THE INTERESTS OF COMPETING GOVERNMENT AND PIÑON CANYON, COLORADO

A Case Study on Small World Networks and the encroachment of military land on agricultural land in Southeast Colorado as a consequence on intergovernmental relationships.

Richard Daniel Mestas

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Public Administration

School of Public Affairs

University of Baltimore Baltimore, Maryland

March, 2012

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A Dissertation

Submitted to College of Public Affairs University of Baltimore in partial fulfillment of the requirements for the degree of Doctor of Public Administration

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The ideas, opinions, and conclusions of this paper solely reflect those of the author. This paper is not intended to reflect any opinion or position of the United States Department of Defense, the Defense Intelligence Agency, the United States Government, the University of Nebraska or those of those of the University of Baltimore.

CONTENTS

Dedication	iii
Acknowledgements	iv
List of Figures	v
List of Tables and Maps	vi
Foreword	viii
Abstract	xvi
1: INTRODUCTION	2
2: LITERATURE REVIEW	24
3: METHODS:	
Narrative Policy Analysis/Social Network Analysis	s /
Agent Based Models & Networks	57
4: NARRATIVE ANALYSIS	81
5: SOCIAL NETWORK ANALYSIS	113
6: NETWORK ANALYSIS/MODELS	136
7: CONCLUSION AND FINDINGS	166
Afterword-A DANGEROUS GAME	182
REFERENCES	184
APPENDICES	185
 A. Informational Interview Summary B. IRB and Questionnaire	197 203 206 285 288 303 310 320 330
BIOGRAPHICAL SKETCH	346

For Mary Margaret

My Beloved, My Hero, My POSSLQ

Acknowledgements

This milestone in my life would not have been possible without the great professional, personal, and intellectual support of many. I would first like to acknowledge my committee members, Dr. John J. Callahan for steadfast support, direction, and insistence to keep this process moving; Dr. Lenneal J. Henderson, for his encouragement to think outside of the box and pursue new ideas; and Dr. James E. Lightfoot for his beyond the call of duty in support of my scholarship.

I would also like to extend my appreciation the Public Administration faculty and staff at the University of Baltimore especially, Drs. C. Alan Lyles, Lorenda Naylor, Laura Wilson-Gentry, Ann Cotten and the late Dr. Daniel Martin. In addition I will forever be grateful to my fellow DPA classmates especially: Denise Gregory-Wyatt, Len Clark, Warren Haynes, Phillip R. Dawalt, Jr. and Katherine Wellman for their enthusiasm, and constant stream of emails, and phone calls of support through this process.

I cannot express the importance the professional support of my supervisors at the National Intelligence University including Mr. Steve Kerda, Mr. Kevin Taliaferro, Mr. James Steinke, Col. Randall Williamson, and Dr. David Ellison.

In addition I would like to acknowledge my colleagues and coworkers at the National Intelligence University-MCA-1, MCA-2, MCA-3 and the John T. Hughes Library-for their support and help in pulling the extra weight ensuring my duties never fell through the cracks.

This work and vision is a testament of my life and upbringing in the American West. To my family, John, Ernestine, Judy, Laura, Reuben, Paula and my late brother Max for their love and constant support. To my extended family of friends, Robert, Ron, Ray, Mizel, Barbara and Nancy, I'd like to thank for guiding me in my growth over the many years.

FIGURE DESCRIPTION

- 1-1 The Army planned expansion as reported in the Denver Post on Feb. 14, 2007
- 1-2 Branson, CO and the Pentagon viewed from equal altitudes of 3,300 feet
- 1-3 U.S. 350 Bypass and bridge connecting Interstate 25 with U.S. 350 north of Trinidad, CO, which routes military convoys past the town
- 1-4 Proposed land acquisition from 7th Division Analysis of Alternatives Study, Piñon Canyon Maneuver Site, CO, May 2004
- 3-1 A simple picture of park improvement spending
- 3-2 Graphs using a single line to show the trend in park spending; the one of the right may be too simplified to be useful
- 3-3 A graph showing park spending trend data by city and county may enhance understanding of the issue
- 4-1 Graphics showing the expanding populations and land mass of Pueblo, Colorado Springs and Fort Carson, CO, from 1956 to 1999
- 4-2 Map showing planned 24,000-acre residential development at Pueblo Springs Ranch, east of Fort Carson
- 5-1 Benzene ring
- 5-2 Basic models representing an intergovernmental network on four levels: Federal/State/County/Municipal
- 5-3 The Benzene ring provides a good visual representation of the universe
- 5-4 Example of Binary Tree; Example of tree network between poles
- 5-5 Progressive Transition between regular and random graphs from Huang, C.Y., Sun, C. T., and Lin H. C., (2005)
- 5-6 NetLogo-generated "Preferential Attachment" random model
- 5-7 NetLogo Diffusion on a Directed Network, before and after
- 5-8 Small World Networks set up with 12 agents; the number 7 agent in the second is linked to all other agents
- 5-9 Weisstein, E.W., "Regular Graph" from MathWorld
- 5-10 WS graph of stakeholders
- 5-11 Networked in WS format, the original 47 agents would appear as at left. The cow has four connections in the 2-regular network shown on the right
- 5-12 Relationship matrix
- 5-13 Attempt to align actors between Pentagon and Ranchers.
- 6-1 NetLogo Piñon Canyon Small World Network with 40 Nodes in NetLogo
- 6-2 Piñon Canyon Network Based on Table 6-1
- 6-3 Piñon Canyon Network arranged in a Benzene model highlighting directional lines
- 6-4 Network of networks on similar encroachment issues: Piñon Canyon, Buckley Air Force Base, Camp George West
- 6-5 Final NetLogo model
- 6-6 Validation run of the model
- 6-7 Run of the model/Final value 100 runs at 1%

Page | vi

6-8 Run of the model/Final value 100 runs at 12%
6-9 Run of the model/Final value 100 runs at 24%
6-10 Run of the model/Final value 100 runs at 36%
6-11 Run of the model/Final value 100 runs at 48%
6-12 Running Behavior Space
6-13 Each agent Value after 365 runs

TABLE DESCRIPTION

- 1-1 7th Division estimated displaced population count, May 2004
- 4-1 Population history of Colorado Springs and Pueblo since World War II
- 6-1 Primary and secondary sources for the Piñon Canyon Network
- 6-2 Covalence in the Piñon Canyon Network

MAPS (Appendix C)

Central Shortgrass Prairie Ecoregional Assessment Final Report November 2006

SE Colorado Land Cover Source: Colorado Department of Natural Resources, Water Supply and Needs Report for the Arkansas Basin, June 2006

Timeline of important management, environmental and training events at U.S. Army Piñon Canyon Maneuver Site, 1980-2008.

Map from the LaJunta Tribune Democrat courtesy PCEOC

Foreword

A Little about this Dissertation and Me

I undertook this research to fulfill certain requirements for the degree of Doctor of Public Administration at the University of Baltimore. Using narrative and network analyses, this dissertation seeks to tell a story, draw a picture, and then animate the picture to enhance readers' understanding of the complex and often polarizing intergovernmental relationships surrounding the Army's proposed expansion of its Piñon Canyon Maneuver Site in Southeastern Colorado.

One of my central goals is to explain how the government agents within the Piñon Canyon network are linked, where influence resides, and how power is exchanged from agent to agent. I have observed over the years that bureaucracies are a lot like people: they can be stubborn, finicky, aggressive, lazy, and most of all, have either a long memory or no memory at all. In a sense, this research treats bureaucracies like people, with all of the dynamics that make us human.

I grew up in Colorado and own land not far from the area known today as Piñon Canyon. I spent part of my youth herding cattle, bucking hay and doing other farm work. I later served as Associate Dean of University of Nebraska, College of Technical Agriculture-Curtis and remain adjunct faculty at the University of Nebraska-Lincoln. These experiences give me solid footing in the world of agriculture.

Currently, I am a program manager at the National Intelligence University in the Department of Defense. I am a graduate of the U.S. Naval War College and an Army veteran with service in the first Gulf War. These experiences give me solid footing in the world of national security.

A Quick Overview of my Case Study

These two sectors-agricultural and national defense-are at the heart of the Piñon Canyon controversy. I consider this to be an ideal public administration case study because it deals with several foundational aspects of the profession, including: federalism and intergovernmental relations; strategic management; policy analysis; decision making; organizational theory and change, as well as public budgeting. But the intractable problem of Piñon Canyon is also important because it shines a light on the increasingly complex and potentially polarizing relationships between bureaucrats at all levels, and the public they serve.

The Piñon Canyon Maneuver Site (PCMS) in Southern Colorado is an Army training range for mechanized units from Fort Carson, which lay farther to the north, between Colorado Springs and Pueblo. The existing site was established in 1983.

During 2006 and 2007, the Army announced a proposed expansion of the site, to increase its size from 235,000 acres to approximately 635,000 acres.

The proposed expansion area includes large portions of the Comanche National Grassland, the Apishapa State Wildlife Area, a few small communities, school districts, and several area ranches, with potential impacts on thousands of people. That means the Army's plan directly affects other federal entities, as well as state, county, district, and municipal interests, in addition to businesses and individual citizens.

Along Colorado's southern border is the City of Branson, which has a population of 74. However, its school district enrolls 493 children-children city leaders believe would be negatively impacted by the proposed expansion. For this reason, the Branson School District sits at the opposite pole from Fort Carson and the Pentagon within the circle or network of Piñon Canyon stakeholders.

Part of what is driving the need to enlarge Piñon Canyon is urban encroachment on Fort Carson. Since the late 1950s, the base finds itself increasingly surrounded by development—a trend which has become even more pronounced during the past 10 years. The City of Pueblo continues to push northwards in the direction of Colorado Springs, placing further stress on the fort.

Compounding encroachment is the technological transformation of the military, which enables smaller units to cover larger swaths of land. While the acreage at Fort Carson and Piñon Canyon was suitable for training last century, the more lethal weapons of the 21st-century travel farther and faster and require vaster exercise and operating areas. The military already has a large footprint in Southern Colorado. In addition to the PCMS, there are the Pueblo Chemical Depot, Fort Carson, Peterson Air Force Base, Schriever Air Force Base, Cheyenne Mountain, and the United States Air Force Academy. So, when one of two feuding land managers at Fort Carson leaked a map showing the proposed expansion could reach east clear to the Kansas border and all the way south to Oklahoma, it created a firestorm. Although the expansion depicted by the map had never been vetted at Army headquarters in Washington, D.C., nor even seriously considered at Fort Carson, it seemed to confirm some citizens' worst suspicions.

Chapter 1, "Conflict and the Piñon Canyon Maneuver Site," explores the history of the area and the related issues in greater depth. You may also be interested in the "Afterword", which sums up current status of the proposed expansion.

Can New Methods be used to Effectively Study Intergovernmental Relationships?

The policy analyst Emery Roe (1994) once said that "many public policy issues have become so uncertain, complex, and polarizedtheir empirical, political, legal and bureaucratic merits unknown, not agreed upon, or both-that the only thing left to examine are the different stories policymakers and their critics use to articulate and make sense of that uncertainty, complexity, and polarization."

In light of Roe's assertion that traditional analytical methods are failing us in situations like Piñon Canyon, I wanted to examine whether new methods could be used to study these intergovernmental relationships and their influence on resulting public policy. That led me to formulate the following three hypotheses, which would allow me to look at the application of more suitable methods for addressing complex problems:

 Small World Networks have value in identifying centers of influence and their potential actors in the pro/con intergovernmental issues surrounding Piñon Canyon encroachment.
 Network theory application may be a more suitable method of discerning whether there can be mutually agreeable and successful models for collaboration or compromise, or not.

3) Applying Small World Networks to Piñon Canyon results in better understanding of the patterns of potential cooperation and conflict, and where they exist. My Framework

My theoretical framework was inspired by the Benzene molecule I studied years ago in undergraduate chemistry. I explain more about this in Chapter 3, but to comprehend my framework, you need only understand that Piñon Canyon is the nucleus of my case study and is surrounded by a network of governments. These governments are capable of bonding with, or linking to, a number of other agents at other levels, from federal to state, and so forth.

Additionally, the methods I selected for analyzing Piñon Canyon demonstrate a cyclical nature, where narrative policy analysis feeds social network analysis, which gives birth to an agentbased model, which in turn helps to tell a new story.

Delimitations of my research included topology, which focuses on shape, nodes and links; topography, which considers placement and position of agents on the network map; and, typology, which looks at the who, what, why, where and when of the networked bureaucracies.

In order to understand the dynamics of an intergovernmental network, it is important to consider each bureaucracy's scope of authority and jurisdiction. In Colorado, this meant considering the impacts of federalism, Home Rule, Dillon's Rule, the Colorado Revised Statutes, the corporate status of school districts, and the role of non-governmental organizations. These authorities undoubtedly inform the actions of street-level bureaucrats and their ability to invoke marble-cake governance.

Chapter 3, "A Different Case Study Path," brings the supporting structures of my theoretical framework together.

What I Learned from Reviewing the Literature

Since Piñon Canyon is an ongoing issue, there is a wealth of information to draw from, although no book-length publications or full histories are yet available. Therefore, my sources included news reports, government reports, stakeholder interviews, historical documents, subject matter experts, correspondence, my personal network and the Internet.

In collecting my literature, I consulted overarching theoretical experts like Agranoff, Barabasi, Goldsmith and Eggers, Strogatz

and Milgram. I also dug into current scholars and subject matter experts such as Doe, Gilbert, Knoke and Yang. For more specifics, see the full literature review in Chapter 2.

Major points noted in the foundational literature include: Network Science can be used across types to include bureaucracies; collaborative public management is an evolving strategy; street-level bureaucrats can drive networks; and, there are direct paths between and through agents.

The subject matter literature aided me in understanding the idiosyncrasies of the agents and the historical themes supporting Piñon Canyon as a stand-alone issue. Significant anthropological and natural resource writings dominate the literature, while the history of the proposed expansion is unwritten outside of government reports.

The Narrative Policy Analysis

I began my study of Piñon Canyon with a narrative analysis, as outlined in Chapter 4 of this dissertation.

Stories are the narrative tales. In this case, the Army started this controversy and therefore, the Army owns the master narrative.

Stories have a beginning, middle, and end. The Army's story begins with its need to transform its forces post-Vietnam and again after the Cold War, which evolved to an encroachment problem, and ends with the expansion problem.

The counter-story is set forth by the organization Not One More Acre. The opposition group's counter-story is that the Defense Department, already a large landowner in the region, does not need to expand further.

The organization Piñon Canyon Expansion Opposition Coalition employs a series of non-stories that do not directly counter the Army's master narrative, but which instead evoke the values of agriculture, ranchers' historic ties to the land, and threats to the environment. Another non-story is the potential loss of property tax revenues to local school districts.

It is important to understand and differentiate the literary term "non-story" from the policy term "non-issue." Non-stories are

circular in nature and have no beginning, middle or end. The Coalition's non-stories have proven effective in derailing the Army's master narrative and taking the service off message.

Bureaucratic critiques, sometimes cast in a story format, are similar to non-stories, in that they do not address the master narrative, but merely critique it. Examples include GAO reports and protests by both Otero and Las Animas Counties that the Army has not yet provided enough or the right information to justify the expansion.

The Social Network Analysis

Having completed my Narrative Policy Analysis, I then performed Social Network Analysis, as described in Chapter 5 of this document. Social Network Analysis consists of methods used to analyze social networks or social structures made up of individual nodes and links. Whereas the Narrative Policy Analysis explained the story, the Social Network analysis explains the environment, or draws the picture, by using observational data and models to determine if situations match reality.

I began by looking at existing network models to see if any of them fit the Piñon Canyon debate. I reviewed the graphs, studied the matrices, and assessed the utility of their visual displays.

I chose NetLogo, available through Northwestern University, as my modeling environment. It is free, multi-agent programmable, and widely used by researchers.

Most models in NetLogo's library are based on some variable of randomness, which had to be either minimized or addressed. NetLogo is easy to learn so this obstacle was simple to overcome.

I looked at scale-free networks, but they only show which agents are on which side, ignoring whether any are actually in the middle or multiple links across. These networks were initially dismissed as unsuitable but later reconsidered.

The primary model of interest was the Small World Network because I was curious to see if bureaucracies behaved like small worlds. The Small World effect first observed by Stanley Milgram is a phenomenon found in nature and technology. The model is mostly focused on average path lengths and clustering coefficients between agents. Average path lengths show the number of steps it takes to get from one member of the network to another, while the clustering coefficient demonstrates the ratio of existing links connecting a node's neighbors to each other, to the maximum possible number of such links (Wilensky, 2005).

While each of these measurements is interesting in itself, they were not the dynamics at play in Piñon Canyon, where I wanted to illustrate centers of influence and power. The Small World Network is very close to what I needed to analyze Piñon Canyon; however, the model's inability to demonstrate diffusion made me want to study other networks. Diffusion pertains to directed links and the transfer of value from one node to the next.

Agent-Based Modeling

Taking into consideration the strengths and weaknesses of the various networks I looked at, the next logical step was to morph the good and attempt to eliminate the bad from the three models in order to optimize the analysis. This quote from Tim Liao (1994) at the University of Illinois sums up my quest:

There are two general approaches to the study of social behavior: Collect observational, survey, or other forms of data and analyze them, possibly by estimating a model; or begin from a theoretical understanding of certain social behavior, build a model of it, then simulate its dynamics to gain a better understanding of the complexity of a seemingly simple social system.

In the Piñon Canyon Model I developed, each stakeholder is represented as a node in the network. The effort to create an agent-based model is captured in Chapter 6. Validation of the model can be found in Appendix D.

My Findings

Here's what I found:

- New models provide different frameworks/outcomes bringing forth an important strategic tool.
- Controversial debates can be analyzed using network models.

• Models for collaboration or compromise among bureaucracies are difficult to find due to the fluidity of the issue and limitations of the study.

The first finding affirms my hypothesis that Small World Networks have value in identifying centers of influence and their potential actors in the pro/con intergovernmental issues surrounding Piñon Canyon encroachment.

The second finding again affirms my hypothesis that Network Theory application may be a more suitable method of discerning whether there can be mutually agreeable and successful models for collaboration or compromise, or not.

My third hypothesis, that Applying Small World Networks to Piñon Canyon results in better understanding of the patterns of potential cooperation and conflict and where they exist, is only partially true, as I had to enhance the model.

Thus, we see that Narrative Policy Analysis can be combined with Network Analysis to study a public administration problem in a different light.

For my complete findings, see Chapter 7.

What Happened Inter-governmentally

My analyses demonstrated the real world position of Branson in the network and showed that Branson School District, as a small government, does not alone have the power to stop the Army.

The collaboration between the ranchers and small governments, like the Branson School District, provided an increase of power in the bureaucratic struggle against the Army.

My analyses also indicated Pueblo City and County are probably the tipping points in the bureaucratic arena.

Suggestions for Further Research

My suggestions for further research include: the study of "networks of networks"; the impact of power and its assignment; the research challenges involved in network research and finally, the dynamics of centrality within intergovernmental relationships.

In Conclusion

Network Analysis as applied to the Piñon Canyon Case Study can be applied to public administration and utilized to study the behaviors of, and between, large and small bureaucracies.

Narrative Policy Analysis complemented by Social Network Analysis helps enrich the Piñon Canyon study and identify centers of influence, thus showing where competing interests collide and where collaboration might be possible.

By leveraging tools such as NetLogo, a model was built to help the reader understand how each of the actors is networked with others.

Abstract

When applied to public administration, networks may be utilized to study the behaviors of and between large and small bureaucracies. Traditional methods of analyzing intergovernmental conflict are often not as informative as network analysis. Network analysis is capable of demonstrating characteristics that traditional analysis does not show. In order to examine intergovernmental relationships and how these networks affect public policy, one must study scenarios where governments and their competing interests collide. The proposed expansion of the Piñon Canyon Maneuver Site in Southeastern Colorado, under consideration since 2004 and as yet unresolved, is such a case. The intent of this dissertation is to "tell a story," "draw a picture" and then "animate the picture" about the complex and often polarizing intergovernmental relationships surrounding Piñon Canyon, to help the reader understand how each of the actors is linked and networked with others.

Piñon Canyon expansion

Potential expansion of the Piñon Canyon Maneuver Site by more than 400,000 acres would make it the Army's largest training site.



Source: Fort Carson

Thomas McKay | The Denver Post

Figure 1-1. The Army planned expansion as reported in the Denver Post on February 14, 2007. Available at: http://www.denverpost.com/portlet/article/html/imageDisplay.jsp?c ontentItemRelationshipId=1437393

CHAPTER 1:

INTERGOVERNMENTAL CONFLICT AND THE PIÑON CANYON MANEUVER SITE

"If you want to gather honey, don't kick over the beehive." -Dale Carnegie How to Win Friends and Influence People

In recent years, research and case studies on intergovernmental problems have looked at polarizing issues to search for trends or behavioral characteristics but rarely apply or identify improved methods of analysis. The idea to understand behavior and then build a model to gain a new understanding can help extract information from within the bureaucracy.

This opening narrative explains the origins of the intergovernmental tug-of-war surrounding the proposed expansion of a military training range to help readers understand how various intergovernmental actors are linked, across geography and time. This research will use the Office of the Assistant Secretary of the Army for Installations and Environment at the Pentagon and the Branson Colorado School District in Las Animas County, Colorado as the polar governments in order to give explanation to the networked bureaucracy between them. It will not, however, argue the merits or shortcomings of the proposed expansion itself, other than to explain the main arguments of both sides.

The policy analyst Emery Roe (1994) once said that "many public policy issues have become so uncertain, complex, and polarized-their empirical, political, legal and bureaucratic merits unknown, not agreed upon, or both-that the only thing left to examine are the different stories policymakers and their critics use to articulate and make sense of that uncertainty, complexity, and polarization."

In light of Roe's assertion that traditional analytical methods are failing us in situations like Piñon Canyon, I wanted to examine whether new methods could be used to study these intergovernmental relationships and their influence on resulting public policy

In 1983 the United States Army acquired approximately 235,000 acres of training space in Southeast Colorado to supplement the main post training ranges of Fort Carson, Colorado. This area is known as the Piñon Canyon Maneuver Site (PCMS) or simply, Piñon Canyon. Much of the land for this second-largest Department of the Army maneuver range was gotten through condemnation of private lands (Department of the Army Report, 7th Infantry Division and Fort Carson, Integrated Cultural Resources Management Plan, 2002-2006, p.195 and 1983 Land Acquisition Documents - Appendix I).

As rural Southeast Colorado was still reeling from the economic recession of the 1970's, with the Soviet Union and United States still staring each other down, few pushed back at the time. But in 2006, when the Army came to the table for a 400,000-acre second helping of the region's ranch lands, nearly everyone did.

In 2004, as militias and militant groups entered the spring fighting in Iraq and it seemed the war would last longer than originally thought, the 7th Division's Integrated Training Area Management (ITAM) Office at Fort Carson prepared a report on the potential acquisition of additional training lands adjacent to the Piñon Canyon Maneuver Site. This report was based on The Piñon Canyon Maneuver Site (PCMS) Revision to Section 7 for Fort Carson's Range and Training Land Program (RTLP) Development Plan, September 2003, which identified the multi-phased acquisition of 6.9 million acres of land, owned by private land owners and the U.S. Forest Service Analysis of *(*Alternatives Study: Piñon Canyon Maneuver Site, Colorado", 2004) While the basic idea for expansion could be seen to have strategic merit, this plan, loosely written and depicting Southeast Colorado as a blank slate to be filled in by Army planners, was not vetted outside of Fort Carson. (Army Interview 2011) Over the course of several months, the plan gained a lot of traction but also generated some dissension within Fort Carson. Because Army officials had made no effort to gauge local opinion with respect to the proposed expansion, they were unaware of the disgruntled emotions of several people and entities in Las Animas County who had concluded the original land acquisition in 1983 was a raw deal. When parts of the ITAM Office's report were selectively leaked, a firestorm erupted.

Over the next several years, a dramatic struggle of wills took place, pitting governments against each other and sometimes against themselves. Basic to the problem of Piñon Canyon is that the survival instinct of bureaucratic organizations conflict with their need to cooperate. Fueled by media and political drama, the case has become a spectacle in the administrative world.

By 2011, the controversy surrounding the expansion had evolved into a bitter dispute on more than a political level. During the course of this research, private citizens as well as elected and appointed officials refused to talk to me or stated that they wouldn't want to "touch this with a ten-foot pole." However, others on both sides of the issue did speak to me, confident of their personal convictions.

It is important in considering this matter to have a sense of Piñon Canyon's remoteness. Whenever one explains a remote position in space there is the need to begin with a single reference point-a landmark, so to speak. The Rocky Mountain Front Range and the prairie foothills are full of such landmarks, though they are located in what most Americans consider "flyover country."

In northeastern New Mexico lies Capulin Volcano which last erupted some 55-65,000 years ago. This extinct cinder-cone volcano is approximately four miles in circumference at the base with a crater diameter of 1,450 feet and an elevation of 8,182 feet at the highest point, slowly rising from around 6,800 feet at its base (Hunner and Lael 2002) Two Texas cattle dealers, Charles Goodnight and Oliver Loving, drove cattle north directly past Capulin Volcano from Texas to New Mexico (Hunner and Lael 2002) and from there to Colorado and Wyoming. The path they took

later became known as the Goodnight-Loving Trail and their adventures later became fictionalized in Larry McMurtry's Pulitzer Prize-winning novel *Lonesome Dove*.

A quick drive in the car about 22 miles north of Capulin and just shy of two miles into the State of Colorado is the town of Branson. Branson is roughly equidistant from the hospitals in Trinidad, Colorado and Raton, New Mexico, as well as Interstate 25, which runs north and south through both. Most people's routine business takes them to Trinidad, since it is the county seat and has the advantage of the closer Wal-Mart.

There is a large flat mesa to the south of Branson covered with juniper, cedar and piñon trees, along with assorted scrub plants and grass. Even though you are at about 6,300 feet in elevation you do not sense the altitude. The geography seems to pull you back to the south towards New Mexico, rather than to the west where the Colorado Rocky Mountains stand somewhere beyond the horizon.

A variety of animals and plants populate this high desert ecosystem. Mule deer, Pronghorn Antelope, turkey, coyotes and even an occasional black bear and Roadrunner can be seen on the many gravel roads that run past Branson. North and east of town the ground is flatter still, as it stretches out towards the Great Plains where for centuries the Plains Indians hunted bison in the grasslands farther to the north.

Within Ecoregional and global contexts, the landscape is representative of a Temperate Steppe, as defined in Bailey's

Ecoregion classification system (Bailey, 1998). Temperate Steppe is a dry environment, where evaporation exceeds precipitation and with periods of extreme cold in the winter. This Ecoregion constitutes approximately 4% of the world's total land mass, and is distributed geographically through the inter-mountain western region of the United States and the southwestern and central plateau regions of Asia, including portions of the Ukraine, Kazakhstan, Mongolia and China (Doe, et al., 2008). The region's correlation with potential global "hot spots" is part of what makes Piñon Canyon attractive to Army planners.

Branson School District

There is not a lot in the town of Branson, in the way of people, commerce or industry. Branson is remote and ties itself to the railroad and the cattle industry artery established by Loving and Goodnight just to the west of town. Branson is about cattle. Branson has a population of 74, which means that any single area rancher has more cattle than Branson has people. Though it is some 175 miles south of Fort Carson, 23 miles due south of the southern border of the Piñon Canyon Maneuver Site and 1,450 miles west of Washington D.C., the City of Branson-and more particularly, the Branson School District-sees itself on the front lines in a war against the Pentagon.

But both Branson and the Pentagon have also become entangled with the cities of Colorado Springs, Pueblo, Trinidad, La Junta, and a web of other governments, politicians, and nongovernmental organizations and agencies with varying financial,

political, educational, occupational, historical, and survival interests at stake.

Branson School District is an anomaly in itself. It serves a township or Census County Division of around 165 people yet has an enrollment of 493 students: 31 in local classrooms and 462 "virtual students" in on-line programs (National Center for Education Statistics, 2011). The school district created Branson School Online as an accredited, diploma-granting, K-12 public school governed by a locally elected Board of Education, which is empowered by Colorado Revised Statutes. This online school is open to all Colorado students who wish to pursue their public school education (Bransonschoolonline.com).

Branson has managed to adapt and survive when other school districts across the nation, hit hard by the economy of the 2000-2010 decade, have simply folded. The credit goes to its engaged and forward-thinking school administration.

In the 1920's, Branson had a newspaper, a bank, three grain elevators and about 1,000 residents. In the 1930's, the town was nearly wiped out by dust storms (Sangres.com). Across the entire Great Plains nearly a million people left their farms from 1930 to 1935 (Egan, 2006). Today, the rural out-migration that began in the 1930's has devastating consequences for communities left behind (Carr and Kefalas, 2009 p.2). This problem is compounded by the fact that 70% of U.S. agricultural lands are expected to change hands in the next 20 years (USDA CREES, 2008), further destabilizing rural areas. Senior farmers and ranchers are

retiring without transferring their businesses because, in many cases, they can't find younger buyers with the requisite capital. Small towns are hemorrhaging their youth to colleges, economic opportunities elsewhere, and the military. (Sleight, 2010)

It is interesting to note that although rural Americans make up just one-sixth of the U.S. population, they comprise 45% of membership in the U.S. Armed Forces (Vilsack, 2010).

The small community of Branson is tied to the military in more than one way and both indeed have a lot at stake with respect to the land north of town. The latest plans would bring the expansion right through town, displacing families and eliminating tax revenues. The Branson School District feels that if the town is to survive and stay relevant in the 21st century, it has no choice but to wage war against the Army.

The District has launched a series of letters to the garrison commander at Fort Carson requesting a "government-togovernment" meeting regarding the proposed expansion. This activist school board, made up entirely of agricultural interests, has tapped-possibly unknowingly-into a little-known bureaucratic "Hail Mary" strategy called "marble cake governance".

Under "marble cake governance" partnerships are formed across varying sectors of government and nongovernmental actors. This is as opposed to traditional "layer cake governance" where different tasks are taken on by different sectors (Klitgaard and Treverton, 2003). In its letters to the Fort Carson Commander, Branson School District invoked its authority to coordinate with

all federal agencies regarding the Army's plans, including the Department of Justice. Branson has portrayed itself as a "hybrid government eroding the line between public, nonprofit and the private sector" in its engagement with the Army (Klitgaard and Treverton, 2003).

Mixed into this struggle, beyond the land and tax revenue, is a complex public opinion dynamic; in 2012, people love soldiers and people love farmers almost to the same degree people hate the military-industrial complex and hate big agriculture. Both the ranchers and-somewhat surprisingly-the Army have for the most part managed to avoid associating themselves with the corporate and industrial networks that shadow both of them.

The Pentagon

The Pentagon is a huge complex, but its footprint on the land is actually about the same size as the City of Branson's (Figure 1-2). It takes no more than seven or eight minutes to walk between its two farthest points. While known for its size, the Pentagon can actually feel like quite an intimate place.



Figure 1-2. Branson, CO and the Pentagon viewed from equal altitudes of 3,300 feet. Courtesy Google Earth.

In the basement of the Pentagon, not very far from where Flight 77 smashed into its western wall on September 11, 2001, is a warren of cubicles supporting the Secretary of the Army's Chief of Legislative Liaison. That is where some of the policy decisions regarding land are made. Land and real estate issues are not taken lightly by the Army, a department that appears to have land everywhere. In Southern Colorado alone reside Fort Carson, Piñon Canyon and the Pueblo Chemical Depot. There are Army properties in practically every state and congressional district, be they bases, dams, hospitals, or recruiting stations, ranging from small buildings to large installations.

On the third floor of the world's largest professional building is the Office of the Assistant Secretary of the Army for Installations and Environment, referred to as OASA (IE&E). OASA (IE&E) provides strategic direction for Army installations and facilities in all matters relating to infrastructure, energy and the environment. Along with an array of other offices in the Pentagon, OASA (IE&E) compiles and analyzes information and recommendations from the installations to project the future needs of the Army's fighting forces. Much of what goes into this process is feedback from soldiers' actual combat experiences, along with cost projections of moving troops, climate, conditions and the need to sustainably manage military lands.

While Branson is full of hard-working farmers and ranchers, the Pentagon cubicles are full of hard-working analysts, many of whom are decorated veterans of earlier wars. While they

understand determining the future of the military is not an exact science, they give it their best shot. They do qualitative and quantitative research and splash that together with some crystal ball reading.

There are just a handful of people working on property issues everywhere from Alaska to the Florida Keys. The task of tracking construction in Texas one minute and the sale of land in North Carolina the next is complicated by hundreds of soldiers and bureaucrats in the field who may not have the same agenda or priorities. Piñon Canyon is one of many controversies that can emerge out of the blue, suddenly going viral in the press or blogosphere.

On April 1, 2011, for instance, while relocating several thousand employees in the Washington D.C. area due to congressional Base Realignment and Closure (BRAC) decisions, the office came under an unexpected barrage of complaints about the wastefulness of a sculpture of "a fairy riding a toad at a bus stop" (Bedard, P.,US News, 2011). The fact that the story broke on April Fool's Day was unfortunate; an even more unfortunate circumstance was that the toad-riding fairy was a real public art submission local officials had required the Army to accommodate but which the service had little control over. This did not prevent phone calls from Capitol Hill from setting the Army switchboard alight. Issues and controversies created by soldiers, private citizens, bureaucrats, or some anonymous benefactor are handled and dealt with daily at the Pentagon.

Piñon Canyon Maneuver Site

Geographically speaking, Las Animas County is to Colorado what Texas is to the United States. As the largest county, is it a massive expanse of land with varying climates and vast natural resources. The western part of the county evokes John Denver's "Rocky Mountain High" paradise, with snow-capped cathedral-spire peaks giving birth to cascading, crystal-clear streams that ultimately find the ocean far away. The eastern part resembles the badlands of Remington and Russell's idealized, epic American West. The county has a rich and colorful history, encompassing Bat Masterson, the Ludlow Massacre, a world-renowned sex change pioneer, and a social détente between the Mexican and Italian cultures that rule the Southern Colorado Front Range from Pueblo to the New Mexico border. The area along the Purgatory River bottom is populated by thick and plentiful brush piñon trees interspersed with large Cottonwoods. This was the Mountain Route of the Santa Fe Trail.

Depending on your point of view, there is really a lot out there or nothing at all.

The Piñon Canyon Maneuver Site is accessed from US 350, the only hard-surface artery running between the communities of Trinidad and La Junta, Colorado. The federal-looking entrance itself surprises you, featuring the obligatory military equipment and painted rocks along what is an otherwise deserted highway. The building complex, which is visible from the road, resembles a

Midwest middle school on steroids, with several outlying warehouses.

If you drive past the entrance east towards La Junta and Rocky Ford, the Rocky Mountains quickly shrink in your rearview mirror and you find yourself smack in the middle of the prairie and the Comanche National Grasslands. With the exception of the railroad tracks, the occasional red, white, and blue tin signs on barbed-wire cattle fences, and the aforementioned entrance, there is not much evidence that you are next to a major military installation. Actually, Piñon Canyon brings to mind what is said about the more famous Area 51: it's a no-name base in the middle of nowhere.

Piñon Canyon itself was always a remote area, known mostly for being a cheap alternative for teen-aged couples to "make out" instead of spending money at the drive-in east of Trinidad. It was also a popular outlying party spot for students from the local schools and junior college wanting to escape the monotony of small-town life. The environs were rarely visited by local sheriffs' deputies or state patrol, unless somebody was injured after hitting a deer. Even many hunters found the area too remote.

The land around Piñon Canyon, as in Branson and the rest of the county, supports a diverse ecosystem with large numbers and variety of big and small game. Many schools in the region drew their mascots' names from the local flora and fauna, whether antelopes, wildcats, farmers, eagles, and even watermelons-hence, the Rocky Ford High School Meloneers. The forest, rangeland and

mineral resources seem to appear and disappear at random in this area, and there have been bitter battles over the vast amounts of gas and oil that sit well below the surface.

While there was some controversy in 1983 about the Army's plan to move a training range out east of Trinidad, there was an equal amount of excitement. At that time, Trinidad's economy was in free fall following the recession of the 1970's and local coal mines were beginning to shut down. The national migration to cities in the 20th century was hard on Trinidad and especially Las Animas County. During the forty-year period between 1940 and 1980, Las Animas County lost over half its population (Census.gov) and unemployment remained high in the early 1980's.

It was under these conditions that Trinidad and Las Animas County entered into an agreement with the Army regarding the establishment of the Piñon Canyon training range.

During Piñon Canyon's initial development, there was speculation within surrounding communities that military convoys would pass through the towns, exciting merchants and annoying a few citizens. The dreams that the Las Animas County business community pinned on the original expansion were big ones, with the potential of new jobs and soldiers stopping in Trinidad on their way to training.

But two things soon happened to dampen the dreams: first, the Army prohibited soldiers from stopping military convoys on their way to Piñon Canyon and second, the Army encouraged the State Highway Department to build a bridge and highway on the

north end of Trinidad, which prevented any military traffic from entering the city in the first place (Figure 1-3). Since the installation's inception, the only two related economic developments worth mentioning are the bridge to avoid Trinidad and the use of the hospital after a wind storm tore through a training exercise in 1989, injuring nearly 100 soldiers.

The anticipated economic benefits never materialized for the business community or the ranchers. According to former U.S. Representative Marilyn Musgrave and John Salazar,

Many of [the area's] ranchers dealt with the Army when the site was created. In the 1980's, the Army promised economic benefits for the towns surrounding the site because troops would do business in the area. However, the reality today is troops travel between Ft. Carson and Piñon Canyon in tight convoys and don't stop at local businesses (Marilyn Musgrave, John Salazar letter, Pueblo Chieftain, July 22, 2007.

A running joke among townsfolk is, "We were told the installation would be a bridge to economic development; instead, the only bridge was one built on the highway on the outskirts of Trinidad that enabled Army personnel to bypass the town entirely" (Elder, 2009)

The Army subsequently reneged on additional promises made to the communities when Piñon Canyon was carved out of the region in the early 1980s, including no live-fire exercises, payments in lieu of lost tax revenue, and no future expansion (Garrett and

Roper, 2006). Citizens who believed the project might help offset the economic downturn and the closure of area coal mines grew disappointed.

The economic downturn and steel market crash of the early 80's not only devastated Pueblo but left cities like Trinidad clinging to economic promises of all kinds. As time passed, small towns across Southern Colorado began to turn into ghost towns. The historical big brother city of Pueblo was too busy nursing its own wounds to help.



Figure 1-3. U.S. 350 Bypass and bridge connecting Interstate 25 with U.S. 350 north of Trinidad, Colorado, which routes military convoys past the town. Courtesy Google Maps.

So in 2006, when citizens heard the Army was considering expanding PCMS beyond its original boundaries, the news brought a lot of unpleasant memories to the surface. And when more details were leaked showing the Army had completed studies to acquire almost seven million acres in total, from I-25 to the Kansas border and from Highway 50 south to the New Mexico and Oklahoma borders, it hit like a bombshell (Figure 1-4).

As before, the proposed expansion would require purchase and condemnation of a number of surrounding ranches, many of which have been passed down in the same families for multiple generations. Many Southern Coloradans feel the ranches are vital to the region's character and economy.

The plans caught the residents of Las Animas, Otero and Pueblo Counties off guard but this time, unlike the 1980s, the population mobilized quickly and immediately pushed back (Roper, 2006).

The Piñon Canyon opposition movement has now become something of a cause célèbre in the eyes of local citizens: a modern-day David and Goliath drama. In reality, though, it is a Goliath and Goliath drama, pitting two huge political interests against each other.

Area ranchers-who combine political might with the libertarianism that lies just under the surface of many Western communities-have put the Army on the defensive by tapping into the powerful Colorado Cattlemen's Association, Congress, and the agriculture industry.

PCMS turned into a public relations disaster for the Army. Because of leaked documents and other uncovered conflicts internal to the service, the Army has created its own Vietnamlike quagmire, with no idea of where to go and how to win. The Army is in danger of losing a valuable constituency in Southern

Colorado, with ranchers claiming they are living in a climate of fear: They are fearful of having land seized, fearful that land and water will be destroyed and wasted, fearful that the Army will come in and destroy their way of life.



Figure 1-4. Proposed land acquisition from 7th Division Analysis of Alternatives Study, Piñon Canyon Maneuver Site, Colorado, May 2004.

Despite locals' concerns, the Army says the plan to expand Piñon Canyon to over seven million acres was "never a realistic option or possibility" but rather the "brainchild of the Range Control folks who one day decided to put their wildest dreams on paper" (Department of the Army Interview, 2011) The study did, however, give traction to the idea of exploring the acquisition of around 400,000 acres. But it was the original narrative-the
report that over 17,000 citizens in Southeastern Colorado would be displaced-that took hold (Table 1-1). The Army lost control of its message, along with any momentum it had to acquire the desired land.

_1		Private	Public	Total	Displaced
Phase		Land	Land	Acres by	Population
#	County	(estimate)	(estimate)	Phase	(estimate)
	Las				
1A	Animas	79592	0	79592	150
	Las				
1B	Animas	35492	0	35492	67
	Las				
2A	Animas	131067	0	131067	247
	Las				
	Animas	29484	0		55
2B	Otero	101407	179145	310036	934
	Las				
3A	Animas	54908	0	54908	109
	Las				
3в	Animas	198304	0	198304	374
	Las				
	Animas	420000	0		792
4	Otero	81337	0	501337	749
	Baca	1637120	667161		4517
	Bent	566240	0		1931
	Las				
	Animas	1578947	163150		2748
	Otero	368174	0		2641
5	Prowers	622800	0	5603592	1949
	Totals	5904872	1009456	6914328	17263

Table 1-1. 7th Division estimated displaced population count, (7th Division, Fort Carson) May 2004

Perhaps the most compelling aspect of the Piñon Canyon debate is the intergovernmental posturing and fighting. Not only are government administrations fighting each other at different levels, they are also fighting at their respective levels. The Pueblo County Board of Commissioners is vocal about its opposition to the expansion of Piñon Canyon (Tucker, J., 2008)while the El Paso County Board of County Commissioners-the neighboring county to the north-favors the plan (Hisey, D., 2007) The Department of the Army is pushing the program while the Department of Agriculture is skeptical. Members of Congress are battling each other and even small towns are coming together to fight interests in Colorado Springs, the largest city in El Paso County. This has put the state government into a corner, as it struggles to support a large area of the state and its networked constituency against the second largest employer in the State of Colorado.

The issues and controversies surrounding the expansion have grown into a complex web of people, politics, policies, prejudices and power. This web connects actors from small places such as Branson, Hoehne, and Kim, Colorado to the august halls of the Pentagon. This network of government entities extends from City Hall in Trinidad to the County Courthouse in La Junta and the Capitol Building in Denver.

The controversy continues to be fluid. During the 15-day period between April 22 and May 6, 2009, two events gave both sides pause. On April 22 Keith Eastin, the Assistant Secretary of the Army, who had not made many friends in Southern Colorado and whose top priority had been expanding PCMS, announced his retirement. PCMS opponents took this as a sign they were winning. But on May 6, Scott McInnis, the former 3rd District Congressman and likely Republican gubernatorial candidate, sent a letter to

then-Governor Bill Ritter urging him to veto legislation that would prevent the Army from buying any Colorado State Board land around Piñon Canyon (Bartles, Denver Post 2009). The tug of war continued.

Then, just a few weeks later, the Army officially canceled plans to add a fifth combat brigade to Fort Carson, eliminating 4,800 new jobs and jeopardizing hundreds of millions of dollars in new infrastructure (Denver Post)raising the ire of the Colorado Springs Business Community.

More recently, in a March 29, 2011 letter to Senators Michael Bennet and Mark Udall, Secretary of the Army John McHugh stated the Army has no plans to expand the boundaries of Piñon Canyon and has not requested any money for acquisition of private land for the next five years (Denver Post). At the same time, Senator Udall confirmed that Fort Carson will get an aviation brigade with about 2,700 soldiers and more than 100 helicopters (KKTV.com).

However, this has not resolved the Army's need for additional training ranges for its soldiers at Fort Carson, and it is difficult to say where this issue will head next. While the Army, the ranchers and the Branson School District may continue to battle each other, the problem is more likely to be addressed through collaboration.

Gifford Pinchot, the first chief of the U.S. Forest Service, offered two very relevant insights over a century ago. In a very utilitarian vein he said, "...where conflicting interests must be reconciled, the question will always be decided from the standpoint of the greatest good of the greatest number in the long run" Pinchot, 1905) In more general advice to government leaders he stated, "Find out in advance what the public will stand for; if it is right and they won't stand for it, postpone the action and educate them" (Pinchot, 1905) The Army would have benefitted from studying Gifford Pinchot as the Service did not gauge public sentiment until well after its initial proposal. It also failed to heed subsequent congressional direction to do so and still has not undertaken the thorough education of the communities involved.

During times of financial hardship, the political environment surrounding an issue that balances economic development against natural resources normally tilts the scale in favor of economic development. This is not necessarily the case in Colorado, though, where commitment to environmental issues runs deep. An excellent example is the 1976 Olympic Winter Games, awarded to Denver by the Olympic Committee. The landmark vote in November 1972 to authorize public expenditures needed to host the games wasn't even close, with 514,228 against and 350,964 for. A 59.4% majority said they weren't willing to spend tax dollars to have the Games in their state, despite potential economic benefits (Sanko, 1999)

The intergovernmental landscape has Branson and the Army at opposite poles with several Municipal County, District, State, and Federal bureaucracies in between. The bureaucratic center of mass is in the Colorado Springs/Pueblo area with the State of Colorado and its various agencies trying to clutch a middle ground.

The two sectors-agricultural and national defense-that are at the heart of the Piñon Canyon controversy are very powerful entities that cross social and political planes. This paper aims to give the reader a comprehensive understanding of the intergovernmental problem and the underlying drivers behind the polar bureaucracies, while applying these insights to a narrative and network framework for an understanding of the phenomena at play.

In Chapter 1, we have explored the history of the area and the related intergovernmental issues in depth. In chapter 2, an analysis of the literature looks at Piñon Canyon and the different paths of analysis. Chapter 3, "A Different Case Study Path," brings the supporting structures of my theoretical framework together with what I learned from reviewing the literature.

Chapters 4, 5 and 6 will look at Piñon Canyon through the lenses of Narrative Analysis, Social Network Analysis and Agent Based Modeling with my findings in Chapter 7. Tying the finding back to the foundational and subject matter literature will show how modeling not only guides the analysis but opens a number of doors for further research.

CHAPTER 2: LITERATURE REVIEW

NETWORK CLASHES AND GOVERNING BY NEWTWORK

"When we try to pick out anything by itself, we find it hitched to everything else in the Universe."

John Muir

My First Summer in the Sierra, 1911

Can Network Science help?

The literature review of this paper explore the potential of network science to assist in addressing the conflicting aims between the actors within the intergovernmental system surrounding the proposed expansion of the Piñon Canyon Maneuver Site. Using Network Science and Theory to further develop the case study, the relationships between the intergovernmental actors-federal, state, county, municipal-will be analyzed to discern the patterns of potential cooperation and conflict and where they exist; i.e., whether there can be mutually agreeable and successful models for collaboration or compromise.

The literature on the Piñon Canyon Maneuver Site Expansion referenced in this case study explores the narrative of the competing interests as well as the importance of network science on the environment, given the conflicting aims between the actors within the intergovernmental system. The literature for this study focuses on two areas:

 Network theory and science as it relates to bureaucracies, foundational literature) and

 Piñon Canyon as a stand-alone political issue. (Subject matter literature)

Public Administration case studies usually focus on sets of actors and competing interests. A particular individual, program or event is studied in depth for a defined period of time (Leedy and Ormrod, 2010), wherein the case study is really a study of a small world. All of the events and people in the small world are somehow connected. They are connected through what is known as a "small world network." A small world network demonstrates how certain subjects are connected through a winnowing of paths, out of thousands or even millions of other subjects, via the smallworld effect (Lewis, 2009). This small world becomes in essence the context for the case study. Network science, being visual mathematical studies of complex structures, helps administrators understand their properties at various points in time and space.

Instead of utilizing small world networks to study individual people, why not use small world networks to study the behaviors of and between large and small bureaucracies? Using Small World Networks and applying the study of relationships between intergovernmental actors-federal, state, county, municipal-results in better understanding of the patterns of potential cooperation and conflict and where they exist; i.e., whether there can be mutually agreeable and successful models for collaboration or compromise.

Two very important terms in network science are **topography** and **topology**. Topology is the mathematical study of links and

nodes and the virtual arrangement of these elements in a network and, more importantly, is concerned with those features of geometry which "remain unchanged after twisting, stretching or other deformations of a geometrical space" (Nicas, 2009). Topography is simply "the map" along with its shapes and features. This can be referred to as the terrain of the environment or, for this case study, the political terrain.

Mapping the topography of a case study, especially understanding the nodes in the middle, will provide models where political tipping points may be identified. Further, designing the topology as a quantitative geometric problem can help the Public Administration Professional develop a different perspective of political problems. Once the shapes of the objects involved are mapped one can understand the way they are put together. To appreciate political relationships in government across its varying levels and how those relationships connect and drive public policy, one must employ a scenario where governments and competing interests collide.

Present state of scholarship related to the topic

A search via World-Cat and the Internet found several papers and works on military encroachment. There are limited articles and papers on military encroachment and federalism; however, none could be found on network theory, encroachment and intergovernmental relationships. As the Department of Defense changes force structure through operational tempo and

transformation, the potential for cities to encroach on military installations and vice versa will be high.

Issues facing the military and communities alike should be studied from varying points of view to minimize potential conflict. Since graphs are visual representations of social networks (Knoke, 2008), applying graphs to intergovernmental relationships provides the potential for such studies to be a significant contribution to scholarship.

Central to the case study is why and how networks become important in bureaucracies. Robert Atkinson (2003) states that, "In the networked world, government will shift from managing programs to guiding and funding networks". (p.15) In addition Koliba (2012) stresses that "Governance networks are distinguished from other forms of social networks because of the characteristic of network actors and the kinds of functions and collective actions they take on." (p. 71)

Networks allow the bureaucracy to have farther reach and provide an avenue for collaboration. Managers often work in environments where they find themselves facilitating and operating in multi-organizational networked arrangements to solve problems that can't be solved by a single organization (O'Leary, Gazley, McGuire, and Bingham, 2009 p. 1) and government innovators must shop for necessary resources to increase the reach of their networks (Goldsmith and Eggers, 2004 p. 34). Because of this reach and collaboration, networks can become complex very quickly.

Public managers are beginning to need periodic table-like and logarithmic charts to predict outcomes. While network management intersects quantitative and qualitative methods, the lines between the two become blurry. Agranoff and McGuire (2003) stated that network management offers an important class of collaborative management models, so that "Our understanding of network management is derived mainly from theoretically examining, rather than empirically cataloging, its tasks". (p.35) The theoretical examination may be nothing more than understanding the intergovernmental exchanges and where they arise. However, public managers must understand the environment as there may or may not be an important relationship between the conditions that cultivate networks and the places they are needed (Moore, 2009 p. 213).

Intergovernmental management through networks must be goal oriented as well, though the goal can change from one level to another or between rival agencies. Goldsmith and Eggers (2004) stress the importance of mission, strategy and determining what is delegated to the network in the first place as well as the dilemma of accountability and the hierarchy of responsibilities. For example, should the state pressure counties to follow its intentions? Paul Posner (2009) elaborates, "…the 'hidden hand' of government often at play in public service networks has frequently gone unheralded". (p. 89)

The "hidden hand" works in spite of barriers, and the reach of a government agency be may felt both where it is intended and

where it is not. An agency will limit itself if it is too inwardly focused and guards its turf, as explained by Snyder and Briggs (2004): "Conventional government bureaucracies-designed to solve stable problems for established constituencies through centrally managed programs and policies-are hampered by important limitations in this environment." (p. 172) The hidden hand also plays into Ronald Burr's structural hole theory of social networks as explained by Koliba (2012):

"Structural holes exist where ever there is a lack of tie between two or more relevant actors, making them somewhat ubiquitous. They are important to network managers when an opportunity exists to fill a hole by building links. (pp. 82-83)

Intergovernmental networks may be used to identify tipping points in pro-and-con intergovernmental issues like Piñon Canyon and encroachment, or other similar situations where agencies are forced to interact, such as with FEMA in the wake of an emergency. The follow-up question is how does an agency leverage its influence to get others to act? Examining management patterns may reveal more about organizational style as opposed to related inter-organizational collaboration. Managerial behavior can change as a result of a discriminative stimulus that occurs before the behavior (Manz and Sims, 1981) in contrast to learning by consequence, which many consider the prevailing method.

The culture of an organization is critical to its ability to manage outside of its organization. According to Rachel

Fleishman (2009), "Although several different theories have been proposed to explain why organizations participate, there is no consensus on which motivations are most important and under what conditions some may be more salient than others." (p. 32) The link from networks and organizations to collaboration also presents an important link for public managers as "organizational structures, clientele characteristics, and environmental factors do make important differences in improving program outcomes" (Ryu and Rainy, 2009 p. 191).

When applying theory and science to public problems in order to understand phenomena a manager would have to look at an issue and see the situation to determine its relevance. Public managers need to understand the appropriate time and place to consider exploring networks to solve problems. The power of networked government lies in its pragmatism (Kettl, 2009 p. 1). Specifically, the manager would need to see certain conditions to move toward the direction of network analysis. Goldsmith with Kettl (in Moore, 2009) stated that conditions under which a network would develop include:

-Government's performance is glaring;

-The technical requirements for dealing with a problem and the institutional arrangements governing the social response are out of sync;

-Some features of a problem could best be attacked by a loosely coupled network rather than by a large hierarchical organization. (p. 213)

These are conditions that provide a good start and move to the engagement of partnerships to create networks and accomplish goals. Kamensky, Burlin, and Abramson (2004) state that, "there are certain preconditions that need to be present for networks and partnerships to be successful; Successful collaborative ventures are premised on the existence of trust, a mutual obligation to succeed, and the ability to build consensus." (p. 12)

In other words, there is the need to win hearts and minds as a precondition for moving policies forward, such as environmental initiatives or base expansions. There is also a momentum factor involved in policy management. Posner (2009) states that, "The criteria for assessing networks rest less on an ability to deliver specific outcomes and more on how networks encourage the formation and sustainability of positive interactions across the multiple players sharing the network (p. 238-239)." However, Eggers (2009) warns that to move to a network model, a major dilemma is that a hierarchical approach is easier than a networked approach. In addition, a hierarchal approach makes it easier to protect self-interests. Meyerson gives an example of individual states competing for their share of the economic pie. This also relates to the case for counties in the Piñon Canyon debate, as "The framers did not believe that altruism would govern commercial relations" (Meyerson, 2002 p. 115).

In addition to the momentum of an issue, the sustainability of an issue also proceeds in relationship to the ability to reach out and touch others, no matter where they are. Agranoff (2003) notes that:

While not every observer would agree that institutions/ organizations have become quite so delinked it is clear that deep understanding of today's social relationships include multiple networks of relationships within and between social organizations, ranging for some people from local to global in scope. (p. 6)

When looking at the "delinked" the policies began to fall in the intergovernmental and inter-sector area. The authority chains become blurred in that neither federal nor state authorities have effective authority to control policy decisions (Waugh, 2009 p. 275). "Trying to determine each level of government role in intergovernmental relationships will help a public manager understand the framework and develop the appropriate skills rather than utilization of the traditional stovepipe approach" (Kamensky et al. 2004 p. 19).

The actors within the network structure and their influence on the network are yet another aspect to consider. As in the real world, certain individuals have power and influence. The connections and social structure can be studied to address the impact of smaller social structures and the dependence of one actor on others in that network. In other words, just as the mobs are important, the centers of influence should be identified.

Burke (1997) addresses the importance of centers of influence by stating,

The primary focus of network exchange research is to increase our understanding of the distribution of power in exchange networks-networks of individuals, each of whom can exchange with selected others. Central to the concept of dependence is the idea that actors may have alternative sources for whatever resource they need. Thus, each actor exists within a network of other actors with resources, and the network structure (i.e., who can exchange with whom) determines the existence and number of alternative sources each actor has. (p.134)

This idea begs additional questions such as, who has the influence? Is there a way to identify the stakeholders and separate them from the center of influence?

In 1967 Adams tried to simplify this concept by applying some simple guidelines for characterizing closeness between groups. He stated that "The two basic structural divisions of the social network are, very simply, kin and non-kin." This was written in a time before Facebook and MySpace, but shows what may have been tendencies demonstrated in early social network research. While these ideas are clearly more social science, they demonstrate a few of the qualitative aspects of network theory.

Network Theory

Understanding networks, intergovernmental relationships and frameworks is all tied to graphs. While trying to understand the

tug of war between the few against the many the research flow went from the politics, to the environment, to chemistry, to networks and then to, of all places, Tupperware-and the bureaucracies that surround and color the issue like a spaghettistained plastic bowl sitting in the cupboard.

A review of the literature on network theory should start in two places; first, the practical and second, the theoretical. While one can see networks nearly everywhere, the practical impact of networks can be best visualized by looking at Tupperware. Like competing governments, women competed against neighbors for the same market and leverage in the community. Growth of both depends on gaining the upper hand in competing networks within a community or small world.

Norman Squires conceptualized and implemented the "party plan method" of direct selling. He did this first at Fuller Brushes, then at Tupperware (Clarke, 1999). Later, Brownie Humphrey Wise mastered the method (Clarke, 1999) and the business world took notice of networks. In the 1950's, home-party selling was a new alternative to door-to-door cold selling and took advantage of women's social networks (Kahn-Leavitt, 2004). The principles were simple and Squires and Wise built a company that by 2008 produced over \$2 billion in sales and over \$161 million in profit-all built around network theory (Clark, 2009).

Tupperware was built on networks. The direct sales were based upon "a particularly viable form of sales in geographical areas and social groupings with strong female networks and

kinship structures" (Clarke, 2009 p. 83). Today, many businesses such as cable television, Internet providers, and credit cards offer incentives for customers to sign up networks of friends. MySpace, Twitter, Linked-In and Facebook are just a few of the companies doing business based simply on the power and profusion of networks.

The review of the theoretical literature on networks should rightfully begin with Stanley Milgram. While at Harvard University, Milgram conducted experiments that studied the average number of "nodes" between people in social networks living in the United States; this later came to be associated with "Six Degrees of Separation". Milgram (1967) reported that "chains varied from two to ten intermediate acquaintances, with the median at five". While at the City University of New York, Milgram and Jeffery Travers of Harvard University expanded the research on the so-called "Small World Experiment" which "demonstrated the feasibility of the 'small world' technique, and took a step toward demonstrating, defining and measuring interconnectedness in a large society" (Travers and Milgram, 1969 p. 441). The research was groundbreaking at the time because it suggested that human society is a small world-type network characterized by short path lengths (Watts, D. J. and Strogatz S. H. 1998) Small worlds are central to network science and network theory not only for their explanation of how people are linked, but also the illustration of simple and quick expressways within what otherwise appears to be a chaotic population.

There are several mathematical functions and models for small world networks to explain information flow, connectivity, and dualities. Much of network theory surrounded the Internet or other communication technologies, such as phone and fax networks. In its modern genesis, network theory and systems theory were almost one and the same.

Network theory developed but remained only an interesting sidebar of social science research until 1998, when Duncan J. Watts and Steven Stroqatz from Cornell University published the first network model showing the utility of the small world phenomenon and proposed an emergence process-called a generative procedure-for constructing small world networks (Lewis, 2009). The study demonstrated that networks created in nature and those that are man-made both have properties exhibited in the small world. Their article states, "Ordinarily, the connection topology is assumed to be either completely regular or completely random. But many biological, technological and social networks lie somewhere between these two extremes" (Watts and Strogatz, 1998 p. 440). The term "topology" is important to consider here because it refers to the network as a study of a shape that is continuous and able to morph beyond that of standard slope or bell-curve. The graph is no longer a representation of an idea or trend, but rather a road map of where actors live in a community.

Watts and Strogatz (1998) go into great technical detail about the small world phenomenon and carefully explain the neighborhoods and other map-like features of their study. Once

beyond the technical aspects one can actually see the neighborhood they describe. For example, "The idealized construction above reveals the key role of short cuts. It suggests that the small-world phenomenon might be common in sparse networks with many vertices, as even a tiny fraction of short cuts would suffice" (p. 441). As with backstreets or an alley, the networks take on a lot of the topographic features of a community.

Are neighborhoods systems or networks? The reason to focus on networks and to differentiate networks from systems may center on systems being an assemblage of nodes and related devices concerned with the same function whereas networks may or may not be concerned with the same function, though they are still connected. Watts (1999) wrote in another study that:

The motivation for the small-world problem comes from social networks, but it turns out to be a much more general effect that arises under quite weak conditions in large, sparse, partly ordered, and partly random networks. Its existence is not predicted in current network theories yet it seems likely to arise in a wide variety of real networks, especially in social biological and technical systems. One consequence of this result that it is highly likely that the phenomenon exists in the real social world-a notion only supported by limited data but consistent with anecdotal experience. (p. 524)

Network science, especially regarding how it relates to small worlds, falls somewhere between building a circuit board and predicting the weather. The effect of partly ordered and partly random networks is important to consider because as the science develops it is not important whether there will be firm laws governing networks but rather the use of the science to help predict the governing of networks.

As networks are non-linear and three dimensional, the mathematical dynamics involved in explaining them are highly complex. Mapping small world networks into geometric forms that remain constant under transformations is difficult because relationships within networks change. For example, one person may become acquainted with another through a common friend and develop a bond stronger than the original acquaintance. The political characteristics of relationships are reflected in cliques and other variables. A study could be focused on parents and offspring as easily as it could between professions. Beshers and Laumann (1967) explain:

In sociometric research the links between individuals, such as friendship or communication, may be viewed as defining a network. If we group the individuals by some characteristic, such as occupation, then we may assign weights to the links among these groups. We can define paths over these weighted links and distributions of paths as before. We can also seek to infer gaps among the occupations from these distributions. One is that the influence of time lags

varies substantially; for example, one's best friends today may stem from recent acquaintances. One's neighbor, one's wife, and one's father are traded in less easily in approximately that order and are therefore results of prior social factors. This influence of time lags is complicated by the other difficulty-the changing occupational distributions that result from economic structural effects. (p. 234)

Strogatz (2001) further addresses the problems of such non-linear dynamics by stating:

The speculations that these architectures are dynamically advantageous (for example, more synchronizable or errortolerant) need to be sharpened, then confirmed or refuted mathematically for specific examples. Other ripe topics include the design of self-healing networks, and the relationships among optimization principles, network growth rules and network topology. In the longer run, network thinking will become essential to all branches of science as we struggle to interpret the data pouring in from neurobiology, genomics, ecology, finance and the World-Wide Web. (p. 274)

When networks take on fractal properties the mathematics also becomes trickier. Briggs (1992) explains this fractal nature and its impact, saying "Nonlinear systems-including many dynamical systems and all chaotic systems-are extremely sensitive to small

changes, because the feedback to their inextricable parts can amplify small changes into large results." (p. 19) Briggs goes on to say that network thinking, " (p. 30)," will be handicapped by the stability of networks or lack thereof. Strogatz (2004) adds that in these network phenomena that ultimately networks, like nature, organize themselves "in fractals, when an arbitrary small piece of a complex shape is a microcosm of the whole. (p. 255)" Meyerson (2002) also describes government as a fractal when saying: "Our federalist system can be seen as a kind of fractal structure. A picture of the governing design for the nation would reveal, rather than a simple government structure, the selfsimilar pattern associated with fractals." (p. 195)

Tichy, Tushman and Fombrun (1979) discuss the instability of networks over time asking, "Why do they change, and by how much...and how frequently do they change under different sets of conditions?" (p. 507) Political networks can be more challenging due to the shifting sands of loyalty and voters being simply temperamental. As fractals are found in nature, networks are held together in patterns and bonds. The planet is held together in a process of bonding and people can be looked at within the same environment. Bonds, along with links and nodes, vary in strength.

Political sands as a metaphor are really nothing more than shifting dunes. Homogeneity, especially political homogeneity, is difficult to express as a mathematical validity to describe the trends of the few representing the many. In the analysis of networks which combines the data from several places in time and

space, the varying sets of conditions become even more important. Eulau and Siegel (1981) discuss the problems of finding the current that pushed group thought or even mob mentality:

The political homogeneity of face-to-face relationships has been noted often, but its etiology is little understood. There are several hypotheses as to why it is that people in contact with each other come to think and act alike, the best known being the "social absorption" and the "mutual attraction" hypotheses. The absorption hypothesis holds that people in frequent and continuing contact feel "pressured" to behave as others in the social situation do, regardless of whether such behavior is consensually validated or imposed, and that, as a result, they conform to social norms. The attraction hypothesis holds that people who are "similar" are attracted to each other and, in seeking each other out, come to form relationships which as a result are homogeneous. The first set holds that people in contact with each other come to share political orientations either because they are "socially absorbed" into their interpersonal context or because they are "mutually attracted" because of common characteristics in the first place. The second set holds that people specifying the partisan identification of their primary zone do so either because they "project" their own identification on others or "introject" the identification of their primary zone associates. Because of the small

sample and sub-samples involved, all of the "findings," though theoretically plausible, can only be considered suggestive for replication with much larger samples. (p. 507)

These factors are important to consider because it may be easy to explain trends without actual scientific data. Studying the fractal nature of networks-where connectivity reaches from the group to individual levels-may better explain the trends in relationships along with their orientations.

Newman (2003) expands on the problems of data collection and the problem of going between levels of data:

Traditional social network studies often suffer from problems of inaccuracy, subjectivity, and small sample size. With the exception of a few ingenious indirect studies such as Milgram's, data collection is usually carried out by querying participants directly using questionnaires or interviews. Such methods are labor-intensive and therefore limit the size of the network that can be observed. Survey data are, moreover, influenced by subjective biases on the part of respondents; how one respondent defines a friend for example could be quite different from how another does. (p. 6)

Looking at the players within the network and the sheer amount of data involved can cripple research-this is advice that must be heeded.

Returning to the original theme that networks represent something real, how would they be described in nature? Can network science be used to not only accurately predict but build a mathematical model? Miller and Page (2007) addressed the properties of social connections and how they can be represented: While networks—and, more importantly, the interactions among agents they facilitate—have long been considered by social scientists, especially sociologists, a wave of recent interest has been prompted by computational and mathematical models created by complex system researchers. Rather than focusing on any particular network, this new work considers the generic properties of social connections.

The nature of networks is also critical to study. If one were to look at a network in terms of a living organism, then in many ways network science parallels chemistry. Linus Pauling (1998) explains that structure factors and symmetry are important in chemistry because they help explain the atomic arrangement. This is very true for networks. He explains that structural features of molecules and crystals are governed by considerations of symmetry in this example: "A three bladed propeller can be rotated about its axis through 120° and it appears unchanged from its original condition, if the three blades are identical...." (p. 869)

In science, elements form chemical bonds to form compounds that become stable in nature. The links and nodes are represented by molecules, smaller atoms and bonds. Once the atoms are

connected they stack. As one would find in chemical bonds, there is a process responsible for the attractive interactions between nodes and links—in the case of chemistry, atoms and molecules that form compounds; in the case of social science or network theory, forming centers of influence. The stacking of atoms and molecules side by side to build a crystal results in a second type of symmetry, called translation symmetry or lattice symmetry (Pauling, 1998) because it builds itself upon a ladder in varying directions like networks would. There should also be similar laws governing the energy required to build and break them, and the energy needed to hold them together.

Molecular geometry, network science, spatial geometry and molecular structure provide the three-dimensional arrangement needed to study the properties in science. Albert-László Barabási (2003) also makes this connection to chemistry by comparing social networks to chemical reactions. While researching molecular databases at the Argonne National Laboratory and studying whether complex networks have small world properties, he noted that, "cells are small worlds with three degrees of separation". (p. 186) Barabási also touches on another important concept of fractal structure that underlies the design of models such as the Internet. Transitioning these concepts from public administration to chemistry and other sciences is not too difficult; as with bonds that bring chemicals together, there are also many bonds in the government world.

Piñon Canyon

This study about a military base, its expansion, and its complex set of actors began on an entirely different idea. It started with an idea about a battle between two counties, El Paso County, Colorado (population estimate: 622,858) and Las Animas County, Colorado (population estimate: 17,353), related to the proposed expansion. That then begged a question; What kind of job did the Army do in preparing a collaborative environment to ensure the success of the project? As stated in a September 2009 National Academy of Public Administration report, "The Military Departments are responsible for cooperative planning at the state and local level. This includes submitting plans for changes on installations that could affect neighboring areas to the affected local community and state governments for comment" under Executive Order 12372 (National Academy of Public Administration [NAPA], 2009).

Across the nation, encroachment and Base Realignment and Closure (BRAC) issues are linked to a vast network of intergovernmental issues ranging from the economic to the environmental. These issues often take center stage and challenge all levels of government to adapt.

Developing a case study where the topography can be viewed to better understand the morphing topology of public policies through many levels of government-given the conflicting aims between the actors within the intergovernmental system and where other objectives and interests come into play-provides the basis

for this dissertation. Piñon Canyon is more than a place on a map; it is place in a network that stretches from the Pentagon to hundreds of dusty ranches on the eastern plains of Colorado.

The merit of the Piñon Canyon expansion itself is a peripheral issue and the study of who is right or wrong will not be addressed. The research focuses only on the relationships and mapping the topography to better understand the topology or, said in simpler terms, who is on the map at any given time and where do they move based upon the conditions?

The public policy issues that address Piñon Canyon are fluid and evolving over time. Although highly visible in the State of Colorado, Piñon Canyon does not have a lengthy bibliographic history outside of media and government reports. Most of the literature that is meaningful, containing current scientific theories, and timely is more related to general encroachment and BRAC issues and found in government publications, reports and scholarly papers; there are limited books to be found. The literature addressing the intergovernmental system and the networks in which they reside dominates the literature.

The research regarding network theory is very important to Piñon Canyon Maneuver Site and is central to the research. Goldsmith and Eggers (2004) state that, "The ancient Greeks, for example, outsourced tax collection to tax farmers and leased out the state mines to concessionaires." (p. 9) This concept is important because the Army could lease land within the confines of the PCMS to cattle ranchers and other interests to ensure the

success of the expansion. In addition, Goldsmith and Eggers address the selection of partners and determining which may be the best for government. The critical idea that governments choose which other levels of government to partner with will also determine who benefits most from the expansion.

