July 4, 2006

Dear Reader,

Welcome to the third issue of Perspectives in Public Affairs. Nearly doubling in size from past issues, Volume 3 reflects the excellence of the students at Arizona State University. We are pleased to offer a selection of this year’s best student papers on public policy and public affairs, covering an incredibly diverse range of interests: disaster relief, land development, education, urban youth, and science-led policy debates. I am pleased to present this work on behalf of the ASU School of Public Affairs, and delighted that our students have chosen Perspectives to share their work and their voices with the larger academic community.

Many thanks to all the authors who submitted papers, and to the Editorial Board members and our faculty adviser, Dr. Laura Peck, for their contributions, efforts and support to bring this issue to publication. We are indebted to the School of Public Affairs and to Director Dr. Robert Denhardt for financial support and encouragement. Thank you all for making this forum possible.

With the publication of Volume 3, I will be stepping down as Editor in Chief—to allow others the honor and privilege of leading the journal as I concentrate on writing my dissertation. It has truly been a pleasure to be so honored the past two years, and I have enjoyed the challenges, teamwork and friendship that have come with working together to produce the journal. Watching it improve with each issue has been most gratifying and I know that it will continue to do so in the coming years. Wishing much success to the incoming leadership team!

Finally, I would like to express my most profound thanks and gratitude to my friend and Managing Editor Nicole Nixen, without whom none of this would have been possible—thanks so much for everything.

I hope you enjoy this year’s Perspectives.
Regards,

Anne Ellis
Editor in Chief
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FEMA Reorganization and the Response to Hurricane Disaster Relief

Tonya Adamski, Beth Kline, and Tanya Tyrrell

Abstract
The authors offer an empirical research study intended to investigate the 2003 restructuring of the Federal Emergency Management Agency (FEMA) under the Department of Homeland Security (DHS). Our study explores the relationship between this restructuring and the efficiency of FEMA’s response to hurricane disaster relief. We hypothesized that hurricane response prior to the 2003 reorganization was managed more efficiently than hurricane response following this reorganization. To investigate this hypothesis, data was collected on 22 hurricanes affecting the U.S. mainland and Hawaii from 1988 to 2005. In order to measure the efficiency of hurricane response, the following variables were examined: deaths associated with each hurricane, damage in U.S. dollars, the time it took to dispatch FEMA personnel, and the time it took to dispatch supplies to the affected sites. Since FEMA directors and U.S. presidents can also potentially impact hurricane management, they were included as independent variables.

We also conducted a public opinion survey to offer a better understanding of the public’s reaction to FEMA’s performance in hurricane relief management, its transition into the DHS, states’ reliance on federal assistance, and the impact political affiliation has on these variables. Our findings show that since the 2003 reorganization, FEMA has displayed a significant increase in the time taken to dispatch supplies to hurricane-affected areas. Correlations also were found between the time taken to dispatch supplies and the acting FEMA director and US President. Survey results showed a significant parallelism between the overall approval of FEMA and the approval of their management of Hurricane Katrina. Further associations were found between party affiliation and reaction to Hurricane Katrina and states’ reliance on the federal government in the event of a disaster.

Introduction
Throughout its relatively brief history, the Federal Emergency Management Agency (FEMA) has undergone many incarnations. These organizational changes have largely served as a response to the unique and increasing external challenges confronting the agency, and ultimately, the nation. Perhaps the most encompassing and controversial organizational change experienced by FEMA was its absorption into the expansive Department of Homeland Security (DHS) in
Created as a federal response to the September 11, 2001, terrorist attacks, the large governmental organization of DHS serves as a unified defense structure against the escalating threat of terrorism and other potential hazards (Homeland Security Act, 2002).

FEMA’s assimilation into DHS, which merged more than 22 government agencies, was marked by immense skepticism and controversy. Opponents of this transition feared that revocation of FEMA’s independent status would severely hamper its ability to quickly respond to disasters. This fear was largely predicated on the notion that additional bureaucratic layers create communication lapses and red tape, forcing officials to abide by tedious rules and regulations. Opponents were concerned that rather than proactively responding to disasters, FEMA would be subject to these rigid protocols, having to steer through them in order to provide vital services (Glasser & White, 2005).

Furthermore, opponents of the transition feared that disaster management would further be jeopardized due to the unintended negative consequences of merging domestic and national security issues. They asserted that, as a result of limited funds and personnel, natural disaster relief would become secondary to security issues under the new, centralized Department of Homeland Security (Glasser & White, 2005). Although not much credence was given to these arguments at the time of the merger, the recent controversy surrounding the management of Hurricane Katrina has refocused attention on these issues.

This analysis seeks to empirically examine whether there is, in fact, a relationship between the March 2003 reorganization of FEMA into the Department of Homeland Security, and its efficiency in hurricane relief management. The second segment of this investigation will examine public opinion, gleaned from a survey posted on the World Wide Web, regarding the public’s approval of FEMA. This portion also is concerned with the role that political party affiliation plays in the individual evaluation of FEMA’s overall performance as well as its management of Hurricane Katrina.

Understanding public opinion of FEMA and the factors contributing to the formation of this perspective is of immense significance. The Federal Emergency Management Agency exists for the very purpose of providing disaster relief and mitigation to the public. Furthermore, it is the public who is directly and irrevocably affected by FEMA’s efficiency in meeting these goals. Therefore, national opinion is a valid component of the current dialogue and debate surrounding FEMA’s efficacy in disaster management.

The findings yielded through this analysis are of particular importance as FEMA seeks to redefine its goals and role in a post 9/11 environment. As a result of Hurricane Katrina, national discussion and controversy continues regarding the proper role of FEMA in disaster management as well as the appropriate structure this vital agency should assume. With congressional hearings pending that seek to answer such critical questions, this study aims to contribute to the body of forthcoming answers.

Review of the Literature

Early History of Disaster Management—1803-1930s

The origins of federal involvement in disaster management can be traced to the early nineteenth century. At this time, local governments were primarily responsible for disaster assistance (Popkin, 1990). Yet when municipal resources were exhausted, officials could call upon state governments for help. Most states, however, were ill-equipped, unprepared, or
unwilling to intervene (Stratton, 1989). Similar problems existed at the national level, where federal assistance was often piecemeal, uncoordinated, or uncertain (May, 1985). No general policies to guide government intervention existed, and it was never clear whether the federal government should or would intervene (Schneider, 1998). The first example of the federal government becoming involved in a local disaster occurred in 1803, when a raging fire destroyed a New Hampshire community. Congress responded by passing a law that provided financial assistance to the town (Haddow & Bullock, 2003). In the century that followed, ad hoc legislation was passed more than 100 times in response to natural disasters (FEMA History, 2005).

Under Roosevelt’s administration in the 1930s, the federal government began investing in emergency management functions. The Flood Control Act of 1934 gave the Army Corps of Engineers increased authority to design and build flood control projects. In addition, the Reconstruction Finance Corporation and the Bureau of Public Roads were given authority to make financial loans for repair and reconstruction of certain public facilities after disasters (Haddow & Bullock, 2003; FEMA History, 2005).

Evolution of Disaster Management—1950s-1970s

Government involvement in natural disasters evolved significantly during the middle decades of the twentieth century (Schneider, 1998). In the 1950s, the federal government began to take a systematic approach to disaster assistance. Over the next two decades, federal programs focused on civil defense against nuclear attacks and long-term recovery from natural disasters (Schneider, 1993). Congress enacted two significant pieces of legislation that made federal assistance readily available to disaster-stricken communities. First, the Civil Defense Act of 1950 delineated the first general, national policy for providing emergency relief, focusing primarily on recovery from nuclear attack. Second, the Disaster Relief Act of 1950 specified a standard process by which state and local authorities could request federal assistance, focusing on long-term recovery assistance such as grants and loans rather than on immediate disaster assistance. Both 1950 laws asserted the federal role in emergency management as secondary to state and local government efforts.

Although the 1950s were a relatively quiet time for natural disasters, commencement of the Cold War affected objectives of disaster management. First, nuclear war and nuclear fallout became the principal focus. Second, the idea of disaster preparedness emerged. As a result, state and local governments instituted civil defense programs to prepare for possible nuclear attacks. The directors of these programs became the first recognized face of emergency management in the United States.

In the following decade, massive natural disasters required major federal response and recovery operations. In 1960, the Hebgen Earthquake shook rural Montana, and Hurricane Donna hit west coast Florida. The following year, Hurricane Carla devastated Texas. In an effort to change the piecemeal federal approach to disaster assistance, President Kennedy created the Office of Emergency Preparedness in 1961 to deal with natural disasters. Subsequent calamities tested the activities of the executive preparedness office, including an earthquake, registering 9.2 on the Richter Scale, which shocked Prince William Sound, Alaska in 1964, and Hurricane Betsy that ravaged the Gulf Coast in 1965. Losses from Hurricane Betsy prompted passage of the National Flood Insurance Act of 1968, amended in 1972, requiring the mandatory purchase of flood insurance for all homeowner loans backed by federal mortgages. This flood legislation
revealed that government sought to protect individual financial investment and reduce government disaster expenditures (Haddow & Bullock, 2003).

The combination of Hurricane Betsy, Hurricane Camille in 1969, and the 1971 San Fernando earthquake, prompted passage of the Disaster Relief Act of 1974. This law firmly established the process of presidential disaster declarations and gave the Department of Housing and Urban Development the most significant authority for natural disaster response and recovery. Even with this legislation, emergency management fragmentation persisted. By the early 1970s, more than 100 federal agencies were involved in some aspect of risk and disaster management (Popkin, 1990). Parallel organizations and programs at the state and local levels added to the confusion and compounded the complexity of federal disaster relief efforts (Haddow & Bullock, 2003; FEMA History, 2005).

In the 1970s, federal response was directed at recovery, not preparation or relief operations. Two major studies of disaster assistance, one by the Office of Emergency Preparedness (1972) and another by the National Governors’ Association (1978), showed a disjointed, complex emergency system torn between civil defense and disaster recovery (Schneider, 1993). The sheer number of programs and initiatives was problematic. Ambiguity of disaster relief responsibilities among various levels of government and non-governmental participants led to widespread support for developing a more organized, cohesive emergency management process with a more centralized focus (Schneider, 1998). Adding credibility to the National Governor’s Association lobbying efforts at consolidation of emergency management activities into one federal agency, the 1979 nuclear power plant accident at Three Mile Island in Pennsylvania highlighted the inadequacy of federal preparedness and acted as an impetus to consolidate emergency management functions.

Establishment of the Federal Emergency Management Agency

President Carter, who was committed to streamlining all government agencies and administrative processes, was the first to restructure the emergency management system. Issuing Executive Order 12127 on March 31, 1979, Carter officially established the Federal Emergency Management Agency. The newly established agency was to be guided by Reorganization Plan Number 3, which sought to consolidate emergency preparedness, mitigation, and response activities under FEMA and to strengthen the structure, management, and operations of the government’s disaster relief system (Schneider, 1995). A second executive order followed, mandating the reassignment of agencies, programs, and personnel into FEMA. This consolidation made the agency accountable to 23 Congressional committees and sub-committees.

Adding to the complexity of program, policy, operation, and personnel integration, Carter experienced difficulty finding a director for the agency. Selecting from his cabinet, Carter appointed then-Office of Personnel Management Director, John Macy, to the post in August 1979. Macy was tasked with unifying an organization that was not only philosophically separate but geographically separate as well. Macy emphasized the similarities between natural hazards preparedness and civil defense activities by developing a new concept called Integrated Emergency Management Systems, an all-hazards approach to emergency management that

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FEMA Reorganization

included direction, control, and warning as necessary functions for all emergencies, from small, isolated events to the supreme emergency of nuclear attack (Haddow & Bullock, 2003).

First Shift: From Disaster Management to Nuclear Preparedness

Macy’s tenure and the all-hazards focus of disaster management ended with the incoming Reagan administration. In 1981 Louis O. Guiffrida replaced Macy as FEMA director. Although Guiffrida did not have direct experience in natural disaster management, his background involved terrorism preparedness at the state level. Between the early and mid 1980s, FEMA did not face any significant natural disasters, yet the agency continued to evolve. Guiffrida proceeded to reorganize FEMA consistent with his terrorist training experience and the president’s administrative policies. Agency resources were realigned in accordance with Guiffrida’s top priority: government preparedness against nuclear attack. Although Guiffrida sought to elevate and enhance the national security responsibilities of the agency and created a new national headquarters in Washington, D.C., the agency suffered from morale problems among employees.

By 1985, dislike of Guiffrida’s style and questions about FEMA operations came to the attention of then-Representative Al Gore (D-TN), who served on the House Science and Technology Committee. Gore advocated congressional hearings as well as Department of Justice and Grand Jury investigations of senior political officials at FEMA. These inquiries led to the resignation of Guiffrida and other top aides in response to a variety of charges, including misuse of government funds.

In his second term, Reagan selected retired military general Julius Becton to be FEMA director. Formerly the director of the Office of Foreign Disaster Assistance in the State Department, Becton is credited with restoring integrity to the operations and appropriations of the agency. Becton continued the pattern of isolating resources for national security priorities, neglecting the potential of a major natural disaster. Of the more than 20 FEMA programs, earthquake, hurricane, and flood programs ranked near the bottom in importance (Haddow & Bullock, 2003).

In the late 1980s, Congress passed the Stafford Disaster Relief and Emergency Assistance Act (1988) that made several changes in existing federal disaster policy. First, inconsistencies in past policies were clarified by redefining the definition of an emergency situation. Second, the responsibilities and obligations of public institutions during natural disasters were expanded. Third, a process to guide when and how emergency management agencies across the intergovernmental system would become involved in a crisis situation was established (Schneider, 1998), delineating how the response would move from the local level through the state up to the federal level (Schneider, 1995). Finally, the Stafford Act of 1988 permitted the president to approve disaster declaration without congressional approval.

Even with this important piece of legislation, the ability of FEMA to support a national emergency remained in doubt. By the end of the 1980s, morale problems within the agency persisted, and poor leadership with state and local partners over agency spending and priorities caused internal strife. During the late 1980s and early 1990s, FEMA operations were severely criticized by federal authorities (Schneider, 1998).

Then, in 1989, two devastating natural disasters called FEMA’s continued existence into question. The worst tropical storm in more than a decade, Hurricane Hugo attacked Puerto Rico, the U.S. Virgin Islands, North Carolina, and South Carolina, causing 85 deaths and more than $15 billion in damages. Senator Earnest Hollings (D-SC) personally called interim FEMA director
Robert H. Morris to ask for help, but the agency responded slowly. Expressing his frustration, Hollings called the agency “the sorriest bunch of bureaucratic jackasses” on national television (Franklin, 1995, ¶ 1). Emergency management personnel at all governmental levels took steps to activate response processes; however, their actions were uncoordinated. Ineffective implementation fueled intense criticisms of the entire governmental response. Nationwide perception was that FEMA was a failure, fostering a lasting impression of governmental non-responsiveness and incompetence (Schneider, 1998). Also in 1989, the Loma Prieta earthquake shook California. While FEMA spent the 1980s focused on nuclear attack planning, state partners in emergency management concentrated on more realistic natural disaster risks. FEMA was ill-prepared for the earthquake, but the agency’s reputation was saved due to state counterpart efforts. FEMA was not so lucky with the next destructive disaster.

In 1992, Hurricane Andrew slammed into Florida and Louisiana. Federal and state emergency systems were not equipped to handle a disaster of this magnitude (Schneider, 1998). Local and state governments were overwhelmed, and for the first three days, FEMA was nowhere to be found. In a press conference, then-Emergency Management Director of Miami-Dade County in Florida, Kate Hale, questioned FEMA’s inefficient response by asking, “Where the hell is the cavalry?” (Marek, Pound, Knight, Barnes, & Slivka, 2005, p. 36). When the agency did respond, incompetence delayed relief efforts further.

Hurricane Andrew focused national attention on FEMA. As the media followed the crisis, the agency’s failure to respond was witnessed by Americans across the country. The efficacy of FEMA as the national emergency response agency was in doubt. Because lack of action prompted heavy criticism, President George H. W. Bush intervened, circumventing FEMA and dispatching Secretary of Transportation Andrew Card to take over the response operation and sending in the military. During this disaster, the FEMA director was Wallace E. Stickney, whose only qualification to lead FEMA was that he was a close friend and former neighbor of Bush Chief of Staff John Sununu.

In the wake of Hurricane Andrew, criticisms of FEMA intensified. The Wall Street Journal ran a front-page article that quoted a range of disaster specialists who thought the agency was more trouble than it was worth. Critics maintained that complete dissolution of the agency was preferable to transformation. Bureaucratic delay was one of the agency’s biggest problems. Another important impediment was a misdirected agency mission. First, FEMA was still spending half of its budget on preparation against nuclear attack and World War III. Second, the mission of natural disaster response was muddled. FEMA saw its main responsibility as distributing federal loans and grants to help rebuild an area after disaster, taking a reactionary, rather than mitigating, role. The agency would not issue aid directly to a state until a governor declared a state of emergency and specifically requested assistance (Franklin, 1995).

The established processes and systems of FEMA failed in response to Hurricane Andrew. FEMA eventually recognized the need to apply all of its resources to the response effort, using national security assets for the first time in a natural disaster response. However, the public and elected officials had already lost faith in FEMA. Starting with Hurricane Hugo three years earlier, public concern over natural disasters increased. People expected the federal government to react, but FEMA seemed incapable of carrying out the essential function of emergency management. In the aftermath of Hurricane Andrew, governmental and non-governmental watchdog groups, in concert with Government Accounting Office investigations, called for major reforms (Haddow & Bullock, 2003). Yet, for the remaining years of the Reagan administration
and the four years of President George H. W. Bush’s administration, FEMA’s resources and personnel focused their attention on ensuring the continuity of government operations in the event of a nuclear attack. Little attention was paid to natural hazard management.

Second Shift: Revitalization under Witt

During the early 1990s a great deal of attention focused on improving government performance (Osbourne & Gaebler, 1992; Dilulio, Garvey, & Kettl, 1993). The reinventing government initiative came about because public agencies responded too slowly or haphazardly to pressing public issues and were uncoordinated and disorganized (Schneider, 1998). Government reforms occurred under the activist federal administration of Clinton. As governor of Arkansas, Clinton had experience responding to several major flooding disasters and realized how important effective response and quick recovery was to communities. To implement change, Clinton nominated James L. Witt as the FEMA director in 1993. Former county judge, small business owner, and director for the Office of Emergency Services in Arkansas, Witt was the first director with direct emergency management experience. Illustrating a commitment to reinventing the emergency management system, Clinton took the unprecedented step of elevating Witt to his cabinet (Adams, 2005).

Witt revitalized FEMA through his leadership, seeking to restore the people’s trust that the government would be there in times of need (Rood & Graber, 2005). His overriding mission was to provide leadership for all hazards and a comprehensive emergency management system. Over a four-year time frame, 1994 to 1998, he initiated a number of reforms (Schneider, 1998). Inside the agency, he (1) conducted a top-to-bottom review of FEMA’s mission, personnel, and resources (Franklin, 1995), (2) initiated sweeping reforms that streamlined disaster relief and recovery operations, (3) emphasized preparedness and mitigation, (4) implemented customer service training, and (5) boosted employee morale. Outside the agency, he strengthened relationships with state and local emergency managers and established new connections with Congress and the media. The end of the Cold War also allowed Witt to redirect resources from civil defense to disaster relief (FEMA History, 2005).

Witt’s changes were quickly tested as the nation experienced unprecedented natural disasters. The Midwest floods of 1993 resulted in disaster declarations in nine states; this time FEMA met the needs of flood victims quickly and with few bureaucratic tangles (Franklin, 1995). The Northridge Earthquake followed in 1994, testing all streamlined approaches and technology advancements for service delivery. FEMA rose to these challenges, positively changing its image in the aftermath of Hurricane Andrew. Moreover, Witt’s performance was widely praised through the 1990s (Adams, 2005).

Third Shift: Terrorism and the Department of Homeland Security

During the 1990s, FEMA responded to over 500 emergency disasters and major disaster related events (Lehrer, 2004). Only two of those incidents were related to terrorism, the first World Trade Center bombing in 1993 and the Oklahoma City bombing in 1995. These terrorist acts represented a new phase in the evolution of emergency management and unknowingly acted as a harbinger of future terror attacks. This event led to disagreements over which agency should be responsible for response to terrorist acts. The Nunn-Lugar legislation of 1995 left the question open as to who would be the lead agency in terrorism, allowing several different agencies and departments to have a role in terrorism planning. There was some attempt at coordination, but in
general, agencies pursued their own agendas. Even amidst this confusion, by the end of the 1990s, FEMA was well received by Congress and communities.

At the request of President George W. Bush, FEMA established the Office of National Preparedness in 2001 to focus attention on the then-undeclared terrorist threat and other national security issues. This was the first step in refocusing FEMA’s mission and attention from the all-hazards approach of emergency management embraced by the Clinton Administration (Haddow & Bullock, 2003). The shift in focus was accelerated by the terror attacks of September 11, 2001. The destruction of the World Trade Center and the Pentagon could arguably be considered the first national disaster event, outside of wartime, in the history of the United States. Emergency management in the United States was changed forever by the events of 9/11.

Immediately following the terrorist attacks, funding for homeland security increased dramatically, beginning with a $40 billion emergency supplemental appropriations act, $10.7 billion of which was appropriated for homeland security initiatives (Haynes, 2004). However, the most significant action taken by the federal government to combat terrorism was the creation of the Department of Homeland Security.

On November 25, 2002, President Bush signed into law the Homeland Security Act (2002) and announced that former Pennsylvania Governor Tom Ridge would become the secretary of DHS. This act authorized the greatest federal government reorganization since President Harry Truman joined the various branches of the armed forces under the Department of Defense. DHS has been charged with several missions: (1) to protect the United States from further terrorist attacks, (2) to reduce the nation’s vulnerability to terrorism, and (3) to minimize the damage from potential terrorist attacks and natural disasters. The creation of DHS was largely in response to the criticism that increased federal intelligence and inter-agency cooperation could have prevented the 9/11 attacks (Haynes, 2004).

DHS fused over 179,000 federal employees and 22 existing federal agencies, including FEMA, under the umbrella of a single, cabinet level organization (DHS Organizational History, n.d.). The consolidation of all federal agencies to combat terrorism follows the same logic that first established FEMA in 1979. The decision to move FEMA to DHS was intended to speed responses to threats such as nuclear weapon detonation, chemical attack, or hurricane destruction (Adams, 2005). Yet the practical effect of the restructuring has been much different.

By burying the agency within layers of a larger bureaucracy, FEMA’s structure, mission, and resources have been altered (Koff, 2005; “Bush’s FEMA,” 2005). First, FEMA’s director went from reporting directly to the president to being an underling of the DHS secretary, essentially becoming a cog on the bureaucratic wheel. Second, when FEMA folded into DHS, the agency’s focus shifted primarily to management of the consequences of terrorist attacks (Lehrer, 2004). Third, FEMA officials now have to pass along requests for resources or manpower through DHS, which is oftentimes busy coordinating the efforts of dozens of agencies and offices (Adams, 2005). Furthermore, FEMA’s budget and key federal disaster mitigation programs, developed over many years, have been slashed under DHS command (Rood & Graber, 2005).

