Overall	51.4	50

The normal resting respiration rate of cattle, according to the Merck Veterinary Manual, 8th ed. (1998), is 26-50 breaths per minute. All of the calculated averages from this experiment fall in the upper portion of this range.

The experimental group had an average respiration rate that was 2 breaths per minute lower than the control group of steers. These calves did not breathe as intensely as the control group and showed no signs of physical pain (panting, bellowing, spastic movement, etc.).

The heifer group showed little variation between the control and experimental groups. The experimental heifer calves actually had a higher average respiration rate than the control group.

Overall, regardless of sex, the control groups of calves collectively had a mean respiration rate 1.4 breaths per minute higher than the tail bending (experimental) group. The kicking data, displayed in Table 2, provides another interesting view of the calves' behavior.

Table 2. Kicks per calf while handling

	Control (Kicks/Calf)	Tail Bend (Kicks/Calf)
Heifers	1	0
Steers	1.4	0.1
Overall	1.3	0.1

Throughout the experiment, there were few incidences of kicking or stoppages during the working process. One 250-pound steer had the highest number of kicks with 3. Three quarters of the heifers did not kick at all. The data shows that the tail bending groups of both sexes had kicking frequencies nearly 1 kick per calf lower than the control calves.

DISCUSSION/CONCLUSION

It is difficult to compare the results of this experiment to others because there is no other or very little data that has been collected on the subject of tail bending cattle. Personal communications with small producers were the only source of information when preparing for this experiment. Most producers that were interviewed claimed that tail bending was simply a restraining technique, but some agreed that it may have a calming effect on the calves, as well (Woodley, 2007).

The data from this experiment indicate that properly bending the tails of calves while they are being worked can cause the calves to have lower respiration rates. These lower rates can be the result of the calf being less stressed in the squeeze chute and, possibly, feeling less pain.

It should also be noted that this experiment was limited by time and resources. These limitations could have affected the data in adverse ways. For example, the low number of heifers might not accurately represent what is true for all heifers. This experiment should be repeated again with one hundred or more calves. Also, the males used in this experiment were already castrated, taking out a major step in the traditional handling of male calves. It would be interesting to see if the results found here would be similar to those found while studying male calves during castration. Dramatic weather changes that occurred 24 hours before the experiment took place might have also affected the test calves. The temperature decreased almost 30°F and the winds increased to 5-10 miles per hour.

Additionally, bending the tails of calves can be comparable to the twitching procedure in horses in which the tip of a horse's nose is pinched and twisted during handling. It is believed that this procedure releases endorphins and alleviates pain (Lagerwaij, 1984). Further study on tail bending should include testing for endorphins in calves in order to see if tail bending has the same effect as twitching horses.

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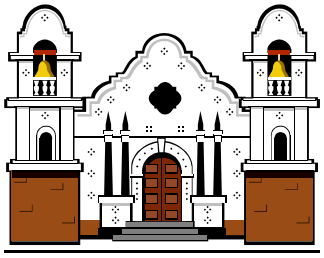

ROBERT WITHERS
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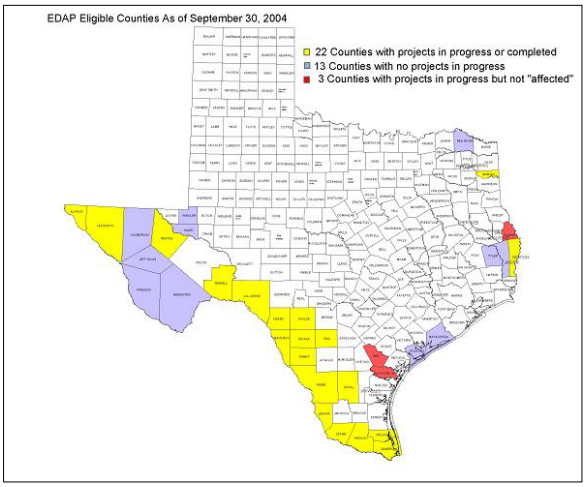
LAW, POVERTY, AND ECONOMIC DEVELOPMENT: A STUDY OF THE TEXAS COLONIAS

INTRODUCTION



Colonias are underdeveloped shanty-towns most prevalent along the Texas/Mexico border. In Texas, the history of the colonias is not widely documented, but it is assumed that they have been in existence since the 1950's (Federal Reserve, 1). Legal definitions of a Colonia vary from agency to agency and also differ depending on funding requirements (Secretary of State, 1). However, colonias can best be characterized by a lack of adequate plumbing and sewage waste disposal, an absence of potable water, substandard housing, and an unavailability of solid waste disposal (EPA, 2003).

PROBLEM STATEMENT

A general lack of knowledge and a hesitation to recognize these areas as a legitimate problem are major obstacle facing colonias. By addressing these issues, it may be possible to help alleviate some of the stresses that the peoples of these areas are facing. This article will further describe a colonia, including a brief

history and legal definitions, as well as detail legislation that has been enacted throughout the years.

BRIEF LITERATURE REVIEW

Much has been published regarding the border colonias. Unfortunately, most of the literature has not been highly publicized and is somewhat obscure and difficult to find. However, once the research was tracked down, it proved to be extremely helpful in describing the plights of the Texas/Mexico border. The Dallas branch of the Federal Reserve Bank released the most comprehensive study of the colonias, especially those found in Texas.

ANALYSIS/DISCUSSION OF ISSUES

Legal Definition of a Colonia

Legal definitions of a colonia vary from agency to agency and also differ depending on funding requirements (Secretary of State, 1). Section 775.001 of Texas Government Code defines a colonia as "a geographic area that:

(A) is an economically distressed area as defined by Section 17.921, Water Code; and

(B) is located in a county any part of which is within 50 miles of an international border."

Section 17.921 of the Texas Water Code proves the definition of an "economically distressed area as "an area in which:

(A) water supply or sewer services are inadequate to meet minimal needs of residential users as defined by board rules;

(B) financial resources are inadequate to provide water supply or sewer services that will satisfy those needs; and

(C) an established residential subdivision was located on June 1, 2005, as determined by the board."

Causation of the Formation of Colonias

Like many newly formed areas of high-density immigration such as the meat packing districts of the 1900's in Chicago as described in Upton Sinclair's novel *The Jungle*, wasteland is converted into residential area as quickly and cheaply as possible. As little infrastructure is placed into this land as possible and deed

holders convince potential occupants to sign a contract for deeds (Federal Reserve, 5). While this allows for a low down payment and monthly payments, occupants do not own the property until all payments are made. A contract for deed, unlike their counterpart a deed for trust generally does not need to be registered at the County Clerk's office. It also affords the landowner the ability to more easily repossess the land, should payments be late (Federal Reserve, 9). Cities hesitate to incorporate colonias because of the expenses that are incurred to create an infrastructure of water and sewage required by recent legislation (EPA, 2003). Even if cities were willing to take on the cost, most buildings in the Colonias are not up to safety codes.

Conditions of the Colonias

According to the publication released by the Federal Reserve Bank, 64.4% of all Colonia residents are Hispanic, yet 85% of residents under 18 were born in the United States and are therefore citizens. The average income of families living in the colonias is extremely low – with 906 of the 1092 families surveyed in the Cameron Park colonia earning less than $10,000 annually (Federal Reserve, 7). It is then no surprise that unemployment rates in the area are extremely high, ranging from 20% to 60% (Federal Reserve, 7). While these issues are bad, arguably the two worst problems facing colonias are health issues caused by a lack of integrated sewage and running water. An estimated 70% of colonia residents lack access to fresh water, sewage hookups, gas, or electricity (Davidhizar, 2). Due to this lack of basic necessities, diseases – often those that are easily manageable and/or curable – are rampant. River water and shallow well water is often used for personal hygiene and encourages outbreaks of dysentery and hepatitis A (Mroz, Morales, & Van Derslice, 1996). Once basic health and hygiene issues are addressed, perhaps then, other problems such as education and unemployment can be solved.

A History of Legislation in Regards to Colonias

The Office of the Attorney General provides the following outline of Texas legislation regarding colonias:

1987

The Legislature consolided most of the laws regarding subdivision platting. City extraterritorial jurisdictions (ETJ's) were defined to range from one-half mile for cities with fewer than 5,000 inhabitants up to 5 miles for cities of 100,000 or more. Chapter 242 contained the basic requirements to record a plat: city approval if the land is inside the city limits, both city and county approval for land outside the city but inside its ETJ, and county approval for land outside city ETJ's.

Separate legislation expanded the longstanding statewide prohibition against service to an unplatted lot. The act also provided that a city may define and classify divisions of land exempt from obtaining city plat approval.

1989 In 1989 the Legislature passed the first major Texas legislation addressing colonias. It set up the Texas Water Development Board's EDAP funding program, told state agencies to come up with model rules to assure water and sewer service to residential developments, and toughened platting requirements. A basic policy underlying the legislation was that the state would spend millions of dollars to address water and sewer infrastructure needs in existing colonias, but there would be strict laws and rules to prevent new colonias from happening.

1990 A number of provisions provided funding for the EDAP program. To implement the statutory purpose of assuring water and sewer for residential areas, the Model Subdivision Rules imposes several requirements on the platting of new subdivisions. If water and sewer infrastructure is not built when final plat approval is sought, the subdivider must post a bond or other financial guarantee to cover such cost.

1991 SB 1189 expanded the coverage and closed some loopholes in laws related to preventing colonias.

1993 HB 2079 increased the potential involvement of the Office of the Attorney General (OAG). The attorney general gained power to sue to recover from a subdivider damages adequate to undertake construction or other activity necessary to comply with a county requirement adopted under

1995 HB 1001 revamped county regulation of platting in many counties in the border region. Its key feature was enhancing platting requirements, utility connection limitations, advertising and disclosure provisions, and restrictions on the sale of lots lacking water and sewer.

Other legislation amended and added Property Code provisions regarding the use of contracts for deeds or other executory contracts for property used or to be used as the purchaser's residence. Enhanced notification requirements were imposed before a seller may enforce the remedies of recission or of forfeiture and acceleration

1997 Several bills made mostly minor changes to laws related to subdividing and colonias. Of particular interest to colonias residents, SB 1512 relaxed the prohibitions against providing utilities to lots not platted or lacking water and sewer service.

1999 SB 1421 made several important changes. It expanded the applicability of the special county platting laws and other requirements These counties may now charge subdividers fees for the costs of inspections to ensure compliance with county subdivision rules To facilitate platting of older unplatted subdivisions, SB 1421 allowed limited variances from some requirements (but not requirements for water and sewer services). The bill also shifted to the TWDB ultimate responsibility for preparing and adopting the model rules. The bill provided for a state "Colonia Initiatives Coordinator" to help coordinate colonias-related efforts of state and local governments

2000 Following a process that included considerable public input, the Texas Water Development Board formally adopted revised Model Subdivision Rules.

2001 The Texas Legislature made several changes of note. SB 198 strengthened a number of contract for deed safeguards and made them applicable statewide. The 2001 amendments provide an opportunity for these lot owners to obtain utility services if either (1) water service is feasible or (2) a residence is begun by May 1, 2003. Commissioners courts have discretion to grant or deny such requests. Residential construction, alteration, repair, etc., will have to meet the International Residential Code. Electrical work must meet the National Electrical Code. Other construction must comply with the International Energy Conservation Code. Under these changes, political subdivisions may adopt comprehensive floodplain management rules that go beyond the requirements of the federal National Flood Insurance Program. Civil and criminal enforcement is strengthened. Reasonable fees may now be charged to cover the local program's cost. HB 2912 and HB 3111 refined state statutes in Chapter 366 of the Health & Safety Code regarding on-site sewage facilities (OSSF) like septic systems. A number of colonias-related programs under various state agencies were expanded. These included (1) an extension of the Owner-Builder Loan Program, (2) a new Colonia Initiatives Advisory Committee, (3) a new Colonia Model Subdivision Program, (4) new outreach to non-border colonias, (5) a new Colonia Self-Help Program, and (6) newly required training for applicants and recipients of EDAP assistance. SJR 37 proposed a constitutional amendment to provide $175 million to counties for access roads to connect border colonias with public roads.

Problems with Legislation

Even though great progress has been made, legislation has, thus far, been unable to catch up with the growth of the Colonias. In Texas, 1987 was the first year for any significant legislation to identify or address the Colonias. That legislation, signed into law by then-Governor William Clements, authorized the Texas Water Board to provide loans and grants for water and waste service (Secretary of State, 3). The most significant legislation to be enacted within the past two decades happened in 1995 when Governor George W. Bush signed a bill that gave counties in affected areas the authority to "regulate subdivisions in economically distressed areas by imposing platting requirements and service requirements on persons selling property. [It] imposes civil and criminal penalties for failure to comply with the requirements" (Secretary of State, 2006). According to some experts, it would cost an estimated $500 million to extend sewage to all colonias in Texas. However, while some government entities are beginning to get involved, ones such as cities that can make the greatest impact are still failing to do so. The colonias must be legally platted before nearby cities are willing to even consider providing funding (Mroz et al., 1996). Recent State model-subdivision rules require improvements such as paved roads and street lighting to qualify for platting (Davidhizer, 302). Obviously, residents of colonias are too poor to be able to afford such improvements.

CONCLUSION AND POLICY IMPLICATIONS

Each year, the Texas legislature writes laws addressing the border colonias. In addition, organizations, both not for profit and for profit alike, are beginning to release publications addressing these settlements. Current trends in legislation indicate that as time progresses, the burden of providing basic services such as running water and sewage will shift from falling upon nearby cities (where they are often neglected anyways) to developers trying to liquidate their useless land. As visibility increases and these developers are held to their obligations of installing said utilities, it will be possible to begin addressing other issues facing the colonias, including public health, education, and unemployment.

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EQUINE BEHAVIOR AND TRAINING: HOW TO TAKE THE "BUCK" OUT OF A BUCKING HORSE

INTRODUCTION

Bucking is a movement performed by a horse in which the animal lowers his head and raises his hindquarters into the air, usually while kicking out with his hind legs. If powerful, it may unseat the rider enough so that he or she falls off the horse. As a rider, it is important to understand why a horse bucks and what to do if this problem occurs. This article includes the opinions of three horse trainers: Jay Henson, Curt Pate, and Tripp Townsend. "All three horsemen start horses under saddle with one goal in mind; to develop a truly broke, well–trained mount, no matter if he's ultimately headed to the branding pen, a show arena, or the nearest wilderness trail."

So what are the reasons that horses buck? According to trainer Jay Henson, bucking occurs with horses that are "too-fresh, well-fed, or stalled with too little exercise." Also certain bloodlines are more inclined to buck than others. And of course, bucking can be induced by previous training methods. Here are some different opinions and strategies for preventing and surviving a bucking horse.

There are three likely times for a green horse to buck; when first mounted, when first moved, or when dismounted. It is extremely important for the first ride on a green horse to occur without incident. A bad

experience on the first ride slows the training process tremendously. Therefore, the trainer must do everything in his power to assure a successful learning experience upon the initial ride. Part of this is to not expect too much of the horse. If the rider asks the horse to back on the first ride, then the horse should be expected to take only one or two steps maximum. Since the horse cannot yet move smoothly and consistently with the rider's weight, the rider must adjust his own center of gravity quickly and quietly so he does not interfere with the horse. By being diligent and precise with body language, a potentially dangerous and frustrating situation can be avoided.