Scholarly work on military geography is limited but is addressed in publications that focus on encroachment and development. Rachael Woodward (2004) states that, "The issue of relativism in environmental impact should be recognized. Military activities are not alone in shaping the environment; intensive agriculture and heavy industry, for example also have profound and deleterious impacts on the natural environment." (p. 74)

Probably the best source regarding the anthropological and historical background of Piñon Canyon comes from Dr. Bonnie Clark at the University of Denver. Dr. Clark has developed an extensive Website and research on the issue. In addition to the controversy and the anthropological relationship between people and the land, she has also brought a clear historical perspective on the settling of the land itself:

In the 1820s, Americanos showed up, many traveling along the Santa Fe trail, which ran from the Mississippi River to Santa Fe and then to Mexico City. The Santa Fe Trail runs parallel to the Purgatory River and traveling the trail was an important way that both Hispanic and Anglos learned about the region. In the mid-19th Century this area was part of the territory conquered by the US in the Mexican-

American war, but throughout the rest of that century Hispanics continued to move north into the region, as Anglos began to join them from north and east. Settlers from both groups largely supported themselves through raising livestock, which remains the backbone of the region's economy. As historian Sarah Deutsch so distinctly put it, here the Hispanic and Anglo frontiers didn't meet, they interlocked. From an archaeological and anthropological viewpoint, you couldn't ask for a richer data set for exploring issues of ethnic and national identity, place-based knowledge, and the creation of multicultural community (Clark, 2007 p. 3-4).

Clark also teamed up with Minette Church to discuss the more specific anthropological aspects of the area. The southeastern plains of the area lie between two branches of the Santa Fe Trail's Mountain Route and Cimarron Cut-off traveled for centuries by the Native American tribes that roamed the land. The value of the region is explained:

The addition of approximately 418,600 acres to the Piñon Canyon Maneuver Site will affect an estimated 5,900 prehistoric sites. Roughly one-third of these sites are along canyons of the Purgatoire and Apishapa rivers - areas that stand in stark contrast to the relatively featureless intervening grasslands. High prehistoric site densities have been encountered along the canyons; common site types include open artifact scatters, rock art panels, rock

shelters, substantial circular habitation structures, tipi rings, and lithic procurement locations. Evidence suggests an intensive occupation between A.D. 100 and 1450 by peoples who manufactured pottery, grew corn, and foraged. Few sites have been excavated (Church and Clark, 2007).

Much of the scholarly work done on the Piñon Canyon Maneuver Site involves geological, anthropological, and environmental papers. For example, Shaw and Diersing (1989) conducted a study on the use of tracked vehicles that "will become a basis for determining the amount of use an area can receive" which points to the fragility of the area's ecosystem.

These discussions are supported by several other related journal articles including by Larry Loendorf (2005) of New Mexico State University, who states: "Some of the drawings in Piñon Canyon provide new insight into how hunter-gatherers survived ...some drawings on boulders that show animals and nets". (NMSU Website, 2005) The boulders with this art are near a basalt dike, and Loendorf believes the hunters drove animals into nets placed over a break in this dike. While similar rock art has been found in Utah, the Piñon Canyon site is the farthest east in which such drawings have been found. (Loendorf 2005)

In a tangential relationship to the Piñon Canyon debate, there is the interaction between governments and the BRAC process. Brian Kehl (2003) asserts politics was not removed from the BRAC process as exemplified by Fort Carson, which is becoming a winner under BRAC as a direct result of the political process.

There only exists a small body of research on the politics of BRAC in general. Optimal Stationing of Army Forces (OSAF) is an optimization-based decision-support model adopted by the Army to support its 2005 BRAC proposal, written by Dell, Ewing, and Tarantino (2008). The research states that as a result of BRAC:

By 2011 the Army will close 400 installations (13 installations that primarily house active-duty soldiers, 176 Army Reserve centers, and 211 National Guard armories) and realign 56 active units. These BRAC actions will impact 43 states, cost more than \$13 billion to implement, and generate an expected 20-year net savings of \$7.6 billion. (Dell, Ewing, and Tarantino (2008) p 421).

Ewing, Tarantino and Parnell also produced studies that looked into the best decision methods in working BRAC and forcematrix issues. The Piñon Canyon site is ultimately a site to train soldiers. The Pentagon must come up with a long-term idea of what types of war it will be fighting and in what types of circumstances. The analysis into the decision-making process to acquire these training areas is also important to consider. They state that, "Recent world events have not altered the need to transform the military infrastructure to meet future needs. In fact, these recent events have exacerbated the need to rapidly accomplish transformation and reshaping (Ewing et al., 2005). Both the Army and Naval War Colleges offer studies on BRAC, as well. At the Army War College, Lathroum-then Acting Undersecretary of Defense for Acquisition-looked at the BRAC

process and studied how the best decision-making process could be brought to the table. At Fort Carson, for example, if other installations were to close, what would be the best method for handling a surge of troops and resources in a limited area?

The Secretary of Defense provided seven BRAC principles to guide the armed services in the development of their recommendations. These principles were: Recruit and Train; Quality of Life; Organize; Equip; Supply, Service, & Maintain; Deploy & Employ (Operational); and Intelligence. Lathroum (2006) explains the process in greater detail:

With the above analytic framework in place, the analytic process addressed data collection through the establishment of recommendations. The first step in this process was the collection of capacity data that provided current, maximum and surge capacity of installations and DOD facilities. This data helped to identify the domain in which each analytical team operated. The second step in the process was the collection and analysis of military value data. Military value was quantified by applying attributes, weights, and metrics to the set of questions derived from the four military value selection criteria. Military judgment was not precluded from this portion of the analysis. This was achieved through the qualitative and subjective assessment of the application of the BRAC Principles through the military value criteria. (Lathroum, 2006, p. 8)

At the Naval War College, Mackubin (2008) discusses a critical link to BRAC: Transformation. Mackubin's argument is worth noting because he brings into the discussion of modern operational art the concept of "Time/Space/Forces" and how the tug of war between what is needed and what is wanted is not only a political struggle internal to the Pentagon, but also a struggle of ideas and direction:

They (the Pentagon) will be able to distribute forces more widely by increasing information sharing via a secure network that provides actionable information at all levels of command. This, in turn, will create conditions for increased speed of command and opportunities for selfcoordination across battle-space. Critics claim that this proves the Pentagon does in fact seek a technological El Dorado. (p. 65)

It should also not be overlooked that the Piñon Canyon debate, while focusing on the military, is also an agriculture and natural resources debate. The Piñon Canyon Maneuver Site contains many occurrences of plant Species of Special Concern and DoD Species at Risk, some of which represent the highest quality locations known for these species in the world (Neid, Decker, Handwerk, Panjabi and Spackman, 2007). Many agriculture scientists are concerned about the impact of training on the land and the military's response to how it is impacted:

Military land managers' informal reasons for either allowing or not allowing grazing seem to have little

empirical basis. They could allow grazing to maintain savanna and grassland and reduce the risk of fire, thus benefiting military training. The use of grazing animals to maintain vegetative structure is often preferred over the use of more intensive means such as herbicides, mowing, or burning. Grazing also brings in funds to support management, creates a stronger tie with the local community, and allows local residents to benefit from the land, all of which add support for grazing as a management tool. Research has not examined the training and grazing interaction (Guretzky and Anderson, 2006, p.51).

A bloc of the review of literature must be devoted to the large number of Policy Documents that are the government reports, letters, and studies done at all levels. Drawing on the review and analysis of the problem, policy documents become critical to understanding the problem and its context.

The Government Accountability Office document, GAO-09-171 Defense Infrastructure, Additional Information Is Needed to Better Explain the Proposed 100,000-Acre Expansion of the Piñon Canyon Maneuver Site January 2009 is the primary GAO document used by the expansion opposition to attack the Army's methodology. In addition, Government Accountability Office document, GAO-09-32, Army's Approach for Acquiring Land Is Not Guided by Up-to-Date Strategic Plan or Always Communicated Effectively, criticizes the Army's approach to dealing with the public on issues of dealing with land owners and their represented governments. Specific to Piñon Canyon:

Army officials and community groups said that the Army did not adequately explain its reasoning for the proposed expansion at Piñon Canyon. In this case, the public at times relied on rumors and leaked documents. These information sources often did not provide clear, complete, or accurate data. Without a consistent and clear DOD-wide practice that both addresses concerns about early disclosure of land acquisitions and permits some flexibility to engage the public, the Army and other services are likely to experience communication problems similar to those encountered at Piñon Canyon (p.1).

These reports were very detailed in illustrating the see when new training ranges or land ready for use to meet training requirements were necessary to be communicated.

As part of the relevant literature with respect to agriculture, the words of conservationist Aldo Leopold should be kept in mind-especially as they address the key issue of economics. Leopold (1939) stated, "Conservation implies selfexpression in the landscape, rather than blind compliance with economic dogma" (p. 316). Much of what advances or delays any environmental initiative is based on commerce.

This discussion can also correlate to National Defense. Thomas Barnett (2004) explains in *The Pentagon's New Map*, the U.S. has spent the last 30 years "moving progressively away from
warfare against states or even blocs of states and toward a new era of warfare against individuals" (p. 92). In the political spectrum, governments, whether Branson or the Army are now waging war against individual bureaucracies.

Finally, within the narrative analysis, the application of social hermeneutics to the Piñon Canyon story makes the case study more manageable by interpreting and providing context for what was learned through interviews. Fischer (1993) states that "All of us commonly use stories to make and support arguments, and the close relationship between close stories and arguments is embedded in the English Language" (p. 167).

In addition, Fischer explains that "the narrative form can offer a powerful tool to an analyst seeking a hermeneutic explanation" (p. 172). This process is essential to giving the intergovernmental struggle a coherent plot.

As the literature gives a framework to build the case study, it becomes clear that bridging the history and the theory will be an important part of the methodology. The process of telling a story/drawing a picture/animating the picture will be a useful addition to achieving this goal.

CHAPTER 3: METHODS

A DIFFERENT CASE STUDY PATH: Narrative Policy Analysis/Social Network Analysis/Agent Based Models

"There are two general approaches to the study of social behavior: Collect observational, survey, or other forms of data and analyze them, possibly by estimating a model; or begin from a theoretical understanding of certain social behavior, build a model of it, then simulate its dynamics to gain a better understanding of the complexity of a seemingly simple social system."

> -Tim F. Liao Department of Sociology University of Illinois

To clarify the role and purpose of research, an explanation is in order. Network science will be applied to a public administration problem to determine if models can be used to understand what happens in a controversial environment. The network design will fit into the whole research process by framing a scenario that can be analyzed using limited data with predictive variables or comprehensive data. It is important to emphasize the value of combining explanatory, exploratory and descriptive research in a complex problem.

The use of multiple research strategies in this case study is to triangulate methodologies that address a complicated intergovernmental problem. The research utilizes descriptive, explanatory and exploratory research to build the case study. In short:

Narrative Policy Analysis explains the "story".

Descriptive research illustrates the problem, context, and situation and demonstrates, to a degree, the ripple effect of bureaucracies and how each action by one entity has wider implications across the scope of the issue.

Social Network Analysis explains the "environment". Explanatory research defines the phenomena at play, by utilizing observational data and studying models to determine if the problem matches reality.

Agent Based Modeling draws a picture of the "environment"

Exploratory research provides preliminary work and direction for further research in determining and designing hybrid models to address intergovernmental issues.

The descriptive component of the research explores, "What does an intergovernmental issue look like between bureaucracies?" and how does their influence shift and morph within the story. Though there is exploration in the Narrative Policy Analysis it deals more with meta-narratives and non-stories as public policy phenomena. Quantitative measurement can be applied to the network models but not the narrative analysis. The Social Network Analysis can be achieved both quantitatively and qualitatively through graphs and matrices. The exploration phase of the research in Social Network Analysis does not analyze the mean, median, or mode, but is be more concerned with direction, value

(power), and frequency. It also explores in a narrative sense the suitability of one model over another. The Agent Based Model is the primary exploratory descriptive research component.

Research Design and Multimethodology

Using a Benzene molecule, and its properties in nature, it was easy to see the parallels between social and molecular networks. In chemistry links are molecules formed by protons, neutrons and electrons that make them more stable. Benzene is an organic chemical compound with a cyclic nature. It is composed of 6 carbon atoms in a ring, with 1 hydrogen atom attached to each carbon atom. This concept is the formulation of the theoretical framework.



Theoretical Framework

Figure 3-1 Theoretical Framework

Surrounding the nucleus of Piñon Canyon, are three shared bonds of analysis. Narrative policy analysis feeds the social network analysis, which gives birth to a model, which in turn tells a new story in this analytic cycle. Surrounding this nucleus are the networks of other governments, which can be bonded to other entities.

Bureaucracies associated with PCMS compose a limited universe. There are a over 100 bureaucracies and elected officials that have an interest in Piñon Canyon. Since this study focuses on bureaucracies, most elected officials were eliminated and a total of 51 organizations were identified. Some elected officials such as county commissioners and school board members could be and were used to represent the body (county government, school district, etc.) as a whole. The 51 identified were narrowed to 46 by eliminating five whose interests were equal to another stakeholder-such as the Department of Defense land and resource management office, which is equivalent to the Department of the Army land and resource management office-and an additional six whose interests were duplicated by another agency and/or unrealistically outside of the scope of the expansion. That brought the final stakeholder count to 40. No comprehensive list of stakeholders existed to provide the basis for a sampling frame; therefore much of the stakeholder list was obtained through interviews and research. Because the bureaucracies are of varying size and influence, identifying the comprehensive list was necessary to find a starting point.

This study interviewed a number of stakeholders. Many bureaucracies either did not wish to participate or simply did

not return multiple calls or requests by letter. Interviewing was conducted between January and September 2011. In addition to the primary stakeholders several Subject Matter Experts were consulted as secondary sources.

Secondary data collection was done through interviews with journalists, academic researchers based in Colorado, other political offices such as that of the lieutenant governor, and by research over the Internet. Internet research provided a wealth of information simply by searching "Piñon Canyon" and "Selected Agency" to collect an agency's public position in addition to public meeting minutes on the issue.

This chapter describes the research design of the sample and the methodology used to collect and weight the data. As network science evolves, especially as applied to the social sciences, the hypothesis presented in this paper is designed to explore the merits and utility of the craft to address complicated issues. It may also be applied to the necessity of incorporating network science in public administration curricula in colleges and universities.

Descriptive Research and Categories

The main characteristic of this research is the attempt to control the variables. Since there is a known universe the situation is explained as comprehensively as possible (Chapter 1). There is the ability to introduce variables for the descriptive research by adjusting for possible unknown scenarios. The survey (Appendix A) utilized was not intended to be the sole instrument

to explain why and how. The survey studied the dynamics of relationships contributing to the narrative analysis and identifying centers of influence, rather than with cause-effect relationships. The cause-effect relationships happen more in the political arena than in the day-to-day bureaucratic environment.

Explanation of the phenomenon is tied to the categories of the agents in the research. (Tongia and Wilson, 2007) While a great deal of the research deals with topography and topology another phenomena must be addressed, and that is typology. Typology, which is the result of the classification of things according to their characteristics, is necessary to ensure that the agents studied are suitable for the research. Classification of agents involved in the phenomena demonstrates that similar organizations are studied. For example, elected officials used in this research would skew the classification and the results—so like agents are studied with similar agents. The models will reflect an epistemological process that explores the relationships between the agents and resulting phenomena.

It is very important to understand the decision to focus on the bureaucracies and not elected officials. The decision was based on four reasons:

1) Elected officials can change every election and the transitory nature of politicians makes them less useful as research subjects.

2) The bureaucracies are entrenched. The requirements to drive the policies of the elected officials have three subpossibilities:

A) Bureaucrats support elected officials;

B) Bureaucrats oppose elected officials but enforce political policy;

or

C) Bureaucrats oppose elected officials and interfere with political policy.

3) Political positions taken by elected officials are readily available, making collective political influence not a variable, but a variable zone with a different set of values.

4) Typology of agents.

When constructing research the value of classification becomes evident. The Piñon Canyon scenario is comprised of stakeholders that are individuals, families, clubs, activists, and lobbyists. Some non-governmental agencies, such as the Cattlemen and Opposition group, are included because their membership is comprised of representatives of other stakeholders; therefore, they can be considered shadow bureaucracies.

The products of the classification, i.e. the classes, are also called types. Szostak (2004) designed a simple typology theory-5W Who, What, Why, Where, When-to classify theories which will be used here to classify agents. Utilizing the theory to address the stakeholders in the Piñon Canyon issue can be

identified as PI(f)-Political Bureaucracies(Szostak)-and
presented as:

Who are the agents? The agents for this study are bureaucracies and non-governmental agencies that exert influence on public policy. Their actions are shaped in the arena of public opinion and politics.

What do the agents do? The agents exert influence on each other and the general public. They have a constituency and answer to higher political powers. Their influence is not duplicated by another group and is autonomous.

Why do the agents do this? The agent serves a constituency and is dependent on its own self-interest. The agent has a customer base that is local and whose primary support is local. It is in the agent's nature to network with another agent if it serves its own purpose.

Where does the process occur? The process occurs in the political and public arenas.

When does the process occur? For this research, the process occurs from any starting point in time where a significant announcement was made or leaked by the Army. After a period of two years the issue tends to reach equilibrium. Also this research is covering the period from 2007-2010. How close the network process comes to an ideal standard is gauged to the case study. The case study utilizing the network science is meant to be a practical approach to measure the effectiveness of utilizing network science and as model for decision making.

Explanatory Research

As a multimethodology case, Piñon Canyon has a built-in need to investigate a problem that has not been clearly defined. The explanatory research of this dissertation focuses on the why questions. For example, the research can be used to measure the power or influence of characters over time. In dealing with an intergovernmental struggle it is important to develop explanations about why governments conflict, why governments align with some agents but not others, and if there are centers of influence that can be centers of compromise. The goal of the Piñon Canyon explanatory research is to answer these questions.

In order for the reader to appreciate the complexities of a public administration problem and to supplement the exploratory and descriptive research, this case study looks to identify what actual phenomenon is occurring. This is accomplished through the Agent-Based Model. The utility of the explanatory research would then be revealed in the utility of the model.

The objective of the exploratory research is to construct a clear connection and foundation behind network theory in an intergovernmental scenario. Not only will this section of the

research explain the phenomenon at play, it drives the development of the model testing hypothesis and validity of its predictions. This section of the research advances the theories at play utilizing proved and existing methods.

Working Hypotheses and Exploratory research

The case study design incorporates three methods of analysis sharing the same research question. The hypotheses raise the guiding questions to this paper and drive the methods. The guiding questions are as follows:

1) Can network theory/network science be applied to the study of intergovernmental relationships?

2) Can network science be applied to "close the gap"between competing interests in the intergovernmental arena?3) What does a network between competing governments looklike?

4) How can the network theories of "Connectivity, Exchange, and Locality" be applied to a public administration problem?

The research problem is as follows:

How does the expansion of the Piñon Canyon Maneuver Site illustrate the rivalry between levels of government, given the potentially conflicting aims between the U.S. Army and its readiness mission in the intergovernmental system in which it resides, where competing objectives and interests come into play? In short, Can new methods be used effectively to study the political relationships in government, across its varying levels, and how those relationships connect and drive Public Policy?

The first sub problem is to determine and identify any centers of influence between two components of government that rival each other. This can be at differing levels, such as federal and state, or at the same level, such as between counties. In utilizing a multimethodology approach, this sub problem will be addressed through narrative analysis of the descriptive research.

The second sub problem is to apply existing models to map the competing interests involved with the Piñon Canyon Maneuver Site. The topography can be transferred to a working model of the network. In utilizing a multimethodology approach this sub problem will be addressed through social network analysis of the explanatory research.

The third sub problem is to construct a model, then map, analyze, and interpret the collected data to evaluate the application of the theory against reality. Utilizing network science will answer how intergovernmental systems work when confronted with a problem. In utilizing a multimethodology approach this sub problem will be addressed through the application of Agent-Based Modeling and a simulation of the model in order to determine if the model reflects reality as result of exploratory research.

Formal Hypotheses and Exploration/Prediction

Three hypotheses are presented for this research. They are:

1) Small World Networks have value in identifying centers of influence and their potential actors in the pro/con

intergovernmental issues surrounding Piñon Canyon encroachment.

2) Network theory application may be a more suitable method of discerning whether there can be mutually agreeable and successful models for collaboration or compromise, or not.

3) Applying Small World Networks to Piñon Canyon results in better understanding of the patterns of potential cooperation and conflict, and where they exist.

The hypotheses tie to the concept of Morton Grodzin's "tipping points" and how they impact "Marble-Cake governance" (Grodzin, 1966). Introducing the dynamic of networks into these ideas also helps explain how the separation of national and state functions as well as those governments devolved from the state interact.

As the hypotheses presented are also tied primarily to network science, it is extremely important to understand the methodologies that were used to arrive at the final models. First is the use of Narrative Policy Analysis.

Methodology

The multimethodology used in this case study is actually designed to be universal in nature. Narrative Policy Analysis bridges the humanities and social sciences; Social Network Analysis focuses on a social science applied to a political

science; Agent-Based Modeling bridges social sciences with math and the natural sciences.

To summarize the methodology: Narrative Policy Analysis: Explains the "story" Social Network Analysis: Draws a picture of the "environment"

Agent Based Modeling: Animates the "environment"

The research strategy employed by this paper will build the case study combining the multimethods approach of Policy Narrative Analysis and Social Network Analysis with statistical topography built on Agent-Based Modeling. According to Gray (2004), "The case study method is ideal when a 'how' or 'why' question is being asked about a contemporary set of events over which the researcher has no control.

The case study compares and contrasts the positions of the Army and, in this study, the Branson School District-representing the first bureaucratic defensive line of the ranchers-and the bureaucracies between them on the explicit issue, as well as a variety of intersecting interests including: land; minerals; tax bases; economic sacrifice; burden sharing; agriculture necessity; national security; patriotism; the wars in Afghanistan and Iraq; effectiveness of military training and tactics; and the relationship between the military and agricultural economic engines.

The case study also introduces a revolutionary and vivid depiction of the relationships between bureaucrats and

bureaucracies with respect to a complex and controversial issue. Simple qualitative or quantitative research cannot present a clear picture of an issue as complex as Piñon Canyon.

The methodological path in the study of Piñon Canyon presents a number of challenges and opportunities. It became critical to develop an approach that does not limit the explanation of the phenomena surrounding what lies between the ranchers and the Army, yet at the same time is not so complicated that the research is meaningless or confusing to build upon. The approach should also tie the variables together simply and clearly. Spreading the variables—in this case agents—across methods achieves a result where different actors can be analyzed based on the type of phenomena they are engaged in.

Presenting Piñon Canyon in the context of a case study "illuminates a decision or set of decisions: why they were taken, how they were implemented, and with what result" (Schramm, 1971) and "investigates a contemporary phenomenon in depth and within its real life context, especially when the boundaries between the phenomenon and context are not clearly evident" (Yin, 2009). In the case of this study, decisions will be analyzed in the context of their relationships with other decision makers.

Unfortunately, complicated issues require complicated approaches. The first step in understanding a complicated issue is to step back, take a look at the issue and describe what it is. Narrative Policy Analysis is a good tool to address such

circumstances. According to Roe (1994), "Narrative Policy analysis is designed to analyze especially complex issues".

The objective of Narrative Policy Analysis is twofold: "first to underscore the important and necessary role that policy narratives have in public policy everywhere and, second, to establish ... analytical approaches that allow one to reformulate intractable policy problems in ways that make them more amenable to conventional policy approaches" (Roe, 1994).

By utilizing this approach, the "story" of the ranchers and the Army is able to be compared and contrasted to the correlating "meta- narratives" and any "non-stories" that are driving the two entities in opposite directions. The narrative will also help stress the sequence of events against the competing ideas presented by both sides.

Once the stories are understood, the next approach is to understand what type of environment the ranchers and Army are competing in. The use of Social Network Analysis simplifies the bureaucracies into actors, explaining each party's relations and exploring possible models from the simple to the complex. As each "actor" is tied to a "relation," a map can be drawn to understand the context of the entire controversy.

Statistical topography is the simple collection of data and mapping the results in time and space. The maps are usually complicated but can be understood with computerized assistance.

Agent-Based Modeling is, according to Gilbert (2008), "a computational social science," creating a simplified

representation of social reality. Models will be used to theorize potential outcomes to political issues dependent on the strengths of relationships found in the study.

In addition, the role of network theory will be applied to study the relationships between governments and entities. Various models will be used to demonstrate and predict the outcome and direction of government strategies.

Networks are usually thought of as simple nodes and links on a graph paper. In research, points on a graph often represent real people, but the sterile dots that eventually morph into lines quickly diminish the individuality of people (or in this case, bureaucracies) represented by the dots, and lock otherwise fluid governments and their policies into a fixed point in space. Network science in many ways attempts to distinguish those points in space to demonstrate the strength between each one and its neighbors, along with information regarding the primary environment. Networks, whether they are in the form of grids, railroads, computers or especially people, bring order to chaos.

Academic researchers widely think of social networks and small world networks in terms of relationships among actors that demonstrate ongoing problems. This is accurate but the substantive nature of relationships among governments is a complex problem when unlocking the nature of the public sector. As stated in the forward of this paper:

In order for anyone to appreciate the political relationships in government across its varying levels and

how those relationships connect, drive, and shape public policy it is important to understand that bureaucracies are a lot like people...they can be stubborn, finicky, aggressive, lazy, and most of all, have either a long memory or no memory at all. In a sense, this research treats bureaucracies like people with all of the dynamics that make us humans.

Individuals with competing interests form various political relationships which form various political bodies, administrations and/or governments. Network science is a method that can be utilized to study these complex designs and patterns and to treat each government as an individual, rather than a group of political players.

The exercise can be then applied and analyzed in either direction to larger, more complex political systems, or down to a few competing individuals. The dynamic behavior of administrations and governments, and their relationships with other levels, can be utilized not only to explain simple directional trends but also the relationships that drive and influence the trends.

Specific focus and design of the project

The design that will lay the basis for the research will incorporate three different methods focused on identifying factors that may contribute to a political condition or administrative solution (pro/con). By comparing subjects-the various government entities involved-through the extensive

collection of data, conclusions can be drawn to generalize the behavior of governmental networks. Utilizing a research method where political processes meet network process is important, especially for the quantitative aspects of the research. The purpose of using mixed methods is to quantify data in a qualitative investigation (Leedy and Ormrod, 2010, 97). The narrative of Piñon Canyon will be qualitative and conclusions based on quantitative models.

In order to "quantify data for a qualitative investigation", a sample population and the subsequent analytic techniques need is identified. For this case, the population was collected via a hybrid of "convenience" and "purposive" sampling. Convenience sampling takes subjects readily available and purposive samples are chosen for a specific purpose (Leedy and Ormrod, 2010). Since the subjects sample will represent their particular component of government (county, state, city, agency, etc.) random sampling would be counter-productive.

The survey instrument itself focuses on questions of influence and power. By surveying these variables, centers of influence can be identified and mapped on a graph. Once these centers are identified, further analysis will be conducted to relate the qualitative aspects to the quantitative aspects.

Because of political sensitivity surrounding some of the interviewees, some requested non-attribution, which was granted. There were also a number of "secondary sources" interviewed, such as newspaper reporters and elected officials not in the bureaucratic chain of research.

The quantitative aspects to be collected and measured are focused on the principles of "Connectivity, Exchange, and Locality" (Committee on Network Science for Future Army Applications, 2005) in that:

Connectivity:	Strength and volume
Exchange:	Number of links and relationships and
	to whom

Locality: Where in time and space do they exist?

The generation of models in the case study will help drive the theories and hypotheses surrounding the guiding questions of the research. The methods of measurement for the quantitative aspects will focus on the collected data via interviews and available reports. The experimental control will focus specifically on relationships between groups and not opinions on the subject matter. Modeling of the data will be done through standard statistical, mathematical and geometric principles and utilizing applied Agent-Based models.

Agent-Based Modeling is a computational method that enables researchers to create, analyze, and experiment with models composed of agents within an environment (Gilbert, 2008). Using this method it will be possible to see how the agents interact based on the environment or virtual world. The method will play an important role in studying the relationship and strengths between the actors in the case study. Using Agent-Based Modeling

with the data will help determine if the hypotheses presented for this research actually follow the dynamics of small world networks.

Graphs are important tools for communicating data. In the simplest terms, graphs are illustrative models of mathematical events used to visualize the relations between objects. Graphs are tools to show the user what the math is doing, or the mathematical explanation of what is being learned. Graphs are used to show and to aid understanding.

In order to drive policy there has to be some degree of political harmony. Varying levels of governments have to synchronize their efforts across each other to drive public policy and solve public problems. At every level of governmentfrom federal to municipal-competing interests collide. These collisions, as in chemistry and physics, drive issues in varying directions while forming bonds between the colliding bodies. In the intergovernmental system in which governments reside, network science can be applied with graph theory to study if solutions and momentum can explain the behaviors of both large and small bureaucracies. Using network science and theory to study the relationships between policies and the intergovernmental actors in the federal, state, county and municipal arenas, along with resultant patterns of potential cooperation and conflict, helps discern whether there can be mutually agreeable and successful models for political and civic success-or not.

An example of using graph and network science to study the political and administrative relevance will help bring clarity to its purpose and importance. Say an individual wanted to depict how much various cities spent on park improvements and the number of parks. Utilizing a simple scatter diagram representing values of two variables under study one can visualize the data (Figure 3-1) and get a simple picture of park improvement spending among cities.



Figure 3-2. A simple picture of park improvement spending. Taking another step, the data can be drawn into a single line to represent the trend among cities for how much they spend on park improvements (Figure 3-2). These data are a little more helpful in that the data are now simpler to read and understand; yet with respect to complex issues these single lines can lead to over-simplification.



Figure 3-3. Graphs using a single line to show the trend in park spending; the one on the right may be too simplified to be useful.

Rather than utilizing the traditional method to explain the trend of the data, the scatter diagram representing values of two variables under study can be looked at another way, to see if perhaps anything can be learned by looking at cities as county seats and which counties they belong to (Figure 3-3). While there may be little to be learned without knowing all of the variables, there is a lot to be seen on the surface of such a graph and visualization of the network.



Figure 3-4. A graph showing park spending trend data by city and county may enhance understanding of the issue.

The above graph is a just a simple example based on a hypothetical scenario, but the lesson for the analyst is that there are other simple ways to express information and navigate around data. Applying this science to public administration can be quite useful. As network science emerges as a field, the tools that public managers have at their disposal are vast and, thanks to technology, powerful. The field is maturing at a rapid pace in a time of exploding technological capabilities. Navigating a graph without technology versus with technology is similar to navigating with a sextant versus a global positioning device.

This is an important concept to remember: as with all statistics that make generalizations about populations, graphs are used to drive certain points home. The problem with graphs as with any statistical exercise is that they can be used to exaggerate as easily as they can be used to explain. Hence graphs are simply a visual means of communication. Because graphs may have many flaws, the scientific use of these graphs to explain networks must have detailed information in order not to mislead the reader or researcher.

"Networks are graphs that represent something real," states Ted Lewis (2009) in his text *Network Science*. To take this idea one step further is to look at not only what is real, but what is true. As the historian Shelby Foote once noted, "Facts are the bare bones from which the truth is made". Graphs can indeed show what is real but do they always show what is true?

Finding a case study to apply network science in an intergovernmental environment is a complicated task in itself. Governments often turn and twist to maneuver political gain. Under federalism, especially, the dance is never the same. If network science is really "a science" it shouldn't matter which case study is used; however, the complexity of the case may demonstrate how useful it is at other levels. The case study in question should be chaotic enough to require investigation to understand the order behind it. In short, there should be conflicting issues and conflicting governments; conflicting values and conflicting lifestyles; conflicting ends and conflicting means.

Piñon Canyon, while having a large number of stakeholders at various levels, is by no means unique. There are countless public policy disputes that are equally or even more complicated. Piñon Canyon provides an excellent scenario because it illustrates what any bureaucracy from Branson, Colorado and Washington D.C. will do and will fail to do.

CHAPTER 4: NARRATIVE ANALYSIS

"Talk is cheap, and so is criticism"

-Emery Roe Narrative Policy Analysis Theory and Practice (Duke University Press, 1994, p.145)

The first sub problem is to determine and identify any centers of influence between two components of government that rival each other. This can be at differing levels, such as federal and state, or at the same level, such as between counties. In utilizing a multi-methodology approach this sub problem will be addressed through Narrative Analysis. Emery Roe (1994) suggests that Narrative Analysis is beneficial when

...public policy issues have become so uncertain, complex, and polarized-their empirical, political, legal, and bureaucratic merits unknown, not agreed upon, or both-that the only things left to examine are the different stories policymakers and their critics use to articulate and make sense of the uncertainty, complexity, and polarization (P. 3).

Explaining policy analysis through narrative techniques connects the "perception of the agents" to the "administrative problem" and gives the researcher the ability to control the variables; or, in this case, tie the content (message or story) to the agents. In this narrative, the agents are competing levels of government: the U.S. Army, and other public entities—such as the Branson School Board—representing the interests of local ranchers.

A narrative is nothing more than a collection of stories along a chain of events. Some narratives take on the role of master narratives that are embedded in the culture while others take on the role of sub narratives or "the story behind the story." The Army's master narrative, outlined in full below, has to do with *ensuring the national defense* by training soldiers to fight, win and return home alive. The ranchers' master narrative, or counter story, has to do with *defending their way of life*.

The narrative of the Army as a whole is framed in a 235year succession of stories from Valley Forge to the Civil War, World War I, World War II, Korea, through Vietnam, to the contemporary campaigns in Southwest Asia. The narrative of the Branson School District as a whole is tied to the pioneers, oneroom school houses, Goodnight-Loving, the railroads, and through its children to the future. Each agent hopes its story will drive public opinion and make it clear that the storyteller is working in the nation's or the community's best interest.

It is also important to ascertain at various points in the narrative who is telling or narrating the agents' stories, as surrogates sometimes have a role to play.

Finally, there is the metanarrative, which results from a comparison of the opposing stories. It is hoped that through such comparisons common ground might emerge, to enable movement "on issues that were dead in the water in their older agendas" (Roe, 1994, p. 52).

Roe's (1994) four basic steps to narrative policy analysis can thus be summarized as follows:

 Define the story and identify the narrative policy.
 Identify other narratives that do not conform or run counter to the dominant policy narrative.

3. Compare the two sets of narratives in order to generate a metanarrative "told" by the comparison.

4. Determine how the metanarrative recasts the problem in a way to make it more amenable (pp. 3-4).

From this point on in the chapter and throughout the Narrative Analysis, the reader will be introduced to each stakeholder. This process will help the reader understand the centers of influence that are highlighted later in the Social Network Analysis and the building of the model. The terms Army and Department of the Army are used interchangeably and both refer to the U.S. Army at large, headquartered at the Pentagon; Fort Carson is used to indicate the garrison commander at the installation in Colorado Springs, Colorado.

I. Define the story and identify the narrative policy.

Army policy drove the initiative to expand Piñon Canyon as well as the related storyline, which goes like this:

As the Vietnam War was winding down in the 1970's, the Army began a peacetime transition from fighting to training. The Cold War with the Soviet Union was still in full swing and contingencies were also being planned for the next war. The generation of officers who had fought in World War II was retiring fast, so lessons learned from the jungles of Vietnam and the hills of Korea were dominant.

The Army needed to place its pieces on the training and doctrinal chessboard. The dynamics of conventional war were changing; technology combined with greater lethality in new weapons platforms meant smaller forces could fight across increasing large swaths of land. A modern Army brigade can cover an area equivalent to that covered by a much bigger World War II Division (3-4 brigades plus 6-8 support battalions), so more room is needed to maneuver in training. Because of its wide-open spaces and for other reasons, Fort Carson, Colorado became a strategic location. A comprehensive study determined that the installation needed to expand by one-to-two hundred thousand acres as the result of additional Department of the Army requirements placed on the post.

Fort Carson is primarily in El Paso County and extends into northern Pueblo County. It is bordered by the City of Colorado Springs to the north and by the Rocky Mountains to the west. These immutable facts led the Army to look in the direction of the two remaining compass points; i.e., south and east. Directly to the east of Fort Carson are Interstate 25 and Fountain Creek, two major obstacles to contiguous growth. Colorado Governor Richard Lamm, who had established a reputation as a strong environmentalist, was confronted with the expansion of Fort Carson during his time in office. He was advised by the state's

agricultural industry, and appointed a committee to review the training requirements.

The City of Pueblo, a major political force in the State of Colorado, was at the time the third most populous city in the state. Pueblo had built its fortunes as a blue collar "Steel City". While Denver may be the capital of Colorado, Pueblo is the capital of Southern Colorado. It is the economic, political, and educational center in that quarter of the state.

In the preceding decade, Pueblo was the second most populous city behind Denver but was eclipsed by an explosion of military growth in Colorado Springs. This caused some resentment in Pueblo. So when the Army's first initiative in response to the study proposed extending the Fort Carson installation immediately south to Lake Pueblo and U.S. Highway 50, it was met with strong resistance. It was in this climate that the Army was forced to look elsewhere.

Additional options were pursued, such as the Pueblo Army Depot. Ultimately, the area east of the ghost town of Thatcher in Las Animas County emerged as the most promising alternative. Renamed Piñon Canyon, the initial site was planned for 245,000 to 250,000 acres. Roughly half of the needed area was acquired through the condemnation of private-mostly ranch-lands and the Army completed purchase of the additional land in 1983. Training began on site in 1985.

For the next several years the amount of training at Piñon Canyon continued to grow, with the most intensive training

occurring between 1990 and 1998. Then training subsided once the wars in Southwest Asia began in 2003, as a significant number of units were deployed overseas.

In 2004, as the entrance of militias and militant groups marked the spring fighting in Iraq, the Integrated Training Area Management (ITAM) Office for the 7th Division's G-3 (Operations Office) at Fort Carson prepared a new report centering on the potential acquisition of training lands adjacent to the Piñon Canyon site. Officials believed that, although loosely drawn, the plan had strategic merit, in light of Army transformation efforts mandating additional training space for more maneuverable forces, and further restrictions on operations and training at Fort Carson due to encroachment. (The policy section below offers evidence for this rationale.)

Over the course of several months, elements of the plan gained a following within Fort Carson but also generated some dissension. Before long-and prior to any consultation with citizens, local governments, or the State of Colorado-portions of the plan were selectively leaked. The leaked material included a map suggesting the Army sought to annex seven million acres of land adjoining the PCMS.

The Army dismissed the document as nothing more than planners "putting their wildest dreams on paper," but the sevenmillion-acre storyline-rather than the critical need for land to train soldiers-was the one that stuck in people's minds. Although the Army subsequently scaled back its proposal, to over 418,000

acres to, most recently, just over 100,000 acres, its backtracking has failed to eliminate the earlier impression of an attempted federal land grab.

For the most part, the Army has told its own story, without the aid of the military-industrial establishment of Colorado Springs or other likely supporters. As the initiative continued to lose momentum, the Army's messaging shifted from its intended storyline about the need for training to meet its national defense mission and protect soldiers' lives, to castigating the citizenry of Southeastern Colorado as anti-Army and antipatriotic. This shift served to drive the federal and local governments even farther apart.

The Policy

As noted above, there are two major drivers for the expansion of Piñon Canyon, both of which relate to training. The drivers are transformation and encroachment.

The Army's current transformation policy has its genesis in a concept called AirLand Battle. AirLand Battle was the framework that formed the basis of the Army's war-fighting doctrine against the Soviet Union until its collapse in 1991, as well as during the First Gulf War. AirLand Battle replaced the aging World War II tactics and emphasized coordination between land, air and naval forces to create a fluid battle space that would paralyze superior forces by taking out logistical and supply arteries. To get a mental picture AirLand Battle, think of the American Eagle injuring the Soviet Bear by air and then devouring the helpless force on the ground once it was paralyzed.

As noted, changes in lethality and distance brought by advances in military technology also had strategic implications for AirLand Battle doctrine. As a result, the Army is finalizing Army Training Transformation and converting all active and Reserve component units to Infantry Brigade Combat Teams (IBCT). An IBCT is entirely self-contained with combat and support units, and can be deployed alone as a single force. The teams also act as rapidly deployable modular forces, more able to adapt to a wide variety of combat situations.

This doctrine envisions land and air units working in harmony, and requires a lot more training space than was needed in the past. In total, according to the Army, the ideal doctrinal maneuver box for an IBCT is approximately 113,000 acres (TC 25-1 Training Land, U.S. Army, 2004a).

The Army has defined training needs for the Piñon Canyon Maneuver Site as:

Full Spectrum of Support
Realistic Training
Dominant Land Forces
Night Training
Terrain
Lessons Learned
Live Fire Ranges (U.S. Army PCMS Website 2011)

These needs relate to the narrative and stakeholders as follows:

Full Spectrum of Support

Full spectrum of support operations primarily impact environmental groups and government agencies such as the U.S. Forest Service, the Colorado Division of Wildlife and the Colorado Department of Natural Resources. The three primary types full spectrum of support training operations identified by Fort Carson are Peace Support and Stability Operations, Low-intensity Conflict, and High-intensity Conflict.

Peace support and stability operations, or Military Operations Other than War (MOOTW), are operations that involve nation building and humanitarian aid. Such training operations tend to require an urban landscape and limited use of open range. Use of training ranges tends not to harm the environment or wildlife. Noise and use of weapons is minimized though the use of power generation equipment is widespread.

Low-intensity conflict operations can be categorized as counter-insurgency or police actions against a lightly armed force. Such training operations involve extensive use of motorized vehicles and can call for limited use of ordnance. There may be some impact on wildlife and natural resources, especially if the training is of long duration.

High-intensity conflict training operations simulate largescale battlefield engagements against an equally equipped opposing force, such as a North Korean, Chinese, or Soviet (Russian)-type threat. Such exercises would certainly have the

attention of the Department of Natural Resources, Division of Wildlife, U.S. Forest Service, and local governments' emergency responders to combat wildfires or casualties from accidents.

Realistic Training

Realistic training, simulating a battlefield environment, impacts surrounding areas with dust and noise. Area ranchers would be concerned about the impact on livestock grazing nearby. Environmental and pollution issues would impact primarily Las Animas and Baca counties.

Dominant land forces

The ability to cover a large area is critical for realistic training. Depending on the type of and location of the training, the impact outside of the area could be minimal. Use of dominant land forces primarily impacts ranchers with livestock in the area.

Night Training

Colorado Springs and Pueblo are sources of light pollution affecting the main post of Fort Carson. At the Piñon Canyon site, though, the site is remote and possesses excellent dark skies for training at night. The cities of Rocky Ford, La Junta, Trinidad, and Walsenburg, though nearer to Piñon Canyon, display a softer horizon glow than the cities of Pueblo and Colorado Springs which are 50-90 miles away. Night training on the installation involves the occasional use of flares and flood lights, disrupting wildlife and livestock.

Terrain

The land around Piñon Canyon does indeed offer a variety of terrain on which to train, from rolling hills to steep canyons. In combination with the mountainous terrain of Fort Carson, the site gives the Army lots of options to choose from. As with mixed training uses, the Department of Natural Resources, Division of Wildlife, Forest Service, and Colorado State Historic Preservation are all concerned with impacts on the terrain. Lessons Learned

As the Army's experiences from Iraq and Afghanistan are cataloged and put to the test in training scenarios, high-tech intelligence gathering, Special Forces operations, and small unit tactics are now also considered critical to future mission success. The lessons learned provide soldiers with experience to prepare them for situations they may encounter in the operational environment.

Live Fire Ranges

The evolution of combat experience drove the requirement for expeditionary forces capable of sustained operations. Enemies in the current wars in Southwest Asia are quite different from those in most previous wars. The elusive combatants in Iraq and Afghanistan find refuge in villages or remote areas, forcing units such as the brigades stationed at Fort Carson to rely more on technology and quick reaction than the concept of mass troops. The advent of technology has in some ways turned Carl von Clausewitz's Principles of War on their heads. Army Officers sometimes use the acronym "MOOSE MUSS" to remember Maneuver,
Objective, Offensive, Security, Economy of Forces, Mass, Unity of Command, Surprise, and Simplicity. As technology becomes a force multiplier (affecting mass), the actual forces or "boots on the ground" find themselves stretched thin mopping up the battle space.

Fort Carson has four IBCTs under the 4th Infantry Division, plus attached and supporting units. If each brigade had six maneuver boxes—its own maneuver box, plus one for attached units, and an "at rest" maneuver box to allow each ecosystem to rehabilitate over time—the space needed would equal 678,000 acres. That means the Army would require more than 400,000 additional acres at Piñon Canyon to meet its needs. Following the outcry over the report suggesting the Army wanted seven million acres, the service in 2006 floated a proposal for 418,000 acres to be added to Piñon Canyon's 235,806 acres, for a total training area of 653,806 acres. This was also in addition to Fort Carson's 137,300 acres, the use of which is limited due to proximity of civilian interests along its fence lines.

The main post at Fort Carson is quickly becoming encroached upon by both Pueblo and Colorado Springs. In a 2009 National Academy of Public Administration report, Fort Carson was featured as an example of an installation with major encroachment issues (National Academy of Public Administration, 2009). Since World War II, the population history of Colorado Springs and Pueblo from the Census Bureau is:

Year	Colo Spgs Pop	Pueblo Pop
1940	36,789	52,162
1950	45,472	63 , 685
1960	70,194	91,181
1970	135,060	97 , 453
1980	214,914	101,686
1990	281,140	98,640
2000	360,890	102,121
2010	416,427	106,595

As shown, Colorado Springs surpassed Pueblo in population during the 1960's and in fewer than 50 years, has become nearly four times the size of its more southerly neighbor. The growth in Colorado Springs is directly correlated with the increase in military missions based in El Paso County. The only major military employer in Pueblo County, the Pueblo Chemical Depot missile maintenance facility, lost most of its missions in the 1970s. Today, it stores left over chemical munitions in several hundred earthen igloos on the site.



Figure 4-1. Graphics showing the expanding populations and land mass of Pueblo, Colorado Springs and Fort Carson, Colorado, from 1956 to 1999. Source: Strengthening National Defense: Countering Encroachment through Military-Community Collaboration, 2009, National Academy of Public Administration.

The National Academy (2009) identified 12 encroachment challenges. Impacts on the main installation of Fort Carson and surrounding communities are clear and can be summarized as:

(1) Create intense noise that extends into communities

The major maneuver units at Fort Carson are considered "Modular Brigades" that consist of an assortment of Infantry, Calvary, Field Artillery, Aviation, and Armor (Tank) units. These units are known to be extremely loud in combat and in training. Their major purpose is to either break fortified areas or simply blow them up. A single unit can be heard miles away in Pueblo. Colorado Springs borders Fort Carson to the north and noise often echoes off the mountains of the Colorado Front Range, Cheyenne Mountain and the foot hills of Pikes Peak.

(2) Increase risks of airplane crashes or exposure to unexploded ordnance

Training for war employs a lot of scenarios that involve aircraft. For communities next to a military or commercial airport, there is risk. When ordnance is added to the equation, the risk factor naturally increases. People do not want to live with such risk. Colorado Springs is known to have unstable air for aircraft, due to the elevation and thermals that rise off the sparsely vegetative ecosystem that dominates the area.

(3) Contaminate the environment and damage ecosystems

Use of large equipment over a limited terrain will cause damage to the environment through a variety of causes such as erosion, fuel spills, deforestation, and litter. This damage can quickly contaminate or harm nearby lands and waterways. The threat of surface runoff to aquifers in Colorado Springs is a major concern. ,. The Fountain Creek which flows into the Arkansas River in Pueblo could be significantly threatened.

(4) Endanger protected species

The use of munitions, heavy equipment, and concentrations of bivouacked troops drive animals, insects, and vegetation from their natural habitat and invite replacement species that can be harmful and invasive. The Front Range of Colorado is known to be prone to wildfires and dust storms. Fort Carson and Colorado

Springs also reside in a state with an activist environmental movement.

(5) Stress on public infrastructure and services

The double-edge of the sword of a large military presence in Colorado Springs is the stress on the infrastructure. The economy of Colorado Springs is based primarily on military installations. The military, aerospace and electronics industries employ one-fifth of the work force. The infrastructure, especially around the installation, is stressed. This is especially noticeable in the shortage of water and urban sprawl. Further, the cost of living in Colorado Springs has historically been between 5-8% higher than in Pueblo (http://www.citydata.com/city/Colorado-Springs-Colorado.html).

(6) Generate citizen complaints

Because Colorado Springs has historically been a military community, the number of citizen complaints has been relatively low. As the community diversifies and becomes larger, more groups with opposition to the military are starting to gain traction. Such opposition was reflected in the 2008 election of local peace activist Dennis Apuan, to Colorado Legislative House District 17, which encompasses portions of southwestern Colorado Springs and the Fort Carson installation.

The opposite of military encroachment is civilian encroachment. Civilian communities' impact on Fort Cason can be characterized as:

(1) Expand development or other activities in ways that constrict the use of military training areas

The Interstate25 corridor between Colorado Springs and Pueblo is beginning to build up and over the past five years a 24,000-acre development known as "Pueblo Springs Ranch" is being developed north of the city and directly east of Fort Carson. The development is designed to accommodate growth and projects a 50year growth plan.



Figure 4-2. Map showing planned 24,000-acre residential development at Pueblo Springs Ranch, east of Fort Carson. Source Pueblo Chieftain

(2) Permit development that can present obstacles to low-flying aircraft

As mentioned above, the altitude of Colorado Springs can create several hazards for aircraft. This does not mean that there would be no aviation training at this altitude. It would mean that training should take place elsewhere. Related to the Piñon Canyon issue is the Air force's planned expansion of training flights across the state (Pueblo Chieftain, 2011)

(3) Interfere with night-time training through light pollution

Colorado Springs has grown considerably since Fort Carson was established. Since military units need to train in both urban and non-urban environments, light pollution has become a major training obstacle at main post.

(4) Degrade electronic navigation and communication frequencies used by the military

Interference and limitations to the use of electronics at Fort Carson come not only from the surrounding communities but from the density of surrounding sister military installations. Cheyenne Mountain, Peterson Air Force Base and Schriever Air Force Base are all heavy users of electronic (especially hightech) communications platforms.

(5) Fail to support needed public infrastructure for DoD activities

Colorado Springs has so far maintained strong support of infrastructure for Fort Carson; the city of Pueblo remains more of a question. As the training demands on the installation grow, Pueblo will have a huge say in the future of the main post. (6) Through development, force the migration of endangered species onto military property The development of surrounding areas not only impacts endangered species but other wildlife, as well, such as deer and ducks looking for water and habitat. Development pushes these animals onto local military reservations with more open space. North of Fort Carson at the Air Force Academy, natural resources specialists work to manage a herd of deer through annual hunting seasons. These policies are in place to keep the herd thinned because of traffic and health hazards.

The Army believes all of this is mounting evidence of dramatically reduced opportunities for training at Fort Carson main post and a dramatically increasing need for more land at PCMS on which to train large units.

II. Identify other narratives that do not conform or run counter to the dominant policy narrative.

The ranchers' master narrative consists of three parts-a counter story, a non-story, and a non-story critique-told through a number of storytellers, including the Branson School Board, the Colorado Cattlemen's Association, the Piñon Canyon Expansion Opposition Coalition (PCEOC), and a group known as Not One More Acre (NOMA).

The Counter Story

The potential for negative economic outcomes in communities in the path of the proposed expansion, including the town of Branson, forms the core of the counter story.

The storyline is that expansion of the PCMS would have devastating effects on the economy of Southern Colorado and these

effects would ripple throughout the state. Most especially, the Army's purchase or condemnation of private lands would take value out of a massive portion of the state, by precipitating losses in both agricultural production and tax payments (property and income) to local governments.

According to the narrative, the impact on the City of Pueblo would be more devastating than the drawdown of the steel mills in the 1970s, as numerous financial and economic ties to Southeastern Colorado would disappear. While some economic benefit might accrue to Colorado Springs from a more stable future for the Army at Fort Carson, little benefit would trickle down to Pueblo and the local economy there would soon crumble. Once Colorado Springs becomes the economic hub, Pueblo would become Colorado's Detroit.

Citizens are led to expect a decrease in fees collected by the Colorado Land Board, which leases land in each county to generate funds for education; the decrease or loss of said fees, would affect educational opportunity for students across Colorado. It is this line of reasoning that compelled the Branson School Board to correspond with the Pentagon, and to take the Army to task for failing to consult with the community regarding the proposed expansion of PCMS.

Counter story narrators offer Hoehne School District (RE-3) as "Exhibit A" in their defense. The town of Hoehne sits 32 miles west and north of Branson and about 20 miles west of PCMS. The school district received the lowest grade in Colorado's state

financial audit released in August 2011. According to the *Pueblo Chieftain*, Hoehne's woes stem from overspending and plummeting property-tax revenue to the Hoehne School District; revenue fell by \$211,000-about 6% of the district's operating budget-in Fiscal Year 2010 alone. Superintendent Christine Barela said "declining property values and delinquent property tax payments combined to reach that sum" (Chieftain, 2011). The tax base means a lot to small rural school districts.

In September 1983, Hoehne School District (then designated R-3) Superintendent Dennis Trump initially rejected a check for \$114,157.47 from the Army, meant to offset the liability arising from "said reduction of the school district's tax base due to land acquisition" (Trump Letter, 1983). The said "land acquisition" was to establish the PCMS. Details were later ironed out and the school district accepted the money on 47 different properties in its district (Las Animas County Tax Records, 1981 Tax Schedule). The 47 properties combined to 208,170.69 acres, purchased for \$26,527,067.87, or about \$127 per acre (Piñon Canyon Acquisition Data, courtesy of the Dept. of the Army). Branson promises to be less cooperative than Hoehne was.

The counter story is, in part, a retelling of cautionary tales from the creation of PCMS in the early 1980s. The insinuation is: the Army lied to you before and they will again, if that's what it takes to get your land. According to Dr. Grady Grissom, a Princeton-and-Stanford educated partner in Rancho Largo Cattle Company, headquartered in Walsenburg, Colorado, "the

citizens of Southern Colorado were essentially bulldozed by the Department of Defense in 1983" (Grissom, 2011).

These comments from the Piñon Canyon Expansion Opposition Coalition Website (2011), which refer to the current expansion proposal, underscore this theme:

The Piñon Canyon expansion has been going through the planning process for the last eight years, but people living in Southeastern Colorado didn't have a clue that the Army was planning to "sustain" Fort Carson by seizing their land and forcing them from their homes.

This seems to put forth a clear message that the Army is not interested in people, but only in people's land.

Reading into the master narratives of the Army, one acquires a solid understanding of the arguments for expansion. For example, having the ability to recognize the significance of how large a training box is necessary to properly train a brigade, allows the question to be answered with simple arithmetic. The reader is also made aware that the military-civilian encroachment issue around the City of Colorado Springs impacts tens of thousands of people, something that must be resolved. The message becomes difficult to follow when counter stories paint the Army's narrative not as a story, but as a conspiracy. The ranchers have, in fact, hijacked the narrative; in turn, the Army's primary and secondary arguments have gone off course.

The Non Story

There are several non-stories associated with Piñon Canyon. The Army's suggestion that the ranchers of Southern Colorado lack patriotism could be considered one of these, yet it is void of meaning from an analytical point of view. Problem statements that are joined for form larger narratives are an example of such a non-story. These groups of stories form a chain of cause-andeffect relationships that spiral from one participant and problem to another problem with another participant, which in turn is creating a new problem with a third participant, and the chain continues on indefinitely.

The suggestion that the expansion will force the relocation of thousands of people shifts the narrative from the counter story to the non-story. The non-story highlights the integrity of individual ranchers and families, and their deep roots in the land-these are values which resonate in the state's centennial farming and ranching communities.

The assertion that ranch families will be uprooted from their homes if the expansion goes through parallels the biblical tales of Moses and the Israelites and the stories of slaves who were removed involuntarily from Africa. In this non-story, there are echoes of *Little House on the Prairie* and *My Antonia* and other foundational stories of the American West. The message is clear: Ranchers, your way of life is under attack from the U.S. Army!

The ranchers' non-story, leveraging the agrarian tenet of sustainable wealth or profitability, is deeply embodied in western culture. The ability of farmers and ranchers to acquire wealth is not to be confused with lust after money or greed, but more tied to the concept of gentry and people born to the land.

The 1956 movie "Giant", with Rock Hudson, James Dean and Elizabeth Taylor, is an example of this concept.

It should not be lost that ranchers are entrepreneurs and businessmen, and are part of a huge agricultural industry. Though there is romanticism associated with the cowboy life, beef is big business and an intricately networked entity in itself.

The non-story reflects how closely the ranchers tie themselves to the land, with sometimes biblical fervor. Many ranchers feel that at the beginning of time, it was God or Providence that bestowed the land upon them, and they will surrender it to no man or government: "And give you the blessing of Abraham, to you, and to your descendants with you; that you may inherit the land on which you are a stranger, which God gave unto Abraham" (Genesis 25:8).

The tenet of independence is also part of the ranchers' narrative and ties back to the minutemen of revolutionary Concord, who left their plows in the field to arm themselves. Patriotism is not in short supply around Southern Colorado. The ranchers view themselves as the true patriots who feed the planet and care for the land, while painting the Army as a giant corporation bent on taking liberties away.

Lifestyle characteristics are also components of the ranchers' story. The lifestyle argument is part of the Goodnight-Loving story and speaks to the ranchers' rights to pursue happiness. In order for the ranchers to live and raise their families as they wish, they must list free from government

interference. In addition, when the Army takes away viable lands for military purposes, it is seen to be taking away land-based opportunities from future generations.

Such stories are non-stories, because they have no discernible beginning or end; once told, they continue to spiral and to defy analytical processes. It may be surprising to some that the threatened displacement of over 17,000 people is a nonstory, but this demonstrates how very effective such arguments can be when forcing one side to respond the non-story, causing that side to go off message. The story of generations of land owners, while emotionally compelling, can also backfire-making the ranchers appear not as agrarian gentry but as privileged aristocrats who control the people around them and want to own forever the land God bestowed upon them. The family angle also is a non-story, in that it approaches the argument from the same standpoint.

The Critique

The critique of the Army's master narrative is a straightforward one: the service hasn't built an air-tight case for expanding Piñon Canyon. Members of the Colorado congressional delegation point to the Army's unwillingness to respond to questions from the Government Accountability Office regarding its proposal. The Army has back-tracked from plans for seven million acres to 100,000 acres (Pankratz, The Denver Post, 2009)in its latest documents. Recently, the U.S. District Court vacated the Fort Carson commander's Record of Decision regarding possible environmental impacts resulting from ramped-up training on acreage it already owns at Piñon Canyon. According to Jim Harrell (Prendergast, 2011), Vice President of Instruction at Otero Junior College in Otero County and a board member of the anti-expansion group Not One More Acre, each of these events, and others, validates community members' suspicions about the genuine need for expansion leaving a "genuine dark cloud hanging over the region.".

The ranching community contends a sound agricultural base is as critical to national security as the training of soldiers. Modern agricultural practices have increased the number of people each farmer can feed. But as agricultural production has become globalized, political powers have become comfortable with the United States importing its food as it does oil. According to ranchers, encroachment on agricultural lands and the shrinking of the industry threatens the nation's economy and well-being.

The ranchers' environmental argument is directed at maintaining a healthy Short grass Prairie Ecosystem, likening cattle to modern-day buffalo that actually help the environment in Southeastern Colorado. Their argument is that it is better to have cattle eating and spreading manure on the prairie than to have tanks and other tracked vehicles tearing up the ground and polluting land and water. The ranchers quote from a speech given by Robert F. Kennedy, Jr., and reported in the Chicago Tribune on May 16, 2003: "The federal government is America's biggest polluter and the Department of Defense is the government's worst

offender" (PCEOC Website, 2011). The bottom line of the story?the military and agriculture don't mix.

3) Compare the two sets of narratives in order to generate a metanarrative "told" by the comparison.

The metanarrative can be understood as the "story between the stories." Analyzing opposing narratives makes the differences between them sharper. As a result of this increased clarity, opportunities for resolution may be found.

The Army seeks additional lands to conduct training a soldier may need in battle to protect the citizens of Southeastern Colorado and their cherished way of life. A survey commissioned by the Army and conducted by Booz Allen Hamilton in the communities of La Junta, Pueblo, Trinidad, and Walsenburg found that 91% of those surveyed supported the proper training of soldiers and "Stakeholders and residents in the PCMS area stated that they are very patriotic." Others indicate there are "unresolved issues" from the initial expansion that retard progress on the matter.

This appears to run counter to a statement by the new commanding general of Fort Carson suggesting, "The long fight over Piñon Canyon is starting to give Colorado the reputation of being 'anti-military'" (Roper, 2011).

Is it possible, instead, that the citizens are not antimilitary, but simply want and need a fuller explanation of the Army's intentions? This would correlate with the Branson School Board's demand to enter into consultations with its much larger federal counterpart. It is interesting that the tiny Branson School District, rather than one of the relatively larger municipal or political districts in the area, has taken on the role of narrator here. It has taken on an activist role in the debate to capitalize on the ranchers' strategic communication efforts through the Cattlemen, PCEOC and NOMA. Has the District invoked the argument that the Army failed to coordinate with local governments to not only forestall a loss in revenues, but to catalyze action by other area governments?

On the face of it, it would appear that the Pentagon has the upper hand against a small school district in the middle of nowhere. However, when it comes to bureaucratic fist-fighting, the two sides are more equally matched than one might think. Both boast highly educated bureaucrats backed by skilled legal counsel, and both labor in the shadows of significantly larger entities; to wit, big agriculture and the military-industrial complex.

Respondents to the Booz Allen Hamilton survey also value individual property rights (97%) and ranching and agriculture (96%), as well as the economic benefits derived from strong ties to the land.

As the total amount of land is limited and land is seen as being able to be used either for training or for ranching, competing values emerge.

Perhaps nowhere are these competing values more evident than in the City of Pueblo. Many Puebloans work at Fort Carson or

for defense contractors or defense-related industries that support the Army in the region. But many businesses in Pueblo also derive income from transactions with the ranching communities to the south, and may Puebloans esteem the ranching culture, too. The city would be loath to take sides against or offend either the military or agriculture sectors.

4) Determine how the metanarrative recasts the problem in a way to make it more amenable.

It is possible to recast the problem? Yes. We have now established a metanarrative that highlights agreement on the need for national defense to protect Southern Coloradans' cherished way of life, underscores the need of the Army to arm citizens with additional information for decision making, points up competing values with respect to use of the land, and which portrays Pueblo as a linchpin community.

The Army needs to make its case better, but its ability to do so is impeded by a lack of trust. Can other entities—say the American Legion, the American GI Forum or other veterans' advocacy groups with standing in the area—help to bring opposing forces together to ensure citizens have the facts on which to base decisions?

Can the land really only be used for either military training or agricultural purposes? Why not both? There are numerous precedents, including nearby at the Pueblo Depot and elsewhere nationwide, for crops to be grown and cattle grazed on federal reservations like Piñon Canyon. This only requires some

creativity. In several locations the Army leases land to or from ranchers. Can an agreement be designed for the ranchers to lease the land to the Army and then somehow maintain a herd on that land?

Does the City of Pueblo have the capacity to play the role taken on earlier by the Branson School Board; i.e. that forcing the Army to the table? As a larger community with feet in both the agricultural and military camps, could Pueblo be the linchpin in resolving the stalemate? It certainly has a lot at stake in the matter. The ranchers argue that in terms of sustainment, the Army focused primarily on El Paso County and nowhere else. In order to meet the social, economic, and environmental demands of the residents, both Branson and Colorado Springs need to be at the table, as well.

The narratives of the ranchers and the Army have some similarities, even, insofar as projecting forces to defend our interests and the ability to feed ourselves are both matters of national security. The narrative which shapes the controversy also drives the course of political events.

Both the ranchers and the Army have framed the metanarrative in terms of "us versus them." By explaining the metanarrative in terms of "The Army did this" and the "Ranchers are that" only drives the argument into a quagmire that ensures it will never get resolved, with both sides in a lose-lose situation.

The metanarratives that set the stage for the emergence of an amenable solution are not the master narratives put forth. The emergence of hard-line position, especially by the ranchers, is both part of the culture and part of the image they wish to project. The cowboy culture of suspicion and defiance towards the government has been documented elsewhere. As far as ranchers are concerned, patriotism doesn't have to wear a uniform.

While farmers and cowboys are often not thought of as militant, they have a long history of militancy. The American Agriculture Movement that brought huge tractor rallies to Washington, D.C. in 1978 and 79 was born in Campo, Colorado, roughly 80 miles east of Branson. The Farm Aid concerts that started in the mid-80s were also born out of agricultural activism of the late 1970s.

The method in which the sides may come together will most likely be driven by the larger Southern Colorado community; their understanding of the metanarratives will determine what they will accept in the southeast quadrant of the state. The political realities of the people and their feelings have been lost in the conflicting stories and may have little in common with the ranchers' or Army's desires. Since 1983, the Army has built few ties to the bureaucracies that connect the "perception of the agents" to the "administrative problem". There are a lot of stakeholders; however, the largest center of influence is clearly Pueblo and Pueblo County. Perhaps it is they who could bring the Army, Branson and the ranchers together.

The hope for compromise is not lost. The Piñon Canyon Expansion Opposition Coalition that is leading the charge against expansion, states clearly in its Response to the Army Report Required by the National Defense Authorization Act; Section 2831 that:

"Our opposition to a 100,000 acre expansion is not a refusal to compromise. Instead it is insistence that the DoD lives within their means and utilize their current resources efficiently to give our soldiers the training that they deserve."

While there is strong sentiment by PCEOC that leasing is not a viable solution, there may be other creative means to expand training without eminent domain.

CHAPTER 5: SOCIAL NETWORK ANALYSIS

"Emptiness can affect the unwary." -Bernard DeVoto The Western Paradox - A Conservation Reader Yale University Press, 2001, p.281.

The second sub problem is to apply existing models to map the competing interests involved with the Piñon Canyon Maneuver Site. The topography can be transferred to a working model of the network. This sub problem will be addressed through social network analysis.

The two indispensable elements of any social network are actors and relations (Knoke and Yang, 2008). Actors are the groups or, in this case, the bureaucracies involved. Each bureaucracy, Las Animas County, U.S. Forest Service, etc. are actors. As in every other type of quantitative research, an actor is a single unit of data or a subject; a collection of subjects is a population; a sub collection of subjects is a sample, and so on. In graph theory they are known as "nodes" and later on in *Netlogo* as "turtles." In short, for this research turtles will be referred to as stakeholders, and vice versa.

The stakeholders in a bureaucratic network are similar to individuals. Each has its own interest and the interests of close relationships. As the relationships become more distant the bonds tend to be weaker, unless there is a mutual interest that benefits both. The scalability of a bureaucratic network is a reflection of this phenomenon. This is true in the Piñon Canyon study. There is a value in the relationships that trumps where one bureaucracy physically sits from another.

Stakeholders

Some stakeholders can be consolidated. The Office of Colorado Natural Resources, for example, can serve as a blanket for some minor state stakeholders with minimal impacts. This allowed the list to be consolidated to 40 stakeholders, each of which was assigned a distinct turtle, or, agent, number (see Appendix H).

A relation is defined as a type of connection or contact between actors. In this study, as in NetLogo, they will be referred to as "links." Relationships or links can be directed or non-directed. The directed link shows a flow of influence or power in a certain direction. They tend to have a positive and negative end if they are active. "Positive" and "negative" are used to describe the flow of influence and not the nature of the relationship. For example, an actor may gain influence from two other actors; therefore, the relationship is directed to the receiving actor as noted below:

☺ (-) (+) ☺ (+) (-) ☺

In this example the center agent is the center of influence

The design elements used in the research are intended to show how the Piñon Canyon actors exert influence across governmental boundaries. Bureaucracies are tricky to measure in that there needs to be a method to confirm that the person interviewed represents the entire organization. Secondary sources

have been utilized to verify the primary collection (see Appendix H).

Data collection for this study was done through several methods. The first method was to collect a wide range of "secondary sources" via newspapers, the internet, government reports, meeting records etc. The Piñon Canyon issue is well documented, especially in Colorado, making secondary source collection relatively easy. The second method of collection involved interviews of government officials. Interviews of elected officials were avoided, though not eliminated entirely. Because most elected officials have made their positions on the proposed expansion of Piñon Canyon widely known, the focus of interviews was directed at career bureaucrats whose positions are less likely to change with political tides. Based on the methods, a simple design of relationships based on roles, position and influence could be created.

The sampling units comprised in this research were easy to identify. This Piñon Canyon issue sits in a limited universe. From the beginning, it was easy to determine that the U.S. Forest Service was a stakeholder and therefore an actor and the Colorado Department of Corrections was not an actor. The collection of sampling units became a process of elimination between major actors, minor actors, potential actors and non actors. This study is limited to major and minor actors. This delineated approach keeps the research from engaging in secondary and tertiary issues.

Knoke and Yang (2008) recommend a specific relational form and content to study such that, "Relational form is a property of actor relations that exists independently of any specific content (intensity, frequency) while relational content captures the meaning of the relationship from the actor's viewpoint (type of tie)." At each level of government-municipal, county, state federal-the intensity and frequency display similar characteristics. For this research the type of tie to be studied is "influence directional relations" where linkages between actors are directed to multiple actors in the network.

What kind of model does Piñon Canyon fit?

There are a number of models and methods for analyzing Piñon Canyon. In order to represent network data, Knoke and Yang suggest graphs and matrices. They state that, "Graphs present visualizations of social networks whereas matrices use mathematical algebraic representations of network relations." Since this research is ultimately focused on agent based modeling, matrices will be utilized to support the models through computer analysis.

An important component left out of social network theory and science is the concept of valence. Though the idea of value directed graphs is common, they tend to study the value direction and occasionally reciprocity, dyadic or binary relationship. In chemistry, valence is the quality that determines the number of atoms or groups that a single atom will unite with. This is a units combining capacity. It would appear that a bureaucracy

could unite with an unlimited number of partners. In the case of the Army with its huge resources, the above statement would certainly be true. What about smaller bureaucracies or those with limited missions?

Taken a step further, networks may also have covalent bonds with other agents in the network to stabilize the relationship. Covalence is the number of shared links and the nature of them. In chemistry, for example, a carbon atom may have four stable orbitals that allow it to combine with other carbons and hydrogen to form a benzene ring (Figure 5-1):



Taking the valence concept from chemistry and applying the design elements to the model elements, some basic network models can be explored. A benzene ring from Chemistry provides a nice graph to represent an intergovernmental network on four levels: federal/state/county/municipal.

Basic Models (Figure 5-2)



The benzene ring provides a good visual representation of the universe that can be expanded into the model below (Figure 5-3).



