Environmental Planning for Water, Transportation, and Land Use

A Senior Project
presented to
the Faculty of the Social Sciences Department
California Polytechnic State University, San Luis Obispo

In Partial Fulfillment
of the Requirements for the Degree
Bachelor of Science

by

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Table of Contents

Research Proposal

I propose to research modern methods of Environmental Planning including uses in water, transportation and land use development. I intend to write a research based paper bases on an overview of environmental planning process related to these fields. Using the Geography background from the Social Sciences along with the classes I attended in Environmental Law and Water Resource Law and Policy, I hope to construct an informative summary. The project will have three main chapters; Water Law and Environmental Planning, Transportation and Environmental Planning, and Environmental Planning and Land Use Development. I will also explore federal and state legal process related to environmental planning, along with alternative energy sources and sustainability practices.

Annotated Bibliography

Woodson, R. Dodge. 2009. Be a Successful Green Land Developer. New York: The McGraw-Hill Companies.

This book addresses sustainable development in natural, rural areas. Zoning laws are discussed as well as a step-by-step guide to environmentally responsible building practices that reduce waste. The author includes a glossary of "green" terms and a second appendix complete with sample permits, forms, surveyor's reports, and project development plans to help the land developer adapt to an environmentally responsible business. This book is helpful to my senior project for two reasons. The first reason is the content is useful in the area of my research of urban and rural environmental planning. Second, the book provides a hand on guide to creating a "green" land development business. This is a great guide for anyone to reference when contemplating any type of land development. The statement of my thesis on the importance of environmental planning, this book provides access and tips in a easy to read format, it should be on every land developers coffee table. (157)

Register, Richard. 2002. Ecocities, Building Cities in Balance with Nature. California: Berkley Hills Press.

Richard Register writes about cities that maintain a limited impact on the environment. The author addresses the population expanse and the over population of cities. Register maintains that through a collective eco-minded consensus cities can have environmental standards that mitigate the rising population. His discussion of rapid transit systems, co-operative gardens, small markets and shops, and neighborhood support for childcare and house maintenance highlights a community oriented city that negates environmental impact. This book is important to my research of urban and rural environmental planning. People will continue to cluster in cities and the importance of maintaining large compact communities with environmental standards and impacts in mind is important to sustaining the earth's ecosystems. The author goes on the discuss "permaculture" which is the philosophy of working to build and function within cities that work with nature not against it. This practice will benefit all life forms and is therefore environmentally responsible. (155)

Dunne, Thomas and Leopold, Luna B. 1978. Water in Environmental Planning. San Francisco: W. H. Freeman and Company.

This book is a review of the principles and role of water as it pertains to environmental planning. The hydraulic cycle is presented along with detailed chapters on precipitation, water balance, water use by vegetation, calculation of flood hazard, and groundwater. The purpose of this book is to also create an understanding of natural processes for planners and individuals concerned with water use. This is an older, education type text that is a thoughtful and educated product on development in regards to water. This book is also helpful to understand technical writings and data often found in environmental impact reports. This book is valuable to my research regarding water in environmental planning. Water is essential to any planning project. The understanding of hydrology, fluvial geomorphology, and river quality is very useful to understand the natural process of water. Water is used as energy, it is vital to communities, and land use. Water is also becoming exceedingly scarce, or is needed to be remediated for general use due to unsustainable practices that pollute and degrade water. (175)

National Research Council, Transportation Research Board. 2000. Transportation Research Record, Journal of the Transportation Research Board. Sustainability and Environmental Concerns in Transportation. No. 1702. Washington D.C.: National Academy Press.

Sustainable transportation planning is imperative to create and maintain natural habitat for animals, forests, and waterways that are beneficial to our eco-system. Through more sustainable transportation and roadway practices the occurrence of wild-life vehicle collisions has been reduced by 97 percent in some areas. This journal uses highway mitigation measures that have been implemented in Canada to protect some of the world's most treasured roadways (Canadian Rocky Mountains National Parks. This is important to my research as it lends educational information to building sustainable highways and byways with the eco-system as a priority. Many diagrams and decision matrix are included in this journal providing valuable information to achieve the desired sustainable transportation project goal. The journal also looks at the role of the automobile industry in the sustainable transportation system. Combining fuel consumption, vehicle emissions, safety, and access to social and economic opportunity help to create a more sustainable roadway system. (163)

Andolina, Tina. www.pcl.org The Planning and Conservation League. 2008. Land Use and CEQA.

