



Infrastructure
STRATEGY
For Iowa's Future Economy

Natural Resources
Sector

REPORT & RECOMMENDATIONS

February 2010

Table of Contents

Acknowledgements 3

Sector Committee Members..... 4

Introduction..... 5

Executive Summary 6

Iowa’s Future Economy 8

The Issues..... 10

Recommendations 15

Infrastructure Planning Process 20

Conclusion..... 23

Supporting Documents 24

Acknowledgements

The Natural Resources Sector Committee acknowledges the work and contributions of each committee member through sharing of expertise, opinions, information, and discussions over the course of four meetings. The Committee would also like to thank Richard Leopold, Director of the Iowa Department of Natural Resources for his leadership as Committee Chair.

The Committee appreciates the time and expertise shared by Dr. Rick Cruse, Iowa State University, Department of Agronomy, for his presentation, “Carbon 101 – Carbon Essentials.” Appreciation is extended to Fr. Bud Grant, for his work to develop a common definition of ecosystems that was utilized by the Committee.

Thanks are also due to the many stakeholders around the state and to the members of the other four Sector Committees who lent their ideas, comments, and expertise to the work of the Natural Resources Sector Committee.

The work of the Sector Committee was managed by the Iowa Department of Economic Development and made possible through funding and support provided by the U.S. Department of Commerce, Economic Development Administration.

Planning process facilitation, staffing, and management were provided by State Public Policy Group, Inc. – SPPG of Des Moines. www.sppg.com

Sector Committee Members

Richard Leopold, Iowa Department of Natural Resources, Des Moines (Chair)

Thomas W. Hart, Iowa Department of Economic Development, Des Moines (Project Director)

Mark Ackelson, Iowa Natural Heritage Foundation, Des Moines

Lori Beary, Iowa Finance Authority, Des Moines

Don Brazelton, Iowa Association of County Conservation Boards, Ankeny

Dee F. Bruemmer, Scott County, Davenport

Tom Buman, Agren, Inc., Carroll

Liz Christiansen, The University of Iowa, Office of Sustainability, Iowa City

Chuck Corell, Iowa Department of Natural Resources, Des Moines

Bill Ehm, Iowa Department of Natural Resources, Des Moines

Chuck Gipp, Iowa Department of Agriculture and Land Stewardship, Des Moines

Bud Grant, Saint Ambrose University, Davenport

Bill Menner, USDA Rural Development, Des Moines

Matt O'Connor, Iowa Pheasants Forever, Hopkinton

Ted Payseur, Veenstra & Kimm Incorporated, West Des Moines

Don Peterson, Iowa Farm Bureau, West Des Moines

Dan Rasmussen, Iowa Chapter Land Improvement Contractors, Independence

Marian Riggs Gelb, Iowa Environmental Council, Des Moines

Gerry Schnepf, Keep Iowa Beautiful, Des Moines

Sherry Timmins, Iowa Department of Economic Development, Des Moines

Introduction

Iowans have high expectations for a strong economy, good jobs, and a future of opportunity. Setbacks came in 2008 with the summer disasters followed by the national recession and significant impacts on Iowa's infrastructure. Even while addressing those challenges through the influx of federal and state short-term funding for jobs, infrastructure, disaster recovery, and other broad needs, Iowans must also give significant consideration of the vision for the future economy and the infrastructure it will demand. Interested Iowans statewide will find in this report a set of recommendations and a strategic direction for the Natural Resources sector.

Natural resources was the subject of deliberations over a four-month period by a diverse array of Iowans who contributed their expertise, experience, and perspectives on the future economy and the natural resources infrastructure that will be required to meet those needs. Because the report was developed by stakeholders from across the state, it reflects and has future application to diverse stakeholders including the private sector, issue-based groups, nonprofit organizations, academia, and local and state government.

Natural resources create the foundation to support Iowa's infrastructure and economies. Iowa's natural resources such as soil, water, and air, all have limited capacities and must be strategically managed to support communities and businesses alike. In addition, natural resources infrastructure such as trails, parks, rivers, and lakes are integral to creating an environment that will attract and retain a vibrant and diverse workforce in our state. The consensus work of the Natural Resources Sector Committee directly addresses how the demands of our future economy can be balanced with the limited supply and capacity of our natural resources infrastructure.