The assistance of a handler may be useful during the first ride. The rider should control the horse by using voice and rein cues that are already understood by the horse. The handler is present to reinforce the rein aids and voice with a more basic cue, halter pressure. By keeping the horse aware of what is being asked, confusion can be minimized and boredom averted, therefore giving the horse less time to think about anything but the rider's requests.

METHODS

In order to minimize the chance of a green horse bucking, the duration of the ride should be kept between five and ten minutes. Some form of restraint should be used while mounting such as; having someone hold the horse, "cheeking" the horse, or facing the horse directly into the fence or corner in a square pen. If you have elected to have someone assist with handling the horse, the holder should be aware of the potential danger. Therefore, they should use a longe line as the holder is required to hold the horse even while bucking is occurring.

If using a handler is not an option, then "cheeking" can be a safe and effective way of restraining the horse. The following steps are all used in this restraint method. While mounting, hold the cheek piece of the bridle with the left hand and pull the horse's head to the left. Then the rider grasps the saddle horn with the right hand. Although this requires a great deal of balance in a rider, it is the safest method for mounting the first time without assistance since the horse cannot put his head down to buck very easily.

The last method of restraint is facing the horse directly into a fence. This will help by discouraging the horse from moving forward while the rider is mounting.

Although this will help with the mounting, it may not prevent the horse from bucking.

Improper mounting techniques such as hitting the horse in the ribs with the left toe, kicking the horse in the hindquarters with right foot when swinging up, and sitting down hard in the saddle should be avoided. Once mounted, the horse should be allowed to relax. Then, sit still and speak calmly to let the horse know that he should remain relaxed and calm. Relax and keep your legs away from the horse's sides. If the horse jumps, maintain balance without squeezing with the lower legs in order to avoid frightening the horse. Be cautious when changing direction as the horse may have a tendency to buck. Also allow plenty of room for directional change so the horse does not have to stop or back up. By utilizing well established voice commands ask the horse to move to one side. Do not allow the horse to move in a straight line. Keep both hands firmly in place on the reins and apply rein aids in a give and take manner. By following these guidelines you keep the learning simple and stress free making for a more enjoyable learning experience for both horse and rider.

According to Henson, the horse with the most buck will not cover a large amount of ground. The more stationary a horse is, the more powerful the buck will be. In order to avoid this, the rider should get the front end of the horse to move forward. While moving the horse forward less force can be exerted on the rider making bucking a bit more tolerable.

Additionally, the rider must be aware of behavioral signs given by the horse that are potential precursors of bad behavior. When a horse is about to buck, you can feel the horse's body become tight and tense. By having a handler lead the horse around a few times in a circle, you can relax the horse to avoid this problem. Slow movements and a calm tone will help relax the tense horse.

According to Curt Pate, elevating a horse's head will free up the front end of the horse therefore redirecting the pressure building in the hind legs. When a horse has time to work out the situation in his mind, then the horse relaxes and both ends work together. Instead of moving the hindquarters first when riding, Pate suggests moving the front end first by leaning from the saddle and letting the colt move his hindquarters on his own. By leaning you make it harder to be comfortable so the horse's automatic response will be to move his hindquarters. "That's the important thing people miss because they don't wait for him to move," says Pate.

According to Tripp Townsend, the rider must relax when sitting on a horse. "People often get on a colt and tighten up, and a horse really feels that. When a scared rider clamps down, looks at his horse, doesn't give his colt any direction, but still asks the horse to go, that colt bucks," says Townsend. By relaxing on a horse's back and giving direction, you can keep the colt from bucking. Another suggestion by Townsend is to keep off

the saddle horn as much as possible. When you hold the horn it pulls the cinch and that can scare a horse even more. Respond confidently regardless of whether you are nervous or not otherwise you are just inviting trouble.

Nobody wants a horse to buck when started under saddle, but it happens, and horses will buck for many generations to come. But if the problem cannot be completely avoided, it can still be potentially diverted or dealt with in a safe fashion. By being completely aware of what the horse is feeling at all times, you can potentially change a scared or unruly behavior into a more positive experience for both the horse and rider.

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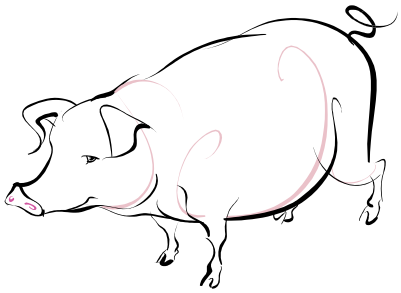


CLÉMENCE IDRAC
BIOMEDICAL SCIENCE DEPARTMENT

PREFERRED TOYS AND CORRELATION OF PLAY AND AGGRESSIVE BEHAVIOR IN WEANED PIGLETS

INTRODUCTION

Intensive rearing conditions in piglet nurseries fail to provide for pig's natural drive to investigate and chew objects. Additionally, weaning causes a lot of stress in piglets by changing their environment and often grouping by size and not by litter; "these changes induce behavioural problems such as belly nosing or increased fighting" (Dudink et al., 2006). I was interested in showing the importance of improving weaned piglets' environment and in finding toys that would relieve boredom and stress. The type of environment in which a pig is raised can have profound effects on its behavior (Grandin 2006). Initially I had intended to look at whether investigative behavior and curiosity differences were correlated to being provided with toys. Grandin (2006) suggested that piglets raised with toys approached a novel object more quickly than piglets raised without toys. However, when I conducted the experiment, my results did not show a clear contrast between groups of pigs with and without toys. The project was altered to see if providing enrichment had an effect on aggressive behaviors. The first part of my study compared piglets' preferences for certain toys by observing how much the toys were used and if that changed over a week. The second part of the study counted the aggressive behaviors of all groups. I hypothesized that providing toys would relieve boredom and therefore might also reduce aggression. Grandin's study (2006) agrees with this hypothesis, but Hill (1998) claimed that increasing the complexity of environmental treatment with human contact and toys did not improve animal

performance or behavior. Those conflicting views made the outcome of my study uncertain.

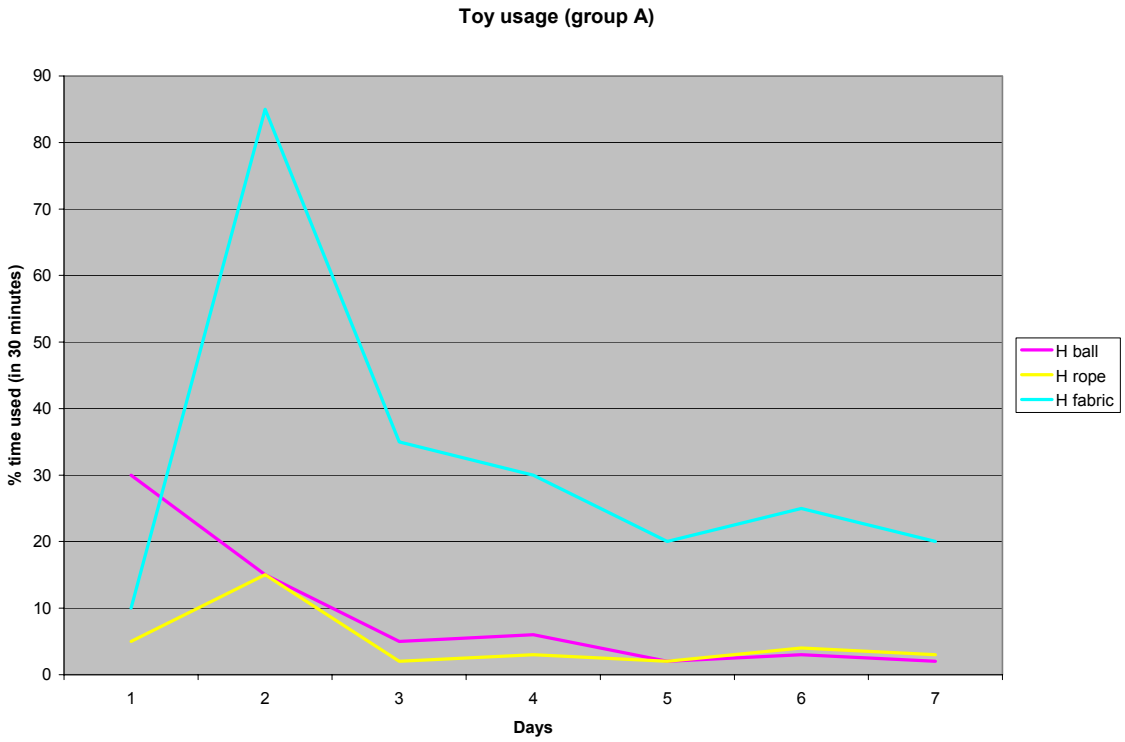
METHODS

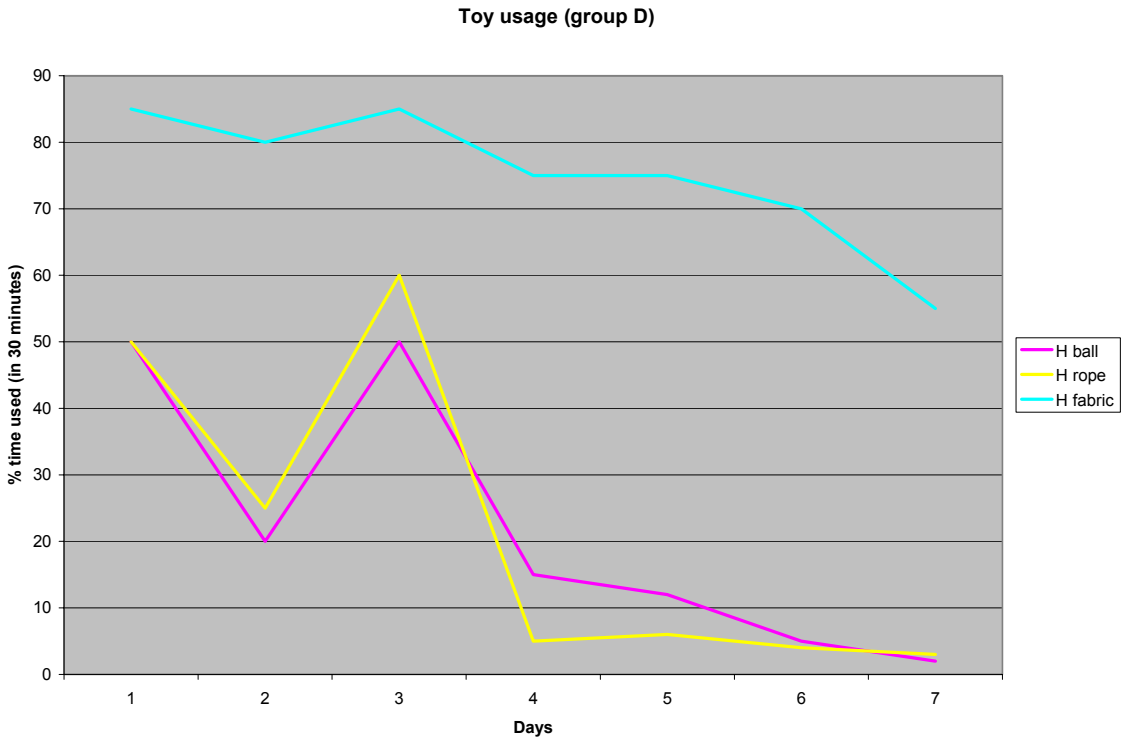
Weaned piglets in the nursery at the animal science research extension facility were observed for ten days from March 20th to March 30th. Four different groups were used; labeled A through D in the order of their pens from the door. There were 10, 11, 12, and 10 piglets in each pen, respectively. Only groups A and D were given toys, these groups were chosen because one was closest to the door and the other was furthest to account for door related activity in the data. On the first day of the study, I ensured that all piglet groups behaved similarly by kneeling next to the pen and timing how long it took for the first piglet to approach me. Initially a ball, a squeaky plastic newspaper and a hanging rubber chew rope were used as toys, but after the initial trial, these had to be changed to a hanging ball, the hanging rubber chew rope and some fabric hanging down because the toys were dragged into the dunging area. For a week, piglets were observed daily for half an hour around 5pm and the time they spent playing was reported as percentage of time observed. At the end of the study all four groups were observed for an hour and the numbers of aggressive interactions were counted per group. Behaviors counted were belly nosing, biting or chewing, pushing and tail biting.

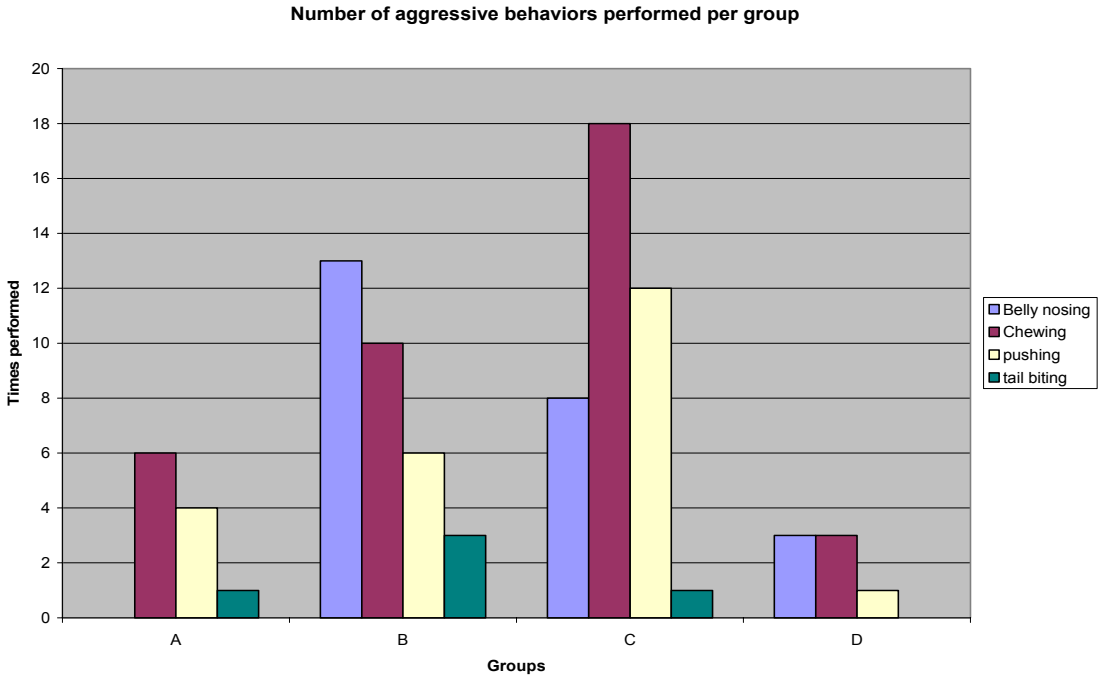
RESULTS

The initial toys did not work because, although piglets showed much interest in them, the toys ended up in manure and piglets stopped using them at that point. After hanging the toys and giving piglets a piece of curtain to chew on, I was able to graph the amount of time they spent playing with each toy. The graphs, included on page 5, show that group A generally spent less time playing than group D. Toy usage was highest for the first 2 to 3 days then declined before leveling off. In both groups, fabric was used more than the hanging chew rope and hanging ball. Group A was not very interested in the fabric on the first day. They played with it more on day 2, but then declined, on day 3. Usage then reached a plateau at 25% of the 30 minute measurement period. The hanging chew rope and ball leveled rapidly to approximately 5% of the time period. Group D had higher percentages of play time for all toys. The fabric was much higher than the other two toys, starting at about 85% and going to 55% on the last day. The hanging ball and hanging rope started at around 40% of play in 30 minutes and leveled off at 10%. Part two of the experiment was also graphed and included on page 6. In groups A and D, there were a total of 11 and 10 aggressive behaviors. The average number of

aggressive actions in piglets with toys was 10.5. Groups B and C had aggressive interaction totals of 32 and 39, respectively. The average number of aggressive behaviors in toy-deprived piglets was 35.5. The difference between piglets with toys and piglets without toys was 25 aggressive interactions in a one hour period.