The Planning and Conservation League (PCL) has helped draft CEQA (The California Environmental Quality Act) and the Coastal Act of 1976. The PCL is a non-profit lobbying organization, working in the State Legislature and at the administrative level in state government to enact and implement policies to protect and restore the California environment. A project that the organization is currently working on is the Environmental Impact Report for the High Speed Rail Project. The high speed rail project is being planned to traverse the central valley. This assessment (EIR) urged the state to study building the rail system and locating stations along existing highways and transportation corridors, rather than through virgin wilderness or on farmland where it would induce sprawl. The organization urged rail service that would maximize

passengers and defer people out of cars. Also, the PCL demanded that wildlife crossings and other wildlife and habitat sensitive building practices be included in any future High Speed Rail System. This website is important to my research as it has educational up to date information on politics and lobby groups who want to build a more sustainable California. (188)

www.climatescience.gov Scientific assessment of the effects of global change on the United States. 2008. A Report of the Committee on Environment and Natural Resources, National Science and Technology. Washington D.C. : National Science and Technology Council (U.S.), Committee on Environment and Natural Resources.

This document is important to my research as it discusses the most recent data on climate change and how this will affect natural systems and the human environment. With increasing global temperatures due to global warming, biological systems on the planet will be altered. This document gives data to model the extent of impact the climate change will have on the United States. The report discusses ozone levels, biological diversity, ecosystem composition, and the natural environment. For example, "On small oceanic islands with cloud forests or high-elevation ecosystems, such as the Hawaiian Islands, human-induced climate change, land use changes, and invasive species are likely to have synergistic effects that drive several species (e.g., some endemic birds) to extinction"[V.1.c]. This document is important to my research to measure the data of impacts to the environment so as to plan accordingly. Also, the information in this document clearly states the human impact on the environment as detrimental to global warming. Being savvy to this information will help the environmental planner make decisions in all areas of planning more sustainable. (180)

Lee, Richard W. ... [et al.] 2002. Mineta Transportation Institute, San José State University. The California General Plan process and sustainable transportation planning. Springfield, VA: Available through the National Technical Information Service,

This document is a case study preformed for the Mineta Transportation Group by San Jose State University. The case study looked at 400 general transportation plans throughout California to determine key factors to implement sustainable transportation planning practice. The findings concluded that California's transportation planning director's advocate for sustainability and its importance to the general plan. Currently only a small percentage of transportation planners agree that the general plan utilizes sustainability principles to a large extent. Most planning directors support sustainability practices that include less single-occupant autos to other modes. This document is important to my research as it pertains to sustainable regional transportation in California. This study has provided key information on what planners think and feel is most important for sustainable transportation planning. By creating this document, a more educated look can be taken at the needs of planners who want to make more sustainable planning decisions. (150)

Herson, Albert I. and Lucks, Gary A. 2008. California Environmental Law and Policy, a Practical Guide. California: Solano Press Books.

This book takes an extensive look at CEQA (the California Environmental Quality Act) and presents the laws in a readable format and explains the context of laws applicable to different situations. The book is separated into chapters within four main categories; Environmental/Land Use Planning, Regulation of Natural Resources, Pollution Control, and Permitting and Environmental Compliance Auditing Guides. The text is useful to my research as it presents CEQA and applicable federal environmental laws in an accessible guide. The introductory chapter gives a brief overview of the organization of the judicial process and how environmental law is reviewed through that process. Water quality, air quality, local land use planning, preparation and review of Environmental Impact Reports, hazardous waste management including Federal/ State cleanup programs are all discussed in chapters. Permitting fundamentals including types of permits is a valuable resource when implementing sustainable planning practices. Overall this book is applicable to all areas of environmental planning, (156)

Mega,Voula. 2005. Sustainable Development, Energy and the City: a civilization of visions and actions. New York: Springer Science+Business Media Inc.

This book on sustainable urban development was written about energy use and environmental planning pertaining to the European Union. The text addresses the Johannesburg World Summit on Sustainable Development, and the urgency for more sustainable urban centers. United Nation population statistics are discussed with a cause of action for the share of renewable energy in the total energy supply. Mega addresses the need for consumption patterns in regards to resource attainment. She also addresses the issues of transportation and cultural values that will be part of the consumption patterns. Mega uses data from the Framework Programme on Research and Technological Development on global change in ecosystems, sustainable energy and transportation systems. Some flaws with this book include citation difficulties (all reference information is at the end of book without citation at the bottom of the pages). This book has been translated to English from French/Dutch (the author is from Belgium). This book has been translated to English from French/Dutch (the author is from Belgium). This book is important to my research because I feel that having a global perspective on sustainable development is imperative to globalization. As the population raises, the need to share resources, education, and sustainability practices will be vital. (180)

Wright, Ronald. 2004. A Short History of Progress. New York: Carroll and Graf Publishers.