The benzene ring demonstrates a number of limitations such because it shows location and not intensity, frequency, valence and type of tie. While the model is governed by structural features of symmetry, the need to find a suitable model that demonstrates intensity, frequency, valence, and type of tie becomes evident. Another route for studying the Piñon Canyon network is to design a tree binary or tree to show data structure that emulates a hierarchical structure with a set of linked nodes. In an order directed tree, the graph is similar to a family tree with each node represented as children or parent nodes demonstrating direction and order.

The tree data structure is handy to represent directed graphs; however, the lattice tends to be represented as abstract nodes of sources and targets. Different lattice strategies would make this model confusing quickly.



Figure 5-4 Example of Binary Tree Example of tree network between poles

There are three social network models utilized in this study. A simulation environment is necessary to create and execute a model to determine how policies morph. NetLogo (Wilensky, 1999) was chosen as the simulation environment because it is widely used, easily available, and runs on most computer operating systems.

The dilemma now comes to the type of model Piñon Canyon fits.

Progressive transition between regular and random graphs



Figure 5-5 Progressive Transition between regular and random graphs from Huang, C.Y., Sun, C. T., and Lin H. C., (2005)

Watts and Strogatz proposed a one-parameter model, which interpolates between an ordered finite dimensional lattice and a random graph. The algorithm behind the model is: Starting with a regular ring lattice with nodes in which every node is connected to its first neighbors and second neighbors on either side randomly rewire each edge of the lattice with a probability such that self-connections and duplicate edges are excluded.

Generating a Scale Free Network begins with a small number of nodes, and during each iteration, a new node is introduced and

29

connected to pre-existing nodes according to a probability based on each node's vertex degree.Random Networks are generated by adding links between pairs of randomly chosen nodes as seen in figure 5-5.

The models used from NetLogo are:

Preferential Attachment Diffusion on a Directed Network Small Worlds

NetLogo's modeling environment for social phenomena allows researchers to explore model behavior under various conditions. As an environment which enables researchers to manipulate models, it is a suitable format for analysis.



Figure 5-6. NetLogo generated "Preferential Attachment" random model

A number of network models are provided in the models library in NetLogo. The first model experimented with is the Preferential Attachment model. Preferential Attachment or "scalefree networks" are networks in which the distribution of the number of connections of each node is not a normal distribution; instead, it follows what is a called a power law distribution
(Wilensky, 2005).

In the Preferential Attachment model, each step, adds a new node. "A new node picks an existing node to connect to randomly, but with some bias" (Wilensky, 2005). Barabási (1999) explains:

Random network models assume that the probability that two vertices are connected is random and uniform. In contrast, most real networks exhibit preferential connectivity. For example, a new actor is most likely to be cast in a supporting role with more established and better-known actors. Consequently, the probability that a new actor will be cast with an established one is much higher than that the new actor will be cast with other less-known actors. Similarly, a newly created Web page will be more likely to include links to well-known popular documents with alreadyhigh connectivity, and a new manuscript is more likely to cite a well known and thus much-cited paper than its lesscited and consequently less-known peer.

Barabási's explanation makes clear why each side in the Piñon Canyon controversy would align itself to high profile supporters. Public support is important, but it must be the right public support; i.e., the City of Pueblo supporting the ranchers would be more meaningful than the cattlemen supporting the ranchers. The Army-represented by the Star-and the ranchersrepresented by the cow-are built in a simple model that is easily manipulated. Scale-free networks are beneficial in that it is easy to distinguish which agents are on what side. The agents can also be resized to demonstrate centers of influence.

The Erdős-Rényi model, named for Paul Erdős and Alfréd Rényi, is somewhat similar to the Preferential Attachment model, insofar as it would generate a random graph demonstrating the connected component of a network formed by randomly connecting two existing nodes per time step. This process, however, can be modified in NetLogo by manipulating the probability connecting the nodes, causing the fragmented components to attract towards a designated agent. This process is helpful to emphasize that each component is closely connected with the rest, but fails to demonstrated opposition.

Scale-free networks are troublesome in the Piñon Canyon case due to the lack of representation of valence. Agents are held together by bond or "links" and the scale free model really only shows which agents are on which side, ignoring whether any are actually in the middle or if there are links across. Due to the limitation of the Preferential Attachment model, it will require modifications to be a suitable model.

The second model studied is NetLogo's "Diffusion on a Directed Network." As Wilensky (2005) describes it, "this model demonstrates diffusion of a quantity through a directed network." The quantity moves among nodes in the network only along

established, directed links between two nodes. The simple rules that drive this diffusion lead to interesting patterns related to the topology, density, and stability of the network.



Figure 5-7. NetLogo Diffusion on a Directed Network, before and after.

Diffusion on a Directed Network is a much better model in that it demonstrates directed links and the transfer of value from one node to the next. The primary limitation is that the valence/covalence of each agent is limited to four in the map directions of north south east and west.

Returning to chemistry, effusion and diffusion are characteristics commonly associated with gases passing through a channel, but in the social sciences the definition covers the transfer of characteristics from one element to another. Correlating this idea to social networks is easy, as the size of the node can correspond to the amount of influence. While this model provides many of the needed characteristics, it is restricted to a lattice shape that makes it difficult to:

- a) Assign specific bureaucracies to points on a lattice based on a relationship.
- b) Attach or demonstrate relationships across the lattice.
- c) Match the number of agents with the number of nodes on the lattice since the model is designed on a grid and is restricted.

Limitations of the Diffusion on a Directed Network model may cause one to reject as a suitable model, though components of this can be incorporated into another working model.

One of the most commonly studied networks is the small world network. A small world network is a mathematical graph in which nodes that are not neighbors of one another can be reached from every other, or connected, based on a small number of links that can be created or already exist.

The small-world effect, first observed by Stanley Milgram, is the rapid decline in average path length as a small number of random links are added to structured networks (Lewis, 2009). In 1998 Steven Strogatz and his student, Duncan Watts, published the first comparative study of complex networks. The analysis revealed that the "small world" phenomenon is a unifying feature of diverse networks found in nature and technology (Strogatz, 2003). The small world network generated by Watts-Strogatz (WS) will be utilized as the base model. There are some limitations to the WS model that will be discussed further, but it is important to understand the basic dynamics of the model. The model is a scalable random graph generator that produces graphs with smallworld properties. This small world effect demonstrates short average path lengths, rewiring probabilities, and high clustering.



Figure 5-8. Small world networks set up with 12 agents; the number 7 agent in the second is linked to all other agents.

The example above utilizing NetLogo demonstrates a small world network set up with 12 agents. The second example shows the number 7 agent (12 o'clock is always zero) linked to all of the other agents. In this example, all agents in the set up are separated by a minimum of 3 degrees of separation in the first graphic, and then two degrees of separation in the second graphic. There are some assumptions to this model in that the model assumes that each agent is connected with the two nearest agents on either side.

A small world network is generated from two agents. In network science, a regular graph vertex has the same number of neighbors, if all local degrees are the same number (Lewis, 2009). A 1-regular graph consists of disconnected edges, and a 2-regular graph consists of disconnected cycles such that: For an ^r-regular graph on ⁿnodes, M= $\frac{1}{2}$ nr

Simple networks can be displayed such that:

For r > n/2 there do not exist any disconnected $_r\mbox{-regular}$ graphs on $_n$ vertices.



Figure 5-9. Weisstein, E.W., "Regular Graph" from MathWorld.
One problem is that WS does not have two important properties observed in the Piñon Canyon scenario network: the diffusion capability mentioned above, and the ability to maneuver the agents along the sides.

Yet a third issue is that the WS model is mostly interested in average path lengths and clustering coefficients. Average path lengths show the number of steps it takes to get from one member of the network to another while the clustering coefficient demonstrates the ratio of existing links connecting a node's neighbors to each other to the maximum possible number of such links. (Wilensky, 2005) While each of these measurements is interesting in itself, they do not address the dynamics at play in Piñon Canyon in relation to determining centers of influence and power. The small world network is very close to what is needed to analyze Piñon Canyon but its inability to demonstrate diffusion will require the model to be.



Figure 5-10. WS graph of stakeholders.

For instance, a WS graph for the stakeholders would look like the above, utilizing a NetLogo graph where the x and y corner coordinates (cor) are min-pxcor -17; max pxcor 17, minpycor -17 and max pycor 17 and center xy coordinates are 0,0 as seen above. Networked in WS format, the original 47 agents would appear as follows:



Figure 5-11. Networked in WS format, the original 47 agents would appear as at the left. The cow has four connections in the 2-regular network shown on the right.

For this example, the Colorado Cattlemen will be identified as agent 42 out of 47 agents and, for identity purposes shape is identified as a cow. Notice how the cow has four connections in this 2-regular network: between its neighbors (41 to 42 and 42 to 43) and its neighbor's neighbor closest to the cow (40 to 42 and 42 to 43). There appears to be a fifth connection (highlighted in red) which is actually 43's connection to 42's closest connection. While WS gives a nice model to start, the first difficulty is soon encountered.

The limitations of WS include that it is more random when determining its effect. The randomness is scalable ranging from very low entropy to entropy comparable to that of a random network (Lewis, 2009). Because the model that needs to be built should be less random, the WS needs to be controlled and built where the user can place links between nodes, rather than the links be placed randomly to measure the influence.

The second problem is the model produces an unrealistic valence (bond)/distribution of the number of edges incident to the vertex of the graph that can't be controlled. As in chemistry, an atom can bond only with so many other atoms. In building an intergovernmental model, the valence is unknown therefore the model calls for greater ability to experiment.

Social structure in networks is more than relationships, it is about geography. According to Knoke and Yang (2008),"...the most common question about social networks is 'who knows whom?' but perhaps the most relevant question is 'Who knows who knows whom?' In the case of bureaucracies this question becomes 'Who knows who works with whom?'"

Also, the model has to be studied for bias. In the study of organizations, Small World Networks have what appears to be an inclination to force a partner to hold a relationship with one entity and possibly not others that may be equally close. Therefore it forces an entity to present or hold a relationship

at the expense of a possibly equally valid alternative relationship. The bias displayed also forces relationships down paths around a circle. In other words, relationships have the initial misleading appearance of being directional.

Knoke and Yang (2008) stress the susceptibility of Social Network Analysis to have trouble with reliability and validity of the network analysis, in addition to missing and excluded data. This can be demonstrated a number of ways and there may be "genuine changes in networks" over the course of time, such that "Due to the unique characteristics of social network data, particularly in egocentric analyses, informant reliability and validity measures differ greatly from conventional measures for other types of data" (Mardsen, 1993).

The idea that social networks can change and more importantly change quickly, emphasizes the point that Social Network Analysis is more valuable for ongoing monitoring rather than a one-time study. As with the stock market, the real utility is to monitor the graphs over time for changes in behavior.

Summary of Social Network Analysis

Graphs illustrate paths and circuits, and the three Netlogo models all demonstrate a variety of strengths for use in a Public Administration problem. The paths and circuits are valuable to the researcher in visualizing the behavior of the relationships. Along with the matrices of the research, each Netlogo method

probably could stand on its own merit. The problem with utilizing a single method is in the limitations of what can be described in relation to the behavior.

Relationship strength is most notable in the Preferential Attachment model. This model demonstrates centers of influence very clearly and pulls the actors to one side or the other. Pulling the actors to one side is helpful to determine the influence of one side of the argument but can be problematic when the actor may be stuck in between.

Relationship direction is best displayed on the Diffusion on a Directed Network model. The patterns related to the topography, topology, density, lattice and stability of the network are best observed in this model. Wilensky (2008) states that this:

...model uses directed links, which can be used to create asymmetric relationships between agents. If you used undirected links, the behavior of this model would more closely resemble the DIFFUSE command, where the value of all the nodes would eventually become the same.

The diffuse command would only be helpful in a scenario where it could be assured that issues would become acceptable to all parties. As most public policy controversies go, they may reach equilibrium but they rarely diffuse.

Centrality and Centers of Influence are most apparent in the Preferential Attachment and Diffusion on a Directed Network models. Understanding where relationships are centered and where influence ultimately goes is key to understanding how the dynamics of public policy shift and morph.

Structure and valence are the primary strengths of the Small Worlds Model. The visual model proposed by Duncan Watts and Steve Strogatz while measuring the ranges of the fraction of nodes, the average path and the clustering coefficient illustrates how quickly relationships can change. The range of values is more directly comparable in this model allowing the Network to be observed in manageable conditions.

There are a number of models to look at outside of the models reviewed in this chapter that can analyze relationships. For example an intergovernmental network can be studied in the context of individual relationships between Government and Business and Press and Politicians as seen in figure 5-12.



Figure 5-12 Relationship matrix

Taking the step further an entire table can be built showing where the agents fall on the matrix as in Figure 5-13.



Figure 5-13 Attempt to align actors between Pentagon and Ranchers.

This concept (though somewhat unsuccessful) is an important first step in analyzing Social Networks, as it is necessary to represent the data using either graphs or matrices. The methods shown below (Lewis) were used in applying the Small World Network model to Piñon Canyon.

Graphs Matrices Relationship Measures Centrality and Prestige Cliques Structural Equivalence Visual Displays Blockmodels Here, my primary interests are Centrality and Prestige, as well as Cliques that help form cohesion. In Addition the following determinants and parameters I selected based on Lewis's (2009) general principles of characteristics that apply to modern networks will be applied in the next chapter.

Determinants and Parameters

Structure	Tendency
 Emergence 	Time
 Dynamism 	Evolution
 Autonomy 	Behavior
 Bottom-up evolution 	Scalability
 Topology 	Place
Power	Influence
 Stability 	Pressure

Taking these strengths and weaknesses into consideration, the next logical step is to morph the good and attempt to eliminate the bad from the three models in order to optimize the analysis. This takes this research to the next level in Chapter Six.

33

CHAPTER 6 AGENT BASED MODELING

"The cowboys have a way of trussing up a steer or a pugnacious bronco which fixes the brute so that it can neither move nor think. This is the hog-tie, and it is what Euclid did to geometry." -Eric Bell, in R Crayshaw-Williams The Search for Truth

In the previous chapter, Piñon Canyon was observed using existing models with accepted mathematical properties; all of the models was found wanting in some aspect or aspects. So, the third sub problem is to construct a model, then map, analyze, and interpret the collected data to evaluate the application of the theory. In utilizing a multi-methodology approach, this sub problem will be addressed through the application of agent based modeling and a simulation of the model in order to determine if the model reflects reality as result of the exploratory research.

It now becomes necessary to define and understand what a network is. Lewis (2009) in the textbook *Network Science, Theory* and *Applications*, defines a network as:

G(t) = {N(t), L(t), f(t) : J(t)}
Where t = time, simulated or real
N = nodes, also known as vertices or actors
L = links, also known as edges
f: N x N = mapping function that connects
nodepairs, yielding topology
J = algorithm for describing behaviors of
nodes and links versus time.
G = algorithmic set that defines the
structure (or simply: the network)

The theoretical definition proposed is simple yet allows the user to view the network in much more technical terms if desired. The definition also provides a starting framework from which to build the model.

The problem in dealing with complex and complicated public administration dilemmas is finding a suitable analytical method to describe, study, or solve the dilemma. Choosing an Agent Based Simulation method becomes convenient if one wishes to build a model where individual representatives and actions can be observed by cause and effect. The model will not be designed to reflect a constant, but rather the effects of relationships and where they exist.

While it is important to know how people or organizations feel, it is more important to predict how they will act and interact based on likely scenarios. The action and reaction of an organization can sway a political process in either direction. The influence of the agent and its position in the network are also important phenomena for observation.

While the definition: $G(t) = \{N(t), L(t), f(t) : J(t)\}$ gives the reader the mathematical parameters for the network, it is also necessary to understand the theoretical parameters. The social network analysis in the previous chapter demonstrated that three standard models for networks which, while having interesting strengths and abilities, do not fit an intergovernmental process very well. Rather than trying to pigeonhole the scenarios into different models by matching the

disparate entities into a small number of categories, mathematical parameters must match the theoretical parameters.

Lewis (2009) sets forth general principles of characteristics that should apply to modern networks:

- 1. Structure
- 2. Emergence
- 3. Dynamism
- 4. Autonomy
- 5. Bottom-up evolution
- 6. Topology
- 7. Power
- 8. Stability

Utilizing these theoretical characteristics, a model of the Piñon Canyon network will be built utilizing NetLogo.

1. Structure

Drawing the topology, or the continuity and connectivity of the "Small World", is as critical as showing the topography, which is the position of the agent generally in terms of position (latitude and longitude) on the graph. The network of agents then is designed to become a collection of "living" cells that make a larger living organism.

Starting with the "Small World" model developed by Duncan Watts and Steve Strogatz (1998), for structure and lattice stability, the model was then combined with Diffusion on a Directed Network (Wilensky, 2005), to show changes in influence. The model was then morphed from the circular "Small World" to a Benzene shape because the shape offers a better representation of connections. The Benzene shape also differentiates it from other models. The Benzene Ring now becomes G. The individual links established through research are added as keys onto the model.



Figure 6-1: NetLogo Piñon Canyon Small World Network with 40 nodes in NetLogo.

The small world network will be used as "G" in our network equation. As it displays structural and behavioral properties it will be referred to as "G(t)", as the network evolves over the passage of time. It should be emphasized that whereas the Erdős-Rényi model is a random network of random graphs-starting with N nodes that connect each pair of nodes with probability p, creating a graph with approximately pN(N - 1)/2 edges distributed randomly-the Piñon canyon model is a scale free network where agents may have a varying number of edges or ability to connect.

2. Emergence

The impact of time on a network leading to changes is an important analytical characteristic. Lewis (2009) describes emergence of a network property as a "synchronization issuestable networks transition from one state to another until they reach a fixed point, and stay there." The idea set forth is that a random network will evolve to a non-random network; further, that the network "changes by a factor of 10 as consequence of a dynamic network achieving stability." Emergence becomes a puzzle in a network that exists and may already be stable.

While Lewis describes emergence in terms of "exchange of links" (2009) over time, there is another dynamic at play not having to do with the exchange of links but with the diffusion of a quantity through a directed network. Utilizing the NetLogo model of Diffusion on a Directed Network, the characteristic of emergence doesn't change the lattice but impacts the appearance in relation to the topology and stability of the network. The Piñon Canyon model is built with a stable lattice since the known connections are established.

It is at this point that the Small World Network is joined with Diffusion on a Directed Network. The introduction of the diffusion capability to the small world lattice brings the two most important components of the model together: A lattice and the ability to view changes in the agents. Given the previous definition: $G(t) = \{N(t), L(t), f(t) : J(t)\}$, emergence is time or (t).

3. Dynamism

Dynamism is the simplest characteristic to achieve. Since the network is a "living" function, it must have the mathematical properties to shape and morph. The ability of a graph to morph is described as J(t)or the algorithm for describing behaviors of

nodes. Starting from an initial state with initial inputs the instructions describe what computation that, when executed, will produce an "output". This component is introduced in NetLogo as the commands. As the model is given commands, the model will act upon the information provided.

The commands for the Piñon Canyon Model are laid out in Appendix G. The dynamic behavior is as complex as the researcher desires. The dynamic behavior is a result of the evolution of the model and how the system morphs over time. What makes this new model noteworthy is the fact that it represents a possible method to track bureaucratic opinion and behavior, which is a point of departure from investigations that track only public opinion. Bureaucracies can now be followed and addressed as policies take shape as a consequence of "social network analysis.". How the network behaves is dependent on the links within the network.

4. Autonomy

Based on primary sources (interview) and secondary sources (interviews with press, academics, and collection of print sources), the Piñon Canyon network is explained in Appendix E.

The table in Appendix E is nothing more than N (nodes) and L (links). Establishing the autonomy through structure and function is an expectation of quality in a model; that, in turn, is directly tied to its dynamic behavior. The ability of the network agents- past and current quantity-to decay, reach equilibrium or morph depending on added agents, can be represented as size along with the amount of quantity that has

passed through a link in a given step, to reflect the global or total quantity in the system; in this case, quantity equates to political influence. The first step is to display the model with links.



Figure 6-2 Piñon Canyon Network, based on Table 6-1

The network layout-circle turtles (world-width / 2 - 2) is designed to hold a universe of 40 turtles when the grid size =3 and the number of nodes = 15. (25+15=40) The model also must conform to limitations in that there must be a maximum quantity held by a single agent in the system, and a limitation (capability) to have a maximum quantity that has passed through a link in the system. It also becomes necessary to arrange the model so that opposing sides are opposite and the structure demonstrates the primary direction of links (Table 6-3).



Figure 6-3. Piñon Canyon Network arranged in a Benzene model highlighting directional links.

The portion of the formula where f : N x N is the mapping function that connects nodepairs, yielding topology that allows the flow of power from agent to agent. While the Piñon Canyon model is designed to show current stakeholders instead of the addition or subtraction thereof, the autonomy can be described more in terms of change of agents over time, rather than the number of agents over time. It is in this concept that the autonomy requirements are met.

5. Bottom-up Evolution

Lewis (2009) explains that networks grow from the bottom or local level up to the tip or global level. He states that, "Even if an initial structure of a network is the result of premeditated design, networks evolve and change as a result of their dynamism." (Lewis 2009). This characteristic was actually explained in the Narrative Analysis. As the complexity of the Public Administration problem developed for the Army, a number of stakeholders-Branson, Trinidad, Not One More Acre-started to organize and attach to the structure.

6. Topology

The Piñon Canyon model is a snapshot of a network at a given time. Lewis statement that topology is a "consequence of Darwinism" leads to the conclusion that networks evolve from small to large. This is true for many systems however, in a small world and limited universe the topology will remain quite limited.

The topology designed for the Piñon Canyon model involves actors at the municipal, county, district, state, nongovernmental, and federal levels. There are limitless models to design in such a scenario. The Benzene Ring was chosen because the network has some characteristics similar to chemical properties.

Benzene electrons tend to be localized and stable. The Piñon Canyon network is designed on this principle- not internally, but for external issues. For example, the Colorado State Land Board is concerned with other military-public land encroachment issues in addition to Piñon Canyon. This would be indicated in an external link from the existing network to the Air Force at Buckley Air Force Base or the National Guard around Camp George West, creating a "network of networks" (Figure 6-4).

These would in turn link to another network with a different set of stakeholders. Though the issues may be very similar or nearly exact, the network would not be the same.



Figure 6-4. Network of networks on similar encroachment issues: Piñon Canyon, Lowery Air Force Base, Camp George West.

As in organic chemistry, the carbon atoms of the Benzene Ring have covalent properties. This can be internal to the network or external to a connected network. The networks can also display orbital dynamics that share connections. The nodes (N) in the network that share links are characterized by the orbits sharing pairs of electrons between atoms. The relationship becomes a stable balance between the nodes when they share links as in covalent bonding; this emphasizes the stability and importance of the agents' relationships to each other. In chemistry, covalence is greatest between atoms of similar needs. In Social Networks, covalence describes the tendency of an agent or a functional group to attract others towards itself.

Covalence in the Piñon Canyon Network also in Appendix E is a listing of shared links between Agents. It is important to notice that in the network only five of the 40 (12.5%) agents exhibit covalence with 100% of links. The model also incorporates a shared link (not listed) from Fort Carson to Trinidad as an experiment in the dynamics of the network.

Derivatives of covalent bonds include covalent networks in chemistry. A covalent network solid is a chemical compound in which the atoms are bonded by covalent bonds in a continuous network. These covalent network bonds are considered a macromolecule. They display properties of hardened minerals where the bonds hold the entire network fixed.

These network solids hold no free electrons and consist of uncharged atoms that do not have the ability to connect elsewhere. This can be an example of a network at stalemate. As with a chemical network solid, the strong covalent network holds a hardened lattice that can only be melted with a high outside source of energy. Examples of network solids include quartz, diamond and carbon graphite.

The term "covalence" in regard to networks is important as it allows agents to share numbers of pairs of links between its neighbors or anyone else in the network.

The idea of covalent bonding in networks is also important because the sharing of bonds between agents is key to intergovernmental relations as a whole. Pairs of bonds may also be located between agencies to represent partnerships. Multiple pairs represent multiple partnerships, can be identified in double, triple, and quadruple bonds, and so forth. While the idea of shared bonds provides a qualitative picture of the network, further research and analysis are needed to understand the nature

of these links to be able to predict the behavior of the network. When a directed link is formed the relationships can be classified and drawn in order to successfully predict future centers of influence and behavior. Now that the relationships are known they can be programmed into NetLogo.



Figure 6-5. Final NetLogo Model

7. Power

Lewis states that the power of a network is "proportional to the square of the number of nodes it contains" (Lewis, 2009). The maximum number of links with n nodes is n(n-1)/2 or in the model built: 40(40-1)/2 or 780 links. In the Piñon Canyon model the power is in the influence of an agent and its ability to share that influence or focus it in a central location.

Lewis refers to Metcalfe's law to help define his definition of power. Metcalfe's law declares the value of a network is proportional to the square of the number of connected users of the system (n^2) (Lewis 2008). In other words, the power of a node is proportional to the links that it has. In this case, based on the research gathered, the top 20% of agents displaying the most power based on links (Direct (D) plus Covalent (CV)) are:

Pueblo County (11 D/4 CV = 15)
 Las Animas County (6 D/6 CV = 12)
 City of Colorado Springs (5 D/4 CV = 9)
 Pueblo Chamber of Commerce (5 D/4 CV = 9)
 Colorado Springs Chamber of Commerce (5 D/4 CV = 9)
 Commanding General Fort Carson (4 D/4 CV = 8)
 Piñon Canyon Expansion Opposition Coalition (4 D/\$ CV =8)
 Colorado State Land Board (7 D/1 CV = 8)

The most interesting component of this perspective is the influence of the Chamber of Commerce in Colorado Springs and Pueblo. While it is not surprising that a coalition of businesses whose primary goal is to further the interests of businesses in the area is influential, it is interesting to note that they are networks in themselves.

It is also interesting that Pueblo County has the most influence. The County Commission is the primary entity overseeing provision of government services, land use management, engineering/public works, roads and bridges, housing and human services, ad veterans' and social services (Pueblo County Commissioners, 2011). The idea that the commission exerts influence over an area outside of the county points to the interconnectivity of issues in Southeastern Colorado.

This piece of data points to a concept called exclusion. As described by Tongia and Wilson, "...most network models fail to capture the costs or loss of value of exclusion from the network. Intuitively, as a network grows in size and value, those outside the network face growing disparities" (Tongia and Wilson, 2007). This concept is directly tied to the power of the network; i.e., where are the stakeholders outside of the network located?

A possible explanation and theory is that the entirety of the Pueblo County government and its political machine has manifested itself in the county commission. Tongia and Wilson also assert that "populations excluded from a network will often resort to alternative or parallel networks." This is most likely the explanation of how a government that is not a primary player in the debate becomes the most influential player. Other interests have brought themselves together-much like the ranchers in Branson and the school district did-to find an outlet for their concerns.

8. Stability

A dynamic network is defined as being stable if the rate of change in its nodes and links, or its topology, either diminishes as time passes or is bounded by oscillations within finite limits (Lewis 2008). The Piñon Canyon Model as built is indeed a dynamic network. As each experiment progresses over time, any influence each agent does not keep for itself is divided evenly among its out-link-neighbors, until it reaches a point of equilibrium.

Multiple experiments can be run in NetLogo. This is done under the BehaviorSpace command. BehaviorSpace is an integrated command within NetLogo that allows parameter sweeping (Wilensky, 1999). According to Kim, Reuther, and Kepne (2011), "Parameter sweep applications are a class of application in which the same code is run multiple times using unique sets of input parameter values. This includes varying one parameter over a range of values or varying multiple parameters over a large multidimensional space."

With the BehaviorSpace model run many times, the model's results can be systematically recorded based on changing variables in each model run. Exploring the model's "space" of possible behaviors to determine which agents benefit over time demonstrates the stability of the model. At this point, it becomes necessary to run a stability experiment.

The experiment was run with the following variables: diffusion rate of 12, where diffusion rate is the speed at which influence passes from one agent to another. On a scale of 1-100, 12 was chosen based on the tendency of bureaucratic networks to be slower than social or business networks.

The increments for diffusion were chosen to be based on factors of 12 (12, 24, 35, 48) instead of ten as the duodecimal system (place-value notation radix-12 or base-12). In number theory, the number 12 is the smallest number with six factors (1, 2, 3, 4, and 6). It is also the smallest to include as factors all first four numbers (1, 2, 3, and 4). Twelve is a more functional number than 10 as 10's divisibility factors (1, 2 and 5) are three against 12's five. The use of 12 also allows a maximum diffusion rate of 48, instead of the ten-based 50, allowing the agent to diffuse less than half of its power at any given time.

At any diffusion rate in the Piñon Canyon model, the model would stabilize at the same equilibrium point, just at different times. This variable allows the researcher to control the speed as a whole. Netlogo allows the incorporation of each agent to vary the flow, though it was decided that for purposes of simplicity, the rate would apply to the model as a whole.

The leap from model architecture to ethnographic understanding is tricky. The research is not designed to measure influence but to search for functions to observe behavior. The various ways the numbers influence each other can be measured.

With the BehaviorSpace function running the model many times, the results of each mode can be recorded to give an idea of how influence changes based on the number of agents interacting with each other. This can be measured by the "Linkchance" variable. Link-chance introduces a number of random links into the model that can produce "what-if" scenarios. Measuring for link chances of 0, 1%, 12%, 24%, 36% and 48% the possibility of intergovernmental collaboration increases exponentially among actors with the results influenced by interactions among actors and then by interactions with each other. The model exhibited the following behaviors over 365 days with a diffusion rate of 12:

ARMY

Branson SD



Average Value Rate 365 Days

Figure 6	-6 Validation Run of
mean	6.356092962
max	6.980004327
min	5.324340646
final	6.980004327
"link-ch	ance" 0%



"link-ch	ance" 0%
final	2.17760508
min	1.965220681
max	2.646314758
mean	2.365987819
of the Model	

The above model was run 10times with the variables locked to validate that each result was exactly the same. The test run was successful. Both the Army and Branson had initial spikes-the Army down/Branson up-but overall each gained value as the model approaches equilibrium.

While it is obvious that a gain in value for both agents indicates that both agents are gaining influence from other actors, it isn't obvious where they are gaining influence from. This is where the visual aspects of network models hold value in that one can see how other agents diminish-and who they are-as opposed to just numbers changing on a chart. Now it becomes important to add a random variable of unknown connections and observe how the agents influence changes when compared against each other.

ARMY

Branson SD



Average Value Rate 365 Days "link-chance" 1%



Running the mode-Branson/Army agents-100 times against each other at 1%:

average	final	6.595400166	average f	final	2.395219016
average	min	5.104910304	average m	nin	1.925788528
average	max	6.959822285	average m	nax	2.778724807
average	mean	6.09717826	average n	nean	2.512676755





An initial final average value difference of 4.802399247 (6.980004327-2.17760508) is now 4.20018115 (6.595400166-2.395219016) a slightly increased gap with Branson and the Army each losing a small amount of influence.







Average Value Rate 365 Days "link-chance" 12%



Running the mode-Branson/Army agents-100 times against each other at 12%:

average	final	4.320538784	average f	final	2.821044401
average	min	4.018675952	average m	nin	1.879741346
average	max	6.160135232	average m	nax	2.926627664
average	mean	4.395209735	average m	nean	2.760869315



Figure 6-8 Run of the Model/Final Value 100 Runs at 12%

The gap between the Army and Branson has now shrunk to 1.499494383. At only a 12% random link chance, the two governments have quickly erased the 1% spread of 4.20018115. As the two sides enter a more fluid environment the need to build relationships and collaborative agreements becomes more obvious.







Average Value Rate 365 Days "link-chance" 24%

Average Value Rate 365 Days "link-chance" 24%

Running the mode-Branson/Army agents-100 times against each other at 24%:

average	final	3.427766208	average	final	2.833707736
average	min	3.334069844	average	min	1.864635456
average	max	6.042496291	average	max	2.875060654
average	mean	3.560152226	average	mean	2.751718004



Figure 6-9 Run of the Model/Final Value 100 Runs at 24%

At a 24% random link chance, the Army and Ranchers are now very close at 0.594058472 difference (3.427766208-2.833707736). The question to ask in such a design is if a 24% random-link chance is an actual possibility or a valid measurement. These questions will be addressed later.







Average Value Rate 365 Days "link-chance" 36%

Average Value Rate 365 Days "link-chance" 36%

Running the mode-Branson/Army agents-100 times against each other at 36%:

average	final	3.
average	min	3.
average	max	6.
average	mean	З.

.053024184	average	f
.029661114	average	m
.002187721	average	ma
.183045341	average	me

inal	2.804430165
in	1.862207404
ax	2.855539701
ean	2.738689699



Figure 6-10 Run of the Model/Final Value 100 Runs at 36%







Average Value Rate 365 Days "link-chance" 48%

Average Value Rate 365 Days "link-chance" 48 %

Running the mode-Branson/Army agents-100 times against each other at 48%:

average	final	2.805694553	average	final	2.766188507
average	min	2.782620229	average	min	1.836314311
average	max	6.018000287	average	max	2.840906351
average	mean	2.927877026	average	mean	2.714854857



Figure 6-11 Run of the Model/Final Value 100 Runs at 48%

As expected, as an increased number of random connections are introduced into the model, the influence of the two actors approaches each other in value. The model shows that over a period of 365 days, the model is very active for around 120 days and then stabilizes. This exposes a obvious problem of the model. Because the Branson School District gains influence while the Office of the Secretary of the Army for Installations and Environment loses influence as random connections are introduced, this calls into question the variable of time.



Figure 6-12 Running Behavior Space

After running the model for a test of 365 days, the following values are observed. (See Appendix)



Figure 6-13 Each agent Value after 365 runs

The data observed indicate that Agents 11, 8, 7, 10, and 32 have the greatest influence. These agents are: Fort Carson, Colorado Springs, Colorado Springs Chamber, Assistant Secretary of the Army, and Las Animas County. Pueblo County appears to have less influence however it is important to note that it has 11 connections, only 3 less than agents 11, 8, and 7 combined.

The Problem

Based on the data gathered, the values and the relationships were researched in 2010 and 2011. The model was run for 365 days. When did the 365 days start? Obviously this network did not start in 2010 or 2011 but at some previous point the network probably goes back four or five years. It also assumes that the stakeholders jumped in the pool at the same time, which is also unrealistic. By the time the research on this paper started the controversy was well under way. At first glance this model is a condensed historical analysis and most likely an inaccurate analysis time-wise-at least from a bureaucratic perspective.

A second problem is determining what the numbers mean. There are shared interests at play and networks are not simple "us versus them" pictures. While both bureaucracies' strength acted as suspected, the variable of Branson being local to the issue and the Pentagon being distant is a hard characteristic to judge.

This does not make the model useless. On the contrary, it becomes a living tool to simulate how influences change as bureaucracies change. Once an administrator is aware of where the agents are, one can gauge or forecast changes in influence, behavior and relationships before they happen. It also allows the administrator to study where alliances need to be formed in order to further a cause or agenda.

Attributes of a Network and NetLogo Summary

In determining whether the Piñon Canyon Model is a valid network, it is necessary to evaluate the model on accepted standards of networks. The simplest reflection would be against the following:

- (1) They consist of nodes connected by links.
- (2) Nodes exchange resources across the links.

(3) Nodes only interact through direct linkage. (National Research Council, 2005)

The Piñon Canyon model indeed satisfies the requirements. Each agent is a node, resources are exchanged across links in the form of influence, and the nodes only interact through direct linkage or as random links are introduced. The National Research Council goes on to describe the attributes of a network as:

•Connectivity. A network has a well-defined connection topology in which each discrete entity ("node" in graphtheoretic terminology) has a finite number of defined connections ("links") to other nodes. In general, these links are dynamic.

•Exchange. The connection topology exists in order to exchange one or more classes of resource among nodes. Indeed, a link between two nodes exists if and only if resources of significance to the network domain can be directly exchanged between them.

•Locality. The exchanged resource is delivered, and its effects take place, only in local interactions (node to link, link to node). This locality of interaction entails autonomous agents acting on a locally available state (National Research Council, 2005).

Utilizing a more defined requirement, again, the Piñon Canyon model meets the three attributes of connectivity, exchange, and locality.

To summarize the Piñon Canyon Model itself and for the NetLogo software procedures, the format offered by Wilensky (2008) will be followed:

WHAT IS IT?

This Piñon Canyon model demonstrates diffusion of influence through a directed small world network. The influence moves between nodes in the network along established, directed links between two nodes obtained by research in 2010 and 2011 from interviews and secondary research collected in Colorado and Washington D.C.

The rules that drive this diffusion of influence between agents are meant to represent activity and patterns related to the topology, density, and stability of the network as well as the small world phenomenon at play (Stonedahl and Wilensky, 2008and Watts and Strogatz, 1998).

HOW IT WORKS

In each tick, each node shares some percentage (defined by the DIFFUSION-RATE slider) of its "value" quantity with its neighbors in the network (Stonedahl and Wilensky, 2008). In addition, the model measures two components:

Power Military: Calculated by finding the on-going quantity
of the designated military agent; this shows, on average,
the agent's strength of influence in the network.
Power Agriculture: Calculated by finding the on-going
quantity of the designated agriculture agent; this shows,
on average, the agent's strength of influence in the
network.

The amount of value is divided equally and sent along each of the outgoing links to each other designated node. The model as a directed network also notes value given back and forth (covalence), through which means the stronger bonds are highlighted.

The size of each node shows how much "value" that node has, where the area of the node is proportional to its value. The brightness of a link represents how much value just flowed through that edge (Stonedahl and Wilensky, 2008).

HOW TO USE IT

You may select the speed on the speed slider on top in the gray section. It is recommended to start on "normal speed" for initial observation and then slow the model down on subsequent runs. There are two methods to use this model.

(METHOD 1) Select Grid Size 3; number of nodes 15; diffusion rate 12; link-chance 0, which should be the default. Create the network by selecting the following buttons in order: Set-up/Select Shape/Order Turtles/Benz. This will produce the network. Select the 2010-2011 Network button, and hit Go.

(METHOD 2) Select Grid Size 3; Number of nodes 15; diffusion rate 12; link-chance 0, which should be the default. Create the network by selecting the following buttons in order: Set-up/Select Shape/Order Turtles/Benz. This will produce the network. Hit Go and select the Individual Network button and observe the network as it is built.

The REWIRE-A-LINK button causes one link to disappear, and a new one to appear elsewhere in the grid. The KEEP-REWIRING button causes a continual rewiring of links to occur.

The histogram displays the number of nodes whose values fall into certain ranges to view the distribution of influence among the total nodes.

THINGS TO NOTICE

As time passes, the network tends toward an equilibrium state (Stonedahl and Wilensky, 2008).
THINGS TO TRY

By running the model in Method 2, it is possible to build a network based on several scenarios and introduce actors at various time to see how the model changes. It is also easy to change the links between actors, erase links between actors, or add new links between actors.

EXTENDING THE MODEL

This model can be adapted to a number of scenarios and situations where intergovernmental issues arise and are in conflict. The extent to which relationships matter or are irrelevant is easy to spot in this model.

NETLOGO FEATURES

This model uses NetLogo's DIFFUSE command, which causes all patches to share with their links portions of the value running through them. The ability to control variables is available in the command center.

CHAPTER 7 CONCLUSION AND FINDINGS

SETTLING DIFFERENCES

"It is common sense to take a method and try it: If it fails, admit it frankly and try another. But above all, try something."

Franklin D. Roosevelt Address at Oglethorpe University, May 22, 1932

Overview of findings

The objective of the dissertation was to examine the application of alternative methods of analysis in an intergovernmental problem that is complex, and polarized. Using narrative and network analyses, this dissertation told a story, drew a picture, and then animated the picture to enhance readers' understanding of the intergovernmental relationships surrounding the Army's proposed expansion of its Piñon Canyon Maneuver Site in Southeastern Colorado. The dissertation examined the issue within the context and lens of narrative analysis and social network analysis to see which side of the argument is supported by the bureaucracies involved. After the analysis, the next step was to "build a model, to simulate the dynamics in order to better understand the complexity of the system" (Liao, T. as quoted in Gilbert, 2008). Central to my goal was to explain how the government agents within the Piñon Canyon network are linked, where influence resides, and how power is exchanged from agent to agent.

As stated in the opening, "In light of Roe's (1994) assertion that traditional analytical methods are failing us in situations like Piñon Canyon, I wanted to examine whether new methods could be used to study these intergovernmental relationships and their influence on resulting public policy." That led me to formulate the following three hypotheses, which would allow me to look at the application of more suitable methods for addressing complex problems:

1) Small World Networks have value in identifying centers of influence and their potential actors in the pro/con intergovernmental issues surrounding Piñon Canyon encroachment.

2) Network theory application may be a more suitable method of discerning whether there can be mutually agreeable and successful models for collaboration or.

3) Applying Small World Networks to Piñon Canyon results in better understanding of the patterns of potential cooperation and conflict, and where they exist.

The results of the Multi-method analysis undertaken as part of this dissertation affirm the above hypotheses and therefore, provide support for the use of alternative methods in the application of intergovernmental problems.

The Piñon Canyon case is significant for several reasons. The research supports the claim that social network frameworks and methods can be applied to bureaucracies. The case study, as presented, supports the claim that significant value can be found in the application, theory and methods using agent based models. There should be a great deal of opportunity for future research into the social network analysis of bureaucracies and agent based modeling.

There are significant challenges to this process and the use of these methodologies pose hurdles in their proper use. Additional research into the more intricate behavior of networks needs to be conducted, understood, and taught. While the process may seem complicated to the novice, the methods are quickly learned.

The guiding questions of the analysis were designed to lead up to the hypotheses and relate to the multi-methodology approach. Using Narrative Analysis, Social Network Analysis and Agent Based Modeling helped keep the construct of the problem in place. The issue is in a limited universe networked between Southern Colorado, Pueblo, Colorado Springs, Denver and Washington D.C., and replicated with much different cases nationwide. The value of the analysis in utilizing this methodology is in how it frames the problem as a story, compares and explains the environment and then draws the picture. Reviewing each of the guiding questions:

- Can Network Theory/Network Science be applied to the study of Intergovernmental Relationships?
- 2) Can Network Science be applied to "close the gap" between competing interests in the Intergovernmental arena?
- 3) What does a network between competing governments look like?
- 4) How can the network theories of "Connectivity, Exchange, and Locality" be applied to a Public Administration problem?

It is clear Network Theory/Network Science can be applied to studying stakeholder relationships in the intergovernmental arena and as a valuable tool for determining where gaps among competing interests might be closed. The appearance of networks between competing governments is limited to the researcher's creativity; of the three guiding questions, this has the least clear answer.

Finally, the network theories of "Connectivity, Exchange, and Locality" were addressed in terms of network attributes. The network model contains a well-defined connection topology in which each node has a finite number of defined links to other nodes for connectivity. The model has a topology that exists in order to exchange one or more classes of resources among nodes and satisfies the exchange requirement. The locality requirement is satisfied by node-to-link, link-to-node interaction.

The research shows strong evidence of the feasibility of applying network science to public problems utilizing concepts drawn from social network theory that, in turn, construct working models as a valid and reliable methodology. To explore the utility of the modeling, the analysis pursued three sets of hypotheses-the first focused on identity, the second on application, and the third on topology.

Literature Review

The literature on the Piñon Canyon Maneuver Site Expansion used in this case study focused on two areas:

 Network theory and science as it relates to bureaucracies (Foundational Literature),

and

2) Piñon Canyon as a stand-alone political issue (Subject Matter Literature).

In collecting my literature, I consulted overarching theoretical experts like Agranoff, Barabasi, Goldsmith and Eggers, Strogatz and Milgram. I also dug into current scholars and subject matter experts such as Doe, Gilbert, Knoke and Yang.

Major points noted in the foundational literature include: Network Science can be used across types to include bureaucracies; collaborative public management is an evolving strategy; streetlevel bureaucrats can drive networks; and, there are direct paths between and through agents.

Under network theory and especially in the areas of intergovernmental relations and government by network, there was strong evidence to support the second hypothesis. There has been extensive research into the expansion of network theory into bureaucracies and its utility in finding centers of collaboration and compromise. The idea of applying small worlds to bureaucracies is less pronounced in the literature though the purpose of this research was to study these exact phenomena. The third hypothesis was supported by the literature in a tangential manner in that the published research on both networks and patterns exist but connecting the two to a public administration problem was not as strong as the second hypothesis. From the foundational literature, I processed a lot about the evolving nature of collaboration and how it relates to network strategy. The subject matter literature aided me in understanding the idiosyncrasies of the agents and the historical themes supporting Piñon Canyon as a stand-alone issue. Significant anthropological and natural resource writings dominate the literature, while the history of the proposed expansion is unwritten outside of government reports.

Researching Piñon Canyon as a standalone political issue served to generate insight to the narrative analysis surrounding the competing interests and connections within the bureaucratic complex. Using a literature review to support a narrative analysis was critical in understanding the idiosyncrasies of the groups. In order to build a network, a greater understanding of the issues at play between the actors as well as the importance of Network Science was necessary to understand the environment. Without understanding the environment and the narrative, it is much harder to locate the patterns of potential cooperation and conflict and where the patterns exist. Whether there can be mutually agreeable and successful models for collaboration or compromise is critical to understanding the issue in the first place. The subject matter literature helped gain an excellent grasp of relevant historical themes and government documents.

Aids in understanding of the idiosyncrasies of the agentsHistorical themes support Piñon Canyon as a stand aloneissue

•Significant anthropological and natural resource literature dominates

•History of the proposed expansion is unwritten outside of government reports

The application of the literature review to the hypotheses strengthens the overall study. The literature from newspapers and as documented in archival records clearly supported Piñon Canyon as a stand-alone political issue, especially with respect to the first hypothesis of identifying tipping points in the pro/con intergovernmental issues of Piñon Canyon and encroachment. The second hypothesis surrounding the ability to leverage one side of a policy debate and whether there can be mutually agreeable and successful models for collaboration or compromise, has strong evidence but has not been proven. The third hypothesis was supported by the literature review by providing a better understanding of the patterns of potential cooperation and conflict and where they exist.

Narrative Analysis

The Narrative Analysis was conducted in order to understand the problem through interviews, journalistic history and physical artifacts. Results from the Narrative Analysis followed a similar pattern to those of the Literature Review. The first hypothesis of identifying tipping points in the pro/con intergovernmental issues of Piñon Canyon and encroachment was strongly supported by the collection of stories. The second hypothesis surrounding the ability to leverage one side of a policy debate and whether there can be mutually agreeable and successful models for collaboration or compromise again had strong supporting evidence but has not

been proven. The third hypothesis of providing a better understanding of the patterns of potential cooperation and conflict and where they exist was clearly supported by the Narrative Analysis, as it was by the Literature Review.

Stories are the narrative tales. In this case, the Army started this controversy and therefore, they own the master narrative. Stories have a beginning, a middle, and an end. The Army's story begins with its need to transform its forces post-Vietnam and again after the Cold War, which evolved to an encroachment problem, and ends with the expansion problem.

The counter-story is set forth by the organization Not One More Acre. The group's counter-story is that the Defense Department, already a large landowner, does not need to expand.

The organization Piñon Canyon Expansion Opposition Coalition employs a series of non-stories that do not directly counter the Army's master narrative, but which instead evoke the value of agriculture, ranchers' historic ties to the land, and threats to the environment. Another non-story is the potential loss of property tax revenues to local school districts. Nonstories are circular in nature and have no beginning, middle or end. The Coalition's non-stories have proven effective in derailing the Army's master narrative and taking the service off message.

Bureaucratic critiques, sometimes cast in a story format, are similar to non-stories, in that they do not address the master narrative, but merely critique it. Examples include GAO

reports and protests by both Otero and Las Animas Counties that the Army has not justified the expansion.

Social Analysis

Utilizing participant information and the observation of network science, the study applied the Piñon Canyon issues to three network models. All three models demonstrated strong evidence to support all three hypotheses. Because of the limitations of the models used and difficulty to map the collected research to an appropriate model, none of the hypotheses were proven or disproven. The research simply showed that an intergovernmental controversy does not fit a simple small world network, diffusion along a directed network, or preferential attachment model though the diffusion network came the closest.

Agent Based Model

Building an Agent Based Model on participating direct observations of this model strongly supported all three hypotheses. The Piñon Canyon model demonstrated very strong evidence in identifying tipping points and went beyond in the identification of centers of influence. The indications were strong that a public administrator could research an issue to leverage a debate by collaborating with other entities in the network. Unfortunately, mutually agreeable and successful models for collaboration or compromise are difficult to prove due to the fluidity of the issue. The evidence was strong in that application of Small World Networks to Piñon Canyon, especially

when combined with diffusion along a directed network, resulted in better understanding of the patterns of potential cooperation and conflict and where they exist. While more properties of a diffused network were applied, the concept of a small world is still at play.

Application of General Chemistry

Repeatedly during the course of the research parallels between general chemistry principles and network science appeared. The most enlightening aspect of this research was not in seeking a new methodology to apply to an issue but how nearly every step in building a network correlated to the behavior of protons, neutrons, and electrons. While trying to understand the inner workings of networks the concept of valence and covalence kept reemerging. Valence is a measure of the number of bonds formed by an atom of a given element and covalence is the sharing of pairs of electrons between atoms or, in this case, between agents sharing links. A bureaucracy sharing agents in a network may be as common as their ability to share links. This is a concept that warrants further research.

Centrality and Centers of Influence

The concept of "centers of influence" was clear and obvious from the very beginning. It is interesting to see in the literature and interviews for the narrative that the concept of centers of influence was not thoroughly thought through, or even taken into consideration, by several actors. While many bureaucrats and administrators understood the need and necessity

to collaborate and cooperate, they engaged in the behavior as targets of opportunity presented themselves, rather than as part of a strategy. This was probably one of the most surprising aspects of the research findings.

Findings/What Happened Inter-governmentally?

The analyses demonstrated the real world position of Branson in the network and showed that Branson School District, as a small government, does not alone have the power to stop the Army. The study also showed that the Army remains powerful and continues to be the dominant actor in the intergovernmental arena. This finding does not dismiss or diminish the influence of the Branson School District. Because the ranchers were able to enlist not only the support but the advocacy of smaller governments, they are able to mount an impressive offense against the Army. The strategy of the ranchers, whether intended or not, is evolving to a coalition of governments that can eventually wear down, stop or possibly (though unlikely) remove the Army from Southern Colorado.

The collaboration between the ranchers and several small governments, like the Branson School District, provided an increase of power in the bureaucratic struggle against the Army. This allowed small coalitions to move vertically and horizontally through the bureaucratic maze in order to broker coalitions. Because Fort Carson and the concentration of power in Colorado Springs have strong historical ties, the Army did not engage much outside of El Paso County.

In addition, the State of Colorado is in a difficult situation that leaves it stuck between a consolidated massive political and bureaucratic machine in El Paso County and a much smaller, well-networked machine across a massive portion of the state. The analysis demonstrated that the state has not taken the initiative or an active role on behalf of either side unless it was mission essential to a particular agency.

My analyses also indicated Pueblo City and County are the likely tipping points in the bureaucratic arena. The evidence of this was demonstrated not only in the Narrative Analysis but in the behavior of the bureaucracies/their relationships and the ability-especially Pueblo County-to be well networked and tied closely together as a City-County entity.

While the intergovernmental networks didn't behave like traditional social networks when applied to models they did tie to their self-interests to relationships similar to social units. Their social structures were determined by such interactions and the ties that measured the convergence of the various actors in the network. Pueblo County's relationships were characteristic of social networks in that the smaller governments tied themselves to the larger center of influence. The intergovernmental relationships demonstrated explain some of the intergovernmental phenomena as a social phenomena.

Research Challenges

Lynne Hamill, a Visiting Fellow at University of Surrey in

Guildford, United Kingdom wrote in the Journal of Artificial Societies and Social Simulation that she was "faced with basic questions to which there appeared to be no obvious answers and no guidance" in terms of Agent Based Modeling and that "guidance and standard practices" should be developed (Hamill, 2008). The problem with validity is clear. Hamill's focus on:

- 1) How many agents?
- 2) How many runs?
- 3) How to aggregate results?
- 4) What statistics to use?

was important to consider in order to accept some form of best practices and address the use of proper statistical techniques.

The first question as to the number of agents was addressed in Chapter 3 by limiting the model to bureaucracies and addressing the selection via the products of the classificationcalled types (Szostak, 2004). Utilizing the typology theory (5W Who, What, Why, Where, When) to identify agents simplified the process. By the additional step of eliminating duplicate agents and "acting non-actors" a number of agents was selected that satisfied both the model and narrative.

The second question pertaining to the number of runs was overcome by knowing that the model did not have random variables initiated as a necessity. The random variable for link-chance and introduction of other scenarios was built in as an additional tool to forecast unforeseen events.

The process to aggregate results is up to the user. The purpose of building the model was to give an administrator a starting point. This problem goes hand in hand with the model becoming a historical analysis explained in Chapter 6. Understanding that either the model is built to the narrativethat is, as events happen-or built to understand where the actors are, and to enabling experimentation with possible future scenarios, is the most helpful utility. Aggregating the results would be similar to trying to aggregate an individual because a network represents a living entity.

In Conclusion

The Piñon Canyon Case Study was subjected to several types of analysis, ranging from the traditional narrative policy analysis through an agent-based network analysis using a model adapted by the author via NetLogo. This multi-stage analysis yielded the following intergovernmental findings.

The U.S. Army remains a dominant intergovernmental player in the Piñon Canyon developments. Its place in the overall Colorado intergovernmental structure at both the State and Local government insures that its actions; both positive and negative will affect the intergovernmental conflict and cooperation in the area.

A variety of local government entities, especially the Branson School District, have proven adept at slowing if not stifling the Army's proposed expansion at Piñon Canyon at least for the moment. They have been successful by building coalitions with a variety of other locally interested parties. This finding certainly stresses the importance of intergovernmental coalition building in the resolution of intergovernmental issues.

Finally, the network analysis employed here suggests that as the Piñon Canyon controversy further develops there are intergovernmental actors such as Pueblo County and the Colorado Land Board that are "tipping point" actors in this contest. They are actors, while leaning in one direction or another, who have not made their interest clear to date, but when they do so, their influence could move the Piñon Canyon debate in one direction or another.

The statistics used in the Piñon Canyon model were traditional for the quantitative needs of the research. While network science as a methodology is more a mathematical process, the purpose of this research was a hybrid of the utility of tools and a case study. The value of this research is the use of underused analytical tools to address real world problems.

Additional suggestions for further research include: the study of "networks of networks" or how does the bureaucratic network interact with the business network, political/civic network, press, etc.; the impact of power and its assignment; the research challenges involved in network research and finally, the dynamics of centrality within intergovernmental relationships.

Yet, the key contribution of this dissertation has been to go beyond the Narrative Policy Analysis that has been traditionally used in case study analyses of intergovernmental conflict or cooperation. The Agent Based Network Analysis employed in this dissertation can help future researchers bring

to bear a richer and more productive analysis of intergovernmental issues.

As intergovernmental structures and issues become more complex, it is essential that we use more advanced methodological tools to understand such complexity. It is this author's contention that the Agent Based Modeling analysis tool employed in this dissertation will help future public administration researchers better understand some of the pressing and dynamic issues of the 21st century.

AFTERWORD-A DANGEROUS GAME

"...bear meat would help them get used to the weather. Even if it didn't, a bearskin might come in handy."

"Yes, and them darn bears probably think a little man meat would come in handy."

-Soupy's observation to Po Campo wintering in Montana Larry McMurty's Lonesome Dove

Having analyzed the issues surrounding Piñon Canyon from a scholarly standpoint, I now offer some personal commentary on the current status of the proposed expansion.

The November 30, 2011 edition of the *Pueblo Chieftain* reported that Colorado Governor John Hickenlooper was lobbying Army Secretary John McHugh to find an alternate use for a state prison facility slated for closure. Located near the town of Las Animas, the Fort Lyon prison had previously housed a VA clinic and before that, a naval sanatorium. Closure of the facility means the loss of 200 jobs in an area where well-paying jobs are hard to come by. The governor was quoted as saying:

I told Secretary McHugh that if the Army ever hopes to make more use of the Piñon Canyon (Maneuver Site) in the future, that helping to solve the economic problem of keeping Fort Lyon open would be a major step forward.

In other words, the Army could improve its image in Southeastern Colorado—and perhaps move the Piñon Canyon football down the field—by saving the jobs at Fort Lyon. Or, read more menacingly, the Army should not expect movement on Piñon Canyon unless it is willing to help keep the residents of Las Animas employed. The governor's gambit will most likely be interpreted by the Pentagon as a form of "payola" or "pay to play".

In January 2012, Secretary of Defense Leon Panetta announced dramatic reductions in DOD forces and facilities, with the Army expected to take the brunt of the cuts (http://usnews.msnbc.msn.com/_news/2012/01/26/10244240-panetta-military-cuts-to-hit-all-50-states). Because the Army is being forced to substantially reduce end-strength, units at Fort Carson may now be at risk for disestablishment or relocation.

Prior to Hickenlooper's and Panetta's announcements, the Army had already grown concerned that opposition groups were switching their tactics from simply blocking the expansion of Piñon Canyon to preventing use of even the existing acreage at the site. In light of activists pursuing this more aggressive goal, it is possible the service will conclude its days at PCMS are numbered and it would be better to throw in the towel in Colorado and draw down the force structure at Fort Carson.

There are several examples of cautionary tales for Coloradans to consider, from Fort Ord, California to Naval Weapons Station in Earle, New Jersey. A 1989 tax debate involving Colts Neck and Tinton Falls Township surrounding the education of Navy dependents continues to this day while base missions are BRAC'ed or quietly moved elsewhere. Fort Ord with contaminated groundwater, soil, solid waste is years from clean-up after hundreds of millions of dollars spent since closing in 1994.

Some in Southern Colorado feel they wouldn't lose much with the Army's departure from Piñon Canyon. Jim Herrell of the opposition group Not One More Acre is one of them. "I don't think the military has bought two candy bars and a tank of gas in La Junta since the 1980's," he said recently (Prendergast, 2011). But the military is Colorado's second-largest employer, and the Army's presence-or lack thereof-has impacts far beyond La Junta and Otero County.

Despite this, my research indicated that many components of state government are AWOL from the Piñon Canyon debate. I think this is a mistake and that the state can and should take a more active role in resolving the issues.

Both Agriculture and the Military are important to Colorado. If either side were to win outright—The Army controlling millions of acres or the Army leaving—the consequences would ultimately devastate the economic health of the state. My research also indicated that interests in the City of Pueblo and Pueblo County could be key to bringing opposing stakeholders together.

Agriculture and the military are vital to national security, and I would argue both sectors are vital to Colorado's future prosperity. I spent part of my teenage experience working on ranches to earn money. I remember the hard work herding cattle and can still name each of the three different horses I was thrown from. I am a Combat veteran like all three of my brothers, my father, grandfather, and great grandfather. All of us are veterans of America's wars of the 20th century, came back alive, a testament to both our rural upbringing and military training.

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Appendix A: Informational Interviews Summary

Introduction

Stakeholder and Subject Matter Expert interviews were conducted as part of the analysis collection techniques to develop the model. The purpose of the stakeholder interviews was to assess the collaboration and networking awareness of stakeholders and to collect information on key issues, current activities between bureaucracies related to Piñon Canyon issue. The research conducted 23 interviews with a variety of stakeholders and subject matter experts. Two interviews were in progress when the subjects withdrew. An additional interviewee accepted then pulled out. These interviews, while providing a great deal of information were struck from the research and are not part of this study. The stakeholders were selected based on their knowledge of the Piñon Canyon issue and the complex divisions among the competing bureaucracies.

Methods

Permission was obtained to implement the stakeholder interviews from the Institutional Review Board (IRB) at the University of Baltimore (UB). Upon completion of the completing the IRB certification process, a draft stakeholder interview script and set of the informational interview questions was developed. The purpose of the research is not to determine the strength or weakness regarding either side of the argument but to help understand how the bureaucracies work with or against each other. By designing a broad interview process, a model can be built to show how each interacts over a period of time.

The interview questions focused on the following:

1) What are the primary strengths and weaknesses of the expansion argument? What level of government (Fed/state/county/municipal) carries the most influence in determining an outcome? 2) Who (government entity or agency) most closely understands the immediate needs of your point of view regarding PCMS? 3) Who has the most influence? The least? 4) Which elected officials from all levels of government do you feel most support your point of view? 5) How does that support manifest itself? 6) Where do you see this issue, five years from now? 7) In your opinion, what are the relationships like among the various levels of government? (Are they cooperative? Hostile? Distant? Close?) 8) How do the political decisions that affect you at the following levels influence your support? 9) How do you perceive the federal government in relationship to other governments involved? (United? Split? Unknown?) 10) How do you perceive the state government in relationship to other governments involved? (United? Split? Unknown?) 11) How do you perceive the county government in relationship to other governments involved? (United? Split? Unknown?)

Las Animas / Otero / Pueblo / El Paso 12) How do you perceive the city government in relationship to other governments involved? (United? Split? Unknown?) Trinidad / La Junta / Pueblo / Colorado Springs

The Stakeholder interviews were conducted over the phone and in person. After initial contact with each agency the list was narrowed to ensure that the subject stakeholder was an expert from their agency.

This process of ensuring the list was refined helped the keep the scope of the research fixed on the relevant bureaucracies.

Stakeholder Interview Process

	INTERVIEW	LOCATION	METHOD
SIAREHOLDER	DAIE	LOCATION	MEIHOD
City of Trinidad	5/17/2011	Trinidad, CO	In Person
USDA-NRCA	5/17/2011	Trinidad, CO	In Person
USDA-USFS	8/31/2011	Washington D.C.	Phone
U.S. Army Fort Carson	5/18/2011	Fort Carson, CO	In Person
Not One More Acre	8/16/2011	Welcome, MD	Phone
Piñon Canyon Opposition Coalition	8/15/2011	Washington D.C.	Phone
Branson School District	5/14/2011	Welcome, MD	Phone
City of Pueblo	8/31/2011	Welcome, MD	Phone
Colorado Oil and Gas Conservation	0/22/2011	Washington D.C.	Dhone
Office of Colorado	0/22/2011	washington D.C.	Pilone
Department of Agriculture	5/16/2011	Denver, CO	In Person
Office of Colorado Board of Land Commissioners	5/16/2011	Denver, CO	In Person
Colorado Department of Wildlife	9/19/2011	Washington D.C.	Phone
Department of the Army	8/26/2011	Arlington, VA	In Person

The following Stakeholders were interviewed:
Once a stakeholder agreed to participate, subject was provided with a description of the project and basic interview script. This allowed each subject to prepare for the interview and allow areas that the subject could follow-up outside of the interviews.

Interview Content

Each interviewee answered each of the base questions. General followup to questions was conducted on each response. Interviewees were provided the opportunity to comment or emphasize issues that were important to their respective position.

Interview results

The following summarizes the major questions from the stakeholder interviews.

 What are the primary strengths and weaknesses of the expansion argument?
What level of government (Fed/state/county/municipal) carries the most influence in determining an outcome?

Nearly all of the respondents indicated the primary strengths of the expansion argument centered on the need for soldiers to train. The overwhelming theme regarding weakness focused on the Army's actual need for the land. The Federal Government was determined to be the primary influence on if the expansion happens though the term "Federal Government" usually referred to Congress.

2) Who (government entity or agency) most closely understands the immediate needs of your point of view regarding PCMS?

Not surprisingly, most of the stakeholders associated themselves with like bureaucracies; County to County or State to State. The one agency that was most outside of that model was the NRCS that associated themselves to the ranchers.

3) Who has the most influence? The least?

The Stakeholders provided a wide variety of the most influential stakeholder in the network. While the interviewees all acknowledged the initiative of a collection of small local groups the idea of collaboration was not indicated to be a clear strategy.

4) Which elected officials from all levels of government do you feel most support your point of view?

Nearly each interviewee could identify by name which politicians on the state and federal level were on which side of the argument. As the names of politicians locally were discussed the support of the elected officials became less clear between cities. 5) How does that support manifest itself?

Support for or against an issue was always manifested in public statements or support of legislation.

6) Where do you see this issue, five years from now?

The stakeholders at all levels were unanimous that this issue was not going away in five years and would probably change very little. The issue is beginning to morph from the ranchers that the military will still take over 400,000 or more acres while Army analysts feel that the activists will attempt to close the facility permanently.

7) In your opinion, what are the relationships like among the various levels of government? (Are they cooperative? Hostile? Distant? Close?)

Both extremes frame the relationship between federal and local (SE Colorado) as polite but hostile. The State Government was viewed as cooperative but distant by the local (SE Colorado) agencies. The State agencies viewed most relationships at all levels as tense but cooperative. The federal stakeholders were more likely to indicate that the State was not very active.

8) How do the political decisions that affect you at the following levels influence your support? (Local/ State/ Federal)

Each agency leaned towards decisions made at their respective level as the most influential. There was one notable exception that one of the opposition organizations indicated the federal government (Congress) was critical and a huge influence.

9) How do you perceive the federal government in relationship to other governments involved? (United? Split? Unknown?)

10) How do you perceive the state government in relationship to other governments involved? (United? Split? Unknown?)

These questions provided a lot of interest. Each stakeholder was able to identify the competing interests between Agriculture and the Military. While most understood the spilt interests in the various constituencies, most felt weary about the influence of the military and agricultural business interests getting involved and the ultimate shape the outcome-though there was indication on both sides that the introduction of this dynamic may have already come into play.

11) How do you perceive the county government in relationship to other governments involved? (United? Split? Unknown?) Las Animas / Otero / Pueblo / El Paso

12) How do you perceive the city government in relationship to other governments involved? (United? Split? Unknown?) Trinidad / La Junta / Pueblo / Colorado Springs Most of the respondents gravitated to Pueblo as the critical stakeholder in the governmental relationship network. It was described during multiple conversations that, "As Pueblo goes, so goes all of Southeast Colorado." Each of the respondents felt that Trinidad, La Junta and Colorado Springs were solidly united behind their respective constituencies.

Subject Matter Interviews

EXPERT CONSULTATION SOURCE	CONSULT DATE(S) or INTERVIEW	SOURCE LOCATION	EXPERTISE
Colorado State University	5/19/2011	Denver, CO	Natural Resources and Piñon Canyon history
Department of Defense	8/25/2011	Arlington, VA	Pentagon Network
Pueblo Chieftain	9/1/2011	Washington D.C.	Journalistic and Political Climate
University of Nebraska	5/2010 - 1/2012	Curtis, NE	Rural Affairs
US Army Officer (0-6/COL)	5/2010- 10/2011	Washington D.C.	Army Doctrine
Las Animas County Rancher	5/14/2010	Las Animas County, CO	Ranchers Networks
Office of the Lieutenant Governor of Colorado	5/19/2011	Denver, CO	Political Climate

The purpose of these interviews or consults was to obtain a better understanding of either technical or historical issues relating to the expansion. Some of the subjects were consulted over a long period while others were subject to a single interview.

SUMMARY OF FINDINGS

The Subject Matter Experts were highly valuable in filling in holes on the overall issue of Piñon Canyon. Understanding much of the historical and controversial framework provided by Colorado State University and the Pueblo Chieftain was critical to the Narrative Analysis.

Overall, there were no unusual revelations during the interviews. The findings were consistent with intergovernmental relationships between bureaucracies anywhere in the United States. The interviews were also

helpful in identifying critical stakeholders in the shadows of this controversy.

APPENDIX B IRB and Questionnaire

CONSENT TO PARTICIPATE IN RESEARCH

The Interests of Competing Government and Piñon Canyon, Colorado: A Case Study on Small World Networks and the encroachment issues relating to military land and agricultural land in Southeast Colorado as a consequence on intergovernmental relationships.

You are asked to participate in a research study conducted by Richard D. Mestas and faculty chair John J. Callahan, Ph.D. from the Department of Public Administration at The University of Baltimore in Baltimore, MD. This research is conducted as a dissertation in partial requirements of the Doctor of Public Administration Degree. Your participation in this study is entirely voluntary.

PURPOSE OF THE STUDY

The purpose of this dissertation is to develop a case study on Piñon Canyon Colorado, a military installation and its proposed expansion on surrounding agricultural lands, while applying the principles of Small World Networks to understand the dynamics of the intergovernmental issues at play.

PROCEDURES AND INTERVIEW QUESTIONS

If you volunteer to participate in this study, you will be asked to respond to the following questions based on a list of agencies provided:

1) What are the primary strengths and weaknesses of the expansion argument? What level of government (Fed/state/county/municipal) carries the most influence in determining an outcome?

- 2) Who (government entity or agency) most closely understands the immediate needs of your point of view regarding PCMS?
- 3) Who on the list has the most influence? The least?
- 4) Which elected officials from all levels of government do you feel most support your point of view?
- 5) How does that support manifest itself?
- 6) Where do you see this issue, five years from now?

7) In your opinion, what are the relationships like among the various levels of government? (Are they cooperative? Hostile? Distant? Close?)

8) How do the political decisions that affect you at the following levels influence your support?

9) How do you perceive the federal government in relationship to other governments involved? (United? Split? Unknown?)

10) How do you perceive the state government in relationship to other governments involved? (United? Split? Unknown?)

11) How do you perceive the county government in relationship to other governments involved? (United? Split? Unknown?)

- Las Animas
- Otero
- Pueblo
- El Paso

12) How do you perceive the city government in relationship to other governments involved? (United? Split? Unknown?) Trinidad

- La Junta
- Pueblo
- Colorado Springs

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will be disclosed only with your permission or as required by law. Confidentiality will be maintained upon request.

PARTICIPATION AND WITHDRAWAL

You can choose whether or not to be in this study. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you do not want to answer.

POTENTIAL RISKS AND DISCOMFORTS

There are no physical or emotional risks involved with this study.

POTENTIAL BENEFITS OF THE RESEARCH.

By advancing Network Science into the field of intergovernmental relationships, paths can be identified to follow the strength and stamina of political ideas. Utilizing Small World Networks the Public Administrator can better understand the power of public ideas and how they shift and morph.

IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about this research, please contact Dissertation Chair:

Dr. John Callahan Executive in Residence, School of Public Affairs The University of Baltimore 1420 N. Charles St. Baltimore, MD 21201

Office Number: LAP 410 Phone Number: 410-837-6174, on-campus 6174 Email: jcallahan@ubalt.edu

RIGHTS OF RESEARCH SUBJECTS

The University of Baltimore Institutional Review Board has reviewed my request to conduct this project. The University of Baltimore has established the Institutional Review Board (IRB) in compliance with federal regulations governing research involving human subjects funded by the US government. All research involving human subjects conducted by faculty, staff or students at the University must comply with the federal regulations set forth in 45 CFR 46. If you have any concerns about your rights in this study, please contact the Thomas Mitchell, Chair Institutional Review Board, at the Office Sponsored Research, Office of the Provost at the University of Baltimore at: 410.837.5348

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

Printed Name of Subject

Signature of Subject

Date

Signature of Witness

Date

Approved by the University of Baltimore Institutional Review Board (IRB) on July 8, 2010.