This report does not stand alone, however. As part of a comprehensive and coordinated statewide planning initiative, the recommendations and insights on the Natural Resources sector will be considered by a Task Force, along with similar reports on infrastructure needs for the future economy in buildings and vertical infrastructure, energy, telecommunications, and transportation. The ideas and recommendations contained in the five reports and the coordinated plan reflect the involvement and engagement of more than 200 Iowans over a span of nine months. From those deliberations, a strategy for Iowa's future economy was developed on behalf of and for all stakeholders. It is the hope of the Natural Resources Sector Committee that policymakers, community leaders, business and industry, and others find ways to implement or support the recommendations of this sector report and those of the coordinated Infrastructure Strategy for Iowa's Future Economy.

Executive Summary

Iowa's natural resource infrastructure is integral to the quality of life and economic health of the state. In considering elements of the sector that cut across the four other sector groups (building and vertical infrastructure, energy, telecommunications, and transportation) issues identified by the Natural Resource Committee define critical considerations that must be addressed in making infrastructure and economic development decisions.

The Natural Resource Sector Committee defined the sector based on five integral components of natural resources infrastructure:

- Soil
- Water
- Air
- Ecosystems
- Culture

Each component was evaluated in terms of supply, demand and the impact that community and business needs place on each resource. The following priority issues were identified under each component of natural resources infrastructure:

Soil

- Iowa must enhance the long-term productive capacity and retention of top soil to ensure the viability of Iowa's economy and agricultural industries.
- Water infiltration and the absorptive capacity of soil must be increased to improve the ability to hold water, reduce the effects of flooding and decrease the levels of sediments, nutrients and bacteria in our water systems.

Water

- Iowa must evaluate and manage its water resources for sustainable yield.
- Iowa must promote and implement source water protection for public water supplies.
- Iowa must maintain viable wastewater infrastructure to protect the public's health and comply with federal water quality standards.
- Iowa must assess, prioritize, and coordinate watershed plans to protect public health and meet federal water quality standards.
- Urban storm water management practices must be developed to address local flooding and water quality issues.

Air

- Iowa must be prepared to meet current and future federal air quality standards to protect the public's health.

Ecosystems

- Iowa must consider the impact on ecosystems when making land use planning, infrastructure, and development decisions.

Culture

- Iowa must make the state more attractive to a vibrant and diverse population.
- Iowa must create connections between the public and outdoor activities to help increase the funding, care and volunteering necessary to protect our public areas.

To address these issues, the Natural Resource Sector Committee has made the following six recommendations to ensure that Iowa's infrastructure works to support the state's economic viability, competitiveness, sustainability, and quality of life now and in the future. The recommendations were developed in response to priority issues and should be considered as a whole, with each viewed as critical by the Committee to ensure a strong future economy for Iowa.

1. Increase organic carbon levels in soil.
2. Manage watersheds and water resources to sustain quality and quantity necessary to meet community, business and ecological uses.
3. Manage watersheds and floodplains to reduce the impacts of flooding.
4. Implement practices to ensure Iowa's air will meet new federal public health and welfare standards.
5. Require that the impact on ecosystems be determined and considered in infrastructure planning and development.
6. Create opportunities to increase the use, enjoyment, and appreciation of Iowa's natural and cultural heritage.

These issues and recommendations are further described in the following report, along with the context for planning, elements of Iowa's future economy, and a description of the process that resulted in these recommendations. The work of the Natural Resources Sector Committee, along with the Building and Vertical Infrastructure, Energy, Telecommunications, and Transportation Sector Committees, will be forwarded to a Task Force with combined membership for integration and development of an infrastructure strategy for Iowa's future economy.

Iowa's Future Economy

There is no crystal ball to predict exactly what Iowa's economy will be like in 2020 and beyond, but there are indicators and, certainly, steps that can be taken to shape the economy as Iowa recovers from the dual challenges of the 2008 disasters and the national recession. The Infrastructure Strategy for Iowa's Future Economy initiative was designed to work from a common understanding of Iowa's current economy and forecast of economic factors in order to establish some strategic direction for the state. Essential elements of the future economy were identified from this information and from the deliberations of the participants in the process. This section highlights the foundational premises of the Sector Committees and Sector Chairs Group that guided their work.