This history book on the demise of civilizations due to over consumption illustrates the point of my research. If we do not start building more sustainable communities we will not support the amount of people that we have on the planet, and we will destroy the natural resources that we

have. This book discusses historic events that parallel the events currently taking place in the modern world. Wright uses the Mesopotamian hearth as an example of an Eden that was overexposed and over developed. The result is an apocalypse. The salinization that is plaguing the California central valley farm lands is the result of improper water use without environmental planning. These practices led to the demise of the Sumerians, a highly industrialized society of the time. This book is a blatant reminder of the importance to plan with sustainability in mind. If we continue to only look at the "now" we will short our children's future later. The need to think sustainably when using water, planning transportation, land use development, and disposing of waste is imperative to the eco-system. Wright calls for an educated collective conscious to make better decisions based on our past. (195)

Outline

Topic: An Investigation of Environmental Planning Involving Specific Areas of Hydrology, Land Use Development (Urban/Rural), and Transportation

Introduction: This paper is to inform the reader on the background of environmental planning in three areas. Environmental planning is crucial to maintaining sustainable eco- systems to maintain biodiversity on the planet. With increasing population, demands will be put on our natural resources that must be mitigated so as to create healthy environs. Environmental planning is planning with the focus of a sustainable future in mind. Sustainability can be defined as using a resource so that the resource is not depleted or permanently damaged. Understanding cause and effect of natural process educates the planner to make wise choices that work with nature and not against it. Environmental planning helps to ensure a healthy planet for tomorrow's generations.

1.0 Executive Summary (TBD)

2.0 Environmental Planning

- 2.1 Background of Current Environmental Planning Practices
- 2.2 Current Federal and State Environmental Laws and Policy as it pertains to environmental planning
- 2.3 Importance of Environmental Planning

3.0 Hydrology in Environmental Planning

Introduction

In the next four decades, the worldwide population will grow at an exponential rate. Humans will have to take a long look at how we will manage the resources on the Earth. Environmental planning is a discipline of study that takes into account the natural surroundings, resources, and the requirements to have a functional society that maintains sustainable use practices. This paper is an overview of environmental planning strategies for use in water planning, transportation planning, and land use planning.

The chapter on water planning will highlight the hydrologic cycle and its importance in water planning. A discussion on fluvial geomorphology will emphasize water source and quantity for development. Water remediation is discussed as mitigation to pollution and managing water quality needs. Transportation planning will be outlined by highlighting alternative modes to rapid transit, such as High Speed Rail, car sharing, and transportation sustainability efforts. Environmental land use planning will focus on rural land use planning, urban planning, and state and federal laws pertaining to land use development.

Water in Environmental Planning

Water is vital to the planning procedure. More and more, many scholastic disciplines are coming together in the planning method including; marine biologists, plant ecologists, geologists, foresters, and hydrology engineers who are working together to find collective solutions to environmental planning involving water. Hydrology affects and often drives most urban and rural planning projects. It is imperative to combine efforts with many types of professionals to best understand waters natural process. Understanding the hydrologic process is paramount in understanding why the flow of water affects the planning process so significantly.

The hydrologic cycle explains the process in which water moves around the earth. Through this cycle from ocean to atmosphere to earth and again back to ocean, the water is provisionally stored in streams, rivers, lakes, the soil, or groundwater and is available for all to use. For the purpose of describing the hydrologic cycle in short, I will use only the example of rain with snow being described only to illustrate the diagram presented.

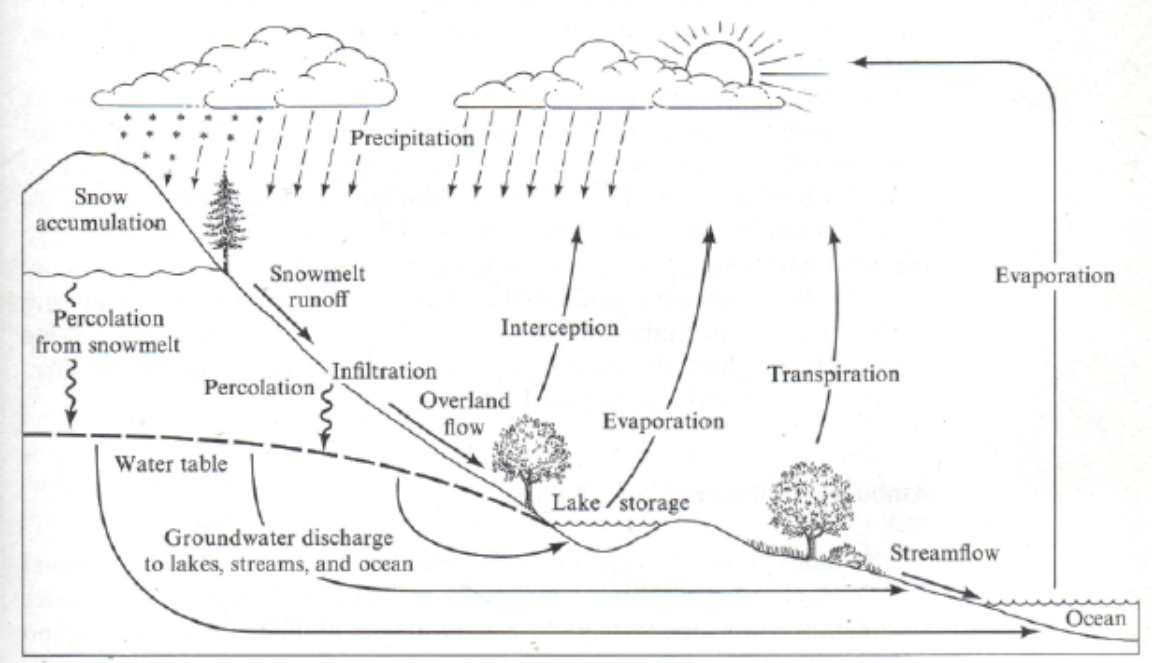


Figure 1-1 Schematic diagram of the hydrologic cycle.