Toy usage (group D)
% time used (in 30 minutes)
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
Days
H ball
H rope
H fabric


Number of aggressive behaviors performed per group
Times performed
20
18
16
14
12
10
8
6
4
2
0
A
B
C
D
Groups
Belly nosing
Chewing
pushing
tail biting

DISCUSSION

It must be noted that there were too few animals included in this study. Therefore the experiment is statistically weak. Despite the limited number of groups studied, the results clearly contrasted piglets with toys to piglets without them. The first part of the experiment showed that enrichment toys should be hanging to prevent piglets from dragging them to the dunging area because they will not play with contaminated toys. 2Piglets show more interest in new objects and will use toys more frequently right after their introduction. Amounts of time spent playing with the toys then decreased as piglets lost interest in them, but play did not completely stop. Pigs' strong drive to investigate things explains why playing time is high at first, then decreases after toys become familiar. It also seems that piglets will play for longer amounts of time with toys that they can chew on. Those toys can be made out of pieces of fabric which are cheap, but tend to rapidly disintegrate. Grandin (2006) determined that replacing the cloth strips was also important in order to maintain the pigs' interest. Grandin's (2006) research also observed that cloth strips were preferred by the pigs, which is congruent with the conclusions above.

The hanging chew rope may have been a bit too large for the piglet's mouths making it harder to grab on to and therefore less interesting to them. The pigs lost interest in the ball after it was hung. Piglets played with it the most when it was on the ground but after hanging the play time was greatly reduced. Piglets in group A may have played less than group D for several reasons; the piglets were smaller and may have been younger or simply weaker than group D; group A was closest to the door so maybe a higher level of activity placed the piglets under more stress.

The second part of my experiment showed a definite difference between piglets with toys and those without toys. Grandin's (2006) research mentions that deprived pigs were more aggressive and excitable than piglets provided with toys. Dudink (2006) agreed that enrichment decreased aggression, although their paper also suggests that aggression is not entirely stopped by toys. Over the hour observed, piglets without toys performed 25 more of the aggressive behaviors counted than piglets with toys. This is a significant difference and agrees with Dudink (2006), Grandin (2006) and my hypothesis that toys reduced aggression in weaned piglets. As I had predicted my results differed from what Hill (1998) suggested. Belly nosing and chewing were the biggest problems and both were decreased in groups with toys.

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These two behaviors are very common in weaned piglets and my research shows that toys can be an effective way to reduce them. This study should encourage further research to improve animal welfare in intensive rearing conditions

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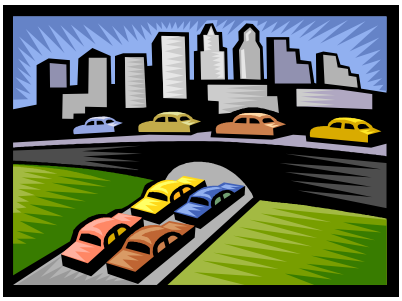


RAUL RAMIREZ
AGRIBUSINESS
THE USE OF EMINENT DOMAIN FOR THE PURPOSE OF ECONOMIC DEVELOPMENT

INTRODUCTION

Under the rights granted by the United States Constitution, any federal, state, or local authority has the right to take private property as long it is for "public use" and just compensation is paid for the property.[33] Unfortunately, the term "public use" was not clearly defined in the 5th Amendment of the United States Constitution and has opened the door for very ambiguous interpretations. Over the years, "public use" has been applied in the many ways: it has justified the removal of urban blight (Berman vs. Parker), built ditches to bring water to irrigation districts (Fallbrook Irrigation Dist. vs. Bradley), or brought in private corporations to a town to stimulate economic activity (Kelo vs. City of New London).[34] The continuous evolution of the interpretation of "public use" has created a tremendous amount of uproar from the public, but none has created more havoc than the newest interpretation: economic development.

As a result of the recent 2005 Supreme Court ruling in the case of Kelo vs. City of New London (in favor the City of New London), thirty-six states, including the State of Texas, have passed new legislation to limit local governments' eminent domain powers for economic development.[35] Unfortunately, many small rural towns in Texas may be adversely affected by this new legislation. As companies that once were the major

[33] Boadu, Frederick Dr. Agricultural Law: Rights and Limitations in Land Ownership, January 19, 2007. AGECO 344 course pack

[34] Kelo vs. City of New London. On Writ of Certiorari To The Supreme Court of Connecticut. Brief of the American Planning Association, The Connecticut Chapter of The American Planning Association, and the Congress for Community Economic Development as Amici Curiae in support of Respondents. Beekman, C., et. Al. (2005) 04-108.

[35] Lameiras, Maria. "States take action to limit eminent domain." American City and Council. 1 Jan. 2007.

source of employment and tax-revenue for rural towns relocate to other countries that offer cheaper labor, the rural city governments will in turn face many financial burdens. The rural towns and other cities that have faced or will face this threat are at a cross road between conserving private property rights and the options available to maintain the overall health and longevity of their cities.

PROBLEM STATEMENT AND OBJECTIVES

Events occurring in time are uncertain, and there may be a point in time when the local and state governments' only option left to ensure the physical and economic well-being of a city and its citizens is to pursue economic development through the use of their eminent domain power. Denying or limiting a potential remedy, as in the case of economic development, may in fact be an infringement of a citizens' inalienable right to ensure their own well-being. This paper has two main objectives. First, the paper examines the circumstances surrounding the Kelo vs. City of New London case. Secondly, this paper presents an example of how the once struggling town of Galveston, Texas has flourished due to the use of economic development and eminent domain.

ANALYSIS

a. The Supreme Court Case of Kelo vs. City of New London

Prior to the 2005 Supreme Court ruling, the City of New London had formed a private nonprofit development agency to help its local government in planning economic development and to develop a state park in the city's waterfront area. The city already had an offer from a pharmaceutical company to build a $300 million research facility near the waterfront area.[36] In addition, the city approved a comprehensive development plan, which projected to create over 1,000 jobs, aimed to increase tax and other revenues, but most importantly focused on revitalizing the economically distressed city.[37] According to the City of New London's Comprehensive Financial Report for 2003 its total net assets decreased by $1,868,741.[38] Adding to the growing disparity, the Financial Report indicated that in 2004 its total net assets decreased by $5,978,880, and its expenditures exceeded its revenues by $3,829,122.[39] In 2003 and 2004 the city had plans to build a much

[36] Susette Kelo v. the City of New London. 545 U.S. 469 (2005).
[37] Ibid
[38] City of New London 2003-2004 Comprehensive Financial Report. http://www.ci.new-london.ct.us. Visited 14 April. 2007.
[39] City, Ibid.

needed elementary school and a science magnet school but lacked the funds to do so.[40]

The development plan involved land that included the state park and about 115 private properties, was adjacent to the pharmaceutical company's facility, and had been designated for a hotel, restaurants, retail and office spaces, marinas for both recreational and commercial uses, a pedestrian riverwalk, approximately 80 new residences, a museum, and parking spaces.[41] The problem arose when the city used its eminent domain power to acquire some of the private property in the development area. Nine of the fifteen owners of the affected properties claimed that since their properties had neither been designated as blighted or in poor condition, the city had no constitutional right, under the "public use" clause of the 5th Amendment, to take their properties.[42] They argued that economic development could not be justified as a "public use."[43] Eventually, the United States Supreme Court affirmed that economic development qualified as a "public use" and allowed the city to proceed with its development plan.

After the 2005 Supreme Court ruling, the City of New London has been thriving. The new and highly controversial interpretation of "public use" has definitely shown that economic development has benefited the majority of the public in New London. In 2006, the total net assets of the city increased by $18,382,897, and its revenues exceeded its expenditures by $4,366,257.[44] Sale of properties, an increase in parking revenue especially from the redeveloped downtown and waterfront areas, and an increase in property tax and sales tax revenues have helped revive the local economy.[45] An important way in which the public has benefited from the economic development is the addition of a highly needed elementary school and a science magnet school,

[40] City, Ibid.
[41] Susette, Ibid.
[42] Ibid.

[43] Ibid.
[44] City of New London 2007 Comprehensive Financial Report. http://www.ci.new-london.ct.us. Visited 14 April 2007.
[45] Ibid.

which had been on the drawing boards for almost three years.[46] According to U.S. Census Data, the citizens of New London and the surrounding area have also seen an increase in income levels since the final court ruling.[47] Table 1 and table 2 show the increase in the income level from census data collected in 2001 and 2005.

Income - 2001	**NEW LONDON**
Median HH Income	$54,621
Per Capita Income	$23,686
Average HH Income	$61293

Income - 2005	**NEW LONDON**
Median HH Income	$59,268
Per Capita Income	$29,888
Average HH Income	unavailable

b. Economic Development in Galveston, Texas

Since the Great Storm of 1900 nearly wiped out the entire island city, Galveston's city government has struggled to find a stable source of revenue.[48] Before the Great Storm, Galveston was a booming port city where the majority of Texas' crown crop, cotton, was exported to other countries. Unfortunately, after the Great Storm hit the city, its main revenue source, the port, was moved further up north to the City of Houston. For a while, gambling operations kept the city afloat after the port was moved to Houston, but in 1957 the Texas Attorney General Will Wilson shut down gambling operations in the city. Since then, tourism has been the largest industry on the island, but its most popular tourist attraction, Moody Gardens, does not pay any *ad valorem* taxes to the local government.[49] A previous arrangement made by the city and the Moody family through their foundation has allowed the attraction to receive a continuing tax exemption. During the late nineties Galveston's city government had a $1.8 million shortfall.[50] According to the Galveston Economic Development Partnership, the city suffered unemployment rates as high as 10.5 % in the late nineties.

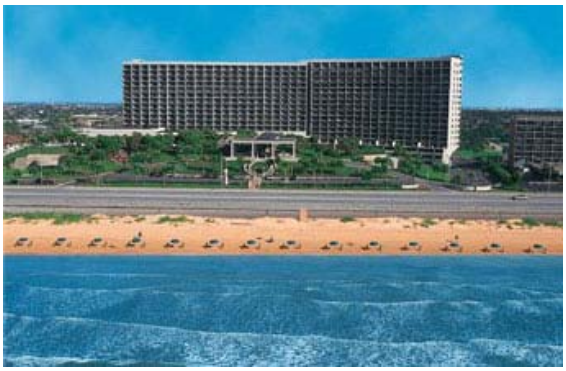
[46] Ibid.
[47] City Profile. http://census.gov Visited 14 April 2007.
[48] Published News about the CEO. http://www.landrysrestaurants.com/pages/about/pg_meettheceo.htm. Visited 14 April 2007.

[49] Ibid.

[50] Ibid.

Galveston as a whole was in bad shape until the turn of the century.[51]

It took a young enterprising developer/business man to spark new interest and economic activity in the once dilapidated city. In 2001, Tillman Fertitta, the chairman, president, and CEO of Landry's Restaurants Inc. began investing $150 million on numerous development projects along Galveston's Sea-Wall. Some of these projects included the San Louis Resort/Spa/Conference Center, numerous restaurants, shops and piers. His most recent development, the construction and management of the city's $30 million convention center, has tremendously boosted the city's tax revenue. The $30 million dollar convention center was created through a public-private partnership between Galveston's city government and Mr. Fertitta. Under this partnership, Galveston had to condemn properties on the convention center's proposed site; and Mr. Fertitta's company would pay for the construction cost of the center, but his company could only retain a management interest on the center. In other words, the City of Galveston owned the convention center, but Mr. Fertitta's company would run the center's business operations. In a 2003 New York Times article, it stated that local governments are eager to sign on with Mr. Fertitta because his brainstorms promise to bring in revenue. Landry's is the largest private employer in Galveston, and Roger Quiroga, the city's mayor, said its investments had prompted "the biggest economic boom we've seen in decades." Statements like this reaffirm the 2005 Supreme Court Decision that economic development serves a "public use" under Just Compensation clause of the Constitution's 5th Amendment.



[51] Employment Statistics. http://gedp.org visited 14 April 2007.

Mr. Fertitta's approach and recent success has lured other developers, businessmen, and entrepreneurs to the island city. A city that was once on the verge of bankruptcy now has a stable source of revenue to provide its citizens the much needed public services that they have been lacking over the years.

CONCLUSION

Eminent domain is a constitutional right that government will always have to ensure the longevity and overall health of communities, cities, states, and entire country. The "public-use" clause under the 5th Amendment of the Constitution has a broad definition for a reason: it must keep pace with the rapid and unpredictable changes occurring in this country. Time has proven that nothing is forever; people pass away, homes are destroyed, technology advances, businesses come and go, and the list goes on. As stated previously, many cases have been presented before the United State's Supreme Court challenging the definition of "public use".

Some definitions have been upheld, while others have been denied. What is important here is that there is some irony that has and will continue to occur. The irony is that none of these Supreme Court decisions, which were filed by the public, have led to a single absolute definition of the term "public use."

The analysis shows that the use of eminent domain for economic development can benefit the overall public, but it must be noted that it should be used as a last resort. Its use should never be completely outlawed, so that if governments are approaching the last resort they will at least have the power to improve their situation.

TRAVIS FINCHER
AGRICULTURAL ECONOMICS
SALMON ON THE SNAKE

INTRODUCTION

The Snake River flows through more than three different states, Wyoming, Idaho, and Washington, and the dams that dot the landscape throughout the length of the river are beneficial to the nearby citizens. They allow for a cost-effective form of electricity and they provide water for irrigation. But the dams also hurt the wildlife of the river, mainly the salmon along with other species of fish. Salmon are born in fresh water, migrate to the ocean and then swim back to fresh water, 90% of the time swimming up the exact river they were born in to spawn[52]. There are four main dams along the lower Snake River; Lower Granite, Little Goose, Lower Monumental, and Ice Harbor, that are blocking the migration path for the salmon.

[52] "Fish FAQ." Woods Hole Science Aquarium. 21 Apr 2007 <http://www.nefsc.noaa.gov/faq/fishfaq2c.html#q20>.

PROBLEM STATEMENT AND STATEMENT OF OBJECTIVE

The dams on the lower Snake River are a source of public controversy because they are lessening the numbers of salmon by inhibiting them from being able to swim up the Snake River to spawn. Even though the dams provide cheap hydroelectric power to the surrounding areas many people are upset about the impact it is having on the ecosystem. The dwindling numbers of salmon is not being helped by the fact that Canadian fishermen are fishing the salmon that swim out of the United States Rivers and into the Pacific even though those fish are protected under United States law. This issue has been causing strife between the two countries for years.[53]

This paper will summarize the cost and benefits of the dams and will show what would be best for the people around the lower Snake River as well as the salmon populations. This paper will also summarize where the most benefits to society lie, whether the most benefits are gained from the hydroelectric power provided from the dams or the salmon being able to return to their breeding grounds and the environmental gains from the lower dams either being bypassed or totally demolished.