Demoting FEMA from an independent agency into the Emergency Response and Preparedness directorate of the sprawling homeland security bureaucracy generated concern

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2 Other federal agencies transferred to DHS included: U.S. Border Patrol, U.S. Customs, Immigration and Naturalization Service, and U.S. Coast Guard.
that the coverage of natural disasters would be diluted. The DHS planning scenarios released in the winter of 2004 illustrates the validity of this concern. Of the 15 worst-case disaster programs, 12 were terrorism related and only one dealt with a category-five hurricane (Marek et al., 2005). Additionally, homeland security officials tend to think of preparedness in terms of prevention, which is impossible with hurricanes, earthquakes, and floods (Reiss, 2005).

**FEMA Instability and Hurricane Katrina**

In March 2004, after the restructuring of FEMA under DHS, former FEMA Director James Witt commented, “I’m extremely concerned that the ability of our nation to prepare for and respond to disasters has been sharply eroded” (Rood & Graber, 2005, ¶ 4). Witt’s concern was credible for several reasons. First, the mission of FEMA has been transformed from disaster management to management of terrorist activities. The shift towards anti-terrorism under DHS is at the expense of FEMA’s natural disaster duties (Reiss, 2005). Second, FEMA lacked stability. Roughly one third of its senior staff was made of acting employees (FEMA History, 2005) because many had been retiring, frustrated by inaccessible leadership within DHS (Walker, 2005). Additionally, a 2004 survey indicated that eighty percent of FEMA employees feel that the agency has weakened by joining DHS (Marek et al., 2005). Third, since DHS conception, the disaster response agency has experienced two major reorganizations and become entangled in bureaucratic red tape (Adams, 2005). Repeated restructuring and political patronage in the upper echelon of management, especially during Republican administrations, have resulted in weakened emergency management system. Hurricane Katrina evidenced this assumption as a reality.

On August 29, 2005, Hurricane Katrina assaulted New Orleans, Louisiana, beginning the largest natural catastrophe ever to hit the United States. The result was a confused response to the worst disaster since 9/11. At the start of the storm, the FEMA director was Michael D. Brown, a politically connected attorney who previously ran an organization for breeders of Arabian horses (Marek et al., 2005). Lacking experience in crisis management, Brown waited five hours after Katrina made landfall to call upon disaster response teams and later professed that he did not know 15,000 storm victims had congregated at the New Orleans Convention Center for days without food or water (Adams, 2005). Brown failed to embrace post-9/11 disaster mechanisms, including the January 2005 National Response Plan (NRP), a 426-page document establishing DHS as the boss of all federal agencies involved in response to major catastrophes (Marek et al., 2005). Proper implementation of NRP would have permitted the FEMA director to recommend the government declare Hurricane Katrina an incident of national significance when it was clear that the hurricane would be catastrophic. This designation would have allowed FEMA to stage massive amounts of aid to the region even if the governor had not specifically requested assistance. Director Brown, however, followed his own ad hoc approach, failing to dispatch assistance until states submitted requests (Walker, 2005). Brown’s decision ultimately left FEMA unprepared for the devastation of Katrina. Less than two weeks after the Katrina crisis began, DHS Secretary Michael Chertoff removed Brown from his role directing relief efforts (Adams, 2005). The White House subsequently named David Paulison, former director of the emergency preparedness division at FEMA, as acting director (“Embattled FEMA Director,” 2005).

FEMA’s inefficient and ineffective response efforts to the catastrophe have generated severe criticisms by elected officials. In the wake of Katrina, some members of Congress are questioning whether FEMA is able to pursue a mission of disaster management and whether
recent bureaucratic reorganizations have left FEMA powerless and without direction. In September 2005, Senator Hillary Rodham Clinton (D-NY) sponsored Senate Bill 1615 to restore the agency’s independent status (Adams, 2005), and two similar measures were working through committees in the House of Representatives (Brown, 2005). Even DHS Secretary Chertoff has since recognized that FEMA might be better off with a narrower focus (Koff, 2005). Conversely, other officials believe FEMA did not fail because it is now part of DHS. Rather, FEMA failed because of ineffective leadership, ignorance of federal guidelines, and mistakes made by various levels of government. Proponents of this view assert that making FEMA an independent agency again would only further complicate the nation’s ability to establish a truly all-hazards agency; the terrorist threat in emergency management should not be ignored but balanced with natural disaster preparedness (Walker, 2005).

Research Questions and Hypotheses
The purpose of this research is twofold. First, in order to gain a more intricate understanding of FEMA’s performance in hurricane response both prior to and following the agency’s March 2003 reorganization, this investigation seeks to determine: (1) Is there a relationship between the 2003 restructuring of FEMA and the efficiency of hurricane disaster response? Second, this analysis seeks to explore the public’s reaction and response to FEMA in the aftermath of Hurricane Katrina: (2) Has the public opinion of FEMA changed after the handling of Hurricane Katrina?

To adequately address these research questions four hypotheses were developed:

(H1) Hurricane response prior to 2003 was handled more efficiently than hurricane response post-2003.

(H2) Significant differences will exist concerning the efficiency of hurricane response between both FEMA directors and presidents.

(H3) There will be a positive relationship between the overall approval of FEMA and the opinion of how Hurricane Katrina was managed.

(H4) The perception of FEMA’s response to Hurricane Katrina will be positive or negative based on political party affiliation.

Data Collection
The following section will elucidate the key variables utilized to empirically examine the relationship between the March 2003 reorganization of FEMA under the Department of Homeland Security and its efficiency in hurricane disaster management.

Dependent Variable
In order to enhance the study’s overall reliability, hurricanes were selected as the primary unit of analysis. The use of the Saffir-Simpson Hurricane Scale allows a uniform method of
reliably comparing hurricanes over a period of time. This standard ensures that all disasters empirically evaluated in this investigation are of a similar intensity and type, each having afforded similar opportunity for preparation. Furthermore, hurricanes were a particularly appropriate unit of analysis due to their historically high frequency of occurrence. Therefore, FEMA has similar experience in providing relief for each disaster examined and an established set of guidelines for appropriate response, recovery, and mitigation efforts.

Information was obtained from the National Hurricane Center (NHC) on 22 hurricanes affecting the U.S. mainland and Hawaii from 1988 to 2005. Hurricanes were only included for analysis if they resulted in a Presidential Disaster Declaration. This declaration is a necessary requirement for an impacted region to receive federal assistance and direct FEMA intervention. A Presidential Disaster Declaration pronounces that certain areas of an affected state are of sufficient severity and magnitude to warrant an emergency declaration under the authority of the Stafford Disaster Relief and Emergency Assistance Act of 1988. Under this Act, FEMA is authorized to provide “major disaster assistance to supplement the efforts and available resources of states, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby” (The Federal Emergency Management Agency, 2000). All hurricanes meeting these criteria were included in the study with the exception of two, which were not utilized due to a lack of sufficient information.

Of the 22 hurricanes included for analysis five were category 1, seven were category 2, six were category 3, three were category 4, and one was category 5. Hurricanes were grouped according to category, with categories 1 and 2 being grouped together and coded as 1, and categories 3 to 5 being grouped together and coded as 2. There were a total of five category 3 to 5 hurricanes before the March 2003 reorganization of FEMA, and a total of five following the reorganization. Additionally, there were a total of nine category 1 to 2 hurricanes prior to the reorganization and three afterward. Hurricanes were compared before and after the reorganization by assigned grouping in order to control for the effect of hurricane category and intensity on the efficiency measures employed in this investigation.

To assess FEMA’s efficiency in disaster management the following variables were measured for each hurricane: (1) number of deaths, (2) original total damage estimate in U.S. dollars, (3) total damage estimate adjusted for inflation in U.S. dollars, (4) FEMA response times for dispatching personnel to the impacted areas, and (5) FEMA response times in dispatching vital supplies to the impacted areas.

Number of deaths was obtained through NHC and includes the number of direct and indirect deaths resulting from the hurricane. For the purpose of this study, only deaths occurring in the mainland U.S. and Hawaii were included. This measure is based on the assumption that the quality of relief efforts can have a direct impact on the resulting number of deaths. This assumption is consistent with FEMA’s own Strategic Plan for the fiscal years 2003 to 2008, which lists reduction of the loss of life and property as an agency-wide goal (The Federal Emergency Management Agency, 2002).

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3 The Saffir-Simpson Scale is a rating system, which assigns a hurricane to a particular category, 1 thru 5, with one being the least severe and 5 being the most severe. The intensity of the hurricane, therefore, is reflected in the category it is assigned, which includes such factors as wind speed and storm surge.

4 Hurricane Bob of 1990 and Hurricane Bret of 1999 were not included for analysis. Information could not be obtained on FEMA response time in dispatching supplies or personnel to the impacted areas, both key variables measured and later discussed in this study.
Measures of property damage were also obtained from NHC. Two measures were utilized, an original total damage estimate and a total damage estimate adjusted for inflation. Original total damage estimates were obtained by using a two to one ratio of insured damages as reported by the American Insurance Service Group. Adjusted figures represent changes in the prices of goods and services, allowing for normalized comparisons between years based on a consistent consumer index. These measures were utilized due to the assumption that effective relief efforts can lead to a reduction in property damage and are also consistent with FEMA agency wide goals to reduce the loss of property.

The final variables utilized to assess FEMA’s efficiency are measures of response times. Response times were separated into two categories: (1) the time, in days, it took FEMA to dispatch personnel to the impacted area after the hurricane made landfall, and (2) the time, in days, the agency took in dispatching vital supplies such as water, food, and blankets. Since hurricanes are generally associated with multiple landfalls over a range of areas, analysis focused on FEMA’s performance in the state in which a Presidential Emergency Declaration was issued, a state of emergency was declared by the governor, and the impact was considered to be the most widespread and significant.

Response times were gathered by examining broadcast media reports and newspaper articles published at the time each hurricane made landfall. Situation reports from state emergency departments were also utilized when available. Information from FEMA situation reports was not utilized for this study in order to maintain independence and avoid the potential bias associated with self-evaluation. Response times were only included in the event that they were corroborated by other media sources. A standard was employed, stipulating that information would only be utilized when verified by a minimum of three sources. In order to increase diversity and minimize the potential for media bias, approximately 40 distinct sources from 12 states were included.

Independent Variable
Since the reorganization of FEMA, our primary independent variable, occurred in 2003 this year served as the cutoff point in which efficiency measures were compared. Response times for supplies and personnel (coded separately), both damage estimates (also coded separately), and the number of deaths were compared before and after the 2003 cutoff point.

Also examined was the impact of various FEMA directors and presidents on the efficiency of disaster management. Each director, five in total, was given a separate code and means were compared for each efficiency measure. Mean values for the administrations of George H.W. Bush, Bill Clinton, and George W. Bush also were compared. Three hurricanes

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5 Damages are listed in U.S. dollars; inflation is adjusted to the year 2004 based on Consumer Price Index inflation index provided by the National Aeronautic and Space Administration (http://www1.jsc.nasa.gov/bu2/inflateCPI.html).

6 Determined by the number of applications submitted to FEMA for assistance, the category at landfall, the amount of damage inflicted in each affected area, and media reports.

7 8 Media reports were located via Internet searches using Google and Yahoo. LexisNexis publication database was utilized to obtain additional articles. Only articles from U.S. news sources were included. Articles were selected that obtained information regarding FEMA response times (as defined in the data collection section of this report) to each of the 22 hurricanes evaluated in this study. The time period evaluated for each hurricane was two weeks prior to landfall and up to six months after landfall. Key words utilized in article search included: hurricane name, FEMA, Federal Emergency Management Agency, FEMA response, FEMA personnel, supplies, state of emergency, disaster declaration, and deaths.

8 Three or more sources were used to verify accurate response times for 15 hurricanes, two sources were used for the remaining seven hurricanes.
occurred during the George H. W. Bush Administration, ten during the Clinton Administration, and nine during the George W. Bush Administration.

Public Opinion Data
The following section will clarify key variables employed to investigate the public’s opinion of FEMA. A survey was placed on the World Wide Web to obtain public opinion on a range of issues pertaining to the performance of FEMA. The survey was developed by this team of researchers at Arizona State University and placed on a publicly accessible Web site. The target population for the survey was unrestricted, and individuals were informed and invited to participate in the survey via e-mail. A combination of convenience sampling and snowball sampling was used to obtain results. Originally, 60 individuals were requested to participate in the survey and were invited to forward the URL to other willing participants. Survey sample included various members of the community, students, private sector employees and government employees. Ultimately, 116 responses were obtained and used in the study. Appendix A.1 details the survey.

Dependent Variable
Questions one and two of the 20-item questionnaire assess the respondent’s familiarity with FEMA and opinion of FEMA’s overall performance, respectively. These responses were ordinal data coded from the most positive response as the largest number (5) to the least positive response as the lowest number (1).

Questions three and four inquire if the respondent’s opinion of FEMA has changed over the last 6 months (“yes” coded as 1; “no” coded as 2), and if so what is the direction of this change. The change in direction was also ordinal data coded from most positive as the largest number (5) to the least positive as the lowest number (1).

Questions five and six request eliciting the respondent’s reaction to two separate statements, both intended to assess the participant’s feelings on federal involvement in state disasters. These responses were also coded from the most positive as the largest number (5) to least positive as the lowest number (1).

Questions six through nine assess the participant’s reactions to FEMA’s handling of different disasters, assigning the most positive response as the largest number (5) to the least positive as the lowest number (1).

Question 10 solicits the respondent’s knowledge about the 2003 absorption of FEMA into DHS. This is also a yes-or-no question, coded 1 for “yes” and 2 for “no.”

The participant was asked in question 11 if he/she felt the incorporation of FEMA into DHS was a positive or negative change. Responses were also coded from the most positive as the largest number (5) to least positive as the lowest number (1).

Finally, respondents were asked if they had ever personally requested assistance from FEMA. The number of respondents who had requested assistance from FEMA was insignificant (n=3) and the question was not considered in final evaluation.

Independent Variables
Independent variables requested in the survey were: (1) sex, (2) education, (3) income, (4) ethnicity, (5) political affiliation, and (6) marital status. Income level was coded with the highest income range, over $100,000, as 6 and the lowest level, under $25,000, as 1. Political
affiliation was categorized as Republican, Democrat, Independent or No party affiliation. However, for several tests this variable was recoded to only reflect the responses of Republicans (1) and Democrats (2).

**Findings**

The authors collected data on 22 hurricanes. Variables included the hurricane category, year, time of supplies dispatched, time of personnel dispatched, cost of damage incurred, adjusted cost of damage incurred, governor, president, and affected region. The intention of this research is to investigate whether a relationship exists between the 2003 restructuring of FEMA and the efficiency of hurricane disaster response. The efficiency measures were defined as: adjusted cost of damage incurred, deaths, time of personnel dispatched, and time of supplies dispatched. These dependent variables were measured against the independent variable stated above.

A cross tabulation was conducted to compare the independent variable of pre-2003 reconstruction and post-reconstruction to the dependent variables of cost adjusted for inflation, deaths, time of personnel dispatched, and time of supplies dispatched, the only significant findings were in time of supplies dispatched $\chi^2 (5, N=22) = 15.27, p = <.05$. A lambda was conducted to measure the direction of the association $\lambda=.18, p= < 0.1$. Reflecting that when supplies dispatched is the dependent variable, we are 18% better able to predict if the year of the disaster was pre-reconstruction or post-reconstruction. A Cramer’s V test $V=.83, p = > .05$ illustrating that 83% of the change in time taken for supplies to be dispatched can be explained by the timeframe of pre-reconstruction or post-reconstruction.

To further investigate the relationship between these variables an independent t-test was conducted. Therefore, the cutoff point in the test definitions was selected as 2003, group $1 < 2003$ group $2 > 2003$. It is important to note that due to the coding of time of supplies dispatched and time of personnel dispatched, a mean of 5.50 would indicate that, on average, it took two to three days following hurricane landfall for supplies to be dispatched. While a mean of 3.36 would indicate, on average, supplies were dispatched between the day of hurricane landfall and one day following. The variable Deaths reflects the number of deaths attributed to the hurricane. The results are as follows in Table 1.

| Table 1: Group Differences pre-2003 DHS incorporation and post-DHS incorporation |
|------------------|------|--------|------|--------|--------|
|                  | Pre 2003 | N     | Mean   | T     | Sig.   | Sig. (2-tailed) |
| Deaths           | Post 2003| N     |        |       |        |                |
| $\geq 2003$      | N = 8   | 190.38|        |       |        |                |
| $< 2003$         | N = 15  | 14.67 | 1.10   | .006  | Not Sig. |
| FEMA Time of Supplies Dispatched | Post 2003| N     |        |       |        |                |
| $\geq 2003$      | N = 8   | 5.50  |        | 2.70  | .087   | .014            |
| $< 2003$         | N = 14  | 3.36  |        |       |        |                |

Table 1 demonstrates the significant difference in the pre and post 2003 FEMA incorporation under the Department of Homeland Security for Deaths $t(21) = 1.10, p<.05$. This finding
indicates that the means of deaths incurred pre-2003 FEMA reconstruction was statistically different at the .05 level than means of deaths post 2003. Furthermore, the dependent variable time of supplies dispatched reflected a finding of $t(20) = 2.70$, $p<.05$ two tailed, leading to the conclusion that time of supplies dispatched pre-2003 was statistically different than post-2003.

In an effort to determine if a relationship exists between the 2003 reconstruction and the efficiency of disaster management, a bivariate correlation was conducted. This correlation was applied to deduce whether a relationship exists and to discover the direction of the relationship. The results are displayed in table 2.

**Table 2: Correlations Pre and Post Incorporation under DHS**

<table>
<thead>
<tr>
<th>2003 pre and post</th>
<th>2003 under and over</th>
<th>Deaths</th>
<th>FEMA Personnel Dispatched</th>
<th>FEMA Supplies Dispatched</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td>.395</td>
<td>.435(*)</td>
<td>.509(*)</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.062</td>
<td>.038</td>
<td>.016</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>27</td>
<td>23</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>Deaths Pearson Correlation</td>
<td>.395</td>
<td>1</td>
<td>.550(**)</td>
<td>.408</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.062</td>
<td>.007</td>
<td>.060</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>Time of FEMA Personnel Dispatched Pearson Correlation</td>
<td>.435(*)</td>
<td>.550(**)</td>
<td>1</td>
<td>.592(**)</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.038</td>
<td>.007</td>
<td>.004</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>Time of FEMA Supplies Dispatched Pearson Correlation</td>
<td>.509(*)</td>
<td>.408</td>
<td>.592(**)</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.016</td>
<td>.060</td>
<td>.004</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>22</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

Table 2 validates a positive correlation between deaths, time of personnel dispatched, and time of supplies dispatched. The direction of the relationship is positive and suggests that as time increases (1 for pre-2003 and 2 for post-2003) so, too, does the number of deaths and the amount of time taken to dispatch both personnel and supplies to the affected area.

The preceding test validates that when efficiency of hurricane relief is measured with the dependent variable of time of supplies dispatched against the independent variable of 2003 reconstruction, a statistically significant correlation is found. This finding further supports the hypothesis that hurricane response prior to 2003 was handled more efficiently than hurricane response post-2003.

In order to investigate our second hypothesis—that significant differences will exist concerning the efficiency of hurricane response between presidents and FEMA directors—a one-way ANOVA was conducted. The results of this test are presented in tables 3.1 and 3.2.
Honestly significantly different testing (Tukey HSD) was conducted to uncover where specific differences lie between presidents along our established dependent variables. Significant differences ($p < .05$) were found between the administrations of Clinton and Bush Jr. in time of supplies dispatched. Differences were also found ($p < .05$) between all three presidents including George H.W. Bush, Bill Clinton, and George W. Bush in cost of damage adjusted. All three presidential administrations also differed significantly ($p < .05$), in time taken to dispatch supplies. Post hoc testing was not conducted between FEMA directors due to an insufficient number of cases among the three directors.

**Public Opinion Research**

Public opinion data was collected from 116 respondents who answered an on-line public opinion questionnaire with 20 items. The variables included, familiarity with FEMA, assessment of FEMA’s response to various disasters, and FEMA’s incorporation under DHS. Independent variables were sex, education, income, and party affiliation. Findings are as outlined in tables 4.1 and 4.2 below.

**Table 4.1: Sex and Political Affiliation**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>No party affiliation</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>47%</td>
<td>35.9%</td>
</tr>
<tr>
<td>Female</td>
<td>58%</td>
<td>11.1%</td>
</tr>
<tr>
<td></td>
<td>Independent</td>
<td>29.9%</td>
</tr>
<tr>
<td></td>
<td>Democrat</td>
<td>23.1%</td>
</tr>
<tr>
<td></td>
<td>Republican</td>
<td></td>
</tr>
</tbody>
</table>

**Table 4.2: Income and Education**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $25,000</td>
<td>17.9%</td>
</tr>
<tr>
<td>$25,000 to 45,999</td>
<td>29.9%</td>
</tr>
<tr>
<td>$50,000 to 74,999</td>
<td>18.8%</td>
</tr>
<tr>
<td>$75,000 to 99,000</td>
<td>18.8%</td>
</tr>
<tr>
<td>$100,000 and above</td>
<td>7.7%</td>
</tr>
<tr>
<td>High school or equivalent</td>
<td>9.4%</td>
</tr>
<tr>
<td>Some college</td>
<td>12.8%</td>
</tr>
<tr>
<td>College</td>
<td>42.7%</td>
</tr>
<tr>
<td>Graduate level or above</td>
<td>35.0%</td>
</tr>
</tbody>
</table>
In response to the question: “Has your opinion of FEMA changed over the past six months?” “Yes” generated a response of 61% and a “no” of 54%. Furthermore the graph below (Figure 1) illustrates responses to the question, “if your opinion of FEMA has changed over the past six months has it changed for the positive or negative?”

Figure 1: Positive or Negative Opinion of FEMA Over the Past 6 Months

Responses to the question: “Were you aware of the change in FEMA incorporating it under the advisement of the Department of Homeland Security?” generated a “Yes” response of 46% and a “No” response of 52%. Responses to the question: “Do you feel FEMA's incorporation under the Department of Homeland Security has led to more effective response to disasters in our nation?” generated 46% definitely not more effective, 34% don’t know/don’t care, 12% somewhat more effective, 5% definitely more effective.

This research seeks to determine whether the public opinion of FEMA has changed after the management of Hurricane Katrina, or H3, and whether the public’s view reflects a relationship between the approval of FEMA and the perception of how Katrina was managed. Methods for testing this hypothesis were a bivariate correlation comparing the variables overall opinion of FEMA and handling of Hurricane Katrina. Outcomes are as follows in table 5.
Table 5: Correlation public opinion of FEMA and the handling of Hurricane Katrina

<table>
<thead>
<tr>
<th>Opinion of FEMA</th>
<th>FEMA response to Katrina</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Correlation</strong></td>
<td></td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.327(**)</td>
</tr>
<tr>
<td>N</td>
<td>117</td>
</tr>
<tr>
<td><strong>Correlation</strong></td>
<td></td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>.327(**)</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>1</td>
</tr>
<tr>
<td>N</td>
<td>116</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).

Both variables were coded with the most positive response being the highest number. In this case, highest level of satisfaction with FEMA’s overall job performance was set at a 5 for Very Positive. Similarly, satisfaction with FEMA’s reaction to Hurricane Katrina was coded from the highest number 6 as the most satisfied and 1 being I Don’t Know. The correlation in Table 3a is a significant positive correlation illustrating that if the respondent’s overall rating of FEMA’s job performance was high, so, too, would be the satisfaction of FEMA’s response to Hurricane Katrina. Equally, if a respondent’s reaction to FEMA’s job performance was low, so, too, would be his/her feelings towards the handling of Hurricane Katrina $p = .01$.