Appendix C Land Maps



Central Shortgrass Prairie Ecoregional Assessment Final Report November 2006 page 8 Available at: http://www.cnhp.colostate.edu/download/documents/2006/CSP_F inal_Report_2006.pdf



SE Colorado Land Cover

Source: Colorado Department of Natural Resources, Water Supply and Needs Report for the Arkansas Basin, June 2006 Available at: http://cwcb.state.co.us/watermanagement/basinroundtables/documents/arkansas/arkbasinwatersupplyneeds.pdf





Timeline of important management, environmental and training events at U.S. Army Piñon Canyon Maneuver Site, 1980-2008.

Map from the LaJunta Tribune Democrat courtesy PCEOC Available at: http://www.pinoncanyon.com/images/ljtd_enhncd_map.jpg



Appendix D

- Model Validation Army 10
- Model Validation Branson 30
- Model Behavior Space 265 Runs

ehaviorSpace results (NetLogo 4.1.3)									
3-12-12 Pinon Canyo	n Final II.nlogo								
Army									
03/12/2012 10:44:08	3:753 -0400								
nin-pxcor max-pxcor		min-pycor	max-pycor						
-11	11	-11	11						
[run number]	1	2	3	4	5				
link-chance	0	0	0	0	0				
diffusion-rate	12	12	12	12	12				
number-of-nodes	15	15	15	15	15				
grid-size	3	3	3	3	3				
[reporter]	[val] of turtle 10								
[final]	8.172026119	8.172026119	8.172026119	8.172026119	8.172026119				
[min]	5.194759569	5.194759569	5.194759569	5.194759569	5.194759569				
[max]	8.172026119	8.172026119	8.172026119	8.172026119	8.172026119				
[mean]	7.113161384	7.113161384	7.113161384	7.113161384	7.113161384				
[steps]	365	365	365	365	365				
[all run data]	[val] of turtle 10								
	6	6	6	6	6				

BehaviorSpace result	s (NetLogo 4.1.3)				
3-12-12 Pinon Canyor	n Final II.nlogo				
Branson					
03/12/2012 10:47:01	:361 -0400				
min-pxcor	max-pxcor	min-pycor	max-pycor		
-11	11	-11	11		
[run number]	1	2	3	4	5
link-chance	0	0	0	0	0
diffusion-rate	12	12	12	12	12
number-of-nodes	15	15	15	15	15
grid-size	3	3	3	3	3
[reporter]	[val] of turtle 30				
[final]	2.626558406	2.626558406	2.626558406	2.626558406	2.626558406
[min]	2	2	2	2	2
[max]	3.494908155	3.494908155	3.494908155	3.494908155	3.494908155
[mean]	2.960913979	2.960913979	2.960913979	2.960913979	2.960913979
[steps]	365	365	365	365	365
[all run data]	[val] of turtle 30				
	2	2	2	2	2

	A	В	С	D	E	F	G	Н
1	[val] of turtle 0	[val] of turtle 1	[val] of turtle 2	[val] of turtle 3	[val] of turtle 4	[val] of turtle 5	[val] of turtle 6	[val] of turtle 7
2	1.403548513	2.113128411	1.142478807	7.32E-20	0.388229393	0.130576503	5.45E-21	7.962976114
3	1.403548513	1	0.896888146	7.32E-20	0.388229393	0.130576503	5.45E-21	3
4	5	2.484902147	1.290756236	1	1	2	1	7.962976114
5	1.54092759	2.241555182	1.187672876	0.028460838	0.444153469	0.253995626	0.02276867	7.213654709
6	365	365	365	365	365	365	365	365
7								
8	[val] of turtle 0	[val] of turtle 1	[val] of turtle 2	[val] of turtle 3	[val] of turtle 4	[val] of turtle 5	[val] of turtle 6	[val] of turtle 7
9	5	1	1	1	1	2	1	3
10	4.586545455	1.163428571	0.99	0.91	0.974545455	1.871428571	0.88	3.306
11	4.225910857	1.307252156	0.977864935	0.8272	0.950712727	1.757468571	0.7744	3.589001455
12	3.910824943	1.434012783	0.964846899	0.751168	0.928184801	1.655984408	0.681472	3.849526526
13	3.635082048	1.545910793	0.95187438	0.681472	0.906723711	1.565174236	0.59969536	4.088411196
14	3.393378668	1.644850679	0.939617982	0.617686221	0.886153526	1.483517263	0.527731917	4.306706643
15	3.181175862	1.732480993	0.928544287	0.559395832	0.866346574	1.409729409	0.464404087	4.505602081
16	2.994583317	1.81022903	0.918959866	0.506200455	0.847212339	1.342725971	0.408675596	4.686364978
17	2.830261618	1.879330923	0.911047085	0.457716668	0.828688549	1.281590192	0.359634525	4.850295329
18	2.685339788	1.940857708	0.90489313	0.413579704	0.81073407	1.225546775	0.316478382	4.998691207
19	2.557345656	1.99573788	0.900513401	0.373444491	0.793323269	1.17393958	0.278500976	5.132823342
20	2.444147017	2.044776886	0.897870293	0.336986181	0.776441578	1.126212824	0.245080859	5.253916877
21	2.343901846	2.088673956	0.896888146	0.303900265	0.760082033	1.081895245	0.215671156	5.363138794
22	2.255016156	2.128036626	0.89746509	0.273902368	0.7442426	1.040586756	0.189790617	5.46158977
23	2.176108269	2.163393255	0.899482327	0.246727802	0.72892414	1.001947202	0.167015743	5.550299486
24	2.105978501	2.195203821	0.902811332	0.222130938	0.714128883	0.965686886	0.146973854	5.630224562
25	2.043583411	2.223869211	0.907319384	0.199884441	0.699859308	0.931558587	0.129336991	5.70224849
26	1.988013902	2.249739234	0.912873719	0.179778418	0.68611734	0.89935085	0.113816552	5.76718304
27	1.938476563	2.273119514	0.919344608	0.161619504	0.672903813	0.868882319	0.100158566	5.825770718
28	1.894277774	2.294277428	0.926607557	0.145229921	0.660218113	0.839996986	0.088139538	5.878687974
29	1.854810122	2.313447225	0.93454482	0.130446517	0.648057984	0.81256018	0.077562794	5.926548874
30	1.819540799	2.330834433	0.943046373	0.117119818	0.636419448	0.786455209	0.068255258	5.969909065
31	1.78800166	2.346619658	0.952010467	0.105113098	0.6252968	0.761580521	0.060064627	6.009269869
32	1.759780703	2.360961862	0.961343858	0.094301465	0.614682683	0.737847339	0.052856872	6.045082381
33	1.734514754	2.374001188	0.9709618	0.084570995	0.604568185	0.715177655	0.046514047	6.077751512

	A	В	С	D	E	F	G	Н
1	[val] of turtle 0	[val] of turtle 1	[val] of turtle 2	[val] of turtle 3	[val] of turtle 4	[val] of turtle 5	[val] of turtle 6	[val] of turtle 7
34	1.711883173	2.385861402	0.980787848	0.075817897	0.594942986	0.693502568	0.040932362	6.107639891
35	1.691602436	2.396652	0.99075354	0.067947721	0.585795506	0.672760875	0.036020478	6.13507159
36	1.673421462	2.406470034	1.000797992	0.060874608	0.57711307	0.652897895	0.031698021	6.160335652
37	1.657117572	2.415401689	1.010867429	0.054520596	0.568882075	0.63386449	0.027894258	6.183689394
38	1.642492999	2.423523648	1.020914684	0.048814952	0.561088151	0.615616237	0.024546947	6.205361485
39	1.629371853	2.430904278	1.03089869	0.043693566	0.55371632	0.59811274	0.021601314	6.225554788
40	1.617597497	2.43760466	1.040783968	0.039098378	0.546751138	0.581317057	0.019009156	6.244448986
41	1.607030261	2.44367948	1.050540119	0.034976847	0.540176841	0.565195214	0.016728057	6.262202975
42	1.597545447	2.449177807	1.060141352	0.031281467	0.533977463	0.549715808	0.01472069	6.278957061
43	1.589031598	2.454143767	1.069566013	0.027969312	0.528136957	0.534849664	0.012954208	6.294834947
44	1.581388978	2.458617137	1.078796163	0.025001621	0.522639291	0.520569562	0.011399703	6.309945539
45	1.574528243	2.462633854	1.08781717	0.022343417	0.517468543	0.506849995	0.010031738	6.32438458
46	1.568369282	2.466226466	1.096617336	0.019963159	0.512608981	0.493666976	0.00882793	6.338236118
47	1.562840191	2.469424523	1.105187559	0.017832418	0.508045126	0.480997873	0.007768578	6.351573827
48	1.557876379	2.472254922	1.113521013	0.015925585	0.503761819	0.468821268	0.006836349	6.364462198
49	1.553419775	2.474742206	1.121612867	0.014219606	0.499744262	0.457116843	0.006015987	6.376957597
50	1.549418132	2.476908825	1.12946003	0.012693732	0.495978065	0.445865279	0.005294069	6.389109217
51	1.545824408	2.478775372	1.13706091	0.011329307	0.492449276	0.435048174	0.00465878	6.400959923
52	1.542596228	2.48036078	1.144415215	0.010109553	0.489144407	0.424647973	0.004099727	6.412547008
53	1.539695392	2.481682502	1.151523761	0.009019399	0.486050454	0.414647904	0.003607759	6.423902863
54	1.537087457	2.482756671	1.158388309	0.008045304	0.483154913	0.405031925	0.003174828	6.435055572
55	1.534741348	2.483598229	1.165011416	0.007175112	0.480445784	0.395784682	0.002793849	6.446029443
56	1.532629023	2.484221058	1.171396305	0.006397914	0.477911579	0.386891467	0.002458587	6.456845472
57	1.530725173	2.484638079	1.177546751	0.005703922	0.475541323	0.378338181	0.002163557	6.46752176
58	1.52900695	2.48486135	1.183466982	0.005084358	0.47332455	0.370111306	0.00190393	6.478073873
59	1.527453728	2.484902147	1.189161587	0.004531353	0.471251297	0.362197871	0.001675458	6.488515173
60	1.526046887	2.484771038	1.194635443	0.004037854	0.469312096	0.354585434	0.001474403	6.498857092
61	1.524769621	2.484477947	1.199893645	0.003597544	0.467497965	0.347262051	0.001297475	6.509109391
62	1.523606765	2.484032213	1.204941452	0.003204763	0.465800398	0.340216259	0.001141778	6.519280372
63	1.522544637	2.483442635	1.209784234	0.002854445	0.464211347	0.333437056	0.001004765	6.529377076
64	1.521570904	2.482717525	1.214427432	0.002542054	0.462723214	0.326913876	8.84E-04	6.539405452
65	1.52067445	2.481864742	1.218876519	0.002263534	0.461328829	0.320636581	7.78E-04	6.549370501

	A	В	С	D	E	F	G	Н
1	[val] of turtle 0	[val] of turtle 1	[val] of turtle 2	[val] of turtle 3	[val] of turtle 4	[val] of turtle 5	[val] of turtle 6	[val] of turtle 7
66	1.519845267	2.480891726	1.223136971	0.002015252	0.460021442	0.314595435	6.85E-04	6.559276411
67	1.519074348	2.479805535	1.227214243	0.001793964	0.4587947	0.308781094	6.03E-04	6.569126667
68	1.518353601	2.478612867	1.231113742	0.001596764	0.457642637	0.303184586	5.30E-04	6.578924152
69	1.517675758	2.477320089	1.234840814	0.00142106	0.456559653	0.297797301	4.67E-04	6.58867123
70	1.517034304	2.475933256	1.238400726	0.001264531	0.4555405	0.292610973	4.11E-04	6.598369827
71	1.516423408	2.474458133	1.241798657	0.001125106	0.454580263	0.287617671	3.61E-04	6.608021489
72	1.515837857	2.472900212	1.245039685	0.001000934	0.453674349	0.282809779	3.18E-04	6.617627447
73	1.515273003	2.471264727	1.248128782	8.90E-04	0.452818465	0.278179991	2.80E-04	6.627188659
74	1.51472471	2.469556671	1.251070807	7.92E-04	0.452008608	0.273721295	2.46E-04	6.636705857
75	1.514189308	2.467780807	1.253870504	7.04E-04	0.451241045	0.269426959	2.17E-04	6.64617958
76	1.513663548	2.465941678	1.256532496	6.26E-04	0.450512305	0.265290525	1.91E-04	6.655610213
77	1.513144566	2.464043625	1.259061286	5.57E-04	0.449819155	0.261305797	1.68E-04	6.664998005
78	1.512629846	2.462090787	1.261461255	4.95E-04	0.449158598	0.257466826	1.48E-04	6.6743431
79	1.512117188	2.460087118	1.26373666	4.40E-04	0.448527849	0.253767906	1.30E-04	6.683645553
80	1.511604677	2.458036393	1.265891639	3.91E-04	0.447924329	0.250203559	1.14E-04	6.692905349
81	1.511090659	2.455942214	1.26793021	3.48E-04	0.447345651	0.24676853	1.01E-04	6.702122419
82	1.510573715	2.453808017	1.269856271	3.09E-04	0.446789609	0.243457775	8.86E-05	6.71129665
83	1.510052635	2.451637085	1.271673605	2.75E-04	0.446254166	0.240266454	7.79E-05	6.720427894
84	1.509526405	2.449432544	1.273385878	2.44E-04	0.445737441	0.237189922	6.86E-05	6.729515984
85	1.50899418	2.447197378	1.274996647	2.17E-04	0.445237704	0.234223721	6.04E-05	6.738560733
86	1.508455272	2.444934432	1.276509358	1.93E-04	0.444753364	0.231363573	5.31E-05	6.747561949
87	1.507909134	2.442646413	1.277927351	1.71E-04	0.444282958	0.228605369	4.67E-05	6.756519431
88	1.507355342	2.440335902	1.279253862	1.52E-04	0.443825146	0.225945169	4.11E-05	6.76543298
89	1.506793585	2.438005354	1.280492027	1.35E-04	0.443378699	0.223379189	3.62E-05	6.774302401
90	1.506223654	2.435657104	1.281644882	1.20E-04	0.442942496	0.220903797	3.18E-05	6.783127504
91	1.505645426	2.433293373	1.28271537	1.06E-04	0.44251551	0.218515505	2.80E-05	6.79190811
92	1.505058859	2.430916268	1.28370634	9.45E-05	0.442096809	0.216210966	2.47E-05	6.800644047
93	1.504463981	2.428527793	1.284620552	8.39E-05	0.441685542	0.213986965	2.17E-05	6.809335158
94	1.50386088	2.426129847	1.285460679	7.44E-05	0.441280938	0.211840416	1.91E-05	6.817981296
95	1.5032497	2.423724229	1.286229311	6.61E-05	0.440882299	0.209768356	1.68E-05	6.82658233
96	1.502630631	2.421312645	1.286928956	5.87E-05	0.440488994	0.207767937	1.48E-05	6.835138142
97	1.502003903	2.418896708	1.287562042	5.21E-05	0.440100453	0.205836428	1.30E-05	6.843648629

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98	1.501369781	2.416477944	1.288130924	4.62E-05	0.439716165	0.203971202	1.15E-05	6.8521137
99	1.500728561	2.414057792	1.288637879	4.10E-05	0.439335669	0.202169738	1.01E-05	6.860533281
100	1.500080561	2.411637613	1.289085116	3.64E-05	0.438958558	0.200429614	8.87E-06	6.868907311
101	1.499426122	2.409218687	1.289474773	3.23E-05	0.438584464	0.198748503	7.81E-06	6.877235745
102	1.498765601	2.406802222	1.289808922	2.86E-05	0.438213063	0.197124169	6.87E-06	6.885518548
103	1.498099367	2.404389351	1.290089568	2.54E-05	0.43784407	0.195554465	6.04E-06	6.893755701
104	1.497427801	2.401981139	1.290318658	2.25E-05	0.437477232	0.194037328	5.32E-06	6.901947197
105	1.496751289	2.399578587	1.290498073	2.00E-05	0.437112329	0.192570773	4.68E-06	6.910093041
106	1.496070222	2.397182631	1.290629638	1.77E-05	0.43674917	0.191152896	4.12E-06	6.918193252
107	1.495384994	2.394794147	1.290715122	1.57E-05	0.43638759	0.189781866	3.62E-06	6.926247857
108	1.494695999	2.392413951	1.290756236	1.40E-05	0.436027447	0.188455922	3.19E-06	6.934256896
109	1.494003628	2.390042808	1.29075464	1.24E-05	0.435668623	0.187173374	2.81E-06	6.942220419
110	1.49330827	2.387681427	1.29071194	1.10E-05	0.435311017	0.185932594	2.47E-06	6.950138487
111	1.492610309	2.385330466	1.290629695	9.73E-06	0.434954548	0.184732021	2.17E-06	6.958011168
112	1.491910123	2.382990538	1.290509412	8.63E-06	0.434599151	0.183570152	1.91E-06	6.965838541
113	1.491208084	2.380662208	1.290352553	7.65E-06	0.434244773	0.182445542	1.68E-06	6.973620691
114	1.490504554	2.378345997	1.290160534	6.78E-06	0.433891376	0.181356804	1.48E-06	6.981357715
115	1.489799887	2.376042385	1.289934726	6.01E-06	0.433538934	0.180302602	1.30E-06	6.989049713
116	1.489094429	2.373751814	1.289676459	5.33E-06	0.433187429	0.179281652	1.15E-06	6.996696796
117	1.488388515	2.371474685	1.289387018	4.73E-06	0.432836854	0.178292721	1.01E-06	7.004299078
118	1.487682468	2.369211367	1.289067651	4.19E-06	0.43248721	0.177334622	8.88E-07	7.011856682
119	1.486976603	2.366962192	1.288719565	3.71E-06	0.432138504	0.176406213	7.82E-07	7.019369735
120	1.486271222	2.364727462	1.288343928	3.29E-06	0.431790749	0.175506398	6.88E-07	7.026838372
121	1.485566617	2.362507448	1.287941874	2.92E-06	0.431443965	0.17463412	6.05E-07	7.034262731
122	1.484863066	2.360302391	1.2875145	2.59E-06	0.431098174	0.173788365	5.33E-07	7.041642954
123	1.484160838	2.358112507	1.287062866	2.29E-06	0.430753404	0.172968158	4.69E-07	7.048979191
124	1.48346019	2.355937983	1.286588002	2.03E-06	0.430409686	0.172172558	4.13E-07	7.056271593
125	1.482761366	2.353778986	1.286090902	1.80E-06	0.430067052	0.171400663	3.63E-07	7.063520317
126	1.482064599	2.351635657	1.28557253	1.59E-06	0.429725538	0.170651604	3.20E-07	7.070725521
127	1.481370112	2.349508116	1.28503382	1.41E-06	0.42938518	0.169924546	2.81E-07	7.077887371
128	1.480678115	2.347396463	1.284475673	1.25E-06	0.429046017	0.169218686	2.47E-07	7.085006031
129	1.479988808	2.345300778	1.283898964	1.11E-06	0.428708088	0.16853325	2.18E-07	7.092081672

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130	1.479302379	2.343221124	1.283304538	9.82E-07	0.428371432	0.167867495	1.92E-07	7.099114465
131	1.478619005	2.341157548	1.282693213	8.70E-07	0.428036088	0.167220705	1.69E-07	7.106104585
132	1.477938854	2.339110079	1.282065781	7.71E-07	0.427702097	0.166592192	1.48E-07	7.11305221
133	1.477262084	2.337078734	1.281423008	6.83E-07	0.427369497	0.165981295	1.31E-07	7.119957519
134	1.47658884	2.335063512	1.280765633	6.05E-07	0.427038328	0.165387376	1.15E-07	7.126820693
135	1.475919261	2.333064404	1.280094373	5.35E-07	0.426708627	0.164809822	1.01E-07	7.133641914
136	1.475253473	2.331081385	1.279409922	4.74E-07	0.426380432	0.164248045	8.90E-08	7.14042137
137	1.474591596	2.329114422	1.278712948	4.20E-07	0.42605378	0.163701477	7.83E-08	7.147159244
138	1.47393374	2.32716347	1.278004098	3.72E-07	0.425728704	0.163169572	6.89E-08	7.153855727
139	1.473280005	2.325228473	1.277283999	3.29E-07	0.42540524	0.162651805	6.06E-08	7.160511007
140	1.472630484	2.323309369	1.276553255	2.92E-07	0.425083419	0.162147671	5.34E-08	7.167125274
141	1.471985264	2.321406086	1.27581245	2.58E-07	0.424763273	0.161656685	4.70E-08	7.173698721
142	1.47134442	2.319518546	1.275062149	2.29E-07	0.424444832	0.161178377	4.13E-08	7.18023154
143	1.470708024	2.317646661	1.274302898	2.02E-07	0.424128124	0.1607123	3.64E-08	7.186723925
144	1.470076137	2.315790339	1.273535222	1.79E-07	0.423813175	0.160258018	3.20E-08	7.19317607
145	1.469448817	2.313949483	1.27275963	1.59E-07	0.423500012	0.159815117	2.82E-08	7.199588171
146	1.468826112	2.312123988	1.271976614	1.41E-07	0.423188657	0.159383195	2.48E-08	7.205960423
147	1.468208067	2.310313746	1.271186648	1.24E-07	0.422879133	0.158961866	2.18E-08	7.212293023
148	1.46759472	2.308518644	1.270390188	1.10E-07	0.42257146	0.158550759	1.92E-08	7.218586168
149	1.466986102	2.306738566	1.269587676	9.75E-08	0.422265659	0.158149517	1.69E-08	7.224840056
150	1.46638224	2.304973391	1.268779539	8.63E-08	0.421961745	0.157757796	1.49E-08	7.231054884
151	1.465783157	2.303222996	1.267966186	7.64E-08	0.421659735	0.157375265	1.31E-08	7.237230851
152	1.465188868	2.301487254	1.267148014	6.76E-08	0.421359644	0.157001607	1.15E-08	7.243368155
153	1.464599386	2.299766038	1.266325405	5.98E-08	0.421061484	0.156636514	1.01E-08	7.249466995
154	1.464014719	2.298059216	1.265498728	5.30E-08	0.420765268	0.156279693	8.91E-09	7.255527571
155	1.463434871	2.296366656	1.264668337	4.69E-08	0.420471005	0.155930859	7.84E-09	7.26155008
156	1.462859843	2.294688225	1.263834573	4.15E-08	0.420178705	0.155589739	6.90E-09	7.267534723
157	1.46228963	2.293023786	1.262997767	3.67E-08	0.419888375	0.155256071	6.07E-09	7.273481699
158	1.461724225	2.291373204	1.262158236	3.25E-08	0.419600021	0.154929603	5.34E-09	7.279391207
159	1.461163619	2.289736342	1.261316285	2.88E-08	0.419313649	0.154610089	4.70E-09	7.285263446
160	1.460607799	2.288113062	1.260472208	2.54E-08	0.419029262	0.154297297	4.14E-09	7.291098616
161	1.460056747	2.286503226	1.259626288	2.25E-08	0.418746863	0.153991001	3.64E-09	7.296896916

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162	1.459510447	2.284906697	1.258778799	1.99E-08	0.418466454	0.153690985	3.21E-09	7.302658544
163	1.458968876	2.283323336	1.25793	1.76E-08	0.418188034	0.153397038	2.82E-09	7.308383699
164	1.458432012	2.281753005	1.257080146	1.56E-08	0.417911605	0.153108961	2.48E-09	7.314072581
165	1.457899828	2.280195567	1.256229477	1.38E-08	0.417637164	0.15282656	2.18E-09	7.319725388
166	1.457372298	2.278650885	1.255378226	1.22E-08	0.417364708	0.152549649	1.92E-09	7.325342317
167	1.456849393	2.277118822	1.254526618	1.08E-08	0.417094236	0.152278049	1.69E-09	7.330923568
168	1.456331081	2.275599242	1.253674867	9.56E-09	0.416825741	0.152011587	1.49E-09	7.336469337
169	1.45581733	2.27409201	1.252823179	8.45E-09	0.416559221	0.151750097	1.31E-09	7.341979822
170	1.455308106	2.272596992	1.251971752	7.48E-09	0.416294668	0.15149342	1.15E-09	7.347455219
171	1.454803375	2.271114054	1.251120777	6.62E-09	0.416032077	0.151241401	1.01E-09	7.352895727
172	1.4543031	2.269643065	1.250270436	5.85E-09	0.41577144	0.150993893	8.93E-10	7.35830154
173	1.453807244	2.268183894	1.249420903	5.18E-09	0.415512751	0.150750753	7.86E-10	7.363672855
174	1.453315769	2.26673641	1.248572346	4.58E-09	0.415255999	0.150511844	6.91E-10	7.369009867
175	1.452828635	2.265300485	1.247724926	4.05E-09	0.415001178	0.150277033	6.08E-10	7.374312771
176	1.452345804	2.263875992	1.246878797	3.58E-09	0.414748276	0.150046195	5.35E-10	7.379581763
177	1.451867235	2.262462805	1.246034105	3.17E-09	0.414497285	0.149819205	4.71E-10	7.384817035
178	1.451392886	2.261060799	1.245190992	2.80E-09	0.414248193	0.149595947	4.15E-10	7.390018782
179	1.450922717	2.259669851	1.244349593	2.48E-09	0.414000991	0.149376306	3.65E-10	7.395187197
180	1.450456685	2.258289841	1.243510036	2.19E-09	0.413755667	0.149160174	3.21E-10	7.400322472
181	1.449994749	2.256920646	1.242672445	1.94E-09	0.413512209	0.148947445	2.83E-10	7.4054248
182	1.449536866	2.25556215	1.241836937	1.71E-09	0.413270605	0.148738018	2.49E-10	7.410494371
183	1.449082994	2.254214234	1.241003626	1.52E-09	0.413030844	0.148531795	2.19E-10	7.415531378
184	1.44863309	2.252876783	1.240172617	1.34E-09	0.412792913	0.148328683	1.93E-10	7.42053601
185	1.448187111	2.251549684	1.239344013	1.19E-09	0.412556798	0.148128591	1.69E-10	7.425508457
186	1.447745014	2.250232824	1.238517913	1.05E-09	0.412322488	0.147931431	1.49E-10	7.430448909
187	1.447306757	2.248926091	1.237694408	9.27E-10	0.412089968	0.14773712	1.31E-10	7.435357554
188	1.446872297	2.247629377	1.236873587	8.20E-10	0.411859226	0.147545577	1.15E-10	7.44023458
189	1.446441591	2.246342574	1.236055534	7.25E-10	0.411630248	0.147356723	1.02E-10	7.445080175
190	1.446014596	2.245065575	1.235240329	6.41E-10	0.41140302	0.147170485	8.94E-11	7.449894525
191	1.445591272	2.243798277	1.234428048	5.67E-10	0.411177528	0.14698679	7.87E-11	7.454677816
192	1.445171574	2.242540576	1.233618763	5.01E-10	0.410953759	0.146805567	6.92E-11	7.459430233
193	1.444755463	2.24129237	1.232812543	4.43E-10	0.410731699	0.146626751	6.09E-11	7.464151962

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194	1.444342895	2.24005356	1.232009451	3.92E-10	0.410511332	0.146450275	5.36E-11	7.468843187
195	1.443933831	2.238824048	1.231209549	3.46E-10	0.410292646	0.146276079	4.72E-11	7.47350409
196	1.443528229	2.237603735	1.230412896	3.06E-10	0.410075626	0.146104101	4.15E-11	7.478134855
197	1.443126048	2.236392527	1.229619545	2.71E-10	0.409860258	0.145934285	3.65E-11	7.482735663
198	1.442727249	2.235190331	1.228829548	2.39E-10	0.409646527	0.145766574	3.22E-11	7.487306696
199	1.442331791	2.233997052	1.228042954	2.12E-10	0.40943442	0.145600914	2.83E-11	7.491848134
200	1.441939636	2.232812601	1.227259808	1.87E-10	0.409223922	0.145437255	2.49E-11	7.496360157
201	1.441550744	2.231636888	1.226480154	1.65E-10	0.409015019	0.145275544	2.19E-11	7.500842944
202	1.441165077	2.230469824	1.225704031	1.46E-10	0.408807696	0.145115736	1.93E-11	7.505296674
203	1.440782597	2.229311323	1.224931478	1.29E-10	0.40860194	0.144957782	1.70E-11	7.509721523
204	1.440403266	2.2281613	1.224162529	1.14E-10	0.408397737	0.144801639	1.49E-11	7.514117669
205	1.440027047	2.22701967	1.223397217	1.01E-10	0.408195072	0.144647263	1.31E-11	7.518485288
206	1.439653904	2.22588635	1.222635573	8.92E-11	0.407993932	0.144494612	1.16E-11	7.522824554
207	1.4392838	2.224761259	1.221877625	7.89E-11	0.407794303	0.144343647	1.02E-11	7.527135643
208	1.438916699	2.223644318	1.221123399	6.97E-11	0.40759617	0.144194328	8.95E-12	7.531418729
209	1.438552567	2.222535446	1.22037292	6.16E-11	0.407399521	0.144046618	7.88E-12	7.535673983
210	1.438191369	2.221434567	1.219626208	5.45E-11	0.407204341	0.14390048	6.93E-12	7.539901579
211	1.43783307	2.220341604	1.218883286	4.81E-11	0.407010617	0.143755881	6.10E-12	7.544101687
212	1.437477637	2.219256482	1.218144171	4.25E-11	0.406818336	0.143612786	5.37E-12	7.548274478
213	1.437125037	2.218179126	1.21740888	3.76E-11	0.406627484	0.143471163	4.73E-12	7.552420123
214	1.436775236	2.217109464	1.216677428	3.32E-11	0.406438048	0.14333098	4.16E-12	7.556538789
215	1.436428203	2.216047425	1.215949828	2.94E-11	0.406250015	0.143192208	3.66E-12	7.560630645
216	1.436083906	2.214992937	1.215226093	2.59E-11	0.406063372	0.143054816	3.22E-12	7.564695858
217	1.435742313	2.213945931	1.214506233	2.29E-11	0.405878106	0.142918777	2.83E-12	7.568734595
218	1.435403394	2.212906338	1.213790256	2.03E-11	0.405694205	0.142784063	2.49E-12	7.572747022
219	1.435067119	2.211874092	1.213078171	1.79E-11	0.405511655	0.142650649	2.19E-12	7.576733303
220	1.434733457	2.210849125	1.212369984	1.58E-11	0.405330444	0.142518507	1.93E-12	7.580693602
221	1.43440238	2.209831372	1.211665701	1.40E-11	0.405150561	0.142387615	1.70E-12	7.584628083
222	1.434073858	2.208820769	1.210965324	1.24E-11	0.404971992	0.142257948	1.50E-12	7.588536908
223	1.433747864	2.207817253	1.210268856	1.09E-11	0.404794726	0.142129482	1.32E-12	7.592420238
224	1.433424369	2.206820761	1.209576301	9.65E-12	0.40461875	0.142002196	1.16E-12	7.596278235
225	1.433103345	2.20583123	1.208887657	8.52E-12	0.404444053	0.141876068	1.02E-12	7.600111058

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226	1.432784767	2.204848602	1.208202924	7.53E-12	0.404270623	0.141751078	8.97E-13	7.603918866
227	1.432468606	2.203872815	1.207522102	6.65E-12	0.404098449	0.141627204	7.89E-13	7.607701818
228	1.432154838	2.202903812	1.206845188	5.88E-12	0.403927519	0.141504428	6.95E-13	7.611460071
229	1.431843436	2.201941533	1.206172178	5.20E-12	0.403757821	0.141382731	6.11E-13	7.615193781
230	1.431534376	2.200985922	1.205503069	4.59E-12	0.403589345	0.141262093	5.38E-13	7.618903105
231	1.431227632	2.200036922	1.204837856	4.06E-12	0.40342208	0.141142499	4.73E-13	7.622588196
232	1.430923179	2.199094478	1.204176533	3.58E-12	0.403256014	0.14102393	4.17E-13	7.62624921
233	1.430620995	2.198158535	1.203519094	3.17E-12	0.403091137	0.140906369	3.67E-13	7.629886299
234	1.430321055	2.197229038	1.202865532	2.80E-12	0.402927438	0.140789801	3.23E-13	7.633499616
235	1.430023336	2.196305935	1.202215839	2.47E-12	0.402764907	0.14067421	2.84E-13	7.637089313
236	1.429727815	2.195389172	1.201570007	2.18E-12	0.402603534	0.14055958	2.50E-13	7.64065554
237	1.42943447	2.194478698	1.200928027	1.93E-12	0.402443307	0.140445898	2.20E-13	7.644198446
238	1.429143279	2.193574462	1.200289889	1.70E-12	0.402284217	0.140333149	1.93E-13	7.647718182
239	1.42885422	2.192676412	1.199655583	1.50E-12	0.402126255	0.140221318	1.70E-13	7.651214895
240	1.428567272	2.1917845	1.199025099	1.33E-12	0.401969409	0.140110393	1.50E-13	7.654688732
241	1.428282413	2.190898676	1.198398425	1.17E-12	0.401813671	0.14000036	1.32E-13	7.658139841
242	1.427999624	2.19001889	1.19777555	1.04E-12	0.40165903	0.139891207	1.16E-13	7.661568366
243	1.427718883	2.189145097	1.197156462	9.16E-13	0.401505478	0.139782922	1.02E-13	7.664974453
244	1.427440172	2.188277247	1.196541148	8.10E-13	0.401353004	0.139675492	8.98E-14	7.668358246
245	1.427163469	2.187415295	1.195929595	7.15E-13	0.4012016	0.139568906	7.91E-14	7.671719888
246	1.426888756	2.186559193	1.195321791	6.32E-13	0.401051256	0.139463152	6.96E-14	7.675059522
247	1.426616015	2.185708897	1.194717721	5.58E-13	0.400901964	0.13935822	6.12E-14	7.678377288
248	1.426345225	2.184864362	1.194117372	4.93E-13	0.400753713	0.139254099	5.39E-14	7.681673329
249	1.426076369	2.184025542	1.193520729	4.35E-13	0.400606497	0.139150778	4.74E-14	7.684947783
250	1.425809429	2.183192395	1.192927777	3.84E-13	0.400460305	0.139048248	4.17E-14	7.68820079
251	1.425544387	2.182364875	1.192338503	3.40E-13	0.40031513	0.138946498	3.67E-14	7.691432488
252	1.425281225	2.181542942	1.19175289	3.00E-13	0.400170962	0.138845519	3.23E-14	7.694643014
253	1.425019926	2.180726551	1.191170922	2.65E-13	0.400027794	0.138745302	2.84E-14	7.697832506
254	1.424760474	2.179915662	1.190592586	2.34E-13	0.399885617	0.138645837	2.50E-14	7.7010011
255	1.424502851	2.179110232	1.190017864	2.07E-13	0.399744423	0.138547115	2.20E-14	7.704148929
256	1.42424704	2.178310221	1.18944674	1.83E-13	0.399604203	0.138449129	1.94E-14	7.707276129
257	1.423993027	2.177515588	1.188879198	1.61E-13	0.399464951	0.138351868	1.70E-14	7.710382833

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258	1.423740794	2.176726293	1.188315222	1.42E-13	0.399326658	0.138255326	1.50E-14	7.713469173
259	1.423490326	2.175942296	1.187754794	1.26E-13	0.399189316	0.138159494	1.32E-14	7.716535282
260	1.423241608	2.175163559	1.187197899	1.11E-13	0.399052917	0.138064364	1.16E-14	7.71958129
261	1.422994624	2.174390042	1.186644518	9.81E-14	0.398917455	0.137969929	1.02E-14	7.722607328
262	1.422749359	2.173621706	1.186094636	8.66E-14	0.398782921	0.137876181	9.00E-15	7.725613525
263	1.422505799	2.172858515	1.185548234	7.65E-14	0.398649308	0.137783113	7.92E-15	7.728600011
264	1.422263929	2.172100431	1.185005295	6.75E-14	0.398516608	0.137690717	6.97E-15	7.731566912
265	1.422023734	2.171347415	1.184465802	5.96E-14	0.398384816	0.137598987	6.13E-15	7.734514355
266	1.4217852	2.170599432	1.183929738	5.27E-14	0.398253922	0.137507916	5.40E-15	7.737442469
267	1.421548314	2.169856445	1.183397083	4.65E-14	0.398123921	0.137417497	4.75E-15	7.740351377
268	1.421313061	2.169118418	1.182867822	4.11E-14	0.397994805	0.137327723	4.18E-15	7.743241205
269	1.421079429	2.168385315	1.182341935	3.63E-14	0.397866568	0.137238589	3.68E-15	7.746112076
270	1.420847403	2.167657101	1.181819406	3.20E-14	0.397739202	0.137150087	3.24E-15	7.748964115
271	1.42061697	2.16693374	1.181300215	2.83E-14	0.397612701	0.137062212	2.85E-15	7.751797443
272	1.420388117	2.166215199	1.180784346	2.50E-14	0.397487059	0.136974958	2.51E-15	7.754612182
273	1.420160832	2.165501443	1.180271779	2.21E-14	0.397362267	0.136888318	2.21E-15	7.757408454
274	1.419935102	2.164792438	1.179762498	1.95E-14	0.397238321	0.136802287	1.94E-15	7.760186378
275	1.419710914	2.16408815	1.179256483	1.72E-14	0.397115214	0.13671686	1.71E-15	7.762946074
276	1.419488255	2.163388546	1.178753717	1.52E-14	0.396992938	0.13663203	1.50E-15	7.76568766
277	1.419267115	2.162693592	1.178254182	1.34E-14	0.396871489	0.136547793	1.32E-15	7.768411256
278	1.41904748	2.162003257	1.177757859	1.18E-14	0.396750859	0.136464142	1.16E-15	7.771116977
279	1.418829339	2.161317507	1.17726473	1.04E-14	0.396631043	0.136381073	1.02E-15	7.773804941
280	1.418612679	2.160636311	1.176774778	9.23E-15	0.396512034	0.13629858	9.01E-16	7.776475264
281	1.418397491	2.159959636	1.176287983	8.15E-15	0.396393827	0.136216658	7.93E-16	7.779128059
282	1.418183761	2.159287452	1.175804328	7.19E-15	0.396276415	0.136135303	6.98E-16	7.781763443
283	1.417971479	2.158619726	1.175323794	6.35E-15	0.396159792	0.136054509	6.14E-16	7.784381528
284	1.417760633	2.157956428	1.174846364	5.61E-15	0.396043954	0.135974272	5.40E-16	7.786982428
285	1.417551213	2.157297527	1.17437202	4.95E-15	0.395928893	0.135894586	4.76E-16	7.789566253
286	1.417343207	2.156642992	1.173900742	4.37E-15	0.395814604	0.135815448	4.19E-16	7.792133117
287	1.417136605	2.155992794	1.173432514	3.86E-15	0.395701082	0.135736852	3.68E-16	7.79468313
288	1.416931396	2.155346902	1.172967317	3.41E-15	0.39558832	0.135658794	3.24E-16	7.797216402
289	1.41672757	2.154705287	1.172505133	3.01E-15	0.395476314	0.13558127	2.85E-16	7.799733042

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290	1.416525115	2.154067919	1.172045944	2.66E-15	0.395365058	0.135504275	2.51E-16	7.802233159
291	1.416324023	2.153434769	1.171589733	2.34E-15	0.395254546	0.135427804	2.21E-16	7.804716861
292	1.416124282	2.152805808	1.171136481	2.07E-15	0.395144773	0.135351855	1.94E-16	7.807184256
293	1.415925883	2.152181008	1.170686171	1.83E-15	0.395035734	0.135276421	1.71E-16	7.809635449
294	1.415728816	2.151560339	1.170238785	1.61E-15	0.394927423	0.1352015	1.51E-16	7.812070548
295	1.41553307	2.150943775	1.169794305	1.42E-15	0.394819835	0.135127087	1.32E-16	7.814489656
296	1.415338637	2.150331285	1.169352713	1.26E-15	0.394712965	0.135053178	1.17E-16	7.81689288
297	1.415145505	2.149722844	1.168913992	1.11E-15	0.394606808	0.13497977	1.03E-16	7.819280322
298	1.414953667	2.149118423	1.168478125	9.80E-16	0.394501359	0.134906857	9.03E-17	7.821652086
299	1.414763112	2.148517995	1.168045093	8.65E-16	0.394396612	0.134834438	7.94E-17	7.824008275
300	1.414573831	2.147921532	1.16761488	7.63E-16	0.394292563	0.134762506	6.99E-17	7.82634899
301	1.414385816	2.147329009	1.167187468	6.74E-16	0.394189207	0.13469106	6.15E-17	7.828674333
302	1.414199055	2.146740397	1.16676284	5.95E-16	0.394086539	0.134620094	5.41E-17	7.830984405
303	1.414013542	2.146155672	1.166340978	5.25E-16	0.393984554	0.134549607	4.76E-17	7.833279305
304	1.413829266	2.145574806	1.165921865	4.63E-16	0.393883247	0.134479593	4.19E-17	7.835559133
305	1.413646219	2.144997773	1.165505485	4.09E-16	0.393782613	0.134410049	3.69E-17	7.837823987
306	1.413464392	2.144424547	1.16509182	3.61E-16	0.393682648	0.134340972	3.25E-17	7.840073966
307	1.413283776	2.143855104	1.164680853	3.19E-16	0.393583347	0.134272358	2.86E-17	7.842309168
308	1.413104363	2.143289417	1.164272568	2.81E-16	0.393484706	0.134204204	2.51E-17	7.844529688
309	1.412926145	2.14272746	1.163866947	2.48E-16	0.393386719	0.134136507	2.21E-17	7.846735623
310	1.412749111	2.14216921	1.163463974	2.19E-16	0.393289383	0.134069263	1.95E-17	7.848927069
311	1.412573255	2.14161464	1.163063632	1.93E-16	0.393192692	0.134002468	1.71E-17	7.851104121
312	1.412398569	2.141063727	1.162665905	1.71E-16	0.393096642	0.13393612	1.51E-17	7.853266873
313	1.412225043	2.140516446	1.162270777	1.51E-16	0.39300123	0.133870215	1.33E-17	7.855415418
314	1.412052669	2.139972772	1.16187823	1.33E-16	0.392906449	0.13380475	1.17E-17	7.85754985
315	1.41188144	2.139432681	1.161488248	1.17E-16	0.392812297	0.133739721	1.03E-17	7.859670262
316	1.411711348	2.138896149	1.161100816	1.04E-16	0.392718768	0.133675126	9.04E-18	7.861776745
317	1.411542384	2.138363153	1.160715916	9.15E-17	0.392625859	0.133610962	7.96E-18	7.86386939
318	1.411374541	2.137833668	1.160333534	8.07E-17	0.392533565	0.133547225	7.00E-18	7.865948289
319	1.411207811	2.137307672	1.159953652	7.13E-17	0.392441881	0.133483913	6.16E-18	7.868013532
320	1.411042186	2.13678514	1.159576256	6.29E-17	0.392350805	0.133421021	5.42E-18	7.870065207
321	1.410877659	2.13626605	1.159201328	5.55E-17	0.392260331	0.133358548	4.77E-18	7.872103404

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322	1.410714222	2.13575038	1.158828854	4.90E-17	0.392170455	0.133296491	4.20E-18	7.874128212
323	1.410551867	2.135238105	1.158458818	4.32E-17	0.392081174	0.133234845	3.69E-18	7.876139719
324	1.410390587	2.134729203	1.158091203	3.82E-17	0.391992483	0.13317361	3.25E-18	7.87813801
325	1.410230375	2.134223653	1.157725996	3.37E-17	0.391904378	0.133112781	2.86E-18	7.880123174
326	1.410071223	2.133721431	1.157363179	2.97E-17	0.391816856	0.133052355	2.52E-18	7.882095297
327	1.409913125	2.133222516	1.157002738	2.62E-17	0.391729912	0.132992331	2.22E-18	7.884054463
328	1.409756071	2.132726885	1.156644658	2.32E-17	0.391643542	0.132932705	1.95E-18	7.886000758
329	1.409600057	2.132234516	1.156288924	2.04E-17	0.391557743	0.132873474	1.72E-18	7.887934267
330	1.409445074	2.131745389	1.155935519	1.80E-17	0.39147251	0.132814635	1.51E-18	7.889855073
331	1.409291115	2.131259481	1.15558443	1.59E-17	0.39138784	0.132756187	1.33E-18	7.891763259
332	1.409138175	2.130776771	1.155235642	1.40E-17	0.39130373	0.132698125	1.17E-18	7.893658909
333	1.408986244	2.130297237	1.154889139	1.24E-17	0.391220174	0.132640449	1.03E-18	7.895542105
334	1.408835317	2.12982086	1.154544907	1.09E-17	0.39113717	0.132583154	9.05E-19	7.897412928
335	1.408685388	2.129347617	1.154202931	9.65E-18	0.391054713	0.132526238	7.97E-19	7.89927146
336	1.408536448	2.128877488	1.153863196	8.52E-18	0.390972801	0.132469699	7.01E-19	7.901117782
337	1.408388491	2.128410453	1.153525689	7.52E-18	0.390891429	0.132413533	6.17E-19	7.902951973
338	1.408241512	2.12794649	1.153190395	6.63E-18	0.390810594	0.13235774	5.43E-19	7.904774113
339	1.408095502	2.12748558	1.152857299	5.85E-18	0.390730291	0.132302315	4.78E-19	7.906584281
340	1.407950457	2.127027702	1.152526387	5.17E-18	0.390650519	0.132247256	4.20E-19	7.908382556
341	1.407806368	2.126572836	1.152197645	4.56E-18	0.390571272	0.132192562	3.70E-19	7.910169016
342	1.40766323	2.126120962	1.151871059	4.02E-18	0.390492548	0.132138228	3.26E-19	7.911943739
343	1.407521036	2.125672061	1.151546615	3.55E-18	0.390414343	0.132084254	2.87E-19	7.913706801
344	1.40737978	2.125226112	1.151224299	3.13E-18	0.390336653	0.132030636	2.52E-19	7.915458279
345	1.407239455	2.124783097	1.150904098	2.76E-18	0.390259475	0.131977372	2.22E-19	7.91719825
346	1.407100056	2.124342995	1.150585997	2.44E-18	0.390182806	0.13192446	1.95E-19	7.918926788
347	1.406961575	2.123905789	1.150269983	2.15E-18	0.390106642	0.131871898	1.72E-19	7.920643969
348	1.406824008	2.123471457	1.149956042	1.90E-18	0.39003098	0.131819682	1.51E-19	7.922349867
349	1.406687348	2.123039982	1.149644161	1.68E-18	0.389955816	0.13176781	1.33E-19	7.924044557
350	1.406551588	2.122611344	1.149334326	1.48E-18	0.389881148	0.131716281	1.17E-19	7.925728112
351	1.406416723	2.122185526	1.149026525	1.30E-18	0.389806971	0.131665092	1.03E-19	7.927400605
352	1.406282746	2.121762507	1.148720743	1.15E-18	0.389733283	0.131614241	9.07E-20	7.929062109
353	1.406149653	2.12134227	1.148416969	1.02E-18	0.38966008	0.131563724	7.98E-20	7.930712697

	А	В	С	D	E	F	G	Н
1	[val] of turtle 0	[val] of turtle 1	[val] of turtle 2	[val] of turtle 3	[val] of turtle 4	[val] of turtle 5	[val] of turtle 6	[val] of turtle 7
354	1.406017436	2.120924797	1.148115188	8.96E-19	0.389587359	0.131513541	7.02E-20	7.932352438
355	1.40588609	2.120510068	1.147815387	7.91E-19	0.389515117	0.131463689	6.18E-20	7.933981406
356	1.405755609	2.120098067	1.147517554	6.98E-19	0.389443351	0.131414166	5.44E-20	7.93559967
357	1.405625988	2.119688774	1.147221677	6.16E-19	0.389372057	0.131364969	4.79E-20	7.937207302
358	1.40549722	2.119282173	1.146927741	5.43E-19	0.389301233	0.131316096	4.21E-20	7.93880437
359	1.4053693	2.118878245	1.146635735	4.79E-19	0.389230874	0.131267545	3.71E-20	7.940390944
360	1.405242223	2.118476972	1.146345646	4.23E-19	0.389160979	0.131219314	3.26E-20	7.941967094
361	1.405115982	2.118078338	1.146057461	3.73E-19	0.389091544	0.131171401	2.87E-20	7.943532887
362	1.404990573	2.117682325	1.145771168	3.29E-19	0.389022566	0.131123804	2.53E-20	7.945088391
363	1.404865989	2.117288915	1.145486755	2.90E-19	0.388954042	0.13107652	2.22E-20	7.946633675
364	1.404742225	2.116898091	1.145204209	2.56E-19	0.388885969	0.131029548	1.96E-20	7.948168805
365	1.404619276	2.116509837	1.144923518	2.26E-19	0.388818344	0.130982885	1.72E-20	7.949693849
366	1.404497136	2.116124135	1.14464467	1.99E-19	0.388751164	0.130936529	1.51E-20	7.951208871
367	1.4043758	2.115740969	1.144367654	1.76E-19	0.388684426	0.130890478	1.33E-20	7.952713939
368	1.404255262	2.115360322	1.144092456	1.55E-19	0.388618127	0.130844731	1.17E-20	7.954209117
369	1.404135518	2.114982176	1.143819065	1.37E-19	0.388552264	0.130799285	1.03E-20	7.95569447
370	1.404016562	2.114606517	1.14354747	1.21E-19	0.388486835	0.130754138	9.08E-21	7.957170064
371	1.403898388	2.114233327	1.143277658	1.07E-19	0.388421836	0.130709289	7.99E-21	7.958635962
372	1.403780992	2.11386259	1.143009618	9.41E-20	0.388357264	0.130664734	7.03E-21	7.960092227
373	1.403664369	2.11349429	1.142743338	8.30E-20	0.388293118	0.130620473	6.19E-21	7.961538924
374	1.403548513	2.113128411	1.142478807	7.32E-20	0.388229393	0.130576503	5.45E-21	7.962976114

	I	J	К	L	М	N	0
1	[val] of turtle 8	[val] of turtle 9	[val] of turtle 10	[val] of turtle 11	[val] of turtle 12	[val] of turtle 13	[val] of turtle 14
2	8.296323962	6.202609666	6.980004327	11.23294113	4.326796875	3.246512088	0.043653881
3	5.912071101	4.738555449	5.324340646	6	2	2.461056929	0.043653881
4	8.296323962	6.202609666	6.980004327	11.23294113	4.326796875	4	1
5	7.521475832	5.648900831	6.356092962	10.30160686	3.883981467	2.969859582	0.111183762
6	365	365	365	365	365	365	365
7							
8	[val] of turtle 8	[val] of turtle 9	[val] of turtle 10	[val] of turtle 11	[val] of turtle 12	[val] of turtle 13	[val] of turtle 14
9	6	5	6	6	2	4	1
10	5.962	4.944	5.86	6.45	2.136	3.766	0.98
11	5.936324	4.898308	5.74622	6.827988364	2.252752	3.562912	0.955457143
12	5.920658446	4.861185067	5.653970291	7.145717697	2.353546051	3.387202371	0.927645029
13	5.913097345	4.831188181	5.579401752	7.413039875	2.441093059	3.235666686	0.897590361
14	5.912071101	4.807120999	5.519356635	7.638210689	2.517624764	3.105413749	0.866115928
15	5.916287799	4.787992482	5.471245439	7.828146174	2.584977008	2.993846723	0.833876431
16	5.924684763	4.772982203	5.432945395	7.988638163	2.644658993	2.898642596	0.801388352
17	5.936388599	4.761411304	5.402716818	8.124535502	2.697910812	2.817730946	0.769054798
18	5.950682223	4.752718224	5.379134248	8.239896311	2.745751167	2.749272682	0.737186163
19	5.966977655	4.746438463	5.361029792	8.338115887	2.789016896	2.691639274	0.706017289
20	5.984793574	4.74218772	5.347446547	8.422034088	2.828395663	2.643392815	0.675721687
21	6.003736778	4.739647893	5.337600351	8.494025461	2.864452947	2.603267153	0.646423321
22	6.023486879	4.738555449	5.330848381	8.556074871	2.897654293	2.570150243	0.618206338
23	6.043783663	4.738691803	5.326663402	8.60984092	2.928383628	2.543067772	0.591123095
24	6.064416633	4.739875354	5.324612668	8.656709127	2.956958299	2.521168107	0.565200768
25	6.085216369	4.741954918	5.324340646	8.697836504	2.983641416	2.503708539	0.54044677
26	6.106047377	4.744804315	5.325554881	8.734188902	3.008651944	2.490042781	0.51685319
27	6.126802164	4.74831791	5.328014442	8.766572293	3.032172952	2.479609673	0.494400409
28	6.147396336	4.752406957	5.331520483	8.795658973	3.054358334	2.471923019	0.473060043
29	6.167764528	4.7569966	5.335908543	8.822009491	3.075338278	2.466562466	0.452797316
30	6.187857029	4.762023409	5.341042259	8.84609101	3.095223705	2.463165376	0.433572975
31	6.207636985	4.767433377	5.346808244	8.868292662	3.114109862	2.461419575	0.415344823
32	6.227078069	4.773180272	5.353111918	8.888938402	3.132079226	2.461056929	0.398068927
33	6.246162547	4.779224297	5.359874108	8.90829775	3.149203847	2.461847654	0.381700579

	I	J	К	L	М	N	0
1	[val] of turtle 8	[val] of turtle 9	[val] of turtle 10	[val] of turtle 11	[val] of turtle 12	[val] of turtle 13	[val] of turtle 14
34	6.264879677	4.785531001	5.367028283	8.926594782	3.165547229	2.463595295	0.366195035
35	6.283224364	4.792070379	5.374518304	8.944015637	3.181165843	2.4661323	0.351508092
36	6.301196059	4.798816156	5.382296594	8.960714799	3.196110336	2.469316141	0.33759651
37	6.318797825	4.805745185	5.390322647	8.976820343	3.210426503	2.473025906	0.324418337
38	6.336035581	4.812836971	5.398561816	8.992438318	3.224156052	2.477159318	0.311933128
39	6.352917453	4.82007327	5.406984325	9.00765641	3.237337228	2.481630138	0.300102101
40	6.369453258	4.827437771	5.415564464	9.022546998	3.2500053	2.486365895	0.28888823
41	6.385654056	4.834915827	5.42427993	9.037169712	3.262192954	2.491305916	0.278256292
42	6.401531797	4.842494237	5.43311129	9.051573564	3.273930605	2.496399616	0.268172883
43	6.41709902	4.850161064	5.442041542	9.065798724	3.285246649	2.501605016	0.258606398
44	6.43236861	4.857905489	5.45105575	9.079878012	3.296167667	2.506887455	0.249527003
45	6.447353602	4.865717678	5.460140748	9.093838137	3.306718585	2.512218491	0.240906578
46	6.462067016	4.87358868	5.46928489	9.107700728	3.316922811	2.517574941	0.232718657
47	6.476521729	4.881510332	5.478477848	9.1214832	3.326802346	2.522938061	0.22493836
48	6.490730375	4.889475188	5.487710435	9.135199475	3.336377881	2.528292844	0.21754232
49	6.504705261	4.897476446	5.496974469	9.14886058	3.34566887	2.533627415	0.210508604
50	6.518458306	4.90550789	5.506262642	9.16247515	3.354693611	2.538932514	0.203816638
51	6.532000995	4.913563839	5.515568424	9.176049843	3.363469299	2.544201055	0.197447127
52	6.545344346	4.921639101	5.524885969	9.189589692	3.372012087	2.549427754	0.191381985
53	6.558498887	4.929728932	5.534210041	9.203098389	3.380337139	2.554608807	0.185604257
54	6.571474642	4.937828997	5.543535949	9.216578532	3.388458677	2.559741625	0.18009805
55	6.584281123	4.945935336	5.552859484	9.230031822	3.396390026	2.5648246	0.174848467
56	6.596927334	4.954044336	5.562176876	9.243459231	3.40414366	2.569856917	0.16984154
57	6.609421773	4.962152698	5.571484741	9.256861143	3.411731245	2.574838392	0.165064173
58	6.621772439	4.970257416	5.580780048	9.270237468	3.419163676	2.579769337	0.160504078
59	6.633986846	4.978355747	5.590060078	9.283587737	3.42645112	2.584650446	0.156149728
60	6.646072038	4.986445195	5.599322398	9.296911186	3.433603052	2.589482704	0.151990302
61	6.658034603	4.994523484	5.608564825	9.310206813	3.440628293	2.594267311	0.14801564
62	6.669880691	5.002588544	5.617785407	9.323473444	3.447535046	2.599005614	0.144216196
63	6.681616032	5.010638492	5.626982397	9.336709768	3.454330931	2.603699059	0.140582999
64	6.693245956	5.018671613	5.63615423	9.34991438	3.461023016	2.608349149	0.13710761
65	6.704775413	5.026686349	5.645299509	9.363085811	3.467617854	2.612957411	0.133782093

	I	J	К	L	М	N	0
1	[val] of turtle 8	[val] of turtle 9	[val] of turtle 10	[val] of turtle 11	[val] of turtle 12	[val] of turtle 13	[val] of turtle 14
66	6.716208989	5.03468128	5.654416982	9.376222551	3.47412151	2.617525366	0.130598976
67	6.727550932	5.042655117	5.663505532	9.389323069	3.480539593	2.622054514	0.127551221
68	6.738805163	5.050606685	5.672564157	9.402385834	3.486877285	2.626546311	0.124632197
69	6.749975301	5.058534917	5.681591963	9.415409322	3.493139366	2.631002165	0.121835652
70	6.761064679	5.066438837	5.690588148	9.428392035	3.499330246	2.63542342	0.119155687
71	6.772076362	5.074317559	5.699551993	9.441332501	3.505453981	2.639811356	0.116586734
72	6.783013163	5.082170274	5.708482856	9.454229285	3.511514306	2.644167183	0.114123535
73	6.793877663	5.08999624	5.717380157	9.467080997	3.517514651	2.648492035	0.111761121
74	6.804672221	5.097794783	5.726243375	9.47988629	3.523458166	2.652786977	0.109494793
75	6.815398997	5.105565282	5.735072041	9.492643868	3.529347739	2.657053001	0.107320108
76	6.826059958	5.11330717	5.743865729	9.505352485	3.535186017	2.661291028	0.105232859
77	6.836656897	5.121019923	5.752624055	9.518010947	3.54097542	2.66550191	0.103229062
78	6.847191445	5.12870306	5.761346667	9.530618114	3.546718163	2.669686432	0.101304943
79	6.857665081	5.136356138	5.770033246	9.543172902	3.55241627	2.67384532	0.099456924
80	6.868079149	5.143978746	5.778683498	9.555674276	3.558071586	2.677979235	0.097681611
81	6.87843486	5.151570503	5.787297153	9.568121257	3.563685793	2.682088786	0.095975783
82	6.888733312	5.159131057	5.795873962	9.58051292	3.569260424	2.686174525	0.094336383
83	6.898975491	5.166660079	5.804413692	9.592848389	3.574796873	2.690236958	0.092760507
84	6.909162286	5.174157261	5.812916129	9.605126839	3.580296408	2.694276542	0.091245395
85	6.919294496	5.181622317	5.82138107	9.617347498	3.585760179	2.698293693	0.089788423
86	6.929372835	5.189054978	5.829808325	9.629509639	3.591189231	2.702288786	0.088387096
87	6.939397942	5.196454992	5.838197715	9.641612583	3.596584509	2.70626216	0.087039037
88	6.949370388	5.203822122	5.846549071	9.653655698	3.601946872	2.71021412	0.085741988
89	6.959290681	5.211156144	5.854862232	9.665638395	3.607277093	2.71414494	0.084493794
90	6.969159272	5.21845685	5.863137045	9.677560131	3.612575873	2.718054867	0.083292404
91	6.978976561	5.22572404	5.871373365	9.689420401	3.617843846	2.721944121	0.082135863
92	6.988742902	5.232957526	5.879571052	9.701218743	3.623081581	2.725812899	0.081022308
93	6.998458608	5.240157133	5.887729973	9.712954732	3.628289594	2.729661378	0.079949958
94	7.008123954	5.247322693	5.895850003	9.724627982	3.633468348	2.733489714	0.078917119
95	7.017739182	5.254454048	5.903931018	9.736238143	3.638618261	2.737298048	0.07792217
96	7.027304505	5.26155105	5.911972903	9.7477849	3.643739708	2.741086502	0.076963566
97	7.036820109	5.268613558	5.919975548	9.75926797	3.648833027	2.744855189	0.076039829

	I	J	К	L	М	N	0
1	[val] of turtle 8	[val] of turtle 9	[val] of turtle 10	[val] of turtle 11	[val] of turtle 12	[val] of turtle 13	[val] of turtle 14
98	7.046286157	5.27564144	5.927938846	9.770687104	3.653898521	2.748604207	0.075149548
99	7.055702793	5.282634572	5.935862698	9.782042082	3.658936463	2.752333642	0.074291374
100	7.065070142	5.289592837	5.943747008	9.793332717	3.663947099	2.756043573	0.073464019
101	7.074388314	5.296516126	5.951591686	9.804558846	3.668930649	2.759734069	0.072666249
102	7.083657407	5.303404339	5.959396649	9.815720336	3.673887311	2.763405193	0.071896885
103	7.092877506	5.31025738	5.967161815	9.826817081	3.678817264	2.767056999	0.071154798
104	7.102048688	5.317075163	5.974887112	9.837848999	3.68372067	2.770689537	0.070438909
105	7.111171023	5.323857608	5.982572472	9.84881603	3.688597672	2.774302853	0.069748184
106	7.120244573	5.330604642	5.99021783	9.859718141	3.693448403	2.777896989	0.069081633
107	7.129269396	5.337316199	5.99782313	9.870555317	3.698272982	2.781471982	0.068438308
108	7.138245548	5.343992219	6.00538832	9.881327566	3.703071518	2.785027867	0.0678173
109	7.14717308	5.35063265	6.012913355	9.892034916	3.707844109	2.788564677	0.06721774
110	7.156052044	5.357237446	6.020398194	9.902677414	3.712590847	2.792082444	0.066638794
111	7.164882488	5.363806569	6.027842804	9.913255125	3.717311816	2.795581198	0.066079662
112	7.173664463	5.370339985	6.035247157	9.92376813	3.722007093	2.799060967	0.065539578
113	7.18239802	5.376837669	6.042611231	9.934216529	3.726676753	2.80252178	0.065017807
114	7.191083211	5.383299601	6.049935009	9.944600436	3.731320863	2.805963666	0.064513645
115	7.199720091	5.389725769	6.057218482	9.95491998	3.735939488	2.809386653	0.064026416
116	7.208308717	5.396116165	6.064461647	9.965175305	3.740532691	2.812790769	0.06355547
117	7.216849148	5.402470789	6.071664505	9.975366568	3.745100531	2.816176043	0.063100186
118	7.225341449	5.408789646	6.078827065	9.985493939	3.749643067	2.819542506	0.062659967
119	7.233785684	5.415072749	6.085949341	9.995557599	3.754160354	2.822890187	0.06223424
120	7.242181925	5.421320115	6.093031355	10.00555774	3.758652449	2.826219118	0.061822454
121	7.250530247	5.427531768	6.100073133	10.01549457	3.763119407	2.829529332	0.061424081
122	7.258830728	5.433707737	6.107074707	10.02536831	3.767561283	2.832820862	0.061038615
123	7.267083451	5.439848058	6.114036115	10.03517916	3.771978132	2.836093742	0.060665567
124	7.275288503	5.445952771	6.120957402	10.04492738	3.776370009	2.839348011	0.060304471
125	7.283445978	5.452021922	6.127838618	10.0546132	3.780736971	2.842583704	0.059954878
126	7.291555971	5.458055564	6.134679819	10.06423687	3.785079073	2.845800862	0.059616355
127	7.299618584	5.464053753	6.141481066	10.07379865	3.789396375	2.848999524	0.059288488
128	7.307633922	5.470016551	6.148242425	10.0832988	3.793688934	2.852179732	0.05897088
129	7.315602098	5.475944026	6.154963969	10.09273759	3.79795681	2.855341531	0.058663147

	I	J	К	L	М	N	0
1	[val] of turtle 8	[val] of turtle 9	[val] of turtle 10	[val] of turtle 11	[val] of turtle 12	[val] of turtle 13	[val] of turtle 14
130	7.323523225	5.481836249	6.161645775	10.10211531	3.802200064	2.858484964	0.058364921
131	7.331397424	5.487693296	6.168287926	10.11143223	3.80641876	2.861610079	0.05807585
132	7.339224819	5.493515251	6.174890509	10.12068865	3.81061296	2.864716922	0.057795594
133	7.347005539	5.499302197	6.181453617	10.12988485	3.81478273	2.867805545	0.057523826
134	7.354739716	5.505054225	6.187977347	10.13902114	3.818928138	2.870875997	0.057260232
135	7.362427489	5.510771431	6.194461802	10.14809782	3.823049251	2.87392833	0.057004511
136	7.370068999	5.516453912	6.200907088	10.1571152	3.82714614	2.876962599	0.056756373
137	7.377664391	5.52210177	6.207313316	10.16607358	3.831218876	2.879978859	0.05651554
138	7.385213816	5.527715113	6.213680601	10.17497328	3.835267532	2.882977166	0.056281743
139	7.392717427	5.533294051	6.220009063	10.18381462	3.839292184	2.885957577	0.056054724
140	7.400175381	5.538838696	6.226298825	10.19259792	3.843292908	2.888920152	0.055834236
141	7.407587839	5.544349166	6.232550015	10.2013235	3.84726978	2.891864951	0.05562004
142	7.414954966	5.549825581	6.238762763	10.20999168	3.851222882	2.894792036	0.055411908
143	7.422276929	5.555268065	6.244937205	10.21860278	3.855152294	2.897701469	0.055209619
144	7.4295539	5.560676745	6.251073478	10.22715715	3.859058098	2.900593314	0.05501296
145	7.436786053	5.566051749	6.257171724	10.23565511	3.862940378	2.903467637	0.054821729
146	7.443973565	5.571393211	6.263232088	10.24409698	3.866799219	2.906324502	0.05463573
147	7.451116617	5.576701264	6.269254717	10.25248311	3.870634709	2.909163979	0.054454773
148	7.458215392	5.581976047	6.275239762	10.26081382	3.874446934	2.911986133	0.054278677
149	7.465270074	5.587217699	6.281187377	10.26908945	3.878235985	2.914791035	0.054107268
150	7.472280853	5.592426363	6.287097718	10.27731034	3.882001951	2.917578755	0.053940379
151	7.479247919	5.597602182	6.292970943	10.28547681	3.885744925	2.920349362	0.053777847
152	7.486171464	5.602745303	6.298807213	10.29358921	3.889464999	2.92310293	0.053619517
153	7.493051684	5.607855875	6.304606692	10.30164786	3.893162267	2.925839529	0.053465241
154	7.499888776	5.612934047	6.310369546	10.30965311	3.896836825	2.928559234	0.053314874
155	7.506682939	5.617979972	6.316095942	10.31760529	3.900488767	2.931262119	0.053168278
156	7.513434373	5.622993804	6.321786049	10.32550474	3.904118192	2.933948257	0.05302532
157	7.520143282	5.627975696	6.32744004	10.33335178	3.907725198	2.936617725	0.052885872
158	7.526809868	5.632925806	6.333058086	10.34114676	3.911309883	2.939270598	0.052749811
159	7.533434339	5.637844292	6.338640364	10.34889001	3.914872347	2.941906952	0.052617018
160	7.540016901	5.642731313	6.344187049	10.35658186	3.91841269	2.944526865	0.05248738
161	7.546557762	5.647587028	6.349698318	10.36422264	3.921931014	2.947130413	0.052360787

	I	J	К	L	М	N	0
1	[val] of turtle 8	[val] of turtle 9	[val] of turtle 10	[val] of turtle 11	[val] of turtle 12	[val] of turtle 13	[val] of turtle 14
162	7.553057133	5.6524116	6.355174352	10.37181269	3.925427421	2.949717676	0.052237133
163	7.559515223	5.65720519	6.360615329	10.37935232	3.928902014	2.952288731	0.052116317
164	7.565932244	5.661967963	6.366021431	10.38684188	3.932354896	2.954843658	0.051998241
165	7.57230841	5.666700081	6.371392841	10.3942817	3.93578617	2.957382535	0.051882811
166	7.578643932	5.671401709	6.376729741	10.40167209	3.939195942	2.959905442	0.051769936
167	7.584939027	5.676073013	6.382032315	10.40901338	3.942584317	2.962412459	0.05165953
168	7.591193908	5.680714159	6.387300749	10.4163059	3.9459514	2.964903666	0.051551508
169	7.597408791	5.685325313	6.392535228	10.42354998	3.949297296	2.967379144	0.051445791
170	7.603583893	5.689906643	6.397735938	10.43074592	3.952622113	2.969838974	0.0513423
171	7.609719429	5.694458315	6.402903065	10.43789406	3.955925957	2.972283235	0.051240961
172	7.615815617	5.698980497	6.408036796	10.4449947	3.959208935	2.974712011	0.051141702
173	7.621872673	5.703473357	6.41313732	10.45204818	3.962471155	2.977125381	0.051044454
174	7.627890816	5.707937064	6.418204823	10.4590548	3.965712725	2.979523428	0.050949149
175	7.633870263	5.712371784	6.423239494	10.46601487	3.968933751	2.981906233	0.050855725
176	7.63981123	5.716777688	6.42824152	10.47292872	3.972134343	2.984273878	0.05076412
177	7.645713938	5.721154942	6.433211091	10.47979664	3.975314609	2.986626445	0.050674273
178	7.651578602	5.725503715	6.438148394	10.48661895	3.978474657	2.988964015	0.050586129
179	7.657405441	5.729824176	6.443053618	10.49339596	3.981614596	2.99128667	0.050499631
180	7.663194673	5.734116493	6.447926951	10.50012796	3.984734535	2.993594493	0.050414728
181	7.668946515	5.738380833	6.452768581	10.50681527	3.987834582	2.995887565	0.050331367
182	7.674661184	5.742617365	6.457578697	10.51345818	3.990914846	2.998165969	0.050249501
183	7.680338897	5.746826256	6.462357486	10.520057	3.993975437	3.000429786	0.050169082
184	7.685979872	5.751007674	6.467105137	10.52661202	3.997016462	3.002679098	0.050090064
185	7.691584324	5.755161785	6.471821835	10.53312354	4.000038032	3.004913988	0.050012403
186	7.69715247	5.759288756	6.476507769	10.53959185	4.003040254	3.007134536	0.049936059
187	7.702684525	5.763388753	6.481163125	10.54601725	4.006023238	3.009340825	0.049860989
188	7.708180705	5.767461942	6.48578809	10.55240002	4.008987093	3.011532936	0.049787155
189	7.713641223	5.771508489	6.490382849	10.55874045	4.011931926	3.01371095	0.04971452
190	7.719066296	5.775528559	6.494947588	10.56503884	4.014857846	3.01587495	0.049643046
191	7.724456135	5.779522316	6.499482492	10.57129546	4.017764962	3.018025016	0.0495727
192	7.729810954	5.783489924	6.503987744	10.5775106	4.020653382	3.020161228	0.049503448
193	7.735130966	5.787431546	6.50846353	10.58368454	4.023523214	3.02228367	0.049435257