(Dunne and Leopold 1978; 5)

"In the cycle, solar energy evaporates water from the ocean. This water is carried by winds over the continents, and when atmospheric conditions are favorable, a portion of the water is precipitated, generally as rain or snow. If cold conditions prevail at the ground surface, snow will be stored there until enough energy is available for melting. The meltwater will thereafter follow the same pathways as rainwater" (Dunn and Leopold 1978; 4).

A few terms will need to be defined in order to understand the diagram completely. *Infiltration* is the process in which water seeps into the soil. *Percolation* is the act of water seeping deeply into soil that is filtered by soil and rock. *Interception* is the process by which water that does not reach the ground and is caught by vegetation, evaporates back into the atmosphere. Most rain water does not reach the ground, and is evaporated back into the atmosphere my interception. Some rain that is not evaporated and remains on the surface of the

soil, often causing floods is called *overland flow.* Water that infiltrates the soil and percolates to the water table moves vertically out of the soil is *groundwater discharge.* Groundwater is then stored in lakes and streams. *Transpiration* is the process by which water is evaporated through the leaves of plants. As water follows this process, groundwater undergoes many chemical changes. Through the *weathering* process, rocks, gases (primarily oxygen and carbon dioxide), and organic acids' determine the groundwater's suitability for use.

The hydrologic cycle is a fitting model for studying environmental planning. The process denotes how numerous biologic functions exist in the natural world. The nutrients that are formed and carried in the water by running through the rocks and soil help nourish bacteria, plant life, fish, birds, animals, and humans. Altering this essential cycle can disrupt the ecosystem causing disastrous effects to all involved. Considerations of the path or flow of water is essential to human modification of the earth.

"Fluvial geomorphology is the study of landform evolution related to rivers" (wdfw.wa.gov). Streams and rivers flow from headwaters, which may be snowmelt, springs, or lakes. The water quality and clarity at the source of the headwater is very pure and clear. It is also usually quite cold and has higher oxygen content. As the water makes its course along the stream and/or river it gains momentum due to gravity and usually heats up. The water is also heated by the nutrients and sediments it picks up along its course. At the mouth of the river, usually the ocean or a larger river, more sediment accumulates creating a murky environment. Different types of fish species and ecology thrive in these two different water points. For example, salmon prefer more oxygenated water to spawn. In more nutrient rich environments like a river mouth, catfish and

carp thrive. As the river or stream makes its course from source point to drainage point, many changes in the land occur from running water. Human modification can also change the course of water flow, affecting quality and quantity.

> "Both extrinsic and intrinsic geomorphic thresholds exist. An extrinsic threshold is exceeded by application of an external force or process, such as a change in sediment supply or discharge. Progressive change in the external force triggers an abrupt, physical change in the system. Examples of forces relating to extrinsic thresholds are climatic fluctuations, land-use changes and base-level changes. An intrinsic threshold is exceeded when system change occurs without a change in an external variable; the capacity for change is intrinsic within the system and can be considered the system's natural variability. An intrinsic threshold might be reached when a torturous meander bend becomes unstable, resulting in a meander cutoff and subsequent reduction in sinuosity" (wdfw.wa.gov).

Understanding fluvial geomorphology is crucial to environmental planning to determine the extrinsic and intrinsic variables that will impact a watercourse. These findings can help the environmental planner mitigate issues pertaining to the project that help to support the life flow of the waterway, and understand conditions that could detrimentally impact a land use project. Water quality is also influenced by a watercourse, and by understanding the flow we gain valuable knowledge to the biology and chemical composition of the water.

As the population continues to climb, water becomes a more scarce resource. Due to industry, water around the world has become polluted and toxic. By understanding the hydrologic process and fluvial geomorphology, planners can make informed decisions that work with nature to preserve the valuable resource that water is. Water remediation, the cleaning of contaminated water is a solution for cleaning water that has already been contaminated by human impact. Ozone sparge technology is a process of water remediation that uses three oxygen molecules (ozone) to displace petroleum based contaminants such as TCE (trichloroethylene). TCE is a highly toxic chemical solvent used to clean metal parts in large scale industrial facilities. It is also used in dry cleaning. This chemical is known to cause cancer, leukemia for example. TCE is

found in water world wide. By injecting ozone into the water, the TCE is displaced from the water where it can be removed rendering the water safer to use. A San Luis Obispo based company is marketing this process to private and government agencies. “Over the past few years there has been an emphasis by government agencies to develop new and innovative technologies for ground water remediation that are both efficient and cost effective. One of the new technologies, in situ ozone sparging, has emerged and is becoming a widely used technique. Ozone sparging involves injecting ozone into the groundwater through a microporous oxidation point that is placed below the water table. The injected ozone mitigates outward and upward through the ground water. As the ozone moves through the saturated region, chemical oxidation of the contaminants takes place” (h2oengineering.com). This is one example of mitigating negative water quality when water quantity is becoming increasingly scarce.