The researchers tested whether the perception of FEMA’s response to Hurricane Katrina would be positive or negative based on the political affiliation of respondents, with an independent sample t-test. The independent variable was set as the recoded party affiliation with Republican coded as 1 and Democrat coded as 2. The dependent variables were FEMA response to Katrina and overall opinion of FEMA’s performance. Findings illustrate that both public opinion to FEMA’s performance overall and public opinion on the handling of Katrina are significantly associated with one’s political party affiliation. Both the overall satisfaction with FEMA and the handling of Hurricane Katrina were associated with party affiliation. Response to Katrina $t(40) = 3.8, p=<.01$; positive or negative opinion of FEMA $t(9) = 2.0, p=<.01$.

Discussion

The first portion of this discussion will focus on H1 and H2, as outlined in the research questions and hypotheses section of this analysis. The second segment of this discussion will offer explanatory information on hypotheses 3 and 4.

Statistical analyses employed in this study consistently indicate that FEMA’s dispatching of supplies to disaster areas is significantly slower following the agency’s 2003 integration into the Department of Homeland Security. These findings directly support research hypothesis H1, which states that hurricane response prior to 2003 was handled more efficiently than hurricane response post-2003. There are a number of plausible explanations for this disconcerting finding.

First, as discussed in the literature review, prior to 2003, FEMA was an independent, cabinet-level agency. The assigned director reported directly to the president, a symbol of the
agency’s influence and prominence within the federal government. During the 2003 restructuring, however, FEMA lost its direct accessibility to the president and became merely another subdivision within the massive Department of Homeland Security. This reorganization, therefore, added superfluous bureaucratic layers to an agency whose mission requires expedience and structure. These additional layers, however, appear to have jeopardized the agency’s ability to respond quickly to emergency events and may serve as a partial explanation for the increased response time in dispatching supplies to disaster areas.

Second, although President Bush espouses an all-hazards approach to federal emergency management, attention and funding since the reorganization have been focused primarily on an anti-terrorism agenda. Studies indicate that the United States spends approximately $180 million per year for the preparation and mitigation of natural disasters and an estimated $20 billion for terrorism. Furthermore, the Government Accountability Office stated in a July 2005 report that out of $3.4 billion in proposed spending for homeland security preparedness grants, approximately $2.6 billion would be utilized for terrorism-focused programs. Although terrorism represents merely a single potential threat among a host of possibilities, these figures indicate that it has, without contention, assumed center stage in emergency management (Glasser & White, 2005).

Finally, FEMA has been unable to reach a state of stability since its integration into DHS. This instability has been heightened by the implementation of numerous resource-intensive organizational changes. In addition to the massive 2003 restructuring, Michael Chertoff, upon assuming the role of DHS director, initiated another organizational overhaul dubbed as the second stage review (Department of Homeland Security, 2005). This review proposed potential changes in the current responsibilities of the Federal Emergency Management Agency and demonstrates the large-scale confusion that continues to exist regarding FEMA’s role in disaster management. In summary, since the 2003 reorganization, FEMA has become an agency that lacks direction, a balanced agenda, and organizational stability, which appear to have hindered its ability to expediently provide supplies to hurricane-impacted areas.

Hypothesis H2 predicted that significant differences would be discovered concerning the efficiency of hurricane response between both FEMA directors and U.S. presidents. Results from this analysis provide direct support for this hypothesis. The most plausible explanation for the differences between directors, which appeared in the areas of supply time dispatching, and damage adjusted for inflation, involves the experience level of each director. James L. Witt, FEMA director from 1993 to 2000, was the only director to have direct experience in the field of emergency management. By contrast, Michael Brown, an attorney with no previous disaster management experience, served as the Judges and Stewards Commissioner for the International Arabian Horse Association prior to his involvement with FEMA. Brown served as FEMA director and primary coordinator during Hurricane Katrina, before being discharged from these duties by DHS Director Michael Chertoff. Due to FEMA’s continued organizational changes, it is of particular importance that its leadership possesses expert knowledge, proficiency, and experience in order to successfully meet the organization’s goals for change and improved performance.

Significant differences also were found to exist between U.S. presidential administrations in the areas of damage adjusted for inflation, amount of time taken to dispatch supplies, and the amount of time taken to dispatch personnel. James L. Witt served as the
single director throughout Clinton’s term in office. As a result, FEMA’s performance will not vary greatly when examined through the Clinton administration or through the directorship of James L. Witt. Witt displayed lower response times in dispatching supplies to affected regions; overall hurricane-related damage was less during his tenure than for other FEMA directors. Therefore, FEMA, during the Clinton administration, performed well in these areas. Due to this inextricable relationship, it is difficult to determine whether the Clinton administration influenced hurricane management in a more positive way than other administrations, or if it’s heightened performance was simply a function of the director. The president, however, is responsible for choosing FEMA directors and, consequently, bears ultimate accountability for the quality of their leadership as well as the agency’s overall performance. Thus, the Clinton administration may have played a significant role in FEMA’s rapid response times and reduced damage estimates not simply because of the appointment of James L. Witt, but also its decision to make FEMA a cabinet-level agency.

Results from the public opinion survey issued in this study indicate that following the disaster of Hurricane Katrina, the majority of individuals adopted a somewhat negative opinion of FEMA. This finding supports hypothesis H3. Results further indicated that many of these individuals were unaware that an organizational change in FEMA had taken place. The individuals in the sample seem to be unaware of changes occurring in the structure of FEMA but acutely aware when management of a disaster is seen as botched or unacceptable. Approval of FEMA and feelings towards the management of Hurricane Katrina fall largely along party lines. This finding directly supports hypothesis H4 and also illustrates the strength of political party identification in interpreting national events. Respondents in this survey were unable to detach their opinion of the handling of Hurricane Katrina from their party affiliation.

Additional results revealed that individuals defining themselves as Republican feel the federal government should be less involved in addressing disasters within states. Furthermore, they reported that the incorporation under DHS has been a positive move for FEMA. This would point to a disconnect between the majority of Republicans surveyed and the dominant view expressed by the majority of Americans. A majority of people surveyed felt the incorporation under FEMA was a negative change, however, a majority of Republicans stated this change was primarily positive. Furthering the divide is the relationship between the transition under DHS and the subsequent slower response times in supplies reaching effected areas. This finding would indicate that although the transition has yielded measurably negative results, it continues to be viewed as a positive change by Republican respondents. Due to the large public divide concerning the federal government versus state’s responsibility in emergency management, the future of FEMA and its role is also likely to be difficult and fragmented. Perhaps as more research becomes available and greater transparency is attained, party identification will play less of a role in the evaluation of public organizations such as FEMA.

Conclusions and Recommendations

The central finding of this study reveals that a relationship exists between FEMA’s transition into the Department of Homeland Security and its efficiency in hurricane disaster response. More specifically, findings illustrate that since the 2003 reorganization, FEMA
displays a significantly slower rate of dispatching vital supplies to hurricane-impacted areas. Furthermore, significant differences were also found to occur in the efficiency of hurricane management between both FEMA directors and U.S. presidential administrations. With regard to FEMA directors, significant differences were revealed in the amount of time taken to dispatch supplies to disaster areas and the amount of damage adjusted for inflation. With regard to presidential administrations, significant differences were found in the areas of damage adjusted for inflation, time taken to dispatch personnel, and time taken to dispatch supplies to affected regions.

Additionally, this analysis demonstrates a correlation between political party affiliation and the individual assessment of FEMA’s coordination of Hurricane Katrina. Results indicate that participants identifying themselves as Republican have a more favorable opinion of FEMA’s performance, while those identifying themselves as Democrat have a less favorable opinion.

The conclusions of this investigation are limited due to the small sample size of hurricanes analyzed. Furthermore, the primary method of data collection for hurricane response time was based on information extracted from media sources. This information, therefore, may be subject to any past or present media bias toward specific political orientations. This potential limitation was alleviated through the inclusion of a wide range of new sources from multiple U.S. regions.

Upon review of the relevant literature, as well as the results of this analysis, it is recommended that future research be directed toward gaining more unified, consistent efficiency measures by which to gauge FEMA’s performance. Due to FEMA’s all-hazards approach to emergency management, it is also recommended that future research be conducted to investigate FEMA’s efficiency in the management of other types of disasters, rather than solely hurricanes. Moreover, as the competence of FEMA is increasingly questioned, it is particularly important that a meaningful dialogue among government officials, emergency management personnel, and the public occur to determine the future status and structure of FEMA. With a new hurricane season impending, policy-makers must decide whether FEMA should be returned to its former independent, cabinet-level status, or if it should remain in the Department of Homeland Security. If FEMA remains in the DHS, then clear guidelines must be established between FEMA officials, DHS personnel, and state and local officials regarding the proper coordination of hurricane relief management. Finally, it is also suggested that a greater number of independent studies be conducted to further define and examine FEMA’s response time in the management of emergency relief efforts. This type of oversight adds greater transparency into the functioning of a crucial public organization and lends necessary opportunity for performance improvement.
Tonya Adamski, Beth Kline, and Tanya Tyrrell

References


Disaster Relief Act of 1950, Pub. L. No. 81-875, § 64 Stat. 1109.

Disaster Relief Act of 1974, 42 U.S.C.A. § 5121 et seq.


Government Executive, 37 (17), pp. 24-32.


Martin, Gary. (2003, July 15). Fort Sam to host rescuers, medical teams also will use SA post as staging area. San Antonio Express, p. 6A. Retrieved November 1, 2005 from LexisNexis Academic database.


FEMA Reorganization


This time officials were ready for storm. (1995, October 6). *Birmingham News*, p. 16A. Retrieved November 1, 2005 from LexisNexis Academic database.


Appendixes

Appendix 1: Public Opinion Survey

Thank you for your participation in this informal survey for graduate research studies at Arizona State University. This survey will be used to measure public opinions on Federal Emergency Response. All responses will be anonymous through this web site and all information is of great value.

The survey will only take 5 minutes and once again thank you very much for your participation.

---

How familiar are you with the Federal organization known as FEMA, Federal Emergency Management Agency, and the services they provide?

- [ ] Very Familiar
- [ ] Somewhat Familiar
- [ ] Not At All Familiar

How do you feel about FEMA’s job performance overall?

- [ ] Very Positive
- [ ] Somewhat Positive
- [ ] Neutral
- [ ] Somewhat Negative
- [ ] Very Negative

Has your opinion regarding FEMA changed over the past 6 months?

- [ ] Yes
- [ ] No

If yes has this opinion changed for the positive or negative? (If no, skip to next question)
Tonya Adamski, Beth Kline, and Tanya Tyrrell

Please rate your feelings on the following statements:
* For the purposes of this survey the term disaster refers to both natural disasters such as hurricanes and intentional acts of destruction such as the attacks on the World Trade Center on 9/11/2001.

States should rely less on Federal assistance when dealing with disaster management within their own states.

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

The Federal government should react and respond to disasters when a request is made by Governor of the affected state.

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
**FEMA Reorganization**

- **Strongly Agree**

How do you feel about FEMA's response to the following disasters

<table>
<thead>
<tr>
<th></th>
<th>Very Positive</th>
<th>Somewhat Positive</th>
<th>Neutral</th>
<th>Somewhat Negative</th>
<th>Very Negative</th>
<th>I Don't Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Oklahoma city bombing in 1995?</td>
<td></td>
<td></td>
<td></td>
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<td>The World Trade Center attacks on September 11th, 2001?</td>
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In response to the terrorist attacks of September 11th, 2001, President George W. Bush instituted the creation of the Department of Homeland Security. This new agency was the most significant transformation of the U.S. government in over half-century, largely transforming and realigning the current patchwork of government activities into a single department whose primary mission is to protect our homeland. In March of 2003 FEMA became part of the new Department of Homeland Security.

Were you aware of this change in FEMA in 2003 prior to this survey?

- **Yes**
- **No**

Do you feel FEMA's incorporation under the Department of Homeland Security has lead to more effective response to disasters in our nation?

- **Definitely**
- **Somewhat**
- **Don't know/Don't care**
- **Definitely Not**
Tonya Adamski, Beth Kline, and Tanya Tyrrell

Have you ever requested or received assistance from FEMA?

☐ Yes
☐ No

If yes, how would you rate your experience with FEMA?
(if no, please skip to next question)

☐ Very Positive
☐ Somewhat Positive
☐ Neutral
☐ Somewhat Negative
☐ Very Negative

What is your sex?

☐ Male
☐ Female

What best describes your education level?

☐ Graduate Level or above
☐ College
☐ Some College
☐ High school or equivalent
What is your income level?

- 100,000 or above
- 75,000 and 99,000
- 50,000 and 74,999
- 25,000 and 45,999
- Under 25,000

What is your ethnicity?

- African American
- Asian American (including South Asia)
- European American
- Latino/a American
- Native American
- Not Listed

What is your political affiliation?

- Republican
- Democrat
- Independent
- No party affiliation
What is your marital status?

- Married
- Single
- Divorced
- Widowed
Lot Splitting and Development Regulation: The Information Asymmetries and Free Rider Issues Associated with Arizona’s Wildcat Development

Paul Christensen, Sherry Haskins, Jamie Hogue and Jess Koldoff

Abstract

Arizona is currently facing a land use problem commonly referred to as “wildcat” development. This type of development occurs when parcels of land are split into five or fewer lots and developed without following the state’s typical subdivision regulations. This behavior results in a myriad of market failure issues such as the free rider phenomenon, when the general public is taxed to provide basic services such as waste disposal for wildcat property owners, as well as information asymmetry, when wildcat properties are sold to unsuspecting buyers. There are also a number of public health, safety and welfare concerns involved.

Using Bardach’s “A Practical Guide for Policy Analysis” (2005), evidence of wildcat development was amassed and criteria selected in order to determine what response, if any, would be appropriate to alleviate the burdens associated with the wildcat problem. The criteria employed included political support, administrative feasibility and public value as defined in Moore’s “Creating Public Value” (1995). Using a matrix, four alternatives were measured against these criteria in order to determine the best policy choice.

The resulting policy recommendation for counties facing this problem is to require verifiable disclosure and restrict building in wildcat developments until infrastructure standards have been met. This will allow private title companies to find an entrepreneurial solution to the need for verifiable disclosure statements as well as encourage counties to make use of this improved information-gathering tool for future planning processes.

Introduction

Loopholes in Arizona law allow property owners to split parcels of land into five or fewer lots and sell them without having to adhere to subdivision regulation requirements (Pima County, 1998, p.4). This process is called “lot splitting.” In many cases, this process results in residential areas that lack basic infrastructure, that do not adhere to subdivision standards or infrastructure requirements, and that are often plagued by blight and decline (Arizona Association of County Planning Directors & Arizona County Supervisors Association, 1999). The creation of a subdivision through the use of lot splits has come to be
known as “wildcat development,” a name that alludes to the uncontrolled nature of urban growth in these development areas.

The prevalence of lot splitting is an important public policy concern given the impacts that occur with this unregulated, unmonitored process. According to the 2000 census, Arizona’s population expanded by 40 percent in the last decade, and wildcat areas are a symptom of this explosive growth. Over the past eight years, nearly 17,000 lot split parcels were sold in Pinal County alone (Holcombe, 2005). The spread of these areas and the government’s failure to respond reflect an ideological debate as old as the West. This issue pits the freedom of landowners against the duties and authority of government.

Lot splits that result in wildcat developments can cause negative physical and economic consequences not only to individual land owners but also to the general public. Some of the impacts associated with lot splitting are lack of emergency access; provision of utility services; water availability; refuse and wastewater disposal; and public construction, maintenance, and improvements (AACPD & ACSA, 1999). In view of the magnitude of the long-term consequences of lot splitting, a major question for policy makers is what can be done to reduce the burden to society associated with the information asymmetry and free rider issues surrounding the use of lot splitting to create wildcat developments. The technical properties of lot splitting and the resulting urban sprawl make it difficult to collect from the land owner all of the economic costs of wildcat development. Due to the lack of data, it is difficult to measure the extent of the market failure. However, the negative externalities related to lot splitting justifiably raise claims for amelioration through public policy in order to protect the public interest.

For the purpose of this analysis, Eugene Bardach’s “A Practical Guide for Policy Analysis: The eightfold path to more effective problem solving” (2005) will be used to frame the policy discussion, analysis process and procedure. This analysis will use evidence from the literature and collected in interviews to identify the problems associated with lot splitting in Arizona. The scope and depth of lot splitting in unincorporated areas of counties will be discussed along with the dynamics of how the problem affects society in Arizona. Policy alternatives will be identified and compared with the status quo of leaving current trends in lot splitting unchanged. Criteria will be described and used to assess the alternatives’ viability and resulting outcomes. An outcome matrix will be used in the analysis to compare alternatives. The tradeoffs between the alternatives will be examined, leading to a policy recommendation for the problem of wildcat development in Arizona. At the core of this analysis is a clear delineation of the criteria developed for judging the different policy alternatives. The proposed criteria decrease the information asymmetry associated with lot splitting, reduce free rider issues, and utilize political and institutional theory to estimate feasibility.

Problem Definition:

The problem, as defined for this analysis, is that too many acres of Arizona land are being developed in an unregulated and unmonitored manner which is detrimental to the citizens’ public health, safety and welfare. For example, in fiscal year 1997-1998, the Pima County Administrator’s Office and Development Services Department reported that about 16 percent of new single-family and mobile-home building permits issued for unincorporated
Pima County were in unregulated or loosely regulated wildcat subdivisions (AACPD & ACSA, 1999). In 2002, Yavapai County found that more than 2,000 home sites were created through lot splitting and only 200 sites were created as part of the formal subdivision process (McKinnon, 2005).

The findings of a 1999 study, compiled by a workgroup of planners representing all fifteen counties in Arizona, suggested that wildcat developments affect a broad range of both public and private interests (AACPD & ACSA, 1999). The study results indicate many stakeholders are affected by this important public policy issue, including the property buyer, local governments, emergency service providers, utility providers, school districts, water districts, mortgage lenders and the community as a whole. The findings are substantiated in a study conducted by Wassmer (2002), characterizing these concerns as being the symptoms of urban sprawl. Each stakeholder has a unique perspective regarding the implications of the unregulated, unmonitored process of lot splitting and the resulting wildcat development (Wassmer, 2002).

According to the literature review, some of the causal assumptions of the problem center on preventing the practice of lot splitting by amending the statutory definition of "subdivision" to include the splitting of all parcels of land (AACPD & ACSA, 1999). Moore (1998) suggests using entrepreneurial thinking to explore new solutions to public policy concerns. Using Moore’s strategy of integrating politics, substance and administration, this analysis will focus on creating public value for Arizona citizens through a solution to the problems associated with wildcat development.

**Methodology**

The data presented in this policy analysis were collected and assembled from a broad array of sources. A literature review of scholarly journals, research articles, reports, newspaper articles, impact surveys, state statutes, and personal interviews provided the basis for determining our recommendations. A tour of lot splitting problems in Pinal County hosted by a county supervisor and an active citizen organization provided opportunities to understand the problem from the elected official and the landowner’s perspective. Historical background information provided a cultural context to the issue and helped to define the problem as being a conflict of American values. Research articles and “best practice” reports such as *Growing Smarter Plus* further expanded knowledge from a policy perspective. A review of the current Arizona State Statutes suggested the lack of tools necessary to adequately address issues surrounding lot splitting. Personal interviews with a land developer, county planners, county supervisors, legislators, land owners, and representatives from the Association of County Supervisors provided perspectives from the many stakeholders.

**Private Property in America**

There is a set of cultural symbols regarding property that are central to the American character, yet Americans seem to be of two minds on property rights and land. Jacobs (1999) suggests that in a broad sense we all agree on principles of land use in that we want land to be
used well. Americans do not want land to be degraded nor do we want land uses to burden the public with wasteful investments or costs such as roads, sewers, or water lines.

Americans seem to agree on the goals of land use. We want land use to be rational, efficient and equitable. According to Jacobs (1999) the problem stems from not agreeing on the definition of these terms nor specific measures to implement the goals. Our disagreement focuses on the interpretation of American history, our understanding of the human motivations and behaviors that drive economics of land use, and the very nature or philosophy of land use. Promoters of a strong private property perspective view landowners as stewards (Jacobs, 1999). This interpretation suggests that owners will want to be responsible managers of their land because they will personally benefit, resulting in social interest. Critics argue that landowners make decisions that are economically and socially sensible from their own perspective but are not judged to benefit the broader public. For example, landowners want to buy low and sell high. From this perspective, landowners make decisions that take into account neither the broader public interest nor a more expansive economic calculation. Garrett Hardin (1968) referred to this as the “tragedy of the commons.” Jacobs (1999) points out that all of the factors—history, economics and philosophy—are further complicated by the particulars of our governance and democratic structures. These four factors make the politics of land contentious, and underlying all four is the fact that land is unique. As a fixed resource, land represents the major source of wealth, status and security for its owners. Land-use planning is a wealth-creating and wealth-distributing process.

According to Yoram Barzel, a professor of economics at the University of Washington, property rights carry two distinct meanings in the economic literature (1997). One meaning is essentially the ability to enjoy a piece of property and is designated as an economic property right. The other meaning, much older and more prevalent, is what the state assigns to a person, which Barzel designates as a legal property right. What people ultimately seek, argues Professor Barzel, “are economic rights, whereas legal rights are the means to achieve the end” (Barzel, 1997, p. 3). This concept affects the issue of lot splitting in a profound way.

Frank Popper (1978) suggested that land is primarily a social weapon. It is a means by which its possessors protect their economic, political and other interests. It may be the most tangible and primitive form of power. Americans seem to want both private property and limits on private property. Jacobs (1999) argues that as Americans we want freedom on our property and restrictions on others people’s property. What we want regarding property is security of our financial investment, clarity of the rules for land use, and certainty regarding how future changes will affect our security. As technology and social values change, the balance point between individual and social rights in property will continually be renegotiated (Jacobs, 1999). The ongoing conflict of American values regarding property rights and land use is clearly represented in the issue of lot splitting in Arizona.

Arizona’s Legal History

Before 2000, Arizona law was silent about disclosure requirements and the regulation of lot splits. The real estate and property laws only covered “land divided for sale into six or more lots” (Arizona Revised Statues, 32-2101). In 1998, the Arizona legislature adopted the Growing Smarter Act, which represented the first statewide attempt to monitor and regulate
Wildcat Development

growth. The Act utilizes the “smart growth” approach of planning and zoning, which entails balancing economic interests with impacts on the environment and quality of life (Heffernon & Melnick, 2001, p.1). This Act requires cities and counties to develop and regularly review long-term development plans. Local governments are also required to conform all zoning actions to information contained in the plans.

Two years later, the State Legislature approved the Growing Smarter Plus Act. For the first time in Arizona history, counties were given limited authority over lot splits. Before 2000, local governments had no planning or zoning authority over these land sales. Counties are now allowed but not required to approve lot splits in unincorporated areas (Heffernon & Melnick, 2001, p.2). The counties are also allowed to adopt ordinances, often referred to as “minor land ordinances” (See Appendix A). These ordinances can prohibit the issuance of building permits in unregulated development areas until the county’s minimum zoning requirements are met. However, the new law requires the counties to approve a lot split as long as a disclosure affidavit is provided (ARS 11-809). The disclosure affidavit must include information on legal and physical access, as well as information on necessary utility easements. None of the information in the affidavit must be verified through a title report or engineering study, and sellers are allowed to answer “unknown” to many of the questions contained in the affidavit (See Appendix B). It should also be noted that the county is only allowed 30 days to act on a lot split before it is automatically approved (ARS 11-809). Thus, the quality and quantity of the information provided varies greatly between transactions. In addition, buyers of property in lot split areas may not be aware that they are required to meet minimum zoning requirements until it comes time for them to build on their property – and that can be several years after the property was originally purchased.