LITERATURE REVIEW

Most of the literature written on the dams of the Snake River and the hydroelectric power that they provide always seems to come back to one central theme, the salmon. Whether the author is for the dams or against them, dealing with the issue of the endangered salmon species is paramount. In one law review the Nez Perce Indian tribe "agreed to waive in-stream reserved water rights claims for salmon throughout the Snake

[53] Schmidt Jr., Robert. INTERNATIONAL NEGOTIATIONS PARALYZED BY DOMESTIC POLITICS (1996)

River Basin"[54]. In another law review, an attorney for the Bonneville Power Administration (BPA), the federal agency that operates the four dams under fire, discusses the problems that the BPA faces because of such things as deregulation, trying to remain competitive in the energy market, and of course, trying to increase the number of salmon in the Snake River. In *Revenue Stream*, an analysis of "expenses and savings with and without the four lower snake river dams[55]" used previous studies on the river and the dams in question, some done by the U.S. Army Corps of Engineers, to compare estimates side by side of the costs and the savings that occur by keeping the dams in place and by removing them. Many news articles came out after *Revenue Stream* was published either siding with it or against. Of the news articles that sided against it said that the estimates that they used were either too high or too low providing a distorted outcome that is more favorable for the removal of the dams.

ANALYSIS/ DISCUSSION OF ISSUE

Many of the dams in the Columbian River Basin were built and are now currently run by the Bonneville Power Administration. The "BPA is a product of the Great Depression and President Franklin D. Roosevelt's 'New Deal.' A foremost New Deal policy objective was the delivery of low-cost power to a wide range of consumers, with federal water development projects serving as a 'government yardstick' by which to measure private utility rates."[56] The building of the four dams in question – Lower Granite, Little Goose, Lower Monumental, and Ice Harbor - provide not only hydroelectric power to the people in the Northwest, they also make possible barge transportation up and down the Snake River for farmers to ship crops, and help out with irrigation for farmers. The dams do have some negative effects on the river; they block the rout for the migration of salmon among other fish.

[54] Hays V, Alexander. The Nez Perce Water Rights Settlement and The Revolution In Indian Country (2006):
[55] "Revenue Stream - An Economic Analysis of the Costs and Benefits of Removing the Four Dams on the Lower Snake River." (2006)
[56] Johnson, Timothy. Coping With Change: Energy, Fish, and The Bonneville Power Administration (1996)

The power that is provided by these four Snake River dams accounts for an estimated five percent of the energy provided to the Pacific Northwest and about twelve percent of the total amount of energy the Bonneville Power Administration provides to its customers. The people for the removal of the dams state that "the RAND Corporation studied the economic impact of removing the lower Snake River dams and replacing their power with clean energy (energy efficiency and wind power). The results showed that doing so would not impede economic growth, and could create as many as 15,000 long-term jobs"[57]. "The Bonneville Power Administration estimates Northwest electricity ratepayers could pay $400 million to $550 million a year to replace the power capabilities of the four lower Snake River dams if those dams were removed."[58] The groups that are for the removal of the dams estimate the cost to consumers to be as low as sixty five cents to as high as five dollars per consumer. There are also other alternative sources of energy that could be implemented. Solar energy and wave power are two renewable sources of energy that could possibly be implemented if the dams were removed. These two forms of energy do need to be researched more for large scale operation but they could be used to create a substantial percentage of the Northwest's energy needs.

The people that are against the dams remaining in place also assess the changes that would have to be put in place to maintain the level of shipping that goes on the Snake River. Their studies have shown that converting the barge transportation to rail transportation would be economical by updating the Northwest's rail lines tough updating the rail lines to accommodate most of the grain would be a one-time cost between $17.7 and $230.6

[57] "Revenue Stream - An Economic Analysis of the Costs and Benefits of Removing the Four Dams on the Lower Snake River." (2006)
[58] Simms, Scott. "Removing Lower Snake River Dams Could Cost Northwest Ratepayers $400 Million to $550 Million Annually." US Fed News (2007)

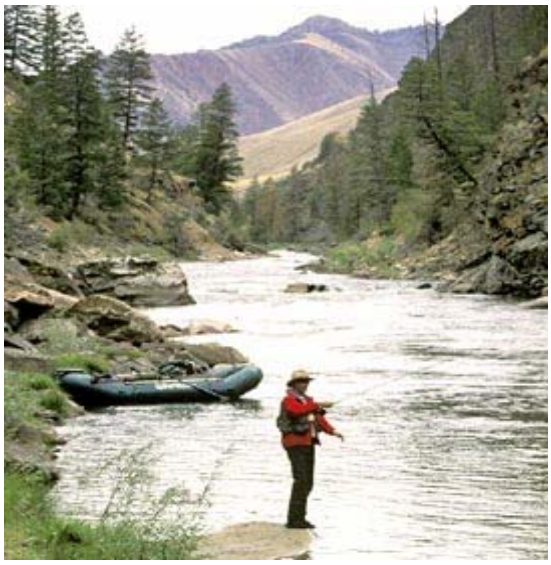
million[59]. One consulting firm "predicted that rail shipping rates will be 'fully competitive' with existing barge rates after the lower Snake River dams are removed. A Northwest transportation consulting firm estimates that annual shipping costs for all goods and commodities currently shipped down the lower Snake River will increase $7.1 million to $13.1 million per year after the removal of the lower Snake River dams. This translates into an increase of about 3 to 7 cents per bushel of grain, which comprises more than 85 percent of all Snake River barge shipments."[60]

Irrigation to farmers, a service provided by the Ice Harbor Dam, is also one of the benefits that the Snake River provides to the people in the area. *Revenue Stream* suggests that if the four dams are removed that the irrigation benefits can still be retained through different means. The Army Core of Engineer's estimation suggests that supplementing the irrigation benefits that the dam provided could be replaced by a one-time expense of $421 and included within that expense would be the "cost of constructing the pumping station and distribution system as well as its annual operation and management costs for the following 10 years." The new pumping station and distribution center would service the 13 effected farms and the 37,000 acres that they encompass"[61].

[59] "Revenue Stream - An Economic Analysis of the Costs and Benefits of Removing the Four Dams on the Lower Snake River." (2006)
[60] "Revenue Stream - An Economic Analysis of the Costs and Benefits of Removing the Four Dams on the Lower Snake River." (2006)
[61] "Revenue Stream - An Economic Analysis of the Costs and Benefits of Removing the Four Dams on the Lower Snake River." (2006)

Salmon recovery is paramount to all people involved in no matter which side of the issue that they stand on. "Federal law requires the federal government not only to prevent the extinction as described in the previous section, but also to take steps to recover salmon and steelhead to a point where they no longer need federal protection."[62] This is not a matter of people for the dams versus people for the dam removal but this is fact that the numbers of salmon need to be increased. The federal government has already started a 'recovery planning' process to try to outline recovery criteria that when implemented will help increase the salmon population while keeping the dams in place and functioning. "The Yakama Indian Nation recently estimated that these additional recovery costs could total between $1.43 billion and $2.34 billion over 10 years, or about $142 million to $234 million per year."[63] "Removing the four lower Snake River dams would decrease the Columbia River Basin-wide implementation costs for federally required recovery plans by about 45 percent, to between $95.6 million and $116 million per year. Such reductions are possible because most tributary habitat in the Snake River Basin is in good condition, and the benefits from removing the lower Snake River dams would reduce the need for expensive tributary habitat improvements in this part of the Columbia River Basin. Remaining funds could be directed to other areas of the basin, primarily Columbia River tributaries outside the Snake River Basin, in order to maximize the positive benefit of habitat restoration investments"[64]. Even if the dams are removed the recovery efforts for the salmon are not free. It would still cost a hefty price per year to see these salmon flourish again.

[62] "Revenue Stream - An Economic Analysis of the Costs and Benefits of Removing the Four Dams on the Lower Snake River." (2006)
[63] "Revenue Stream - An Economic Analysis of the Costs and Benefits of Removing the Four Dams on the Lower Snake River." (2006)
[64] "Revenue Stream - An Economic Analysis of the Costs and Benefits of Removing the Four Dams on the Lower Snake River." (2006)



CONCLUSION

In reality there is no clear cut answer as to what should happen with the dams. This is a very complex issue that will not be able to be totally settled for many years. This issue is also affected by many different variables including energy prices, regulation of energy, and alternative sources of energy that that region of the United States has not implemented yet including sources like solar energy and wave power. It seems that deciding on what would be best for the energy customers and the ecosystem depends on who you believe. People that are against keeping the dams in place say that it will not cost much to put other sources of energy into use and that the whole Northwest will be better off, the people that are for the dams say that the other side's numbers are intentionally misleading in order to make their argument is more appealing to the general public. Eventually the final answer is up to the United States law makers and what they think is best for the public while still fulfilling their duty to protect the salmon.

GENNA MEISNER
AGRICULTURAL ECONOMICS

ANALYSIS OF CURRENT U.S. SUGAR POLICY

BACKGROUND

Sugar producing nations throughout the world have consistently used government regulations and policies to protect producers and processors from unpredictable world market prices. Following this tradition, U.S. sugar production, applying to sugarcane as well as sugar beets, has been heavily regulated through the United States Department of Agriculture (USDA) beginning with the 1934 Sugar Act continuing through the 2002 farm bill. (Jurenas 1). Though the U.S. has means to support domestic production through the sugar program, the nation still imports sugar at the world market price to meet domestic needs. This may be seen in Table 1. (Sugar and Sweeteners: Data Tables).

Table 1 - World production, supply, and distribution 2006/07

Country	Beginning Stocks	Production	Imports	Total Supply	Exports	Domestic Consumption	Ending Stocks
				1,000 metric tons, raw value			
United States	1,598	7,727	2,001	11,326	181	9,449	1,696
Total North America	3,317	13,507	3,536	20,360	518	16,429	3,413
Total Caribbean	312	2,297	579	3,188	1,217	1,494	477
Total Central America	343	4,291	2	4,636	2,529	1,751	356
Total South America	1,091	38,702	982	40,775	21,598	17,616	1,561
Total Western Europe	4,269	17,046	3,173	24,488	1,509	18,042	4,937
Total Eastern Europe	2,141	5,943	5,820	13,904	863	11,005	2,036
Total Africa	3,187	8,719	6,627	18,533	3,868	11,579	3,086
Total Middle East	2,297	5,284	8,834	16,415	3,420	10,480	2,515
Total Asia, Oceania	11,988	59,377	13,264	84,629	12,176	57,641	14,812
World Total	28,945	155,166	42,817	226,928	47,698	146,037	33,193

However under the current sugar program, sugar users can only purchase a specified amount of world market price sugar; they must purchase domestically processed sugar which is held at steady support prices dictated by the 2002 farm bill of $0.18/lb for raw cane sugar and $0.229/lb for refined beet sugar. (Jurenas 3). As seen in the comparison of Table 2 and Table 4, these prices are consistently above world prices. (Sugar and Sweeteners: Data Tables). These consistent discrepancies between domestic and world market prices have caused much of the turmoil and debate that surrounds the U.S. sugar policy programs.

Table 2 - World refined sugar price (monthly and calendar and fiscal year) (Cents per pound)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Cal.	Fiscal
2002	11.88	10.80	10.81	10.09	10.28	10.02	10.23	10.33	9.68	9.72	10.16	10.25	10.35	10.59
2003	10.64	11.10	10.51	10.14	9.95	9.66	9.84	9.74	8.95	8.39	8.67	9.23	9.74	10.06
2004	9.16	9.54	10.59	11.19	10.78	10.73	11.81	11.80	11.12	11.21	11.27	11.23	10.87	10.25
2005	11.63	12.09	12.02	11.76	11.75	12.61	14.70	14.81	14.60	14.18	13.10	15.00	13.19	12.47
2006	16.92	19.99	20.45	21.35	21.81	20.93	20.95	18.16	17.32	17.92	16.41	15.86	19.01	18.35
2007	15.13	14.92	15.59											

Table 4 - U.S. raw sugar price (duty-fee paid, monthly, calendar, and fiscal year)

2006	23.61	24.05	23.10	23.56	23.48	23.32	22.44	21.38	21.27	20.22	19.66	19.59	22.14	22.62

CURRENT POLICIES

U.S. sugar policy is currently run as a no-cost program administered through USDA by means of price support loans, marketing allotments, and tariff rate quotas. Each of these components plays a significant role in maintaining high domestic sugar prices, relative to world market prices.

The non-recourse loans price support system is administered through USDA to sugar processors, compared to the producers, because of the perishable nature of sugarcane and sugar beets and the inability to keep them as collateral for a loan. (Penn 2). However in order to receive these loans, processors must compensate the producers the minimum price that is set by USDA standards. (Jurenas 3). The non-recourse loan allows processors the ability to finance their operations, including the payment to producers, for the year. (Penn 3). If a processor cannot afford the repayment of the loan, one is allowed to pay back the loan by selling it to the Commodity Credit Corporation (CCC). The loan rate is set high, $0.18/lb for raw cane sugar and $0.229/lb for refined beet sugar, in order to keep producers from forfeiting on a loan due to interest rates and thus causing the CCC's excess supply to build up. (Sugar and Sweeteners: Policy 1). The marketing allotment

is another method that supports domestic sugar prices, controls the excess supply from processors, and maintains the policy's requirement as a no-cost government program. To determine the overall allotment quantity (OAQ), the amount domestic processors are allowed to produce, the USDA subtracts 1.532 million short tons, raw value (STRV) and the ending stocks from the previous year including any stocks forfeited to the CCC from the estimated domestic consumption and probable carryover stocks at the end of the year. This number is then allocated between sugar beet producers and sugarcane producers, split 54.35% and 45.65% respectively. If there are any shortages in supply, the remaining percentage is not reallocated to the other sector but must be fulfilled by the CCC stocks; should a shortage persist afterwards, the market can be then be opened up to imports to satisfy domestic needs. (Penn 3).

The last aspect of the sugar program is the tariff-rate import quota; the quota controls the amount of imports allowed in for domestic consumption and production use. This restriction inflates world market prices received by domestic users in order to maintain the support price for domestic processors as well as reduce supply to the U.S. to meet the no-cost provision of the program. Under the World Trade Organization (WTO) rulings, the United States is required to import at least 1.256 million STRV of foreign produced sugar, which is allocated among 41 countries including a 51% and 14% allotment to Canada and Mexico respectively. The remaining amount is open to any of the other 39 countries, and any sugar that is imported above the quota is taxed at a rate of 78% in the form of a tariff. (Penn 3).

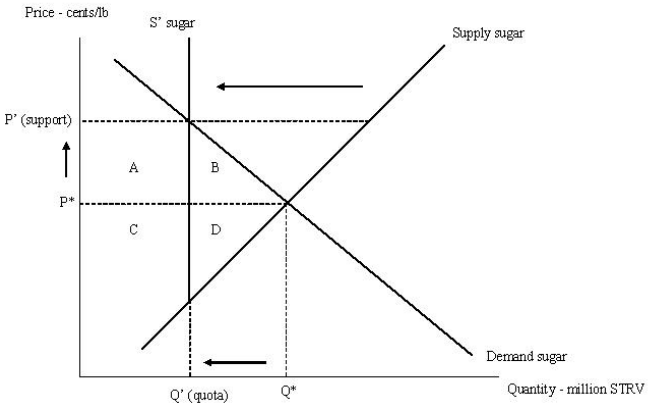
POLICY ANALYSIS

The marketing allotment policy under the sugar program is a market distorting policy; it limits the amount of sugar domestic processors are allowed to sell to the market. This mandatory program was voted on in the past by the sugar processors and continues to function under the no government cost provision of the program. The marketing quota, a means of supporting the sugar program's non-recourse loan rate through the restriction on overproduction on the processors' part, helps keep U.S. sugar prices elevated.