Environmental Planning and Transportation

As the population continues to grow, the need for sustainability within transportation increases. There are several options that are being explored within sustainable transportation models, and also decreasing the impacts on the environment when highways and railways are constructed. In California for example, the California Environmental Quality Act provides transparency within transportation projects. Proposed impacts to the environment with mitigation require the planner to take an educated look at the implications to natural habitats, before building. Communication between agencies regarding law and policy help for a smooth transition from EIR to completed project. New alternative transportation models are also being implemented such as ridesharing, high speed rail, and bicycle use. Market reforms are also being evaluated to address economic, social, and environmental problems that are associated with transportation use. These types of programs will help to meet Kyoto emission- reduction targets, reduce traffic congestion, decrease impact to environmental habitats, and minimize amounts of petroleum utilized.

Coordination between state and federal resource agencies to identify environmental impacts to a transportation project is becoming a priority. This aligns a project to be more productive in an environmentally sound manner. When conservation, restoration, and enhancement are part of the planning process along with joint coordination within agencies, the project will have a higher

sustainability outcome. Promoting this type of model will ensure more environmentally conscious employees. One way to implement this type of cohesiveness between agencies is to mention previous projects that have been successful in monthly newsletters within an agency. Promoting environmental policy used in projects and including other agencies involvement, recognition and support of the project increases inter-agency awareness and environmental awareness. For example (hypothetical), The California Department of Transportation completes a highway project that utilized an Environmental Impact Report highlighting mitigation of an existing stream. Department of Fish and Game were contacted for the mitigation and the project was successfully completed with a bridge that decreased environmental impacts to the stream. If a monthly newsletter was distributed throughout CalTrans highlighting the positive interactions with The Department of Fish and Game, along with awareness of the affected watershed environment including existing laws and policy, communications between agencies could be more efficient and educational.

Models for alternative forms of transportation that promote environmental compliance are becoming more common in the environmental planning practice. One example is part of the 2002 California General Plan Process and Sustainable Transportation Planning. Below is a table highlighting the principles of the document pertaining to sustainable planning process for transportation in California. Case studies were preformed in seven cities of California highlighting current transportation use, and future plans to create more sustainable solutions for the city's transportation needs.

Table ES-1. Transportation Sustainability Principles

Principle A: *Efficiently* and *equally* serve (be subordinate to) the community's comprehensive economic, environmental and equity goals. ***Example: All transportation projects shall be designed and implemented to facilitate and assist the County's Growth Management programs.***

Principle B: Promote self-sustaining (financing) systems wherein users (benefactors) pay the full costs of system construction, operation and expansion. ***Example: Downtown parking expansion should be funded by parking charges.***

Principle C: Promote and enhance more environmentally-friendly transportation modes (essentially any modes other than single-occupant autos). ***Example: The city will require comprehensive pedestrian and bicycle networks in all new neighborhoods.***

Principle D: Reduce use of and dependence on conventional automobiles. ***Example: Automobile traffic within the City's historic commercial districts shall be discouraged.***

Principle E: Reduce the need for travel in general. ***Example: To lower travel demand, new housing should incorporate infrastructure and provisions to facilitate telecommuting and other home-based work.***

Principle F: Make all transportation modes more environmentally sound, without attempting to change the market share of different modes. ***Example: Newly-purchased buses and other city vehicles should have lower emissions than the vehicles that they replace.***

(Lee, Richard W 2002; 9)

The General Plan is a great model for every city in California to emulate, unfortunately people are creatures of habit and are used to cheaper oil prices and automobiles. Many cities were made aware of sustainable transportation planning practices ten years ago with minimal environmental impact, but did little to try and mitigate potential problems and kept existing

transportation planning efforts to support taxpayers/constituents. Now with more expensive oil costs, emission standards, and depleted resources, taxpayers are being forced to look at alternative methods to transportation planning due to their dwindling pocketbooks. Oil prices are very high, and the convenience of driving a car daily is becoming lessened by this fact. A quote from the Transportation Planner of San Luis Obispo County sheds light on an all too common practice of Californian's. "A good General Plan can direct physical change but not behavioral change, However building infrastructure is easier than changing behavior, but it forms the base of transportation planning, and infrastructure alone is not sufficient. For example, you can create a bike lane but it might not be used" (Lee, Richard W 129). Now it is imperative to change old practices so as to conserve minimal resources, and to lessen environmental impacts for future generations. Another example of strategic transportation planning given the environmental constraints we are face with is the light rail train system.