Another provision of the Growing Smarter Plus Act prohibits a person from using the lot split process to avoid the state’s subdivision laws (ARS 11-809). However, the prohibition has never been tested because the law does not provide any guidance on how one would prove a person engaged in lot split activity was trying to avoid subdivision regulation. The Act also allows cities and counties to limit extensions of their water, sewer and street improvements as long as they outline these limits in their general or comprehensive plans (ARS 11-826 and ARS 9-461.08). However, property owners within wildcat subdivisions often place political pressure on the city and county to provide them with needed services, regardless of the limitations stated in the general plan (Pima County, 1998, p.7).

Two issues surrounding the state’s attempt to monitor and plan for growth have exacerbated the current problems associated with lot splitting. First, local governments have been forced to comply with the provisions of the two planning Acts without additional funding. Developing a general or comprehensive plan can cost local governments up to $200,000 and require additional ongoing expenditures (Heffernon & Melnick, 2001, p.5). Thus, counties and cities have dedicated a large portion of their planning and zoning resources to developing these plans, leaving fewer resources available for other priorities, such as developing minor land ordinances. A review of all county ordinances revealed that of Arizona’s fifteen counties, four have not yet developed a minor land ordinance, and those that do have an ordinance adopted it within the last year – nearly four years after the adoption of Growing Smarter Plus (Appendix C).

Another issue that must be recognized is the mismatch of policy solutions to problems. Requiring a person engaged in lot splitting activity to compile an unverified disclosure...
affidavit does not address the information asymmetries nor does it eliminate the free rider problem. For example, the seller of the land can simply reply “unknown” to the questions posed on the disclosure affidavit and subvert the attempt to improve information sharing between buyers, sellers and local governments.

Disclosure affidavits were first developed as protection against future liability in a real estate transaction, and are better defined as a tool of the financial sector, not an effective planning tool. The disclosure is unverified and does not include information on future needs, such as whether or not there is an adequate long-term water source or the adequacy of the physical and legal access to the property. Even if local governments had the resources to review and track lot splits, it would be nearly impossible for them to know which areas would become wildcat subdivisions and which ones would remain undeveloped. In addition, because the information contained in a disclosure affidavit is not specific, potential buyers of the property may not have access to enough data to make an informed decision.

Evidence

Lot splitting has become a common practice in Arizona. For example, in 1997 Pima County granted permits for 3,729 new residential units. Of these, 1,525, or 41%, of the permits issued were in unregulated development areas (Pima County, 1998, p. 22). The practice of lot splitting has many detrimental effects on numerous stakeholders, including the individuals that purchase split lots as well as the general citizenry and governmental jurisdictions in the surrounding area. This is due in large part to the information asymmetry associated with these types of real estate transactions due to a lack of regulatory oversight.

In order for a competitive marketplace to function properly, buyers and sellers must have all of the information needed to enter into a transaction or exchange. Information asymmetry occurs when effected parties to a transaction have unequal or different information (Kraft and Furlong, 2004, p. 76). Lack of verifiable disclosure affidavits as well as a lack of information about water availability and future costs for infrastructure improvement represent just a few examples of information asymmetries experienced by buyers of lot split parcels. In addition, local governments don’t have the resources to track lot splits and determine which ones will result in wildcat subdivisions. According to a 1998 report from Pima County, “unregulated lot splitting occurs on such a large scale that the cumulative result is the creation of residential communities with little if any basic infrastructure or services” (Pima County, 1998, p.6). Hence, local governments lack the needed information to effectively plan for these developments.

Information asymmetry occurs in a market when the seller has more knowledge going into the transaction than the buyer, or vice versa. This is possible in lot splitting situations because the normal subdivision laws that ensure flood risk disclosure and an adequate water supply, legal access to the property, and other infrastructure considerations such as electrical power hookups and sewer connections are not in place to protect the buyer.

Sellers of lot split parcels are not required to perform a land-use study to determine if the property is in a flood plain. As a result “the purchaser is unaware if the property is encumbered by a flood hazard and what is the extent and nature of the flood hazard” (Pima County, 1998, p.11). The unregulated development of property often comes without access to water. When water is provided, the lot split developer can install a substandard system, which
Wildcat Development

may not fail until after the developer has moved on, leaving the costs of renovations with the lot owners (Pima County, 1998, p.11). When water access is not provided, owners must haul water to their homes or drill a well. Lot buyers may find the water table is deeper than they were told at the time they purchased their property, assuming they were made aware that they did not have a water supply. Wells that pump less than 35 gallons per minute are not monitored by local, county, or state agencies (Yavapai County General Plan, 2003, p.54). The unregulated pumping of ground water in concentrated areas also leads to potentially rapid drops in the water table, often referred to as an island effect, in the surrounding area (Jacobs and Megdal, 2004, p108). Often, there is not a sufficient water supply for the number of residents in the area, or there are too many homes hooked up to a single well (Pima County, 1998, p.11).

Further complicating the water issue is the fact that wildcat subdivisions are likely not connected to a sewer system. Over time, poorly maintained or constructed septic tanks can leak into the surrounding water table, polluting the only source of water for these homes (Jacobs and Megdal, 2004, p108). Again, the high concentration of septic systems increases the likelihood that contamination may occur. Even if property owners maintain their septic equipment properly, a neighbor that is not as diligent can pollute the water supply of many lots (Jacobs and Megdal, 2004, p108).

Homes in wildcat subdivisions in unincorporated areas are not likely to be provided with refuse collection. If this is not made clear during the real estate transaction, a lot buyer may find that they have little or no recourse. If refuse collection is not available in the area, the landowner will have to make regular trips to a local landfill, as well as possibly burn what combustible refuse they produce (AACPD & ACSA, 1999, p.10).

Lot split parcels also may not provide for legal access to the buyer’s property (Pima County, 1998, p.9). This happens when a property does not have a legal right-of-way. The road an individual uses for access may actually be located on another’s property. Due to the lack of development planning enforcement, road easements and right-of-ways may differ in width along the length of the road, resulting in areas that may be quite narrow (Pima County, 1998, p.9).

Often roads are damaged by erosion during heavy rains due to poor or inadequate engineering (Pima County, 1998, p.10). Counties are not allowed to pave privately owned roads in unincorporated areas (Holcombe, 2005), which leaves them vulnerable to erosion and a health risk due to the high amount of dust created by traffic (AACPD & ACSA, 1999, p.9). Further, emergency response vehicles may have difficulty finding the home due to poor roads, inadequate signage and poorly numbered addresses (Pima County, 1998, p.12).

Wildcat development has negative impacts on other citizens and local governmental jurisdictions as well. Lot splits create problems for planners because allowing unrestricted development hinders the enforcement of minimum development standards (AACPD & ACSA, 1999, p.15). Wildcat areas lack adequate infrastructure such as water, sewer and roads. When roadways are taken over by a county for maintenance and improvement, the taxpayers of that county bear the costs (Pima County, 1998, p.11). Because the roadways often do not meet construction standards, they are more hazardous than roads in planned development areas, which leads to increased tort liability for the county (Pima County, 1998, p.11).
Property owners can become free riders when they receive the benefits of a commonly provided good or service, such as a road or a water system, without having to pay an equal share for that good or service to be provided. Many times, the owners of lot split parcels are afforded the opportunity to receive benefits from the local government without having to pay for these benefits. For example, many times the buyers of lot split parcels do not reclassify their land for residential development and pay property taxes based on a much lower assessment ratio due to the fact that some types of property, such as grazing land, impose a much lower marginal cost on the local government (Pima County, 1998, p.15). Thus, these owners of lot split property are not paying their fair share.

Another example of the free rider problem can be illustrated by a local government’s obligation to invest in street improvements and water infrastructure so as to ensure public health and safety. While these expenses are normally part of the cost of development within regular subdivisions and paid for by the future owners of the property within that subdivision, in the case of wildcat development, these costs are often borne by all taxpayers in the area.

The unrestricted nature of wildcat development makes it impossible for governments to recover the costs of providing services through taxation (AACPDP & ACSA, 1999, p.15). Residents in lot split developments pay the same county property tax rate as traditional developments. However, wildcat areas are dominated by mobile homes, which have a significantly lower property valuation (Robichaux, 2005). In Pima County, the Improved Full Cash Value per section averages $38.5 million in regulated development areas, but only $8.1 million in unregulated development areas (Pima County, 1998, p.15). This leads to a loss of revenue for counties because the development occurring in wildcat areas is not as valuable as regulated, permanent housing. Counties may also fail to tax all parcels due to unrecorded land deeds, and under-tax developed areas as grazing land instead of taxing them as residential development (Pima County, 1998, p.15).

Criteria

As Bardach (2005) suggests, in order to assess the complex and uncertain scenarios for the basic alternatives combined with their variants, an outcomes matrix is used in this analysis. An overview of all the information is displayed and projected outcomes are given a symbolic descriptor. The information in the criteria columns project how the alternative will affect the value being measured and in what dimension the change will occur.

Based on the evidence of wildcat development and the resulting negative effects for Arizona counties, a number of criteria have been selected in order to weigh various policy alternatives to this problem and maximize the public value outcome. The criteria selected were intended to do just that, with elements taken from Moore’s “Creating Public Value: Strategic Management in Government,” Bardach’s “A Practical Guide for Public Policy: The eightfold path to more effective problem solving,” and from the above stated problem definition of wildcat development itself. The overarching criteria employed in this analysis include the three points of Moore’s strategic triangle: political support, administrative feasibility and public value (22). Political support is defined as whether or not a particular policy alternative, given implementation, would find a majority of the population’s support, including pervasive groups such as interest groups, elected officials and the voting public at large. Administrative or operational feasibility is defined as whether the infrastructure and
resources already in place within a given county could withstand enforcing the newly implemented policy alternative. The third criterion, public value, is defined in terms of the wildcat development policy problem and the specific information asymmetry and free rider issues we are trying to manage. Public value, therefore, is measured in terms of protecting private property rights, protecting Arizona tax payer rights, improving public health and safety, and protecting individual property owner rights. Each of these elements of public value intrinsically incorporates the criteria of political and administrative feasibility. In addition, these elements also measure Bardach’s evaluative and practical criteria, including efficiency, equity, freedom, values, legality, political acceptability and robustness (Bardach, 2005, p.26-33).

Given these elements, our measurement for public value was given four times the weight of the other criteria—political support and administrative feasibility (see Table 1). This was important to do, because, while political and administrative feasibility measures determine whether an alternative can be implemented successfully, public value determines whether an alternative can solve the wildcat development problem of free rider and information asymmetry issues while also balancing the interests of private property and individual owner rights with those of tax payers and the county. These interests and issues are the paramount reason for undergoing the analysis in the first place and therefore warrant a higher degree of weight than the other criteria.

Alternatives

Of course, without viable alternative policies, there would be no need for analysis based on these well-defined criteria. In this analysis, four alternative policies have been selected, which we will title alternatives one through four. Alternative one (A1) upholds the status quo, and, by not changing any aspect of the current policy, allows a continuation of the minor land ordinance implementation. Given that this process allows for proper processing and cataloguing, then the information being gathered by the counties may be adequate to aid future planning activities. This alternative is concerning, though, as it does nothing to alleviate concerns over an adequate water supply, air pollution, construction within floodplains and fissures. While these concerns are significant, A1 will most likely be deemed the most appropriate alternative by developers in the county, who typically support little to no regulation.

Alternative two (A2) requires sellers of lot split property to provide prospective buyers with a verifiable disclosure packet as opposed to the limiting disclosure affidavits now in use. These more inclusive disclosure packets would contain information on whether or not the property is located within the county’s service area and would outline minimum infrastructure standards and requirements that become the responsibility of the new property owner. This requirement prevents sellers from answering “unknown” on the current property disclosure form regarding questions of access to and availability of resources. This change in policy would allow buyers of wildcat developments to be notified of the required improvements and future financial obligations for the property, alleviating information asymmetry problems. Additionally, this alternative could provide a starting point for requiring buyers to make the infrastructure improvements necessary so as to reduce the free rider problem. Verifiable disclosure will most likely be supported by the real estate industry and questioned by
developers and private property advocates who will see it as another attempt to increase the cost of construction and impede property owners. It will also create additional administrative work for counties as they would be required to develop disclosure procedures and begin tracking information on lot splits.

Alternative three (A3) imposes impact fees on the buyers of lot split parcels reflecting the minimum costs of necessary infrastructure improvements in order to protect the health and safety of residents as well as the county bottom line. This alternative includes a stipulation for decreasing the amount of impact fee paid by a lot split purchaser along the magnitude of proposed improvements made by the owner, including water source, sewer/septic system, waste and wastewater removal, and road infrastructure. The result would limit private property rights by mandating a minimum level of development for each parcel, internalizing costs currently shared with all taxpayers. Supporters argue that this method would ensure the general taxpayer is not burdened with paying for infrastructure improvements on someone else’s home. In this scenario, counties would need to develop standards and impact fee levels for varying development types and intensities.

The final alternative, alternative four (A4), includes amending existing state law so that counties have the ability to establish improvement districts in wildcat development areas that have reached a specified size measured by number of lots. The revenues collected through these district property taxes would then be used to fund the needed infrastructure improvements and services in the development area. In order to form an improvement district, 51 percent of the landowners in the wildcat development would need to consent by affirmed signature and the County Board of Supervisors would need a supermajority vote in favor. While the imposition of new taxes is politically unpopular in Arizona, the real estate and large development companies may support this alternative if it is seen to equalize costs of development. On the other hand, homebuilders and property rights groups will oppose the tax because they would then become responsible for the full costs of development. Administration of this alternative would be quite simple as counties already have capacity and experience in collecting taxes and administering improvement districts.

The above alternatives were each weighed against the aforementioned criteria and given scores of -1, 0 or +1 in each category. A score of “-1” means the alternative does not meet the criteria, while “0” reflects a neutral response to the criteria and “+1” reveals an alternative that does meet the criteria as previously defined. The scores for each alternative were then added across the criteria for a total score, allowing for comparability (Table 1). A maximum total score would equal six, while a minimum total score would equal negative six.

According to our purely numerical analysis, policy alternatives two (A2) and four (A4) appear to come the closest to satisfying all of the selected criteria (Figure 1), but we also want to evaluate and confront the tradeoffs latent in these alternatives to be sure they accurately represent our goals in alleviating the problems associated with wildcat development.
Table 1: Performance of Alternatives against Criteria

<table>
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<th>Maximize Administrative Feasibility</th>
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</tr>
<tr>
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<td>A2</td>
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<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>A3</td>
<td>-1</td>
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<td>-1</td>
</tr>
<tr>
<td>4</td>
<td>A4</td>
<td>+1</td>
<td>+1</td>
<td>0</td>
</tr>
</tbody>
</table>

A1: Do nothing  
A2: Require verifiable disclosure  
A3: Impose impact fees on buyers  
A4: Allow counties to establish improvement districts

Figure 1
Tradeoffs

In considering the tradeoffs between the policy alternatives, a few common themes become apparent. At issue are the rights of private landowners versus government control. By analyzing the problem of wildcat development through the lens of a market failure that is caused by information asymmetry and free rider issues, it becomes clear that government intervention of some type, in varying degrees of intensity, is necessary to protect the public value we place on our community, quality of life and environment.

When action is taken to correct information asymmetry, it is necessary to impose fair disclosure regulations to protect prospective buyers. Landowners may view this as an infringement on their right to do as they wish with their property. The rights of individuals come into conflict with the rights of the prospective buyers. It is helpful in addressing the free rider issue to again consider individuals and groups. In this instance, however, regulation correcting free rider issues protects the community as a whole from individuals that are not contributing their fair share to the costs associated with wildcat development. In the following section, we will discuss the four alternatives from our matrix in more detail:

A1: Do nothing.

This allows current trends to continue. The expected outcome is that lot split developments will increase or decrease in number based on the market. Property owners who wish to split their parcels into smaller lots will be able to continue to do so under current laws. However, unregulated wells will continue to operate and be built. Housing units will be developed in areas with insufficient ground water, and the risk of pollutants spoiling the water table due to faulty or too many septic systems will not be abated. Roads will be insufficient, poorly planned and hazardous to drive. County governments will continue to lose revenue due to lower assessed home values and the use of inaccurate valuation rates. Taxpayers may still be required to pay for the infrastructure improvements that are normally paid by developers in regulated developments, and the tax burden to bring the lot split areas up to a reasonable level of code compliance will be absorbed by the surrounding area.

A2: Require verifiable disclosure.

The expected outcome of requiring verifiable disclosure affidavits and the establishment of infrastructure standards and requirements is decreased information asymmetry and a reduction in free rider costs to taxpayers. Landowners still have the right to split their parcels, but buyers will be protected from a lack of information. The reduction of information asymmetry may lead to less demand for split lots, reducing the ability of landowners to profit from their real estate investments. However, reducing the demand for such development will lead to a decrease in the negative environmental and community impacts associated with it. Requiring the property owner to meet minimum infrastructure requirements may also reduce the incidence of poorly constructed roadways and inadequate water supplies.

By requiring split lot buyers to improve their parcels by guaranteeing a basic level of infrastructure before a building permit can be issued, the free rider issue is addressed in that the individual lot owners will bare the costs of improvement rather than taxpayers. Internalizing these costs to the buyer may lead to a decrease in demand for this type of development, leading to a reduction in negative environmental and community impacts.
Increasing the private costs of improvement for the sake of reducing the social costs can be seen as regressive because those who may least be able to afford housing will lose buying power in the market.

**A3: Impose impact fees on buyers.**

The expected outcome of imposing impact fees on lot buyers would be an immediate recovery of infrastructure costs as opposed to assessing fees at the time of residential development. This will lead to funding for water, sewer and road improvement from the onset of development, rather than waiting for individual owners to put housing on their parcels. Again, the free rider issue is addressed by recovering the social costs of development. Compliance with a minimum level of infrastructure and land improvement will ensure adequate access to the property and will reduce the incidence of poor water supply and lack of solid waste disposal. Requiring a minimum level of infrastructure and land improvement will protect the long term value of the land. However, individual property owners will be required to pay more for developing their property. It is unclear if these costs would be greater than, equal to, or less than the costs of regulated development. Currently, a developer wanting to develop a large subdivision pays roughly $33,000 per lot in order to meet all of the requirements imposed by state and local governments (Personal interview with Mark Borushko, President, MB Group Construction Management and Administrative Services on Friday Sept 30, 2005, by Sherry Haskins, Jamie Hogue, and Jess Koldoff). Many of these requirements are not included in the purchase price of lot split parcels and are not paid by the buyer of the property. Instead, the costs are shifted to local taxpayers when the city or county takes on the responsibility of providing necessary infrastructure improvements.

The implementation of impact fees is a contentious political topic that is still being debated for regulated development. Counties would face significant up-front investments. Counties would also be required to develop a system of tracking lot split developments and integrating that information with their planning and zoning process, including development of long-term capital improvement plans.

**A4: Allow counties to establish improvement districts.**

The expected outcome of allowing the establishment of improvement districts is the reduction of costs associated with infrastructure improvement on general taxpayers. The collection of improvement district revenues would decrease the dependence on county general revenues. Some residents will likely not be willing to increase their tax burden, and property owners may view the tax as an infringement on their right to purchase land in unregulated areas. The creation of improvement districts and the construction of infrastructure improvements will reduce the risks to public health and safety.

Infrastructure improvements will increase the value of the homes in those areas for tax purposes, which will lead to an increase in revenue to the counties. The free rider issue is addressed by imposing taxes. However, establishing improvement districts and assessing new taxes will require public and political support.
Policy Recommendation

By itself, lot splitting does not appear to be the policy problem. According to former state legislator and current Yavapai County Supervisor Carol Springer, “Lot splitting has traditionally benefited some people a lifestyle they would not be able to afford otherwise – and are willing to make the compromise of doing without the developed infrastructure of maintained roads, sewers and public utilities to have a piece of rural property” (Personal interview with Carol Springer, Yavapai County Supervisor, Thursday Nov. 10, 2005, by Sherry Haskins). Many lot splits are purchased for investment or recreational purposes and are not developed. In other cases, a family may decide to divide a large parcel of land among family members without intending to develop the land. In cases such as these, the current disclosure requirements would be adequate.

Local governments need additional tools that address the specific planning and zoning issues that arise when a lot split results in a wildcat subdivision. Strengthening the disclosure affidavit so that it is verifiable and provides the information needed by the potential buyer as well as county planning and zoning departments is critical. The sellers of these parcels should no longer be allowed to answer “unknown” to any of the items on the affidavit.

A reasonable solution to eliminating this information asymmetry already exists in the private market. If public policy makers require that the information contained in disclosure affidavits be verifiable, title companies will create an entrepreneurial market to provide that service. Title companies already perform all of the detailed research and verification that must be completed when subdividing land or selling existing developments. The resources already exist in these companies to create a new, less costly and less intensive product for those wanting to sell their properties through the lot split process. Providing the incentive that encourages an existing market to adapt to a new opportunity is the type of entrepreneurial public policy solution Moore encourages when exploring new ways of creating public value (1995, p.299).

Improving the quality of the information contained in the disclosure affidavit will eliminate the information asymmetry faced by future property owners. Potential property buyers will be informed of the likelihood of future investments in the property and will be notified that they will not be able to obtain required building permits unless a minimum level of infrastructure improvement is completed.

As suggested in alternative two (A2), local governments should also be allowed to withhold building permits until a lot split parcel meets a minimum level of compliance with zoning ordinances. Allowing each county to base permit decisions on compliance with their own zoning ordinances will ensure that local needs are being met. In areas of the state where lot splitting is not creating wildcat subdivisions and the associated free rider issues, the building permits can be issued with little or no inconvenience to the lot purchaser. In other areas, such as Pima, Pinal and Yavapai Counties, where the problem of wildcat development is negatively affecting public value, the restriction on issuing building permits can be used as a tool by the local governments to ensure that lot split owners internalize some of the costs associated with developing their land. Tying the issuance of building permits to a minimum level of infrastructure development will minimize the free rider issue that currently saddles Arizona taxpayers. In most cases, general tax revenue will no longer be used to provide basic infrastructure improvements for wildcat developments.
The only remaining barrier to success is local governments’ ability to capture and utilize the data that is contained in the disclosure affidavits. According to Moore, public managers must be capable of innovating and capitalizing on the resources and information available to them (1995, p.232). The current weakness in counties’ abilities to capture information on lot split sales and the resulting wildcat developments illustrates an opportunity for innovation. If the level of information requested in the disclosure affidavits is increased, as suggested above, it could be used to greatly improve planning processes. Thus, counties must find a way to capitalize on the new information that will be provided, in order to improve their own abilities to plan and deploy their resources to deal with future growth.

**Conclusion**

The prevalence of wildcat development, coupled with the state’s unprecedented growth, will continue to pose public policy challenges in Arizona’s future. Sandie Smith, Pinal County Supervisor, recently stated that “the results of the last few years points to the fact that counties do not have the tools to completely deal with these (lot) splits” (Personal interview conducted November 2, 2005, by Sherry Haskins).