However, the program prohibits many producers and buyers from participating in trade by shifting supply curve to the left, as shown in Figure 1, as well as cause a rotation in the supply curve, which becomes a vertical line at Q', the maximum quantity of sugar available for sale under quota. The resulting shift restricts the true market equilibrium price, P*, and quantity, Q*, from meeting. This prohibition of trade reduces both

consumer benefits, shown by a loss of area A and B; the quota has less of an effect on producers, who lose area D but gain A. The overall impact, however, is felt by the whole society, which loses areas B and D because of the economic inefficiency of government intervention in the market.

Figure 1 – Marketing Allotment Quota Program

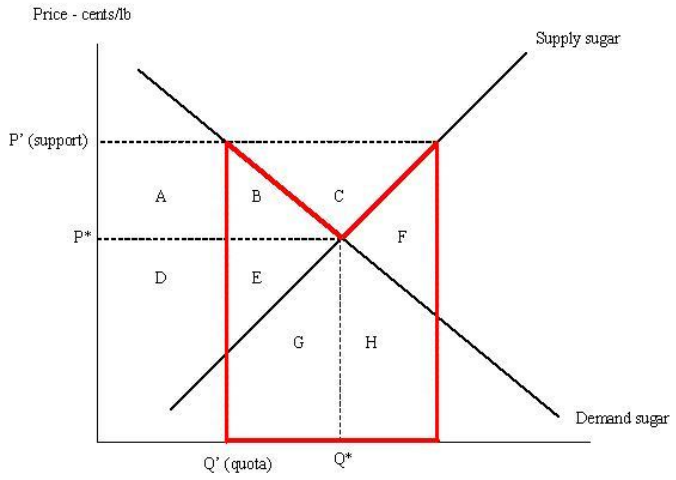


POLICY IMPLICATIONS

The marketing allotment quota policy for sugar, with its economic inefficiencies, does have benefits and drawbacks for suppliers, buyers, and society. One of the advantages of the program is that it assists in supporting the non-recourse loan rate for processors. This, in turn, allows farmers to grow sugarcane and sugar beets because a portion of the loan is passed on from the processors, maintaining a steady supply of sugar from domestic producers. (Roney 12).

Another benefit from this program is that the quota enhances and enforces the loan program. Without the quota, processors would flood the market with excess surplus in attempt to maximize profits from the support price turning the non-recourse loan system into a government surplus purchase program because the government would continue to accept the sugar crop as repayment for the loan. This would alter the policy's no-cost requirement because the government would have to accept the excess as collateral for the loan and end up paying a large cost, shown in Figure 2 represented by areas B, E, F, G, and H. American tax payers would have to assume all the costs of the program, making society as a whole worse off.

Figure 2 – Government Surplus Purchase Program



Some of the negative effects of the policy include a social welfare cost, represented in Figure 1 by areas B and D that result from the restriction of trade between domestic buyers and sellers because they are unable to trade at the true market clearing equilibrium quantity and price. These quotas affect prices as well; if the OAQ is set too conservatively, in order to obtain higher prices for processors, and USDA has been known to increase the OAQ causing prices to drop. These frequent, unintentional fluctuations in price caused by government intervention in the market are results of the policy, and they create many negative effects to the many producers and users who rely on sugar. (Goehring 4)

While the sugar program is operated at no-cost to the government and taxpayers, the program is not truly cost-free. The costs of the programs are passed on to domestic consumers through higher product prices and create net society losses experienced by all as well. However, the debate between sugar processors and users will continue, especially as the time for Congress to draft and vote on the 2007 Farm Bill draws closer.

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GOVERNMENT POLICIES AND ETHANOL

INTRODUCTION

Ethyl alcohol, or ethanol, is a fuel source created through the fermentation and distillation of simple sugars. There are two production methods for ethanol, and they consist of wet milling and dry milling. The largest degree of difference between the two methods is the initial treatment of the grain (McCormick). Regardless of the production process chosen, the end result is a viable alternative to fossil fuels created from simple starches such as corn. With growing emphasis placed upon establishing U.S. independence from imported oils, the corn-derived "moonshine" fuel is gaining momentum on a federal level.

BACKGROUND

Stemming from the chaos created by the oil embargo of the early 1970's, the American government has been determined to find alternative sources of energy. In response to the wrenching effect of a strictly limited petroleum supply to the American public, the federal government began to encourage organized research, development, and production of ethanol as a substitute fuel. By 1980, United States Ethanol plants were producing as much as 175 million gallons in one year. In the modern market, OPEC price setting, limitations on drilling practices, and a heightened awareness of the irreversible environmental impacts of traditional fossil fuels has revived the once-forgotten movement toward ethanol.

As recently as 2005, 81 fully operational ethanol plants across the United States were producing 3.9 billion gallons of ethanol per year (Renewable Fuels Association).

Year	Millions of Gallons	Year	Millions of Gallons	Year	Number of Plants
1980	175	1996	1,100	2000	54
1982	350	1998	1,400	2001	56
1984	430	2000	1,6350	2002	61
1986	710	2001	1,770	2003	68
1988	845	2002	2,130	2004	72
1990	900	2003	2,800	2005	81
1992	1,100	2004	3,400	2006	95
1994	1,350	2005	3,904		

DESCRIPTION OF CURRENT POLICIES

The underlying motivation for government involvement in the ethanol market consists of two main goals: expand ethanol production and expand ethanol consumption. The employment of ethanol as an alternative fuel source has the potential to be a three-fold benison to the United States. If ethanol is slowly phased into use over the next six years, as is proposed in current policy, it would mean eventual American independence from imported oil at inflated prices, cleaner burning fuel with fewer negative environmental impacts, and the elimination of an annual excess supply of corn as a result of government subsidy programs designed to support the market price of corn nationwide. Unfortunately, the propitious characteristics of ethanol implementation cannot be realized in the free market. The number one incentive for ethanol is the replacement of gasoline as a fuel. However, if the price of ethanol cannot be competitive with that of gasoline, it would be nearly impossible to persuade consumers to brave the switching costs and make the transition to a more expensive substitute to gasoline on environmental benefits alone. For this reason, the United States government has developed and implemented three key policies to ensure the adoption of ethanol by the American public.

The three policies vital to the success of ethanol in a profit driven, price discriminatory market are the credit offset for refiners/blenders, the additional tax credit for small ethanol producers, and the minimum usage quotas set into place by the Bush administration through the Energy Policy Act of 2005. The credit-offset policy is a simple tax refund to ethanol refiners/blenders of 51 cents per gallon of ethanol blended with gasoline. Small ethanol producers/blenders are eligible for an additional government income tax credit of ten

cents per gallon for up to 15 million gallons of annual production (Slater). The third policy relating to ethanol is aimed at expanding the current demand in response to the increase in supply created by the tax refunds and small producer tax credits (DiPardo). Under the Energy Policy Act, the federal government created a renewable fuel standard aimed to increase the domestic consumption of ethanol from four billion gallons in 2006 to more than 7.5 billion gallons by 2012. By the year 2017, the renewable fuels standard proposes a 15 percent displacement of current annual gasoline consumption with 35 billion gallons of renewable and alternative fuels in the form of ethanol: both cellulosic and corn-derived (Slater). The underlying motive of the Energy Policy Act is to expand demand through mandatory minimum usage quotas for the United States.

POLICY ANALYSIS

In contrast to the refining of traditional petroleum products, the refining/blending of ethanol fuel is comparatively in its infancy. As it is a fledgling industry, it is not yet operating at maximum operational efficiency or economies of scale to take advantage of the lowest possible cost of production. Much like any other business in the United States, ethanol production is a profit-driven industry that must pass on the costs of production/input to the end consumer. With the government implementation of a tax refund for refiners, federal policy will shift the supply of ethanol outward and likewise expand current demand with lower prices for ethanol as a result of the producer tax refund of $.51 per gallon (see figure 5). By reducing the overall cost of refining for producers, the federal government is able to reduce the market price to consumers to induce greater demand for ethanol. Despite its eco-friendly image, the number one determinant, with regards to demand, is price. In order to more effectively facilitate the transition to ethanol on a national level, federal policy has been designed and implemented to reduce the cost of production to producers through a tax refund, thereby reducing the end cost to the consumer and distorting the market price of ethanol to be competitive with that of gasoline (figure 6)(Miller).

The small producer tax credit is aimed toward creating a more competitive market in terms of ethanol production. Currently, it is an industry with high barriers to entry as start up costs can range from 300 to 650 million dollars per plant. The top ten producers in the U.S. account for 50% of the current 2006 output (see table 2). These leading producers have the first mover advantage over later entrants into the market. As a result of this advantage, they have the ability to operate at much more efficient economies of scale than late-

entrance start up refineries with a much more disadvantageous position on the learning curve (see figure 7). To prevent an oligopoly, high prices to consumers, and limited supply, federal policy has been lent to assist small producers/blenders to increase the number of players in the ethanol refining market and fuel more competitive pricing for the end consumer.

Currently, the demand for gasoline is relatively inelastic. Aside from carpooling to work, bicycling, or using public transportation, the consumption of gasoline by the average American is a necessity. Ethanol is the latest and most viable alternative to gasoline and it has many positive attributes which scientists and environmentalists alike hold with high reverence (Wisner). However, the consumer is driven by price. Despite its positive reputation with special interest groups, government, and the mass media, cost will be the ultimate determinant in ethanol's success or failure. The underlying motive for all three federal policies relating to ethanol production is to lower the cost to the end consumer and expand both the demand and supply. The tax refund to all refiners/blenders cuts the cost of ethanol production by $.51 per gallon and thereby reduces the overhead cost that must be passed on to consumers (Slater). The small producer credit will encourage new producers to enter into the industry, increase the overall quantity supplied of ethanol, and reduce the overall cost at the pump through greater competition and a transition away from a producer/blender oligopoly. President Bush's Energy Policy Act of 2005 is the final step in ensuring the short run success of renewable fuels by mandating an annually increasing minimum usage quota over the next 10 to 15 years (Yacobucci).

POLICY IMPLICATIONS

As with any federal policy, there are both positive and negative aspects to ethanol-related policies. In terms of positive effects of ethanol policy implementation, the current and proposed federal policies are designed to decrease production costs, increase supply, increase demand, and lower the overall cost of ethanol to the end consumer. The three key ethanol policies are essential in the transition to alternative fuels, and they will have a positive impact in terms of further renewable energy development, eco-friendly fuel consumption, government involvement to help regulate price/production, and offering a viable substitute to gasoline.

The implementation of federal policy to help to expand the ethanol market is evidence that government involvement to regulate production levels and price will be beneficial to everyone in the ethanol market. Unlike traditional fossil fuels, whose key players are limited to only a few firms with a high capacity to

set prices and withhold supply in the face of low market prices, ethanol is a fuel overseen by the government and subsidized to be less expensive to produce and more affordable for consumers. Continued government involvement in the ethanol market is a positive sign to consumers that ethanol prices will not be set at outrageous levels as long as federal policy assists producers with refining costs and continues to encourage more players to enter into the production sector. Ethanol is a viable replacement for traditional gasoline and diesel consumption, and it is much less harmful to the environment. In recent years, Americans have become much more aware of the negative impacts of many aspects of daily life, and by encouraging ethanol production and consumption, the federal government is doing something to help preserve the environment.

Unfortunately, for all of its positive effects, there are some downsides to ethanol consumption and the relating federal policies. With the transition to more ethanol and less gasoline come high switching costs and time limitations. No matter how efficient, cheap, or beneficial the use of ethanol eventually becomes to the average American, he or she will be faced with the cost of switching to ethanol powered automobiles with special engines before the full benefits of ethanol can be realized. Time will be a major factor in terms of infrastructure reorganization. Gasoline has been a cornerstone in American life for many years, but the current distribution practices for gasoline will not suffice for ethanol. Ethanol is water-based and cannot be sent through pipelines like gasoline (McCormick). As well, ethanol will require a remodeling of the retail sector to replace gasoline storage tanks and traditional gasoline pumping mechanisms.

Ethanol policies designed to increase production levels will have a distorting effect upon the American corn market. As the production levels of ethanol increase, the price of corn as an input increases, which leads farmers to attempt to increase corn production levels (see figure 1). As production levels increase at a slower rate than the outwards shifts in demand for raw corn, the price of corn will continue to increase. In the face of higher costs of production, livestock producers will decrease output and increase the cost of livestock products to the end consumer (see figure 2). As well, as more corn is demanded on the domestic market for ethanol production, U.S. export quantities will decrease and open a void in international corn levels that could be filled by foreign countries able to profit from a decrease in American export output (figure 3)(Lilliston). Lastly, in terms of corn market distortion resulting from ethanol policies, farmland in the Midwest region will see a large jump in price levels. The supply of farmland is relatively inelastic, and as farmers seek to increase production levels to take advantage of higher market prices, the demand for farmland in the Corn Belt will shift outward,

and the percent change in the price of farmland will greatly outweigh the percent change in the quantity of farmland supplied (see figure 4).

CONCLUSION

The eventual success of ethanol in the American market is dependent upon consumer demand. Currently, consumer demand for ethanol is a direct result of price and its positive characteristics in helping to preserve the environment. Without government involvement to help reduce production costs, increase demand, and entice more players into the production sector, ethanol would not be competitive enough to sway the American public to make the transition away from traditional fossil fuels. By offering tax refunds to all refiners/blenders, providing additional credits for small producers, and mandating minimum federal usage levels, federal ethanol policy has shaped outward shifting demand and supply curves for ethanol that will keep the price relatively constant and allow the United States to reap the benefits of renewable energy (figure 5). Ethanol related policies stem from the consumers reaction to price. In order to lower price, the government must absorb some of the costs of production. Thus, ethanol policies have a negative government cost, and the taxpayers are partially funding ethanol production. However, the overall positive net society effects, as ethanol will further independence from petroleum imports and strengthen renewable energy production, outweigh the negative effects of infrastructure reorganization, switching costs, and corn market distortion to justify the implementation and continuance of federal ethanol policies.