"The High–Speed Rail Authority (HSRA) is committed to building a high-speed train system that minimizes impacts to the natural and built environment, encourages compact land development around transit stations, and helps California manage its pressing issues with climate change, traffic and airport congestion, and energy dependency" (www.cahighspeedrail.ca.gov). The California high-speed train also boasts a zero emission policy that will be the first of its kind in the world. The train would have an interior route from San Diego to Sacramento, with veins to coastal cities. One example of the cost of the 255 mile trip between Fresno and Los Angeles would be $38.00. The average cost by car is $49.00 and the CO2 saved per train trip would be 191.25lbs per person. The time it would take the train to travel between Fresno and Los Angeles would be 1 hr 24 min. The projects goal of zero emissions will require substantial energy to run.

Renewable energy technologies such as wind, solar, geothermal, and biomass are discussed as solutions to the high energy needs of the train. The train vein routes to the coast would be designed to follow existing highway projects so as to reduce potential environmental impacts. The project is being supported at the national level with President Obama signing a $2.25 billion stimulus package to the state of California in support of the high-speed rail project. President Obama supports the development of the first nationwide program of high-speed intercity passenger rail service. The money id funded from the American Recovery and Reinvestment Act (ARRA). The projected project completion date in California is September 30, 2017. This nationwide program will create new jobs in America, promote economic development for the future, decreasing the nation's environmental impact, and increasing the nation's ability to compete in the world (www.whitehouse.gov).

Market reforms for transportation sustainability to address economic, social, and environmental problems are projects worth exploring for planning projects. "Underpricing" is an example of a market reform that should be addressed in transportation planning. An example of "underpricing" is free nonresidential parking. When parking is encouraged, single care use is also encouraged. This does nothing to help the environment or the economy. If nonresidential parking was not free, it would force the single car driver to look at their behavior and possibly elicit change in habits. The money collected for the parking could be used to promote alternative energy needs and research. "Carsharing" is another market reform designed to help promote sustainability and mitigate environmental impacts. "Carsharing uses short-term pricing (hourly or daily rates) and locates vehicles in places that are convenient to access from residences. This gives consumers a convenient and affordable alternative to private ownership and encourages

more efficient travel. Motorists who carshare typically reduce their mileage by 50 percent, compared to owning a private vehicle" (National Research Council 13). "Traffic calming" reduces traffic speeds and volumes on certain roads promoting road safety, pedestrian and bicycle friendly environments, and community livability. Implementations of these types of reforms are often met with skepticism and ignorance which can make acceptance difficult. Community awareness of these types of programs highlighting the positive effects towards the environment and for future generations could promote these programs acceptance.

Land Use Development and Transportation Planning:

Land use development and transportation development are closely tied. Land use creates a need for transportation and increase in transportation facility generates further development. "When the interactions between land use in transportation are not managed well, unintended results can be dispersed development, loss of farmland, costly infrastructure, traffic congestion, environmental degradation, and community disinvestment"(www.nga.org). The holistic approach to Land planning relies on well thought transportation planning and hydrologic planning. Collaboration between lead agencies at the state and regional level promote local governments to make informed decisions in land use. Ride-sharing parking lots are one example of land development with transportation needs in mind.

Environmental Planning and Land Use Development

Managing growth, economics, the environment, and social stability are all integral parts to sustainable land use development. "California, the most populous state with 12% of the Nation's population in 1995, is expected to have 15 percent of the Nation's population by 2025"(www.census.gov). That means that California can expect 17.7 million more people. With the population increase, smart land planning will be necessary to create communities and cities that are functional to live and work in. When developing land, there are many factors that go into the planning process. These include but are not limited to; Drinking water quality/quantity, wastewater management, solid waste management, hazardous waste management, groundwater protection, floodplain zoning, wetlands protection, non-point source pollution, industrial wastewater management, and air quality. This is an overview of initial planning concerns. Environmental land planning is a complex symbiotic maze of systems that rely on each other in order to function efficiently. With environmental planning, zoning and planning basics are required to develop land, along with the understanding of working with nature to optimize land use.

Rural Land Planning

Environmental planning in rural land use projects will take many factors into consideration before any ground is ever broken. Population determines this very first step. This includes age, and income. Considerations of the natural surroundings, cultural and social aspects of the

community, economy, politics, and other unique characteristics of the potential project site all need to be assessed initially. The possibility of reserve natural resources in a protected green space, with growth in mind should also be in this initial planning phase. Zoning; allocation of land use for industrial, commercial, residential, and recreational purposes should be considered given the previous demographics. Infrastructure needs careful attention, given the types of services the community will provide; such as schools, hospitals, fire department, police stations, libraries, and environmental facilities. Other factors include economic growth, pollution prevention, and local government. This process will take many individuals who specialize in the certain fields' to develop an initial plan that works for the community. This will require many revisions to make the plan a reality, and the more community involvement/input the more value the community will have to its constituents. This is a model for managing community meetings, which values the input of the community members.