	I	J	К	L	М	N	0
1	[val] of turtle 8	[val] of turtle 9	[val] of turtle 10	[val] of turtle 11	[val] of turtle 12	[val] of turtle 13	[val] of turtle 14
194	7.740416383	5.791347346	6.512910031	10.58981755	4.026374565	3.024392419	0.049368096
195	7.745667415	5.795237485	6.517327432	10.59590993	4.029207544	3.026487559	0.049301935
196	7.750884272	5.799102126	6.521715913	10.60196193	4.032022257	3.028569168	0.049236746
197	7.756067166	5.802941428	6.526075657	10.60797384	4.034818812	3.030637327	0.049172501
198	7.761216304	5.806755554	6.530406843	10.61394592	4.037597316	3.032692115	0.049109172
199	7.766331896	5.810544662	6.534709653	10.61987845	4.040357874	3.034733614	0.049046734
200	7.771414147	5.814308911	6.538984264	10.6257717	4.043100595	3.036761901	0.048985163
201	7.776463266	5.81804846	6.543230856	10.63162592	4.045825583	3.038777056	0.048924434
202	7.781479458	5.821763467	6.547449606	10.63744139	4.048532944	3.040779158	0.048864523
203	7.786462928	5.825454088	6.551640691	10.64321837	4.051222784	3.042768286	0.04880541
204	7.79141388	5.829120479	6.555804288	10.64895711	4.053895208	3.044744519	0.048747072
205	7.796332517	5.832762797	6.559940572	10.65465788	4.056550321	3.046707934	0.048689489
206	7.801219042	5.836381195	6.564049717	10.66032092	4.059188227	3.048658609	0.048632641
207	7.806073657	5.839975828	6.568131897	10.66594651	4.061809031	3.050596622	0.048576508
208	7.810896562	5.843546848	6.572187285	10.67153489	4.064412835	3.052522051	0.048521073
209	7.815687956	5.847094409	6.576216054	10.67708631	4.066999744	3.054434972	0.048466318
210	7.820448039	5.850618662	6.580218373	10.68260102	4.06956986	3.056335462	0.048412224
211	7.825177008	5.854119757	6.584194414	10.68807927	4.072123286	3.058223597	0.048358777
212	7.82987506	5.857597845	6.588144347	10.6935213	4.074660124	3.060099454	0.048305959
213	7.834542392	5.861053074	6.592068339	10.69892736	4.077180477	3.061963109	0.048253755
214	7.839179198	5.864485594	6.595966558	10.7042977	4.079684444	3.063814636	0.048202151
215	7.843785671	5.867895551	6.599839171	10.70963255	4.082172128	3.065654111	0.048151132
216	7.848362006	5.871283093	6.603686344	10.71493215	4.084643629	3.067481609	0.048100684
217	7.852908394	5.874648365	6.607508241	10.72019675	4.087099046	3.069297205	0.048050795
218	7.857425026	5.877991512	6.611305028	10.72542656	4.089538481	3.071100972	0.048001451
219	7.861912093	5.881312679	6.615076867	10.73062184	4.091962031	3.072892985	0.047952639
220	7.866369782	5.884612009	6.61882392	10.73578281	4.094369796	3.074673316	0.047904348
221	7.870798283	5.887889644	6.622546348	10.7409097	4.096761875	3.076442039	0.047856567
222	7.875197782	5.891145727	6.626244312	10.74600274	4.099138364	3.078199227	0.047809283
223	7.879568466	5.894380398	6.629917971	10.75106216	4.101499362	3.079944953	0.047762487
224	7.883910519	5.897593798	6.633567484	10.75608819	4.103844965	3.081679287	0.047716168
225	7.888224125	5.900786065	6.637193009	10.76108105	4.106175271	3.083402303	0.047670316

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1	[val] of turtle 8	[val] of turtle 9	[val] of turtle 10	[val] of turtle 11	[val] of turtle 12	[val] of turtle 13	[val] of turtle 14
226	7.892509467	5.903957338	6.640794701	10.76604095	4.108490375	3.085114071	0.047624921
227	7.896766728	5.907107754	6.644372717	10.77096813	4.110790373	3.086814662	0.047579973
228	7.900996087	5.91023745	6.647927212	10.77586281	4.11307536	3.088504148	0.047535465
229	7.905197726	5.913346563	6.651458338	10.78072519	4.11534543	3.090182598	0.047491386
230	7.909371822	5.916435227	6.65496625	10.7855555	4.117600679	3.091850082	0.047447729
231	7.913518554	5.919503576	6.658451099	10.79035395	4.119841199	3.093506671	0.047404485
232	7.917638098	5.922551743	6.661913036	10.79512075	4.122067084	3.095152432	0.047361647
233	7.921730631	5.925579862	6.665352211	10.79985612	4.124278426	3.096787436	0.047319206
234	7.925796327	5.928588064	6.668768774	10.80456027	4.126475319	3.09841175	0.047277156
235	7.929835359	5.931576479	6.672162873	10.8092334	4.128657853	3.100025442	0.04723549
236	7.933847901	5.934545239	6.675534654	10.81387573	4.130826121	3.101628582	0.047194199
237	7.937834124	5.937494471	6.678884266	10.81848745	4.132980212	3.103221234	0.047153279
238	7.941794199	5.940424305	6.682211852	10.82306878	4.135120218	3.104803468	0.047112721
239	7.945728296	5.943334868	6.685517558	10.82761991	4.137246227	3.106375349	0.047072521
240	7.949636583	5.946226287	6.688801527	10.83214105	4.139358331	3.107936944	0.047032671
241	7.953519227	5.949098688	6.692063902	10.83663239	4.141456616	3.109488318	0.046993166
242	7.957376396	5.951952195	6.695304825	10.84109414	4.143541173	3.111029537	0.046954001
243	7.961208255	5.954786935	6.698524438	10.8455265	4.145612088	3.112560667	0.046915169
244	7.965014969	5.957603029	6.701722879	10.84992965	4.147669449	3.114081772	0.046876665
245	7.968796701	5.9604006	6.704900288	10.8543038	4.149713343	3.115592917	0.046838485
246	7.972553613	5.963179772	6.708056804	10.85864913	4.151743857	3.117094165	0.046800623
247	7.976285869	5.965940664	6.711192563	10.86296585	4.153761076	3.11858558	0.046763075
248	7.979993627	5.968683397	6.714307703	10.86725413	4.155765086	3.120067226	0.046725834
249	7.983677048	5.971408092	6.717402359	10.87151417	4.157755971	3.121539166	0.046688898
250	7.987336291	5.974114866	6.720476666	10.87574615	4.159733817	3.123001462	0.046652262
251	7.990971513	5.976803837	6.723530757	10.87995027	4.161698708	3.124454177	0.04661592
252	7.99458287	5.979475124	6.726564766	10.88412671	4.163650726	3.125897371	0.04657987
253	7.998170519	5.982128842	6.729578824	10.88827565	4.165589955	3.127331108	0.046544106
254	8.001734614	5.984765108	6.732573064	10.89239727	4.167516477	3.128755448	0.046508625
255	8.005275309	5.987384035	6.735547615	10.89649176	4.169430375	3.130170451	0.046473424
256	8.008792756	5.98998574	6.738502607	10.90055929	4.17133173	3.131576179	0.046438498
257	8.012287109	5.992570334	6.741438169	10.90460005	4.173220623	3.132972691	0.046403843

		J	К	L	М	N	0
1	[val] of turtle 8	[val] of turtle 9	[val] of turtle 10	[val] of turtle 11	[val] of turtle 12	[val] of turtle 13	[val] of turtle 14
258	8.015758516	5.995137931	6.744354429	10.90861421	4.175097134	3.134360046	0.046369457
259	8.01920713	5.997688643	6.747251514	10.91260195	4.176961344	3.135738305	0.046335335
260	8.022633097	6.000222581	6.75012955	10.91656344	4.178813333	3.137107526	0.046301474
261	8.026036568	6.002739855	6.752988662	10.92049887	4.18065318	3.138467769	0.046267872
262	8.029417687	6.005240576	6.755828975	10.92440839	4.182480962	3.13981909	0.046234525
263	8.032776603	6.007724852	6.758650613	10.92829219	4.184296759	3.141161548	0.046201429
264	8.036113459	6.010192793	6.761453699	10.93215042	4.186100649	3.142495201	0.046168582
265	8.039428401	6.012644504	6.764238355	10.93598328	4.187892708	3.143820106	0.046135981
266	8.042721572	6.015080094	6.767004702	10.93979091	4.189673013	3.145136319	0.046103623
267	8.045993114	6.017499669	6.769752861	10.94357349	4.191441642	3.146443898	0.046071505
268	8.049243169	6.019903334	6.772482952	10.94733118	4.193198668	3.147742898	0.046039624
269	8.052471878	6.022291194	6.775195093	10.95106415	4.194944169	3.149033375	0.046007978
270	8.055679379	6.024663353	6.777889403	10.95477256	4.196678219	3.150315385	0.045976564
271	8.058865813	6.027019914	6.780565999	10.95845657	4.198400892	3.151588983	0.04594538
272	8.062031318	6.029360981	6.783224998	10.96211636	4.200112262	3.152854223	0.045914423
273	8.065176029	6.031686656	6.785866516	10.96575206	4.201812404	3.15411116	0.04588369
274	8.068300085	6.033997039	6.788490667	10.96936385	4.203501389	3.155359849	0.04585318
275	8.071403619	6.036292232	6.791097567	10.97295189	4.205179291	3.156600342	0.04582289
276	8.074486766	6.038572335	6.793687328	10.97651632	4.206846183	3.157832693	0.045792818
277	8.077549661	6.040837446	6.796260064	10.98005731	4.208502135	3.159056956	0.045762961
278	8.080592435	6.043087666	6.798815886	10.98357501	4.210147219	3.160273184	0.045733317
279	8.083615221	6.045323091	6.801354907	10.98706958	4.211781506	3.161481428	0.045703885
280	8.08661815	6.04754382	6.803877236	10.99054116	4.213405066	3.16268174	0.045674662
281	8.089601352	6.049749949	6.806382984	10.99398991	4.21501797	3.163874173	0.045645645
282	8.092564956	6.051941575	6.808872259	10.99741598	4.216620286	3.165058778	0.045616834
283	8.095509091	6.054118792	6.81134517	11.00081952	4.218212085	3.166235606	0.045588226
284	8.098433884	6.056281696	6.813801825	11.00420068	4.219793434	3.167404709	0.045559819
285	8.101339463	6.058430381	6.816242332	11.00755961	4.221364401	3.168566135	0.045531612
286	8.104225953	6.06056494	6.818666795	11.01089644	4.222925056	3.169719936	0.045503602
287	8.10709348	6.062685467	6.821075321	11.01421134	4.224475464	3.170866161	0.045475788
288	8.109942167	6.064792055	6.823468015	11.01750444	4.226015694	3.172004861	0.045448167
289	8.11277214	6.066884794	6.82584498	11.02077589	4.22754581	3.173136083	0.045420739

	I	J	К	L	М	N	0
1	[val] of turtle 8	[val] of turtle 9	[val] of turtle 10	[val] of turtle 11	[val] of turtle 12	[val] of turtle 13	[val] of turtle 14
290	8.11558352	6.068963776	6.828206321	11.02402582	4.229065881	3.174259877	0.045393501
291	8.118376429	6.071029091	6.83055214	11.02725439	4.230575971	3.175376292	0.045366452
292	8.121150989	6.073080831	6.83288254	11.03046173	4.232076145	3.176485376	0.04533959
293	8.12390732	6.075119083	6.835197621	11.03364799	4.233566468	3.177587177	0.045312913
294	8.126645542	6.077143937	6.837497485	11.03681329	4.235047006	3.178681742	0.045286421
295	8.129365773	6.079155481	6.839782232	11.03995779	4.236517821	3.179769119	0.04526011
296	8.132068132	6.081153802	6.842051961	11.04308161	4.237978977	3.180849355	0.04523398
297	8.134752736	6.083138988	6.844306772	11.04618489	4.239430539	3.181922497	0.04520803
298	8.137419701	6.085111125	6.846546761	11.04926778	4.240872567	3.182988591	0.045182257
299	8.140069144	6.087070299	6.848772028	11.05233039	4.242305126	3.184047683	0.045156661
300	8.142701179	6.089016595	6.850982668	11.05537288	4.243728276	3.185099819	0.045131239
301	8.145315921	6.090950099	6.853178778	11.05839536	4.24514208	3.186145045	0.04510599
302	8.147913482	6.092870893	6.855360454	11.06139797	4.246546598	3.187183405	0.045080914
303	8.150493977	6.094779062	6.85752779	11.06438085	4.247941892	3.188214946	0.045056008
304	8.153057517	6.096674689	6.859680881	11.06734411	4.249328021	3.189239711	0.045031271
305	8.155604213	6.098557857	6.861819821	11.0702879	4.250705047	3.190257745	0.045006702
306	8.158134176	6.100428647	6.863944702	11.07321234	4.252073028	3.191269093	0.0449823
307	8.160647516	6.10228714	6.866055618	11.07611755	4.253432024	3.192273797	0.044958063
308	8.163144341	6.104133419	6.868152659	11.07900367	4.254782093	3.193271902	0.04493399
309	8.165624762	6.105967563	6.870235918	11.08187081	4.256123295	3.19426345	0.044910079
310	8.168088884	6.107789651	6.872305485	11.08471911	4.257455687	3.195248486	0.04488633
311	8.170536815	6.109599764	6.874361449	11.08754869	4.258779326	3.19622705	0.044862741
312	8.172968662	6.11139798	6.876403902	11.09035967	4.260094272	3.197199187	0.044839311
313	8.17538453	6.113184377	6.878432931	11.09315217	4.261400579	3.198164937	0.044816038
314	8.177784525	6.114959034	6.880448624	11.09592632	4.262698306	3.199124343	0.044792922
315	8.180168749	6.116722027	6.88245107	11.09868223	4.263987508	3.200077447	0.044769962
316	8.182537308	6.118473432	6.884440355	11.10142003	4.265268241	3.20102429	0.044747155
317	8.184890303	6.120213327	6.886416566	11.10413983	4.266540561	3.201964912	0.044724501
318	8.187227837	6.121941787	6.88837979	11.10684176	4.267804523	3.202899355	0.044702
319	8.189550012	6.123658887	6.890330111	11.10952593	4.269060182	3.20382766	0.044679649
320	8.191856928	6.125364702	6.892267614	11.11219246	4.270307591	3.204749866	0.044657447
321	8.194148687	6.127059307	6.894192384	11.11484146	4.271546806	3.205666013	0.044635395
	I	J	К	L	М	N	0
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1	[val] of turtle 8	[val] of turtle 9	[val] of turtle 10	[val] of turtle 11	[val] of turtle 12	[val] of turtle 13	[val] of turtle 14
322	8.196425386	6.128742774	6.896104504	11.11747305	4.27277788	3.206576142	0.044613489
323	8.198687125	6.130415177	6.898004058	11.12008735	4.274000866	3.207480291	0.04459173
324	8.200934003	6.132076589	6.899891128	11.12268446	4.275215818	3.2083785	0.044570116
325	8.203166117	6.133727082	6.901765796	11.12526451	4.276422789	3.209270809	0.044548647
326	8.205383565	6.135366728	6.903628145	11.12782759	4.277621829	3.210157255	0.04452732
327	8.207586441	6.136995598	6.905478254	11.13037384	4.278812993	3.211037877	0.044506136
328	8.209774843	6.138613764	6.907316204	11.13290334	4.27999633	3.211912713	0.044485093
329	8.211948865	6.140221295	6.909142075	11.13541623	4.281171894	3.212781802	0.04446419
330	8.214108601	6.141818261	6.910955948	11.1379126	4.282339734	3.213645181	0.044443426
331	8.216254147	6.143404733	6.9127579	11.14039256	4.283499901	3.214502887	0.0444228
332	8.218385594	6.144980778	6.914548009	11.14285622	4.284652446	3.215354959	0.044402312
333	8.220503035	6.146546466	6.916326355	11.1453037	4.285797419	3.216201432	0.044381959
334	8.222606563	6.148101864	6.918093014	11.14773508	4.286934869	3.217042343	0.044361742
335	8.224696268	6.149647041	6.919848063	11.15015049	4.288064847	3.21787773	0.044341659
336	8.226772242	6.151182063	6.921591578	11.15255003	4.2891874	3.218707628	0.04432171
337	8.228834575	6.152706998	6.923323635	11.15493379	4.290302577	3.219532073	0.044301892
338	8.230883357	6.154221911	6.92504431	11.15730189	4.291410428	3.220351101	0.044282207
339	8.232918676	6.155726868	6.926753677	11.15965443	4.292511	3.221164748	0.044262652
340	8.234940621	6.157221935	6.928451811	11.16199151	4.293604341	3.22197305	0.044243226
341	8.236949279	6.158707178	6.930138785	11.16431323	4.294690498	3.22277604	0.044223929
342	8.238944739	6.160182659	6.931814673	11.16661969	4.295769519	3.223573754	0.04420476
343	8.240927087	6.161648445	6.933479548	11.16891099	4.29684145	3.224366227	0.044185718
344	8.242896408	6.163104598	6.935133482	11.17118723	4.297906339	3.225153493	0.044166802
345	8.244852789	6.164551181	6.936776548	11.17344852	4.29896423	3.225935587	0.044148011
346	8.246796315	6.165988259	6.938408815	11.17569495	4.300015171	3.226712541	0.044129345
347	8.24872707	6.167415892	6.940030357	11.17792661	4.301059207	3.227484391	0.044110802
348	8.250645137	6.168834144	6.941641242	11.18014361	4.302096382	3.228251169	0.044092381
349	8.252550601	6.170243075	6.943241541	11.18234603	4.303126743	3.229012909	0.044074083
350	8.254443545	6.171642748	6.944831324	11.18453399	4.304150334	3.229769643	0.044055905
351	8.256324049	6.173033222	6.94641066	11.18670756	4.3051672	3.230521406	0.044037848
352	8.258192197	6.17441456	6.947979617	11.18886686	4.306177384	3.231268229	0.04401991
353	8.260048069	6.175786819	6.949538263	11.19101196	4.30718093	3.232010145	0.04400209

	I	J	К	L	М	Ν	0
1	[val] of turtle 8	[val] of turtle 9	[val] of turtle 10	[val] of turtle 11	[val] of turtle 12	[val] of turtle 13	[val] of turtle 14
354	8.261891745	6.177150061	6.951086668	11.19314296	4.308177883	3.232747186	0.043984388
355	8.263723307	6.178504345	6.952624897	11.19525997	4.309168285	3.233479384	0.043966804
356	8.265542834	6.179849729	6.954153017	11.19736306	4.310152179	3.234206771	0.043949335
357	8.267350404	6.181186272	6.955671096	11.19945233	4.311129608	3.234929379	0.043931981
358	8.269146097	6.182514031	6.957179199	11.20152787	4.312100615	3.235647238	0.043914742
359	8.27092999	6.183833066	6.958677391	11.20358977	4.313065242	3.236360381	0.043897617
360	8.272702161	6.185143432	6.960165738	11.20563812	4.314023531	3.237068837	0.043880605
361	8.274462687	6.186445188	6.961644305	11.20767301	4.314975523	3.237772639	0.043863705
362	8.276211645	6.187738389	6.963113156	11.20969452	4.315921259	3.238471816	0.043846916
363	8.277949109	6.189023092	6.964572354	11.21170276	4.316860782	3.239166399	0.043830238
364	8.279675157	6.190299353	6.966021963	11.21369779	4.317794131	3.239856418	0.043813671
365	8.281389863	6.191567227	6.967462046	11.21567972	4.318721347	3.240541903	0.043797212
366	8.283093301	6.19282677	6.968892667	11.21764862	4.31964247	3.241222884	0.043780862
367	8.284785546	6.194078035	6.970313886	11.21960459	4.320557541	3.24189939	0.04376462
368	8.286466671	6.195321078	6.971725765	11.2215477	4.3214666	3.242571451	0.043748484
369	8.288136749	6.196555953	6.973128367	11.22347804	4.322369685	3.243239095	0.043732456
370	8.289795853	6.197782713	6.974521752	11.2253957	4.323266836	3.243902353	0.043716532
371	8.291444055	6.199001411	6.97590598	11.22730075	4.324158092	3.244561253	0.043700714
372	8.293081426	6.200212101	6.977281113	11.22919329	4.325043491	3.245215823	0.043685
373	8.294708038	6.201414835	6.978647209	11.23107339	4.325923073	3.245866092	0.043669389
374	8.296323962	6.202609666	6.980004327	11.23294113	4.326796875	3.246512088	0.043653881

	Р	Q	R	S	Т	U	V
1	[val] of turtle 15	[val] of turtle 16	[val] of turtle 17	[val] of turtle 18	[val] of turtle 19	[val] of turtle 20	[val] of turtle 21
2	0.258633544	0.388229393	5.45E-21	3.080076218	0.076852031	0.043653881	3.845895814
3	0.258633544	0.388229393	5.45E-21	2.980390656	0.076852031	0.043653881	1
4	1	1	1	3.300331812	2	1	4.285771642
5	0.304744697	0.444153469	0.02276867	3.053929602	0.229486411	0.106440289	3.945715888
6	365	365	365	365	365	365	365
7							
8	[val] of turtle 15	[val] of turtle 16	[val] of turtle 17	[val] of turtle 18	[val] of turtle 19	[val] of turtle 20	[val] of turtle 21
9	1	1	1	3	2	1	1
10	0.964545455	0.974545455	0.88	3.096545455	1.978	0.96	1.222
11	0.929330909	0.950712727	0.7744	3.168530494	1.947393143	0.919657143	1.426832156
12	0.894572292	0.928184801	0.681472	3.220744178	1.909949486	0.879597029	1.615683963
13	0.860461471	0.906723711	0.59969536	3.257107087	1.867165362	0.840284761	1.789740927
14	0.827164667	0.886153526	0.527731917	3.280826064	1.820302911	0.80205756	1.950160117
15	0.794822195	0.866346574	0.464404087	3.294521466	1.770423941	0.765151343	2.098052014
16	0.763549145	0.847212339	0.408675596	3.300331812	1.718418959	0.729722358	2.234468677
17	0.733436712	0.828688549	0.359634525	3.299999821	1.665032064	0.695864714	2.360396703
18	0.704553947	0.81073407	0.316478382	3.29494316	1.6108823	0.663624556	2.476753751
19	0.67694975	0.793323269	0.278500976	3.286312613	1.556481984	0.63301148	2.58438769
20	0.65065498	0.776441578	0.245080859	3.275039906	1.502252438	0.604007686	2.684077629
21	0.625684589	0.760082033	0.215671156	3.261877031	1.448537491	0.576575277	2.776536265
22	0.602039703	0.7442426	0.189790617	3.247428578	1.395615073	0.550662053	2.8624131
23	0.579709605	0.72892414	0.167015743	3.232178319	1.343707171	0.526206077	2.942298213
24	0.558673599	0.714128883	0.146973854	3.216511077	1.292988363	0.503139236	3.016726327
25	0.538902718	0.699859308	0.129336991	3.200730696	1.243593158	0.481390003	3.086180994
26	0.520361279	0.68611734	0.113816552	3.185074835	1.195622274	0.460885546	3.151098752
27	0.503008282	0.672903813	0.100158566	3.169727119	1.149148036	0.441553315	3.211873186
28	0.48679865	0.660218113	0.088139538	3.154827146	1.104218989	0.42332221	3.268858795
29	0.471684318	0.648057984	0.077562794	3.140478709	1.060863851	0.406123424	3.322374656
30	0.457615186	0.636419448	0.068255258	3.126756563	1.019094897	0.38989102	3.372707842
31	0.44453993	0.6252968	0.060064627	3.113711983	0.978910848	0.374562306	3.420116581
32	0.432406704	0.614682683	0.052856872	3.101377337	0.940299333	0.36007805	3.464833172
33	0.421163722	0.604568185	0.046514047	3.089769849	0.903238986	0.346382578	3.507066643

	Р	Q	R	S	Т	U	V
1	[val] of turtle 15	[val] of turtle 16	[val] of turtle 17	[val] of turtle 18	[val] of turtle 19	[val] of turtle 20	[val] of turtle 21
34	0.410759753	0.594942986	0.040932362	3.07889468	0.867701241	0.333423775	3.547005176
35	0.401144512	0.585795506	0.036020478	3.068747467	0.833651834	0.321153024	3.584818296
36	0.39226899	0.57711307	0.031698021	3.0593164	0.801052097	0.309525096	3.620658857
37	0.384085702	0.568882075	0.027894258	3.050583927	0.769860035	0.298498001	3.65466482
38	0.376548888	0.561088151	0.024546947	3.042528149	0.740031237	0.28803282	3.686960858
39	0.36961465	0.55371632	0.021601314	3.035123956	0.711519643	0.278093531	3.717659787
40	0.363241056	0.546751138	0.019009156	3.02834396	0.684278182	0.268646817	3.74686385
41	0.357388197	0.540176841	0.016728057	3.022159244	0.658259298	0.259661881	3.774665857
42	0.352018225	0.533977463	0.01472069	3.016539976	0.633415393	0.251110264	3.801150212
43	0.347095349	0.528136957	0.012954208	3.0114559	0.609699178	0.242965665	3.826393813
44	0.342585824	0.522639291	0.011399703	3.00687673	0.587063973	0.235203772	3.850466866
45	0.338457912	0.517468543	0.010031738	3.002772464	0.565463933	0.227802101	3.873433599
46	0.334681836	0.512608981	0.00882793	2.999113629	0.544854238	0.220739849	3.8953529
47	0.331229717	0.508045126	0.007768578	2.995871475	0.525191232	0.213997746	3.916278883
48	0.328075511	0.503761819	0.006836349	2.99301812	0.506432537	0.207557932	3.936261389
49	0.325194929	0.499744262	0.006015987	2.990526657	0.48853713	0.201403831	3.955346434
50	0.322565361	0.495978065	0.005294069	2.988371237	0.471465394	0.195520045	3.9735766
51	0.320165796	0.492449276	0.00465878	2.986527119	0.455179162	0.18989225	3.990991388
52	0.317976737	0.489144407	0.004099727	2.984970701	0.439641722	0.184507107	4.007627525
53	0.31598012	0.486050454	0.003607759	2.983679542	0.42481783	0.179352173	4.023519246
54	0.314159233	0.483154913	0.003174828	2.98263236	0.410673697	0.174415829	4.038698532
55	0.312498634	0.480445784	0.002793849	2.981809022	0.39717697	0.169687206	4.053195331
56	0.310984072	0.477911579	0.002458587	2.981190532	0.384296709	0.165156129	4.067037748
57	0.309602411	0.475541323	0.002163557	2.980759003	0.372003353	0.160813052	4.080252219
58	0.308341561	0.47332455	0.00190393	2.98049763	0.360268687	0.156649013	4.092863662
59	0.307190402	0.471251297	0.001675458	2.980390656	0.349065799	0.152655584	4.104895609
60	0.30613872	0.469312096	0.001474403	2.980423332	0.338369039	0.148824829	4.116370335
61	0.305177143	0.467497965	0.001297475	2.980581884	0.328153975	0.145149266	4.127308956
62	0.30429708	0.465800398	0.001141778	2.980853469	0.318397346	0.141621836	4.13773153
63	0.303490665	0.464211347	0.001004765	2.981226135	0.30907702	0.138235866	4.147657143
64	0.302750703	0.462723214	8.84E-04	2.98168878	0.300171945	0.134985045	4.157103982
65	0.302070616	0.461328829	7.78E-04	2.98223111	0.291662102	0.131863394	4.166089407

	Р	Q	R	S	Т	U	V
1	[val] of turtle 15	[val] of turtle 16	[val] of turtle 17	[val] of turtle 18	[val] of turtle 19	[val] of turtle 20	[val] of turtle 21
66	0.301444404	0.460021442	6.85E-04	2.982843597	0.283528464	0.12886525	4.17463001
67	0.300866591	0.4587947	6.03E-04	2.983517441	0.275752948	0.125985238	4.182741669
68	0.30033219	0.457642637	5.30E-04	2.984244528	0.268318374	0.123218253	4.190439602
69	0.299836662	0.456559653	4.67E-04	2.985017393	0.261208421	0.120559446	4.197738406
70	0.299375879	0.4555405	4.11E-04	2.985829183	0.254407587	0.118004205	4.2046521
71	0.298946096	0.454580263	3.61E-04	2.986673616	0.247901151	0.115548139	4.211194161
72	0.298543912	0.453674349	3.18E-04	2.987544953	0.241675131	0.113187069	4.217377556
73	0.298166246	0.452818465	2.80E-04	2.988437959	0.235716251	0.110917012	4.223214772
74	0.297810311	0.452008608	2.46E-04	2.989347874	0.230011903	0.10873417	4.228717842
75	0.297473588	0.451241045	2.17E-04	2.990270378	0.224550115	0.106634922	4.233898372
76	0.297153801	0.450512305	1.91E-04	2.991201568	0.219319519	0.104615809	4.238767559
77	0.296848901	0.449819155	1.68E-04	2.992137924	0.214309318	0.102673533	4.243336216
78	0.296557042	0.449158598	1.48E-04	2.993076282	0.209509259	0.100804941	4.247614787
79	0.296276566	0.448527849	1.30E-04	2.994013816	0.204909601	0.099007021	4.251613367
80	0.296005984	0.447924329	1.14E-04	2.994948004	0.200501095	0.097276895	4.255341716
81	0.295743966	0.447345651	1.01E-04	2.995876613	0.196274951	0.09561181	4.258809273
82	0.295489319	0.446789609	8.86E-05	2.996797674	0.192222819	0.094009134	4.262025172
83	0.295240983	0.446254166	7.79E-05	2.997709461	0.188336764	0.092466349	4.264998252
84	0.294998011	0.445737441	6.86E-05	2.998610474	0.184609245	0.090981045	4.26773707
85	0.294759565	0.445237704	6.04E-05	2.99949942	0.181033093	0.089550917	4.270249911
86	0.294524904	0.444753364	5.31E-05	3.000375195	0.177601493	0.088173755	4.272544797
87	0.294293372	0.444282958	4.67E-05	3.001236871	0.174307964	0.086847448	4.274629502
88	0.294064394	0.443825146	4.11E-05	3.002083678	0.171146344	0.085569969	4.276511552
89	0.293837466	0.443378699	3.62E-05	3.002914991	0.16811077	0.084339379	4.278198241
90	0.293612148	0.442942496	3.18E-05	3.003730318	0.165195664	0.083153821	4.279696636
91	0.29338806	0.44251551	2.80E-05	3.004529287	0.162395718	0.082011515	4.281013584
92	0.293164873	0.442096809	2.47E-05	3.005311633	0.159705879	0.080910753	4.282155719
93	0.292942306	0.441685542	2.17E-05	3.006077191	0.157121337	0.079849901	4.283129472
94	0.29272012	0.441280938	1.91E-05	3.006825884	0.154637513	0.078827392	4.283941072
95	0.292498115	0.440882299	1.68E-05	3.007557714	0.152250044	0.077841721	4.284596555
96	0.292276124	0.440488994	1.48E-05	3.008272752	0.149954774	0.076891449	4.285101773
97	0.292054011	0.440100453	1.30E-05	3.008971133	0.147747744	0.075975193	4.285462394

	Р	Q	R	S	Т	U	V
1	[val] of turtle 15	[val] of turtle 16	[val] of turtle 17	[val] of turtle 18	[val] of turtle 19	[val] of turtle 20	[val] of turtle 21
98	0.291831668	0.439716165	1.15E-05	3.009653047	0.145625178	0.075091627	4.285683909
99	0.29160901	0.439335669	1.01E-05	3.010318733	0.14358348	0.07423948	4.285771642
100	0.291385973	0.438958558	8.87E-06	3.010968473	0.141619219	0.073417532	4.285730746
101	0.291162513	0.438584464	7.81E-06	3.011602585	0.139729124	0.072624612	4.285566217
102	0.290938602	0.438213063	6.87E-06	3.012221417	0.137910072	0.071859599	4.285282894
103	0.290714228	0.43784407	6.04E-06	3.012825347	0.136159086	0.071121414	4.28488546
104	0.290489389	0.437477232	5.32E-06	3.013414772	0.134473324	0.070409023	4.284378457
105	0.290264098	0.437112329	4.68E-06	3.01399011	0.132850073	0.069721433	4.283766277
106	0.290038374	0.43674917	4.12E-06	3.014551792	0.131286743	0.069057692	4.283053178
107	0.289812246	0.43638759	3.62E-06	3.01510026	0.129780858	0.068416885	4.28224328
108	0.289585749	0.436027447	3.19E-06	3.015635966	0.128330057	0.067798133	4.281340571
109	0.289358927	0.435668623	2.81E-06	3.016159366	0.126932082	0.067200594	4.280348912
110	0.289131824	0.435311017	2.47E-06	3.016670918	0.125584774	0.066623458	4.27927204
111	0.288904492	0.434954548	2.17E-06	3.017171083	0.124286072	0.066065947	4.278113573
112	0.288676984	0.434599151	1.91E-06	3.01766032	0.123034004	0.065527314	4.276877007
113	0.288449357	0.434244773	1.68E-06	3.018139084	0.121826685	0.065006842	4.275565729
114	0.28822167	0.433891376	1.48E-06	3.018607827	0.120662311	0.064503843	4.274183014
115	0.287993982	0.433538934	1.30E-06	3.019066994	0.119539158	0.064017654	4.272732027
116	0.287766353	0.433187429	1.15E-06	3.019517022	0.118455574	0.06354764	4.271215831
117	0.287538845	0.432836854	1.01E-06	3.019958343	0.117409982	0.063093189	4.269637389
118	0.287311518	0.43248721	8.88E-07	3.020391375	0.116400869	0.062653715	4.267999562
119	0.287084433	0.432138504	7.82E-07	3.02081653	0.115426788	0.062228654	4.266305117
120	0.28685765	0.431790749	6.88E-07	3.021234208	0.114486353	0.061817464	4.264556728
121	0.286631228	0.431443965	6.05E-07	3.021644796	0.113578237	0.061419624	4.26275698
122	0.286405226	0.431098174	5.33E-07	3.022048673	0.11270117	0.061034634	4.260908369
123	0.286179699	0.430753404	4.69E-07	3.022446203	0.111853933	0.060662013	4.259013306
124	0.285954703	0.430409686	4.13E-07	3.022837739	0.11103536	0.060301298	4.257074121
125	0.285730292	0.430067052	3.63E-07	3.02322362	0.110244333	0.059952044	4.255093062
126	0.285506518	0.429725538	3.20E-07	3.023604175	0.10947978	0.059613825	4.253072302
127	0.285283431	0.42938518	2.81E-07	3.023979718	0.108740674	0.05928623	4.251013935
128	0.285061079	0.429046017	2.47E-07	3.02435055	0.10802603	0.058968865	4.248919985
129	0.284839509	0.428708088	2.18E-07	3.024716962	0.107334904	0.058661348	4.246792405

	Р	Q	R	S	Т	U	V
1	[val] of turtle 15	[val] of turtle 16	[val] of turtle 17	[val] of turtle 18	[val] of turtle 19	[val] of turtle 20	[val] of turtle 21
130	0.284618765	0.428371432	1.92E-07	3.025079229	0.10666639	0.058363317	4.244633077
131	0.28439889	0.428036088	1.69E-07	3.025437616	0.10601962	0.058074418	4.242443818
132	0.284179924	0.427702097	1.48E-07	3.025792375	0.105393761	0.057794316	4.240226381
133	0.283961906	0.427369497	1.31E-07	3.026143744	0.104788013	0.057522686	4.237982456
134	0.283744871	0.427038328	1.15E-07	3.026491953	0.10420161	0.057259215	4.23571367
135	0.283528856	0.426708627	1.01E-07	3.026837217	0.103633815	0.057003605	4.233421594
136	0.283313892	0.426380432	8.90E-08	3.02717974	0.103083921	0.056755565	4.231107741
137	0.283100009	0.42605378	7.83E-08	3.027519716	0.102551253	0.056514819	4.228773569
138	0.282887237	0.425728704	6.89E-08	3.027857327	0.102035157	0.0562811	4.226420482
139	0.282675603	0.42540524	6.06E-08	3.028192745	0.101535011	0.056054151	4.224049832
140	0.282465131	0.425083419	5.34E-08	3.028526133	0.101050213	0.055833725	4.221662923
141	0.282255844	0.424763273	4.70E-08	3.028857641	0.100580188	0.055619585	4.219261007
142	0.282047765	0.424444832	4.13E-08	3.029187413	0.100124384	0.055411502	4.216845291
143	0.281840913	0.424128124	3.64E-08	3.02951558	0.099682268	0.055209257	4.214416938
144	0.281635306	0.423813175	3.20E-08	3.029842267	0.099253331	0.055012638	4.211977063
145	0.28143096	0.423500012	2.82E-08	3.03016759	0.098837082	0.054821442	4.209526741
146	0.281227892	0.423188657	2.48E-08	3.030491655	0.098433051	0.054635474	4.207067006
147	0.281026114	0.422879133	2.18E-08	3.030814561	0.098040786	0.054454545	4.204598851
148	0.28082564	0.42257146	1.92E-08	3.031136401	0.097659852	0.054278474	4.20212323
149	0.280626478	0.422265659	1.69E-08	3.031457259	0.097289831	0.054107087	4.199641062
150	0.28042864	0.421961745	1.49E-08	3.031777211	0.096930323	0.053940218	4.197153227
151	0.280232134	0.421659735	1.31E-08	3.032096329	0.096580942	0.053777703	4.194660572
152	0.280036966	0.421359644	1.15E-08	3.032414676	0.096241318	0.05361939	4.192163909
153	0.279843142	0.421061484	1.01E-08	3.032732313	0.095911094	0.053465127	4.189664019
154	0.279650668	0.420765268	8.91E-09	3.03304929	0.095589928	0.053314772	4.187161651
155	0.279459547	0.420471005	7.84E-09	3.033365655	0.095277491	0.053168187	4.184657521
156	0.279269782	0.420178705	6.90E-09	3.033681451	0.094973468	0.053025239	4.18215232
157	0.279081374	0.419888375	6.07E-09	3.033996714	0.094677553	0.0528858	4.179646707
158	0.278894326	0.419600021	5.34E-09	3.034311476	0.094389455	0.052749747	4.177141314
159	0.278708636	0.419313649	4.70E-09	3.034625767	0.094108893	0.052616961	4.174636749
160	0.278524305	0.419029262	4.14E-09	3.03493961	0.093835597	0.05248733	4.172133593
161	0.278341331	0.418746863	3.64E-09	3.035253025	0.093569306	0.052360742	4.1696324

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1	[val] of turtle 15	[val] of turtle 16	[val] of turtle 17	[val] of turtle 18	[val] of turtle 19	[val] of turtle 20	[val] of turtle 21
162	0.278159711	0.418466454	3.21E-09	3.03556603	0.093309772	0.052237093	4.167133703
163	0.277979443	0.418188034	2.82E-09	3.035878636	0.093056754	0.052116281	4.164638011
164	0.277800523	0.417911605	2.48E-09	3.036190854	0.092810021	0.051998209	4.162145812
165	0.277622947	0.417637164	2.18E-09	3.036502692	0.09256935	0.051882782	4.15965757
166	0.277446711	0.417364708	1.92E-09	3.036814152	0.09233453	0.051769911	4.15717373
167	0.27727181	0.417094236	1.69E-09	3.037125238	0.092105353	0.051659508	4.154694717
168	0.277098238	0.416825741	1.49E-09	3.037435948	0.091881622	0.051551489	4.152220936
169	0.276925988	0.416559221	1.31E-09	3.037746279	0.091663148	0.051445773	4.149752775
170	0.276755054	0.416294668	1.15E-09	3.038056226	0.091449748	0.051342284	4.147290603
171	0.27658543	0.416032077	1.01E-09	3.038365783	0.091241245	0.051240947	4.144834771
172	0.276417108	0.41577144	8.93E-10	3.03867494	0.091037471	0.051141689	4.142385615
173	0.276250081	0.415512751	7.86E-10	3.038983688	0.090838263	0.051044442	4.139943453
174	0.27608434	0.415255999	6.91E-10	3.039292014	0.090643464	0.050949139	4.13750859
175	0.275919877	0.415001178	6.08E-10	3.039599906	0.090452924	0.050855717	4.135081314
176	0.275756685	0.414748276	5.35E-10	3.039907349	0.090266498	0.050764112	4.1326619
177	0.275594753	0.414497285	4.71E-10	3.040214328	0.090084047	0.050674266	4.130250609
178	0.275434074	0.414248193	4.15E-10	3.040520827	0.089905437	0.050586122	4.127847688
179	0.275274639	0.414000991	3.65E-10	3.040826829	0.089730538	0.050499626	4.125453372
180	0.275116437	0.413755667	3.21E-10	3.041132316	0.089559227	0.050414723	4.123067882
181	0.27495946	0.413512209	2.83E-10	3.041437269	0.089391383	0.050331363	4.12069143
182	0.274803698	0.413270605	2.49E-10	3.041741669	0.089226893	0.050249497	4.118324214
183	0.274649141	0.413030844	2.19E-10	3.042045498	0.089065646	0.050169078	4.115966423
184	0.274495781	0.412792913	1.93E-10	3.042348734	0.088907534	0.050090061	4.113618234
185	0.274343606	0.412556798	1.69E-10	3.042651357	0.088752456	0.050012401	4.111279813
186	0.274192606	0.412322488	1.49E-10	3.042953348	0.088600314	0.049936056	4.10895132
187	0.274042773	0.412089968	1.31E-10	3.043254685	0.088451011	0.049860987	4.106632901
188	0.273894096	0.411859226	1.15E-10	3.043555348	0.088304458	0.049787153	4.104324697
189	0.273746564	0.411630248	1.02E-10	3.043855315	0.088160566	0.049714518	4.102026836
190	0.273600168	0.41140302	8.94E-11	3.044154566	0.08801925	0.049643045	4.099739442
191	0.273454898	0.411177528	7.87E-11	3.04445308	0.08788043	0.049572699	4.097462629
192	0.273310743	0.410953759	6.92E-11	3.044750835	0.087744026	0.049503446	4.095196502
193	0.273167694	0.410731699	6.09E-11	3.045047812	0.087609964	0.049435256	4.09294116

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194	0.27302574	0.410511332	5.36E-11	3.04534399	0.087478171	0.049368095	4.090696696
195	0.272884872	0.410292646	4.72E-11	3.045639349	0.087348577	0.049301935	4.088463194
196	0.272745079	0.410075626	4.15E-11	3.045933868	0.087221114	0.049236746	4.086240732
197	0.272606351	0.409860258	3.65E-11	3.046227528	0.087095718	0.0491725	4.084029383
198	0.272468679	0.409646527	3.22E-11	3.046520309	0.086972326	0.049109172	4.081829213
199	0.272332053	0.40943442	2.83E-11	3.046812193	0.086850879	0.049046734	4.079640282
200	0.272196462	0.409223922	2.49E-11	3.047103159	0.086731318	0.048985162	4.077462645
201	0.272061897	0.409015019	2.19E-11	3.047393191	0.086613589	0.048924433	4.07529635
202	0.271928348	0.408807696	1.93E-11	3.047682269	0.086497636	0.048864523	4.073141443
203	0.271795806	0.40860194	1.70E-11	3.047970376	0.086383409	0.04880541	4.070997962
204	0.271664262	0.408397737	1.49E-11	3.048257495	0.086270858	0.048747072	4.068865943
205	0.271533704	0.408195072	1.31E-11	3.048543609	0.086159935	0.048689489	4.066745414
206	0.271404126	0.407993932	1.16E-11	3.048828701	0.086050593	0.048632641	4.064636403
207	0.271275516	0.407794303	1.02E-11	3.049112756	0.085942789	0.048576508	4.062538931
208	0.271147865	0.40759617	8.95E-12	3.049395758	0.08583648	0.048521073	4.060453016
209	0.271021166	0.407399521	7.88E-12	3.049677692	0.085731623	0.048466317	4.058378671
210	0.270895408	0.407204341	6.93E-12	3.049958544	0.08562818	0.048412224	4.056315907
211	0.270770582	0.407010617	6.10E-12	3.050238299	0.085526112	0.048358776	4.05426473
212	0.27064668	0.406818336	5.37E-12	3.050516944	0.085425383	0.048305958	4.052225145
213	0.270523694	0.406627484	4.73E-12	3.050794466	0.085325956	0.048253755	4.050197152
214	0.270401613	0.406438048	4.16E-12	3.051070852	0.085227798	0.048202151	4.048180748
215	0.270280431	0.406250015	3.66E-12	3.05134609	0.085130875	0.048151132	4.046175928
216	0.270160137	0.406063372	3.22E-12	3.051620168	0.085035155	0.048100684	4.044182683
217	0.270040725	0.405878106	2.83E-12	3.051893074	0.084940608	0.048050795	4.042201003
218	0.269922185	0.405694205	2.49E-12	3.052164799	0.084847205	0.048001451	4.040230874
219	0.269804509	0.405511655	2.19E-12	3.052435332	0.084754916	0.047952639	4.038272279
220	0.26968769	0.405330444	1.93E-12	3.052704664	0.084663715	0.047904348	4.036325202
221	0.269571719	0.405150561	1.70E-12	3.052972784	0.084573574	0.047856567	4.034389622
222	0.269456589	0.404971992	1.50E-12	3.053239684	0.084484468	0.047809283	4.032465517
223	0.269342291	0.404794726	1.32E-12	3.053505355	0.084396373	0.047762487	4.030552861
224	0.269228819	0.40461875	1.16E-12	3.05376979	0.084309264	0.047716168	4.028651629
225	0.269116163	0.404444053	1.02E-12	3.054032981	0.084223119	0.047670316	4.026761794

	Р	Q	R	S	Т	U	V
1	[val] of turtle 15	[val] of turtle 16	[val] of turtle 17	[val] of turtle 18	[val] of turtle 19	[val] of turtle 20	[val] of turtle 21
226	0.269004318	0.404270623	8.97E-13	3.05429492	0.084137915	0.047624921	4.024883324
227	0.268893276	0.404098449	7.89E-13	3.054555602	0.084053631	0.047579973	4.023016189
228	0.268783028	0.403927519	6.95E-13	3.05481502	0.083970247	0.047535465	4.021160356
229	0.268673569	0.403757821	6.11E-13	3.055073168	0.083887742	0.047491386	4.019315791
230	0.26856489	0.403589345	5.38E-13	3.055330041	0.083806097	0.047447729	4.017482457
231	0.268456986	0.40342208	4.73E-13	3.055585633	0.083725294	0.047404485	4.015660319
232	0.268349848	0.403256014	4.17E-13	3.05583994	0.083645315	0.047361647	4.013849337
233	0.26824347	0.403091137	3.67E-13	3.056092957	0.083566142	0.047319206	4.012049471
234	0.268137846	0.402927438	3.23E-13	3.056344681	0.083487759	0.047277156	4.010260683
235	0.268032969	0.402764907	2.84E-13	3.056595109	0.083410149	0.04723549	4.008482929
236	0.267928831	0.402603534	2.50E-13	3.056844237	0.083333297	0.047194199	4.006716168
237	0.267825428	0.402443307	2.20E-13	3.057092061	0.083257188	0.047153279	4.004960355
238	0.267722751	0.402284217	1.93E-13	3.057338581	0.083181807	0.047112721	4.003215447
239	0.267620796	0.402126255	1.70E-13	3.057583793	0.08310714	0.047072521	4.001481398
240	0.267519555	0.401969409	1.50E-13	3.057827695	0.083033174	0.047032671	3.999758161
241	0.267419023	0.401813671	1.32E-13	3.058070287	0.082959895	0.046993166	3.998045691
242	0.267319193	0.40165903	1.16E-13	3.058311567	0.08288729	0.046954001	3.99634394
243	0.26722006	0.401505478	1.02E-13	3.058551534	0.082815348	0.046915169	3.994652859
244	0.267121617	0.401353004	8.98E-14	3.058790187	0.082744055	0.046876665	3.992972401
245	0.267023859	0.4012016	7.91E-14	3.059027526	0.082673402	0.046838485	3.991302515
246	0.26692678	0.401051256	6.96E-14	3.059263552	0.082603376	0.046800623	3.989643152
247	0.266830375	0.400901964	6.12E-14	3.059498263	0.082533966	0.046763075	3.987994261
248	0.266734637	0.400753713	5.39E-14	3.059731661	0.082465163	0.046725834	3.986355793
249	0.266639561	0.400606497	4.74E-14	3.059963747	0.082396956	0.046688898	3.984727695
250	0.266545142	0.400460305	4.17E-14	3.06019452	0.082329335	0.046652262	3.983109917
251	0.266451374	0.40031513	3.67E-14	3.060423983	0.08226229	0.04661592	3.981502407
252	0.266358252	0.400170962	3.23E-14	3.060652137	0.082195813	0.04657987	3.979905111
253	0.26626577	0.400027794	2.84E-14	3.060878984	0.082129895	0.046544106	3.978317979
254	0.266173924	0.399885617	2.50E-14	3.061104524	0.082064526	0.046508625	3.976740956
255	0.266082708	0.399744423	2.20E-14	3.061328761	0.081999698	0.046473424	3.975173991
256	0.265992118	0.399604203	1.94E-14	3.061551697	0.081935404	0.046438498	3.97361703
257	0.265902148	0.399464951	1.70E-14	3.061773333	0.081871634	0.046403843	3.972070019

	Р	Q	R	S	Т	U	V
1	[val] of turtle 15	[val] of turtle 16	[val] of turtle 17	[val] of turtle 18	[val] of turtle 19	[val] of turtle 20	[val] of turtle 21
258	0.265812793	0.399326658	1.50E-14	3.061993673	0.081808383	0.046369457	3.970532906
259	0.265724048	0.399189316	1.32E-14	3.06221272	0.081745641	0.046335335	3.969005636
260	0.265635909	0.399052917	1.16E-14	3.062430475	0.081683402	0.046301474	3.967488156
261	0.265548371	0.398917455	1.02E-14	3.062646943	0.081621659	0.046267872	3.965980411
262	0.265461429	0.398782921	9.00E-15	3.062862127	0.081560404	0.046234525	3.964482349
263	0.265375078	0.398649308	7.92E-15	3.06307603	0.081499632	0.046201429	3.962993914
264	0.265289314	0.398516608	6.97E-15	3.063288655	0.081439336	0.046168582	3.961515053
265	0.265204132	0.398384816	6.13E-15	3.063500007	0.081379508	0.046135981	3.960045711
266	0.265119528	0.398253922	5.40E-15	3.063710089	0.081320145	0.046103623	3.958585835
267	0.265035498	0.398123921	4.75E-15	3.063918905	0.081261238	0.046071505	3.957135371
268	0.264952036	0.397994805	4.18E-15	3.06412646	0.081202783	0.046039624	3.955694263
269	0.264869139	0.397866568	3.68E-15	3.064332757	0.081144774	0.046007978	3.954262459
270	0.264786802	0.397739202	3.24E-15	3.064537801	0.081087205	0.045976564	3.952839904
271	0.264705021	0.397612701	2.85E-15	3.064741596	0.081030071	0.04594538	3.951426545
272	0.264623791	0.397487059	2.51E-15	3.064944147	0.080973367	0.045914423	3.950022327
273	0.26454311	0.397362267	2.21E-15	3.065145458	0.080917087	0.04588369	3.948627196
274	0.264462972	0.397238321	1.94E-15	3.065345534	0.080861227	0.04585318	3.947241099
275	0.264383373	0.397115214	1.71E-15	3.065544381	0.080805782	0.04582289	3.945863982
276	0.26430431	0.396992938	1.50E-15	3.065742002	0.080750748	0.045792818	3.944495791
277	0.264225779	0.396871489	1.32E-15	3.065938403	0.080696118	0.045762961	3.943136474
278	0.264147775	0.396750859	1.16E-15	3.066133589	0.08064189	0.045733317	3.941785977
279	0.264070294	0.396631043	1.02E-15	3.066327564	0.080588058	0.045703885	3.940444247
280	0.263993334	0.396512034	9.01E-16	3.066520335	0.080534619	0.045674662	3.93911123
281	0.263916889	0.396393827	7.93E-16	3.066711907	0.080481567	0.045645645	3.937786875
282	0.263840956	0.396276415	6.98E-16	3.066902284	0.0804289	0.045616834	3.936471128
283	0.263765532	0.396159792	6.14E-16	3.067091473	0.080376613	0.045588226	3.935163936
284	0.263690613	0.396043954	5.40E-16	3.067279478	0.080324701	0.045559819	3.933865248
285	0.263616195	0.395928893	4.76E-16	3.067466305	0.080273162	0.045531612	3.932575012
286	0.263542274	0.395814604	4.19E-16	3.06765196	0.080221992	0.045503602	3.931293174
287	0.263468847	0.395701082	3.68E-16	3.067836447	0.080171186	0.045475788	3.930019684
288	0.263395911	0.39558832	3.24E-16	3.068019774	0.080120742	0.045448167	3.92875449
289	0.263323461	0.395476314	2.85E-16	3.068201945	0.080070655	0.045420739	3.927497541

	Р	Q	R	S	Т	U	V
1	[val] of turtle 15	[val] of turtle 16	[val] of turtle 17	[val] of turtle 18	[val] of turtle 19	[val] of turtle 20	[val] of turtle 21
290	0.263251494	0.395365058	2.51E-16	3.068382966	0.080020922	0.045393501	3.926248785
291	0.263180008	0.395254546	2.21E-16	3.068562843	0.07997154	0.045366452	3.925008171
292	0.263108998	0.395144773	1.94E-16	3.068741582	0.079922506	0.04533959	3.923775649
293	0.26303846	0.395035734	1.71E-16	3.068919188	0.079873816	0.045312913	3.922551168
294	0.262968393	0.394927423	1.51E-16	3.069095667	0.079825467	0.045286421	3.921334678
295	0.262898792	0.394819835	1.32E-16	3.069271026	0.079777456	0.04526011	3.920126129
296	0.262829654	0.394712965	1.17E-16	3.069445269	0.07972978	0.04523398	3.91892547
297	0.262760976	0.394606808	1.03E-16	3.069618403	0.079682435	0.04520803	3.917732652
298	0.262692754	0.394501359	9.03E-17	3.069790433	0.07963542	0.045182257	3.916547626
299	0.262624986	0.394396612	7.94E-17	3.069961366	0.07958873	0.045156661	3.915370343
300	0.262557667	0.394292563	6.99E-17	3.070131207	0.079542364	0.045131239	3.914200753
301	0.262490796	0.394189207	6.15E-17	3.070299963	0.079496317	0.04510599	3.913038808
302	0.262424369	0.394086539	5.41E-17	3.070467639	0.079450589	0.045080914	3.911884459
303	0.262358383	0.393984554	4.76E-17	3.070634241	0.079405175	0.045056008	3.910737658
304	0.262292834	0.393883247	4.19E-17	3.070799775	0.079360073	0.045031271	3.909598358
305	0.26222772	0.393782613	3.69E-17	3.070964248	0.07931528	0.045006702	3.90846651
306	0.262163038	0.393682648	3.25E-17	3.071127664	0.079270795	0.0449823	3.907342067
307	0.262098784	0.393583347	2.86E-17	3.071290031	0.079226614	0.044958063	3.906224982
308	0.262034956	0.393484706	2.51E-17	3.071451353	0.079182734	0.04493399	3.905115207
309	0.261971551	0.393386719	2.21E-17	3.071611637	0.079139154	0.044910079	3.904012697
310	0.261908566	0.393289383	1.95E-17	3.071770889	0.079095871	0.04488633	3.902917404
311	0.261845998	0.393192692	1.71E-17	3.071929115	0.079052883	0.044862741	3.901829282
312	0.261783844	0.393096642	1.51E-17	3.072086321	0.079010186	0.044839311	3.900748285
313	0.261722102	0.39300123	1.33E-17	3.072242512	0.07896778	0.044816038	3.899674368
314	0.261660767	0.392906449	1.17E-17	3.072397694	0.07892566	0.044792922	3.898607485
315	0.261599839	0.392812297	1.03E-17	3.072551874	0.078883827	0.044769962	3.897547591
316	0.261539313	0.392718768	9.04E-18	3.072705057	0.078842276	0.044747155	3.896494641
317	0.261479188	0.392625859	7.96E-18	3.07285725	0.078801006	0.044724501	3.895448589
318	0.26141946	0.392533565	7.00E-18	3.073008457	0.078760014	0.044702	3.894409393
319	0.261360127	0.392441881	6.16E-18	3.073158686	0.078719299	0.044679649	3.893377007
320	0.261301185	0.392350805	5.42E-18	3.073307941	0.078678859	0.044657447	3.892351387
321	0.261242633	0.392260331	4.77E-18	3.073456229	0.07863869	0.044635395	3.891332491

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1	[val] of turtle 15	[val] of turtle 16	[val] of turtle 17	[val] of turtle 18	[val] of turtle 19	[val] of turtle 20	[val] of turtle 21
322	0.261184468	0.392170455	4.20E-18	3.073603555	0.078598792	0.044613489	3.890320273
323	0.261126687	0.392081174	3.69E-18	3.073749925	0.078559162	0.04459173	3.889314692
324	0.261069288	0.391992483	3.25E-18	3.073895346	0.078519798	0.044570116	3.888315704
325	0.261012267	0.391904378	2.86E-18	3.074039822	0.078480698	0.044548647	3.887323267
326	0.260955623	0.391816856	2.52E-18	3.074183359	0.078441861	0.04452732	3.886337338
327	0.260899353	0.391729912	2.22E-18	3.074325964	0.078403283	0.044506136	3.885357874
328	0.260843454	0.391643542	1.95E-18	3.074467642	0.078364964	0.044485093	3.884384835
329	0.260787923	0.391557743	1.72E-18	3.074608398	0.078326901	0.04446419	3.883418178
330	0.260732759	0.39147251	1.51E-18	3.074748238	0.078289093	0.044443426	3.882457862
331	0.260677959	0.39138784	1.33E-18	3.074887168	0.078251538	0.0444228	3.881503846
332	0.26062352	0.39130373	1.17E-18	3.075025194	0.078214233	0.044402312	3.880556088
333	0.260569441	0.391220174	1.03E-18	3.075162321	0.078177177	0.044381959	3.879614548
334	0.260515718	0.39113717	9.05E-19	3.075298555	0.078140368	0.044361742	3.878679187
335	0.260462349	0.391054713	7.97E-19	3.0754339	0.078103805	0.044341659	3.877749962
336	0.260409331	0.390972801	7.01E-19	3.075568364	0.078067486	0.04432171	3.876826836
337	0.260356664	0.390891429	6.17E-19	3.07570195	0.078031408	0.044301892	3.875909767
338	0.260304343	0.390810594	5.43E-19	3.075834666	0.07799557	0.044282207	3.874998716
339	0.260252367	0.390730291	4.78E-19	3.075966515	0.077959971	0.044262652	3.874093645
340	0.260200734	0.390650519	4.20E-19	3.076097504	0.077924609	0.044243226	3.873194514
341	0.260149441	0.390571272	3.70E-19	3.076227638	0.077889482	0.044223929	3.872301285
342	0.260098485	0.390492548	3.26E-19	3.076356923	0.077854588	0.04420476	3.871413918
343	0.260047866	0.390414343	2.87E-19	3.076485363	0.077819926	0.044185718	3.870532376
344	0.259997579	0.390336653	2.52E-19	3.076612964	0.077785494	0.044166802	3.869656622
345	0.259947624	0.390259475	2.22E-19	3.076739732	0.07775129	0.044148011	3.868786616
346	0.259897998	0.390182806	1.95E-19	3.076865671	0.077717314	0.044129345	3.867922321
347	0.259848699	0.390106642	1.72E-19	3.076990787	0.077683563	0.044110802	3.867063701
348	0.259799724	0.39003098	1.51E-19	3.077115085	0.077650035	0.044092381	3.866210718
349	0.259751072	0.389955816	1.33E-19	3.077238571	0.07761673	0.044074083	3.865363336
350	0.25970274	0.389881148	1.17E-19	3.077361249	0.077583646	0.044055905	3.864521517
351	0.259654726	0.389806971	1.03E-19	3.077483124	0.07755078	0.044037848	3.863685225
352	0.259607029	0.389733283	9.07E-20	3.077604203	0.077518133	0.04401991	3.862854425
353	0.259559645	0.38966008	7.98E-20	3.077724489	0.077485701	0.04400209	3.86202908

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1	[val] of turtle 15	[val] of turtle 16	[val] of turtle 17	[val] of turtle 18	[val] of turtle 19	[val] of turtle 20	[val] of turtle 21
354	0.259512573	0.389587359	7.02E-20	3.077843988	0.077453484	0.043984388	3.861209155
355	0.259465811	0.389515117	6.18E-20	3.077962704	0.07742148	0.043966804	3.860394614
356	0.259419357	0.389443351	5.44E-20	3.078080644	0.077389688	0.043949335	3.859585422
357	0.259373208	0.389372057	4.79E-20	3.078197812	0.077358106	0.043931981	3.858781544
358	0.259327364	0.389301233	4.21E-20	3.078314212	0.077326733	0.043914742	3.857982945
359	0.25928182	0.389230874	3.71E-20	3.07842985	0.077295567	0.043897617	3.857189591
360	0.259236577	0.389160979	3.26E-20	3.078544731	0.077264608	0.043880605	3.856401448
361	0.259191631	0.389091544	2.87E-20	3.07865886	0.077233852	0.043863705	3.85561848
362	0.259146981	0.389022566	2.53E-20	3.07877224	0.0772033	0.043846916	3.854840655
363	0.259102624	0.388954042	2.22E-20	3.078884878	0.07717295	0.043830238	3.854067939
364	0.25905856	0.388885969	1.96E-20	3.078996778	0.0771428	0.043813671	3.853300298
365	0.259014785	0.388818344	1.72E-20	3.079107945	0.077112849	0.043797212	3.852537698
366	0.258971298	0.388751164	1.51E-20	3.079218383	0.077083096	0.043780862	3.851780108
367	0.258928097	0.388684426	1.33E-20	3.079328097	0.07705354	0.04376462	3.851027494
368	0.258885181	0.388618127	1.17E-20	3.079437092	0.077024178	0.043748484	3.850279823
369	0.258842546	0.388552264	1.03E-20	3.079545373	0.07699501	0.043732456	3.849537064
370	0.258800193	0.388486835	9.08E-21	3.079652943	0.076966034	0.043716532	3.848799183
371	0.258758117	0.388421836	7.99E-21	3.079759809	0.07693725	0.043700714	3.84806615
372	0.258716319	0.388357264	7.03E-21	3.079865973	0.076908655	0.043685	3.847337932
373	0.258674795	0.388293118	6.19E-21	3.079971442	0.076880249	0.043669389	3.846614497
374	0.258633544	0.388229393	5.45E-21	3.080076218	0.076852031	0.043653881	3.845895814

	W	Х	Y	Z	AA	AB	AC
1	[val] of turtle 22	[val] of turtle 23	[val] of turtle 24	[val] of turtle 25	[val] of turtle 26	[val] of turtle 27	[val] of turtle 28
2	0.1218727	2.841212541	1.947250925	2.224137024	0.049054265	1.129616572	0.493045205
3	0.1218727	2.841212541	1	1.99	0.049054265	0.982631915	0.493045205
4	3	5	2.440492031	2.77304867	1.134082766	1.325446716	2
5	0.256818615	3.10388835	2.126511597	2.432687072	0.161240448	1.210077646	0.670182561
6	365	365	365	365	365	365	365
7							
8	[val] of turtle 22	[val] of turtle 23	[val] of turtle 24	[val] of turtle 25	[val] of turtle 26	[val] of turtle 27	[val] of turtle 28
9	3	5	1	2	1	1	2
10	2.704	4.962	1.144545455	1.99	1.044	0.991428571	1.979428571
11	2.448617143	4.906833455	1.271552727	1.992162857	1.07828	0.985862338	1.95507574
12	2.227746629	4.839421956	1.383566094	2.003851167	1.103616183	0.98302424	1.928087222
13	2.036222016	4.76370692	1.482731994	2.022881878	1.12081971	0.982631915	1.899318946
14	1.869670041	4.682821947	1.570862038	2.047454677	1.130707848	0.98440561	1.869405368
15	1.724388024	4.599236626	1.649486081	2.076091062	1.134082766	0.988074066	1.838812813
16	1.597240331	4.514876369	1.719896894	2.107582577	1.131716398	0.993378745	1.807880925
17	1.485570893	4.431222108	1.783187787	2.140946903	1.124340068	1.000076718	1.776854711
18	1.387129282	4.349393113	1.840284263	2.175390657	1.112637821	1.007942491	1.745909153
19	1.300008223	4.270215673	1.891970667	2.210277938	1.097242604	1.016768982	1.715167995
20	1.22259076	4.194279939	1.938912595	2.245103751	1.078734628	1.026367855	1.68471796
21	1.153505591	4.121986868	1.98167576	2.279471612	1.057641346	1.036569349	1.654619424
22	1.09158928	4.053586914	2.020741844	2.313074691	1.034438629	1.047221742	1.624914325
23	1.035854306	3.989211824	2.056521837	2.345679967	1.009552786	1.05819055	1.595631974
24	0.985462024	3.928900691	2.089367247	2.377114944	0.983363164	1.069357544	1.566793234
25	0.939699798	3.872621242	2.119579518	2.407256524	0.95620511	1.080619646	1.538413487
26	0.897961647	3.820287158	2.14741795	2.436021721	0.928373143	1.091887774	1.510504675
27	0.859731877	3.771772106	2.173106344	2.463359911	0.900124206	1.103085658	1.483076667
28	0.824571225	3.726921058	2.196838589	2.4892464	0.871680909	1.11414866	1.456138129
29	0.792105139	3.685559359	2.218783345	2.51367708	0.843234692	1.125022639	1.429697034
30	0.762013859	3.647499953	2.239087984	2.53666402	0.814948868	1.135662852	1.403760931
31	0.734024027	3.61254908	2.257881881	2.558231822	0.7869615	1.146032925	1.378337036
32	0.707901588	3.580510736	2.27527919	2.578414637	0.759388104	1.156103882	1.353432227
33	0.683445783	3.551190113	2.291381161	2.597253721	0.732324165	1.165853252	1.329052961

	W	Х	Y	Z	AA	AB	AC
1	[val] of turtle 22	[val] of turtle 23	[val] of turtle 24	[val] of turtle 25	[val] of turtle 26	[val] of turtle 27	[val] of turtle 28
34	0.660484069	3.524396205	2.306278086	2.614795444	0.705847449	1.175264246	1.305205166
35	0.638867824	3.499943755	2.320050932	2.63108968	0.680020135	1.184325006	1.281894122
36	0.618468709	3.477654648	2.332772703	2.64618851	0.654890743	1.193027928	1.259124336
37	0.599175595	3.457358884	2.344509589	2.660145186	0.630495892	1.201369045	1.236899446
38	0.580891968	3.438895188	2.355321922	2.673013309	0.606861884	1.209347478	1.215222127
39	0.563533724	3.422111365	2.365264978	2.684846187	0.584006119	1.216964953	1.194094027
40	0.547027318	3.406864426	2.374389655	2.695696337	0.561938371	1.224225363	1.173515727
41	0.531308189	3.39302056	2.382743031	2.705615108	0.540661914	1.231134387	1.153486715
42	0.516319433	3.380454971	2.390368841	2.714652399	0.52017453	1.237699155	1.134005384
43	0.502010682	3.369051629	2.39730787	2.722856459	0.500469393	1.243927955	1.115069051
44	0.48833715	3.358702949	2.403598292	2.730273744	0.481535851	1.249829981	1.096673984
45	0.475258836	3.349309419	2.409275946	2.736948837	0.463360111	1.255415111	1.078815446
46	0.462739844	3.340779208	2.414374573	2.742924395	0.445925837	1.260693719	1.06148775
47	0.450747807	3.333027743	2.418926017	2.748241138	0.429214672	1.265676514	1.044684319
48	0.439253402	3.325977289	2.422960396	2.752937857	0.413206689	1.270374405	1.028397758
49	0.428229941	3.319556525	2.426506243	2.757051441	0.397880783	1.274798381	1.012619918
50	0.41765302	3.313700126	2.429590628	2.760616925	0.383215002	1.278959424	0.997341978
51	0.407500227	3.308348355	2.43223927	2.763667543	0.369186839	1.282868418	0.982554516
52	0.39775089	3.303446675	2.434476623	2.766234784	0.35577347	1.286536093	0.968247584
53	0.388385863	3.298945369	2.436325957	2.768348466	0.342951964	1.289972969	0.95441078
54	0.37938735	3.294799185	2.437809426	2.770036799	0.330699452	1.293189314	0.941033321
55	0.370738747	3.290966997	2.438948133	2.771326461	0.318993273	1.296195113	0.928104109
56	0.362424513	3.287411486	2.439762184	2.772242666	0.307811093	1.29900004	0.915611796
57	0.354430059	3.284098836	2.440270732	2.772809236	0.297130997	1.301613446	0.903544847
58	0.346741649	3.280998461	2.440492031	2.77304867	0.28693157	1.304044343	0.891891592
59	0.33934632	3.278082733	2.440443467	2.77298221	0.277191956	1.306301399	0.880640282
60	0.33223181	3.275326748	2.440141603	2.77262991	0.267891903	1.308392933	0.869779137
61	0.325386498	3.272708088	2.439602212	2.772010696	0.259011802	1.310326919	0.859296389
62	0.31879935	3.270206619	2.438840306	2.771142426	0.250532703	1.312110984	0.849180323
63	0.312459873	3.267804292	2.437870173	2.770041949	0.24243634	1.313752418	0.839419311
64	0.306358072	3.265484964	2.436705403	2.768725158	0.23470513	1.315258178	0.830001846
65	0.300484421	3.26323423	2.435358916	2.767207044	0.227322178	1.316634898	0.82091657