Figure One: Corn Supply/Demand Levels

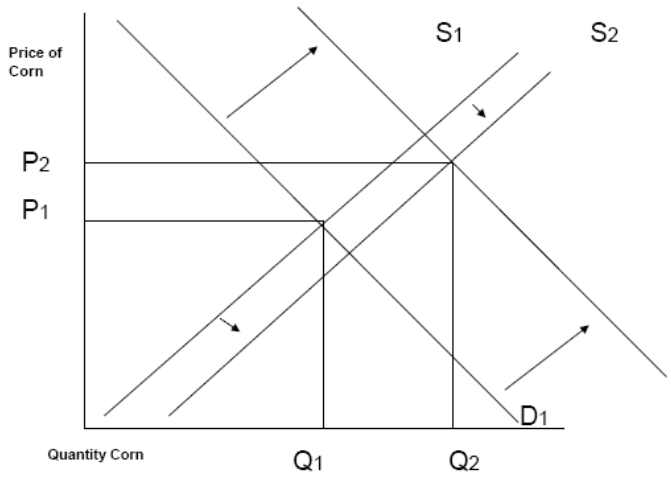

Figure Two: Corn as Livestock Feed

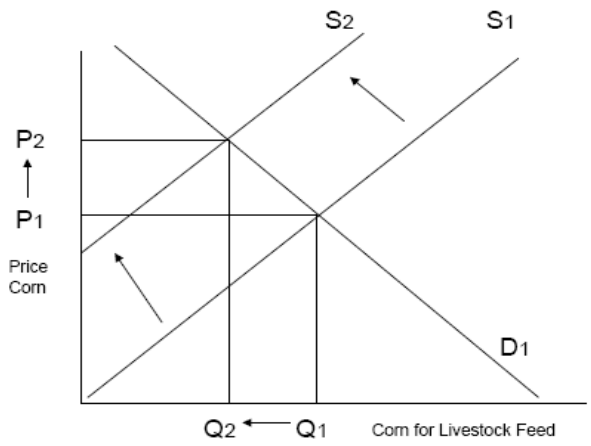

Figure Three: Corn Export Levels and Price

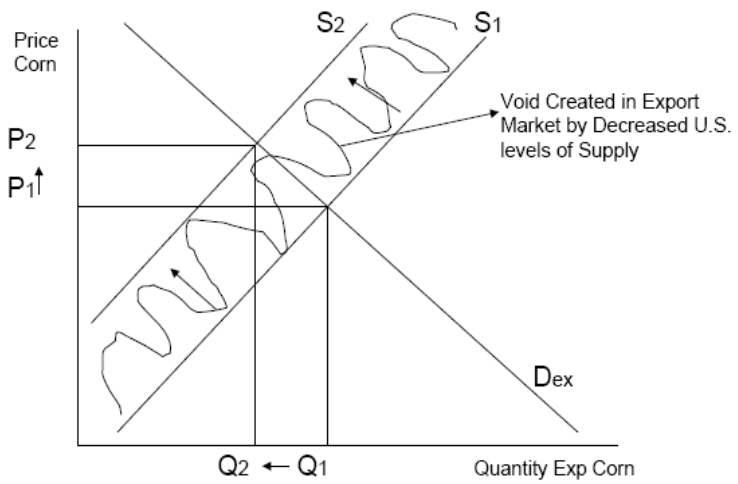

Figure Four: Midwest Farmland

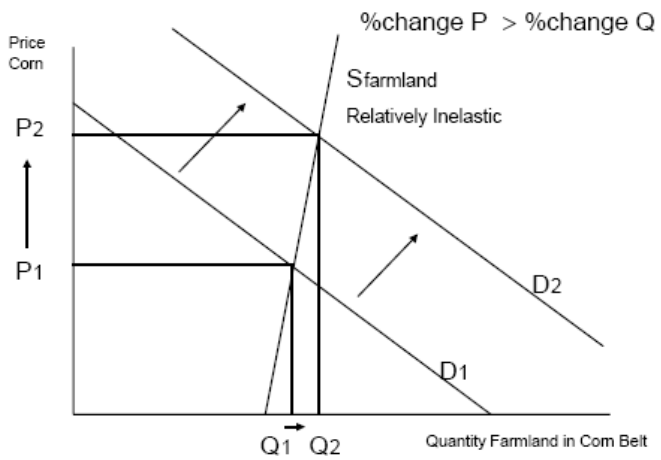

Figure Five: Ethanol Supply/Demand

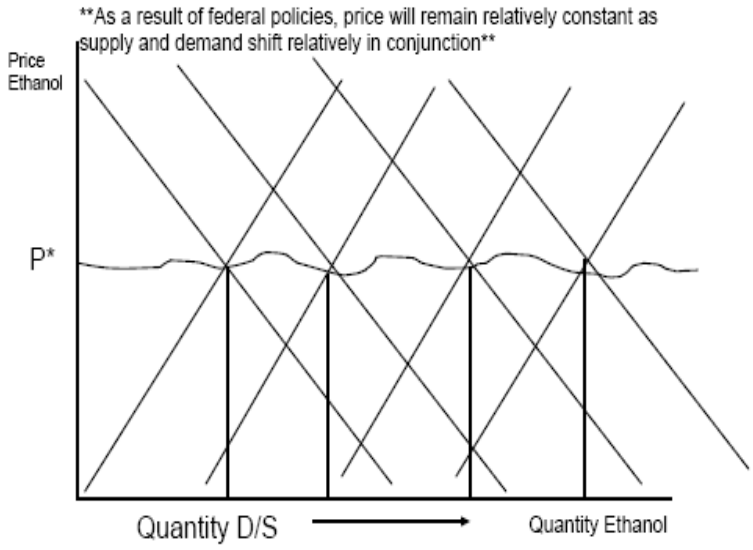

Figure Six: Ethanol Production Economies: of Scale

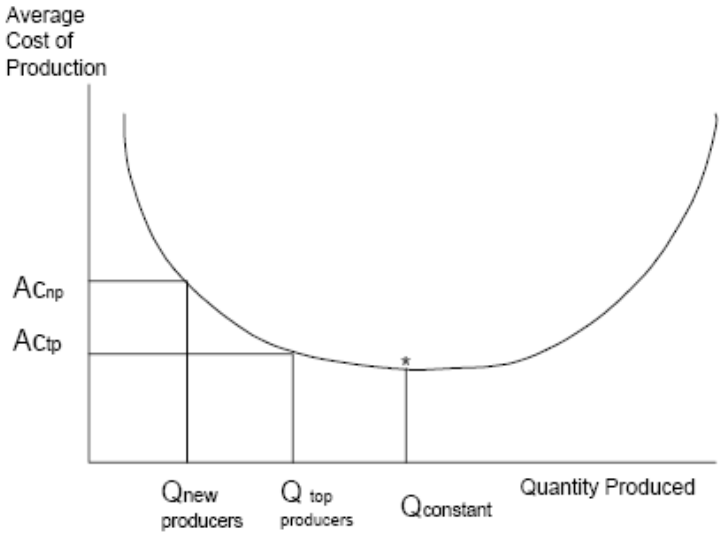

Figure Seven: Ethanol Production: Learning Curve

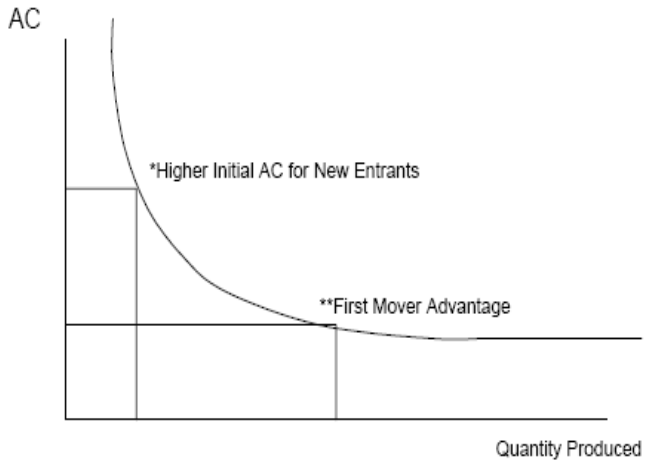

Table 2: Top 10 Ethanol Producers by Capacity, 2007 Forecast (existing production capacity – million gallons per year)

Archer Daniels Midland (ADM)	1070
U.S. BioEnergy Corporation	250
VeraSun Energy Corporation	230
Hawkeye Renewables	225
Aventine Renewable Energy	207
Cargill	120
Abenoga Bioenergy Corporation	110
New Energy Corporation	102
Midwest Grain Processors	95
MGP Ingredients, Incorporated	78
All Others	2956
Total	5443

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ROLE OF CONSUMERS IN FOOD SAFETY REGULATION

INTRODUCTION

The role of the government, industry, and private citizens in promoting public health issues regarding food safety is very important to society. In the United States, food safety regulation is the responsibility of the Food and Drug Administration (FDA), United States Department of Agriculture/Federal Safety and Inspection Service (USDA/FSIS), Center for Disease Control and Prevention (CDC), Department of Human Health Services (DHHS), and the Environmental Protection Agency (EPA), along with many other government organizations. Each government entity has a specific role in carrying out food safety, quality, and defense. As one of the most effective defense systems in the world, the U.S. government is responsible for establishing safety standards, enforcement, inspection and monitoring, tracking problems, and protecting America's food supply (IFIC, 2006).

Private industries, which include manufacturers, distributors, and retailers, also play a vital role in promoting food safety. Properly training employees, emphasizing sanitary necessity, strictly enforcing rules set by the government, being aware and prepared for emergency situations such as recalls, and educating the public about safe food handling are the main responsibilities of private industries. There are many groups and organizations involved with these industries to assist in ensuring a safe food supply. A few of these well known organizations consist of the Beef Industry Food Safety Council (BIFSCO), the National Restaurant Association (NRA), and the American Association of Meat Processors (AAMP).

Consumers, or private citizens, are equally responsible in protecting the food supply. The main role of private citizens is to practice safe and sanitary handling, preparation, and storage of food on a regular basis, be aware of potential hazards regarding food, and inform emergency personnel when severe illnesses occur. This will be discussed in further detail later in this paper.

Living in a democratic society, promoting public health is a shared responsibility between the government, private industries, and private citizens. Why is it so important to promote public health? Everyday, somewhere around the world, it happens. Someone is infected, gets sick, or dies from a foodborne illness, most commonly referred to as food poisoning. In the United States alone, about 76 million cases of foodborne disease occur annually, which result in about 5,000 deaths and 325,000 hospitalizations (CDC).

FOODBORNE DISEASE

Foodborne disease is any illness that results from consuming contaminated food (Wikipedia). This mainly pertains to contaminated or undercooked meat or poultry, and some contaminated beverages, such as raw milk.

Because humans live in such a microbial world, there are numerous opportunities for food and beverages to become contaminated as it is produced and prepared (CDC). Foodborne infections most commonly recognized are caused by the bacteria Campylobacter, E. coli O157:H7, and Salmonella (CDC). Ironically, the most frequently diagnosed foodborne illness, Campylobacter, rarely makes the news (Hingley, 1999). Why is this? In an FDA Consumer Magazine, Audrey Hingley states that this particular bacterium is rarely associated with outbreaks because its infections are more sporadic (1999). It is known, however that this bacterium causes up to 4 million human infections per year (Hingley, 1999). Campylobacter can usually be found in the intestinal tracts of animals and humans without causing any illness (Hingley, 1999). It may be transmitted through the consumption of undercooked meat or poultry, or drinking raw milk or contaminated water. Hingley also states that while most people infected with these bacteria can get well on their own, it is the children and the elderly that are particularly at risk, due to their weakened immune systems (1999). She explains even further that Campylobacter can also be associated with the Gillian-Barre Syndrome, an autoimmune attack on the peripheral nerves that can cause weakness and paralysis, occurs in about 2 out of 100,000 people (1999).

E. coli O157:H7 in spinach, apple juice, or alfalfa sprouts, and Salmonella on poultry and in eggs most frequently make the headlines because they are more associated with outbreaks. E. coli O157:H7 is a pathogen that lives in cattle and other similar animals (CDC). It is typically passed to humans by consuming contaminated food or water with microscopic amounts of cow feces (CDC). This particular pathogen can cause hemolytic uremic syndrome (HUS) which has severe complications, including temporary anemia, profuse bleeding, and kidney failure (CDC). Salmonella, on the other hand, is spread through the intestines of reptiles, birds, and mammals. This infection can cause life-threatening infections in persons with weakened immune systems because it invades the bloodstream (CDC). See Table 1 for more foodborne illnesses, along with where it is found, how it is transmitted, and what symptoms may occur.

PROBLEM STATEMENT AND OBJECTIVES

After looking at the importance of promoting public health and food safety, one can see that the government and food production industries are well known for being increasingly active in protecting America's food supply. It is important to realize that consumers also play a vital role in promoting food safety regulations, but their contributions to society tend to get overlooked. The problem is that very little information is available about the role of private citizens regarding food safety regulations.

Private citizens typically associated with advocacy groups, can make a huge impact in promoting public health and food safety to prevent foodborne illness. The objective of this paper is to examine the role of private citizens in promoting and enforcing food safety regulations by defining citizen participation.

To define the nature of citizen participation, one can look at the Administrative Procedures Act (APA), which outlines how private citizens can participate in regulation. Jill Nylander states that the purpose of the APA is to control how U.S. administrative agencies formulate regulations and "delineates the standard for judicial review of agency hearing decisions" (2006). She then explains that "generally, if an agency seeks to create, amend, or eliminate a rule, it must engage in the rulemaking process prescribed by the APA" (2006). Private or non-profit organizations are included in these regulations. The APA also ensures that the public has the opportunity to participate in the revision and formulation of government regulations. Because of this act, citizens have the right and ability to form advocacy groups and create or revise current regulations that they feel is in the best interest of society. What about the producers? What incentives do they have to keep the food

supply safe and strictly follow regulations put in place by the government? It is important to examine how foodborne illness is handled under U.S. product liability law, in order to understand what citizens can do to defend them selves and ensure all food producers maintain the highest level of food safety. There are a variety of incentives in place for producers to reduce pathogen contamination to safe levels, with this law being the main one. In an Agricultural Economic Report, Jean Buzby et al. explains that "product liability law specifies the exact circumstances under which firms are held liable for injuries or deaths due to contaminated food products, shifting some economic costs of foodborne illness from consumers to the firms responsible for causing illness (2001). Buzby et al. also explains the importance of the plaintiff to identify the specific food contaminate in order to receive maximum compensation (2001). Table 4 shows the differences in compensation amounts if the plaintiff can prove the specific food item that made them ill. There have been many court cases involving issues of food safety and foodborne illness. The USDA analyzed court cases alleging liability for propagating foodborne illness, and found that of these cases, plaintiffs won 30% of the time, the average damage award amount is $133,000(with a range of $2,256 to $2.4 million, and the average time to resolve and action is 3.1 years (Sensitech, 2006). This study also looked at the food items around which suits were filed, and table 2 shows the percentages of the different food items filed as lawsuits (Sensitech, 2006). Table 3 shows the defendant company type and its corresponding percentages of lawsuits filed (Sensitech, 2006). The following are some examples of court cases involving foodborne illnesses that changed the method of regulating food safety all over the world.

A very popular court case involving Jack in the Box and Foodmaker, Inc consisted of an E.Coli outbreak where more than 600 people became ill, and 4 children died (Clark, M). One young child, a nine-year-old Seattle girl, was in a coma 42 days and finally recovered, winning a %15.6 million settlement from the company (Clark, M). This "widely-publicized outbreak and litigation led to widespread changes in food-safety practices at restaurants across the country" (Clark, M).

Another case involves Chili's Grill and Bar in the Chicago suburb of Vernon Hills, Illinois. The restaurant continued to operate even after the kitchen lost its fresh water supply and the dishwashing sanitizer broke (Clark, M). In this case, nearly 50 citizens were represented for salmonella poisoning in 2003, and each received "substantial settlements" (Clark, M).

This next case involves the Finley School District when an E.Coli breakout sickened 11 children after

coming into contact with undercooked ground beef served at lunch at Finley Elementary School (Salvage, 2001). The Finley School District was held 100% liable and had "to pay the victims and their families $4.75 million in damages as compensation for past and future medical expenses and pain and suffering" (Salvage, 2001).

Most cases involving foodborne illness are brought using strict liability (product liability), because all that has to be proven is that there are damages and the product in question was the source of the damages. One does not have to prove there was negligence on the company's part. This type of regulation gives producers incentives to ensure the highest level of safety is obtained.