Techniques for Your Community Meeting

Many different techniques are available for helping a group define problems and agree on solutions. One of these is the Nominal Group Technique, developed by Dr. Andre Delbecq of the University of Wisconsin/Madison. It is designed to help a group of people from different backgrounds and experiences to clarify issues, achieve insights into complex problems, and come to a shared judgment. The technique allows the group to reach conclusions in just a few hours, and it ensures equal participation by preventing more outspoken participants from having too much influence in group decisions.

No special training is necessary to lead a group through the Nominal Group Technique. Materials for the method include paper, pencils, and 3x5 index cards for the participants, and a blackboard or flip chart for each group leader. The seven steps in the process are described below.

Step 1: Introduction and Statement of Task (5 to 10 minutes). On a flip chart, the coordinator writes the question that the participants are to respond to and briefly explains what is going to happen. Participants are then divided into groups of five to seven people with a leader assigned to each group. The coordinator can lead a group, or float between groups to ensure they are keeping on roughly the same schedule.

Step 2: Silent Generation of Ideas (10 to 20 minutes). Each person works silently and independently using paper supplied to list his or her own items in response to the statement of the task. The group leader can also participate.

Step 3: Round-Robin Listing of Items on Flip Chart (10 to 25 minutes). Each group member concisely states one item from his or her list. The group leader writes the item (*without* rewording) on the flip chart and assigns it a number. There is no discussion at this time. Do not be concerned if items appear to duplicate or overlap. Continue in round-robin fashion until all items have been covered.

Step 4: Discussion of Items (15 to 30 minutes). Each group member, in turn, clarifies one of the items he or she has listed on the sheet. Other members may ask questions about the item to be sure of its meaning. Do *not* combine items. This continues until each item has been discussed.

Step 5: Silent Listing and Ranking by Priority (5 to 10 minutes). On separate 3x5 cards, each group member lists, by name and number, 10 of the items that he or she considers most important from the total list. Group members then rank the items according to their personal priorities and write a large number 10 (for 10 points) on the corner of the card that has the highest priority; 9 (for 9 points) on the next, and so forth for all 10 cards. The group leader collects the cards and has someone help record directly on the flip chart the number of votes each item received. The number of votes received for each item is tabulated.

Step 6: Discussion of Vote (10 to 15 minutes). The group discusses the results of the vote. If necessary, the group members can get additional clarification about the meaning of individual items.

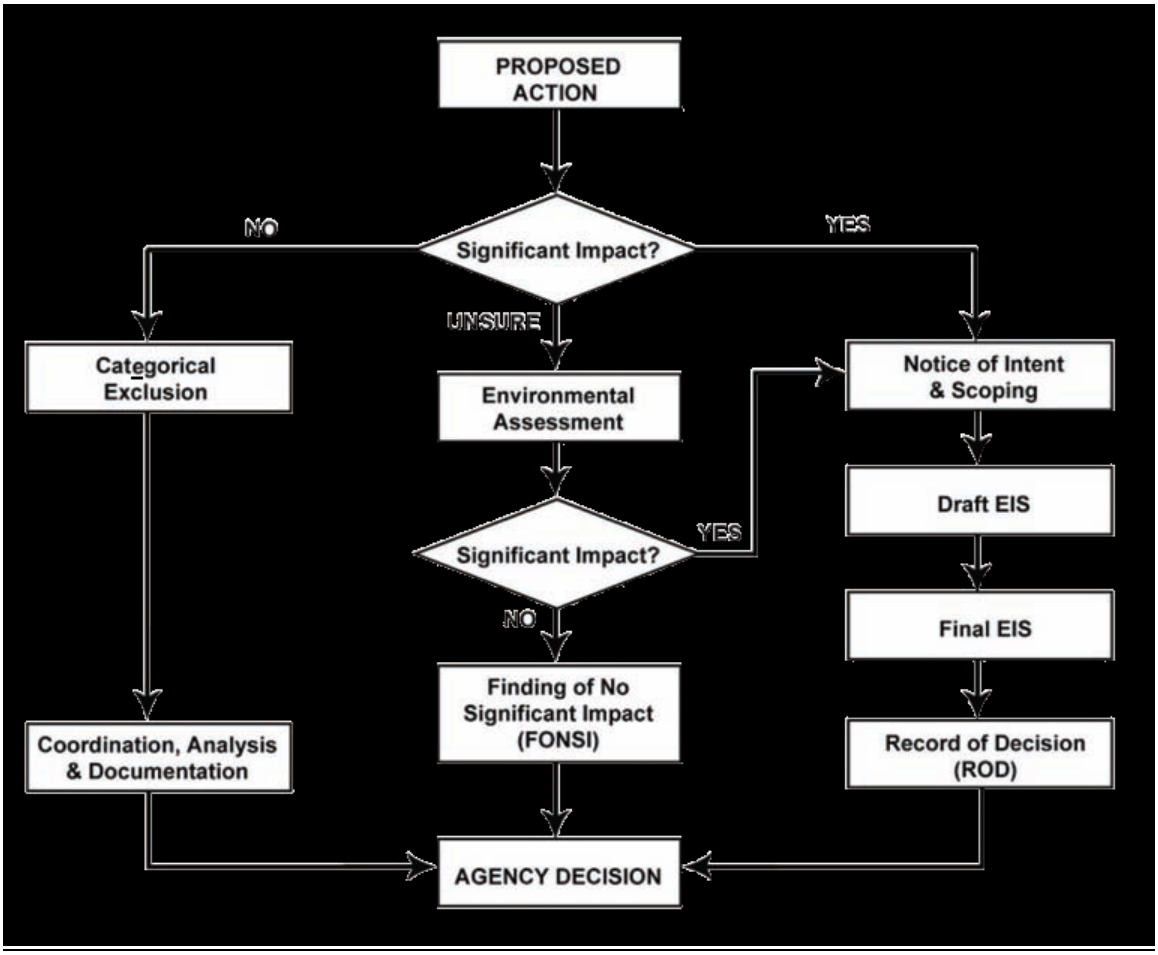
Step 7: Silent Re-Ranking of Items (5 to 10 minutes). Using the same procedure as in Step 5, re-rank those 10 items which received the highest total scores. *Remember,* use the number 10 for the highest priority item and the number 1 for the lowest priority item. The group leader and his or her assistant collect the cards, record the number of votes each item received, and tabulate them. If there is more than one group, each group leader turns in the completed flip chart and the 3x5 cards to the coordinator.