	W	Х	Y	Z	AA	AB	AC
1	[val] of turtle 22	[val] of turtle 23	[val] of turtle 24	[val] of turtle 25	[val] of turtle 26	[val] of turtle 27	[val] of turtle 28
66	0.294829824	3.261039271	2.433842989	2.765501744	0.220271277	1.317888901	0.812152299
67	0.289385591	3.258888709	2.432169284	2.763622588	0.213536892	1.319026201	0.803698041
68	0.284143414	3.256772483	2.430348868	2.761582144	0.207104157	1.320052526	0.795543021
69	0.279095342	3.254681723	2.428392243	2.759392258	0.200958854	1.320973318	0.78767669
70	0.274233764	3.252608644	2.426309363	2.757064094	0.195087403	1.321793751	0.780088743
71	0.269551387	3.250546442	2.424109663	2.754608175	0.189476837	1.322518743	0.772769127
72	0.265041221	3.248489205	2.421802074	2.752034412	0.184114789	1.323152962	0.765708047
73	0.260696568	3.246431824	2.419395051	2.749352142	0.17898947	1.323700844	0.758895978
74	0.256510999	3.244369917	2.416896585	2.746570155	0.174089644	1.324166599	0.752323665
75	0.252478349	3.24229976	2.414314233	2.743696731	0.169404613	1.324554225	0.745982126
76	0.248592701	3.240218218	2.411655128	2.740739659	0.164924192	1.324867516	0.739862656
77	0.244848377	3.238122687	2.408926005	2.73770627	0.160638688	1.325110075	0.733956825
78	0.241239924	3.23601104	2.406133212	2.734603458	0.156538882	1.325285324	0.728256477
79	0.237762108	3.233881578	2.403282734	2.731437707	0.152616004	1.32539651	0.722753728
80	0.234409902	3.231732981	2.400380206	2.728215111	0.148861714	1.325446716	0.717440963
81	0.231178479	3.229564273	2.39743093	2.724941394	0.145268086	1.325438872	0.712310833
82	0.228063201	3.227374776	2.394439893	2.721621934	0.141827581	1.325375761	0.70735625
83	0.225059614	3.225164085	2.39141178	2.718261778	0.138533038	1.325260024	0.702570381
84	0.22216344	3.222932027	2.388350986	2.714865661	0.135377647	1.325094175	0.697946643
85	0.219370567	3.22067864	2.385261638	2.711438023	0.132354939	1.324880602	0.693478701
86	0.216677046	3.218404145	2.382147601	2.707983028	0.129458763	1.324621575	0.689160456
87	0.214079082	3.216108922	2.379012496	2.704504571	0.126683275	1.324319254	0.684986041
88	0.211573028	3.213793487	2.375859707	2.701006303	0.124022921	1.323975695	0.680949815
89	0.20915538	3.211458478	2.372692402	2.697491637	0.121472421	1.323592853	0.677046358
90	0.206822771	3.20910463	2.369513535	2.693963763	0.119026756	1.323172592	0.673270461
91	0.204571965	3.206732769	2.366325863	2.690425661	0.116681156	1.322716684	0.66961712
92	0.202399852	3.204343787	2.363131956	2.686880113	0.114431084	1.322226821	0.666081531
93	0.200303442	3.201938639	2.359934205	2.683329712	0.112272229	1.321704613	0.662659081
94	0.198279863	3.199518323	2.356734834	2.679776874	0.110200488	1.321151598	0.659345344
95	0.196326354	3.197083877	2.353535908	2.676223848	0.108211961	1.320569241	0.656136071
96	0.194440261	3.194636365	2.350339341	2.672672725	0.106302937	1.319958941	0.653027186
97	0.192619032	3.192176872	2.347146909	2.669125446	0.104469886	1.319322034	0.65001478

	W	Х	Y	Z	AA	AB	AC
1	[val] of turtle 22	[val] of turtle 23	[val] of turtle 24	[val] of turtle 25	[val] of turtle 26	[val] of turtle 27	[val] of turtle 28
98	0.190860217	3.189706491	2.343960251	2.665583814	0.102709449	1.318659797	0.647095104
99	0.189161457	3.187226325	2.340780883	2.662049496	0.101018427	1.317973447	0.644264559
100	0.187520486	3.184737474	2.337610202	2.658524037	0.099393778	1.317264152	0.641519698
101	0.185935126	3.182241032	2.334449495	2.655008863	0.097832602	1.316533025	0.638857213
102	0.184403283	3.179738084	2.331299943	2.651505289	0.096332141	1.315781133	0.636273933
103	0.182922944	3.177229702	2.328162629	2.648014527	0.094889766	1.315009497	0.63376682
104	0.181492173	3.174716939	2.325038545	2.64453769	0.093502972	1.314219095	0.631332957
105	0.180109108	3.172200827	2.321928595	2.6410758	0.092169372	1.313410863	0.628969552
106	0.178771961	3.169682377	2.318833604	2.63762979	0.090886692	1.312585698	0.626673924
107	0.17747901	3.167162574	2.31575432	2.634200514	0.089652763	1.31174446	0.624443507
108	0.176228603	3.164642377	2.312691417	2.630788748	0.088465518	1.310887975	0.622275837
109	0.175019147	3.162122715	2.309645508	2.627395198	0.087322985	1.310017034	0.620168555
110	0.173849113	3.159604489	2.306617139	2.624020501	0.086223281	1.309132397	0.618119396
111	0.17271703	3.157088569	2.3036068	2.620665231	0.085164613	1.308234792	0.616126192
112	0.171621485	3.154575794	2.300614928	2.617329905	0.084145266	1.307324921	0.61418686
113	0.170561115	3.15206697	2.297641906	2.614014984	0.083163606	1.306403456	0.612299407
114	0.169534615	3.149562874	2.294688072	2.610720876	0.08221807	1.305471043	0.610461918
115	0.168540724	3.147064247	2.291753722	2.607447941	0.081307168	1.304528304	0.608672558
116	0.167578234	3.144571802	2.288839107	2.604196496	0.080429474	1.303575838	0.606929568
117	0.16664598	3.142086216	2.285944443	2.600966815	0.079583629	1.302614218	0.605231259
118	0.165742843	3.139608136	2.28306991	2.597759132	0.078768332	1.301643997	0.603576012
119	0.164867748	3.137138177	2.280215657	2.594573644	0.077982338	1.300665709	0.601962272
120	0.164019657	3.134676924	2.277381799	2.591410517	0.077224461	1.299679864	0.60038855
121	0.163197576	3.132224931	2.274568427	2.588269883	0.076493563	1.298686956	0.598853413
122	0.162400547	3.129782721	2.271775605	2.585151845	0.075788557	1.29768746	0.597355491
123	0.161627647	3.127350787	2.269003372	2.582056479	0.075108405	1.296681833	0.595893464
124	0.160877991	3.124929596	2.266251747	2.578983837	0.07445211	1.295670515	0.594466069
125	0.160150726	3.122519585	2.263520728	2.575933947	0.073818722	1.29465393	0.593072091
126	0.159445032	3.120121164	2.260810293	2.572906814	0.073207329	1.293632489	0.591710365
127	0.158760119	3.117734715	2.258120406	2.569902426	0.072617058	1.292606583	0.59037977
128	0.15809523	3.115360598	2.255451014	2.56692075	0.072047076	1.291576594	0.589079233
129	0.157449632	3.112999145	2.252802049	2.563961739	0.071496581	1.290542886	0.58780772

	W	Х	Y	Z	AA	AB	AC
1	[val] of turtle 22	[val] of turtle 23	[val] of turtle 24	[val] of turtle 25	[val] of turtle 26	[val] of turtle 27	[val] of turtle 28
130	0.156822625	3.110650665	2.250173433	2.561025328	0.070964808	1.289505813	0.586564241
131	0.156213531	3.108315443	2.247565073	2.55811144	0.070451022	1.288465715	0.585347842
132	0.155621702	3.105993742	2.244976867	2.555219984	0.069954522	1.287422918	0.584157608
133	0.155046511	3.103685804	2.242408703	2.552350857	0.069474632	1.28637774	0.58299266
134	0.154487357	3.101391848	2.239860462	2.549503946	0.069010708	1.285330485	0.581852152
135	0.15394366	3.099112077	2.237332015	2.546679128	0.06856213	1.284281445	0.580735273
136	0.153414864	3.09684667	2.234823227	2.543876272	0.068128305	1.283230905	0.57964124
137	0.152900432	3.094595792	2.232333959	2.541095238	0.067708663	1.282179137	0.578569303
138	0.152399849	3.092359587	2.229864062	2.53833588	0.067302659	1.281126404	0.57751874
139	0.151912619	3.090138185	2.227413387	2.535598045	0.06690977	1.280072959	0.576488857
140	0.151438265	3.087931698	2.224981779	2.532881574	0.066529493	1.279019047	0.575478987
141	0.150976326	3.085740223	2.222569078	2.530186305	0.066161347	1.277964902	0.574488487
142	0.150526361	3.083563843	2.220175123	2.527512069	0.06580487	1.276910752	0.573516739
143	0.150087945	3.081402627	2.217799751	2.524858695	0.065459618	1.275856816	0.57256315
144	0.149660668	3.079256631	2.215442794	2.522226008	0.065125165	1.274803303	0.571627146
145	0.149244137	3.077125898	2.213104086	2.519613832	0.064801104	1.273750416	0.570708179
146	0.148837973	3.075010459	2.210783456	2.517021987	0.064487042	1.27269835	0.569805718
147	0.148441811	3.072910335	2.208480735	2.514450291	0.064182602	1.271647294	0.568919253
148	0.1480553	3.070825536	2.206195753	2.511898561	0.063887424	1.270597428	0.568048293
149	0.147678104	3.06875606	2.203928339	2.509366613	0.06360116	1.269548927	0.567192367
150	0.147309896	3.066701898	2.201678321	2.506854263	0.063323477	1.268501956	0.566351019
151	0.146950364	3.064663031	2.199445529	2.504361325	0.063054054	1.267456679	0.565523811
152	0.146599208	3.062639433	2.197229792	2.501887614	0.062792586	1.266413249	0.56471032
153	0.146256138	3.060631067	2.195030942	2.499432944	0.062538776	1.265371815	0.563910141
154	0.145920876	3.058637893	2.192848808	2.49699713	0.06229234	1.264332521	0.563122882
155	0.145593153	3.05665986	2.190683224	2.494579988	0.062053007	1.263295503	0.562348165
156	0.145272711	3.054696914	2.188534022	2.492181334	0.061820514	1.262260894	0.561585627
157	0.144959302	3.052748992	2.186401038	2.489800985	0.061594611	1.261228821	0.560834918
158	0.144652687	3.050816028	2.184284106	2.487438759	0.061375054	1.260199404	0.560095701
159	0.144352637	3.04889795	2.182183064	2.485094475	0.061161613	1.259172761	0.559367648
160	0.144058929	3.046994679	2.180097752	2.482767954	0.060954064	1.258149003	0.558650448
161	0.143771351	3.045106135	2.17802801	2.480459017	0.060752191	1.257128237	0.557943797

	W	Х	Y	Z	AA	AB	AC
1	[val] of turtle 22	[val] of turtle 23	[val] of turtle 24	[val] of turtle 25	[val] of turtle 26	[val] of turtle 27	[val] of turtle 28
162	0.143489698	3.043232232	2.17597368	2.478167489	0.06055579	1.256110566	0.557247404
163	0.143213772	3.04137288	2.173934606	2.475893194	0.060364662	1.255096087	0.556560988
164	0.142943384	3.039527988	2.171910635	2.47363596	0.060178617	1.254084896	0.555884277
165	0.142678351	3.037697459	2.169901613	2.471395615	0.059997471	1.253077081	0.55521701
166	0.142418497	3.035881194	2.167907392	2.46917199	0.059821048	1.252072728	0.554558935
167	0.142163653	3.034079092	2.165927822	2.466964917	0.059649179	1.25107192	0.553909808
168	0.141913655	3.032291049	2.163962758	2.46477423	0.059481701	1.250074734	0.553269394
169	0.141668347	3.03051696	2.162012054	2.462599767	0.059318458	1.249081245	0.552637467
170	0.141427578	3.028756717	2.16007557	2.460441365	0.059159299	1.248091524	0.552013808
171	0.141191202	3.027010211	2.158153163	2.458298865	0.05900408	1.247105638	0.551398206
172	0.14095908	3.025277331	2.156244697	2.456172109	0.058852662	1.246123652	0.550790457
173	0.140731076	3.023557966	2.154350035	2.454060942	0.05870491	1.245145627	0.550190364
174	0.140507062	3.021852002	2.152469041	2.451965211	0.058560696	1.24417162	0.549597738
175	0.140286913	3.020159326	2.150601585	2.449884764	0.058419897	1.243201687	0.549012395
176	0.140070507	3.018479824	2.148747536	2.447819453	0.058282392	1.24223588	0.548434158
177	0.13985773	3.016813381	2.146906765	2.44576913	0.058148069	1.241274247	0.547862856
178	0.13964847	3.01515988	2.145079145	2.443733651	0.058016816	1.240316836	0.547298324
179	0.139442619	3.013519207	2.143264554	2.441712872	0.057888527	1.23936369	0.546740402
180	0.139240076	3.011891246	2.141462866	2.439706653	0.057763102	1.23841485	0.546188936
181	0.139040739	3.01027588	2.139673963	2.437714854	0.057640441	1.237470356	0.545643777
182	0.138844514	3.008672995	2.137897725	2.43573734	0.057520451	1.236530244	0.54510478
183	0.138651308	3.007082475	2.136134035	2.433773976	0.057403041	1.235594547	0.544571808
184	0.138461033	3.005504203	2.134382777	2.431824628	0.057288123	1.234663298	0.544044725
185	0.138273602	3.003938067	2.132643839	2.429889166	0.057175614	1.233736526	0.543523401
186	0.138088934	3.00238395	2.130917109	2.427967461	0.057065432	1.232814259	0.543007711
187	0.137906949	3.00084174	2.129202475	2.426059386	0.0569575	1.231896522	0.542497532
188	0.137727571	2.999311322	2.127499831	2.424164817	0.056851744	1.230983339	0.541992748
189	0.137550726	2.997792584	2.12580907	2.422283629	0.056748091	1.230074732	0.541493244
190	0.137376343	2.996285415	2.124130085	2.420415702	0.056646472	1.229170721	0.540998911
191	0.137204355	2.994789703	2.122462775	2.418560916	0.05654682	1.228271323	0.540509641
192	0.137034695	2.993305338	2.120807036	2.416719154	0.056449072	1.227376555	0.540025332
193	0.136867299	2.99183221	2.119162769	2.414890298	0.056353165	1.226486432	0.539545885

	W	Х	Y	Z	AA	AB	AC
1	[val] of turtle 22	[val] of turtle 23	[val] of turtle 24	[val] of turtle 25	[val] of turtle 26	[val] of turtle 27	[val] of turtle 28
194	0.136702108	2.99037021	2.117529874	2.413074236	0.05625904	1.225600968	0.539071202
195	0.136539061	2.988919232	2.115908255	2.411270853	0.05616664	1.224720172	0.53860119
196	0.136378102	2.987479169	2.114297815	2.40948004	0.05607591	1.223844057	0.538135759
197	0.136219178	2.986049914	2.11269846	2.407701687	0.055986797	1.22297263	0.537674821
198	0.136062233	2.984631364	2.111110096	2.405935686	0.05589925	1.222105899	0.537218291
199	0.135907219	2.983223415	2.109532631	2.404181931	0.05581322	1.221243869	0.536766087
200	0.135754087	2.981825965	2.107965976	2.402440317	0.05572866	1.220386547	0.536318129
201	0.135602788	2.980438912	2.10641004	2.400710741	0.055645524	1.219533934	0.53587434
202	0.135453277	2.979062155	2.104864737	2.398993101	0.055563768	1.218686034	0.535434646
203	0.135305511	2.977695597	2.103329978	2.397287297	0.055483351	1.217842847	0.534998973
204	0.135159447	2.976339139	2.101805678	2.39559323	0.055404232	1.217004374	0.534567252
205	0.135015045	2.974992684	2.100291754	2.393910803	0.055326371	1.216170613	0.534139414
206	0.134872264	2.973656136	2.098788122	2.392239919	0.055249731	1.215341563	0.533715393
207	0.134731068	2.972329402	2.097294699	2.390580483	0.055174276	1.214517221	0.533295125
208	0.134591419	2.971012387	2.095811404	2.388932403	0.055099971	1.213697583	0.532878547
209	0.134453282	2.969705	2.094338159	2.387295585	0.055026782	1.212882643	0.5324656
210	0.134316623	2.968407149	2.092874883	2.385669939	0.054954678	1.212072397	0.532056225
211	0.13418141	2.967118745	2.091421499	2.384055374	0.054883626	1.211266837	0.531650364
212	0.134047609	2.965839699	2.089977931	2.382451803	0.054813597	1.210465957	0.531247963
213	0.133915191	2.964569923	2.088544101	2.380859137	0.054744562	1.209669748	0.530848968
214	0.133784126	2.96330933	2.087119936	2.379277291	0.054676493	1.208878201	0.530453327
215	0.133654386	2.962057836	2.08570536	2.377706178	0.054609364	1.208091307	0.530060988
216	0.133525942	2.960815356	2.084300302	2.376145716	0.054543147	1.207309056	0.529671904
217	0.133398768	2.959581808	2.082904688	2.37459582	0.05447782	1.206531436	0.529286025
218	0.133272838	2.958357108	2.081518448	2.373056408	0.054413357	1.205758436	0.528903306
219	0.133148128	2.957141176	2.08014151	2.3715274	0.054349735	1.204990045	0.528523701
220	0.133024614	2.955933933	2.078773806	2.370008715	0.054286932	1.204226249	0.528147167
221	0.132902271	2.954735299	2.077415266	2.368500275	0.054224927	1.203467035	0.52777366
222	0.132781078	2.953545197	2.076065823	2.367002001	0.054163699	1.20271239	0.527403138
223	0.132661012	2.95236355	2.074725408	2.365513816	0.054103228	1.201962299	0.527035562
224	0.132542054	2.951190282	2.073393956	2.364035643	0.054043495	1.201216747	0.526670892
225	0.132424181	2.950025319	2.0720714	2.362567408	0.053984481	1.20047572	0.526309089

	W	Х	Y	Z	AA	AB	AC
1	[val] of turtle 22	[val] of turtle 23	[val] of turtle 24	[val] of turtle 25	[val] of turtle 26	[val] of turtle 27	[val] of turtle 28
226	0.132307376	2.948868588	2.070757675	2.361109035	0.053926168	1.199739202	0.525950116
227	0.132191618	2.947720015	2.069452718	2.359660451	0.053868539	1.199007177	0.525593936
228	0.13207689	2.946579528	2.068156464	2.358221583	0.053811578	1.198279628	0.525240514
229	0.131963173	2.945447058	2.06686885	2.356792359	0.053755268	1.19755654	0.524889816
230	0.13185045	2.944322535	2.065589814	2.355372708	0.053699595	1.196837893	0.524541807
231	0.131738705	2.943205889	2.064319295	2.353962559	0.053644542	1.196123673	0.524196454
232	0.131627921	2.942097053	2.063057231	2.352561842	0.053590096	1.195413859	0.523853726
233	0.131518082	2.940995959	2.061803561	2.351170488	0.053536242	1.194708435	0.523513591
234	0.131409174	2.939902542	2.060558226	2.34978843	0.053482968	1.194007383	0.523176019
235	0.131301181	2.938816736	2.059321167	2.348415599	0.05343026	1.193310683	0.522840979
236	0.131194089	2.937738478	2.058092325	2.347051929	0.053378106	1.192618316	0.522508443
237	0.131087885	2.936667703	2.056871642	2.345697354	0.053326494	1.191930265	0.522178381
238	0.130982555	2.935604348	2.055659061	2.344351808	0.053275412	1.191246509	0.521850767
239	0.130878086	2.934548352	2.054454523	2.343015227	0.053224849	1.190567029	0.521525573
240	0.130774465	2.933499655	2.053257974	2.341687545	0.053174794	1.189891805	0.521202772
241	0.13067168	2.932458194	2.052069357	2.3403687	0.053125237	1.189220817	0.520882339
242	0.130569718	2.931423912	2.050888616	2.339058629	0.053076167	1.188554046	0.520564247
243	0.13046857	2.930396748	2.049715697	2.33775727	0.053027574	1.187891471	0.520248473
244	0.130368222	2.929376646	2.048550546	2.33646456	0.05297945	1.187233071	0.519934991
245	0.130268664	2.928363548	2.047393108	2.335180439	0.052931785	1.186578827	0.519623779
246	0.130169886	2.927357397	2.04624333	2.333904847	0.05288457	1.185928717	0.519314812
247	0.130071877	2.926358137	2.045101159	2.332637722	0.052837796	1.185282722	0.519008068
248	0.129974628	2.925365714	2.043966544	2.331379007	0.052791456	1.184640819	0.518703525
249	0.129878127	2.924380072	2.04283943	2.330128641	0.052745541	1.184002989	0.51840116
250	0.129782366	2.923401158	2.041719768	2.328886567	0.052700044	1.183369209	0.518100953
251	0.129687336	2.922428919	2.040607507	2.327652727	0.052654957	1.18273946	0.517802881
252	0.129593027	2.921463302	2.039502594	2.326427063	0.052610273	1.182113719	0.517506926
253	0.129499431	2.920504255	2.03840498	2.32520952	0.052565984	1.181491966	0.517213065
254	0.129406539	2.919551728	2.037314616	2.32400004	0.052522085	1.180874179	0.51692128
255	0.129314342	2.918605668	2.036231452	2.322798568	0.052478568	1.180260337	0.51663155
256	0.129222833	2.917666027	2.035155438	2.321605048	0.052435426	1.179650419	0.516343858
257	0.129132004	2.916732755	2.034086527	2.320419426	0.052392655	1.179044403	0.516058183

	W	Х	Y	Z	AA	AB	AC
1	[val] of turtle 22	[val] of turtle 23	[val] of turtle 24	[val] of turtle 25	[val] of turtle 26	[val] of turtle 27	[val] of turtle 28
258	0.129041846	2.915805802	2.03302467	2.319241648	0.052350248	1.178442268	0.515774508
259	0.128952353	2.91488512	2.031969819	2.318071659	0.052308199	1.177843991	0.515492814
260	0.128863516	2.913970663	2.030921926	2.316909407	0.052266502	1.177249553	0.515213085
261	0.128775329	2.913062381	2.029880945	2.315754837	0.052225152	1.176658931	0.514935301
262	0.128687785	2.912160229	2.02884683	2.314607898	0.052184144	1.176072103	0.514659446
263	0.128600877	2.91126416	2.027819532	2.313468538	0.052143473	1.175489049	0.514385504
264	0.128514597	2.910374128	2.026799008	2.312336704	0.052103133	1.174909747	0.514113457
265	0.12842894	2.909490089	2.025785211	2.311212346	0.052063119	1.174334175	0.513843289
266	0.128343899	2.908611998	2.024778095	2.310095413	0.052023428	1.173762312	0.513574984
267	0.128259468	2.907739809	2.023777616	2.308985854	0.051984054	1.173194137	0.513308526
268	0.12817564	2.906873481	2.02278373	2.30788362	0.051944994	1.172629628	0.5130439
269	0.12809241	2.906012968	2.021796392	2.30678866	0.051906242	1.172068763	0.512781091
270	0.128009771	2.905158228	2.020815558	2.305700926	0.051867794	1.171511522	0.512520082
271	0.127927719	2.90430922	2.019841185	2.304620368	0.051829647	1.170957883	0.51226086
272	0.127846246	2.9034659	2.018873229	2.303546938	0.051791797	1.170407824	0.51200341
273	0.127765348	2.902628228	2.017911647	2.302480589	0.051754239	1.169861325	0.511747717
274	0.127685019	2.901796161	2.016956398	2.301421271	0.05171697	1.169318365	0.511493766
275	0.127605254	2.90096966	2.016007438	2.300368939	0.051679986	1.168778922	0.511241545
276	0.127526048	2.900148685	2.015064726	2.299323544	0.051643284	1.168242975	0.510991039
277	0.127447395	2.899333194	2.01412822	2.298285041	0.05160686	1.167710504	0.510742234
278	0.12736929	2.89852315	2.013197878	2.297253383	0.051570711	1.167181487	0.510495118
279	0.127291729	2.897718511	2.01227366	2.296228524	0.051534834	1.166655903	0.510249676
280	0.127214707	2.896919241	2.011355525	2.295210418	0.051499225	1.166133732	0.510005895
281	0.127138219	2.8961253	2.010443432	2.294199021	0.051463881	1.165614953	0.509763764
282	0.127062259	2.89533665	2.009537341	2.293194287	0.051428799	1.165099545	0.509523268
283	0.126986825	2.894553254	2.008637213	2.292196172	0.051393977	1.164587488	0.509284395
284	0.12691191	2.893775075	2.007743007	2.291204631	0.05135941	1.16407876	0.509047134
285	0.126837511	2.893002075	2.006854685	2.290219621	0.051325098	1.163573343	0.508811471
286	0.126763623	2.892234218	2.005972207	2.289241098	0.051291036	1.163071214	0.508577394
287	0.126690242	2.891471468	2.005095534	2.288269019	0.051257222	1.162572355	0.508344892
288	0.126617363	2.890713788	2.004224628	2.28730334	0.051223653	1.162076744	0.508113952
289	0.126544983	2.889961143	2.003359452	2.286344019	0.051190327	1.161584362	0.507884564

	W	Х	Y	Z	AA	AB	AC
1	[val] of turtle 22	[val] of turtle 23	[val] of turtle 24	[val] of turtle 25	[val] of turtle 26	[val] of turtle 27	[val] of turtle 28
290	0.126473098	2.889213498	2.002499966	2.285391014	0.051157241	1.161095188	0.507656714
291	0.126401702	2.888470818	2.001646133	2.284444283	0.051124393	1.160609203	0.507430393
292	0.126330793	2.887733068	2.000797916	2.283503783	0.05109178	1.160126386	0.507205588
293	0.126260367	2.887000214	1.999955277	2.282569474	0.051059401	1.159646719	0.506982288
294	0.126190419	2.886272221	1.99911818	2.281641315	0.051027252	1.15917018	0.506760482
295	0.126120945	2.885549056	1.998286588	2.280719263	0.050995331	1.158696751	0.50654016
296	0.126051943	2.884830686	1.997460465	2.27980328	0.050963637	1.158226412	0.506321311
297	0.125983408	2.884117076	1.996639774	2.278893324	0.050932166	1.157759144	0.506103923
298	0.125915336	2.883408195	1.995824479	2.277989355	0.050900918	1.157294927	0.505887986
299	0.125847724	2.88270401	1.995014546	2.277091334	0.050869889	1.156833742	0.505673491
300	0.125780569	2.882004488	1.994209938	2.276199222	0.050839078	1.15637557	0.505460425
301	0.125713866	2.881309597	1.99341062	2.275312979	0.050808482	1.155920391	0.50524878
302	0.125647613	2.880619306	1.992616557	2.274432566	0.0507781	1.155468188	0.505038544
303	0.125581806	2.879933582	1.991827715	2.273557945	0.05074793	1.15501894	0.504829708
304	0.125516441	2.879252395	1.991044059	2.272689077	0.05071797	1.154572629	0.504622262
305	0.125451516	2.878575714	1.990265556	2.271825925	0.050688218	1.154129237	0.504416197
306	0.125387026	2.877903507	1.98949217	2.27096845	0.050658672	1.153688745	0.504211501
307	0.125322969	2.877235744	1.988723868	2.270116614	0.05062933	1.153251135	0.504008166
308	0.125259342	2.876572396	1.987960617	2.269270381	0.050600191	1.152816387	0.503806182
309	0.125196141	2.875913431	1.987202384	2.268429714	0.050571253	1.152384484	0.503605539
310	0.125133363	2.87525882	1.986449134	2.267594575	0.050542514	1.151955408	0.503406228
311	0.125071005	2.874608533	1.985700837	2.266764929	0.050513972	1.15152914	0.50320824
312	0.125009063	2.873962541	1.984957458	2.265940738	0.050485626	1.151105663	0.503011566
313	0.124947536	2.873320816	1.984218965	2.265121967	0.050457474	1.150684958	0.502816195
314	0.124886419	2.872683327	1.983485327	2.26430858	0.050429515	1.150267008	0.50262212
315	0.124825711	2.872050047	1.982756511	2.263500542	0.050401747	1.149851795	0.502429332
316	0.124765407	2.871420947	1.982032485	2.262697817	0.050374168	1.149439302	0.50223782
317	0.124705505	2.870795998	1.981313218	2.261900369	0.050346777	1.14902951	0.502047577
318	0.124646002	2.870175173	1.980598679	2.261108165	0.050319572	1.148622404	0.501858594
319	0.124586896	2.869558444	1.979888836	2.26032117	0.050292552	1.148217964	0.501670862
320	0.124528183	2.868945784	1.979183659	2.259539348	0.050265715	1.147816175	0.501484372
321	0.12446986	2.868337164	1.978483117	2.258762667	0.05023906	1.147417019	0.501299116

	W	Х	Y	Z	AA	AB	AC
1	[val] of turtle 22	[val] of turtle 23	[val] of turtle 24	[val] of turtle 25	[val] of turtle 26	[val] of turtle 27	[val] of turtle 28
322	0.124411926	2.867732558	1.977787179	2.257991092	0.050212586	1.147020479	0.501115086
323	0.124354376	2.867131938	1.977095814	2.25722459	0.05018629	1.146626538	0.500932273
324	0.124297209	2.866535279	1.976408994	2.256463126	0.050160173	1.146235179	0.500750668
325	0.124240421	2.865942553	1.975726688	2.255706669	0.050134231	1.145846387	0.500570264
326	0.124184011	2.865353735	1.975048865	2.254955184	0.050108465	1.145460143	0.500391052
327	0.124127975	2.864768797	1.974375498	2.25420864	0.050082872	1.145076431	0.500213024
328	0.12407231	2.864187714	1.973706556	2.253467003	0.050057452	1.144695236	0.500036172
329	0.124017015	2.86361046	1.97304201	2.252730241	0.050032202	1.144316541	0.499860489
330	0.123962086	2.863037009	1.972381832	2.251998322	0.050007122	1.143940329	0.499685965
331	0.123907522	2.862467337	1.971725993	2.251271215	0.04998221	1.143566584	0.499512594
332	0.123853318	2.861901417	1.971074463	2.250548887	0.049957466	1.143195292	0.499340367
333	0.123799474	2.861339226	1.970427215	2.249831306	0.049932887	1.142826434	0.499169277
334	0.123745986	2.860780737	1.969784221	2.249118443	0.049908473	1.142459997	0.498999316
335	0.123692853	2.860225926	1.969145453	2.248410265	0.049884223	1.142095963	0.498830477
336	0.123640071	2.859674769	1.968510882	2.247706742	0.049860134	1.141734318	0.498662751
337	0.123587638	2.859127241	1.967880482	2.247007843	0.049836207	1.141375046	0.498496132
338	0.123535552	2.858583319	1.967254224	2.246313538	0.04981244	1.141018131	0.498330611
339	0.12348381	2.858042978	1.966632082	2.245623797	0.049788831	1.140663558	0.498166182
340	0.12343241	2.857506194	1.966014028	2.244938589	0.04976538	1.140311312	0.498002838
341	0.12338135	2.856972943	1.965400036	2.244257884	0.049742085	1.139961378	0.49784057
342	0.123330628	2.856443203	1.964790079	2.243581653	0.049718946	1.13961374	0.497679372
343	0.123280241	2.85591695	1.96418413	2.242909867	0.04969596	1.139268384	0.497519236
344	0.123230186	2.85539416	1.963582164	2.242242496	0.049673128	1.138925295	0.497360156
345	0.123180462	2.854874812	1.962984153	2.241579511	0.049650448	1.138584457	0.497202124
346	0.123131066	2.854358881	1.962390072	2.240920884	0.049627918	1.138245857	0.497045133
347	0.123081997	2.853846345	1.961799894	2.240266585	0.049605539	1.13790948	0.496889177
348	0.123033251	2.853337182	1.961213596	2.239616587	0.049583308	1.137575311	0.496734248
349	0.122984827	2.852831369	1.96063115	2.23897086	0.049561225	1.137243335	0.496580339
350	0.122936723	2.852328884	1.960052531	2.238329377	0.049539288	1.136913539	0.496427445
351	0.122888936	2.851829706	1.959477715	2.23769211	0.049517498	1.136585908	0.496275557
352	0.122841464	2.851333811	1.958906676	2.237059031	0.049495851	1.136260429	0.496124669
353	0.122794305	2.850841179	1.95833939	2.236430113	0.049474349	1.135937086	0.495974776

	W	Х	Y	Z	AA	AB	AC
1	[val] of turtle 22	[val] of turtle 23	[val] of turtle 24	[val] of turtle 25	[val] of turtle 26	[val] of turtle 27	[val] of turtle 28
354	0.122747457	2.850351788	1.957775831	2.235805328	0.049452989	1.135615866	0.495825869
355	0.122700918	2.849865616	1.957215976	2.235184649	0.04943177	1.135296756	0.495677942
356	0.122654686	2.849382642	1.9566598	2.234568049	0.049410692	1.134979741	0.495530989
357	0.122608759	2.848902845	1.956107279	2.233955501	0.049389754	1.134664807	0.495385004
358	0.122563135	2.848426204	1.955558388	2.233346979	0.049368955	1.134351942	0.49523998
359	0.122517811	2.847952698	1.955013104	2.232742456	0.049348293	1.134041131	0.49509591
360	0.122472785	2.847482306	1.954471404	2.232141906	0.049327768	1.133732361	0.494952789
361	0.122428057	2.847015008	1.953933263	2.231545302	0.049307379	1.133425619	0.494810609
362	0.122383623	2.846550783	1.953398659	2.230952619	0.049287125	1.133120891	0.494669365
363	0.122339482	2.846089611	1.952867567	2.230363831	0.049267004	1.132818165	0.494529051
364	0.122295632	2.845631471	1.952339966	2.229778913	0.049247017	1.132517427	0.49438966
365	0.12225207	2.845176345	1.951815831	2.229197838	0.049227162	1.132218664	0.494251186
366	0.122208795	2.844724211	1.951295141	2.228620582	0.049207438	1.131921863	0.494113623
367	0.122165806	2.844275051	1.950777872	2.228047119	0.049187845	1.131627011	0.493976966
368	0.122123099	2.843828844	1.950264002	2.227477425	0.04916838	1.131334097	0.493841207
369	0.122080674	2.84338557	1.94975351	2.226911475	0.049149045	1.131043106	0.493706341
370	0.122038528	2.842945212	1.949246371	2.226349243	0.049129837	1.130754026	0.493572363
371	0.121996659	2.842507749	1.948742565	2.225790707	0.049110756	1.130466845	0.493439266
372	0.121955066	2.842073162	1.94824207	2.225235841	0.049091801	1.130181551	0.493307045
373	0.121913747	2.841641432	1.947744864	2.224684621	0.049072971	1.12989813	0.493175693
374	0.1218727	2.841212541	1.947250925	2.224137024	0.049054265	1.129616572	0.493045205

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	AD	AE	AF	AG	AH	AI	AJ
1	[val] of turtle 29	[val] of turtle 30	[val] of turtle 31	[val] of turtle 32	[val] of turtle 33	[val] of turtle 34	[val] of turtle 35
2	3.429118298	2.17760508	3.429118298	6.659251651	1.177968498	0.35752198	0.394988798
3	3	1.965220681	3	3	1.177968498	0.35752198	0.394988798
4	4.505756307	2.646314758	4.505756307	7.751365331	3	1	1
5	3.821266135	2.365987819	3.821266135	7.058004607	1.485239914	0.41035264	0.45420513
6	365	365	365	365	365	365	365
7							
8	[val] of turtle 29	[val] of turtle 30	[val] of turtle 31	[val] of turtle 32	[val] of turtle 33	[val] of turtle 34	[val] of turtle 35
9	3	2	3	3	3	1	1
10	3.108	1.981428571	3.108	3.352545455	2.965428571	0.964545455	0.988545455
11	3.210761714	1.970130909	3.210761714	3.674454442	2.936645714	0.932587273	0.976136364
12	3.308367948	1.965220681	3.308367948	3.969032074	2.911932232	0.903489983	0.962791114
13	3.40091679	1.965876306	3.40091679	4.23914308	2.889975618	0.876748613	0.948570803
14	3.488518497	1.971340816	3.488518497	4.487282145	2.86978375	0.851963615	0.933565829
15	3.571293062	1.980920715	3.571293062	4.715631462	2.850615981	0.828820286	0.917885327
16	3.649368291	1.993984069	3.649368291	4.926107999	2.831928232	0.807071902	0.901648931
17	3.722878245	2.009958027	3.722878245	5.120402464	2.813329329	0.786525939	0.884980456
18	3.791961961	2.028325924	3.791961961	5.300011552	2.794546363	0.767032845	0.86800313
19	3.856762355	2.048624112	3.856762355	5.466264777	2.775397284	0.748476922	0.850836086
20	3.91742529	2.07043862	3.91742529	5.620346882	2.755769271	0.730768945	0.833591865
21	3.974098735	2.093401738	3.974098735	5.763316675	2.735601724	0.713840209	0.816374727
22	4.026932025	2.117188593	4.026932025	5.89612292	2.714872931	0.697637755	0.799279591
23	4.076075174	2.141513775	4.076075174	6.01961784	2.693589665	0.68212056	0.782391486
24	4.121678256	2.166128047	4.121678256	6.13456863	2.671779101	0.667256512	0.765785364
25	4.163890833	2.190815188	4.163890833	6.241667342	2.649482567	0.653020026	0.749526219
26	4.202861425	2.215388969	4.202861425	6.341539408	2.626750759	0.639390187	0.733669412
27	4.238737029	2.239690308	4.238737029	6.43475102	2.603640081	0.626349307	0.718261145
28	4.271662676	2.263584576	4.271662676	6.521815566	2.580209899	0.613881829	0.703339045
29	4.30178103	2.286959098	4.30178103	6.603199248	2.556520486	0.601973502	0.688932803
30	4.329232032	2.30972082	4.329232032	6.679326018	2.532631515	0.590610768	0.675064863
31	4.354152573	2.331794155	4.354152573	6.750581932	2.508600976	0.57978033	0.661751102
32	4.37667622	2.353119	4.37667622	6.817318987	2.484484424	0.56946885	0.649001522
33	4.396932966	2.37364892	4.396932966	6.879858537	2.460334467	0.55966275	0.63682091

	AD	AE	AF	AG	AH	AI	AJ
1	[val] of turtle 29	[val] of turtle 30	[val] of turtle 31	[val] of turtle 32	[val] of turtle 33	[val] of turtle 34	[val] of turtle 35
34	4.41504903	2.393349487	4.41504903	6.938494317	2.436200455	0.550348103	0.625209474
35	4.431146682	2.412196775	4.431146682	6.993495146	2.412128307	0.541510574	0.614163443
36	4.445344105	2.430175985	4.445344105	7.045107338	2.388160442	0.533135413	0.603675623
37	4.457755295	2.447280216	4.457755295	7.093556852	2.364335799	0.525207483	0.593735919
38	4.468489978	2.463509349	4.468489978	7.139051227	2.340689899	0.517711305	0.584331802
39	4.477653567	2.478869048	4.477653567	7.181781309	2.317254961	0.510631122	0.575448744
40	4.485347136	2.493369873	4.485347136	7.221922808	2.294060037	0.503950974	0.567070605
41	4.491667427	2.507026477	4.491667427	7.259637691	2.271131165	0.497654769	0.559179981
42	4.496706863	2.519856904	4.496706863	7.295075438	2.248491536	0.491726366	0.551758513
43	4.500553596	2.531881964	4.500553596	7.328374175	2.226161658	0.486149648	0.544787162
44	4.503291563	2.543124676	4.503291563	7.359661689	2.204159532	0.480908596	0.538246445
45	4.505000555	2.553609789	4.505000555	7.389056345	2.182500813	0.475987353	0.532116648
46	4.505756307	2.563363355	4.505756307	7.416667919	2.161198976	0.471370291	0.526378005
47	4.505630592	2.572412357	4.505630592	7.442598336	2.140265472	0.467042061	0.521010851
48	4.504691329	2.580784394	4.504691329	7.466942353	2.119709877	0.462987641	0.515995752
49	4.503002691	2.5885074	4.503002691	7.489788163	2.099540041	0.459192386	0.511313619
50	4.500625229	2.595609409	4.500625229	7.511217945	2.079762214	0.455642052	0.506945794
51	4.497615997	2.60211835	4.497615997	7.531308368	2.060381186	0.452322835	0.502874125
52	4.494028676	2.608061882	4.494028676	7.550131036	2.041400397	0.449221392	0.499081025
53	4.489913705	2.613467245	4.489913705	7.567752902	2.022822059	0.446324856	0.495549517
54	4.485318415	2.618361148	4.485318415	7.584236635	2.004647258	0.443620853	0.49226327
55	4.480287161	2.622769665	4.480287161	7.599640957	1.986876056	0.441097513	0.489206619
56	4.474861449	2.626718163	4.474861449	7.614020951	1.969507585	0.438743468	0.486364582
57	4.469080074	2.630231238	4.469080074	7.627428336	1.952540131	0.43654786	0.483722869
58	4.462979243	2.633332671	4.462979243	7.639911724	1.935971219	0.434500336	0.481267878
59	4.456592705	2.636045392	4.456592705	7.651516844	1.919797688	0.432591042	0.478986698
60	4.449951876	2.638391456	4.449951876	7.662286758	1.904015761	0.430810621	0.476867094
61	4.443085958	2.640392034	4.443085958	7.672262051	1.888621112	0.429150196	0.474897497
62	4.436022059	2.642067402	4.436022059	7.681481006	1.873608924	0.427601368	0.473066986
63	4.428785308	2.643436947	4.428785308	7.689979764	1.858973952	0.426156194	0.471365274
64	4.421398964	2.644519172	4.421398964	7.697792473	1.844710569	0.424807183	0.469782684
65	4.413884524	2.645331706	4.413884524	7.704951422	1.830812818	0.423547274	0.468310128

	AD	AE	AF	AG	AH	AI	AJ
1	[val] of turtle 29	[val] of turtle 30	[val] of turtle 31	[val] of turtle 32	[val] of turtle 33	[val] of turtle 34	[val] of turtle 35
66	4.406261825	2.645891325	4.406261825	7.711487166	1.817274456	0.422369824	0.466939084
67	4.398549147	2.646213967	4.398549147	7.717428636	1.804088999	0.421268592	0.465661576
68	4.390763303	2.646314758	4.390763303	7.722803251	1.791249754	0.420237721	0.464470144
69	4.38291973	2.646208032	4.38291973	7.727637009	1.778749859	0.419271726	0.463357825
70	4.375032579	2.645907358	4.375032579	7.73195458	1.766582316	0.418365472	0.462318126
71	4.367114796	2.645425569	4.367114796	7.735779385	1.754740017	0.417514163	0.461345002
72	4.3591782	2.644774788	4.3591782	7.739133676	1.743215776	0.41671332	0.460432831
73	4.351233556	2.643966456	4.351233556	7.742038607	1.732002348	0.415958771	0.459576392
74	4.34329065	2.643011361	4.34329065	7.744514297	1.72109246	0.41524663	0.458770843
75	4.335358355	2.641919667	4.335358355	7.746579892	1.710478824	0.414573286	0.458011697
76	4.327444691	2.64070094	4.327444691	7.748253622	1.70015416	0.413935385	0.457294802
77	4.31955689	2.63936418	4.31955689	7.749552857	1.690111211	0.413329818	0.456616325
78	4.31170145	2.637917844	4.31170145	7.75049415	1.680342761	0.412753705	0.455972723
79	4.303884186	2.636369878	4.303884186	7.751093288	1.670841647	0.41220438	0.455360735
80	4.296110288	2.634727736	4.296110288	7.751365331	1.66160077	0.411679385	0.454777357
81	4.288384361	2.632998412	4.288384361	7.751324656	1.652613109	0.411176448	0.454219828
82	4.280710471	2.631188464	4.280710471	7.750984991	1.643871731	0.41069348	0.453685612
83	4.273092189	2.629304032	4.273092189	7.750359453	1.635369795	0.410228555	0.453172387
84	4.265532631	2.627350868	4.265532631	7.749460577	1.627100565	0.409779908	0.452678023
85	4.258034488	2.625334354	4.258034488	7.74830035	1.619057414	0.409345919	0.452200577
86	4.250600068	2.623259524	4.250600068	7.746890238	1.611233829	0.408925102	0.451738273
87	4.243231325	2.621131083	4.243231325	7.745241213	1.603623419	0.408516101	0.451289493
88	4.235929888	2.618953429	4.235929888	7.74336378	1.596219914	0.408117678	0.450852766
89	4.228697089	2.61673067	4.228697089	7.741267999	1.589017175	0.407728705	0.450426756
90	4.221533991	2.61446664	4.221533991	7.738963507	1.58200919	0.407348156	0.45001025
91	4.214441412	2.612164918	4.214441412	7.736459542	1.575190082	0.406975099	0.449602155
92	4.207419943	2.609828843	4.207419943	7.733764959	1.568554104	0.406608691	0.44920148
93	4.200469977	2.607461527	4.200469977	7.730888252	1.562095647	0.40624817	0.448807335
94	4.193591719	2.605065874	4.193591719	7.727837567	1.555809238	0.405892849	0.448418919
95	4.186785214	2.602644587	4.186785214	7.724620724	1.549689537	0.405542111	0.448035517
96	4.180050354	2.600200187	4.180050354	7.721245231	1.543731343	0.405195402	0.447656488
97	4.173386901	2.59773502	4.173386901	7.717718295	1.537929587	0.404852227	0.447281261

	AD	AE	AF	AG	AH	AI	AJ
1	[val] of turtle 29	[val] of turtle 30	[val] of turtle 31	[val] of turtle 32	[val] of turtle 33	[val] of turtle 34	[val] of turtle 35
98	4.166794497	2.595251272	4.166794497	7.714046839	1.532279337	0.404512145	0.446909331
99	4.160272678	2.592750977	4.160272678	7.710237516	1.526775792	0.404174766	0.446540251
100	4.153820888	2.590236027	4.153820888	7.70629672	1.521414287	0.403839743	0.446173628
101	4.147438488	2.587708185	4.147438488	7.702230596	1.516190283	0.403506773	0.445809116
102	4.141124766	2.585169089	4.141124766	7.698045054	1.511099374	0.403175591	0.445446417
103	4.134878948	2.582620264	4.134878948	7.693745778	1.506137279	0.402845964	0.445085271
104	4.128700208	2.580063128	4.128700208	7.689338236	1.501299842	0.402517694	0.444725456
105	4.12258767	2.577499	4.12258767	7.684827688	1.496583033	0.40219061	0.444366783
106	4.116540424	2.574929106	4.116540424	7.680219199	1.491982939	0.401864568	0.444009094
107	4.110557523	2.572354586	4.110557523	7.675517643	1.487495768	0.401539446	0.443652257
108	4.104637998	2.569776501	4.104637998	7.67072771	1.483117845	0.401215144	0.443296164
109	4.098780856	2.567195836	4.098780856	7.665853921	1.478845607	0.400891583	0.442940732
110	4.092985092	2.564613509	4.092985092	7.660900626	1.474675604	0.400568699	0.442585894
111	4.087249686	2.562030371	4.087249686	7.655872017	1.470604493	0.400246445	0.442231603
112	4.081573613	2.559447217	4.081573613	7.650772132	1.46662904	0.399924786	0.441877826
113	4.075955845	2.556864783	4.075955845	7.645604861	1.462746113	0.3996037	0.441524546
114	4.070395351	2.554283756	4.070395351	7.640373952	1.458952681	0.399283178	0.441171755
115	4.064891107	2.551704773	4.064891107	7.635083019	1.455245813	0.398963217	0.440819458
116	4.059442091	2.549128429	4.059442091	7.629735541	1.451622674	0.398643825	0.44046767
117	4.054047289	2.546555278	4.054047289	7.624334875	1.448080521	0.398325015	0.440116412
118	4.0487057	2.543985833	4.0487057	7.618884255	1.444616704	0.39800681	0.439765712
119	4.04341633	2.541420575	4.04341633	7.613386799	1.441228661	0.397689235	0.439415606
120	4.038178202	2.538859951	4.038178202	7.607845512	1.437913916	0.39737232	0.439066134
121	4.032990352	2.536304376	4.032990352	7.602263291	1.434670076	0.397056101	0.438717338
122	4.027851831	2.533754239	4.027851831	7.596642929	1.431494829	0.396740616	0.438369268
123	4.022761708	2.531209902	4.022761708	7.590987118	1.428385944	0.396425904	0.438021971
124	4.01771907	2.528671704	4.01771907	7.585298455	1.425341265	0.396112009	0.437675501
125	4.01272302	2.526139959	4.01272302	7.579579441	1.422358709	0.395798974	0.437329912
126	4.007772684	2.523614963	4.007772684	7.573832489	1.419436267	0.395486844	0.436985256
127	4.002867203	2.521096991	4.002867203	7.568059925	1.416571999	0.395175666	0.436641591
128	3.998005741	2.518586301	3.998005741	7.562263988	1.413764032	0.394865485	0.43629897
129	3.99318748	2.516083132	3.99318748	7.55644684	1.411010559	0.394556348	0.43595745

	AD	AE	AF	AG	AH	AI	AJ
1	[val] of turtle 29	[val] of turtle 30	[val] of turtle 31	[val] of turtle 32	[val] of turtle 33	[val] of turtle 34	[val] of turtle 35
130	3.988411622	2.513587712	3.988411622	7.550610562	1.408309836	0.394248301	0.435617084
131	3.983677392	2.51110025	3.983677392	7.544757162	1.40566018	0.393941388	0.435277927
132	3.978984031	2.508620946	3.978984031	7.538888573	1.403059969	0.393635655	0.434940032
133	3.974330803	2.506149984	3.974330803	7.533006657	1.400507635	0.393331145	0.434603449
134	3.969716993	2.503687538	3.969716993	7.527113209	1.39800167	0.393027902	0.434268231
135	3.965141901	2.501233772	3.965141901	7.521209958	1.395540615	0.392725966	0.433934424
136	3.960604853	2.498788838	3.960604853	7.51529857	1.393123067	0.392425378	0.433602078
137	3.956105189	2.496352882	3.956105189	7.509380648	1.39074767	0.392126177	0.433271236
138	3.951642272	2.493926038	3.951642272	7.503457736	1.388413119	0.3918284	0.432941943
139	3.94721548	2.491508433	3.94721548	7.49753132	1.386118153	0.391532082	0.43261424
140	3.942824213	2.489100187	3.942824213	7.491602831	1.383861558	0.391237258	0.432288168
141	3.938467887	2.486701413	3.938467887	7.485673645	1.381642164	0.39094396	0.431963764
142	3.934145937	2.484312217	3.934145937	7.479745087	1.379458842	0.390652218	0.431641063
143	3.929857813	2.481932698	3.929857813	7.473818431	1.377310504	0.390362062	0.4313201
144	3.925602984	2.479562949	3.925602984	7.467894902	1.375196101	0.390073519	0.431000906
145	3.921380935	2.477203061	3.921380935	7.461975678	1.373114623	0.389786614	0.430683512
146	3.917191166	2.474853114	3.917191166	7.456061891	1.371065096	0.389501372	0.430367944
147	3.913033194	2.472513188	3.913033194	7.450154628	1.36904658	0.389217814	0.430054229
148	3.90890655	2.470183357	3.90890655	7.444254936	1.367058171	0.388935962	0.429742391
149	3.90481078	2.467863689	3.90481078	7.438363817	1.365098996	0.388655833	0.429432451
150	3.900745445	2.465554249	3.900745445	7.432482235	1.363168215	0.388377445	0.42912443
151	3.896710118	2.463255099	3.896710118	7.426611114	1.361265017	0.388100815	0.428818346
152	3.892704387	2.460966295	3.892704387	7.420751341	1.359388621	0.387825955	0.428514216
153	3.888727852	2.458687893	3.888727852	7.414903767	1.357538276	0.387552879	0.428212054
154	3.884780126	2.456419941	3.884780126	7.409069208	1.355713256	0.387281597	0.427911873
155	3.880860835	2.454162487	3.880860835	7.403248443	1.353912862	0.387012121	0.427613686
156	3.876969613	2.451915575	3.876969613	7.397442222	1.35213642	0.386744457	0.427317501
157	3.873106111	2.449679246	3.873106111	7.39165126	1.350383282	0.386478614	0.427023328
158	3.869269985	2.447453538	3.869269985	7.385876244	1.348652821	0.386214596	0.426731173
159	3.865460905	2.445238486	3.865460905	7.380117829	1.346944435	0.385952409	0.426441041
160	3.86167855	2.443034124	3.86167855	7.37437664	1.345257542	0.385692056	0.426152938
161	3.857922609	2.44084048	3.857922609	7.368653278	1.343591581	0.38543354	0.425866866

	AD	AE	AF	AG	AH	AI	AJ
1	[val] of turtle 29	[val] of turtle 30	[val] of turtle 31	[val] of turtle 32	[val] of turtle 33	[val] of turtle 34	[val] of turtle 35
162	3.854192781	2.438657582	3.854192781	7.362948313	1.341946014	0.38517686	0.425582827
163	3.850488772	2.436485457	3.850488772	7.35726229	1.340320319	0.384922019	0.42530082
164	3.846810298	2.434324126	3.846810298	7.35159573	1.338713994	0.384669015	0.425020847
165	3.843157082	2.43217361	3.843157082	7.345949128	1.337126555	0.384417845	0.424742905
166	3.839528858	2.430033928	3.839528858	7.340322956	1.335557537	0.384168509	0.42446699
167	3.835925365	2.427905096	3.835925365	7.334717663	1.334006488	0.383921001	0.424193101
168	3.832346349	2.425787129	3.832346349	7.329133675	1.332472976	0.383675319	0.423921232
169	3.828791564	2.423680037	3.828791564	7.323571397	1.330956581	0.383431456	0.423651378
170	3.825260772	2.421583833	3.825260772	7.318031215	1.329456901	0.383189408	0.423383532
171	3.821753739	2.419498524	3.821753739	7.312513493	1.327973547	0.382949167	0.423117688
172	3.818270238	2.417424116	3.818270238	7.307018575	1.326506143	0.382710727	0.422853838
173	3.81481005	2.415360615	3.81481005	7.30154679	1.325054327	0.382474081	0.422591973
174	3.811372959	2.413308024	3.811372959	7.296098443	1.32361775	0.382239219	0.422332086
175	3.807958754	2.411266344	3.807958754	7.290673828	1.322196074	0.382006133	0.422074165
176	3.804567233	2.409235574	3.804567233	7.285273218	1.320788975	0.381774815	0.421818201
177	3.801198196	2.407215713	3.801198196	7.279896872	1.319396138	0.381545254	0.421564184
178	3.797851447	2.405206756	3.797851447	7.27454503	1.318017261	0.381317441	0.421312102
179	3.794526797	2.4032087	3.794526797	7.26921792	1.316652051	0.381091364	0.421061944
180	3.791224061	2.401221537	3.791224061	7.263915755	1.315300226	0.380867014	0.420813698
181	3.787943056	2.399245259	3.787943056	7.258638733	1.313961513	0.380644378	0.420567351
182	3.784683605	2.397279857	3.784683605	7.253387038	1.312635648	0.380423447	0.420322891
183	3.781445535	2.39532532	3.781445535	7.248160842	1.311322377	0.380204207	0.420080305
184	3.778228675	2.393381635	3.778228675	7.242960303	1.310021454	0.379986647	0.419839579
185	3.775032859	2.391448789	3.775032859	7.237785569	1.308732642	0.379770756	0.419600701
186	3.771857923	2.389526766	3.771857923	7.232636774	1.307455712	0.379556519	0.419363657
187	3.768703708	2.387615551	3.768703708	7.22751404	1.306190441	0.379343926	0.419128432
188	3.765570056	2.385715127	3.765570056	7.222417482	1.304936615	0.379132963	0.418895013
189	3.762456814	2.383825474	3.762456814	7.217347199	1.303694027	0.378923618	0.418663385
190	3.75936383	2.381946572	3.75936383	7.212303285	1.302462475	0.378715877	0.418433535
191	3.756290955	2.380078402	3.756290955	7.207285821	1.301241767	0.378509728	0.418205447
192	3.753238044	2.37822094	3.753238044	7.202294879	1.300031715	0.378305157	0.417979107
193	3.750204953	2.376374163	3.750204953	7.197330523	1.298832136	0.378102152	0.4177545

	AD	AE	AF	AG	AH	AI	AJ
1	[val] of turtle 29	[val] of turtle 30	[val] of turtle 31	[val] of turtle 32	[val] of turtle 33	[val] of turtle 34	[val] of turtle 35
194	3.74719154	2.374538048	3.74719154	7.192392808	1.297642854	0.377900698	0.417531612
195	3.744197666	2.372712569	3.744197666	7.187481779	1.296463701	0.377700783	0.417310428
196	3.741223195	2.370897699	3.741223195	7.182597474	1.29529451	0.377502394	0.417090933
197	3.738267991	2.369093412	3.738267991	7.177739925	1.294135123	0.377305516	0.416873113
198	3.735331921	2.367299679	3.735331921	7.172909153	1.292985384	0.377110138	0.416656952
199	3.732414855	2.365516472	3.732414855	7.168105175	1.291845143	0.376916245	0.416442437
200	3.729516663	2.36374376	3.729516663	7.163327999	1.290714256	0.376723824	0.416229551
201	3.726637217	2.361981512	3.726637217	7.158577627	1.289592581	0.376532862	0.416018281
202	3.723776391	2.360229698	3.723776391	7.153854056	1.288479982	0.376343346	0.415808612
203	3.720934062	2.358488284	3.720934062	7.149157274	1.287376326	0.376155263	0.415600529
204	3.718110105	2.356757237	3.718110105	7.144487265	1.286281485	0.375968599	0.415394018
205	3.715304401	2.355036524	3.715304401	7.139844008	1.285195333	0.375783342	0.415189064
206	3.712516828	2.353326109	3.712516828	7.135227475	1.28411775	0.375599478	0.414985654
207	3.709747267	2.351625957	3.709747267	7.130637634	1.283048617	0.375416996	0.414783772
208	3.706995603	2.349936033	3.706995603	7.126074447	1.281987821	0.375235881	0.414583404
209	3.704261717	2.348256299	3.704261717	7.121537873	1.28093525	0.375056122	0.414384537
210	3.701545496	2.346586719	3.701545496	7.117027863	1.279890797	0.374877705	0.414187156
211	3.698846826	2.344927253	3.698846826	7.112544369	1.278854356	0.374700619	0.413991248
212	3.696165593	2.343277864	3.696165593	7.108087333	1.277825825	0.37452485	0.413796799
213	3.693501686	2.341638513	3.693501686	7.103656697	1.276805105	0.374350387	0.413603795
214	3.690854994	2.34000916	3.690854994	7.099252398	1.275792099	0.374177217	0.413412222
215	3.688225408	2.338389765	3.688225408	7.094874368	1.274786713	0.374005328	0.413222068
216	3.685612819	2.336780287	3.685612819	7.090522539	1.273788855	0.373834709	0.413033319
217	3.683017119	2.335180685	3.683017119	7.086196837	1.272798435	0.373665348	0.412845962
218	3.680438201	2.333590918	3.680438201	7.081897184	1.271815368	0.373497232	0.412659983
219	3.67787596	2.332010943	3.67787596	7.077623501	1.270839568	0.37333035	0.412475371
220	3.675330289	2.330440719	3.675330289	7.073375706	1.269870952	0.373164691	0.412292112
221	3.672801085	2.328880203	3.672801085	7.069153714	1.26890944	0.373000244	0.412110194
222	3.670288244	2.327329351	3.670288244	7.064957437	1.267954953	0.372836996	0.411929604
223	3.667791664	2.325788119	3.667791664	7.060786783	1.267007414	0.372674938	0.41175033
224	3.665311241	2.324256465	3.665311241	7.056641662	1.266066748	0.372514057	0.41157236
225	3.662846876	2.322734344	3.662846876	7.052521977	1.265132881	0.372354344	0.411395682

	AD	AE	AF	AG	AH	AI	AJ
1	[val] of turtle 29	[val] of turtle 30	[val] of turtle 31	[val] of turtle 32	[val] of turtle 33	[val] of turtle 34	[val] of turtle 35
226	3.660398466	2.321221712	3.660398466	7.048427632	1.264205743	0.372195788	0.411220284
227	3.657965913	2.319718524	3.657965913	7.044358528	1.263285263	0.372038377	0.411046154
228	3.655549118	2.318224734	3.655549118	7.040314564	1.262371373	0.371882102	0.41087328
229	3.65314798	2.316740299	3.65314798	7.036295638	1.261464006	0.371726952	0.410701652
230	3.650762404	2.315265172	3.650762404	7.032301644	1.260563097	0.371572917	0.410531257
231	3.64839229	2.313799308	3.64839229	7.028332478	1.259668581	0.371419987	0.410362085
232	3.646037544	2.31234266	3.646037544	7.024388032	1.258780395	0.371268152	0.410194125
233	3.643698068	2.310895184	3.643698068	7.020468196	1.25789848	0.371117402	0.410027365
234	3.641373767	2.309456832	3.641373767	7.016572861	1.257022773	0.370967727	0.409861795
235	3.639064547	2.308027559	3.639064547	7.012701915	1.256153217	0.370819117	0.409697405
236	3.636770313	2.306607317	3.636770313	7.008855246	1.255289754	0.370671564	0.409534183
237	3.634490971	2.305196062	3.634490971	7.00503274	1.254432327	0.370525058	0.40937212
238	3.632226429	2.303793744	3.632226429	7.001234283	1.25358088	0.37037959	0.409211205
239	3.629976593	2.302400319	3.629976593	6.997459759	1.252735359	0.37023515	0.409051427
240	3.627741372	2.301015738	3.627741372	6.993709051	1.251895711	0.37009173	0.408892778
241	3.625520674	2.299639956	3.625520674	6.989982042	1.251061883	0.36994932	0.408735248
242	3.623314408	2.298272925	3.623314408	6.986278614	1.250233824	0.369807912	0.408578825
243	3.621122484	2.296914597	3.621122484	6.982598649	1.249411483	0.369667497	0.408423502
244	3.618944812	2.295564926	3.618944812	6.978942027	1.24859481	0.369528067	0.408269268
245	3.616781302	2.294223865	3.616781302	6.975308628	1.247783756	0.369389613	0.408116114
246	3.614631866	2.292891367	3.614631866	6.971698332	1.246978274	0.369252127	0.407964031
247	3.612496415	2.291567384	3.612496415	6.968111018	1.246178315	0.369115601	0.40781301
248	3.610374862	2.290251868	3.610374862	6.964546565	1.245383835	0.368980026	0.407663041
249	3.608267118	2.288944774	3.608267118	6.961004851	1.244594786	0.368845395	0.407514116
250	3.606173098	2.287646054	3.606173098	6.957485755	1.243811124	0.368711699	0.407366227
251	3.604092714	2.28635566	3.604092714	6.953989153	1.243032805	0.368578931	0.407219364
252	3.602025881	2.285073546	3.602025881	6.950514924	1.242259785	0.368447083	0.407073518
253	3.599972514	2.283799665	3.599972514	6.947062945	1.241492021	0.368316147	0.406928682
254	3.597932527	2.282533969	3.597932527	6.943633093	1.24072947	0.368186116	0.406784848
255	3.595905835	2.281276412	3.595905835	6.940225246	1.239972092	0.368056983	0.406642006
256	3.593892356	2.280026946	3.593892356	6.93683928	1.239219844	0.36792874	0.406500148
257	3.591892006	2.278785526	3.591892006	6.933475072	1.238472687	0.367801379	0.406359268

	AD	AE	AF	AG	AH	AI	AJ
1	[val] of turtle 29	[val] of turtle 30	[val] of turtle 31	[val] of turtle 32	[val] of turtle 33	[val] of turtle 34	[val] of turtle 35
258	3.589904701	2.277552104	3.589904701	6.930132499	1.23773058	0.367674895	0.406219356
259	3.587930358	2.276326634	3.587930358	6.926811439	1.236993484	0.367549279	0.406080405
260	3.585968896	2.275109069	3.585968896	6.923511768	1.23626136	0.367424524	0.405942407
261	3.584020234	2.273899363	3.584020234	6.920233364	1.23553417	0.367300624	0.405805355
262	3.582084289	2.272697469	3.582084289	6.916976103	1.234811876	0.367177572	0.405669241
263	3.580160981	2.271503342	3.580160981	6.913739863	1.234094441	0.367055362	0.405534057
264	3.57825023	2.270316935	3.57825023	6.910524522	1.233381827	0.366933985	0.405399797
265	3.576351956	2.269138203	3.576351956	6.907329957	1.232673998	0.366813437	0.405266452
266	3.57446608	2.267967099	3.57446608	6.904156046	1.231970919	0.36669371	0.405134016
267	3.572592522	2.266803577	3.572592522	6.901002667	1.231272553	0.366574798	0.405002482
268	3.570731204	2.265647594	3.570731204	6.897869699	1.230578865	0.366456695	0.404871842
269	3.568882048	2.264499102	3.568882048	6.89475702	1.229889822	0.366339394	0.40474209
270	3.567044977	2.263358056	3.567044977	6.891664509	1.229205388	0.366222889	0.404613218
271	3.565219914	2.262224413	3.565219914	6.888592046	1.22852553	0.366107174	0.404485221
272	3.56340678	2.261098126	3.56340678	6.88553951	1.227850213	0.365992243	0.40435809
273	3.561605502	2.259979151	3.561605502	6.882506781	1.227179406	0.36587809	0.404231821
274	3.559816001	2.258867443	3.559816001	6.879493739	1.226513074	0.365764709	0.404106405
275	3.558038204	2.257762958	3.558038204	6.876500264	1.225851187	0.365652094	0.403981836
276	3.556272035	2.256665652	3.556272035	6.873526238	1.225193711	0.36554024	0.403858109
277	3.55451742	2.25557548	3.55451742	6.870571543	1.224540614	0.36542914	0.403735217
278	3.552774284	2.254492398	3.552774284	6.867636059	1.223891866	0.365318789	0.403613153
279	3.551042554	2.253416363	3.551042554	6.864719669	1.223247436	0.365209181	0.403491911
280	3.549322157	2.252347332	3.549322157	6.861822256	1.222607292	0.365100312	0.403371486
281	3.547613019	2.25128526	3.547613019	6.858943703	1.221971404	0.364992174	0.40325187
282	3.545915069	2.250230105	3.545915069	6.856083894	1.221339741	0.364884764	0.403133059
283	3.544228234	2.249181823	3.544228234	6.853242711	1.220712275	0.364778074	0.403015046
284	3.542552443	2.248140372	3.542552443	6.850420041	1.220088975	0.364672101	0.402897825
285	3.540887625	2.24710571	3.540887625	6.847615767	1.219469812	0.364566839	0.40278139
286	3.539233709	2.246077793	3.539233709	6.844829775	1.218854758	0.364462283	0.402665736
287	3.537590625	2.245056579	3.537590625	6.842061952	1.218243782	0.364358427	0.402550856
288	3.535958303	2.244042027	3.535958303	6.839312183	1.217636858	0.364255267	0.402436746
289	3.534336673	2.243034095	3.534336673	6.836580355	1.217033955	0.364152797	0.4023234