Action must be taken to minimize the information asymmetries and free rider issues associated with wildcat development. In order to address this issue, public policy makers must first realize that “politics is the gatekeeper of the lot splitting problem in Arizona” (Personal interview with Craig Sullivan, Director of Arizona County Supervisor’s Association, November 2, 2005, conducted by Sherry Haskins). A solution must balance the interests of private property rights with government’s need to protect the health and safety of residents as well as the interests of individual property owners with the community at large. A solution must also be operationally obtainable from the perspective of both property owners and government officials. A balanced approach that incorporates improved disclosure requirements with the ability of local governments to limit development in areas that lack basic infrastructure adequately addresses the necessary criteria and represents an entrepreneurial solution that creates public value for Arizona.
References


Appendix A: Pima County Minor Lands Division Ordinance

Chapter 18 of the Pima County Code is hereby amended by adopting a new chapter, 18.70, “Minor Lands Division” to read as follows:

CHAPTER 18.70
MINOR LANDS DIVISION

Sections:
18.70.010 Purpose
18.70.020 Definitions
18.70.030 Permit Required
18.70.040 Applicability
18.70.050 General Requirements
18.70.060 Procedures
18.70.070 Exceptions
18.70.080 Violations, Penalties, & Enforcement

18.70.010 Purpose
The purpose of this Chapter is to protect the public health, safety, and welfare by providing for the review of all land divisions, unless otherwise excepted by this Chapter, in order to determine whether the resulting lots, parcels, or fractional interests meet or provide for the following:
A. Minimum applicable zoning requirements.
B. Legal access.
C. Physical access.
D. Reservation of utility easements on the lots, parcels, or fractional interests being created.

18.70.020 Definitions
A. Applicant: Owner or owner’s authorized agent of land subject to this Chapter.
B. Minimum applicable county zoning requirements: The minimum acreage and dimensions of the resulting lot, parcel or fractional interest as required by the Pima County Zoning Code.
C. Legal access: A right of legal ingress and egress to and between the lots, parcels, or fractional interests being created.
D. Lot: Refer to section 18.03.020L.3.
E. Physical access: Access that is traversable by a two-wheel drive passenger motor vehicle.
F. Subdivision: Refer to section 18.69.020A.14.a.

18.70.030 Permit Required
A. No land may be divided into five or fewer lots, parcels, or fractional interests, any of which is ten acres or smaller, unless a land division permit has been issued by Pima County.
B. Payment of an applicable land division fee in accordance with the adopted fee schedule is required as a condition of obtaining a land division permit.

Co8-03-11 3

18.70.040 Applicability
A. The provisions of this Chapter apply to all land divisions of a parcel into five or fewer lots, parcels, or fractional interests, any of which is ten acres or smaller in size, unless otherwise excepted by this Chapter.
B. County issuance of a land division permit under this ordinance is not a representation that the division complies with state laws or county ordinances regarding the subdivision of land.
C. It is unlawful for a person, or group of persons acting in concert, to attempt to avoid the provisions of this Chapter or other county ordinances and state subdivision laws by dividing a parcel of land into six or more lots, parcels, or fractional interests or to sell or lease six or more lots, parcels, or fractional interests, by using a series of owners or conveyances.
D. Failure to obtain a land division permit prior to dividing land into lots, parcels, or fractional interests shall be a violation of this Code.

18.70.050 General Requirements.
A. No parcel of land may be divided into five or fewer lots, parcels, or fractional interests without complying with this Chapter and obtaining a land division permit, unless otherwise excepted by this Chapter.
B. All improvements to and development of land divided pursuant to this Chapter must comply with all other applicable Pima County Code provisions.
C. A building, or use permit shall not be issued for development on any lot, parcel, or fractional interest that does not comply with the provisions of this Chapter.
D. A land division application that does not comply with one or more of the items listed in section 18.70.060A may still have a permit issued if the applicant signs and records an acknowledgment that no building or use permit will be issued until the lot, parcel or fractional interest meets the minimum zoning requirements, has legal access, physical access, and has reserved utility easements.
E. The granting or issuance of any certificate, permit, registration or other approval pursuant to this Chapter requires compliance with all other applicable laws and Pima County Code provisions.

18.70.060 Procedures
A. Submittal of Application. The applicant must submit a properly completed and filled out land division application and any required supporting documentation for staff review as set forth below.
1. An application applies to all land divisions described in Section 18.70.040A and requires:
   a. All of the following:
      1. A complete land division application and a survey sealed by a registered land surveyor showing the property boundary lines, the locations of existing structures, legal access, average cross slope, lot area, lot width, and utility easements for each lot, parcel, or fractional interest being created. The applicant may substitute an ALTA survey for the purposes of meeting this requirement at its discretion;
      2. A standard preliminary title report demonstrating that there is legal access to each lot, parcel, or fractional interest being created from a public right-of-way;
      3. A statement from a registered professional engineer or a licensed surveyor stating that the resulting lots, parcels, or fractional interests being created will have physical access that is located within the boundaries of the legal access;
      4. Identification of all topographic, hydrologic or other site constraints, requirements or limitations that must be addressed as a condition of the eventual issuance of a building or use permit, including, but not limited to, identifying all areas for each lot, parcel, or fractional interest being created;
Wildcat Development

interest being created that lie within the hillside development overlay zone or regulatory floodplain as defined by the Federal Emergency Management Agency (FEMA) or by Pima County. For Section 18.70.060, there shall be no requirement for independent studies; or b. A signed written acknowledgment from the property owner that has been recorded with the Pima County Recorder’s Office and acknowledges that no building permit or use permit will be issued until the lot, parcel, or fractional interest meets the minimum zoning requirements, has legal access, will have physical access from a public right of way, and has reserved utility easements.

B. Review of Application
1. Applications shall be reviewed in 30 days pursuant to an application checklist. The thirty-day time period shall start once the application is determined to be complete by the Development Services Director or the Development Services Director’s designee.
2. Upon review, staff will issue a land division permit or return the application to the applicant as an incomplete submittal.
3. A complete application that is not reviewed within the thirty-day time period shall be deemed approved.

18.70.070 Exceptions
The following are excepted from the requirements of this Chapter:
A. Creation or realignment of a public right-of-way by a public agency;
B. Creation or realignment of a conservation easement, public easement, private easement, or any other easement as recognized by Pima County;
C. Creation or realignment of a special assessment district;
D. Sale, lease, transfer or development of space within an apartment, industrial or commercial building;
E. Compliance with a court order to divide the land;
F. Cemetery lots;
G. Subdivisions created under the authority of A.R.S. Titles 11 and 32, and Chapter 18.69 of the Pima County Zoning Code;
H. Division of land within a commercial or industrial zoning district;
I. Division of land within the Transitional (TR) and Multiple Use (MU) zoning district, if used solely for nonresidential purposes;
J. Division of land for sale, lease, or exchange between adjacent property owners, if the sale, lease or exchange does not create additional lots, parcels or fractional interests of sufficient size and configuration that would require a building or use permit under the Pima County Zoning Code.

18.70.080 Violations, Penalties, and Enforcement
A. The enforcement of this chapter and conditions of the land division permit shall be in accordance with Chapter 18.95 (Compliance and Enforcement).
B. Penalties
A violation of this Chapter shall result in the assessment of civil penalties in an amount provided by Section 18.95.040. Payment of a civil penalty shall not relieve any person from the requirement to comply with the terms of this Chapter.

SECTION 3: That Ordinance Number 1997-46 for fees for various services of the Pima County Development Services Department is hereby amended as follows:

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1. Land Division Permits.
a. Application
$150 per lot, parcel, or fractional interest created.

Appendix B: Affidavit of Disclosure

Pursuant to A.R.S. §33-422

I, __________________________________________________________________________ (seller(s)) being duly sworn, hereby make this affidavit of disclosure relating to the real property situated in the unincorporated area of:

__________________________________________________________

__________________________, County, State of Arizona, located at:

____________________________________________________________________

and legally described as:

(Legal description attached hereto as exhibit "A")

1. There □ is □ is not....legal access to the property, as defined in A.R.S. § 11-809..(unknown)

   Explain: ____________________________________________________________

   ____________________________________________________________

   ____________________________________________________________

2. There □ is □ is not....physical access to the property. (unknown)

   Explain: ____________________________________________________________

   ____________________________________________________________

   ____________________________________________________________

3. There □ is □ is not a statement from a licensed surveyor or engineer available stating whether the property has physical access that is traversable by a two-wheel drive passenger motor vehicle.
4. The legal and physical access to the property is not...the same....unknown not applicable.

Explain: ____________________________________________________

______________________________________________________________

If access to the parcel is not traversable by emergency vehicles, the county and emergency service providers may not be held liable for any damages resulting from the inability to traverse the access to provide needed services.

5. The road(s) is/are publicly maintained privately maintained not maintained not applicable. If applicable, there is not....a recorded road maintenance agreement.

If the roads are not publicly maintained, it is the responsibility of the property owner(s) to maintain the roads and roads that are not improved to county standards and accepted for maintenance are not the county's responsibility.

6. A portion or all of the property is not....located in a FEMA designated regulatory floodplain. If the property is in a floodplain, it may be subject to floodplain regulation.

7. The following services are currently provided to the property: water sewer electric natural gas single party telephone cable television services.

8. The property is served by a private well a shared well no well. If served by a shared well, the shared well is not....a public water system, as defined by the safe drinking water act (42 United States Code § 300f).

9. The property does have does not have ... an on-site wastewater treatment facility (i.e., standard septic or alternative system to treat and dispose of wastewater). unknown. If applicable: a) The property will will not . . . require installation of an on-site wastewater treatment facility; b) The on-site wastewater treatment facility has has not been inspected.

10. The property has been has not been ... subject to a percolation test. unknown.

11. The property does not...meet the minimum applicable county zoning requirements of the applicable zoning designation.

12. The sale of the property does not...meet the requirements of A.R.S. § 11-809 regarding land divisions. If those requirements are not met, the property owner may not be
able to obtain a building permit. The seller or property owner shall disclose each of the
deficiencies to the buyer.

Explain: ____________________________________________________

______________________________________________________________

______________________________________________________________

13. The property is not located in the clear zone of a military airport or ancillary military facility, as defined in A.R.S. § 28-8461. (Maps are available at the state real estate department's web site.)

14. The property is not located in the high noise or accident potential zone of a military airport or ancillary military facility, as defined in A.R.S. § 28-8461. (Maps are available at the state real estate department's web site.)

15. Notice: If the property is located within the territory in the vicinity of a military airport or ancillary military facility the property is required to comply with sound attenuation standards as prescribed by A.R.S. § 28-2482. (Maps are available at the state real estate department's web site.)

16. The property is not located under military restricted airspace unknown. (Maps are available at the state real estate department's web site.)

This affidavit of disclosure supersedes any previously recorded affidavit of disclosure.

I certify under penalty of perjury that the information contained in this affidavit is true, complete and correct according to my best belief and knowledge.

Dated this (date) day of (year) by:

Seller's name (print): ______________ Signature: _____________

Seller's name (print): ______________ Signature: _____________

State of Arizona ss.

County of ___________

Subscribed and sworn before me this (date) day of (year), by

_______________________________________________

_____________________________________________
Notary public

My commission expires:

(date)

Buyer(s) hereby acknowledges receipt of a copy of this affidavit of disclosure this (date) day of (year)

Buyer's name (print): _______________ Signature: _____________

Buyer's name (print): _______________ Signature: _____________

Appendix C: County Adoption of Minor Land Ordinances

<table>
<thead>
<tr>
<th>County</th>
<th>Minor Land Ordinance</th>
<th>Year Adopted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apache</td>
<td>Yes</td>
<td>2005</td>
</tr>
<tr>
<td>Cochise</td>
<td>Yes (variation)</td>
<td>2004</td>
</tr>
<tr>
<td>Coconino</td>
<td>Yes</td>
<td>2004</td>
</tr>
<tr>
<td>Gila</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Graham</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Greenlee</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>La Paz</td>
<td>Yes</td>
<td>2004</td>
</tr>
<tr>
<td>Maricopa</td>
<td>Yes</td>
<td>2001</td>
</tr>
<tr>
<td>Mohave</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Navajo</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Pima</td>
<td>Yes</td>
<td>2005</td>
</tr>
<tr>
<td>Pinal</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Santa Cruz</td>
<td>Yes (variation)</td>
<td>1979</td>
</tr>
<tr>
<td>Yavapai</td>
<td>Yes (variation)</td>
<td>2002</td>
</tr>
<tr>
<td>Yuma</td>
<td>Yes</td>
<td>2004 (draft)</td>
</tr>
</tbody>
</table>
District Grade-Span And Math AIMS Scores

Daniel Hunting

Abstract
In April 2005, Arizona Governor Janet Napolitano recently signed Senate Bill 1068, authorizing the formation of the School District Redistricting Commission (SDRC) that will be charged with making recommendations about combining some of the state’s 200 school districts into units of more logical size. This effort to combine districts is based on arguments of fiscal and logistical efficiency and local control. Conspicuously absent from the legislation is any mention of the educational impacts of such changes. This paper examines the effect of district grade-span on high school math Arizona's Instrument to Measure Standards (AIMS) scores in 2003 in an effort to determine whether Kindergarten through 12th grade (Unified) districts performed differently from 9-12th grade (Union) districts. Analysis of the data shows no correlation between district configuration and math AIMS performance. Policy makers can be reasonably sure that changes to district grade-span will have little or no effect upon student achievement.

Introduction
Arizona is somewhat unusual in that it allows three types of school districts: Kindergarten through 12th grade districts known as Unified districts; K through 8th grade, or Elementary districts and 9th through 12th grade, or Union high school districts (Arizona Republic, Feb. 27, 2005). There are over 200 school districts in the state, some consisting of a single small school, and some with many very large schools. On April 25, 2005, Governor Janet Napolitano signed Senate Bill 1068, which authorized the formation of a commission to make recommendations about the possibility of combining some of these districts into more rational forms (ibid). This legislation was designed to increase fiscal efficiency through the elimination of duplicate services, such as administration, in areas that are served by separate elementary and high school districts. The educational effects of these changes were apparently not considered when drafting this legislation.

It is reasonable to think that there might be effects on student learning from changes in district grade configuration. Alspaugh (1998) demonstrated that standardized test scores in Missouri tended to decrease when district grade configuration required the students to attend more schools, i.e. middle and junior high schools in addition to primary and high schools (p. 24). It seems that a likely cause for these effects is the change in curriculum associated with changing schools. It also seems reasonable to think that these changes would be exacerbated by changing districts as well as schools, and that students who had to change districts upon entering high school would have lower math AIMS scores in high school. Maintaining a
consistent curriculum between elementary and high school districts must be difficult, especially in cases where multiple elementary districts feed into one high school district. The Phoenix Union High School District, for example, accepts students from 13 different Elementary districts, each with a different curriculum. A district such as this might have a harder time getting their students to perform well compared to those districts that are able to maintain a consistent curriculum.

Although the Arizona Department of Education sets statewide standards for each grade level in Arizona schools (Arizona Department of Education, 2005), choice of actual curriculum is left up to the individual districts and/or schools. Compliance with the state requirement to align their curriculum to the standards is unknown, but personal observation suggests that some schools are reluctant to change their programs to meet these standards. Under the federal No Child Left Behind program, all states are obligated to set standards and regularly test that those standards are being met. Arizona has chosen to make mastery of those standards, as measured through the AIMS test, a high school graduation requirement.

Literature review

A literature review of the subject turned up surprisingly few objective articles analyzing what influences outcomes on high-stakes tests (HSTs). There are even fewer articles available about the impact of district grade configuration on learning. This is probably because Arizona is one of only three states that still maintain separate elementary and high school districts (Arizona Republic, Feb. 27, 2005). The first article I came across that looked promising was a long piece by Amrein & Berliner (2002). The abstract for High Stakes Testing, Uncertainty, and Student Learning promised a brief history of high-stakes testing and an analysis of 18 states to see how the tests affect actual learning. The authors have an apparent bias against high-stakes testing which makes evaluation of their work difficult. In the first sentence of the abstract, it warns of the ‘severe consequences’ associated with high-stakes testing, although the authors later admit that it is very difficult to answer the question of whether learning is increased by high-stakes tests. Throughout the paper, the authors seem intent on making assertions, in the absence of data, that these tests discriminate against ethnic minorities and, furthermore, that the tests are somehow designed to be oppressive to various segments of society.

The authors looked at student scores on four widely-used tests (SAT, ACT, NAEP and AP) to see how these scores changed after the introduction of high-stakes tests in 18 states. They speculated that, if the HSTs were effective at increasing student learning, then scores on the other four tests should increase as well. They failed to consider the fact that HSTs are minimum standards tests applied universally to all high-school students, while the SAT, ACT and AP tests are taken by a self-selected group of college-bound students. The National Assessment of Educational Progress (NAEP) test is a somewhat better comparison, but there are selection issues with this test as well and, like SAT and ACT, it is a norm-referenced test, not a criterion-referenced test like the HSTs the authors are comparing it to.

The statistical analysis that Amrein & Berliner apply to their data is quite elementary, simply tracking whether scores on the four tests in the 18 states went up or down in relation to national averages. They did not account for the magnitudes of any changes and used no regression, no analysis of variance, or any other measure whatsoever. They made no attempt
to control for socio-economic status or any other variables and attributed all of the changes in the standardized test scores to the implementation of high-stakes tests.

Next I came across a response to Amrein & Berliner by Bruce Thompson. Thompson (n.d.) may have his own agenda to promote, but at least his biases are not quite so obvious. His rebuttal to Amrein & Berliner is focused on their flawed analysis of their data. He reviews their methodology and shows that their techniques lost a lot of information by converting continuous data into essentially binary data (2). Thompson then re-analyzes the data with what he claims are more appropriate tools and comes to the conclusion that there is no association between HST implementation and scores on the SAT, AP and NAEP, and a weak negative association with the ACT (8). Thompson’s analysis is more sensible than Amrein & Berliner’s, actually computing p-values and confidence levels. It is interesting to note that, while Amrein & Berliner saw a strong negative relationship between HST implementation and standardized test scores, Thomson basically saw no association, while Raymond & Hanushek (2003), of the Hoover Institution found a strong positive association from the exact same data (53).

An article by Slovacek, Kunnan & Kim (2002), while not as directly related to this topic, as the others, uses regression techniques that are very similar to the ones used here. They looked at how charter schools in California serving low-socio-economic status (SES) students compared to traditional public schools. In comparison to the other articles I looked at, this article was much more academically rigorous. Their methodology was explained thoroughly, and SPSS outputs were presented as tables in the final article. The dependent variable in this study was the Academic Performance Index (API), which was correlated with six independent variables; participation in Free or Reduced Price Lunch Program (as a proxy for SES), percentage of English language learners, percentage of student turnover in the school, percentage of fully credentialed teachers, percentage of teachers with emergency credentials, and number of students enrolled in the school.

Although it is clear that these authors are supporters of charter schools, their methodology is at least more reliable than that of Amrein & Berliner. One thing did strike me as curious: they produced a regression equation for all California schools using the above variables, and a separate, slightly modified equation, dropping the emergency certification variable, which was run on data for charter schools. Several variables that were thought to be significant for charter schools were considered, but ultimately not included in the final equation. I was left wondering why the authors didn’t just include a dummy variable indicating ‘charter / not-charter’ and run one regression on the entire data set. That would better quantify the effects of charter schools in relation to overall outcomes.

**Specification of the theoretical model**

The dependent variable for this study is mean scale math scores from the 2003 high school AIMS test, averaged at the district level. AIMS is actually three separate tests, covering math, reading and writing. Since there is no composite score indicating overall school performance, I decided to choose the math test as the benchmark of district performance. Scores on the math portion of the AIMS test are reported in the ADE data as Mean Math Scale Score (MMSS). Math scores are the most appropriate measure for this examination for two reasons. First, the basic skills of reading and writing will have been taught in primary school. Subsequent years of schooling will refine these skills, but major
new reading and writing skills will not be added at the high school level. The math portion of the AIMS test, however, tests skills that are generally introduced to students in middle and high school grades. If there is a positive benefit to be found in a Unified school district, perhaps from having a curriculum that is more continuous across grades, that benefit may be more observable in math scores. Secondly, the math portion of the AIMS test is more significant from a political perspective. There has been considerable controversy surrounding the imposition of a high-stakes test as a condition for high school graduation in Arizona. Passing rates for the math portion of AIMS are far lower than in reading and writing, so most of that controversy is centered on math scores (Bland, 2005). An analysis that showed that district configuration had a sizable effect on math AIMS scores would have genuine policy implications.

The primary independent variable of interest for this study is district grade span, denoted by the dummy variable $K_{12}$, where one represents a Unified district with a kindergarten through twelfth grade program and zero is a Union High School District covering ninth through twelfth grade only. Other independent variables are as follows:

- **FRL** = Percentage (10% = 10) of students on Free and Reduced Lunch Price Program in each district. Okpala, Okpala and Smith (2001, p. 111), and other researchers have used this as a proxy for socio-economic status.

- **DistSize** = Number of students tested in each district on the math portion of the AIMS test. Districts vary greatly in size, so heteroskedasticity is a possibility with this variable. The Park test will be used to evaluate whether heteroskedasticity is present.

- **Ethnicity** will be represented by five variables, each expressing ethnicity as a percentage (10% = 10) of the students in each district taking the test, with White as the omitted case. These are the same categories expressed in the AIMS data from ADE:
  1. Hispanic
  2. Black
  3. American Indian
  4. Asian
  5. Other

- **PPE** is per-pupil expenditures, in dollars, for each district, as reported in data on the ADE’s web site.

- **Rural** is a dummy variable that is set to one if the school is in a rural area. Most districts in the state, except for those in metropolitan Phoenix and Tucson, plus those serving Flagstaff, Prescott and Yuma, were deemed to be rural in nature.

- **TeachExp** is the experience, in years, of the average teacher in the district.
Table 1: Sign hypotheses

<table>
<thead>
<tr>
<th>Variable</th>
<th>Expected Sign</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>K12</td>
<td>+</td>
<td>This is the primary variable of interest in this study. Assuming that AIMS success is at least partly reliant upon a curriculum that specifically teaches the standards that the test measures, and that a Unified district is more likely to maintain a rational curriculum flow across grades than split districts, this sign should be positive.</td>
</tr>
<tr>
<td>FRL</td>
<td>-</td>
<td>Fowler &amp; Walberg, noted that socio economic status was negatively associated with student success, so this coefficient will be negative.</td>
</tr>
<tr>
<td>DistSize</td>
<td>-</td>
<td>Fowler &amp; Walberg observed district size to be negatively correlated with student outcome.</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-</td>
<td>Hispanic, Black, and American Indian students generally score lower on standardized tests (Drake &amp; Forester, 2003).</td>
</tr>
<tr>
<td>Black</td>
<td>-</td>
<td>Okpala, Okpala &amp; Smith observed negative relationship between African Americans and math achievement scores.</td>
</tr>
<tr>
<td>American Indian</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>+</td>
<td>Asian students tend to score higher on standardized tests.</td>
</tr>
<tr>
<td>Other</td>
<td>?</td>
<td>Because this is a catch-all ethnicity, its sign is difficult to predict.</td>
</tr>
<tr>
<td>PPE</td>
<td>+</td>
<td>This variable represents per pupil expenditure, and it seems reasonable that money spend on students has a positive effect.</td>
</tr>
<tr>
<td>Rural</td>
<td>-</td>
<td>Issues such as hours-long bus rides for students and an inability to attract and retain well-qualified teachers indicate that rural schools will not perform as well on the AIMS test.</td>
</tr>
<tr>
<td>TeachExp</td>
<td>+</td>
<td>Teachers who are more experienced should have higher performing students.</td>
</tr>
</tbody>
</table>

Discussion of the data to be analyzed

Data for this study came from the Arizona Department of Education (ADE) web site that provides a rich source of information on Arizona schools. This data was downloaded and imported into SPSS for analysis. The specific data was drawn from the 2003 tenth grade AIMS results, aggregated at the district level for traditional public schools. According to the ADE's online ‘frequently asked questions’ page, private schools are exempt from AIMS, but charter schools, which receive state funding, must administer the test. Charter schools were omitted from this study for two reasons. First, they often do not follow the same grade-span configuration as traditional public schools. A charter school may choose to serve students from sixth through twelfth grade, for example. This makes comparisons to traditional districts inappropriate. More importantly, charter schools are largely immune from public policy...
control (ADE, 2006), so even if an effect were observed at this level it would be very difficult to do anything about it.