LITERATURE REVIEW

Michael Taylor wrote an article in the Food and Drug Law Journal which stated that "public confidence" is important because doubts about food safety can "skew food choices in ways that are detrimental to public health" (1997). For example, "a person who avoids consumption of fruits and vegetables due to general concern about the safety of pesticide residues is making an unhealthy food choice" (Taylor, 1997). He further commented that

> "Most Americans have a relatively high degree of confidence in the safety of the food supply, based presumably on a combination of experience and the assumption and belief that there is a system in place for ensuring that food is safe. People react strongly, however, when a food safety problem strikes home or when the system itself seems to have failed. Such real or perceived failures in the food safety system capture media attention, which in turn heavily influences public opinion and reaction (Taylor 1997)."

This opinion of the public is what makes them react so harshly towards the government, claiming that government organizations are not doing everything necessary to ensure a safe food supply. This will now lead to the analysis of the situation.

ANALYSIS

As stated previously, consumers have important food safety responsibilities. Along with practicing safe handling, storage, and cooking practices, citizens must also have access to food safety information and should use a credible source to make informed decisions about everyday eating habits. This is not the only way

consumers contribute to promoting food safety.

It is very common and natural in today's society for consumers to automatically place the blame on the government for not strictly enforcing effective regulations to keep the food supply safe in order to prevent foodborne illness. Is it really the government's fault, or should producers and consumers also be responsible for the frequent illnesses that occur? There is a huge misconception about the reason for the frequent occurrence of foodborne illness in the United States.

U.S. policy-making must be conducted on the record, with a publicly accessible docket, under laws such as the federal Administrative Procedure Act (Public Citizen 2000). Public access to information and decision-making is also guaranteed in U.S. domestic law by the Freedom of Information Act, the Government in the Sunshine Act and the Federal Advisory Committee Act (FACA) (Public Citizen 2000). Before new or revised regulations are made, the APA has an open forum for public discussion, which allows citizens to get involved and speak their opinions about the regulations presented.

So how can citizens place the blame on government organizations, when in reality, consumers have the opportunity to change the regulations as needed? There is no excuse for such implications that the government is solely responsible. This is where food advocacy groups come in to play. Food advocacy groups are very important participants in providing new food safety regulations, educating consumers about proper food handling, and defending consumers from legal issues regarding foodborne illnesses. Table 5 gives a list of some of the advocacy groups involved in food safety, just to give a little perspective as to how many groups there are.

As one of the nations top consumer advocates, the Center for Science in the Public Interest (CSPI), "has long sought to educate the public, advocate government policies that are consistent with scientific evidence on health and environmental issues, and counter industry's powerful influence on public opinion and public policies (CSPI online). CSPI's accomplishments include "leading the efforts to win passage of laws that require Nutrition Facts on packaged foods (and, later, to include trans-fat on those labels), define the term "organic" for foods, and put warning notices on alcoholic beverages.

CSPI also conducted eye-popping studies on the nutritional quality of restaurant meals and movie theater popcorn, helped to increase funding for the government's food safety inspections and nutrition and physical activity programs, and spurred new policies in some cities and states to remove soda and junk foods from schools" (CSPI).

Why is the role of advocacy groups and private citizens so important? When problems in the food supply occur, it is up to citizens to report these mishaps to the government. Private citizens cannot expect government agencies to visit every food producing company to ensure regulations are being enforced. There is a heavy reliance on public participation to see when laws are being broken and inform the necessary personnel. Food advocacy groups unite thousands of ordinary citizens into one powerful voice that can be heard in every public arena: the media, the marketplace, the courts, and the state and national governments.

CONCLUSION

In conclusion, it is important for consumers to understand that it is not only the government's and producer's responsibilities to provide a safe food supply. Consumers also play a vital role by being involved with food advocacy groups to make sure the highest standard of regulations are in place to protect the food supply and prevent foodborne illness. Instead of blaming government when outbreaks occur, one should look at the laws in place and do everything necessary to amend regulations not being strictly enforced. If this can be accomplished, the occurrence of foodborne illness could slowly decline and truly make America a safer place.

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MELISSA CAMPBELL

AGRIBUSINESS
MILK POLICY

INTRODUCTION

The United States produces many agricultural commodities. One of the most versatile and widely used products is milk. Milk has many influential policy programs. Although the effects of current dairy policies lack the ability to sustain long term change, this industry is highly profitable. In 2004, milk sales exceeded $27.4 billion and were accredited with 11.4 percent of total agricultural cash receipts (Miller 7). Milk has production valued second only to beef and equal to that of corn (see Appendix B). In the following paper, such topics as current dairy programs, their economic effects and specific aspects will be discussed.

BACKGROUND

The United States dairy industry has undergone many changes. There are approximately 1,081 dairy product manufacturing plants across the country (Geisler 1). These plants are often proprietary or cooperatively owned, and are usually located near each packaging plants (Hoskin 2). Due to milk's quick-perishing nature, it is considered a flow product and must be sent to market at least every other day.

Milk is divided in to four main classes. The primary products and base prices for each class (as of March 2007) are: Class I, beverage-fluid milk, $10.50 per hundred weight (cwt); Class II, frozen products, $9.69 per cwt for skim milk and $1.08 per pound for non-fat solids ; Class III, cheeses, $10.50 per cwt; and

Class IV, butter and powdered milk, $8.99 for skim milk (see Appendix A). Total per capita fluid milk consumption has decreased the past twenty years. Such things as a decline in the number of children, eating more meals away from home and competition with other beverages are accredited with causing this (Hoskin 2). In 2005, $147 billion dollars was spent on milk advertising campaigns, compared to the $808 million on carbonated beverages (Geisler 2). However, cheese consumption per person has double over the past twenty five years. The value added products of cheese now consumes over half the milk supply (see Appendix A).

Ten states account for over 70 percent of all milk supplied. They are, respectively: California, Wisconsin, New York, Pennsylvania, Minnesota, Idaho, Texas, Michigan, Washington, and New Mexico. The West and Southwest regions of the United States offer such amenities as less expensive land, favorable climates, inexpensive hired labor, and the availability of high-quality but low-cost feed (USDA 5). These factors give this area a comparative advantage and contributed to the westward shift of the dairy industry (USDA 5).

In 2005, the United States over all produced nearly 177 billion pounds of milk (Geisler 1). Of that, only 30 percent contributed to basic fluid milk sales. Holstein cows tend to be used most frequently in milk production, as they yield more milk per cow, compared to other breeds (Hoskin 1). Due to technological advances, milk yield per cow has increased at a rate of 2.1 percent per year (compared to corn, which is only 1.8 percent) (USDA 4). This, along with increasing economies of scale, has led to a decline in the quantity of milk inputs. Over the past twenty years, the number of dairy farms has decreased by 75 percent and the number of cows per farm has decreased by nearly 25 percent (see Appendices B, C, D, and E). As small farms are decreasing in number, the heard size at the remaining dairies has nearly tripled between 1980 and 2003 (USDA 4).

CURRENT POLICIES

Due to the intensive demands of running a dairy, these farmers are less likely to generate off-farm income. This causes dairy farms to rely on stable prices and markets which are often dictated by government programs. Dairy policies currently in existence include: price supports, marketing regulations that set minimums prices, and direct payments.

Although the first dairy policies were enacted in the 1930's, the current policies still seem to work in a well integrated fashion (see Appendix E). The Federal Milk Marketing Order (FMMO), which created a marketing environment that benefits milk consumers and producers, was first enacted by the Agricultural Marketing Agreement Act of 1937 (Hoskin 1). FMMOs established a minimum price the initial milk handler must pay for milk to be sold to them (USDA 38). However, as the dairy market has expanded, FMMOs have experienced a lot of change. With the Federal Agricultural Improvement and Reform Act of 1996, FMMOs were reduced to ten, large orders, reflecting the natural boundaries in milk production regions (USDA 41).

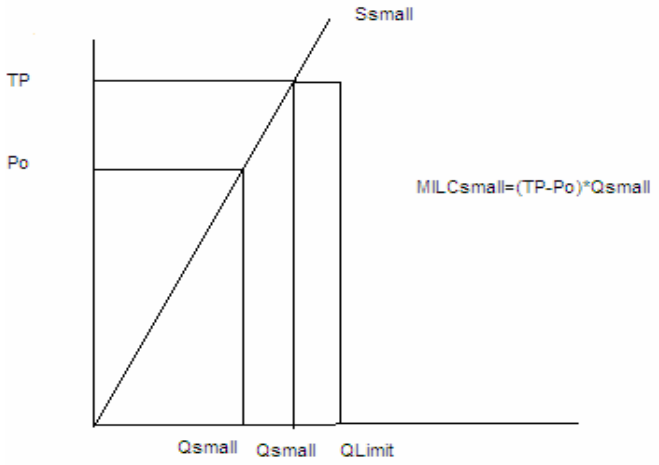
Although there are currently no dairy supply management programs, there are support price programs. One of the supply purchase programs is through the Commodity Credit Corporation (CCC) (Hoskin 1). It was started with the Agricultural Act of 1949, but has only been slightly modified since (USDA 43). The CCC purchases excess manufactured grade dairy products. The Farm Security and Rural Investment Act of 2002 (2002 Farm Bill), sets the support price at $9.90 per cwt, which will be in effect until 2007. The 2002 Farm Bill also began a direct countercyclical payment to producers and includes a schedule for eliminating the purchase support program (Hoskin 1).

The Milk Income Loss Contract (MILC), a coupled direct payment program, was established by the 2002 Farm Bill. Although it is an output-limited payment, it tends to adjust to variations in dairy operation sizes. However this tends to expand production, thus reducing price. The direct payments administered by MILC help to offset the impact of the FMMOs for smaller producers outside of a FMMO region. It has been estimated that federal dairy policies only increase milk commodity prices by one percent (see Appendices G and H). Although this is good for consumers, farm revenue in the long run is believed to increase by only three percent, even after market returns and government payments (USDA 5).

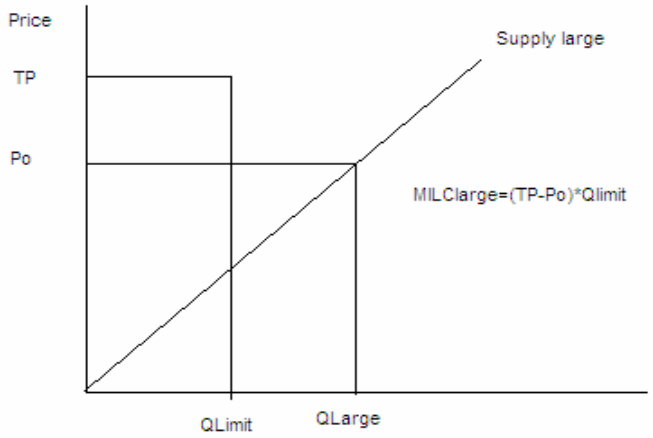
POLICY ANALYSIS

The primary goal of most dairy policies, including MILC, is price stability. MILC achieves this, as it has a limited affect on the profitability of dairies. The price stability required for the dairy industry suggests price support programs and the MILC program allow less milk price fluctuation. MILC may actually lower milk prices as well as national returns in the short run. However, the stability it creates is well worth the trade off. The MILC program contributes over a quarter percent to the increases in farm revenue and commodity

price brought on by federal policies (USDA 58). The revenue increase this policy generates makes it more difficult for high-cost farms to compete with low-costing ones. This is because the higher prices improve the profitability of low-cost farms by allowing them to expand and take market shares from high-cost farms (USDA 6). The following two graphs illustrate the supply constraints created by the MILC program.



MILC effects on small producers



MILC effects on the supply of Large producers

MILC provides monthly stipends, to producers who participate, when the reference price (the FMMO's Class I price in Boston) falls below the target price of $16.94 (USDA48). The payment rate is 45 percent of the difference between the target price and market price (USDA 48). Only 2.4 million pounds is eligible to have payments made (USDA 48). Due to MILC being a supplementary program, states with a large number of small dairy farms get the most benefits, receiving a greater portion of payments in comparison to their production. MILC is a prime example of conflicting policy outcomes (USDA 50). However, the safety net established by other programs under the market price is negated by MILC payments, which causes prices to remain at a lower level longer than necessary.

POLICY IMPLICATIONS

A positive aspect of MILC due to its direct payments is it has an indirect ability to increase production without distorting price. MILC can also reduce the negative impacts felt by the elimination of other policy programs (USDA 50). Without MILC, it is estimated the remaining dairy programs would cause all-milk prices to increase by four percent (MILC only raises price by one percent) (USDA 6). Programs like MILC tend to assist in keeping prices low on milk products with a shelf life, but tend to raise those of perishable value-added items (USDA 67).

MILC also has a slight potential to reduce the number of allowed participants in programs such as Special Supplemental Nutrition for Women, Infants, and Children (WIC). The number of participants in WIC depends on the cost of operation. Milk is a primary item supplemented in this program, and if the program is successful and prices begin to rapidly rise, the number of program participants will be reduced. High milk prices will also affect how those who in food assistance programs elect to spend their stamps. A problematic aspect of MILC is due to the 2.4 million pound cap. The largest dairies that produce the most product do not benefit much from this program. It helps the small dairies catch up in production, thus leveling the playing field. The long term effect of this policy will be higher prices, though not dramatically so. This relates back to the low cost farms being able to expand as prices increase, which in turn drives prices back down. It begins to create a cycle, as the purpose of MILC is to offset low producer prices. Thus prices begin to slowly increase again.

CONCLUSION

Due to the extended time frame dairy programs have been in place, it an arduous process to quantify the full implications of dairy policies and to envision how the market would act with out them. Even with all of these programs in effect, there is still price stability. The actual farm revenue is believed to only increase by about three percent, while consumers only feel a one percent increase in price. Despite this, milk production is still increasing quite rapidly, making milk a very profitable commodity.

Figure One:

Announcement of Advanced Prices and Pricing Factors for April 2007 1/
Release Date: March 23, 2007

Base Skim Milk Price for Class I 2/:	$10.50	(per hundredweight)
Advanced Class III Skim Milk Pricing Factor:	$10.50	(per hundredweight)
Advanced Class IV Skim Milk Pricing Factor:	$8.99	(per hundredweight)
Advanced Butterfat Pricing Factor 3/:	$1.3896	(per pound)
Class II Skim Milk Price:	$9.69	(per hundredweight)
Class II Nonfat Solids Price:	$1.0767	(per pound)
Two-week Product Price Averages:		
Butter	$1.2782	(per pound)
Nonfat Dry Milk	$1.1655	(per pound)
Cheese	$1.3656	(per pound)
Dry Whey	$0.7021	(per pound)
Special information for Appalachian and Southeast:		
Diesel Fuel Price	$2.587	(per gallon)
Mileage Rate Factor	$0.00442	(per cwt. per mile)

1/ See Price Formulas at www.ams.usda.gov/dyfmos/mib/price_form_2007.htm

2/ Higher of advanced Class III or IV skim milk pricing factors. The Class I skim milk price equals this price plus applicable Class I differential.

3/ The Class I butterfat price equals this price plus (applicable Class I differential divided by 100).

Note: The Class I price equals (Class I skim milk price times 0.965) plus (Class I butterfat price times 3.5), rounded to the nearest cent.

For information only: The Class I base price is: $15.00
(Sometimes referred to as the Class I mover, it equals (base skim milk price for Class I times 0.965) plus (advanced butterfat pricing factor times 3.5).)