	AD	AE	AF	AG	AH	AI	AJ
1	[val] of turtle 29	[val] of turtle 30	[val] of turtle 31	[val] of turtle 32	[val] of turtle 33	[val] of turtle 34	[val] of turtle 35
290	3.532725667	2.242032741	3.532725667	6.833866357	1.216435048	0.364051012	0.402210812
291	3.531125215	2.241037923	3.531125215	6.831170075	1.215840108	0.363949907	0.402098976
292	3.52953525	2.240049601	3.52953525	6.828491399	1.215249107	0.363849479	0.401987888
293	3.527955705	2.239067732	3.527955705	6.825830217	1.214662018	0.36374972	0.401877541
294	3.52638651	2.238092278	3.52638651	6.823186419	1.214078814	0.363650628	0.401767931
295	3.5248276	2.237123196	3.5248276	6.820559895	1.213499469	0.363552197	0.401659052
296	3.523278908	2.236160447	3.523278908	6.817950536	1.212923956	0.363454422	0.4015509
297	3.521740368	2.23520399	3.521740368	6.815358233	1.212352248	0.363357298	0.401443468
298	3.520211913	2.234253785	3.520211913	6.812782878	1.21178432	0.363260822	0.401336751
299	3.518693479	2.233309793	3.518693479	6.810224363	1.211220146	0.363164988	0.401230746
300	3.517185001	2.232371974	3.517185001	6.80768258	1.2106597	0.363069792	0.401125445
301	3.515686414	2.231440288	3.515686414	6.805157423	1.210102957	0.362975229	0.401020846
302	3.514197653	2.230514697	3.514197653	6.802648787	1.209549891	0.362881295	0.400916942
303	3.512718656	2.229595162	3.512718656	6.800156566	1.209000477	0.362787986	0.400813729
304	3.511249358	2.228681643	3.511249358	6.797680654	1.208454691	0.362695297	0.400711202
305	3.509789697	2.227774103	3.509789697	6.795220948	1.207912508	0.362603223	0.400609356
306	3.50833961	2.226872503	3.50833961	6.792777343	1.207373904	0.362511761	0.400508186
307	3.506899034	2.225976804	3.506899034	6.790349737	1.206838854	0.362420907	0.400407689
308	3.505467909	2.22508697	3.505467909	6.787938027	1.206307334	0.362330655	0.400307857
309	3.504046172	2.224202962	3.504046172	6.78554211	1.205779321	0.362241002	0.400208689
310	3.502633762	2.223324743	3.502633762	6.783161886	1.205254791	0.362151943	0.400110178
311	3.501230619	2.222452276	3.501230619	6.780797254	1.20473372	0.362063475	0.40001232
312	3.499836682	2.221585524	3.499836682	6.778448112	1.204216085	0.361975594	0.399915111
313	3.498451891	2.220724449	3.498451891	6.776114361	1.203701863	0.361888294	0.399818546
314	3.497076188	2.219869016	3.497076188	6.773795903	1.203191031	0.361801573	0.39972262
315	3.495709512	2.219019188	3.495709512	6.771492638	1.202683566	0.361715427	0.39962733
316	3.494351804	2.218174929	3.494351804	6.769204469	1.202179446	0.36162985	0.399532671
317	3.493003007	2.217336203	3.493003007	6.766931297	1.201678649	0.361544841	0.399438638
318	3.491663062	2.216502973	3.491663062	6.764673026	1.201181151	0.361460394	0.399345228
319	3.490331911	2.215675206	3.490331911	6.76242956	1.200686931	0.361376505	0.399252436
320	3.489009498	2.214852864	3.489009498	6.760200802	1.200195967	0.361293171	0.399160257
321	3.487695764	2.214035914	3.487695764	6.757986658	1.199708237	0.361210389	0.399068689
	AD	AE	AF	AG	AH	AI	AJ
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1	[val] of turtle 29	[val] of turtle 30	[val] of turtle 31	[val] of turtle 32	[val] of turtle 33	[val] of turtle 34	[val] of turtle 35
322	3.486390654	2.21322432	3.486390654	6.755787033	1.199223719	0.361128154	0.398977725
323	3.485094111	2.212418047	3.485094111	6.753601833	1.198742393	0.361046462	0.398887363
324	3.483806079	2.211617061	3.483806079	6.751430964	1.198264236	0.360965311	0.398797598
325	3.482526503	2.210821329	3.482526503	6.749274334	1.197789229	0.360884695	0.398708426
326	3.481255327	2.210030814	3.481255327	6.747131849	1.197317349	0.360804613	0.398619844
327	3.479992496	2.209245485	3.479992496	6.745003418	1.196848575	0.360725059	0.398531846
328	3.478737956	2.208465307	3.478737956	6.74288895	1.196382888	0.36064603	0.39844443
329	3.477491653	2.207690246	3.477491653	6.740788354	1.195920267	0.360567524	0.398357591
330	3.476253533	2.20692027	3.476253533	6.73870154	1.195460691	0.360489535	0.398271325
331	3.475023543	2.206155346	3.475023543	6.736628418	1.195004139	0.360412062	0.398185629
332	3.473801628	2.205395439	3.473801628	6.734568899	1.194550593	0.3603351	0.398100498
333	3.472587737	2.204640519	3.472587737	6.732522895	1.194100031	0.360258645	0.398015929
334	3.471381817	2.203890552	3.471381817	6.730490317	1.193652435	0.360182696	0.397931918
335	3.470183815	2.203145506	3.470183815	6.728471078	1.193207784	0.360107247	0.397848461
336	3.468993681	2.20240535	3.468993681	6.726465091	1.192766059	0.360032296	0.397765555
337	3.467811362	2.201670051	3.467811362	6.724472271	1.192327241	0.359957839	0.397683195
338	3.466636807	2.200939577	3.466636807	6.72249253	1.191891309	0.359883873	0.397601379
339	3.465469966	2.200213897	3.465469966	6.720525784	1.191458246	0.359810395	0.397520102
340	3.464310788	2.199492981	3.464310788	6.718571948	1.191028032	0.359737401	0.397439361
341	3.463159223	2.198776796	3.463159223	6.716630937	1.190600647	0.359664889	0.397359152
342	3.46201522	2.198065313	3.46201522	6.714702669	1.190176075	0.359592854	0.397279472
343	3.460878732	2.197358499	3.460878732	6.712787059	1.189754295	0.359521294	0.397200317
344	3.459749707	2.196656326	3.459749707	6.710884026	1.18933529	0.359450206	0.397121684
345	3.458628098	2.195958762	3.458628098	6.708993487	1.18891904	0.359379587	0.397043568
346	3.457513855	2.195265777	3.457513855	6.70711536	1.188505529	0.359309432	0.396965968
347	3.456406931	2.194577342	3.456406931	6.705249564	1.188094737	0.35923974	0.396888879
348	3.455307278	2.193893427	3.455307278	6.703396019	1.187686646	0.359170507	0.396812297
349	3.454214847	2.193214002	3.454214847	6.701554644	1.18728124	0.359101729	0.39673622
350	3.453129593	2.192539038	3.453129593	6.699725361	1.1868785	0.359033405	0.396660644
351	3.452051466	2.191868506	3.452051466	6.69790809	1.186478408	0.358965531	0.396585566
352	3.450980422	2.191202377	3.450980422	6.696102752	1.186080947	0.358898104	0.396510982
353	3.449916412	2.190540621	3.449916412	6.694309269	1.1856861	0.358831121	0.396436889

	AD	AE	AF	AG	AH	AI	AJ
1	[val] of turtle 29	[val] of turtle 30	[val] of turtle 31	[val] of turtle 32	[val] of turtle 33	[val] of turtle 34	[val] of turtle 35
354	3.448859393	2.189883212	3.448859393	6.692527564	1.185293849	0.358764578	0.396363284
355	3.447809316	2.189230119	3.447809316	6.69075756	1.184904177	0.358698474	0.396290164
356	3.446766138	2.188581315	3.446766138	6.688999181	1.184517068	0.358632805	0.396217525
357	3.445729812	2.187936771	3.445729812	6.687252349	1.184132503	0.358567569	0.396145364
358	3.444700294	2.187296461	3.444700294	6.685516989	1.183750468	0.358502762	0.396073679
359	3.443677539	2.186660355	3.443677539	6.683793027	1.183370944	0.358438381	0.396002465
360	3.442661502	2.186028427	3.442661502	6.682080388	1.182993915	0.358374424	0.39593172
361	3.441652141	2.185400649	3.441652141	6.680378997	1.182619365	0.358310888	0.39586144
362	3.44064941	2.184776995	3.44064941	6.678688781	1.182247278	0.35824777	0.395791623
363	3.439653267	2.184157436	3.439653267	6.677009667	1.181877637	0.358185068	0.395722266
364	3.438663668	2.183541947	3.438663668	6.675341582	1.181510426	0.358122778	0.395653364
365	3.43768057	2.1829305	3.43768057	6.673684453	1.181145629	0.358060898	0.395584916
366	3.436703931	2.182323069	3.436703931	6.67203821	1.18078323	0.357999425	0.395516919
367	3.435733708	2.181719628	3.435733708	6.670402779	1.180423213	0.357938357	0.395449369
368	3.434769859	2.181120151	3.434769859	6.668778092	1.180065563	0.35787769	0.395382263
369	3.433812342	2.180524611	3.433812342	6.667164077	1.179710265	0.357817422	0.395315599
370	3.432861116	2.179932983	3.432861116	6.665560664	1.179357301	0.357757551	0.395249373
371	3.43191614	2.179345241	3.43191614	6.663967783	1.179006658	0.357698074	0.395183583
372	3.430977372	2.178761361	3.430977372	6.662385367	1.17865832	0.357638988	0.395118226
373	3.430044772	2.178181315	3.430044772	6.660813345	1.178312272	0.357580291	0.395053299
374	3.429118298	2.17760508	3.429118298	6.659251651	1.177968498	0.35752198	0.394988798

	AK	AL	AM	AN
1	[val] of turtle 36	[val] of turtle 37	[val] of turtle 38	[val] of turtle 39
2	5.45E-21	0.338406343	0.258633544	3.808077723
3	5.45E-21	0.338406343	0.258633544	2.733078358
4	1	1.585186617	1	4.29140316
5	0.02276867	0.509995493	0.29905253	3.956925352
6	365	365	365	365
7				
8	[val] of turtle 36	[val] of turtle 37	[val] of turtle 38	[val] of turtle 39
9	1	1	1	3
10	0.88	1.151428571	0.934545455	2.894545455
11	0.7744	1.272294286	0.876530909	2.820283636
12	0.681472	1.367366362	0.824876292	2.771620817
13	0.59969536	1.440695808	0.778684831	2.74386296
14	0.527731917	1.495725158	0.737210363	2.733078358
15	0.464404087	1.535380936	0.69983045	2.735980395
16	0.408675596	1.562151637	0.666024287	2.749827623
17	0.359634525	1.578153586	0.635354569	2.772338674
18	0.316478382	1.585186617	0.607452625	2.801619915
19	0.278500976	1.58478121	0.582006235	2.836103994
20	0.245080859	1.578238437	0.558749658	2.874497709
21	0.215671156	1.566663849	0.53745548	2.915737835
22	0.189790617	1.55099626	0.517927952	2.958953741
23	0.167015743	1.532032224	0.499997546	3.003435792
24	0.146973854	1.510446865	0.483516515	3.04860868
25	0.129336991	1.486811618	0.468355268	3.094008934
26	0.113816552	1.461609365	0.454399413	3.139265993
27	0.100158566	1.435247348	0.441547343	3.18408629
28	0.088139538	1.408068198	0.429708267	3.228239888
29	0.077562794	1.380359362	0.418800595	3.271549288
30	0.068255258	1.352361167	0.408750626	3.313880052
31	0.060064627	1.324273717	0.39949146	3.355132978
32	0.052856872	1.296262804	0.390962111	3.395237571
33	0.046514047	1.268464965	0.383106775	3.434146611

	AK	AL	AM	AN
1	[val] of turtle 36	[val] of turtle 37	[val] of turtle 38	[val] of turtle 39
34	0.040932362	1.240991817	0.375874217	3.471831643
35	0.036020478	1.213933775	0.36921727	3.508279234
36	0.031698021	1.187363233	0.363092402	3.543487893
37	0.027894258	1.161337296	0.357459365	3.577465517
38	0.024546947	1.135900117	0.352280883	3.610227304
39	0.021601314	1.111084905	0.347522397	3.641794037
40	0.019009156	1.08691564	0.343151834	3.672190691
41	0.016728057	1.063408545	0.339139407	3.701445293
42	0.01472069	1.040573345	0.335457448	3.729588011
43	0.012954208	1.018414346	0.332080245	3.756650414
44	0.011399703	0.996931351	0.328983906	3.782664886
45	0.010031738	0.976120451	0.326146233	3.80766416
46	0.00882793	0.955974694	0.323546606	3.831680953
47	0.007768578	0.936484654	0.321165878	3.854747687
48	0.006836349	0.91763892	0.318986275	3.876896275
49	0.006015987	0.899424508	0.31699131	3.898157954
50	0.005294069	0.881827209	0.315165697	3.918563178
51	0.00465878	0.864831889	0.313495269	3.938141531
52	0.004099727	0.848422732	0.31196691	3.956921679
53	0.003607759	0.832583455	0.310568481	3.974931334
54	0.003174828	0.817297479	0.309288758	3.992197251
55	0.002793849	0.802548081	0.308117371	4.008745218
56	0.002458587	0.788318511	0.307044745	4.024600077
57	0.002163557	0.774592093	0.306062046	4.039785738
58	0.00190393	0.761352309	0.305161133	4.054325205
59	0.001675458	0.748582864	0.304334508	4.068240606
60	0.001474403	0.736267739	0.303575269	4.081553225
61	0.001297475	0.724391236	0.302877074	4.094283532
62	0.001141778	0.71293801	0.302234095	4.106451221
63	0.001004765	0.70189309	0.301640985	4.118075242
64	8.84E-04	0.691241906	0.301092841	4.129173834
65	7.78E-04	0.680970291	0.300585173	4.13976456

	AK	AL	AM	AN
1	[val] of turtle 36	[val] of turtle 37	[val] of turtle 38	[val] of turtle 39
66	6.85E-04	0.6710645	0.300113871	4.149864339
67	6.03E-04	0.661511204	0.29967518	4.159489472
68	5.30E-04	0.652297499	0.299265672	4.168655679
69	4.67E-04	0.6434109	0.298882218	4.177378121
70	4.11E-04	0.634839336	0.298521971	4.185671429
71	3.61E-04	0.626571148	0.298182338	4.193549727
72	3.18E-04	0.61859508	0.297860964	4.201026661
73	2.80E-04	0.610900271	0.297555712	4.208115414
74	2.46E-04	0.603476245	0.297264647	4.214828732
75	2.17E-04	0.596312903	0.296986015	4.221178944
76	1.91E-04	0.58940051	0.296718236	4.227177976
77	1.68E-04	0.58272969	0.296459883	4.232837372
78	1.48E-04	0.576291408	0.296209672	4.23816831
79	1.30E-04	0.570076965	0.29596645	4.243181615
80	1.14E-04	0.564077984	0.295729184	4.247887778
81	1.01E-04	0.558286402	0.295496951	4.252296962
82	8.86E-05	0.552694457	0.295268927	4.25641902
83	7.79E-05	0.547294678	0.295044381	4.260263508
84	6.86E-05	0.542079874	0.294822663	4.26383969
85	6.04E-05	0.537043128	0.294603202	4.267156555
86	5.31E-05	0.532177782	0.294385494	4.27022282
87	4.67E-05	0.52747743	0.294169098	4.273046946
88	4.11E-05	0.522935909	0.293953631	4.275637144
89	3.62E-05	0.518547289	0.29373876	4.278001381
90	3.18E-05	0.514305865	0.293524202	4.280147391
91	2.80E-05	0.510206148	0.293309712	4.282082682
92	2.47E-05	0.506242858	0.293095086	4.28381454
93	2.17E-05	0.502410914	0.292880153	4.285350042
94	1.91E-05	0.498705429	0.292664774	4.286696053
95	1.68E-05	0.4951217	0.292448838	4.287859244
96	1.48E-05	0.491655205	0.292232256	4.288846085
97	1.30E-05	0.48830159	0.292014964	4.289662863

	AK	AL	AM	AN
1	[val] of turtle 36	[val] of turtle 37	[val] of turtle 38	[val] of turtle 39
98	1.15E-05	0.485056669	0.291796916	4.290315676
99	1.01E-05	0.481916413	0.291578084	4.290810448
100	8.87E-06	0.478876947	0.291358456	4.291152927
101	7.81E-06	0.475934541	0.291138031	4.291348692
102	6.87E-06	0.473085609	0.290916824	4.29140316
103	6.04E-06	0.470326698	0.290694857	4.291321587
104	5.32E-06	0.467654488	0.290472162	4.291109073
105	4.68E-06	0.465065782	0.290248778	4.290770568
106	4.12E-06	0.462557507	0.290024752	4.290310873
107	3.62E-06	0.460126705	0.289800135	4.289734649
108	3.19E-06	0.457770529	0.289574983	4.289046413
109	2.81E-06	0.455486239	0.289349357	4.288250551
110	2.47E-06	0.453271202	0.289123318	4.287351313
111	2.17E-06	0.451122881	0.288896933	4.286352821
112	1.91E-06	0.449038836	0.288670267	4.285259073
113	1.68E-06	0.44701672	0.288443389	4.284073944
114	1.48E-06	0.445054273	0.288216367	4.28280119
115	1.30E-06	0.443149321	0.287989271	4.281444451
116	1.15E-06	0.441299772	0.287762168	4.280007255
117	1.01E-06	0.439503613	0.287535128	4.27849302
118	8.88E-07	0.437758908	0.287308217	4.276905058
119	7.82E-07	0.436063791	0.287081501	4.275246575
120	6.88E-07	0.434416469	0.286855047	4.273520677
121	6.05E-07	0.432815217	0.286628917	4.271730372
122	5.33E-07	0.431258372	0.286403173	4.269878572
123	4.69E-07	0.429744336	0.286177877	4.267968096
124	4.13E-07	0.428271571	0.285953085	4.26600167
125	3.63E-07	0.426838596	0.285728856	4.263981934
126	3.20E-07	0.425443987	0.285505244	4.261911443
127	2.81E-07	0.424086373	0.2852823	4.259792666
128	2.47E-07	0.422764433	0.285060075	4.257627992
129	2.18E-07	0.4214769	0.284838618	4.255419731

	AK	AL	AM	AN
1	[val] of turtle 36	[val] of turtle 37	[val] of turtle 38	[val] of turtle 39
130	1.92E-07	0.42022255	0.284617975	4.253170117
131	1.69E-07	0.419000208	0.284398189	4.250881309
132	1.48E-07	0.417808742	0.284179302	4.248555392
133	1.31E-07	0.416647063	0.283961354	4.246194382
134	1.15E-07	0.415514123	0.283744382	4.243800228
135	1.01E-07	0.414408913	0.283528422	4.241374809
136	8.90E-08	0.413330462	0.283313506	4.238919942
137	7.83E-08	0.412277837	0.283099667	4.236437381
138	6.89E-08	0.411250138	0.282886934	4.233928818
139	6.06E-08	0.410246499	0.282675334	4.231395888
140	5.34E-08	0.409266089	0.282464892	4.228840165
141	4.70E-08	0.408308106	0.282255633	4.226263172
142	4.13E-08	0.407371778	0.282047577	4.223666374
143	3.64E-08	0.406456363	0.281840746	4.221051186
144	3.20E-08	0.405561146	0.281635158	4.218418971
145	2.82E-08	0.404685441	0.28143083	4.215771042
146	2.48E-08	0.403828585	0.281227776	4.213108667
147	2.18E-08	0.402989941	0.281026012	4.210433065
148	1.92E-08	0.402168897	0.280825549	4.20774541
149	1.69E-08	0.401364862	0.280626398	4.205046834
150	1.49E-08	0.400577269	0.280428569	4.202338426
151	1.31E-08	0.399805571	0.28023207	4.199621235
152	1.15E-08	0.399049242	0.28003691	4.196896268
153	1.01E-08	0.398307775	0.279843092	4.194164495
154	8.91E-09	0.397580684	0.279650624	4.19142685
155	7.84E-09	0.396867498	0.279459508	4.18868423
156	6.90E-09	0.396167768	0.279269747	4.185937497
157	6.07E-09	0.395481057	0.279081344	4.183187478
158	5.34E-09	0.394806949	0.278894299	4.18043497
159	4.70E-09	0.394145039	0.278708612	4.177680737
160	4.14E-09	0.39349494	0.278524284	4.174925513
161	3.64E-09	0.39285628	0.278341312	4.17217

	AK	AL	AM	AN
1	[val] of turtle 36	[val] of turtle 37	[val] of turtle 38	[val] of turtle 39
162	3.21E-09	0.392228698	0.278159694	4.169414875
163	2.82E-09	0.39161185	0.277979428	4.166660786
164	2.48E-09	0.391005401	0.27780051	4.163908353
165	2.18E-09	0.390409032	0.277622936	4.161158171
166	1.92E-09	0.389822434	0.277446701	4.158410811
167	1.69E-09	0.389245309	0.277271801	4.155666817
168	1.49E-09	0.388677372	0.277098229	4.152926714
169	1.31E-09	0.388118348	0.276925981	4.150191001
170	1.15E-09	0.38756797	0.276755048	4.147460157
171	1.01E-09	0.387025983	0.276585425	4.144734638
172	8.93E-10	0.386492142	0.276417103	4.142014881
173	7.86E-10	0.38596621	0.276250076	4.139301304
174	6.91E-10	0.385447958	0.276084336	4.136594305
175	6.08E-10	0.384937166	0.275919874	4.133894265
176	5.35E-10	0.384433624	0.275756682	4.131201545
177	4.71E-10	0.383937127	0.275594751	4.128516492
178	4.15E-10	0.383447479	0.275434072	4.125839434
179	3.65E-10	0.382964491	0.275274637	4.123170685
180	3.21E-10	0.38248798	0.275116435	4.120510541
181	2.83E-10	0.382017771	0.274959458	4.117859288
182	2.49E-10	0.381553695	0.274803697	4.115217193
183	2.19E-10	0.381095588	0.27464914	4.112584513
184	1.93E-10	0.380643294	0.274495779	4.109961488
185	1.69E-10	0.380196662	0.274343605	4.107348349
186	1.49E-10	0.379755545	0.274192605	4.104745314
187	1.31E-10	0.379319802	0.274042772	4.102152586
188	1.15E-10	0.378889299	0.273894095	4.099570361
189	1.02E-10	0.378463904	0.273746563	4.096998822
190	8.94E-11	0.378043491	0.273600168	4.09443814
191	7.87E-11	0.377627939	0.273454897	4.09188848
192	6.92E-11	0.377217132	0.273310743	4.089349992
193	6.09E-11	0.376810955	0.273167694	4.086822822

	AK	AL	AM	AN
1	[val] of turtle 36	[val] of turtle 37	[val] of turtle 38	[val] of turtle 39
194	5.36E-11	0.376409299	0.27302574	4.084307103
195	4.72E-11	0.37601206	0.272884872	4.08180296
196	4.15E-11	0.375619137	0.272745079	4.079310511
197	3.65E-11	0.375230431	0.272606351	4.076829866
198	3.22E-11	0.374845847	0.272468679	4.074361126
199	2.83E-11	0.374465296	0.272332052	4.071904384
200	2.49E-11	0.374088688	0.272196462	4.069459729
201	2.19E-11	0.373715938	0.272061897	4.06702724
202	1.93E-11	0.373346966	0.271928348	4.064606991
203	1.70E-11	0.372981691	0.271795806	4.062199048
204	1.49E-11	0.372620037	0.271664261	4.059803475
205	1.31E-11	0.372261931	0.271533704	4.057420324
206	1.16E-11	0.3719073	0.271404125	4.055049648
207	1.02E-11	0.371556076	0.271275516	4.052691489
208	8.95E-12	0.371208193	0.271147865	4.050345888
209	7.88E-12	0.370863585	0.271021166	4.048012878
210	6.93E-12	0.370522191	0.270895408	4.04569249
211	6.10E-12	0.37018395	0.270770582	4.043384748
212	5.37E-12	0.369848803	0.27064668	4.041089674
213	4.73E-12	0.369516696	0.270523694	4.038807283
214	4.16E-12	0.369187573	0.270401613	4.03653759
215	3.66E-12	0.368861381	0.270280431	4.034280602
216	3.22E-12	0.36853807	0.270160137	4.032036325
217	2.83E-12	0.368217589	0.270040725	4.02980476
218	2.49E-12	0.367899892	0.269922185	4.027585906
219	2.19E-12	0.367584932	0.269804509	4.025379759
220	1.93E-12	0.367272663	0.26968769	4.023186309
221	1.70E-12	0.366963042	0.269571719	4.021005548
222	1.50E-12	0.366656028	0.269456589	4.01883746
223	1.32E-12	0.366351579	0.269342291	4.01668203
224	1.16E-12	0.366049656	0.269228819	4.01453924
225	1.02E-12	0.36575022	0.269116163	4.012409067

	AK	AL	AM	AN
1	[val] of turtle 36	[val] of turtle 37	[val] of turtle 38	[val] of turtle 39
226	8.97E-13	0.365453233	0.269004318	4.010291489
227	7.89E-13	0.365158661	0.268893276	4.00818648
228	6.95E-13	0.364866466	0.268783028	4.006094012
229	6.11E-13	0.364576617	0.268673569	4.004014055
230	5.38E-13	0.364289079	0.26856489	4.001946578
231	4.73E-13	0.364003819	0.268456986	3.999891548
232	4.17E-13	0.363720808	0.268349848	3.997848929
233	3.67E-13	0.363440014	0.26824347	3.995818684
234	3.23E-13	0.363161408	0.268137846	3.993800776
235	2.84E-13	0.362884961	0.268032969	3.991795164
236	2.50E-13	0.362610646	0.267928831	3.989801807
237	2.20E-13	0.362338434	0.267825428	3.987820663
238	1.93E-13	0.362068301	0.267722751	3.985851688
239	1.70E-13	0.361800218	0.267620796	3.983894837
240	1.50E-13	0.361534163	0.267519555	3.981950064
241	1.32E-13	0.36127011	0.267419023	3.980017321
242	1.16E-13	0.361008035	0.267319193	3.978096562
243	1.02E-13	0.360747915	0.26722006	3.976187736
244	8.98E-14	0.360489728	0.267121617	3.974290795
245	7.91E-14	0.360233451	0.267023859	3.972405686
246	6.96E-14	0.359979062	0.26692678	3.970532359
247	6.12E-14	0.359726542	0.266830375	3.968670762
248	5.39E-14	0.359475869	0.266734637	3.966820841
249	4.74E-14	0.359227022	0.266639561	3.964982543
250	4.17E-14	0.358979984	0.266545142	3.963155813
251	3.67E-14	0.358734733	0.266451374	3.961340598
252	3.23E-14	0.358491253	0.266358252	3.959536842
253	2.84E-14	0.358249523	0.26626577	3.957744489
254	2.50E-14	0.358009527	0.266173924	3.955963483
255	2.20E-14	0.357771247	0.266082708	3.954193767
256	1.94E-14	0.357534665	0.265992118	3.952435286
257	1.70E-14	0.357299765	0.265902148	3.950687981

	AK	AL	AM	AN
1	[val] of turtle 36	[val] of turtle 37	[val] of turtle 38	[val] of turtle 39
258	1.50E-14	0.357066531	0.265812793	3.948951794
259	1.32E-14	0.356834946	0.265724048	3.947226669
260	1.16E-14	0.356604994	0.265635909	3.945512547
261	1.02E-14	0.356376661	0.265548371	3.943809369
262	9.00E-15	0.35614993	0.265461429	3.942117078
263	7.92E-15	0.355924787	0.265375078	3.940435615
264	6.97E-15	0.355701218	0.265289314	3.93876492
265	6.13E-15	0.355479207	0.265204132	3.937104935
266	5.40E-15	0.355258742	0.265119528	3.935455602
267	4.75E-15	0.355039807	0.265035498	3.93381686
268	4.18E-15	0.35482239	0.264952036	3.93218865
269	3.68E-15	0.354606477	0.264869139	3.930570914
270	3.24E-15	0.354392055	0.264786802	3.928963592
271	2.85E-15	0.354179112	0.264705021	3.927366625
272	2.51E-15	0.353967634	0.264623791	3.925779954
273	2.21E-15	0.353757609	0.26454311	3.924203519
274	1.94E-15	0.353549024	0.264462972	3.922637261
275	1.71E-15	0.353341869	0.264383373	3.921081121
276	1.50E-15	0.35313613	0.26430431	3.91953504
277	1.32E-15	0.352931797	0.264225779	3.91799896
278	1.16E-15	0.352728857	0.264147775	3.91647282
279	1.02E-15	0.352527299	0.264070294	3.914956563
280	9.01E-16	0.352327112	0.263993334	3.913450129
281	7.93E-16	0.352128286	0.263916889	3.91195346
282	6.98E-16	0.351930809	0.263840956	3.910466498
283	6.14E-16	0.35173467	0.263765532	3.908989184
284	5.40E-16	0.351539859	0.263690613	3.907521461
285	4.76E-16	0.351346366	0.263616195	3.906063269
286	4.19E-16	0.351154181	0.263542274	3.904614552
287	3.68E-16	0.350963292	0.263468847	3.903175252
288	3.24E-16	0.350773691	0.263395911	3.90174531
289	2.85E-16	0.350585366	0.263323461	3.900324671

	AK	AL	AM	AN
1	[val] of turtle 36	[val] of turtle 37	[val] of turtle 38	[val] of turtle 39
290	2.51E-16	0.35039831	0.263251494	3.898913277
291	2.21E-16	0.350212511	0.263180008	3.897511071
292	1.94E-16	0.350027961	0.263108998	3.896117996
293	1.71E-16	0.34984465	0.26303846	3.894733996
294	1.51E-16	0.349662569	0.262968393	3.893359015
295	1.32E-16	0.349481708	0.262898792	3.891992997
296	1.17E-16	0.349302059	0.262829654	3.890635885
297	1.03E-16	0.349123612	0.262760976	3.889287625
298	9.03E-17	0.348946359	0.262692754	3.887948161
299	7.94E-17	0.348770291	0.262624986	3.886617439
300	6.99E-17	0.348595399	0.262557667	3.885295402
301	6.15E-17	0.348421675	0.262490796	3.883981997
302	5.41E-17	0.34824911	0.262424369	3.88267717
303	4.76E-17	0.348077696	0.262358383	3.881380866
304	4.19E-17	0.347907425	0.262292834	3.880093031
305	3.69E-17	0.347738288	0.26222772	3.878813613
306	3.25E-17	0.347570277	0.262163038	3.877542557
307	2.86E-17	0.347403385	0.262098784	3.876279811
308	2.51E-17	0.347237603	0.262034956	3.875025321
309	2.21E-17	0.347072923	0.261971551	3.873779036
310	1.95E-17	0.346909337	0.261908566	3.872540904
311	1.71E-17	0.346746839	0.261845998	3.871310871
312	1.51E-17	0.346585419	0.261783844	3.870088888
313	1.33E-17	0.346425072	0.261722102	3.868874901
314	1.17E-17	0.346265788	0.261660767	3.86766886
315	1.03E-17	0.346107561	0.261599839	3.866470715
316	9.04E-18	0.345950383	0.261539313	3.865280414
317	7.96E-18	0.345794247	0.261479188	3.864097908
318	7.00E-18	0.345639146	0.26141946	3.862923146
319	6.16E-18	0.345485072	0.261360127	3.861756078
320	5.42E-18	0.345332018	0.261301185	3.860596656
321	4.77E-18	0.345179978	0.261242633	3.859444829

	AK	AL	AM	AN	
1	[val] of turtle 36	[val] of turtle 37	[val] of turtle 38	[val] of turtle 39	
322	4.20E-18	0.345028945	0.261184468	3.858300549	
323	3.69E-18	0.344878911	0.261126687	3.857163768	
324	3.25E-18	0.344729869	0.261069288	3.856034437	
325	2.86E-18	0.344581813	0.261012267	3.854912507	
326	2.52E-18	0.344434736	0.260955623	3.853797932	
327	2.22E-18	0.344288631	0.260899353	3.852690663	
328	1.95E-18	0.344143492	0.260843454	3.851590654	
329	1.72E-18	0.343999312	0.260787923	3.850497856	
330	1.51E-18	0.343856085	0.260732759	3.849412225	
331	1.33E-18	0.343713803	0.260677959	3.848333713	
332	1.17E-18	0.343572462	0.26062352	3.847262273	
333	1.03E-18	0.343432053	0.260569441	3.846197861	
334	9.05E-19	0.343292571	0.260515718	3.845140431	
335	7.97E-19	0.34315401	0.260462349	3.844089937	
336	7.01E-19	0.343016364	0.260409331	3.843046334	
337	6.17E-19	0.342879625	0.260356664	3.842009578	
338	5.43E-19	0.342743789	0.260304343	3.840979624	
339	4.78E-19	0.342608849	0.260252367	3.839956427	
340	4.20E-19	0.342474799	0.260200734	3.838939945	
341	3.70E-19	0.342341632	0.260149441	3.837930132	
342	3.26E-19	0.342209344	0.260098485	3.836926946	
343	2.87E-19	0.342077928	0.260047866	3.835930344	
344	2.52E-19	0.341947378	0.259997579	3.834940283	
345	2.22E-19	0.341817688	0.259947624	3.833956719	
346	1.95E-19	0.341688854	0.259897998	3.832979611	
347	1.72E-19	0.341560868	0.259848699	3.832008917	
348	1.51E-19	0.341433725	0.259799724	3.831044595	
349	1.33E-19	0.341307421	0.259751072	3.830086602	
350	1.17E-19	0.341181948	0.25970274	3.829134899	
351	1.03E-19	0.341057302	0.259654726	3.828189443	
352	9.07E-20	0.340933476	0.259607029	3.827250195	
353	7.98E-20	0.340810467	0.259559645	3.826317113	

	AK	AL	AM	AN
1	[val] of turtle 36	[val] of turtle 37	[val] of turtle 38	[val] of turtle 39
354	7.02E-20	0.340688267	0.259512573	3.825390157
355	6.18E-20	0.340566872	0.259465811	3.824469287
356	5.44E-20	0.340446276	0.259419357	3.823554464
357	4.79E-20	0.340326474	0.259373208	3.822645648
358	4.21E-20	0.340207461	0.259327364	3.821742799
359	3.71E-20	0.340089231	0.25928182	3.820845879
360	3.26E-20	0.33997178	0.259236577	3.819954849
361	2.87E-20	0.339855102	0.259191631	3.81906967
362	2.53E-20	0.339739191	0.259146981	3.818190304
363	2.22E-20	0.339624044	0.259102624	3.817316713
364	1.96E-20	0.339509654	0.25905856	3.81644886
365	1.72E-20	0.339396017	0.259014785	3.815586705
366	1.51E-20	0.339283127	0.258971298	3.814730214
367	1.33E-20	0.339170981	0.258928097	3.813879347
368	1.17E-20	0.339059572	0.258885181	3.813034069
369	1.03E-20	0.338948896	0.258842546	3.812194343
370	9.08E-21	0.338838948	0.258800193	3.811360132
371	7.99E-21	0.338729724	0.258758117	3.8105314
372	7.03E-21	0.338621218	0.258716319	3.809708112
373	6.19E-21	0.338513426	0.258674795	3.808890232
374	5.45E-21	0.338406343	0.258633544	3.808077723

Appendix E

Piñon Canyon Network Identification

					COLOR			
					and			
POSITION	STAKEHOLDER	IDENTIFIED AS		TYPE	VALUE	LINKED TO	SHARE	VERIFIED BY
1	La Junta Chamber of Commerce	chess pawn	23	NGA	1	18, 21, 25, 40,	18, 25	Secondary Source
2	Trinidad School District	house two story	25	DG	1	21, 32, 39	39	Secondary Source
3	Colorado State Parks	squirrel	27	SG	1	5, 11, 14, 19, 26, 37,	none	Interview
4	City of Walsenburg	orbit 4	29	LG	1	16, 23, 32	16, 23	Secondary Source
5	Colorado Division of Wildlife	hawk	31	SG	2	14, 19, 20,	none	Interview
6	Colorado Department of Transportation	wheel	33	SG	1	0, 8, 13, 23	none	Secondary Source
7	Colorado Springs Chamber of Commerce	chess king	35	NGA	3	8, 11, 12, 13, 18,	8, 11, 12, 18	Interview
8	City of Colorado Springs	orbit 1	37	LG	6	7, 9, 11, 12, 13,	8, 11, 12, 13	Secondary Source
	Deputy Under Secretary of Defense for							
9	Installations and Environment	pentagon	39	FG	5	10, 11	11	Interview
	Assistant Secretary of the Army for							
10	Installations and Environment	tank	40	FG	6	7, 8, 9, 11	9, 11	Interview
11	Commanding General Fort Carson	star	38	FG	6	7, 8, 9, 10,	7, 8, 9, 10	Interview
12	City of Fountain	orbit 2	36	LG	2	7, 8, 10, 11	7, 8	Secondary Source
13	El Paso County	die 1	34	CG	4	8, 11, 12	8	Secondary Source
14	USDOI Fish and Wildlife Service	fish	32	SG	1	19, 26, 33	none	Secondary Source
15	Advisory Council on Historic Preservation	chess king	30	FG	1	7, 21, 32, 35	none	Secondary Source
16	Huerfano County	die 4	28	CG	1	4, 32, 39,	4	Secondary Source
17	Environmental Protection Agency	tile water	26	FG	1	9, 10, 11	none	Secondary Source
18	Pueblo Chamber of Commerce	chess bishop	24	NGA	3	0, 1, 7, 21, 23,	0, 1, 7, 23	Interview
	San Isabel National Forest and Comanche							
19	National Grassland	tree pine	22	FG	2	11, 26, 37	26	Interview
20	USDOI Bureau of Land Management	tile stones	20	FG	1	11, 19, 22, 26, 33	none	Secondary Source
21	Las Animas County Chamber of Commerce	chess knight	18	NGA	1	32, 39	32, 39	Secondary Source
22	Colorado State Land Board	cactus	16	SG	3	2, 5, 27, 28, 30, 33, 37	37	Interview
23	Pueblo County	die 2	14	CG	5	0, 4, 16, 15, 18, 24, 32, 34, 35, 38, 39,	0, 4, 18, 24,	Interview
24	City of LaJunta	orbit 5	12	LG	1	1, 25, 23	1, 25	Interview
25	Otero County	die 3	10	CG	2	1, 23, 24	1, 23, 24	Secondary Source
			_					
26	USDA Natural Resources Conservation Service	flower	8	FG	1	19, 28, 29, 31, 32,	19	Interview
27	Hoehne School District	house efficiency	6	DG	1	2, 21, 29, 30, 31, 32	32	Secondary Source
28	Colorado Cattlemen's Association	COW	4	NGA	2	29, 31, 33	none	Interview
29	Piñon Canyon Expansion Opposition Coalition	tree	2	NGA	3	30, 31, 32, 33	30, 31, 32, 33	Interview
30	Branson School District	house ranch	1	DG	2	29, 31, 32	29, 32	Interview
31	Not One More Acre	bird	3	NGA	3	24, 25, 29, 32	29, 32	Interview
32	Las Animas County	die 5	5	NGA	3	21, 27, 29, 30. 31, 39	21, 27, 29, 30, 31, 32	Interview
33	Colorado Department of Agriculture	person farmer	7	SG	3	28, 29, 31, 37	28, 29, 37	Secondary Source
34	City of Springfield	circle	9	LG	1	28, 29, 31, 32, 35	35	Secondary Source
35	Office Of Baca County Commission	die 6	11	CG	1	25, 28, 32, 34	34	Secondary Source
36	Colorado State Historic Preservation	acorn	13	SG	1	3, 15, 19, 37	none	Secondary Source
37	Colorado Department of Natural Resources	butterfly	15	SG	1	5, 22, 33	22, 33	Interview
38	City of Rocky Ford	orbit 6	17	LG	1	1, 25, 24	none	Secondary Source
39	City of Trinidad	circle 2	19	LG	3	2, 11, 21, 32	2, 21, 32	Interview
40	City of Pueblo	orbit 3	21	LG	5	18, 23	18, 23	Interview

Assignment of Power

SMALL GOV'T	MUNICIPAL	COUNTY	STATE	NGA	FEDERAL	LARGE GOV'T	ACTIVE	PASSIVE	COLLABORATIVE
1	2	3	3	1 3	4	5	1	-1	+/-1

POSITION					
1	La Junta Chamber of Commerce	chess nawn	1	ACTIVE/TASSIVE	1
2	Tripidad School District	house two story	1		1
3	Colorado State Parks	squirrel	2	_7	1
4	City of Walsenburg	orhit 4	1	2	1
5	Colorado Division of Wildlife	hawk	2	-1	2
6	Colorado Department of Transportation	wheel	3	-2	1
7	Colorado Springs Chamber of Commerce	chess king	3	2	3
/ 	City of Colorado Springs	orbit 1	5	<u></u> ⊥1	6
0	Deputy Under Secretary of Defense for		5	1	0
9	Installations and Environment	pentagon	4	-1	3
	Assistant Secretary of the Army for				
10	Installations and Environment	tank	4	+2	6
11	Commanding General Fort Carson	star	4	+1	5
12	City of Fountain	orbit 2	2		2
13	El Paso County	die 1	3	+2	5
14	USDOI Fish and Wildlife Service	fish	4		3
15	Advisory Council on Historic Preservation	chess king	4		4
16	Huerfano County	die 4	3	-2	1
17	Environmental Protection Agency	tile water	4		3
18	Pueblo Chamber of Commerce	chess bishop	3		3
	San Isabel National Forest and Comanche	· · · ·			
19	National Grassland	tree pine	4	-2	2
20	USDOI Bureau of Land Management	tile stones	4	-2	2
21	Las Animas County Chamber of Commerce	chess knight	1	+1	2
22	Colorado State Land Board	cactus	3	+1	4
23	Pueblo County	die 2	5		5
24	City of LaJunta	orbit 5	2		2
25	Otero County	die 3	3		3
26	USDA Natural Resources Conservation Service	flower	4		4
27	Hoehne School District	house efficiency	1		1
28	Colorado Cattlemen's Association	cow	2	+1	3
20	Piñon Canyon Expansion Opposition Coalition	tree	1	+2	3
29	Branson School District	house ranch	1	+1	2
21	Not One More Acre	hird	1	+1	2
22	Las Animas County	dia E	3	+1 +1	3
22	Colorado Department of Agriculture	nerson farmer	3	±1	4
24	City of Springfield		3 7	1	4
25	Office Of Base County Commission	dia 6	2	-1	
35	Colorado State Historic Preservation		2	-1	2
30		acom	5	-2	1
37	Colorado Department of Natural Resources	butterfly	3	-2	1
38	City of Rocky Ford	orbit 6	2	-1	1
39	City of Trinidad	circle 2	2	+1	3
40	City of Pueblo	orbit 3	5		5

APPENDIX F

NetLogo Setup Commands

```
directed-link-breed [active-links active-link]
directed-link-breed [inactive-links inactive-link]
turtles-own [ val new-val ] ; a node's past and current quantity,
represented as size
links-own [ current-flow ] ; the amount of quantity that has passed
through a link
                           ; in a given step
globals [
  total-val
                           ; total quantity in the system
  max-val
                           ; maximum quantity held by a single node
in the system
 max-flow
                           ; maximum quantity that has passed through
a link in the system
 mean-flow
                           ; average quantity that is passing through
an arbitrary
                           ; link in the system
1
;;; Setup Procedures ;;;
to setup
  clear-all
  set-default-shape turtles "cow"
  set-default-shape links "small-arrow-link"
  layout-circle turtles (world-width / 2 - 2)
  crt number-of-nodes
  ask patches with [abs pxcor < (grid-size / 1) and abs pycor < (grid-
size / 1)]
    [ sprout 1 [ set color blue ] ]
  ; create a directed network such that each node has a LINK-CHANCE
percent chance of
  ; having a link established from a given node to one of its
neighbors
  ask turtles [
    set val 1
    let neighbor-nodes turtle-set [turtles-here] of neighbors4
    create-active-links-to neighbor-nodes
    Γ
     set current-flow 0
      if random-float 100 > link-chance
      Γ
       set breed inactive-links
       hide-link
      1
```

```
]
  1
  ; spread the nodes out
 ask turtles [
 layout-circle turtles (world-width / 2 - 2)
  1
 update-globals
 update-visuals
 update-histogram
end
;;; Main Procedure ;;;
to go
 ask turtles [ set new-val 0 ]
 ask turtles [
   let recipients out-active-link-neighbors
   ifelse any? recipients [
     let val-to-keep val * (1 - diffusion-rate / 100)
      ; we keep some amount of our value from one turn to the next
     set new-val new-val + val-to-keep
      ; What we don't keep for ourselves, we divide evenly among our
out-link-neighbors.
     let val-increment ((val - val-to-keep) / count recipients)
     ask recipients [
       set new-val new-val + val-increment
       ask in-active-link-from myself [ set current-flow val-
increment ]
     1
    1 [
     set new-val new-val + val
    1
  ]
 ask turtles [ set val new-val ]
 update-globals
 update-visuals
 tick
 update-histogram
 update-plots
end
to rewire-a-link
  if any? active-links [
    ask one-of active-links [
     set breed inactive-links
     hide-link
    1
    ask one-of inactive-links [
     set breed active-links
     show-link
```

```
]
  1
end
to set-shape
ask turtle 1
    [set val 1]
ask turtle 2
    [set val 1]
ask turtle 3
    [set val 1]
ask turtle 4
    [set val 1]
ask turtle 5
    [set val 2]
ask turtle 6
    [set val 1]
ask turtle 7
    [set val 3]
ask turtle 8
    [set val 6]
ask turtle 9
    [set val 3]
ask turtle 10
    [set val 6]
ask turtle 11
    [set val 5]
ask turtle 12
    [set val 2]
ask turtle 13
    [set val 4]
ask turtle 14
    [set val 4]
ask turtle 15
    [set val 4]
ask turtle 16
    [set val 1]
ask turtle 17
    [set val 3]
ask turtle 18
    [set val 3]
ask turtle 19
    [set val 2]
ask turtle 20
    [set val 2]
ask turtle 21
    [set val 2]
ask turtle 22
    [set val 4]
ask turtle 23
    [set val 5]
ask turtle 24
```

```
[set val 2]
ask turtle 25
   [set val 3]
ask turtle 26
    [set val 4]
ask turtle 27
    [set val 1]
ask turtle 28
   [set val 3]
ask turtle 29
    [set val 3]
ask turtle 30
    [set val 2]
ask turtle 31
    [set val 3]
ask turtle 32
    [set val 4]
ask turtle 33
    [set val 4]
ask turtle 34
    [set val 1]
ask turtle 35
    [set val 2]
ask turtle 36
   [set val 1]
ask turtle 37
    [set val 1]
ask turtle 38
    [set val 1]
ask turtle 39
   [set val 3]
ask turtle 0
    [set val 5]
end
;;;
       Updates
                  ;;;
to update-globals
 set total-val sum [ val ] of turtles
 set max-val max [ val ] of turtles
 if any? active-links [
   set max-flow max [current-flow] of active-links
    set mean-flow mean [current-flow] of active-links
  1
end
to update-visuals
 ask turtles [ update-node-appearance ]
 ask active-links [ update-link-appearance ]
```

```
to update-node-appearance ; node procedure
 ; scale the size to be between 0.1 and 5.0
 set size 0.1 + 5 * sqrt (val / total-val)
end
to update-link-appearance ; link procedure
 ; scale color to be brighter when more value is flowing through it
 set color scale-color gray (current-flow / (2 * mean-flow +
0.00001)) - 0.41
end
;;;update-histogram ;;;
to update-histogram
 set-current-plot "Histogram"
 set-plot-x-range 0 ceiling (max-val + 0.5)
 set-histogram-num-bars ceiling (sqrt (count turtles))
 histogram [val] of turtles
end
;;; Plotting ;;;
to update-plots
 set-current-plot "Power Military"
ask Turtle 9
 [plot [val] of turtle 9]
ask Turtle 10
 [plot [val] of turtle 10]
ask Turtle 11
 [plot [val] of turtle 11]
 set-current-plot "Power Agriculture"
ask turtle 29
 [plot [val] of turtle 29]
ask Turtle 30
 [plot [val] of turtle 30]
ask Turtle 31
  [plot [val] of turtle 31]
end
```

end

Network Links Commands

```
ask turtle 1 [ create-active-link-to turtle 18]
ask turtle 1 [ create-active-link-to turtle 21]
ask turtle 1 [ create-active-link-to turtle 25]
ask turtle 1 [ create-active-link-to turtle 0]
ask turtle 2 [ create-active-link-to turtle 39]
ask turtle 2 [ create-active-link-to turtle 32]
ask turtle 2 [ create-active-link-to turtle 21]
ask turtle 3 [ create-active-link-to turtle 5]
ask turtle 3 [ create-active-link-to turtle 11]
ask turtle 3 [ create-active-link-to turtle 14]
ask turtle 3 [ create-active-link-to turtle 19]
ask turtle 3 [ create-active-link-to turtle 26]
ask turtle 3 [ create-active-link-to turtle 37]
ask turtle 4 [ create-active-link-to turtle 16]
ask turtle 4 [ create-active-link-to turtle 23]
ask turtle 4 [ create-active-link-to turtle 32]
ask turtle 5 [ create-active-link-to turtle 14]
ask turtle 5 [ create-active-link-to turtle 20]
ask turtle 5 [ create-active-link-to turtle 19]
ask turtle 6 [ create-active-link-to turtle 8]
ask turtle 6 [ create-active-link-to turtle 0]
ask turtle 6 [ create-active-link-to turtle 23]
ask turtle 6 [ create-active-link-to turtle 13]
ask turtle 7 [ create-active-link-to turtle 8]
ask turtle 7 [ create-active-link-to turtle 11]
ask turtle 7 [ create-active-link-to turtle 12]
ask turtle 7 [ create-active-link-to turtle 13]
ask turtle 7 [ create-active-link-to turtle 18]
ask turtle 8 [ create-active-link-to turtle 7]
ask turtle 8 [ create-active-link-to turtle 9]
ask turtle 8 [ create-active-link-to turtle 11]
ask turtle 8 [ create-active-link-to turtle 12]
ask turtle 8 [ create-active-link-to turtle 13]
ask turtle 9 [ create-active-link-to turtle 10]
ask turtle 9 [ create-active-link-to turtle 11]
ask turtle 10 [ create-active-link-to turtle 9]
ask turtle 10 [ create-active-link-to turtle 11]
ask turtle 10 [ create-active-link-to turtle 8]
ask turtle 10 [ create-active-link-to turtle 7]
```

```
ask turtle 11 [ create-active-link-to turtle 10]
ask turtle 11 [ create-active-link-to turtle 9]
ask turtle 11 [ create-active-link-to turtle 8]
ask turtle 11 [ create-active-link-to turtle 7]
ask turtle 12 [ create-active-link-to turtle 10]
ask turtle 12 [ create-active-link-to turtle 11]
ask turtle 12 [ create-active-link-to turtle 7]
ask turtle 12 [ create-active-link-to turtle 8]
ask turtle 13 [ create-active-link-to turtle 8]
ask turtle 13 [ create-active-link-to turtle 11]
ask turtle 13 [ create-active-link-to turtle 12]
ask turtle 14 [ create-active-link-to turtle 33]
ask turtle 14 [ create-active-link-to turtle 19]
ask turtle 14 [ create-active-link-to turtle 26]
ask turtle 15 [ create-active-link-to turtle 7]
ask turtle 15 [ create-active-link-to turtle 21]
ask turtle 15 [ create-active-link-to turtle 32]
ask turtle 15 [ create-active-link-to turtle 35]
ask turtle 16 [ create-active-link-to turtle 39]
ask turtle 16 [ create-active-link-to turtle 32]
ask turtle 16 [ create-active-link-to turtle 4]
ask turtle 17 [ create-active-link-to turtle 9]
ask turtle 17 [ create-active-link-to turtle 10]
ask turtle 17 [ create-active-link-to turtle 11]
ask turtle 18 [ create-active-link-to turtle 0]
ask turtle 18 [ create-active-link-to turtle 1]
ask turtle 18 [ create-active-link-to turtle 7]
ask turtle 18 [ create-active-link-to turtle 21]
ask turtle 18 [ create-active-link-to turtle 23]
ask turtle 19 [ create-active-link-to turtle 26]
ask turtle 19 [ create-active-link-to turtle 37]
ask turtle 19 [ create-active-link-to turtle 11]
ask turtle 20 [ create-active-link-to turtle 11]
ask turtle 20 [ create-active-link-to turtle 19]
ask turtle 20 [ create-active-link-to turtle 22]
ask turtle 20 [ create-active-link-to turtle 26]
ask turtle 20 [ create-active-link-to turtle 33]
ask turtle 21 [ create-active-link-to turtle 32]
ask turtle 21 [ create-active-link-to turtle 39]
ask turtle 22 [ create-active-link-to turtle 2]
ask turtle 22 [ create-active-link-to turtle 5]
```

```
ask turtle 22 [ create-active-link-to turtle 27]
ask turtle 22 [ create-active-link-to turtle 28]
ask turtle 22 [ create-active-link-to turtle 30]
ask turtle 22 [ create-active-link-to turtle 33]
ask turtle 22 [ create-active-link-to turtle 37]
ask turtle 23 [ create-active-link-to turtle 0]
ask turtle 23 [ create-active-link-to turtle 4]
ask turtle 23 [ create-active-link-to turtle 15]
ask turtle 23 [ create-active-link-to turtle 16]
ask turtle 23 [ create-active-link-to turtle 18]
ask turtle 23 [ create-active-link-to turtle 24]
ask turtle 23 [ create-active-link-to turtle 32]
ask turtle 23 [ create-active-link-to turtle 34]
ask turtle 23 [ create-active-link-to turtle 35]
ask turtle 23 [ create-active-link-to turtle 38]
ask turtle 23 [ create-active-link-to turtle 39]
ask turtle 24 [ create-active-link-to turtle 25]
ask turtle 24 [ create-active-link-to turtle 23]
ask turtle 24 [ create-active-link-to turtle 1]
ask turtle 25 [ create-active-link-to turtle 24]
ask turtle 25 [ create-active-link-to turtle 1]
ask turtle 25 [ create-active-link-to turtle 23]
ask turtle 26 [ create-active-link-to turtle 19]
ask turtle 26 [ create-active-link-to turtle 28]
ask turtle 26 [ create-active-link-to turtle 29]
ask turtle 26 [ create-active-link-to turtle 31]
ask turtle 26 [ create-active-link-to turtle 32]
ask turtle 27 [ create-active-link-to turtle 2]
ask turtle 27 [ create-active-link-to turtle 21]
ask turtle 27 [ create-active-link-to turtle 29]
ask turtle 27 [ create-active-link-to turtle 30]
ask turtle 27 [ create-active-link-to turtle 31]
ask turtle 27 [ create-active-link-to turtle 32]
ask turtle 28 [ create-active-link-to turtle 29]
ask turtle 28 [ create-active-link-to turtle 31]
ask turtle 28 [ create-active-link-to turtle 33]
ask turtle 29 [ create-active-link-to turtle 30]
ask turtle 29 [ create-active-link-to turtle 31]
ask turtle 29 [ create-active-link-to turtle 32]
ask turtle 29 [ create-active-link-to turtle 33]
ask turtle 30 [ create-active-link-to turtle 32]
ask turtle 30 [ create-active-link-to turtle 29]
ask turtle 30 [ create-active-link-to turtle 31]
```

```
ask turtle 31 [ create-active-link-to turtle 29]
ask turtle 31 [ create-active-link-to turtle 24]
ask turtle 31 [ create-active-link-to turtle 25]
ask turtle 31 [ create-active-link-to turtle 32]
ask turtle 32 [ create-active-link-to turtle 21]
ask turtle 32 [ create-active-link-to turtle 27]
ask turtle 32 [ create-active-link-to turtle 29]
ask turtle 32 [ create-active-link-to turtle 30]
ask turtle 32 [ create-active-link-to turtle 31]
ask turtle 32 [ create-active-link-to turtle 39]
ask turtle 33 [ create-active-link-to turtle 29]
ask turtle 33 [ create-active-link-to turtle 31]
ask turtle 33 [ create-active-link-to turtle 28]
ask turtle 33 [ create-active-link-to turtle 37]
ask turtle 34 [ create-active-link-to turtle 28]
ask turtle 34 [ create-active-link-to turtle 29]
ask turtle 34 [ create-active-link-to turtle 31]
ask turtle 34 [ create-active-link-to turtle 35]
ask turtle 34 [ create-active-link-to turtle 32]
ask turtle 35 [ create-active-link-to turtle 34]
ask turtle 35 [ create-active-link-to turtle 32]
ask turtle 35 [ create-active-link-to turtle 28]
ask turtle 35 [ create-active-link-to turtle 25]
ask turtle 36 [ create-active-link-to turtle 3]
ask turtle 36 [ create-active-link-to turtle 37]
ask turtle 36 [ create-active-link-to turtle 15]
ask turtle 36 [ create-active-link-to turtle 19]
ask turtle 37 [ create-active-link-to turtle 22]
ask turtle 37 [ create-active-link-to turtle 5]
ask turtle 37 [ create-active-link-to turtle 33]
ask turtle 38 [ create-active-link-to turtle 25]
ask turtle 38 [ create-active-link-to turtle 1]
ask turtle 38 [ create-active-link-to turtle 24]
ask turtle 39 [ create-active-link-to turtle 32]
ask turtle 39 [ create-active-link-to turtle 11]
ask turtle 39 [ create-active-link-to turtle 21]
ask turtle 39 [ create-active-link-to turtle 2]
ask turtle 0 [ create-active-link-to turtle 23]
ask turtle 0 [ create-active-link-to turtle 18]
```

```
Set Shape Command
ask turtle 30
    [ set color 25
      set shape "book"
      set val 2]
ask turtle 29
    [ set color 9.9
      set shape "tree"
      set val 3]
ask turtle 31
    [ set color 9.9
      set shape "bird"
      set val 3]
ask turtle 28
    [ set color 9.9
      set shape "cow"
      set val 3]
ask turtle 32
    [ set color 45
      set shape "die 5"
      set val 4]
ask turtle 27
    [ set color 25
      set shape "house efficiency"
      set val 1]
ask turtle 33
    [ set color 65
      set shape "person farmer"
      set val 4]
ask turtle 26
    [ set color 95
      set shape "flower"
      set val 4]
ask turtle 34
    [ set color 15
      set shape "circle"
      set val 11
ask turtle 25
    [ set color 45
      set shape "die 3"
      set val 3]
ask turtle 35
    [ set color 45
      set shape "die 6"
      set val 2]
ask turtle 24
    [ set color 15
      set shape "orbit 5"
      set val 2]
ask turtle 36
```

```
[ set color 65
      set shape "acorn"
      set val 1]
ask turtle 23
    [ set color 45
      set shape "die 2"
      set val 5]
ask turtle 37
    [ set color 65
      set shape "butterfly"
      set val 1]
ask turtle 22
    [ set color 65
      set shape "cactus"
      set val 4]
ask turtle 38
    [ set color 15
      set shape "orbit 6"
      set val 1]
ask turtle 21
    [ set color 9.9
      set shape "chess knight"
      set val 2]
ask turtle 39
    [ set color 15
      set shape "circle 2"
      set val 3]
ask turtle 20
    [ set color 95
      set shape "tile stones"
      set val 2]
ask turtle 0
    [ set color 15
      set shape "orbit 3"
      set val 5]
ask turtle 19
    [ set color 95
      set shape "tree pine"
      set val 21
ask turtle 1
    [ set color 9.9
      set shape "chess pawn"
      set val 1]
ask turtle 18
    [ set color 9.9
      set shape "chess bishop"
      set val 3]
ask turtle 2
    [ set color 25
      set shape "house two story"
      set val 1]
ask turtle 17
```

```
[ set color 95
      set shape "tile water"
      set val 3]
ask turtle 3
    [ set color 65
      set shape "squirrel"
      set val 1]
ask turtle 16
    [ set color 45
      set shape "die 4"
      set val 1]
ask turtle 4
    [ set color 15
      set shape "orbit 4"
      set val 1]
ask turtle 15
    [ set color 95
      set shape "chess king"
      set val 4]
ask turtle 5
    [ set color 65
      set shape "hawk"
      set val 2]
ask turtle 14
    [ set color 65
      set shape "fish"
      set val 4]
ask turtle 6
    [ set color 65
      set shape "wheel"
      set val 1]
ask turtle 13
    [ set color 45
      set shape "die 1"
      set val 4]
ask turtle 7
    [ set color 9.9
      set shape "chess king"
      set val 31
ask turtle 12
    [ set color 15
      set shape "orbit 2"
      set val 2]
ask turtle 8
    [ set color 15
      set shape "orbit 1"
     set val 6]
ask turtle 11
    [ set color 95
      set shape "star"
      set val 5]
ask turtle 9
```

```
[ set color 95
   set shape "pentagon"
   set val 3]
ask turtle 10
  [ set color 95
   set shape "tank"
   set val 6]
```

```
Behavior Space Test Variables
["link-chance" 0]
["diffusion-rate" 12]
["number-of-nodes" 15]
["grid-size" 3]
```

```
BENZ Position Command
```

```
ask turtle 0 [move-to patch -1 10]
ask turtle 1 [move-to patch 1 10]
ask turtle 2 [move-to patch 2 9]
ask turtle 3 [move-to patch 3 8]
ask turtle 4 [move-to patch 4 7]
ask turtle 5 [move-to patch 5 6]
ask turtle 6 [move-to patch 6 5]
ask turtle 7 [move-to patch 7 4]
ask turtle 8 [move-to patch 7 3]
ask turtle 9 [move-to patch 7 2]
ask turtle 10 [move-to patch 7 1]
ask turtle 11 [move-to patch 7 -1]
ask turtle 12 [move-to patch 7 -2]
ask turtle 13 [move-to patch 7 -3]
ask turtle 14 [move-to patch 7 -4]
ask turtle 15 [move-to patch 6 -5]
ask turtle 16 [move-to patch 5 -6]
ask turtle 17 [move-to patch 4 -7]
ask turtle 18 [move-to patch 3 -8]
ask turtle 19 [move-to patch 2 -9]
ask turtle 20 [move-to patch 1 -10]
ask turtle 21 [move-to patch -1 -10]
ask turtle 22 [move-to patch -2 -9]
```

ask	turtle	23	[move-to	patch	-3	-8]
ask	turtle	24	[move-to	patch	-4	-7]
ask	turtle	25	[move-to	patch	-5	-б]
ask	turtle	26	[move-to	patch	-6	-5]
ask	turtle	27	[move-to	patch	-7	-4]
ask	turtle	28	[move-to	patch	-7	-3]
ask	turtle	29	[move-to	patch	-7	-2]
ask	turtle	30	[move-to	patch	-7	-1]
ask	turtle	31	[move-to	patch	-7	1]
ask	turtle	32	[move-to	patch	-7	2]
ask	turtle	33	[move-to	patch	-7	3]
ask	turtle	34	[move-to	patch	-7	4]
ask	turtle	35	[move-to	patch	-б	5]
ask	turtle	36	[move-to	patch	-5	6]
ask	turtle	37	[move-to	patch	-4	7]
ask	turtle	38	[move-to	patch	-3	8]
ask	turtle	39	[move-to	patch	-2	9]

APPENDIX G

Link Justification Matrix

		AGENT #	
		LINKED	
AGENT	STAKEHOLDER LINK	TO	Source/Justification
1	La Junta Chamber of Commerce		
	Pueblo Chamber of Commerce	18	Not One More Acre Interview
			http://www.action22.org/directories/DIRMembership.pdf
	Las Animas County Chamber of Commerce	21	Not One More Acre Interview
			http://www.lajuntatribunedemocrat.com/homepage/x1090821273/Chamber-of-Commerce-banquet
	City of LaJunta	24	Not One More Acre Interview
			http://www.lajuntachamber.com/
	Otero County	25	Not One More Acre Interview
			http://www.lajuntachamber.com/
	City of Pueblo	40	City of Pueblo Interview
			http://www.action22.org/directories/DIRMembership.pdf
			La Junta Chamber is tied to Pueblo and the Pueblo Chamber as the closest economic hub. It ties to Otero County and the City of La Junta are central to its mission. These Links focus on primarily on
			economic and second to social connections.
2	Trinidad School District		
	Las Animas County Chamber of Commerce	21	http://www.truidadchamber.com/community_resource_guide.html
		22	http://www.isdl.org/Resources/Community-Resources.html
	Las Animas County	32	City of Irinidad Interview
	and and the second	20	nttp://www.isul.org/nciex.pnp/option=com_k2&view=item&task=download&id=46
	City of Trinidad	39	City of 1 minda interview
			ntp://www.tsq1.org/Administration/Board-of-Education/Belief-Statements.html
		1	The Trivial School District in the the Chember of Commerce on a solution this dependent on the Level Andrew School S
			The immutacian school District is used to me chamber of Commerce as a relationship dependent on the base education of local critizens into the community. The School District as the largest in Las
	Colorado Stata Danka		Animas County is used to the county government for services and regulatory processes. The School District is the primary public education provider to the City of Trinidad.
3	Colorado State Parks	Ē	In a life state state
	Colorado Division of Wildlife	5	nttp://dnr.state.co.us/
	Commonding Consul Fost Coroon	11	nttp://www.koaa.com/news/state-parks-wildine-agencies-to-merge-juiy-1/
	Commanding General Fort Carson	11	Doe Interview http://www.mean.em/file/Military.ImportFast Cargon County/Period Material/County Day Dece 1 Vol 2 Seation/ECDCB 2009 TechDay County/Hitter/off
	USDOL Fish and Wildlife Service	14	indp//www.ppace.org/nes/minitaly_impactPoit_carson_GrowinProject_materials/Growin_PratPriase_1_voi_2_sections/PCKOF_2008_renterep_Companionity.pdf
	CSDOI Fish and whathe Service	14	Doe microrew http://www.dio.mil/opi.hip/Ca/TDDoc2AD=ADA/82607
	San Jeabal National Foract and Comancha National Grassland	10	Intp://www.nutc.int/cgroundet.txDot.txDot.AdA492007
	San Isaber National Polest and Comanche National Grassfand	19	Indp//www.autc.mix/giPoint/etrikboc.rkb/ab/ab/a62007
	USDA Natural Resources Conservation Service	26	CSDAPOSTS INCTIVEN http://www.ide.mil/edi.htm/CstTRDoc?AD=ADA/82607
	OSDA Natural Resources Conservation Service	20	Imp//www.auto-image/orong/controls/im/out/work/in/out/work/in/control/image/imag
	Colorado Department of Natural Resources	37	Intro/An estate on us/
	Colorado Departmente o Francia de Colorado Departmente o Francia de Colorado Departmente o Francia de Colorado	51	Imper/university for the second s
			The network of natural resource agencies in Colorado is compounded by the consolidation of Colorado State Parks and Colorado Division of Wildlife in 2011. Colorado State Parks and
			Wildlife are merging offices and responsibilities. The links for Colorado State Parks is based on interviews and existing partnerships.
4	City of Walsenburg		
	Huerfano County	16	http://www.cityofwalsenburg.com/
			http://www.carson.army.mil/FortCarson2010/text/pinon/research report.pdf
	Pueblo County	23	City of Pueblo Interview
	· · · · · · · · · · · · · · · · · · ·		http://www.action22.org/directories/DIRMembership.pdf
ſ	Las Animas County	32	Piñon Canyon Expansion Opposition Coalition Interview
			http://www.action22.org/directories/DIRMembership.pdf
			The city of Walsenburg sits halfway between Pueblo and Trinidad and has commerce ties to both through a long history of coa lmining and agriculture. The city has stronger ties to the surrounding
			rural county communities with several family ties well as serving as a smaller economic hub alternative to Pueblo and Trinidad.
5	Colorado Division of Wildlife		
	USDOI Fish and Wildlife Service	14	Colorado Division of Wildlife Interview
			USDA-USFS Interview
	San Isabel National Forest and Comanche National Grassland	19	Colorado Division of Wildlife Interview
			USDA-USFS Interview
	USDOI Bureau of Land Management	20	http://wildlife.state.co.us/SiteCollectionDocuments/DOW/WildlifeSpecies/Grasslands/wholeplan.pdf
			http://www.coloradoopenlands.org/_pdf/our%20work/peak%20to%20prairie%20conservation%20document.pdf
			The network of natural resource agencies in Colorado is complex and compounded by the consolidation of Colorado State Parks and Colorado Division of Wildlife in 2011. Colorado Division of
			Wildlife tended to have strong ties with federal partners on several issues ranging from hazardous fuels to wildlife protection.
6	Colorado Department of Transportation	c.	
<u> </u>	City of Pueblo	0	City of Pueblo Interview
		0	http://www.iajuntatribunedemocrat.com/homepage/x115/491302/The-Department-of-Local-Attars-meets-with-council?zc_p=1
	City of Colorado Springs	8	ntp://www.cooradoot.into/programs/statewide-planning/documents/2005/PlanAmendmentMay2011final_full.pdf
	EI D O	12	ntp://www.cooradospnngscnamber.org/mittarypdf/roff%2Ucasof%2Ucrowth%2UPfan_draft_vol1_USU8.pdf
<u> </u>	El Paso County	15	intp://ppacg.org/commutees/utansportation/utansportation-advisory-committee-tac
	n	22	Imp//www.concausspringschamber.org/imitiality/put/ruti=2/uCutaison=2/urkegmail/artivaria/artivariality/put/ruti=2/uCutaison=2/urkegmail/artivaria/arti
	Pueblo County	23	imp//www.conadouou.nuo/pogranissaaewide/pianing/documents/2035/nar/Antendinentenv042011_rina_1un.pui http://www.lonadouou.nuo/pogranissaaewide/pianing/documents/2035/nar/Antendinentenv042011_rina_1un.pui
			imposition and a subsection and a subsection of the section of the
1		1	The cost account of the providence of the provid
1			La rues una ruesto un une contesto or population.

		AGENT #	
		LINKED	
AGENT	STAKEHOLDER LINK	TO	Source/Justification
7	Colorado Springs Chamber of Commerce		
	City of Colorado Springs	8	http://www.coloradospringschamber.org/military/pdf/Fort%20Carson%20Reg%20Growth%20Plan_draft_vol1_0508.pdf
			http://www.leg.state.co.us/Clics/Clics/007A/commsumm.nsf/b4a3962433b52fa787256e5f00670a71/f0bf9631246d1c7b872572b8006a5c97?OpenDocument
	Commanding General Fort Carson	11	http://www.coloradospringschamber.org/military/pdf/Fort%20Carson%20Reg%20Growth%20Plan_draft_vol1_0508.pdf
			http://www.carson.army.mil/FortCarson2010/text/pinon/research_report.pdf
	City of Fountain	12	http://www.coloradospringschamber.org/military/pdf/Fort%20Carson%20Reg%20Growth%20Plan_draft_vol1_0508.pdf
			http://www.coloradospringschamber.org/chamber/partners.asp
	El Paso County	13	http://www.coloradospringschamber.org/military/pdf/Fort%20Carson%20Reg%20Growth%20Plan_draft_vol1_0508.pdf
			http://www.leg.state.co.us/Clics/Clics/2007A/commsumm.nsf/b4a3962433b52fa787256e5f00670a71/f0bf9631246d1c7b872572b8006a5c97?OpenDocument
	Pueblo Chamber of Commerce	18	http://www.coloradospringschamber.org/military/pdf/Fort%20Carson%20Reg%20Growth%20Plan_draft_vol1_0508.pdf
			http://southerncoloradobusinesspartnership.com/Partners.html
			While the focus of the Colorado Springs chamber is on Colorado Springs and El Paso County, the importance of Pueblo as a southern neighbor has grown as the two counties become increasingly
			networked.
8	City of Colorado Springs		
	Colorado Springs Chamber of Commerce	7	http://www.leg.state.co.us/Clics/Clics/2007A/commsumm.nsf/b4a3962433b52fa787256e5f00670a71/f0bf9631246d1c7b872572b8006a5c97?OpenDocument
			http://www.coloradospringschamber.org/chamber/partners.asp
	Deputy Under Secretary of Defense for Installations and Environment	9	http://www.defensecommunities.org/headlines/conservation-programs-provide-ft-carson-ample-buffer-from-community/#
			http://www.defensecommunities.org/headlines/army-taps-carson-lewis-mcchord-wainwright-for-new-units/#
	Commanding General Fort Carson	11	http://www.coloradospringschamber.org/military/pdf/Fort%20Carson%20Reg%20Growth%20Plan_draft_vol1_0508.pdf
			http://www.springsgov.com/links.aspx?sectionid=23
	City of Fountain	12	http://www.coloradospringschamber.org/military/pdf/Fort%20Carson%20Reg%20Growth%20Plan_draft_vol1_0508.pdf
			http://www.springsgov.com/files/annexplan06.pdf
	El Paso County	13	http://www.coloradospringschamber.org/military/pdf/Fort%20Carson%20Reg%20Growth%20Plan_dtraft_vol1_0508.pdf
			The City of Colorado Springs is tied via economics, social, and political links to Fort Carson. The city is a strong supporter of the local chamber, and the Department of Defense system that supports
			it
9	Deputy Under Secretary of Defense for Installations and Environment		
	Assistant Secretary of the Army for Installations, Energy and Environment	10	Department of the Army Interview
			http://www.gao.gov/assets/290/284826.pdf
			http://leeds.colorado.edu/asset/brd/coloradoeconomicopportunities.pdf
	Commanding General Fort Carson	11	http://www.gpo.gov/fdsys/pkg/CHRG-111hhrg52667/html/CHRG-111hhrg52667.htm
			http://www.defense.gov/pubs/BSR_2008_Baseline.pdf
			Fort Carson's most valuable assets are its training ranges that the Department of Defense hopes to expand.
10	Assistant Secretary of the Army for Installations, Energy and Environment		
	Colorado Springs Chamber of Commerce	7	Department of the Army Interview
			http://www.asaie.army.mil/Public/IE/doc/BG_Aycock_Energy_Security_Panel_Brief_V12_W-0_NOTES.pdf
	City of Colorado Springs	8	Department of the Army Interview
			http://www.asaie.army.mil/Public/IE/doc/BG_Aycock_Energy_Security_Panel_Brief_V12_W-0_NOTES.pdf
	Deputy Under Secretary of Defense for Installations and Environmen	9	Department of the Army Interview
			http://www.gpo.gov/fdsys/pkg/CHRG-111hhrg494449/html/CHRG-111hhrg49449.htm
	Commanding General Fort Carson	11	http://www.gpo.gov/fdsys/pkg/CHRG-111hhrg52667/html/CHRG-111hhrg52667.htm
			http://www.army.mil/article/18402/
			Fort Carson's most valuable assets are its training ranges that the Department of the Army hopes to expand.
11	Commanding General Fort Carson		
	Colorado Springs Chamber of Commerce	7	Department of the Army Interview
			http://www.carson.army.mil/FortCarson2010/text/pinon/research_report.pdf
	City of Colorado Springs	8	Department of the Army Interview
			http://www.carson.army.mil/FortCarson2010/text/pinon/research_report.pdf
	Deputy Under Secretary of Defense for Installations and Environmen	9	Department of the Army Interview
			http://www.gpo.gov/fdsys/pkg/CHRG-111hhrg49449/html/CHRG-111hhrg49449.htm
	Assistant Secretary of the Army for Installations, Energy and Environment	10	Department of the Army Interview
			http://edocket.access.gpo.gov/2007/pdf/07-3912.pdf
			Fort Carson enjoys a strong relationship with the local community and is dependent upon the Department of the Army and Department of Defense
12	City of Fountain		
	Colorado Springs Chamber of Commerce	7	http://www.coloradospringschamber.org/chamber/partners.asp
			http://www.coloradospringschamber.org/military/pdf/Fort%20Carson%20Reg%20Growth%20Plan_draft_vol1_0508.pdf
	City of Colorado Springs	8	http://www.springsgov.com/files/annexplan06.pdf
			http://www.coloradospringschamber.org/military/pdf/Fort%20Carson%20Reg%20Growth%20Plan_draft_vol1_0508.pdf
	Assistant Secretary of the Army for Installations, Energy and Environment	10	Department of the Army Interview
			http://www.carson.army.mil/FortCarson2010/text/pinon/research_report.pdf
	Commanding General Fort Carson	11	http://www.fountaincolorado.org/egov/docs/1306189609_602447.pdf
			http://www.fountaincolorado.org/egov/docs/1176765928_661743.pdf
			As a bedroom community south of Colorado Springs, the City of Fountain shares a school district with Fort Carson. The base and community are tightly linked though it's economy is diversified
			outside of the military.
13	El Paso County		
	City of Colorado Springs	8	http://www.coloradospringschamber.org/military/pdf/Fort%20Carson%20Reg%20Growth%20Plan_draft_vol1_0508.pdf
			http://www.elpasoco.com/About_elpaso_county.asp
	Commanding General Fort Carson	11	http://www.carson.army.mil/FortCarson2010/text/pinon/research_report.pdf
			Department of the Army Interview
	City of Fountain	12	http://www.coloradospringschamber.org/military/pdf/Fort%20Carson%20Reg%20Growth%20Plan_dtraft_vol1_0508.pdf
			http://www.elpasoco.com/About_elpaso_county.asp
			El Paso County has its strongest links to its two largest communities of Colorado Springs and Fountain. As the largest employer in El Paso County, Fort Carson is one of the largest stakeholders.