Data from 2003 was used because it is the most recent complete data set available. While much 2004 data is available, data is still missing for many schools. Of the 106 high school districts in this study, 91 are Unified (K-12) districts and 15 are Union high school (9-12) districts. The analysis was limited to Category 1 scores. According to ADE’s online documents, Category 1 data contains scores only for those students who speak English as their first language. Category 2 data contains scores for all students whose first language is not English, regardless of their level of fluency. Because there was no way to gauge the English language proficiency levels of students recorded under the Category 2 data, it was decided that more accurate results would be obtained with Category 1 data. All of this data was imported into an Excel spreadsheet in preparation for regression in SPSS.

Category 1 AIMS data can be broken down by district. Within each district, the total number of students taking each portion of the test is reported, and those numbers themselves are further broken down by ethnicity. The mean scores for each district on the reading, writing and math portions of the test are reported.

The percentages of students enrolled in the free-and-reduced lunch program are available from the Child Nutrition Programs portion of the ADE website. October 2003 data was downloaded in Excel format. This data is aggregated at the school level, so it was necessary to combine these figures in the spreadsheet to obtain district-level data. Expenditures per pupil data were also brought into the spreadsheet from the ADE’s Annual Financial Report for Fiscal Year 2002 – 2003. Teacher experience figures were obtained by downloading the Teacher Experience Index report for each of the districts in Adobe Acrobat format, reading the average teacher experience line, and inputting that number into the spreadsheet.

Table 2- Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Variation</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>MMSS</td>
<td>481</td>
<td>456</td>
<td>527</td>
</tr>
<tr>
<td>FRL (%)</td>
<td>56</td>
<td>07</td>
<td>100</td>
</tr>
<tr>
<td>DistSize (Students)</td>
<td>627</td>
<td>13</td>
<td>7294</td>
</tr>
<tr>
<td>Asian (%)</td>
<td>1.20</td>
<td>0.00</td>
<td>6.95</td>
</tr>
<tr>
<td>Black (%)</td>
<td>2.05</td>
<td>0.00</td>
<td>12.78</td>
</tr>
<tr>
<td>Hisp (%)</td>
<td>25.47</td>
<td>0.00</td>
<td>95.97</td>
</tr>
<tr>
<td>Indian (%)</td>
<td>16.44</td>
<td>0.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Other (%)</td>
<td>4.87</td>
<td>0.00</td>
<td>23.02</td>
</tr>
<tr>
<td>PPE ($)</td>
<td>3752</td>
<td>647</td>
<td>8294</td>
</tr>
<tr>
<td>TeachExp</td>
<td>8.86</td>
<td>4.90</td>
<td>11.40</td>
</tr>
<tr>
<td>n = 106</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Descriptive statistics for all variables are listed in Table 2, above. Of special note is the skewed distribution of district size. Arizona has many small districts with just a few hundred students, and a few that are extremely large. The implications of this distribution on
academic achievement in relation to district grade span are unknown and may merit further study. It is also worth noting the relatively small standard deviation of the dependent variable, Mean Math Scale Score.

The K12 dummy variable was encoded by looking at the name of each district. Those that had “Unified District” in their names received a '1' and those with “Union High School District” were labeled '0.' The Rural variable was somewhat more subjective. All districts were determined to be rural and coded as ‘1,’ except those in the metropolitan Phoenix and Tucson areas, Flagstaff, Prescott and Yuma (Table 3, below).

### Table 3- Dummy Variables

<table>
<thead>
<tr>
<th>Dummy Variable</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>K12</td>
<td>91</td>
<td>15</td>
</tr>
<tr>
<td>Rural</td>
<td>77</td>
<td>29</td>
</tr>
<tr>
<td>n =106</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Results

Ordinary least squares linear regression was run on this data using SPSS v12.0. The program was also instructed to produce a table of residuals, for later use in performing the Park test for heteroskedasticity. The following equation emerged from the regression run:

\[
MMSS = 501.89 - 0.607K12 + 0.004FRL + 0.001DistSize + 2.131Asian - 1.047Black - 0.249Hisp - 0.214Indian - 0.349Other - 0.001PPE - 6.569Rural - 0.148TeachExp
\]

To account for the possibility of heteroskedasticity, the table of residuals was immediately put in to Excel, along with data for the suspected proportionality factor, DistSize. Formulas were then applied to calculate the log of the squared residual and the log of district size for each observation. These figures were then imported back into SPSS and another regression run as the Park test. This test showed that the t-score of the suspected proportionality factor was –0.065, which is small enough that we can say that there is no evidence of heteroskedasticity of error in the original regression.

Full results of the estimated coefficients, standard errors and t-statistics are shown in Table 4, below.

### Table 4 - Results of the regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>501.886</td>
<td>8.774</td>
<td>57.202</td>
</tr>
<tr>
<td>K12</td>
<td>-0.607</td>
<td>2.980</td>
<td>-0.204</td>
</tr>
<tr>
<td>FRL</td>
<td>0.004</td>
<td>0.064</td>
<td>0.061</td>
</tr>
<tr>
<td>DistSize</td>
<td>0.001</td>
<td>0.001</td>
<td>1.129</td>
</tr>
</tbody>
</table>
Table 4 - Results of the regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>2.131</td>
<td>0.821</td>
<td>2.595*</td>
</tr>
<tr>
<td>Black *</td>
<td>-1.047</td>
<td>0.423</td>
<td>-2.478*</td>
</tr>
<tr>
<td>Hisp</td>
<td>-0.249</td>
<td>0.052</td>
<td>-4.812</td>
</tr>
<tr>
<td>Indian</td>
<td>-0.214</td>
<td>0.048</td>
<td>-4.489*</td>
</tr>
<tr>
<td>Other</td>
<td>-0.349</td>
<td>0.218</td>
<td>-1.599</td>
</tr>
<tr>
<td>EPP</td>
<td>-0.001</td>
<td>0.001</td>
<td>-1.006</td>
</tr>
<tr>
<td>Rural</td>
<td>-6.569</td>
<td>3.321</td>
<td>-1.978</td>
</tr>
<tr>
<td>TeachExp</td>
<td>-0.148</td>
<td>0.786</td>
<td>-0.188</td>
</tr>
</tbody>
</table>

* Statistically significant at or above the 5% level, 1 tailed

The equation as a whole has a respectable $R^2$ of 0.599, an adjusted $R^2$ of 0.552 and an F-statistic of 12.745, which is well above the critical value required for this equation. However, the primary independent variable of interest, $K12$, had a very small magnitude with an unexpected sign, and was of no statistical significance. A minuscule t-statistic and standard error several times the magnitude of the coefficient, indicates that district configuration has little impact on the equation. Surprisingly, most of the other variables also had small coefficients and poor levels of significance.

Socio-economic status, as measured by participation in the Free and Reduced Price Lunch program (FRL) had almost no magnitude or significance. Size of district (DistSize), expenditures per pupil (EPP) and teacher experience (TeachExp) were all similarly trivial in their contribution to math AIMS scores. With both magnitude and significance levels so low, it is impossible to say that consideration of these variables adds anything to our understanding of math AIMS scores.

Racial and ethnic variables showed stronger levels of significance, with Asian, Black and Hisp being significant at or above the 5% level. But, there were very low levels of magnitude for each of these coefficients. The maximum effect was seen with Asian students, where a 1% increase in the number of Asian students would raise the district average score only two points on a test where the statewide mean score is 481, all other factors being equal.

The coefficient tied to the dummy variable Rural had the largest magnitude of any in the equation, and was significant at nearly the 5% level, one-tailed. The equation indicates a likely drop in AIMS math scores of 6.6 points for a rural district, compared to a similar urban or suburban district.
Conclusion

The weakness of this regression equation, with low magnitudes and confidence in nearly all the independent variables, can be explained by noting the very narrow variation of the dependent variable. High school Math AIMS scores in 2003 had a mean value of 481 and a standard deviation of less than 14. There is simply not enough difference in the scores to show much effect from any combination of variables. The scores are clustered tightly enough that any effects from the independent variables considered here are likely to be very small. But this is not to say that there are no policy implications from these findings. First, and most directly related to the passage of SB 1068 and the possibility of combining districts, it appears that the commission does not need to consider the educational effects of their decisions very much. They can feel free to base their choices on fiscal and other concerns, as the legislature intended.

There are a number of secondary inferences that may be reached from an analysis of this data as well. The relatively tight clustering of math AIMS scores, with such a small standard deviation, may indicate that districts have already substantially aligned their curricula to the state standards. If all districts were teaching to the same standards, and doing so with similar effectiveness, then one would expect the scores to be tightly grouped.

Although there are significant variations in per pupil funding in this data set, this variation appears to have no effect on AIMS scores. This may indicate that the funding formulas for school districts, which have been criticized for being inequitable, are actually quite fair. Wealthy suburban districts with computers in every classroom performed about as well as poorer districts with lower funding levels. Similar reasoning applies to the free and reduced price lunch program: it could be argued that the program has had its desired effect of boosting the scores of poor students to meet those of richer students. One could also infer that the lack of significance and magnitude in the teacher experience variable indicates that the districts are doing a good job of recruiting able young teachers who are as capable in the classroom as their veteran colleagues. More directed research will, of course, be required to reach firm conclusions about any of these hypotheses. The troubling relationship between rural districts and lower AIMS scores should also be investigated further to ascertain the nature and cause of this variation.

Finally, there is opportunity to refine and further this research. Since averaging the data at the district level absorbed much of the variability in the scores, it might be productive to run a similar regression on school-level data. School-level data is available from the ADE website, so it would just be a matter of matching schools to what type of district they are operating under and running the same model. It is possible that there are more apparent effects at this level. The same regression could also be run on the reading and writing AIMS scores to see if differences emerge. The district-level reading scores are just as tightly clustered as math, and the writing scores have only a slightly higher standard deviation, so I would expect the results to be similar, but if the data is analyzed at the level of the school, interesting differences may be detected.
References
*Arizona Republic.* (2005, February 27) Unifying school districts will mean better education for kids. Editorial. p. V1-V2s
Abstract
This article examines how urban youth in California used art and culture, particularly hip hop culture, to engage in civic dialogue over the March 2000 ballot initiative, Proposition 21, also known as the “Gang Violence and Juvenile Prevention Act.” On the surface, this “tough-on-crime” initiative seemed to promise the public more protection from the rising number of young people who commit violent offenses. But opponents of Prop 21 protested that the initiative’s representations of urban youth, and of “the facts” concerning juvenile crime, were misleading. Renaming it “California’s War on Youth Initiative,” dissenters argued that the initiative ignored the root causes of juvenile crime, while further marginalizing low-income youth of color whose cultures and backgrounds fall outside of the dominant mainstream ideologies of American schools and society (Templeton, 2000, para. 2). In retaliation, youth activists from around the state used hip hop, visual art, street performance and other strategies to build community capacity, and to take up space with presence in ways that enabled them to participate as assets in the decision-making processes that were directly affecting their lives. The creation and promotion of these young people’s art and culture enabled them to construct civic identities, which not only gave them public voice and representation, but also led to a sustainable youth movement. Although California voters passed Prop 21, the conflict over the initiative served as a catalyst for young people to organize, build social capital and to redefine themselves in civic terms (Bhimji, 2004).

Proposition 21
Prop 21 was sponsored by former California Governor Pete Wilson, with the support of the California District Attorneys Association and the California State Sheriffs Association. According to the California Budget Project’s 2000 Budget Brief on Prop 21, the initiative had two main components: it changed the juvenile court system by making it easier to prosecute juveniles as adults and it increased penalties for gang related violence (p. 1). Prior to Prop 21, the focus of the juvenile court system was rehabilitation and treatment, which the juvenile justice system arranged in long-term partnerships with agencies such as schools, social service organizations, and other community-based groups. The only juveniles who faced the adult court system were those 16 or older who had committed serious offences (i.e., murder, certain types of sexual crimes, kidnapping etc.), and who had a previous felony record. Prop 21
Heather Stickeler

would change this framework in the following ways:

- Young people 14 and older could be tried as adults, and prosecutors no longer would have to have their cases reviewed by a judge before filing them with the adult court system. The list of serious crimes that qualify youth for adult court would broaden to include crimes such as gang membership (regardless of any criminal activity associated with membership) and unarmed robbery.

- Penalties for youth convicted of certain crimes would increase. The juvenile justice system would no longer have discretion over sentencing of youth who committed certain crimes (discretion that enabled the system to individualize treatment programs) and youth 14 and over who were charged with a felony would no longer be given the option of informal probation which enabled them to live in their communities, get job training, and mental health and drug treatments. As a result, more youth would be sentenced to institutions, juvenile halls, or camps.

- The definition of criminal activity would be broadened and lengthier sentences would be imposed for crimes which are gang-related, even if they are minor offenses. Local enforcement officers would be required to keep a gang registry of anyone “suspected” of gang membership and the allowable use of wire taps would be broadened. Under Prop 21, provisions would also be loosened to allow juveniles who are only partially associated with a gang, or may not even belong to a gang, to be prosecuted under the state gang statutes.

- Law enforcement would be allowed to release the names of juveniles upon arrest for “serious” felonies instead of waiting to be filed by the district attorney under current law. Prop 21 would also allow the release of names of juveniles suspected of committing a violent offense if the release would protect the public (again, this would be at the discretion of the prosecutors, not the judge or the juvenile justice authorities). Also, Prop 21 would prevent the “sealing” of arrest records for juveniles less than 14 years of age or older convicted of “serious” or “violent” crimes, whereas currently these records are sealed after six years.

- Youth who are convicted of defacement (i.e. graffiti) could carry a felony charge for property damage of $400 or more (as opposed to a charge of $50,000 under the old law) and could be sent to jail for up to one year for a misdemeanor charge (an increase from six months). (pp. 2-4)

According to Fazila Bhimji (2004), the main argument in support of Prop 21 was that many juvenile offenders do not respond well to prevention and rehabilitation strategies of a juvenile justice system that is simply not equipped to protect the public from repeat offenders (p. 40). Proponents felt that, rather than waste funds on these incorrigible youth (i.e. “hardened gang members” whom they felt were beyond reform), juvenile court resources should be reserved to help “typical teenagers who make mistakes” (p. 40). In the end, they claimed that money would be saved and the public would be better protected from rising numbers of potential juvenile offenders.

Resistance to Prop 21
But opponents of Prop 21--mostly made up of members of Critical Resistance Youth Force, a Bay-area coalition of nearly 40 youth-driven activist organizations working in partnership with the American Civil Liberties Union, the California Teacher’s Association, The Youth Law Center, and Californians for Justice--argued that this rhetoric was not only anti-youth, it also diverted attention away from the systemic and root causes of juvenile crime. Those opposed to Prop 21 felt that it played off of negative stereotypes of urban youth perpetuated by mass media, and served to further reinscribe a binary which divided “gang members,” associated with these negative stereotypes, and “normal kids.” By calling for a segregation of “violent youth,” Fazila Bjimji (2004) notes, “Proposition 21 affirm[ed] the depiction of urban as being inherently deficient and minimize[d] the role of structural issues that may lead young people to assume oppositional identities” (p. 55).

While media hype surrounding the vote on Prop 21 suggested that juvenile crime was on the rise, statistics from the state’s Department of Justice indicated the opposite. According to reports, felony juvenile arrests declined by 15 percent between 1989 and 1998, juvenile homicide arrests dropped by 42 percent, and the rate of juvenile misdemeanor arrests stayed the same during this period (California Budget Project, 2000, pp. 4-5). Despite these statistics, California still ranked highest in youth incarceration rates in the country (p. 5). According to Vincent Schiraldi of the Justice Policy Institute, “Part of the problem [is] the public’s misperception that youth crime is increasing when it’s really falling--even as kids behave better, we treat them worse” (as cited in Geiser, 2001, Escaping the Box, para. 4). This misperception is fueled by a media industry driven by stories and images that will attract viewers, and consequently, attract advertising dollars. According to A. Clay Thompson (2005), despite years of dropping youth crime, “‘if it bleeds, it leads’ remains the mainstream media mantra.” He writes: “Publishers, editors, and reporters know that carnage grabs readers and viewers immediately; bureaucratic statistical reports on the declining amount of violence don’t” (para. 2). Teen activist, Nell Geiser, concurs. In her article, “Youth Storm the Media” (2001), Geiser cites a 1996 research study, which examined how The New York Times was framing youth over a three month period. During that period, researchers found that 54 percent of The New York Times’ articles involving youth and crime portrayed youth primarily as perpetrators, whereas in reality, youth had been victims of violent crime 12.5 times more than they had been perpetrators that year (para. 6). Geiser argues there is a “prevailing picture of [urban] youth as super predators and gangsters” which is hindering their ability to engage civically (para. 4).

In their fight against Prop 21, youth activists focused on discrepancies between their own lived experience of being an urban youth and the media’s representation of that experience, as well as drew particular attention to the ways in which under-funded urban schools--and tradition school structures that favor white, upper class cultures and discourses--systematically marginalize, misrepresent, and/or silence low-income, young people of color, discouraging them from active participation in society and civic discourse. Many argued that the media’s reliance on negative stereotypes of urban youth to “sell” stories leads to the construction of a culture of fear, which in turn leads to the justification of provisions like those under Prop 21 and to increased spending on incarceration, even when it means fewer dollars will go towards education, rehabilitation, and job development opportunities. In the case of Prop 21, legal analysts estimated that provisions could cost California upwards of $330 million in yearly operating costs (due to the costs of using adult courts to try juvenile
offenders, to administer a gang registration program, and to pay for an increased number of inmates with extended sentences), and upwards of one billion dollars to cover costs of new prison construction (Martinez, 2000, para. 2). While voters agreed to this high level of increased spending towards incarceration, they seemed to ignore the fact that California ranked 41st in educational spending nationally in 2000 (para. 2). Opponents of Prop 21 argued that lack of educational resources was where the real problem with juvenile crime resided. According to critical theorist Henry Giroux, these causes are the “violence of mind, body, and spirit of crumbling schools, low teacher expectations, unemployment and housing discrimination, racist dragnets and everyday looks of hate by people who find [urban youth] guilty by suspicion” (as cited in Bimji, 2004, p. 43).

The Construction of “At-Risk” Youth in American Society

At present, if students do not succeed in school, or in other institutional structures (i.e. the foster care system, rehabilitation centers, the juvenile justice system, job programs etc.), they are generally “considered failures, stereotypically labeled, deliberately alienated, and discarded” (Mitchell, 2003, p. 8). But many researchers (Blake 2004; Fine 1990; Giroux 1984; Mitchell 2003) argue that these young people are not failures by nature, but rather are constructed by a rigid paradigm of what it means to succeed, and by a school system and media culture that holds them accountable to the cultural and economic values and beliefs of the dominant middle-class. According to Peter McLaren, “schools have always functioned to reproduce inequality, racism and sexism while they fragment democratic social relations emphasizing competitiveness and cultural ethnocentrism” (as cited in Fine, p. 5), generally at the expense of women, minorities and other students from less privileged backgrounds. This favoring of certain kinds of knowledge over others is what many theorists refer to as the “hidden curriculum” of traditional schooling (Corrigan 1987; Giroux 1984). Henry Giroux asserts that “the dominant school culture functions not only to legitimate the interests and values of specific groups, it also functions to marginalize and disconfirm forms of knowledge and experience that are extremely important to subordinate groups” (as cited in Fine, p. 5). Researcher Brett Elizabeth Blake has studied what happens to these adolescents once their schools, covertly or overtly, label them culturally, educationally, or socially disadvantaged, and therefore, “at-risk.” According to her, these young people, desperate to find a place of their own, ultimately resist, reject, and refuse “the scraps of mainstream society that they [are] thrown,” creating and retreating to a safe space, which Blake defines as “the culture of refusal” (p. 105)--a culture most closely associated with “drop-outs,” gang members, and juvenile offenders.

When school and civic institutions label youth “at-risk,” policy makers fail to see how they can enhance a community and, as a result, design programs as interventions, rather than as opportunities meant to enable their potential (Heath and Smyth, 1999, p. 27). But a systematic, top-down approach to problem-solving and development, more often than not, seeks to restrain, rather than to foster, positive social change, and as a result usually has failed to build community capacity in ways that meet its economic and social needs (Stivers, 2002). Within this paradigm of governance, youth are typically “positioned as objects onto which educative, acculturative, and legislative practices are performed,” denied self-representation in the public realm and critical engagement in the decision-making processes that directly
affect their lives and their communities (Woodson). Shirley Brice Heath and Laura Smyth write that without “repeated and consistent immersion in activities framed within and around pro-social and pro-civic value orientations, [young people] miss out on opportunities to see themselves as agents capable of working for the creation of ‘good’ for fellow humans, their community, or the society at large” (p. 24). And communities miss out on opportunities “to benefit from the energy, creativity, and commitment of young people” (p. 24).

**History of Youth Organizing in California**

By calling for “books, not bars,” youth activists urged the government and the public to seek alternatives to Prop 21 that would address the systemic causes of poverty and juvenile crime and to create opportunities that would nurture their growth as individuals and as members of the broader community. This call made its way through a network of nearly 40 youth organizations across the state, largely fostered by a thriving hip hop culture which served as an invitation and a catalyst for the movement, as well as a space for young people to take up presence and begin reframing their identities in civic terms.

But the force of this youth coalition did not simply develop overnight; in fact, it took over ten years to foster. Elizabeth Martinez (2000) explains that as early as 1991, youth were beginning to organize in California around the Gulf War. In 1993, some Latino youth in Northern California started to demand La Raza studies in the public school curriculum. In 1994, the youth organization, Olin (formerly called STEP, Student Empowerment Project), organized wide-scale school walkouts, protesting cuts in school funding and the proliferation of prison industrial complexes throughout the state. This organization is also credited for coming up with the “Schools not Jails” slogan, used frequently during protests against Prop 21. California’s youth movement continued to pick up steam when young activists campaigned against Proposition 187, which denied undocumented citizens access to health and education services, and Proposition 227, which put an end to bilingual education in the public schools. But still, these efforts were fairly temporal, disparate, and unorganized. It wasn’t until 1998, with the organization of the Critical Youth Resistance Conference, that youth activist organizations across the state of California came together for the first time. Nearly 3,000 people convened at this event to discuss issues related to California’s growing Prison Industrial Complex and to articulate organizing strategies. As a result of this meeting, adolescents, college-aged organizers, and adult academics and civic leaders gained skills and shared knowledge, but also created an opportunity to bridge social capital and articulate a common struggle against the California prison system. According to youth activist, Desiree Evans (2002), the Critical Resistance Conference enabled dozens of youth--many of them fitting the profile of the majority of incarcerated youth--to realize themselves as fresh voices in the debate over juvenile justice.