Many other methods exist for reaching agreement in a group. (See *Effective Meeting Skills: A Guide for More Productive Meeting,* by Marion E. Haynes, Crisp Publications, Inc., 95 First Street, Los Altos, CA 94022.) Choose or design a discussion or voting technique that fits your particular meeting goals and needs.

(www.epa.gov)

After an initial plan has been approved by community members, environmental standards can be applied. Environmental compliance with state regulatory officials will take time and multiple re-evaluations. Again, specialists within the fields that make up the land use planning project will

need to tighten their pieces of the puzzle to fit the compliance ordinances. This map outlines the guidelines for environmental compliance.



(www.planning.dot.gov)

An Environmental Assessment will initially be prepared when the project site is being considered for development. A draft EIS will be constructed if any significant impacts to the environment are going to occur upon development. "An Environmental Impact Statement (EIS) is a detailed statement prepared by the federal lead agency describing a proposed project, its significant environmental effects, mitigation measures, and alternatives" (Herson and Lucks 2008). When the Record of Decision is cleared with an agency decision (providing mitigation

has been completed), the project has the green light from the feds. State and county agencies may require their own Initial Study, or Environmental Impact Report that also is required to be drafted and approved.

Funding is a big issue in environmental land planning projects. Questions that must be answered are; will revenues be sufficient in the community to afford the plan and required environmental mitigations? If the community continues to grow, will the revenue be sufficient to afford the green space and sustainable services that are part of the initial plan? An additional positive outcome to an Environmental Assessment is to acquire a realistic view of land development, and the costs associated. An initial study provides transparency in a project, allowing for appropriate funding.

Urban Land Planning

Building cities with environmental sustainability in mind seems far reaching. The reality is that often times, community is closer in the city, and if it can be nurtured into a co-operative environment, sustainability is in close reach. A model for building sustainable cities comes from Paolo Soleri's "Ecopolis Design Principles"

1. Restore degraded land.
2. Fit the bioregion.
3. Balance development.
4. Halt urban sprawl.
5. Optimize energy performance.

6. Contribute to the economy.
7. Provide health and security.
8. Encourage community.
9. Promote social equity.
10. Respect history.
11. Enrich the cultural landscape.
12. Heal the biosphere.

(Register 2002; 174)

Cities incorporating these principles may be able to transform an energy sucking, pollution filled, despoiled environment into a supportive cultural haven. “The well formed city is a kind of economic/social machine of very high efficiency. People live in cities partly because the very structure of the city means that they can get more done there with less energy, effort, time, and financial cost”(Register 2002; 58). Combining the two ethics would seem to be the natural progression.

Growing populations, expensive energy, limited oil, and contaminated water along with climate change is what will alter the existing city and urban sprawl in the future. Humanity will be forced to make changes, which should have happened four decades ago. Renewable energy sources are being researched and put into use on a large scale, but big enough yet to release the reigns of oil. Many of the renewable energy sources are expensive to extract and research, making the model for cooperative living in cities more beneficial.

Conclusions

The need for more sustainable living practices has come four decades late. Environmental Planning is a resource tool that can be used to help plan for our future in a way that will not deplete our natural resources, will promote cooperative living, and utilize less energy. By understanding the natural biosphere that is being developed, the ability to plan development becomes intrinsic with the environment. This process will create more value to the land and the community members. If the land has more value to the community, it is more likely to be nurtured and cared for; thus prolonging its life for future generations. I hope this paper gave some valuable insight into a few environmental planning practices that can be used, expanded upon, and researched further.

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