		AGENT #	
		LINKED	
AGENT	STAKEHOLDER LINK	TO	Source/Justification
14	USDOI Fish and Wildlife Service		
	Huerfano County	16	http://projects.propublica.org/recovery/locale/colorado/huerfano
			http://www.huerfanojournal.com/node/2286
	San Isabel National Forest and Comanche National Grassland	19	http://www.fs.fed.us/outernet/r2/psicc/publications/amendments/amend_24_picketwire_canyon.pdf
			http://www.cnhp.colostate.edu/download/documents/2006/CSP_Final_Report_2006.pdf
	Colorado Department of Agriculture	33	Colorado Department of Agriculture Interview
			http://www.nasda.org/nasda/nasda/foundation/state/Colorado.pdf
			http://wildlife.state.co.us/SiteCollectionDocuments/DOW/WildlifeSpecies/Grasslands/wholeplan.pdf
			The U.S. Fish and Wildlife Service, while tied to a number of partners across varying initiatives, is tied to Huerfano County as a major source of funding. The Cooperative Conservation Partnership
			Initiative Citizens for Huerfano County are active in their own right similar to PCEOC. The partnerships with the USFS and Colorado Department of Agriculture reflect not only ties via Pinon Canyon
			but to larger state issues as well.
15	Advisory Council on Historic Preservation		
	Colorado Springs Chamber of Commerce	7	http://www.preserveamerica.gov/06-23-08PAcommunity-coloradospringsCO.html
			http://visitcos.com/news/tag/historic-destinations/
	USDOI Bureau of Land Management	21	http://www.achp.gov/blm.html
			http://www.achp.gov/docs/Section3%20Report2-24-09FINAL.pdf
	Not One More Acre	32	http://issuu.com/coloradopreservation/docs/ranching-survey-report
	1. B. C. J. B. C. J. B. C. L.		http://www.csindy.com/colorado/making-an-impression/Content?oid=2005522
	City of Springfield	35	http://coloradopreservation.org/crsurvey/rural/baca/index.html
			http://www.preserveamerica.gov/cobaca.html
			ACHP supports communities based on preservation need. While it does not side with groups over issues, it does develop strong partnerships. ACHP's support of the Comanche National Grasslands
			are more critical to Springheid and Baca County as they provide a historic resources that forms ecological and cultural tourism.
16	Huerfano County		
	City of Walsenburg	4	http://www.huerfano.us/Home_Page.html
			http://www.cityofwalsenburg.com/
	Las Animas County	32	City of Trinidal Interview
			http://sccog.net/AboutUs.html
	City of Trinidad	39	City of Trmidad Interview
			http://sccog.net/AboutUs.html
			Huerfano County is often thought as an outlier to the Piñon Canyon issue. The county, it's economy, social and family ties are very close to its southern neighbor.
17	Environmental Protection Agency	0	
	Deputy Under Secretary of Defense for Installations and Environment	9	http://www.epa.gov/ORD/memo_of_understanding.pdf
	Assistant Constant field Association Frances di Presidente	10	Department of the Army Interview
	Assistant Secretary of the Army for installations, Energy and Environment	10	ntp://www.army.mu/article/10009/
	Communities Communities Communities Communities	11	Department of the Army Interview
	Commanding General Fort Carson	11	nttp://www.eba.gov/greenpower/documents/top10federal_2009.pdf
			Department of the Anny metrices
			The Environmental Frotectoria Agency's responsibility or maintaining and enorcing national standards at an every of government expectancy environmental protection as part of 0.3, princips
18	Pueblo Chamber of Commerce		
10	City of Dasha	0	http://www.pueblochamber.org/chamber.info
<u> </u>	City of Fuebio	U	Imp///www.paconcolumod.vsg/viamod=mo
<u> </u>	La Junta Chamber of Commerce	1	Na (Do More Acre Interview
<u> </u>	La sultà Chambel of Commerce	1	I not once inter the intertext intertext is /DIP/Mambarshin.ndf
<u> </u>	Colorado Spripos Chamber of Commerce	7	imper www.accontex.org/unicecontex.provembers.http://unicecontex.p
	Colorado Springs Chamber of Commerce	,	Impose or reconsistent growth and the second s
			http://www.landsofkansas.com/resources/articles.cfm/sews/Colorado/Pueblo-Camper-backs_Army-studies.cf=Pinon-Canvon/
	Las Animas County Chamber of Commerce	21	http://southerncoloradobusinessnattnership.com/Partners.html
	Eas Annuas county chamber of commerce		http://www.action22.org/directories/DIRMembership.pdf
	Pueblo County	23	http://www.pueblochamber.org/chamber.org/chamber.info
	T actio county		http://www.nedco.org/content/our-partners
19	San Isabel National Forest and Comanche National Grassland		
	Commanding General Fort Carson	11	USDA-USFS Interview
	contraining contrain for carbon		http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5209204.pdf
	USDA Natural Resources Conservation Service	26	USDA-USFS Interview
			http://www.rurdev.usda.gov/co/FY09EngineerResources/08%20Important%20Rangelands%20&%20National%20Grasslands.pdf
	Colorado Department of Natural Resources	37	USDA-USFS Interview
			http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5209204.pdf
			The Comanche National Grassland along with its USDA partner NRCS, ties both to the Army and to the ranchers via NRCS. The link to CDNR is through the umbrella of sub bureaucracies to the
			agency.
		AGENT #	
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		LINKED	
AGENT	STAKEHOLDER LINK	<u>TO</u>	Source/Justification
20	USDOI Bureau of Land Management		
	Commanding General Fort Carson	11	http://www.blm.gov/co/st/en/BLM_Information/newsroom/2011/september/fort_arson_and_pinon.html
		10	Department of the Army Interview
	San Isabel National Forest and Comanche National Grassland	19	http://www.blm.gov/pgdata/etc/mediatab/bitm/corresources/resource_advisory/tront_range_rac.Par.5555.File.dat/racminmarch-0/a.pdf
	Colored State Lord Doord	22	http://www.bim.gov/pgdata/etc/medialib/bim/co/resources/resource_advisory/iront_range_rac.Par.82500.File.dat/racminmay-0/.pdf
	Colorado State Land Board	22	Colorado Board of Land Commissioners Interview
	LICDA Natural Recourses Concernation Service	26	indp//russianos.state.co.us/securits/securits/redoperations/redos/rAS.asbx http://ususianos.state.co.us/securits/securits/redos/rAS.asbx
	USDA Ivatural Resources Conservation Service	20	Indp//www.onr.gov/inte-invarypat/1/3++ofevo3.pdf
	Colorado Department of Agriculture	33	Calorado Denartmento A orienture Interview
	Colorado Department of Agreentare	55	Chinado Departinente or Agricultare Interfew
			Secretary of the Interior Salazar has a complicated problem with Piñon Carvon while being strong on the environmental concerns with Pinon Carvon The BLM also counts on the Army to prevent any
			adverse entry under mining laws and provide a consistant uninterupped use of lands. The obvious link with Agriculture on the land management side is also tightened with the relationship between the
			Secretary of the Interior and Commissioner of Agriculture who are brothers.
21	Las Animas County Chamber of Commerce		
	Las Animas County	32	http://www.chieftain.com/news/local/trinidad-chamber-opposes-pinon-expansion/article_c6cbb5e6-4d29-11e0-8eaa-001cc4c03286.html
			http://www.chieftain.com/news/local/pinon-expansion-foes-oppose-army-covenant/article_c76cb1d6-13df-11e0-9680-001cc4c002e0.html?
	City of Trinidad	39	http://www.trinidadchamber.com/about_the_chamber.html
			http://www.tlac.net/about_us.html
			The Chamber of Commerce walks a fine line between supporting the ranchers in the county and supporting any business the community can receive from the Army. The Chamber views both economic
			development and economic protection as its mission.
22	Colorado State Land Board		
	Trinidad School District	2	http://www.trustlands.state.co.us/Documents/10-2010_board_packet.pdf
			Colorado Board of Land Commissioners Interview
	Colorado Division of Wildlife	5	http://dn.state.co.us/
	Hades Colorid District	07	http://csit.colostate.edu/pages/csit-programs.html
	Hoenne School District	21	Colorado Board of Land Commissioners Interview burg/investment/clip.2010 board neelest aff
	Colorado Cattlemen's Association	28	Indp//www.instandes.nate.co.us/pocuments/10-2010_00at_packet.put
	Colorado Catternen 3 Association	20	Constance Donate CommissionErs match new http://trail.com/documents/commissionErs/match/c
	Branson School District	30	Report Restances on the second s
-	Diabon beloor Dibine	50	Extended build in Land comments/10-2010 board packet.pdf
	Colorado Department of Agriculture	33	Colorado Department of Agriculture Interview
			http://trustlands.state.co.us/Documents/FY%202009-10%20Annual%20Report.pdf
	Colorado Department of Natural Resources	37	http://dnr.state.co.us/
			Colorado Board of Land Commissioners Interview
			In addition to the interview point to the large amount of State Trust Lands in the County and the impact on the local economy. Trinidad, Branson and Hoehne's income from the state in addition to its
22			proximity to Chancellor Ranch and its evolving status in relation to the land board are also considered and noted by the Commission. The relationship with other state agencies is well documented.
23	Pueblo County	0	
<u> </u>	City of Pueblo	U	City of rueoto mice view thir://www.padeo.org/content/uw-partners
	City of Walconburg	4	Impary we repeated with the second particles
	City of waisehold g	4	City of 1 work interview
	Advisory Council on Historic Preservation	15	Imp// www.acconfigurecones.provements.pppu
	ravisity could be fisione i reservation		http://www.preserveamerica.gov/PAcommunity-puebloC0.html
	Huerfano County	16	City of Pueblo Interview
			http://www.action22.org/directories/DIRMembership.pdf
	Pueblo Chamber of Commerce	18	City of Pueblo Interview
			http://www.pedco.org/content/our-partners
	City of LaJunta	24	City of Pueblo Interview
			http://www.scedd.com/about_us.htm
	Las Animas County	32	City of Pueblo Interview
			http://www.scedd.com/about_us.htm
	City of Springfield	34	City of Pueblo Interview
		25	http://www.scedd.com/about_us.htm
	Baca County	55	City of ruebo metrylew
	C_{1}^{\prime} and c_{1}^{\prime} c_{2}^{\prime} c_{3}^{\prime}	20	Inttp://www.sceau.com/adout_us.nnn
	City of Rocky Ford	38	City or ruebo merview Inter/invave.exico22 ara/insectories/DIRMembership.ndf Inter/invave.exico22 ara/insectories/DIRMembership.ndf
	City of Trinidad	30	Integration and a second s
	City of Hindau	57	
			Pueblo County and the City of Pueblo are tied together by two very strong government systems. While Colorado tends to have strong counties, the relationship between the city and county is most
			likely the strongest in the State after Colorado Springs/El Paso. The county government serves as a both an outward network to the smaller surrounding counties and a form of insulation to the city.

		AGENT #	
		LINKED	
AGENT	STAKEHOLDER LINK	TO	Source/Justification
24	City of LaJunta		
	La Junta Chamber of Commerce	1	Not One More Acre Interview
			http://www.lajuntachamber.com/html/about_us.html
	Pueblo County	23	Not One More Acre Interview
			http://www.scedd.com/about_us.htm
	Otero County	25	Not One More Acre Interview
			http://www.seedd.com/about_us.htm
25	Other Counts		The City of La Junta is the first major satteline community east of Pueblo. The test to Pueblo can be found in the commerce that flows to the west as much as the water does to the east. La Junta
25	Utero County		situatee east of rueo, os major industrial Park provides a rurai option for inving less than 40 minutes away.
	La Juita Chambei of Commerce	1	Not One where Acte Interview bits/insure/acte and start/acte and start
	Pueblo County	23	http://www.ajunachaniber.com/ntm/adout_us.nim
-	T doto county	20	http://www.sead.com/about.us.htm
	City of LaJunta	24	Not One More Acre Interview
-			http://www.lajuntatribunedemocrat.com/news/x1203794012/Otero-County-doesnt-agree-with-no-adverse-effect-finding-at-Pinon-Canyon-site
			The Otero County, like it's county seat La Junta iprovides a number of rural sattelite communities east of Pueblo. The ties to Pueblo can be found in the commerce, jobs, and education opportunites
			that are west in Pueblo County. Otero County and its proximity to the Pueblo Industrial Park and Pueblo Depot Activity make it a rural/bedroom location for Pueblo.
26	USDA Natural Resources Conservation Service		
	San Isabel National Forest and Comanche National Grassland	19	USDA Natural Resources Conservation Service Interview
			http://www.rurdev.usda.gov/co/FY09EngineerResources/08%20Important%20Rangelands%20&%20National%20Grasslands.pdf
 	Colorado Cattlemen's Association	28	USDA Natural Resources Conservation Service Interview
L	Diffuse Groups Prove 1 (Q) (11) Q	20	nttp://www.cooraaocatue.org/crmicontact.aspx
 	Piñon Canyon Expansion Opposition Coalition	29	USDA vatural resources conservation service interview
	N O M	21	Intp://www.iws.gov/induitani-prante/piw/coorad0/C053.ftm USDA Naturel Resources Consensation Sension Enterprises
<u> </u>	INOT One More Acre	51	CSDA FARMAR RESOURCES CONSET WRITE THE PROVE THE PROVIDENCE OF T
	Las Animas County	32	Intp://www.iws.gov/indontaneprint/piw/colorado/cos/intri USDA Natural Resources Conservation Service Interview
	Las Tillinas County	52	bitr/main resource - Owner than a min/CDAG/1178305637691
			The NRCS mission of ensuring private lands are conserved and restored with priority work directed toward landowners naturally aliens the agency with the ranchers and cattlemen. The agency's sister
			bureaucracy, the forest service also ties them to either.
27	Hoehne School District		
	Trinidad School District	2	City of Trinidad Interview
			http://sc-boces.org/
	Las Animas County Chamber of Commerce	21	www.carson.army.mil/FortCarson2010/text/pinon/research_report.pdf
			http://trinidadcf.org/
	Piñon Canyon Expansion Opposition Coalition	29	Piñon Canyon Expansion Opposition Coalition Interview
			http://www.carson.army.mil/FortCarson2010/text/pinon/research_report.pdf
	Branson School District	30	Branson School District Interview
	Not One More Age	21	Prinor Canyon Expansion Opposition Coantion Interview
	Not the Mole Acte	51	Not Otle Mide Acte Interview Information and I
	Las Animas County	32	Imp//www.cason.amy.im/rorecarson.cov/www.pinon/research_eport.put
	Las rinnas courty	52	Prino Carvon Exansion Onnosition Coalition Interview
-			Of all the bureaucracies in peril, none are more so than the Hoehne School District. The initial 400,000 acre proposal would take the community off the map. This fact has tied the school district very
			closely to the ranchers and their supporters.
28	Colorado Cattlemen's Association		
	Piñon Canyon Expansion Opposition Coalition	29	http://www.coloradocattle.org/news.aspx?NewsID=159
			http://www.carson.army.mil/FortCarson2010/text/pinon/research_report.pdf
L	Not One More Acre	31	Not One More Acre Interview
I	No. 4 No. 1 1		http://www.springfieldcolorado.com/expand2.html
 	Colorado Department of Agriculture	33	Colorado Department of Agriculture Interview
			nttp://coorradocante.org/anniadons.aspx
1			The colorado cancements association has, usually opposed any government acquisition or land that impacts the industry. The support of the ranchers against the Army represents the first "industry burgered" industry industry and a first moder.
29	Piñon Canvon Expansion Annocition Coalition		ourdeeree joning uie see or the failefield.
29	Reancon School Dietrict	30	Ranson School District Interview
	Dianson School District	50	Filon Canvon Expansion Opposition Coalition Interview
-	Not One More Acre	31	Not One More Acre Interview
-			Piñon Canyon Expansion Opposition Coalition Interview
-	Las Animas County	32	Branson School District Interview
			Piñon Canyon Expansion Opposition Coalition Interview
	Colorado Department of Agriculture	33	Colorado Department of Agriculture Interview
			Piñon Canyon Expansion Opposition Coalition Interview
			The Piñon Canyon Expansion Opposition Coalition is the primary non-governmental bureaucracy support for the ranchers.
30	Branson School District		
I	Piñon Canyon Expansion Opposition Coalition	29	Branson School District Interview
			Prior Canyon Expansion Opposition Coalition Interview
 	Not One More Acre	31	Brancon School District Interview Brancon Econol District Interview Brancon Econol District Interview Brancon Econolisis Denselisis Condition Interview
<u> </u>		20	Prinor Canyon Expansion Upposition Coantion interview
	Las Animas County	32	Dianson School District Interview
<u> </u>			prime canyon expansion opposition control interview The Brancos School District's activity stance against the Army pensents an education human crack constitution of another values and a stance and the Army's consistion. This
1			The Disease Desires activity state against us range operation in concarry presenting a constructivy presenting a constructivy or memory
I	1		our ender the second more encertee in meterical opposition than any other agency of government.

		AGENT #	
		LINKED	
AGENT	STAKEHOLDER LINK	TO	Source/Justification
31	Not One More Acre		
	City of LaJunta	24	Not One More Acre Interview
			Piñon Canyon Expansion Opposition Coalition Interview
	Otero County	25	Not One More Acre Interview
			http://www.secoloradoheritage.com/about-our-heritage/media/local-officials-want-army-to-comply-with-historic-preservation-rules
	Piñon Canyon Expansion Opposition Coalition	29	Not One More Acre Interview
			Piñon Canyon Expansion Opposition Coalition Interview
	Las Animas County	32	Not One More Acre Interview
			Pinon Canyon Expansion Opposition Coalition Interview
			Not One More Acre Opposition has taken the harder line of opposing ANY continued use or expansion of PCMS. The organization has taken root in both Otero and Las Animas Counties and while based in Trinidad has actually been more active from La Junta and its efforts to pull support closer to the larger population centers of Pueblo County, El Paso County and the Colorado eastern plains.
32	Las Animas County		
	Las Animas County Chamber of Commerce	21	City of Trinidal Interview
		27	http://www.irnutadchamber.com/
	Hoehne School District	27	Branson School District Interview
	Big - Come Emotion Operation Condition	20	Prinor Canyon Expansion Opposition Coantion Interview
	Pinon Canyon Expansion Opposition Coantion	29	Not One More Acte Interview
	Drangen Calcal District	30	I non Canyon Expansion Opposition Coanton Interview Parson School District Intensiew
	Branson School District	50	Dianson School Dosuit interview
	Not One More Age	31	a non-canyon Expension opposition Control Interview Not One More Acre Interview
	INOT ONE MORE ACTE	51	City of Trainidad Interview
	City of Trinidad	30	Give of Trainida Interview
	City of Hindad	37	Erasson School District Interview
			Las Animas County has the benefit of being a very nowerful county though the population ratio between Trinidad and the County is nearly 2-1. Links to the schools and ranchers is highlighted by
			members being active in the Anti-expansion movement.
33	Colorado Denartment of Agriculture		
	Colorado Cattlemen's Association	28	Colorado Department of Agriculture Interview
			Not One More Acre Interview
	Piñon Canvon Expansion Opposition Coalition	29	Colorado Department of Agriculture Interview
			Piñon Canyon Expansion Opposition Coalition Interview
	Not One More Acre	31	Colorado Department of Agriculture Interview
			Piñon Canyon Expansion Opposition Coalition Interview
	Colorado Department of Natural Resources	37	Colorado Department of Agriculture Interview
			Colorado Division of Wildlife Interview
			The Colorado Department of Agriculture has become more active on behalf of the ranchers with John Salazar. The former congressman has drawn upon his network to draw a line against the Army on
			behalf of the Ranchers. As a former Army veteran he has also been able to provide a technical and user counter several of the military's arguments for expansion.
34	City of Springfield		
	Colorado Cattlemen's Association	28	http://www.springfieldcolorado.com/expand2.html
		20	Phon Canyon Expansion Opposition Coalition Interview
	Pinon Canyon Expansion Opposition Coalition	29	Not One More Acre Interview
	Not One More Age	21	Phone Canyon Expansion Opposition Coalition Interview
	Not One More Acte	31	Not One More Acte Interview
	Las Animas County	32	r mon Canyon Expansion Opposition Continin Interview Bion Canyon Expansion Donosition Continin Interview Bion Canyon Expansion Donosition Denterview
	Las Animas County	32	r non canyon expansion opposition Control interview
	Dana County	35	Integer we want to the Example of the Control of th
 	Baca County		Integer w w a springerooks/status/coll/Parakoullygov.ntm
			https://www.analysectore
1		1	isolated and a nossible deathblow.
35	Baca County		
	Otero County	25	http://www.action22.org/directories/DIRMembership.pdf
<u> </u>	Okto County		http://www.scedd.com/about us.htm
<u> </u>	Colorado Cattlemen's Association	28	http://www.springfieldcolorado.com/expand2.html
			http://www.coloradocattle.org/bpannualbanquet.aspx
	Las Animas County	32	http://www.action22.org/directories/DIRMembership.pdf
			http://www.scedd.com/about_us.htm
	City of Springfield	34	http://www.c-spanvideo.org/appearance/595458243
			http://www.bacacountyedc.com/
			Baca County is home to the American Agriculture Movement that organized tractor protest rallies in Washington D.C. during the late 1970's. The county, like Spingfield has a great deal at stake if the
			Army expands. The area already isolated may be even more isolated depending on the reach of the military.
36	Colorado State Historic Preservation		
	Colorado State Parks	3	http://www.historycolorado.org/sites/default/files/files/OAHP/Programs/StatePlan.pdf
L			http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5209204.pdf
L	Advisory Council on Historic Preservation	15	http://www.historycolorado.org/sites/default/files/files/OAHP/Programs/StatePlan.pdf
I			http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5209204.pdf
I	San Isabel National Forest and Comanche National Grassland	19	http://www.historycolorado.org/sites/default/files/files/OAHP/Programs/StatePlan.pdf
 	ders sins das ""	27	http://www.is.usda.gov/intereet/FSE_DOCUMENTS/stelprdbb209204.pdf
	Colorado Department of Natural Resources	51	nttp://www.is.usda.gov/internet/SE_DOCUMENTS/stelprob209204.pdf
 			http://www.is.ted.us/outernet/r2/pstcc/publications/amendments/amend_24_picketwire_canyon.pdf
			Cotorado State Historic Preservation (History Colorado) is tied to the both State and Federal Stakeholders interested in preserving both the ancient and modern history of the area.

		AGENT #	
		LINKED	
AGENT	STAKEHOLDER LINK	то	Source/Justification
37	Colorado Department of Natural Resources		
	Colorado Division of Wildlife	5	http://dnr.state.co.us/
			Colorado Division of Wildlife Interview
	Colorado State Land Board	22	http://dnr.state.co.us/
			Colorado Board of Land Commissioners Interview
	Colorado Department of Agriculture	33	Colorado Department of Agriculture Interview
			Colorado Division of Wildlife Interview
			The Colorado Department of Natural Resources, while not active in the controversy, has tied itself closer to more active state bureaucracies in a policy of watchful waiting.
38	City of Rocky Ford		
	La Junta Chamber of Commerce	1	http://www.action22.org/directories/DIRMembership.pdf
			http://www.lajuntachamber.com/html/alphabetical_list.html
	City of LaJunta	24	http://www.action22.org/directories/DIRMembership.pdf
			http://www.lajuntaeconomicdevelopment.net/team.htm
	Otero County	25	http://www.oterogov.com/
			http://rockyfordcolo.com/?s=pinon
			Rocky Ford, like Walsenburg is a nearly forgotten stakeholder. Though it is close to Pueblo, family, culture, and economic ties link it close to the county and larger sister city of LaJunta.
39	City of Trinidad		
	Trinidad School District	2	City of Trinidad Interview
			http://www.tlac.net/
	Commanding General Fort Carson	11	City of Trinidad Interview
			http://www.chieftain.com/news/local/business-owners-seek-jobs-at-pinon-canyon/article_c68226e2-4715-11e1-af73-001871e3ce6c.html
	Las Animas County Chamber of Commerce	21	City of Trinidad Interview
			http://www.tlac.net/
	Las Animas County	32	City of Trinidad Interview
			http://asanimascounty.org/
			Trinidad, like Pueblo is the one city that is torn. Still attempting to reap the benefits that never came with Piñon Canyon's inception, it is counting on the Army to make good on promised that the
			expansion will provide a positive economic outlook.
40	City of Pueblo		
	Pueblo Chamber of Commerce	18	City of Pueblo Interview
			http://www.pedco.org/content/our-partners
	Pueblo County	23	City of Pueblo Interview
			http://www.pedco.org/content/our-partners
			Pueblo is stuck in the middle. What was once Colorado's Second City is now thought of as the southern edge of the front range metro-plex that runs north to Fort Collins. The community of Pueblo,
			consisting of countless business interests, seeks to capture the power, independence, and influence it lost to closing mills and the onset of the Military Industrial Complex in Colorado Springs some 40-
			50 years ago. The ties between the County and City are probably the strongest in the State.

APPENDIX H

Branson/Fort Carson Correspondence

BRANSON SCHOOL DISTRICT RE-82

Home of the Bearcats 101 Saddle Rock Drive PO Box 128 Branson, CO 81027

(719) 948-5531 voice (719) 946-5619 fax www.bransonschooloniine.com

February 24, 2011

Public Affairs Office Attn: Robert McLaughlin Garrison Commander – Fort Carson Suite 200 Building 1118 Fort Carson, CO 80913

Enclosed is a copy of the Resolution of the Branson School District RE-82 in Las Animas County, Colorado calling on all federal agencies including the United States Army to coordinate with the District regarding plans, policies and actions.

The Resolution sets forth at length the statutes, regulations and Executive Orders that require agencies including the Army to coordinate with local governments such as the Branson District.

Pursuant to these laws, including the Army's own regulations as to NEPA processes found in Title 32 of the Code of Federal Regulations, we request that you meet with the Branson School Board on March 28, 2011 or April 4, 2011 to commence coordination with regard to the proposed expansion of the Pinon Canyon Maneuver Site.

Please contact Branson School at 719-946-5531 by March 14, 2011 to arrange meeting details. If it is impossible for you to meet on one of these dates, we expect that you will be able to agree to a mutually convenient date at the time of contact.

The meeting we request will be a government to government meeting with discussion participation only by the Board and staff and the Army and staff. The meeting will be open, but there will be no public participation. This format, consistent with the laws requiring coordination with local government, will allow us as government officials to focus on the facts.

We know, as do you, that mere public informational meetings or public input meetings do not satisfy the lawful requirements regarding your relationship with the District as a unit of local government. Had you engaged in coordination with the District and other local governments in the area during your prior NEPA activities, perhaps you would have fared better in court.

In preparation for our first coordination meeting, we request that you provide for our review plans, studies and activity documents relating to the proposed expansion of the Maneuver Site.

Further, it appears to the Board that enhancement of check dams and construction of new structures in the cantonment area constitute violations of Judge Matsch's order that invalidated the Transformation ROD and FEIS for Pinon Canyon Maneuver Site expansion. The status of that construction as it relates to the Court Order will be on our agenda.

We request that you provide for our review documents related to training of a Combat Aviation Brigade unit at the Maneuver Site. We are of the opinion that the construction activities on the Site are directly related to training of an additional CAB unit at the Site. We are interested in how that comports with Judge Matsch's order.

We will point out how we believe that the 2010 EA is not a new study at all, but simply a justification for the prior EIS that was set aside by the Court. We will be prepared to demonstrate our position in writing at the meeting; we also will be prepared to demonstrate why we believe that the law requires an EIS, not an EA.

When a meeting date is set, we will provide you with an agenda containing the subjects we wish to discuss, and will invite you to add subjects. A final agenda will be provided at least ten days prior to the meeting.

The meeting we request is consistent with your own regulations. Pursuant to 32 CFR section 651.14, you should have already established with us a "continuing relationship. . .to promote cooperation and resolution of mutual land use and environment-related problems" in order to "promote" "general cooperative problem solving." (651.14 (g))

Coordinated engagement with our local government is called for by subsection g entitled "Relations with local, state, regional and tribal agencies"; the subsection requires you to "establish a continuing relationship" with "adjacent local, state, regional and tribal governments and agencies." Our District is such adjacent local government.

With regard to the proposed expansion of Pinon Canyon Maneuver Site, you have not fulfilled your legal obligations to coordinate with us. You did not do so during the development of the EIS that was set aside by the Court, and you have not done so as you move forward with an EA. We expect that you will honor your lawful obligations now that we have formally requested that coordination talks begin.

Congress has mandated that federal agencies coordinate with local governments, even in the highly sensitive area of Homeland Security as pointed out in the enclosed Resolution. The President of the United States has ordered closer working relationships, as did former Presidents Reagan and Clinton. The Council on Environmental Quality has directed coordination through its regulations setting the standards by which the NEPA process is to be applied. And, the United States Army has itself set forth regulations calling for the type of coordination talks we now request. (See 32 CFR 651.14, and the Army's website setting forth its position on NEPA processes: United States Army Environmental Command NEPA site)

The USAEC website contains a narrative "NEPA & The Army" that includes the following sentence: "NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made." To that end, 32 CFR 651.14 sets forth the provisions that lead us to expect that you will meet with our local government to coordinate with us in an attempt to resolve inconsistencies in policy and land and environmental problems.

We trust that the Army will adhere to the law and its own regulations and agree to begin coordination meetings with the District. If not, please be assured that we will pursue every legal means to require that you follow the law.

We look forward to the first meeting at which we hope to begin a mutually beneficial coordination process. We hope that the meeting will be arranged voluntarily in order to avoid expensive judicial and political procedures to require compliance with the law.

Jerry Winford - Board President

Nick Lingus - Board Member

Dick Louden - Board Member

Beverly Shelden - Board Member

Allen Winford - Board Member

cc: Ashton B. Carter – Under Secretary of Defense for Acquisition, Technology & Logistics John McHugh – Secretary of Army Eric Holder, Jr. – Attorney General Robert Gates - Secretary of Defense United States District Court – Colorado

A Artes Areas a



DEPARTMENT OF THE ARMY OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY INSTALLATIONS ENERGY AND ENVRONMENT 110 ARMY PENTAGON WASHINGTON, DG 20210-0110

MAR 28 2011

Mr. Jerry Winford, Board President Branson School District RE-82 101 Saddle Rock Drive PO Box 128 Branson, CO 81027

Dear Mr. Winford:

I have been asked to respond on behalf of Secretary of Defense Robert M. Gates to your February 24, 2011 letter concerning the Pinon Canyon Maneuver Site (PCMS). PCMS serves as an important training site in preparing our Soldiers to combat terrorism at home and abroad. Comprised of 235,000 acres, it provides critical maneuver lands for Soldiers from Fort Carson.

There continues to be discussion in local meetings and news media about potential Army land acquisition and expansion for PCMS. Please be assured the Army has no plans to expand PCMS boundaries and, accordingly has not requested any funds be programmed in the Department of Army budget (FY12-16) for the acquisition of land at PCMS over the next five years. Soldiers and units assigned to Fort Carson will be using PCMS within its current boundaries as they train and prepare for the dangerous assignments for which they have been tasked by this nation.

I trust this clarifies the Army's position and intentions concerning PCMS. The Army will continue to work with the Colorado Congressional delegation and local communities concerning the accomplishment of its mission at Fort Carson.

Sincerely,

Principal Deputy Assistant Secretary of the Army (Installations, Energy and Environment)



BRANSON SCHOOL DISTRICT RE-82

Home of the Bearcats 101 Saddle Rock Drive PO Box 128 Branson, CO 81027

(719) 946-5531 voice (719) 946-5619 fax www.bransonschoolonline.com

May 18, 2011

To: Robert McLaughlin, Fort Carson Garrison Commander,

In response to our request for a coordination meeting with you, our School received a telephone call during which you agreed to meet with us---but at your office. You did this after canceling the May 12, 2011 coordination meeting with the School Board which you agreed to attend. Please understand that we do not write this letter from the standpoint of turf status, but from the standpoint of the good of our Board and our constituents.

If our Board travels to your office for a meeting, each will be giving up at least a day of work on their revenue based business. None of our constituents would be able to attend the meeting to observe our discussions.

Our meetings have to be open meetings, each with an agenda prepared in advance and posted with notice of the meeting. Coordination meetings are government to government meetings. So the public is not allowed to make comments or statements during the meetings. But members of the community can attend and listen. Then they are given a chance to make comments AT THE NEXT REGULARLY SCHEDULED REGULAR, NON-COORDINATION, BUSINESS MEETING. This precaution is taken to assure the representatives of both governments that the discussions will be relevant government to government discussions.

The process just outlined has to be followed under the Colorado open meeting law. Could we hold a coordination meeting at your office? Of course. Could we hold such meeting at your office and be in compliance with the spirit of the open meeting law? Of course not. The constituents who may want to attend a meeting of our Board are entitled to have that meeting scheduled locally so that they don't have to undertake the expense and loss of time connected with a trip to your office. They have the right to reasonably expect that our open meetings will be held locally, within the community.

We know that you will understand this. It is based on the same concept of coordination with local government that you express and demonstrate in **Full Battle Rattle**. There you point out how important it was for you and your command officers to visit with the local officials in Iraq on their home base, their home site. You point out how important it is that you show the interest in going to meet with them, and how important it is to show the whole local community your willingness to work with locally elected officials.

.....

The concept you represent as being very effective in Iraq encompasses our reasons for suggesting that you meet with our Board in our community, instead of at your office. Your attendance at a meeting in this community will demonstrate your intent to work with local citizens and their elected officials.

We will not reiterate the reasons you must coordinate with us. We simply now request that you apply to our situation what you display in <u>Full Battle Rattle</u> to be a successful method of working with local elected officials in a meaningful way.

We would appreciate it if you would meet with us in our meeting room on June 2, 2011 or June 3, 2011. Please call the Branson School at (719)946-5531 by Monday May 23, 2011 to confirm one of these dates.

Sincerely,

Jerry Winford Branson School Board President

Cc:

Secretary of Defense, Robert Gates Undersecretary of Defense and Acquisition, Technology and Logistics, Ashton B. Carter Secretary of Army, John McHugh

BRANSON SCHOOL DISTRICT RE-82

Home of the Bearcats 101 Saddle Rock Drive PO Box 128 Branson, CO 81027

/ (719) 946-5531 voice (719) 946-5619 fax www.bransonschooloniins.com

August 8, 2011

To: Colonel Robert F. McLaughlin Garrison Commander 1626 Ellis Street Suite 200 Fort Carson, Colorado 80913

Letters dated February 24, 2011, March 28, 2011 and May 18, 2011 requested a government to government meeting regarding the proposed expansion of the Pinon Canyon Maneuver Site. They are enclosed with this letter for reference.

The Branson School District RE-82 in Las Animas County, Colorado invoked their authority to coordinate with all federal agencies including the United States Army regarding plans, policies and actions. A copy of the Resolution is included again.

The Army's own regulations as to NEPA process found in Title 32 of the Code of Federal Regulations and in the Department Of Defense Regulations 5030.54 & 4165.57, both clearly outline the requirement of coordinating with Local Governments to reach consistency in policy and Land Use Plans. Finally in your BRAC document Section.2905 (D) & (E) states "the Secretary of Defense shall consult with the Governor of the State and the <u>heads of the local governments</u> concerned for the purpose of considering any plan for the use of such property by the local community concerned."

This is now our 4th and final letter requesting to meet as government to government and discuss the Pinon Canyon Maneuver Site prior to any information released to the public. This letter along with our prior correspondences will be sent to the appropriate agencies including the Department of Justice.

After receiving no responses from our last letter dated May 18, 2011it is clear that you have intentionally violated the Executive Order 13575-Section 4 (a), (b), (c) & (d).

Today's letter will serve notice to you and the Federal departments listed, we are prepared to take necessary action to insure the Federal Statues outlining our authority to coordinate will not be ignored.

As with all of our letters we are offering your choice of two meeting dates to be conducted in our meeting room. We request a meeting in our facility to accommodate the number of local elected officials who will be attending. The meeting dates are August 26, 2011 or September 2, 2011. Please call the Branson School at (719)946-5531 by August 16, 2011 to confirm one of these dates or to recommend another date. An agenda is attached, please be prepared with your decision makers to discuss these issues. If there is anything you would like to add, please let me know 10 days prior to the meeting.

Sincerely,

Winford-Branson School Board President

Member ck Lingus 🖉

Dick Louden -Board Member

Felden - Board Member

Allen Winford -Board Member

Cc: Department of Justice, Christopher H. Schroeder Secretary of Defense, Leon E. Panetta Undersecretary of Defense and Acquisition, Technology and Logistics, Ashton B. Carter Secretary of Army, John McHugh Attorney General, Eric Holder, Jr U.S. Army, Deputy Garrison Commander, Steven J. McCoy United States District Court- Colorado

Agenda for Government to Government Coordination Meeting between Branson School District RE-82 and Department of Army

August 26, 2011 or September 2, 2011 6:30 PM

I. Pledge of Allegiance

II. Welcome

III. Introduction of School Board Members and Agency Personnel

IV. Army Documents Related to Combat Aviation Brigade and Proposed Expansion

V. Environmental Assessment

VI. Status of Construction in Pinon Canyon Maneuver Site Cantonment Area

VII. Status of Proposed Pinon Canyon Maneuver Site Expansion

VIII. Discussion Points for Next Meeting

IX. Colonel McLaughlin's Response Time

X. Set next meeting date

XI. Adjourn Meeting

APPENDIX I

Selected 1983 Piñon Canyon Acquisition Data

Pinon Canyon Acquisition Data

	ACQUISITION	ACRES			Dollars
OWNER	TRACT NUMBER	ACQUIRED		PRICE	per Acre
1 Bailey	416	82.88	\$	12,000.00	\$145
	101, 110, 118 &				
2 Baldwin	119	39,245.00	\$	4,493,552.50	\$115
3 Bartell	303	390.36	\$	52,000.00	\$133
	307, 310, 500 &				
4 Biernacki	502	18,685.73	\$	2,130,167.00	\$114
	417, 422, 708, 710				
5 Big Canyon Grazing	& 807	29,151.32	\$	4,080,000.00	\$140
6 Bowdie (estate) - [Reed]	409	320.00	\$	32,000.00	\$100
7 Brownewell, Mattie - [S]	212	419.86	<u>\$</u>	48,090.00	\$115
8 Brownewell, Wm. I	203	420.00	\$	48,090.00	\$115
9 Burgener	505	400.00	\$	80,000.00	\$200
	412	162.86	<u> </u>	23,411.00	\$144
11 Chancellor	/0/-1, 2	13.74	<u> </u>	2,000.00	\$146
12 Cheyenne Mining	305, 306 & 309	7,313.70	\$	1,067,552.00	\$146
13 Cneyenne Mining	incl above	incl above		incl above	
14 Crowder	805	2,399.69	\$	275,964.35	\$115
15 Crowder	702, 703 & 801	5,705.96	<u>\$</u>	656,185.65	\$115
	302	463.33	\$	73,000.00	\$158
	200	19,353.03	\$	2,499,833.00	\$129
18 Faris [+ Ranches J]	401, 511 & 514	484.43		incl above	
19 Gilmore	201	80.89	\$	12,000.00	\$148
20 Gutierrez	803	8,143.37	\$	1,066,000.00	\$131
21 Gyurman [Land & Cattle]	408	4,578.95	\$	858,587.22	\$188
22 Gyurman	408-2, 3	494.61		incl above	.
23 Herschberger	304	608.63	<u>\$</u>	82,000.00	\$135
	404 & 406	4,652.86	\$	735,000.00	\$158
25 Honnbaum	204	160.00	\$	23,000.00	\$144
DG Faria	Inclaine 17 or 18	Incl line 17 or			
	above	18 above	Inc	line 17 above	• · · -
27 Long		640.29	\$	73,600.00	\$115
28 Milnoic	512	4,442.52	\$	533,100.00	\$120
29 McIntyre	410	325./2	\$	37,653.00	\$116
21 Morris	402	2,867.46		244,315.36	\$85
32 Morris et al	403 & 421	649.92	\$	65,000.00	\$100
	407	1,139.14	<u> </u>	113,900.00	\$100
34 Oberg	420	111.86	\$	26,450.00	\$236
	202	13,979.34	<u> </u>	1,708,245.00	\$122
36 Schlesinger	902	1,391.03	<u> </u>	200,000.00	\$144
37 Sharp	500 P 605	423.71		86,000.00	\$203
Suppird Environmental	509 & 605	9,510.98	>	1,733,596.00	\$182
38 [Chevenne Mining]	incluine 12 shows		•	1	
39 Sundu				Ine 12 above	* 040
40 Thomas (P et al)	400	400.00	<u> </u>	84,000.00	\$210
41 Thompson		402.44	<u> </u>		\$143
42 Van Vleet		423.14	<u>م</u>	41.075.00	\$203
43 White	<u> </u>	292.00	ر	41,975.00	\$144
44 Wilson		26 017 09		2 060 060 00	\$198
45 Wilson	incl above	<u>20,917.90</u>	⊅	2,900,980.00	\$110
46 Winkelman	502				<u> </u>
47 Zinsser	706	00.00		00,000.79	\$215 \$405
		208 170 60	• •	020.00	⇒125 € €407
		200,170.09	. 🕈 🖓 -	20,021,001.01	

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	·.	HOEHN	E SCHOOL DI	STRICT		
TAX SCHE <u>NO. 3-40</u>	D. <u>OWNER</u> O-	ACRES IN OWNERSHIP	ACRES IN PROJECT	LAND VALUE IN PROJECT	MINERAL ACRES & VALUE	PERSONAL PROPERTY VALUES
2085	Bailey	80	80	\$ 660	<u> </u>	<u></u>
2165	Baldwin	22,081	22,081	↓ 000 54,740	₽ 80 10.652	\$
3670	Biernacki	400	400	960		
3675	Big Canvon	18,242	18,242	44,530	5,625	5,131
	Grazing	52,28/	29,112	77,942	9,775	200
4565	Brodie (estate)	320	320	770	200	
4685	Brownewell,	420	420	780	320	
4690	Mattie Provincial2			/00	340	
-000	browneweil,	420	420	880	260	
4987	Burgener	400	100			-
5770	Cha	400	400	960	80	
5830	Chancellor	150	100	380		
6255.3	Cheyenne Mining	1,920	1,920	4 530	8	3,192
7750	Cheyenne Mining	880	880	2,110	160	
7755	Crowder	2,400	2,400	5,710	1,120	2 010
10527	Ervin	5,706	5,706	15,260	1,363	
10792	Faris	19 480	480	1,150	160	
10792.1	Faris	520	19,390	47,254	6,520	5,760
19040	Gilmore	81	81	1,250		
20725	Gutierrez	15,209	8,143	28,202	2 555	
20905	Gyurman	6,496	4,587	11,986	4,587	130
22122	Herschhergen	966	484	1,162	484	3.370
22225	Hill	5 256	608	1,462	80	
22310	Hohnbaum	160	4,052	25,665	1,960	5,244
25202	Faris	780	780	2 110		
30675	Long	240	240	560	044	
32420	McIntype	4,367	4,367	11,440	1.320	1 900
30960	Moffett	320	320	770	320	
31860	Morris	8,4/2	2,867	6,932	560	
31865	Morris	1,140	040	2,000	640	
33052	Novey	113	113	2,740	1,140	
33760	Oberg	14,186	13,979	13.979	5 000	
39197	Schlesingen	12,548	1,391	3,338	1.391	
-3910.1	Sharn	400	400	960		
41512	Sunbird	10,554	10,028	24,071	1,990	6,107
11	Environmenta]	7,770	4,4/0	10,742	· 480	
41522	Sundu	400	400	960		
42076	I homas	112	112	890	20	
43865	Thompson Van Vloot	369 -	369	890	320	
45432	White	280	280	630	120	
45700	Wilson	400 25 446	400 25 AAC	960	400	
45700.1	Wilson	640	20,440 640	62,150	7,871	12,330
45/9/	Winkleman	400	400	1,540	601	
40333	Zinsser	80	7	14	100	
			· · ·			
		221 425	100 455			

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Office of SUPERINTENDENT

Hochne Public School District R-3

Hoehne, Colorado

P. O. BOX 91 AREA CODE 303 PHONE 846-4457

December 14, 1982

Re: MRORE-PC

Mr. Peter P. Pollreis Chief, Real Estate Division Department of the Army Omaha District, Corps of Engineers 6014 U.S. Post Office and Court House Omaha, Nebraska 68102

Dear Sir:

Enclosed is the necessary information requested concerning the Pinon Canon Site. We were able to gain the information on personal property as listed. This was the complete record of personal property because not every tax parcel had personal property.

Secondly, enclosed is the correct certification for 1981. There were errors in the first assessed evaluation and an audit was completed at the request of the county commissioners.

Sincerely,

Dennis Trump

Dennis Trump Superintendent

DT:jm

Juck 3

Dr Denvis Trump Hoehne Snool Dist 3 PO Bux 91 Hochwe, Colo 81046 846-4457 CODE NO FROM 1981 TAX SCHEDULE Personal OWNER AGRICULTURAL REAL PROPERTY 1. Bailey, Alice C. 3-100-2085 Ś 660 2. Baldwin, Owen & Doris T. 3-400-2165 54,740 3. Bartell, Henry L. & Bernadette H. 3-400-2782 960 4. Biernacki, LeRoy F. & Adna 38-400.920 -5290 3-400-3670 44,530 -> 5. Big Canyon Grazing Association 3-400-3675 83,670 - 3-400-930 - 200 6. Brodie, Marie Bosse, Estate 3-400-4565 770 7. Brownewell, Mattie 3-400-4685 780 8. Brownewell, Wm. I. 3-400-4690 880 9. Burgener, Lowell F. & Lois M. 3-400-4987 960 10. Cha, John 3-400-5770 380 250 250 1050 -21,410 11. Chancellor, James & Paula D. 3-400-5830 12. Cheyenne Mining & Land Company, Inc. 3-400-6255.3 4,530 13. Cheyenne Mining & Land Company, Inc. 2,110 3-400-6255.4 5,710-> 3-400-2240- 2,010 14. Crowder, Jack & Margaret 3-400-7750 15. Crowder, Jack & Margaret 3-400-7755 15,260 16. Ervin, Jerry N & Sally A. 3-400-10527 1,150 17. Faris, Joe E., et al 3-400-10792 47,350 18. Faris, Joe E. & Sons Ranches 3-400-10792.1 1,250-3-1-1-3200 - 5760 19. Gilmore, Gloria June 3-100-19040 660 20. Gutierrez, Ben 3-400-20725 46,310-+=+-+00-+160 - 210 17,960 3-400-4240 - 6740 Gyurman, Charles Land & Cattle Co., Inc. 21. 3-400-20905 3-P-400-20910,1 2,330 3-400-4260- 6740 22. Gyurman, John & Josephine 23. Hershberger, James W. 3-400-22122 1,460 24. Hill, Robert J. & Joella J. 27,0003-400-4590 - 5520 3-400-22225 25. Hohnhaum, George C. 3-400-22310 380

CODE NO FROM 1981 TAX SCHEDULE AGRICULTURAL REAL PROPERTY

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26.				
-	Kitch, James O. (Joe E. Faris)	3-400-25202	\$ 2,110	
27.	Long, Dalton	3-400-26650	560	
28.	Mincic, Charles V. & Mary Ann	3-400-30675	unan 11,440 <i>33</i> 8	- charles mixed may 1 -400-653+ - 1900
29.	McIntyre, Albert	3-400-32420	770	
30.	Moffett, E. Claudette & W. Royce	3-400-30960	19,320	
31.	Morris, Margaret	3-400-31860	2,000	
32.	Morris, Margaret, et al	3-400-31865	2,740	
33.	Novey, Bert & Ruby	3-400-33052	900	
34.	Oberg, Michael L. et al	3-400033122.2	200	1982 Only
35,	Oxley, Thomas, John C. & Mary June	3P-400-33760	66 840	5,200
36.	Schleisinger, Robert A. & Violet M.	3-400-39197	06,040	
			200	
37.	Sharp Ranch, Inc.	3-400-39910-1	25 060-082	- Ver- Car 1 & Q.201
37. 38.	Sharp Ranch, Inc. Sumbird Environmental Resources	3-400-39910.1	25,060 ∜₹≥	-900-9000.1 - 8840
37. 38.	Sharp Ranch, Inc. Sunbird Environmental Resources	3-400-39910.1 3-400-41512	25,060 ∛≉≥ 10,650	~900~9000.1_ \$940
37. 38. 39.	Sharp Ranch, Inc. Sumbird Environmental Resources Sundu, James C.	3-400-39910.1 3-400-41512 3-400-41522	25,060 ∛₹≥ 10,650 960	~ 900 ~ 900 . 1 - 6 9 40
37. 38. 39. 40.	Sharp Ranch, Inc. Sunbird Environmental Resources Sundu, James C. Thomas, Phillip & Louise	3-400-39910.1 3-400-41512 3-400-41522 3-400-42076-1-7	25,060 → ₹≃ 10,650 960 	~900~9000.1_ \$940
37. 38. 39. 40. 41.	Sharp Ranch, Inc. Sumbird Environmental Resources Sundu, James C. Thomas, Phillip & Louise Thompson, Wallace & Lovilean	3-400-39910.1 3-400-41512 3-400-41522 3-400-42076-1-7 3-400-42147	25,060 →₹ 2 10,650 960 390 890	~900 - 900 s. 1 - 6940
37. 38. 39. 40. 41. 42.	Sharp Ranch, Inc. Sunbird Environmental Resources Sundu, James C. Thomas, Phillip & Louise Thompson, Wallace & Lovilean Van Fleet, Estate	3-400-39910.1 3-400-41512 3-400-41522 3-400-42076-1-7 3-400-42147 3-400-43865	25,060 → ₹≈ 10,650 960 2 890 890 630	~9m~ 9mm, 1 _ 6940
 37. 38. 39. 40. 41. 42. 43. 	Sharp Ranch, Inc. Sunbird Environmental Resources Sundu, James C. Thomas, Phillip & Louise Thompson, Wallace & Lovilean Van Fleet, Estate White, Clinton A. & Evelyn V.	3-400-39910.1 3-400-41512 3-400-41522 3-400-42076-1-7 3-400-42147 3-400-43865 3-400-45432	25,060 → ₹≥ 10,650 960 890 890 630 960	~ 400 ~ 4000. 1 _ 6 940
 37. 38. 39. 40. 41. 42. 43. 44. 	Sharp Ranch, Inc. Sunbird Environmental Resources Sundu, James C. Thomas, Phillip & Louise Thompson, Wallace & Lovilean Van Fleet, Estate White, Clinton A. & Evelyn V. Wilson, George W.	3-400-39910.1 3-400-41512 3-400-41522 3-400-42076-1-1 3-400-42147 3-400-43865 3-400-45432 3-400-45700	25,060 →₹ ≥ 10,650 960 5 890 630 960 62,150 →3- #	~900~11= 8940 10~11=80 - 12,330
 37. 38. 39. 40. 41. 42. 43. 44. 45. 	Sharp Ranch, Inc. Sumbird Environmental Resources Sundu, James C. Thomas, Phillip & Louise Thompson, Wallace & Lovilean Van Fleet, Estate White, Clinton A. & Evelyn V. Wilson, George W.	3-400-39910.1 3-400-41512 3-400-41522 3-400-42076-1-7 3-400-42147 3-400-43865 3-400-45432 3-400-45700 3-400-45700.1	25,060 * ₹ 10,650 960 5 890 630 960 62,150 + 3-70 1,540	~900~11080-12,330
 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 	Sharp Ranch, Inc. Sumbird Environmental Resources Sundu, James C. Thomas, Phillip & Louise Thompson, Wallace & Lovilean Van Fleet, Estate White, Clinton A. & Evelyn V. Wilson, George W. Wilson, George W.	3-400-39910.1 3-400-41512 3-400-41522 3-400-42076-1-7 3-400-42147 3-400-43865 3-400-45432 3-400-45700 3-400-45700.1 3-400-45797	25,060 * ₹ 10,650 960 5 890 630 960 62,150 +3-7 1,540 960	-900-11050-12,330

Total 5119,800

OWNER



KATHLEEN ROMERO Chief Deputy

COUNTY ASSESSOR LAS ANIMAS COUNTY TRINIDAD, COLORADO 81082 PHONE (303) 846-2881

November 1, 1982

Dr. Dennis Trump, Sup't Secretary to School Board School District R-3 Hoehne, Colo. 81046

Dear Sir:

TINEST ABEYTA

America

This letter is to advise you that there were a few errors on Rudy Mazza's Tax Roll Book for the year 1981 payable in 1982.

We discovered the errors when Gary Waller was auditing Rudy Mazza's Tax Roll Book.

Your new valuation for 1981 should have been <u>6,504,590</u>, therefore you lost 548,300 in valuation.

I am very sorry for the errors that we made. If you have any questions that you would like to ask, please feel free to call Rudy Mazza, Gary Waller, or myself.

Thank-You

Juan Ernest Abeyta County Assessor of Las Animas County

kfr

Office of SUPERINTENDENT

Hoehne Public School District R-3

Hoehne, Colorado

P. O. BOX 91 AREA CODE 303 PHONE 846-4457

September 27, 1983

Department of the Army Omaha District Corps of Engineers 6014 U.S. Post Office and Courthouse Omaha, Nebraska 68102

Dear Ms. Plourde:

This letter is in recognition of U.S. Treasurer's Check No. 240,967 in the amount of \$114,157.47 which Hoehne School District has received.

I am returning the enclosed receipt unsigned for the following reason. The wording of the receipt is "the United States of America is hereby relieved of any and all further obligation or liability arising from said reduction of the school district's tax base due to said land acquisition." This wording could affect federal funding that we are currently receiving (Chapter 2 of the Education Consolidation and Improvement Act of 1981) and any revenue that we may be eligible for in the future (Public Law 81-874).

The variance comes from the different interpretations of the word, government. Our interpretation was the action of Congress and the Military Construction Appropriations Committee of 1982 and the acquisition process by the Army Coprs of Engineers. The current wording of the receipt must be interpreted as the government and all bureaucratic divisions, i.e. Department of Education.

The specific intent and purpose of the military appropriation was to provide relief for the bonded indebtedness of the school district which is within the bond redemption fund. No mention was made of the general fund. The present wording of the receipt could limit or eliminate certain types of federal funding for the general fund which has no relationship with the bond redemption fund.

Twice in telephone conversations with the Army Corps of Engineers Office in Omaha, I asked about future revenue for the general fund under Public Law 81-874 and was told that it would not be affected. I accepted those answers, but the receipt as currently written, would sign the possibility of that revenue away. The Hoehne Board of Education approved the amount of \$114,157.47 in the regular meeting June 23, 1983 as the enclosed minutes display.

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I am not trying to be difficult in this matter, however, we as a school district can not affort to sign away the possibility of receiving federal funds for our general fund.

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If the receipt is amended so that the final paragraph were to read "The undersigned...land acquisition", except liability to make payment under Public Law 81-874 and any other funds payable under any public law. This addition would remove the question of the signing away revenue provided as a right under public law.

Thank you.

Sincerely,

James Strump

Dennis Trump Ed.D. Superintendent

DT:jm

HOEHNE R-3 SCHOOL DISTRICT

BOARD OF EDUCATION

DATE: June 23, 1983	CALLED BY: <u>Bart Barbata</u> , President
NINUTES OF: Regular Bo	Dard Meeting TIME: 8:13 PM
ROLL CALL: Bart Barbata and Dr. Dem	a, Ed Gyurman, Lee Shulin, Alfonso Benavidez, Robert Cappellucci, his Trump, Superintendent. ABSENT - Nash Valdez, Gary Larson
GUESTS: None	
SUBJECT	DISCUSSION
Minutes	The Board Minutes of May 26, 1983, Regular Board Meeting, and the minutes of June 2, 1983, Interview Meeting, were reviewed and discussed. A motion was made by Board Member Shulin and seconded by Cappellucci to accept the minutes as presented. Motion passed unanimously. ABSENT - Valdez, Larson
Treasurer's Report	Following discussion Board Member Gyurman made a motion to accept the Treasurer's Report and to approve payment of all due accounts presented, seconded by Shulin. Motion passed unanimously. ABSENT - Valdez, Larson
Corrections & Additions	None
Correspondence	Dr. Tump reported he had received a letter from the Dept. of the Army, Omaha District Corps of Engineers concerning Pinion Canyon.
ACTION ITEMS: Accountability Report	 Dr. Trump informed the Board that the Accountability Committee directed their energies in four main areas this last year. Discussion of the Secondary Curriculum Discussion of "Indicators of Quality Schools" Set dates for 6 meetings Made recommendation for Accountability Committee replacements
Committee Appointments	Dr. Trump presented the FHA recommendations: Nominations - Edna Van Gundy Mary Tortorelli Butch Hall Alternates - Kathy Hill JoAnn Karspeck
	A motion was made by Board Member Shulin and seconded by Barbata to approve the recommendations. Motion passed unanimously. ABSENT - Valdez, Larson
	It was the consensus of the Board to appoint the following to the Accountability Committee:
	Joyce Hall - Reappointment Joyce Hall - Reappointment Peggy Rivera - New Member Bill DeVolin - Alternate New Member Gary Larson - Board Member Rep Mary Tortorelli ~ Elementary Teacher Rep
	Peggy Rivera - New Member Bill DeVolin - Alternate New Member Gary Larson - Board Member Rep Mary Tortorelli ~ Elementary Teacher Rep

DATE: June 23, 1983

Page 2 of

MINUTES OF: Regular Board Meeting

SUBJECT	DISCUSSION
Chapter I Contract	Dr. Trump reported that the State has allowed \$33,298 (new money) for the Chapter I Budget for the 83-84 school year. In view of this information Dr. Trump recommended that a contract be offered to Gerald Lell. Board Pres. Barbata moved to offer Gerald Lell a contract for the 83-84 school year, seconded by Shulin. Motion passed unanimously. ABSENT - Valdez, Larson
Pinon Canyon Proposal	After reviewing and discussing the letter received by the Dept of the Army the following motion was made by Board Pres. Barbata and seconded by Benavidez:
	Resolved: The Board of Education of the Hoehne R-3 School District agrees to accept the Pinon Canyon Proposal from the Dept. of the Army for the amount of \$114,157.47. Also, that Dr. Trump be authorized to invest this money according to State legal guidelines since the Bonds can not be paid off until 12-1-90.
	Motion passed unanimously. ABSENT - Valdez, Larson
INFORMATION ITEMS: Volleyball Uniforms	Following discussion a motion was made by Board Member Gyurman and seconded by Cappellucci to buy 15 Volleyball uniforms (consisting of 2 tops and 1 pair of shorts) from Broderich for the 83-84 school year. Motion passed unanimously. ABSENT - Valdez, Larson
Next Board Meeting	The next Regular Board Meeting will be held July 28, 1983 at 8:00 PM
Adjournment	The meeting was adjourned at 9:21 PM
	Bart Barbarta

Office of SUPERINTENDENT

Hochne Public School District R=3

Hochne, Colorado

P.O. BOX 91 AREA CODE 303 PHONE 846 - 4457

July 6, 1983

Mr. Gary D. Blair Chief, Real Estate Division Department of the Army Omaha District Corps of Engineers 6014 U.S. Post Office and Courthouse Omaha, Nebraska 68102

Dear Mr. Blair:

This letter is to formally notify you that the Hoehne R-3 Board of Education voted to accept your proposal concerning the Pinon Canyon Maneuver Site. This action was taken in its regular meeting June 23, 1983.

The money received will be placed in a separate account and used only towards the retirement of the bonds. This account will be audited annually until it is expended for its designated purpose.

The Board recognizes that the payment of \$114,157.47 will relieve the Government of any further obligation or liability arising from the reduction of the tax base in connection with the Pinon Canyon Maneuver Site land acquisition.

Sincerely,

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Dennis Trump, Ed.D. Superintendent

DT:jm

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June 9, 1983

Real Estate Division

Mr. Dennis Trump Superintendnent, School District R-3 P.O. Box 91 Hoehn, Colorado 81046

Dear Dr. Trump:

As you know, the authorization from our higher headquarters to acquire the real estate for the Pinon Canyon Maneuver Site contained the following language:

"Funds are included in this project for retirement of outstanding school bonds relating to land to be acquired. The amount to be paid is based on total indebtness (sic) of the school district as of 1 January 1982 and shall be computed on the basis of the percentage by which the school district's tax base will be diminished (sic) as a result of this action."

Attached is a tabulation showing by ownership the amount we feel the tax base of School District R-3 is reduced as a result of the Pinon Canyon Maneuver Site land acquisition. The list includes all ownerships of record within the project boundary and School District R-3 during 1981, which is the nearest full year to the January 1, 1982 authorization for which complete tax records were available. For your additional information, the 1982 assessments on the affected ownerships were partially complete at the time of our research, and in all cases, they remained the same as for 1981. We would assume that the same would hold true for the remainder of the school district; therefore, there would not be a proportionate change in 1982 from 1981. The County Assessor's office has advised that the county school district's tax basis consists of taxes on real property, personal property and mineral interests.

The tabulation consists of seven (7) columns briefly explained below:

a. <u>Tax Schedule No.</u> - This number identifies the ownerships within the project by number, as they appear on the Las Animas County Assessors Tax Schedule - Agricultural Real Property. The tax schedule is the county's assessed value of land and improvements by ownership. No Federal or State land is included because it is tax exempt.

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b. <u>Owner</u> - The names under this column are the names of owners of record for the 1981 tax year. It should be noted that due to land sales between the 1981 assessment and our acquisition, names on this list may not coincide with the owners of record at the time of our acquisition. We feel the owners names or configuration of the ownership is immaterial since the intent is to determine the assessed value of the land and improvements within the project and school district as it relates to the entire school district.

c. <u>Acres in Ownership</u> - This column depicts the total assessed acres in each ownership affected by the project within the school district as shown on the Tax Schedule. In over 75% of the cases we are acquiring the total ownership as shown on the Tax Schedule.

d. <u>Acres in Project</u> - This column represents the amount of acres within each ownership that are acquired for the project. In cases where the total ownership as shown on the Tax Schedule is acquired, that acreage is used. On partial acquisition, the acreage we actually acquired is used. We are doing this because in calculating acreages, ours and the assessors may not agree. Therefore, on total acquisitions, the assessors acreages are used, since credit should only be given to what is assessed. On partial acquisitions, there is no way to determine what is actually assessed, so our acreages are used. The acreages in this column also include what we refer to as "unaconomic remmants", or in other words, lands that we were legally obligated to purchase but are not a part of the project. These lands will be turned over the the General Services Administration for disposal and, depending on whether another Governmental body uncertainty, they are included as a tax base reduction to give you the benefit of doubt.

e. Land Value in Project - This column depacts the assessed valuation of land and improvements within the project and school district, and includes the "uneconomic remnants" mentioned above.

f. <u>Mineral Acres and Valuation</u> - This column represents the amount of privately-owned mineral acres and valuation within the boundary. Federal and State-owned minerals are not included in this total since they are exempt from taxation. The County Assessor's office advised that private minerals are taxed as a rate of one dollar per acre; therefore, the numbers in this column represent both acres and dollars.

g. <u>Personal Property Values</u> - This column represents the personal property values by ownership as furnished to us by your letter dated December 14, 1982. The values apparently relate to the total ownership; therefore, we have used a proportionate amount as it relates to the percentage of an ownership we are acquiring.

According to a letter dated November 1, 1982 from the Las Animas County Assessor to you, which was attached to your December 14, 1982 letter to this office, the total 1981 assessed valuation of School District R-3 was \$6,504,590. Our computations indicate that that valuation has been reduced by \$594,182or .091348Z as a direct result of the Pinon Canyon Maneuver Site land acquisition.

We believe the total outstanding indebtedness of the bond as of January 1, 1982 to be as follows:

Total Bond Retired Prior to January 1, 1982 Remaining	Principal \$1,200,000 80,000 \$1,120,000	Interest \$1,009,057.75 244,655.25 \$ 764,402.50
		~ F043402.30

Total \$\$,120,000 + \$764,402.50 = \$1,884,402.50

Because the bonds cannot be prepaid until on or after December 1, 1989 and then only in inverse numerical order and at your option, we believe it would be mutually beneficial to make a one time lump sum payment for our proportionate share of the bond.

Since the bonds mature over the next 17 years the lump sum payment will be discounted to the present worth of 1.00 (what 1.00 payable yearly is worth today) using a liberal 5% interest rate.

Although your annual payments are variable, for simplicity we have based the payment on what our annual proportionate share would be which is arrived at as follows:

Total Bond	Indebtedness	\$1,884,402.50
Government	Reduction by %	X .091348
Government	Proportionate Share	= \$ 172,136.40
Years Remaj	ning on Bond Payment	- 17

Government Average Annual Payment = \$ 10,125.67

The 5% interest discount rate was extracted from the Compound Interest Tables (the Six Functions of \$1.00 and Annual Constants for Monthly Payment Loans) prepared by the Financial Publishing Company, 82 Brookline Avenue, Boston, Massachusetts, for the American Institute of Real Estate Appraisers of the National Association of Realtors.

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The payment is calculated as follows:

Government Average Annual 5% Interest Discount Rate	l Payme	Ų	\$10,125.67		
Government Proportionate	Share	(Lump	Sum)	Ē	\$114.157.47

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We suggest that you consult with your legal or bond counsel to review the above. If you are in agreement with the payment of \$114,157.47, we will deliver a check and have the School Board or its authorized agent execute a document stipulating that the funds will be applied towards retirement of the bonds and also that the Government is relieved of any further obligation or liability arising from the reduction of the tax base in connection with the Pinon Canyon Maneuver Site land acquisition.

If you have any questions regarding the above, please contact Mike D'Agosta of my staff at (402) 221-4392.

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Sincerely,

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Cary D. Blair Chief, Real Estate Division

Enclosure

CF: MRDRE Troía

BIOGRAPHICAL SKETCH

Richard Mestas currently serves as a Program Manager at the National Intelligence University in Washington D.C. In this capacity, he coordinates Contracts, Campus Engineering, Space, Facilities, Mission Assurance and New Construction. He also previously served as NIU's Assistant Admissions Officer.

From 2009-11, Mr. Mestas took leave from the federal government to serve as Associate Dean, University of Nebraska College of Technical Agriculture. As Associate Dean, Mr. Mestas oversaw Student Services, Library, Information Technology, Residence Life and Facilities for the campus located in Curtis, Neb. He was also instrumental in the creation of the college's "Combat Boots to Cowboy Boots" program, which seeks to match returning war veterans with opportunities in agriculture.

Additionally, his work in the field of higher education has included assignments with the U.S. Navy Recruiting Command, the United States Merchant Marine Academy, Colorado State University-Pueblo, Lamar Community College, and the Defense Intelligence Agency.

He is an Army veteran of the first Gulf War, where he served as a munitions and light equipment maintenance officer with VII Corps in Southwest Asia.

Mr. Mestas received his Bachelor of Arts Degree from Colorado State University-Pueblo and Master of Arts Degree from the United States Naval War College. At present, he is a candidate for Doctor of Public Administration at the University of Baltimore. He is a native of Southern Colorado and resides in Southern Maryland.