**The Youth Coalition and Prop 21**

With the campaign against Prop 21, California’s growing youth movement reached its zenith. Seeing themselves as assets, and as civic participants--perhaps for the first time--young people who were opposed to Prop 21 began using what they knew best to mobilize
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others and get their message across—the language, style, and methods of the hip hop culture. Evans writes

[These youth took] their cues from the Civil Rights Movement, holding rallies, protests, sit-ins, and door-to-door campaigning—all with a ‘hip-hop flavor.’ Many [youth organizations] developed a theory of organizing that goes from local to global, using hip hop culture to educate, empower, politick and allow young people to address their problems in their own language and in a method that is familiar to them. (2002, Generation Hip Hop Wakes, para. 2)

Underground Railroad, a collective of young artists or “raptivists” (hip hop activists) and one of the principle organizations involved with Critical Resistance, defines hip hop as “a positive, life affirming culture featuring lyrical battles without violence” and sees its own events as “conscious attempts to create liberated zones,” against systemic oppression (as cited in Shuman, 2000, Anti-Corporate section, para. 4). This notion of free space complies with the critical theory of Henry Giroux and others (e.g. Augusto Boal 1985; Paulo Freire 1970; and bell hooks 1994) who have developed methodologies of resistance which promote education and civic participation as liberatory practices. The main goal of critical (or emancipatory) pedagogy and practice is to accommodate “the language forms, types of presentation, modes of reasoning, and cultural practices that have meaning for students” (Fitzclarence & Giroux as cited in Fine, 1991, p. 6) and “to elicit interrogation, expression, and the exchange of discourse and stories” (p. 81). These theorists argue against the “banking method of education,” and instead favor education based on dialogue, critical reflection, and problem-posing. Within this context, adults are no longer the privileged possessors of knowledge, but rather co-learners and facilitators; and young people are no longer passive receptacles for information and civic policies, but rather active participants in the process of cultural production and community development. Instruction and learning are no longer seen as neutral processes, but ones deeply rooted, and determined by, “contexts of history, power, and ideology” (Giroux & McLaren as cited in Goodman, 1999, p. 24).

By using hip hop as a vehicle for organizing, youth activists working against Prop 21 were able to find their own political voice, as well as to engage others in an already existing cultural network to wake up and pay attention. Hip hop was both a spark for civic dialogue and a space for people to come together, suspend judgment, and listen to multiple points of view. According to Jay Imani, youth activist and member of Third Eye, hip hop culture was central to young people’s fight against Prop 21. He notes: “On a march, if the chants have a hip hop flavor, young people will join. It’s also…crucial for drawing together youth of all colors because hip hop is multi-ethnic from the get” (as cited in Martinez, 2000, From Hip-Hop to Hilton, para. 2). During the youth campaign against Prop 21, arts and culture became an invitation for youth, and other social groups often left out of public discourse, to gather and to talk about a particular civic issue of consequence to their lives. If you simply “use[d] the word dialogue” to get people to come and talk about a civic issue, “nobody would go,” argues Abel Lopez (as cited in Assaf, Korza & Bacon, 2002, Art as an Invitation to Participate, para. 4). This lack of participation is mainly because people have been silenced by public discourses in the past, or habituated to think that they have nothing to say or no power to make a difference. On the other hand, if you tell people that they are going to see a show, they are often compelled to join you. Youth activists relied on young people’s familiarity and enthusiasm for hip hop, or “raptivist,” events, to get a large, diverse group of youth to gather.
in one place. Once these events were underway, organizers then took advantage of the space to educate the crowd about issues related to Prop 21, as well as to register them to vote. As one “raptivist” put it: “We perform, then organizations follow us with outreach and people get involved. People listen more to art than they will to a speech or pamphlet” (Shuman, 2000, This is How We Do It, para. 4).

Early in the youth campaign against Prop 21, hip hop events were organized at high schools known for their neglect by the state, as well as sponsored at larger venues that combined an evening of music, poetry, and political messaging about juvenile justice and the prison system (Martinez, 2000). But new permit procedures that assess higher safety costs were soon leveraged against these events, making it difficult for organizers to secure spaces. As a result, the youth activists had to adapt their strategies, holding what they called “Guerrilla Hip Hop Concerts.” One example of this tactic involved putting artists on trucks which were then driven to area schools and parks. Another example involved organizing MCs, poets, and other “raptivists” to perform on public buses. Other groups sponsored hip hop clubs with an activist message in their schools (Shuman, 2000). According to youth organizer, Anita DeAsis, membership in the Youth Force Coalition tripled in the school year preceding the vote on Prop 21, “but the number that seem[ed] more important . . . [was] the number of people who turn[ed] out at events, who [got] turned on by a quarter-page flyer or anti-21 song, who [then] turn[ed] their peers or parents on in turn” (Shuman, 2000, This Is How We Do It, para. 10). Aaron Shuman, a member of the Bad Subjects Collective (another youth activist organization) writes: “What No on 21 advocates [were] building out of hip hop, they hop[ed], was a grassroots communication infrastructure, capable of inspiring and mobilizing enough people to the polls” (para. 10).

This grassroots approach of working through an existing infrastructure to organize and mobilize people to action has traces of Saul Alinksy’s use of faith-based organizations to build a sustainable movement. It also shows how bonding social capital worked as a counter strategy to racialized images of youth as threatening and as a way of enabling youth to take up space with presence. A kind of strategic essentialism was fostered not only by the movement’s association with hip hop and an energetic urban youth identity, but also with young people’s representation of themselves as civic participants dedicated to long-term solutions, versus short-term punitive measures. “Whereas the language of Proposition 21 supporters works to segregate ‘bad’ from ‘good’ young people, youth activists form[ed] a collective identity,” argues Bjimji, “identifying with the criminalized as common victims of society that accepts dramatic inequalities in children’s health, education, and welfare” (pg. 44). Bjimji notes that during speak-outs, concerts, and meeting with public officials, youth activists always deployed the rhetoric of ‘we’ and ‘us,’ thereby displaying a solidarity with all youth and breaking down the binary between “criminals” and “citizens” (pg. 44). He writes: “The language of Proposition 21 constructs youth as irresponsible but the youth very explicitly point[ed] out that it is ‘you guys’ who need to show responsibility, whereas ‘we’ kids are the ones who are being deprived of good education” (pg. 53). By contextualizing their arguments within the broader context of civic issues, such as education, family, and concerns for the future, youth activists also found a discursive space in which to construct a collective civic identity and to challenge (and work within) the system as caring citizens interested in their futures, not as marginal or oppositional youth upset about the here and now. This “new” civic identity helped the youth leverage resources and support from the
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entertainment industry, labor, teachers, gay and faith communities, and citizens in the four-county Bay Area (Templeton, 2000). While continuing to attract youth supporters and train them as organizers, young Californians sought critical engagement with the public, with adults, and with various cross-section groups in order to address misperceptions, look at root causes of juvenile crime, and focus on how these root causes not only affect youth, but the broader civic society of which they were part.

In addition to hip hop concerts, youth organizers staged sit-ins and protests at the Hilton Hotel, Pacific Gas & Electric and Chevron buildings throughout the state (all companies that gave significant amounts of money, at former Governor Wilson’s request, to get Prop 21 on the ballot), organized statewide conferences to continue building a sense of unity among organizers and activists, held candlelight vigils to symbolically remember imprisoned youth and those to be imprisoned after Prop 21, staged school walk outs and massive parades through city arteries, and organized simultaneous state-wide banner drops from interstate bridges. “We don’t have money to buy billboards and air commercials to inform the public about this repressive measure,” noted one youth activist, “So we’re combating Prop 21 with our art skills” (as cited in Martinez, 2000, Coordinating the Power, para. 2). Because the media has been so conditioned to ignore, discount, and/or demonize youth, youth activists had trouble getting the media to publicize their actions and ideas. So instead of relying on the media, they created a holistic and integrated approach to organizing, hoping to get the word out to the public by occupying public space and by representing themselves as creative citizens willing to work together to effect positive social change.

After Prop 21

As mentioned in the beginning of this article, Prop 21 passed in March 2000. And while disappointed, many activists were not surprised that the California electorate would vote the bill into law. According to Elisabeth Gerber, an associate professor at the University of California at San Diego and expert on ballot initiatives: “Tough-on-crime measures tend to pass overwhelmingly” (as cited in Beiser & Solheim, 2000, para. 10). In fact, California is the 43rd state since 1993 to pass a law making it easier to try young people as adults, despite declining juvenile crime rates (para. 11). The youth movement that developed in resistance to Prop 21 was bigger than the issue itself; it was about “training politically conscious youth for a new movement” a movement focused on long-term civic engagement (Favianna Rodriguez as cited in Martinez, 2000, para. 4). “That’s why you didn’t see people sitting around mourning the day after Prop. 21 passed,” notes youth activist Jay Imani, “We are in a much stronger position now . . . We were able to organize people not just to defeat Prop 21 but for bigger goals, to educate youth to see the idea of building a larger, long-term movement for changing the political economic realities of California” (para. 4).

For some, this growing movement is redefining what it means “to win.” Since the 2000 ballot initiative, multiple youth organizations have continued to work to raise awareness of systemic issues which exploit youth, as well as compromise the overall health of their communities. They have also continued to hold political education and organizer training sessions for young people. The youth-based organization, SOUL (School of Unity and Liberation), holds training sessions for youth activists every summer. The Critical Resistance Youth Force Coalition has been collaborating with the Books Not Bars campaign, a project of
the Ella Baker Center for Human Rights, to oppose the expansion of Alameda County’s Juvenile hall, and the building of Superjails in California. Youth Making A Change (YMAC) in San Francisco is working to reform the policies and practices of the Youth Guidance Center, the city’s official name for its juvenile hall facility. In the past few years, YMAC’s efforts have created a space for a young person to sit on an official board that oversees policy development at the hall, as well as helped organize speak-outs to pressure city officials to listen to their demands (Fernandez, 2002). All over the state, youth continue to focus on educational and legal reform, as well as on building partnerships with other groups, such as labor and teacher’s unions. The steam has not been let out of this growing youth movement. “We were determined to come out of this fight with something we could hold on to,” argues one youth organizer, “and that’s the movement...We got momentum. So we can’t lose” (as cited in Templeton, 2000, para. 9).

**Youth Organizing: Challenges and Lessons Learned**

But that momentum doesn’t mean that this growing youth and social movement is without its challenges. Some argue, for example, that the movement’s reliance on the infrastructure and symbols of an urban youth hip hop culture marginalizes or silences other youth experience. One youth organizer explains: “...when we talk about youth, it’s not just English-speaking youth or hip hop listening youth. Organizers that are using hip hop as a tool should . . . understand that by using hip hop, you can’t organize all youth. You’re really targeting certain communities, certain populations” (as cited in LISTEN, Inc., 2004, p. 12).

This danger of forming a “collective” identity around a particular interest or culture that ignores the diversity of the youth community and experience is what Robert Putnam (2000) describes as the “dark side of social capital” (p. 350). In his book, *Bowling Alone*, Putnam writes

> Norms and networks that serve some groups may obstruct others, particularly if the norms are discriminatory or the networks socially segregated. A recognition of the importance of social capital [i.e. relationships of trust and reciprocity] in sustaining community life does not exempt us from the need to worry about how that ‘community’ is defined –who is inside and thus benefits from social capital and who is outside and does not. (p. 358)

With a continued focus on intergenerational partnerships and cross-sector alliances, the Coalition of youth-driven activist organizations currently at work in California seems to be conscious of this critical risk, and to be actively pursuing strategies to broaden the scope of their campaigns.

The youth movement in California is also learning how to speak across discourses to negotiate differences with those in power –which was a challenge for them during their campaign against Prop 21. As one youth activist noted:

> With PG&E [one of Prop 21’s corporate backers and the site of numerous protests by youth groups], I think we were surprised and a little scared to be in the same room with them. It was hard to define exactly what our power was and how to use it –it had been grown in the street. [Since Prop 21,] we [have] learned that we have to do things like tape discussions and get promises in writing. (as cited in Martinez, 2000, Lessons Learned, para. 1)
Researchers Brett Elizabeth Blake (2004) and Christopher Worthman (2002) argue that one of the reasons why teenagers of minority or low socioeconomic backgrounds have difficulty adapting to school and institutional practices, even when they see this type of literacy as valuable, is because their primary discourses, or “local literacies,” are at odds with the secondary discourses of their schools and civic institutions. This belief is founded on the work of literary theorist James Gee, who views discourse as a way of interacting and doing, defined by and definitive of a particular social context (Worthman, p. 59). Gee contends that individuals are born into a primary discourse, a home environment, which shapes their ways of being in and understanding the world. Secondary discourse, in turn, involves social institutions beyond the family and requires individuals to communicate with those who are “non intimates” (p. 59). For Gee, a person’s primary discourse serves as a framework or base for the acquisition of secondary discourses later in life (p. 59). These secondary discourses are, in part, the discourses of our public school education system and public administration. They are the discourses of the intellectual elite whose values, norms, and beliefs often do not reflect the self-interests, and class-interests, of the educationally at-risk adolescent (p. 11). Learning how to mediate across discourses, without diminishing the power of one’s own primary discourse (and the energy and spirit that it brings to civic engagement, democratic decision-making, and social change movements), is a difficult task, but one which can enable youth “to communicate in particular contexts and across contexts, [and thereby] develop a communicative voice” (p. 63) capable of gaining legitimacy and strength in partnerships with adults, businesses, and policy makers.

The biggest challenge facing youth activists today is learning how to build sustainable organizations that do not rise and fall around short-term, issue-oriented, conflicts, but rather keep attracting supporters and developing strategies to meet changing needs and demographics. According to one youth trainer, typically

...Youth organizers come in and they fight this little fight and they leave, and then another year’s crop comes in...So it just stays in that year of development as opposed to building on itself and building power year to year...I think we need a clearer vision of how young people’s work fits into social change work. We need a serious plan for power that we don’t have right now, and I think [is] difficult to get on the real agenda for discussion. I think there’s high turnover and burnout. (LISTEN, Inc., 2004, p. 13)

Some youth organizers argue that more political education, training in organizing techniques, partnerships with adults and cross-sector groups, and mentoring in positive youth development are needed to sustain and keep developing the movement (p. 13). As one youth put it: “Lots of students we work with are facing very difficult life situations and it’s hard to keep being an organizer when you’ve got major problems at home” (p. 11). Other youth organizers stress the importance of being reflexive and flexible: “…It’s about keeping our eyes and ears open to opportunities that come, not holding ourselves to one approach— but to change, have multiple approaches, but also see what our strengths and limitations are and constantly bringing in what we don’t have” (p. 10). But in order to be able to adapt and change, youth organizers also argue that long-term social movements, like the one that gained footing during the conflict over Prop 21, also need to convince foundations that positive youth development strategies are not simply “the flavor of the month” (p. 12). According to the Critical Youth Force Coalition director, Khadine Bennett: “Lots of foundations are pushing juvenile justice work right now, [but they also] have a responsibility to not just see it as the
hot new thing to fund” (as cited in Fernandez, 2002, Looking Forward, para. 2). On the one hand, foundations need to make long-term commitments to the cause, but on the other hand, organizers are working to make youth less reliant on foundations. “So it’s kind of like a double sided coin,” notes one youth, “more foundations need to give and more organizations need skills to . . . do grassroots fundraising” (as cited in LISTEN, Inc., 2004, p. 12).

Conclusion

Even with these challenges, the mobilization and organization of nearly 40 youth-driven activist organizations during the campaign against Proposition 21, and the creation of partnerships between these groups and other social justice organizations, is likely to guarantee a foundation for young people’s continued struggle for systemic change in California. These young people not only have a unique relationship to public space—through their participation in school institutions—they also make up a large percentage of communities throughout the state. As a result, their struggle is not simply about positive youth development or juvenile justice system reform, it is also about articulating a vision of community development committed to participatory government, social justice, and diversity. A Bay Area organizer explains

[Our city] has 400,000 people, 100,000 of these are under 17. So if you’re talking about transforming your schools and communities, you have to talk about it from transforming the hearts and minds of the people that are there. And if a quarter of your population is under 17, you know, that’s your future in many ways, that’s your present. So how are we going to…create opportunities within schools, within any institution that young people are a part of for youth to have the skills they need to be life-long change agents? (as cited in LISTEN, Inc., 2004, p. 8).

During the campaign against Prop 21 in 2000, youth art and culture were both the invitations and the sparks for renewed participation in civic dialogue. The process of engaging youth through cultural networks and giving them voice through their art helped these young people assume ownership of their experiences, engage critically in the process of meaning-making and self-definition, and become active participants in social/cultural change. Through art, youth activists began to take up presence in the public realm, break down the hegemonic power structures that control youth representation, and engage civically. They also began to realize themselves as assets, and to redefine themselves in civic terms. As evidenced by this case, the energy and creativity of youth activism can be a powerful force—powerful enough, perhaps, to overcome this generation’s lack of faith and participation in the democratic process, as well as to inspire the participation of older citizens, many of whom have grown cynical of politics and governance (Frishberg, 1998, p. 21). As one youth organizer boldly claims:

The whole [youth] generation is going to change what the whole social justice movement does…I think there is a new spirit…that’s going to rejuvenate and revitalize the social justice movement in this country, and some of the tactics [of youth activists]—the lack of fear, the use of hip hop and culture—is [sic] incredible and beautiful. (as cited in LISTEN, Inc., 2004, p. 4)
References


Intractable Debate:
Why Congressional hearings on climate fail to advance policy

Ryan Meyer*

Abstract
In the study of science-led policy debates considerable attention has gone to the role of experts in constructing shared knowledge and defining policy options. This paper explores expert advice as it plays out in one particular political arena – live testimony in a public hearing before Congress – using global climate change as a lens for the discussion. I begin by reviewing literature relevant to expert advice, science as it exists in public arenas, and the management of uncertainty by scientists and politicians. I then use this to frame an analysis of testimony given before Congress on issues of climate change and associated uncertainty.

Using the transcripts of three Congressional hearings over the course of 15 years, I show how the use of scientific advice on a policy problem can be problematic when both politicians and experts manage uncertainty to maintain the status quo. In addition, the advancement of policy decisions is hindered due to conflicting notions of “good science” and a mutually enforced assumption of objectivity that narrows the scope of debate. Despite concurrent advances in climate science itself, discourse in this setting demonstrates both a lack of political progress and a striking similarity in the content of political debate about climate science and climate policy, suggesting that such venues are not useful in advancing solutions for, or understanding of, a policy issue.

Introduction
Studies of science and its relationship to society struggle with the social division implied by that topic and the reality that there is no clean separation between the two. Public science is seen as a one-way communication to a non-scientific audience, but in practice the audience is mixed, and the interaction goes both ways (Hilgartner 1990). A Congressional hearing is a microcosm of this reality. It is structured specifically to facilitate science’s speaking truth (from the mouths of experts) to power (the politicians), yet all participants become involved in constructing scientific knowledge and in advancing political interests.

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In the study of science-led policy debates, considerable attention has gone to the role of experts in constructing shared knowledge and defining policy options. This paper explores expert advice as it plays out in one particular political arena – live testimony in a public hearing before Congress – using global climate change as a lens for the discussion. I begin by reviewing literature relevant to expertise, science as it exists in public arenas, and the management of uncertainty by scientists and politicians. I then use this to frame analysis of testimony given before Congress on issues of climate change and associated uncertainty.

Though each entails a debate about climate science, the hearings chosen for analysis differ greatly. I have somewhat haphazardly selected three hearings that differ in goals, impetus, Congressional committee and participating politicians and scientists. They represent a sample of public debate among experts over a period of 15 years (1991-2005), a time during which knowledge of climate science, through numerous government funding programs, advanced considerably.

Based on my analysis, I argue that, far from clarifying controversy and enabling policy, hearings involving testimony on the uncertain and controversial issue of climate change impede political progress for three reasons. First, they introduce an illusion of objectivity that reinforces the idiomatic perception of science (Rose 1987). The notion of objectivity narrows the scope of a debate, privileges the information offered by expert witnesses, and ignores biases and political motivations inherent in the proceedings.

Second, regardless of agreement or conflict among testimonies, a hearing brings forth a narrow set of knowledge (focused by particular disciplinary biases) from within a much broader scientific community. This knowledge is selective among interpretations of the specific problem at issue, but also among varying conceptions of what constitutes “good science” or policy relevant science.

Finally, conflicting statements by experts are not easily resolved in the setting of a Congressional hearing. It can be difficult, especially for non-experts, to distinguish among statements that represent broadly accepted science, personal scientific judgments, and value-based opinions that do not stem from any particular expertise.

As Stephen Zehr (1999, p. 8) notes, it is “important to understand that public science is simply another occasion for performing real scientific work. Scientific knowledge is essentially being constructed in these public settings.” I emphasize two important concerns in assembling scientific advice on a complex, controversial issue. First, it is important that such advice be assembled by a neutral actor with sufficient knowledge of the issue and experience in assembling a balanced perspective. Constructing a neutral process is not a simple task in political arenas. Though far less glamorous than a public hearing, reports by the Office of Technology Assessment are a good example of a balanced, neutral representation of issues, which receive very broad input. Second, I argue that hearings on climate change may be useful tools for adding to the public record or in building support for a preconceived policy position, but they should not be seen as ways to reduce controversy (political or scientific), nor as opportunities to induce finality for debates that are ongoing among scientists.
Uncertainty Management

As a fairly nebulous concept that is rarely given more definition or explanation than a single word, the concept of uncertainty is quite common in public discourse, and can take on many forms (Table 1).

Table 1: Multiple Types of Uncertainty

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Risk</td>
<td>Know the odds.</td>
</tr>
<tr>
<td>Uncertainty</td>
<td>Don't know the odds: may know the main parameters. May reduce uncertainty but increase ignorance.</td>
</tr>
<tr>
<td>Ignorance</td>
<td>Don't know what we don't know. Ignorance increases with increased commitments based on given knowledge.</td>
</tr>
<tr>
<td>Indeterminacy</td>
<td>Causal chains or networks open.</td>
</tr>
</tbody>
</table>

Source: Wynne, 1992

In a broad discussion of public science (including but certainly not limited to settings like that of a Congressional hearing) Stephen Zehr (2000) has noted several roles for uncertainty discourse:

- Among scientists it can create a demand for more research and point to inadequacy of scientific statements;
- In the media it can be used to bring drama to a narrative;
- It could be seen as delegitimizing science and opening the doors for others (non-scientists) to do work; or
- In politics it can legitimate the status quo, or be a boundary-ordering device.

Given assumptions of the truth and objectivity of science, one might expect uncertainty to be detrimental to science when exposed to (or by) politics. On the contrary, the existence of uncertainty is sometimes “managed” by both scientists and politicians in ways that allow them to justify action (or inaction) and build authority through boundary work. Thus, uncertainty can reinforce the dominance of science in a debate such that both scientists and politicians benefit. Shackley and Wynne (1996) have expanded this idea in identifying several ways in which uncertainty is managed as a “boundary-ordering device.” Such uncertainty discourse (categorized as transformation, displacement, condensation or scheduling – see Table 2) allows experts to maintain legitimacy, validity and relevance in their own social world and that with which they communicate.¹

¹ Some work has been done on the more general concept of uncertainty in “public science.” For a useful review of this, see Zehr (2000), and Friedman, Dunwoody and Rogers (1999).
Table 2: Uncertainty Management

<table>
<thead>
<tr>
<th>Transformation</th>
<th>Consolidation of multiple types of uncertainty into a single representation that is often more tractable.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condensation</td>
<td>Representation of multiple types of uncertainty within a single statement, often with unspecified types implicit for select audiences.</td>
</tr>
<tr>
<td>Scheduling</td>
<td>Predictions of future reduction in uncertainty often in terms of institutions and research programs.</td>
</tr>
<tr>
<td>Displacement</td>
<td>Deflection of responsibility for uncertainty. Does not directly threaten authority, but can reduce policy relevance.</td>
</tr>
</tbody>
</table>

Source: Shackley and Wynne, 1996

Research like that of Shackley and Wynne (1996) has revealed examples of scientists managing uncertainty along social boundaries in a variety of public venues. For example, a detailed retrospective look at the concept of climate sensitivity (van der Sluijs et al. 1998), in a particular estimate of climate change potential that has remained constant since the late 1970s, showed how such a concept can carry different and quite fluid meaning for scientists of different disciplines and politicians who must interact with them.