Figure Two:

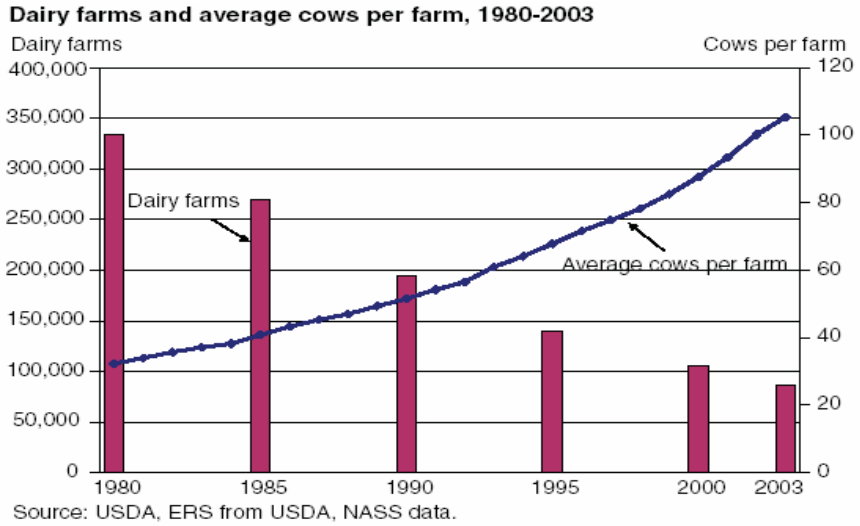


Figure Three:

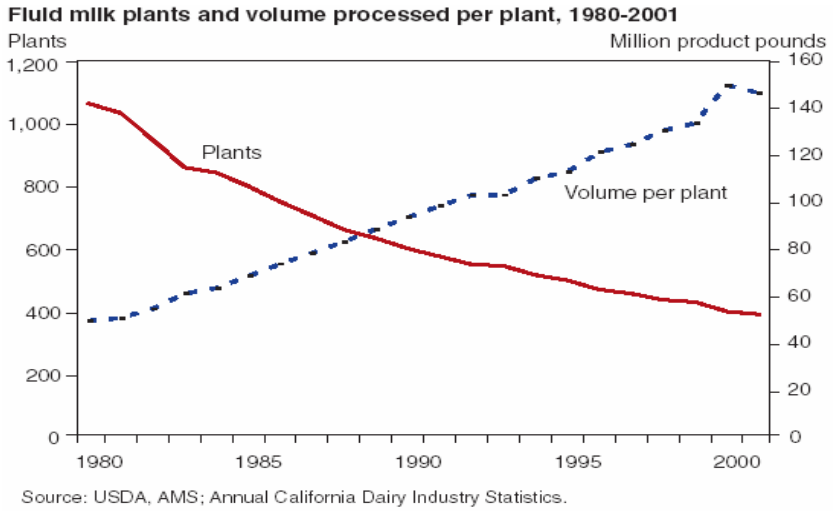


Figure Four:

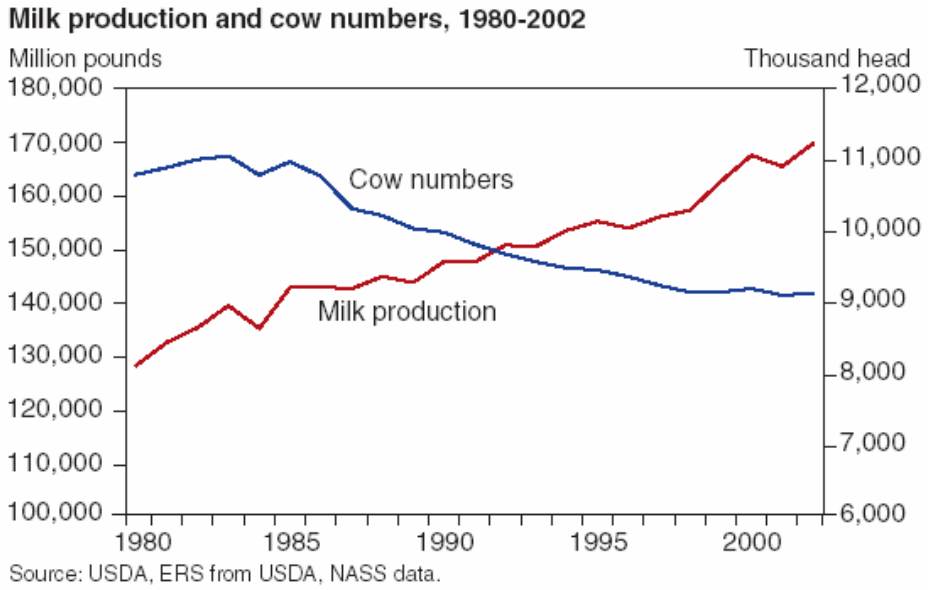


Figure Five:

Table 3.1—Overview of selected U.S. dairy programs

	Federal milk marketing orders	Milk price support program	State pricing, over-order premiums	Interstate dairy compacts	Milk Income Loss Contract (MILC)	Dairy Export Incentive Program (DEIP)
Objectives:						
Stabilize market conditions	X	X				
Producer price support		X	X	X		
Producer income support	X		X	X	X	
Develop export markets						X
Protect domestic programs						
Increase demand						X
Program instruments:						
Minimum price regulation	X		X	X		
Government purchase and storage		X				
Direct producer payments					X	
Export subsidies						X
Tariffs, tariff-rate quotas						
Mandatory funding for product promotion, research, and development						
Products:						
Milk	X		X	X	X	
Butter		X				X
NFDM		X				X
Cheese		X				X
Other dairy products						X

Source: ERS, from various USDA sources.

Figure Six:

Table 4.2—Shortrun effects of selected dairy programs on dairy market indicators, FAPRI analysis

	2003	2004	2005	2006	2007	Average
Effects on milk production						
Scenario[1]			*Percent change*			
MILC	0.5	0.9	0.6	0.4	0.2	0.5
CCC	0.5	0.6	0.6	0.3	0.2	0.4
DEIP	0.0	0.0	0.3	0.5	0.5	0.3
FMMO	0.5	0.9	0.6	0.6	0.6	0.6
All selected programs	1.5	2.4	2.2	1.7	1.6	1.9
Effects on all-milk price						
MILC	-2.1	-2.9	-3.5	-1.8	-1.2	-2.3
CCC	3.4	3.8	-0.9	-0.9	-0.5	1.0
DEIP	0.0	0.0	2.2	1.7	1.3	1.0
FMMO	3.9	4.3	0.2	0.2	0.3	1.8
All selected programs	5.4	5.2	-2.1	-0.8	-0.2	1.5

[1] See text for scenario descriptions.
Source: Brown (2003).

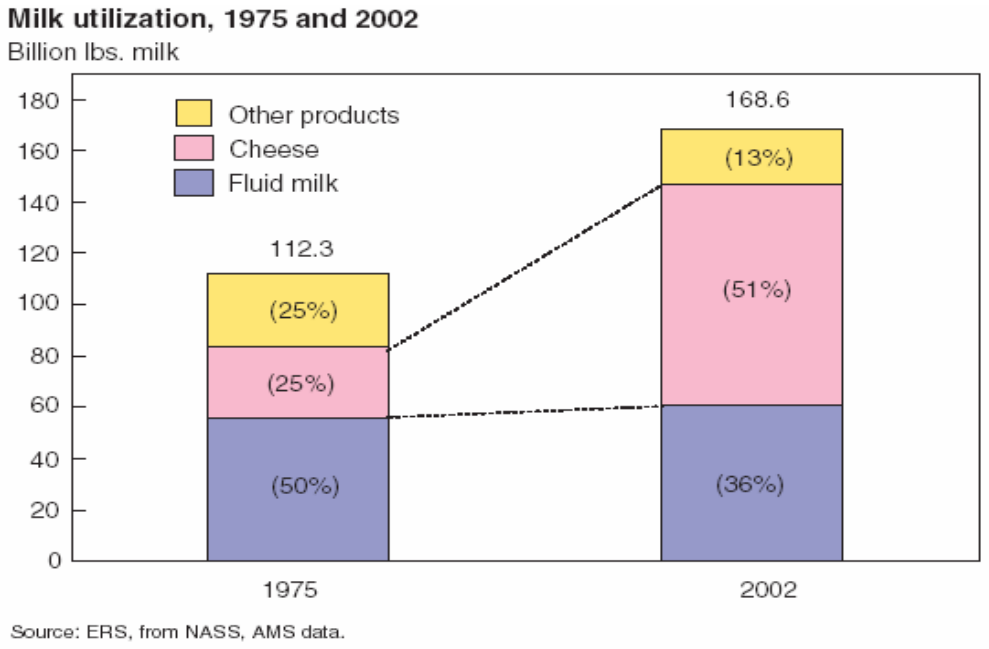
Figure Seven:

Table 4.9—Average wholesale and retail product price effects of dairy programs

	FAPRI	FAPSIM
	percent	
Wholesale		
Cheese	-2.8	-1.7
Butter	-16.5	-21.3
Nonfat dry milk	6.5	11.1
Retail		
Fluid	7.5	3.4
Cheese	-1.8	-0.4
Butter	-8.9	-9.4

Source: Brown (2003) and Price (2004).

Figures Eight and Nine:



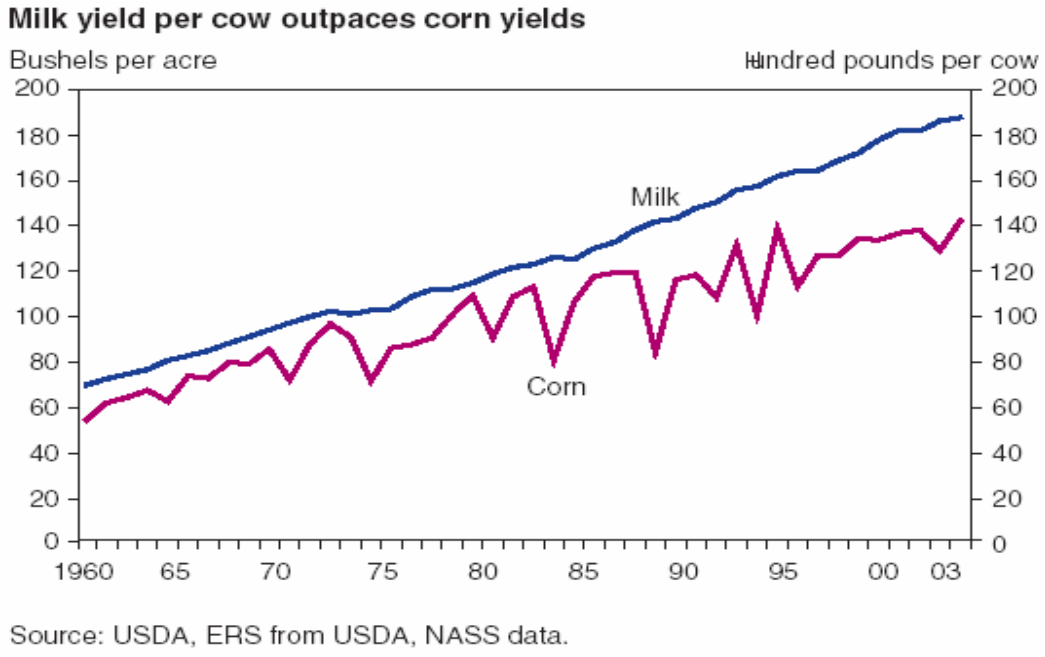


Figure Ten:

Milk Product Elasticities 1985-1995

Product	Elasticity estimate (%)	Source
Fluid milk	-0.63	Heien and Wessels, 1988
	-0.076	Helmberger and Chen, 1994
Cheese	-0.52	Heien and Wessels, 1988
	-0.33	Huang, 1985
Butter	-0.73	Heien and Wessels, 1988
	-0.17	Huang, 1985

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JOSEPH BIENSKI
AGRIBUSINESS
CASE STUDY: DEERE & COMPANY

Deere & Company manufactures and distributes a full line of agriculture equipment as well as construction and forestry equipment. Deere & Company is looking to make changes in their worldwide logistics organization and their relationship with FedEx. FedEx logistics provides services to 11 Deere & Company facilities in North America. Each facility negotiates its own individual service agreement separately with FedEx and this causes a lack of standardization in the logistic services provided by FedEx. Deere & Company could be spending more money on logistics than it should be spending, due to the lack of standardization. Deere & Company should expand by building 5 new manufacturing facilities in North America and have one generalized service agreement with FedEx for all facilities old and new.

The profit margin in 2005 was 7.5% and increased to 8.5% in 2006, which is an increase of 13.3% between 2005 and 2006. In 2006, Deere & Company had $0.085 in net income for every dollar of sales. With this expansionary plan that will take place over the years to come, sales will increase 10%, causing an increase in net income of 15%, and together they will cause the profit margin to increase. The increase in profit margin will also be due to the efficiency of the new manufacturing plants and the cost saving from switching to one generalized service agreement with FedEx

The Inventory turnover ratio for Deere & Company has increased from 7.1 times in 2005 to 7.8 times in 2006, an increase of 9.8%. Having a high inventory turnover ratio in an industry like Deere & Company is very difficult. For Deere & Company, having a moderate to low inventory turnover ratio is not a bad thing, because most of their inventory is durable, meaning the lifespan of their inventory is very long, and the goods

are reusable. With this new expansionary strategy, inventory will increase with sales. Deere & Company is headed in the right direction because an increase in the inventory turnover means sales are increasing.

In 2005, the proportion of debt Deere & Company had relative to its assets was 80%. In 2006, the debt ratio decreased to 78%. Between 2005 and 2006, there was a 2.5% decrease in the debt ratio. This is very high and is a weakness for Deere & Company. By having a high debt ratio, it will be moderately difficult for Deere & Company to borrow money for any future expansion. Deere & Company has outstanding brand identity and consumer loyalty, and that alone will give them some creditability towards borrowing money. With the expansionary strategy, the debt ratio will increase, but once the expansion is complete, the debt ratio will slowly decrease over time.

The current liquidity ratio has decreased from 2.23 times in 2005 to 2.09 times in 2006, which is a decrease of 6.27%. The liquidity ratio will decrease during the expansion strategy and slowly increase once the expansion is completed. The P/E ratio for Deere & Company was 8.24 times in 2005 and increased to 14.43 times in 2006. There was an increase of 75.12% between 2005 and 2006. Having a high P/E ratio suggest that high earning growth is expected in the future by investors.

. Building five new manufacturing facilities in North America will require Deere & Company to invest $150 million dollars. The interest rate will be 10% because of the high debt ratio. Net cash flows for each of the ten years are projected to be $9 million dollars. At the end of year 10, Deere & Company will sell the new facilities for $600 million dollars, with most of that estimated value coming from the prime real-estate locations. Deere & Company will then use the $600 million dollars to improve the older facilities and help improve their research and development. A $150 million dollar investment of 5 new manufacturing facilities will have a net present value of $136.63 million dollars over a 10 year lifespan.

Statement of Cash Flows

units in millions	T0	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Investment	-150										
Cash Flows		9	9	9	9	9	9	9	9	9	9
Salvage Value											600
Net Cash Flows		9	9	9	9	9	9	9	9	9	609

Interest Rate	0.1
PV of Cash Flows:	
Time "0"	-150
Year 1	8.181818
Year 2	7.438017
Year 3	6.761833
Year 4	6.147121
Year 5	5.588292
Year 6	5.080265
Year 7	4.618423
Year 8	4.198566
Year 9	3.816879
year 10	234.7959
NPV	136.6271

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