An interesting paradox revealed by this conception of scientific uncertainty in the political sphere is that, while rhetoric may emphasize the goal of reducing uncertainty to enable policy goals, its existence is quite welcome to those who favor the institutional, political or research funding status quo. In the end uncertainty does not seem to weaken the role of science; indeed, sometimes it even strengthens it. Uncertainty may be far more detrimental to the policy process than to any established priority research area from which an expert might be called upon to testify.

Objectivity and Other Notions of Science

The above-mentioned claim by Zehr (1999) that public representations of science are another form of scientific work, rather than merely interpretations, runs counter to the more broadly assumed “dominant view” of the popularization of science. Simply put, the dominant view holds that complex scientific knowledge can only be fully understood by scientists, and thus its effective communication requires simplification. Such simplification is deemed either as appropriate or as a distortion, and scientists can use these judgments to demarcate “good science” (Hilgartner 1990). Of course, as both Zehr and Hilgartner suggest, reality is far more complicated. It appears that both simplification and construction of knowledge may happen in either in the laboratory or in public forums (Zehr 1999; Hilgartner 1990).2

2 Hilgartner finds the dominant view to be inadequate, in part because of obvious feedbacks between public and laboratory science and evidence that scientists themselves often learn from simplifications assumed to be directed at the lay public.
With this dominant view, if two claims by scientists do not agree, then one must be a distortion. Both scientists and politicians can be seen falling into this trap when they apply their own notions of science in an attempt to ascertain which account is a distortion. But distortion is not a necessary ingredient for dispute over scientific results. The mere fact that each discipline has a unique way of framing and investigating a problem virtually guarantees that competing claims will emerge in multidisciplinary debates such as that of climate change and climate policy.

Recognizing the inadequacy of the dominant view is important in scrutinizing public debate about science, but equally important is tracing how the dominant view (held dear by many who are involved in such discourse) shapes an argument. The problem is that each expert assumes his or her own rationality and objectivity, and that the audience assumes the rationality and objectivity of all experts. So, when supposedly rational claims compete, they rule each other out – it is intractable.

**Hearings**

*1991: The policy cart and the science horse.*

For the purposes of this discussion, I draw from testimony given in three hearings over the past 15 years (See Appendix A).\(^3\) The first, which took place on October 8, 1991, was a review of “Priorities in Global Climate Change Research,” organized by Representative Rick Boucher (D-VA), chair of the subcommittee on science of the House Committee on Science, Space and Technology. The hearing brought forth experts from academia and government agencies. Despite the explicit emphasis on the allocation of research funding in the U.S. Global Change Research Program, a main topic that emerged in this hearing was that of uncertainty in climate models and the question of whether model output was relevant to climate change policy.

Testimony by each witness in 1991 followed a fairly similar structure. Each witness gave an outline of his own area of expertise, assessed general understanding of the climate system from that perspective and pointed out areas where further research was needed. Though each arrived at a conclusion that more research was needed to achieve an understanding of climate that would better inform policy, each reached this conclusion in different ways. For example, Jerry Mahlman’s testimony, which outlined a series of predictions about the next 50 years and associated a level of probability with each, ends with the prediction “that society’s need for detailed climate change predictions will increase at a rate faster than the scientific community can provide them,” necessitating a “sustained effort over many decades” by the global leaders and the scientific community (Priorities in Global Climate Change Research: Testimony of Jerry Mahlman 1991, p. 25). This assertion adds a social component to otherwise scientific predictions of how the physical environment will change, one that reinforces the need for scientific predictions. Mahlman expresses little doubt

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\(^3\) I cite individual testimony from each of the hearings in the References section below. All general information was taken from the public record of the relevant hearing unless otherwise noted. Page numbers are noted only for the 1991 hearing, as all others were read from internet resources.
about his own predictions, but emphasizes that increased research will reduce uncertainty and improve specificity. 

Richard Lindzen, on the other hand, arrives at the same conclusion about a need for more funding, but from the opposite direction. Skeptical that global average temperatures can be expected to rise as much as predicted by current modeling efforts, he expresses confidence that improvements in basic theory along with better models will prove that climate change is not such a problem (Priorities in Global Climate Change Research: Testimony of Richard Lindzen 1991). Ralph Cicerone, on the other hand, similarly acknowledges the indeterminacy of current modeling efforts and the many areas where more understanding is needed, but is less skeptical. He takes a neutral approach to predictions of the significance of climate change, but reinforces the case for more research when he notes the danger of our lack of understanding in the face of such complexity and compares climate change research to the study of cancer (Priorities in Global Climate Change Research: Testimony of Ralph Cicerone 1991).

After the official testimony of each witness, the ensuing discussion led all three experts to agree that: 1. current climate modeling efforts were not useful in informing policy makers on what to do about climate change, and 2. that such policy relevant information would become available within about ten years. In other words, despite great uncertainty expressed in one way or another by all experts at this hearing, it is taken for granted by all that science in its current form can and will reduce these uncertainties, leading to a clear way forward in policy guiding how humans should interact with their environment.

In general, politicians in the room agreed with this assessment, not wanting to, as put by Don Ritter of Pennsylvania, “put the policy cart before the science horse.” (Priorities in Global Climate Change Research: Testimony of Don Ritter 1991, p. 8). The only alternative view was submitted in writing by George Brown, from California, who felt that “scientific uncertainty has become an operational synonym for inaction on global environmental issues, and the debate over global change has thus become an impediment to action on a wide range of issues critical to our survival” (Priorities in Global Climate Change Research: Testimony of George E. Brown 1991, p. 6). Unfortunately, Brown’s absence from the hearing itself meant that no one openly questioned whether the science horse was in any kind of position to be pulling a policy cart, regardless of uncertainty.

1995: Climate uncertainty or climate conspiracy?

As one of a set of hearings on “Scientific Integrity and Public Trust,” the Subcommittee on Energy and Environment of the House Committee on Science held a hearing entitled “Climate Models and Projections of Potential Impacts of Global Climate Change,” on November 16, 1995. The testimony in these proceedings makes for an interesting comparison with the 1991 hearing in light of the political atmosphere in which it was staged. Large cuts to the budget of the U.S. Global Change Research Program (USGCRP), which funds the majority of climate research in the U.S., had been proposed, and both the hearing and the proposed cuts came amid Republican suspicions of exaggeration and distortion of information related to climate change, and accusations that dissenting scientific views had been suppressed (Brown 1997). Thus, beyond questions of uncertainty, like “how to know when we know enough to act,” issues of scientific integrity were now at stake. As in
Intractable Debate

1991, the hearing drew testimony from government officials and academics, including Jerry Mahlman, who had testified in 1991.

Mahlman’s testimony was almost identical to his earlier statement of 1991. In both he includes a statement indicating that it is not the place of scientists to give policy advice, but he *does* suggest that reports of the Intergovernmental Panel on Climate Change be used as a basis for such a decision. He then reinforces the idea of neutrality by assigning seemingly objective probabilities to predicted events, leaving policy makers to “place their bets.” Finally, he ends with the same kind of “meta-prediction” that societal need for better predictions will increase.

An interesting departure from Mahlman’s 1991 testimony, however, is in the list of events to which he assigns probabilities (or, to apply Wynne’s (1992) framework, measures of risk). While the 1991 list included only climatological events, such as the radiative effect of increased greenhouse gases, the 1995 list added events in the progress of climate research, such as the ability to model regional climate. This adds two new dimensions to the statement that suggest increased skill in navigating the social boundary between climate science and policy. First, Mahlman anticipates policy makers’ desire for uncertainty scheduling (Appendix A), and predicts scientific breakthroughs in that area. Second, Mahlman mixes two kinds of statements in his list of probabilities. He puts predictions of events in a natural system into the same uncertainty framework as predictions of the evolution of scientific knowledge. Thus, he simultaneously engages in three of the four types of uncertainty management noted by Shackley and Wynne (1996): transformation, condensation, and scheduling.4

The other testimony of note in this hearing was that of Patrick Michaels (Climate Models and Projections of Potential Impacts of Global Climate Change: Testimony of Patrick Michaels 1995), a climate researcher known for his vocal and highly visible skepticism of mainstream climate science.5 Michaels presents a series of arguments that climate models and mainstream consensus on climate change estimates cannot be trusted, and that a group of scientists labeled “the minority” have been suppressed. These assertions raise questions about the difference between “bad” science and uncertain science, but do not offer satisfactory answers. For example, Michaels argues that his (minority) view, which is that climate change will be much smaller than was predicted in the early 90s, has been supported by recent changes in climate predictions. He uses this observation to claim that: 1. models used to project climate change as reported in consensus documents like the assessment reports of the Intergovernmental Panel on Climate Change (IPCC) are flawed and inaccurate, and 2. that scientific consensus reports (which did not incorporate his criticisms) in general are not to be trusted.

Michaels’ testimony provides useful fodder for any climate skeptic, expert, politician or otherwise, but is unhelpful in understanding what is to be believed about climate. Two main contradictions illustrate this:

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4 Mahlman also does some uncertainty ‘displacement’ at the end of his testimony when he notes that as climate predictions progress, there may be surprises along the way. He does not indicate whether this expectation is included in his prior assessment of uncertainty.

5 For example, both in 1995 (Zehr 2000) and more recently (Michaels 2001) Michaels can be found making public statements along these lines.
1. Michaels claims that climate models are flawed and inaccurate, but that recent developments have brought their results more into line with his own work. He does not offer an explanation of why the newer models are “better,” nor in fact does he appear to believe that to be the case. Thus a lay person is left to wonder what it is that makes Michaels’ work on climate any more valid than that represented by the IPCC.

2. Michaels describes global warming controversy as a “classic example of the normal and creative scientific tension that exists between those who formulate hypotheses (i.e. ‘models’) and those who evaluate such hypotheses with observed data.” In light of this, were previous consensus estimates a conspiracy against the minority view, or simply an early step in evolving scientific knowledge?

It is difficult to see how the scientific information presented in this hearing can lead to a better informed decision. The real debate in this hearing, though not explicit, is about conflicting notions of valid and/or usable knowledge. As a subtext, however, this debate is confusing and unhelpful.

In the 1991 hearing, experts differed over the gravity of climate change, but agreed that further funding of science would clarify this uncertainty and yield scientific information suitable for a policy decision. Sure enough, some testimony in the 1995 hearing did suggest that viable policy options were now available, but, as Robert Watson, representing the IPCC, noted, such decisions would still be made in the face of considerable uncertainty (Climate Models and Projections of Potential Impacts of Global Climate Change: Testimony of Robert Watson 1995). Other testimony like that of Michaels, which attempted to undermine the scientific integrity of the IPCC, suggested that such policy was unnecessary. In both cases, the testimony mixes conflicting interpretations of scientific knowledge with value-based conclusions about what should be done. In a sense, each argument invokes the precautionary principle from opposite perspectives forcing decision makers operating in such a landscape to base any conclusion on values, not science. So, while the views of scientists are logged on the public record, the information they provide does not add significant traction to any particular argument.

2005: Peer review or State of Fear?

The third hearing in this analysis, on “Science in Environmental Policy-Making,” was organized by Senator James Inhofe (R-OK) before the Senate Committee on Environment and Public Works on September 28, 2005. This hearing included experts from academia, non-profit organizations, one government agency, and Michael Crichton, a famous novelist and author of the recently published environmental thriller, State of Fear. Witnesses testified on a range of controversial environmental issues and larger questions of how science should or should not inform policy decisions. Despite the stated broader scope of this debate, climate change dominated the discussion, with particular focus on uncertainties in climate science and the relevance of climate science to policy.

From climate-related testimony in this hearing, it is clear that, in 10 years since the 1995 hearing, little has changed to bring any clarity to public debate over global warming or
the definition of good science. In this discussion, opposing scientific views reach similar impasses with respect to the role of climate models and the definition of good or valid science. In particular, this debate featured an argument by Crichton and Gray that good science must be verifiable and replicable, and thus, that climate models are not and may never be useful to policy. The opposing side, represented by David Sandalow and Richard Benedick and echoed by Senators Boxer and Clinton, holds that good science should be determined on the basis of peer review. Each side, from its own normative perspective sees the other as lacking the credibility necessary to bring sound science to the table.

Discussion

Each of these three hearings is different in the ideological and experiential make-up of the expert panel, the impetus for the hearing itself, and the prescribed topic of discussion. Given these differences, the similarity of the discourse and the recurrence of (un)certain themes is striking. Climate science knowledge developed considerably between 1991 and 2005, and yet a comparison of the hearings from those years shows that many of the disagreements and misunderstandings that surfaced in the 1991 hearing remained unchanged 14 years later. This is particularly interesting given the assurances by experts in 1991 that climate science would make great advances of relevance to policy in a decade or less. Of course there is no crime in being wrong about such things, even for a scientist. But perhaps the crime is in the failure of all parties to recognize that consensus and policy are not automatic outcomes of scientific knowledge. Similarly, it should be noted that any problem discussed before Congress is arguably a societal problem by definition. The arguments about climate policy and knowledge of climate science, as described above, appear to take social concerns out of the equation, apparently placing the burdens of decision making on science itself.

In summarizing these debates, perhaps it is useful to take, as a starting point, some of the fall-out from the 1995 hearing on climate modeling. In a commentary piece in Environment Magazine, Representative George Brown (1997), who was the ranking Democrat on the House Science Committee at the time, reviews the events of the hearing and attempts to make sense of it all. His article begins by addressing the issue of misunderstandings and misrepresentations of science in these forums, lamenting that expertise is not subject to any particular standard of science that will assure the best information. In the end, he settles on peer review, claiming that without it:

Such policy advice… constitutes nothing more than personal opinion. As such, it deserves no more deference than the opinions of other thoughtful citizens. But while most scientists generally try to limit their advice to scientific issues within their expertise or at least clearly distinguish between science and personal opinion, skeptic scientists frequently fail to abide by this standard in their publications (Brown, 1997).

I do not deny that progress has been made outside of this sphere, but am merely pointing out that framing of the issue in public discourse yields equally intractable controversy that is policy-irrelevant.
Ryan Meyer

One can see other Democrats taking up this charge in the 2005 hearing when Senator Clinton emphasizes the need for peer review and rejects the idea that Dr. Gray (who has published peer-reviewed material, but not on long-term climate change) or Crichton should be included as expert scientists (Science in Environmental Policy Making: Testimony of Hilary Clinton 2005).

But, especially in a hearing like that of 2005, it is not clear that one conception of science is, by definition, better than another. Concerns raised by Michael Crichton about the validity and use of models are, by some views of science, perfectly defensible and relevant. Indeed, Crichton’s skepticism of modeling has been voiced by other peer-reviewed scientists (Oreskes, Shrader-Frechette, and Belitz 1994). Furthermore, Crichton’s adherence to the model of a double-blind, un-biased, replicable study as the best way to achieve good science may be unrealistic for climate modeling (indeed, even if feasible it would not address concerns of model indeterminacy), but as one view of science that has been highly successful in certain areas it may be a valuable thought exercise.

The point here is that, in this hearing, as in the others discussed herein, there was enough intellectual capital in the room to construct a very rich (though by no means comprehensive) narrative of a difficult problem involving expertise in many areas, including politics. The problem was not in anyone or everyone’s wrongness about what is real or true; it was the wrongness of the situation – of a public hearing which simply highlights and exacerbates the exploitability of uncertainty and the “excess of objectivity” available to any politically motivated actor (Sarewitz 2004).

In a final commentary capping a string of responses to Brown’s 1997 article, Simon Shackley (1997, p.3) noted that “skeptical scientists are even more convinced than most that a robust scientific knowledge base is available to direct policy, even if their understanding of that knowledge base is very different from the orthodox view,” and that both the mainstream scientists and skeptics think that “general political consensus on the environment is only feasible through the ‘bottom line’ of scientific knowledge and understanding.” How can both sides of the argument believe so strongly in both the possibility and the power of objectivity?

Writing in “Risk and Culture,” Douglas and Wildavsky (1982, p. 72) observe that “something has gone badly wrong with the idea of objectivity. It is taken out of context and turned into an absolute value for all discourse. The rules that produce objectivity rule out someone’s subjectivity.” In defense of the value of métis, James Scott (1998) invokes a similar indictment of rationality: “As Pascal wrote, the great failure of rationalism is ‘not its recognition of technical knowledge, but its failure to recognize any other.’”

What is to be done? Despite the numerous and apparently obligatory pleas by participants in all three of the hearings, it is unrealistic to think that politics can some how be silenced in the name of objectivity once a scientist begins speaking. Indeed, there is no reason to think that this would be desirable. If climate scientists truly have made an effort to provide policy relevant information to decision makers over the last 15 years, they seem to have failed, at least in the limited view of this case study. Rather than strangulation, it will take enlightened and informed use of politics to nurture this sort of interaction. And of

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8 See Michaels et al. (1997)
9 They also point out that objectivity can often be wrongly equated with rightness.
course, politicians are the actors in this relationship that are best positioned to understand interests, values and decision making – not climate scientists. Especially on their home turf.

In a moment of incredulity during the 1991 Priorities in Global Change Research hearing, Jerry Mahlman pointed out that:

It’s important to recognize that from a scientist’s perspective, looking at your extraordinarily difficult jobs, that I often look and wonder when I hear you being so concerned about uncertainty. Since I read the paper every day, it seems like every decision you make has equivalent or greater uncertainties. I don’t see that there’s any special status to this problem whatsoever in terms of uncertainty” (Priorities in Global Climate Change Research: Testimony of Jerry Mahlman 1991, p. 78)

In addition to what Shackley (1996) might consider to be gratuitous displacement of uncertainty, Mahlman’s statement performs an interesting kind of boundary work – putting it to the politicians, not to make the tough decision, but to make the same sort of decision they are faced with day in and day out. Perhaps this is a glimmer of a way forward.

If neutrality in a Congressional hearing is impossible, then it should be acknowledged that every participant, “expert” or not, is a political actor with interests and values. Though perhaps distasteful to scientists preferring the “dominant view” of science, this recognition might make their jobs a bit easier. It would force the politicians to admit, as Mahlman pointed out in 1991, that their job is to operate under uncertainty, while experts simply provide information and protect their interests. Furthermore, it would encourage politicians to recognize that decisions informed by scientists or other experts are no different from any number of other difficult political decisions they face.

**Conclusion**

I would like to say that those of us on this side of the panel are not experts. We’re not scientists. I recognize that. But, you know, sometimes it might be healthy to sit back and kind of push back and look at it in an unscientific way and look at it in just a logical way. You’ve got to keep in mind that Washington, D.C., is the city of hysteria. Everyone has got to be hysterical about everything that happens up here. (Science in Environmental Policy Making: Testimony of James Inhofe 2005)

Although this paper has documented a lack of progress at the level of discourse in Congressional hearings, far more work is needed to place this modest case study in a broader context of political and scientific discourse, as well as a context of political outcomes. It would probably be extremely difficult to find tangible connections among hearings and eventual policy decisions (or lack thereof), but such an exercise may prove useful in performing a type of sensitivity analysis of the Congressional hearing landscape – looking for strengths in the process and finding ways for experts advice to gain traction.

An important element in assembling valuable public scientific discourse is an understanding of disciplinary norms. As discussed above, we can see many examples of how
such boundaries are managed, but it would be interesting to apply systematic study of how normative frameworks clash when applied to a problem like expert input to climate policy.

As for alternatives or improvements to Congressional hearings, a modest proposal is that of carefully exploring and applying the idea of neutrality. The obvious starting point for this is a retrospective look at the Office of Technology Assessment (OTA), which was famous for its ability to assemble politically neutral expertise to report on an issue. In addition to neutrality, the structure of OTA meant a certain degree of buy-in to the process by both Democrats and Republicans (Bimber 1996). Of course a major drawback of OTA work was the difficulty in assessing the depth of impact that its reports had on policy, but perhaps the idea of neutrally mediating expertise might be applied beyond the generation of written reports.

A brief glance at an OTA report on climate policy models (Congress, 1994) yields a discussion of climate modeling which lays bare many of the issues so bitterly fought over in each of these hearings, but in an uncontroversial and matter-of-fact way. The report recognizes the multiple types of uncertainty inherent in climate model results, and also briefly discusses the limitations of models in providing reliable information about the future. This is balanced with a straightforward account of the reasons for concern about climate change, and a discussion of both the uncertainty and potential danger of inaction.

There may be multiple models that better ensure neutrality and buy-in to the process of assembling panels and, more generally, expert input to the policy process. With this plan to move forward, perhaps progress can be made in finding an important and effective role for science in hysteria of political debate.
References


Appendix A. List of witnesses who gave testimony for three hearings on climate science.

<table>
<thead>
<tr>
<th>Witness</th>
<th>Position/Institution (as listed on public record)</th>
<th>Summary of Debate</th>
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<tbody>
<tr>
<td>Jerry D. Mahlman</td>
<td>Director, Geophysical Fluid Dynamics Laboratory for the National Oceanic and Atmospheric Administration (NOAA)</td>
<td>Disagreement on significance of climate change. Agreement that more research is needed to answer important policy questions.</td>
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<tr>
<td>Richard S. Lindzen</td>
<td>Alfred P. Sloan Professor of Meteorology at MIT</td>
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<tr>
<td>Ralph J. Cicerone</td>
<td>Professor of geosciences and chemistry at UC Irvine</td>
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<tr>
<td>Peter F. Guerrero</td>
<td>Director, Environmental Protection Issues at Resources, Community, and Economic Development Division, U.S. General Accounting Office</td>
<td>Disagreement on significance of climate change, the validity of climate science and whether distortion or suppression of science has occurred. Agreement that more research is needed.</td>
</tr>
<tr>
<td>Jerry D. Mahlman</td>
<td>Director, Geophysical Fluid Dynamics Laboratory for the National Oceanic and Atmospheric Administration (NOAA)</td>
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<tr>
<td>Patrick Michaels</td>
<td>Assistant Professor, Department of Environmental Science, University of Virginia</td>
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<tr>
<td>Robert T. Watson</td>
<td>Associate Director of Environment, Office of Science and Technology Policy, Executive Office of the President</td>
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<tr>
<td>William Neirenberg</td>
<td>Director Emeritus, Scripps Institution of Oceanography</td>
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<tr>
<td>David Gardiner</td>
<td>Office of Policy, Planning, and Evaluation; Environmental Protection Agency</td>
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<tr>
<td>Thomas Gale Moore</td>
<td>Senior Fellow, Hoover Institution; Stanford University</td>
<td></td>
</tr>
<tr>
<td>Michael Crichton</td>
<td>Author</td>
<td>Disagreement on significance of climate change, the validity of climate science, whether distortion or suppression of science has occurred, and the measure by which expertise should be judged (peer review or verifiability). Agreement that more research is needed.</td>
</tr>
<tr>
<td>Richard Benedick</td>
<td>President, National Council for Science and the Environment</td>
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<tr>
<td>William Gray</td>
<td>Department of Atmospheric Science, Colorado State University</td>
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<tr>
<td>Donald Roberts</td>
<td>Professor, Division of Tropical Public Health, Department of Preventive Medicine and Biometrics, Uniformed Services University of the Health Sciences</td>
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<tr>
<td>David Sandalow</td>
<td>Director, Environment and Energy Project, The Brookings Institution</td>
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