Essential Elements of the Future Economy

Iowa's economy of the future can benefit from and faces challenges because of the disasters and the recession. Iowans have vowed to come back from adversity stronger than ever. The future holds opportunity for innovative and strategic thinking, which tend to be a departure from day-to-day challenges of our infrastructure. In early discussions, each Sector Committee and the Sector Chairs Group worked to identify how Iowa's economy can build upon current short term investments to grow stronger and more globally competitive.

Eight essential elements of the future economy were identified by the Sector Committees and the Sector Chairs Group. The essential elements were used by the Sector Committees to guide and measure their work and recommendations against the vision for Iowa's economic future.

The Essential Elements of Iowa's Future Economy are:

- Smart growth
- A diversified economy that ensures a strong agricultural sector
- A skilled workforce for quality jobs
- Environmental stewardship
- Iowa-based energy solutions
- An economy that is globally competitive
- A population that chooses to live and work in Iowa
- Realistic funding for new and maintenance of infrastructure

Iowa's Current Economy and its Impacts

In the current environment of Iowa in 2010, a number of trends are affecting the state's economy. The following factors are taken from data provided to the Committees by David Swenson, a Research Scientist with Iowa State University's Department of Economics. First, the population of Iowa is shifting from rural to urban areas. Two other factors include the aging population and the baby boomer generation nearing retirement age. There has been an increase in the outmigration of young workers to other states, and population growth in Iowa has been due to increases in immigrant and minority populations in the state.

Due to the economic recession and the scaling back or closing of significant numbers of manufacturers across the state, non-metropolitan Iowa is losing both jobs and Iowans between ages of 25 and 44, which also has an echo effect of population loss in the under-20 category, reflecting children of those 25-44 year-olds. Iowa's unemployment rate, which has typically

remained relatively low, may start to have a structural upward shift. The rural housing stock is deteriorating, and economic vitality is concentrated in a relatively few areas. Additionally, tax capacity in non-metropolitan communities is rapidly eroding, due to population shifts and loss of manufacturing employers. However, rural energy opportunities such as biofuels and wind, are evolving.

Iowa in 10 Years

Swenson predicts that in ten years, Iowa will see the results of current trends in population, namely, that there will be fewer people in non-metropolitan areas, more investment and growth in metropolitan areas, and the continued outmigration of young and working-age people. He notes that regional trade centers, called micropolitan communities (populations of 10,000 – 50,000), will be mostly stable, but not growing. The sectors that will lead in job demand will be business, personal care, education, and health services. Although Swenson downplays the role of energy production in rural resettlement, the Sector Committees identify the energy industry's crucial role in the future economy of Iowa as a significant contributor to the overall rural economy and its potential to be a mitigating factor in further rural depopulation. Swenson predicts that manufacturing will still be important, but the number of jobs will have decreased, and the manufacturing businesses that remain will be those with the most efficient and productive processes.

It is clear that action taken to shape Iowa's future economy will be key determinants in the success of the state. As technology develops, energy and telecommunications infrastructure will be critical to the state's competition in a global economy. Additionally, transportation, buildings, and vertical infrastructure will remain fundamental for moving and storing goods and services and supporting Iowa's workforce. Finally, natural resources will be essential to the state's continued economic success within the agricultural, industrial, and business sectors. All sectors are integrated and mutually dependent. The work of the planning initiative is to harness the opportunities of these critical sectors. When people come to live and work in Iowa, it will be because of Iowans' anticipation of the coordinated natural resources, transportation, buildings and vertical infrastructure, energy, and telecommunications infrastructure to support a robust economy.

The Issues

Sector Scope and Definition

Natural Resource infrastructure is incredibly broad and challenged the sector committee in defining the scope of the term. Committee members indicated that natural resources encompass Iowa's raw materials such as soil, water and air, but also includes physical infrastructure such as parks, trails and lakes; plants, wildlife and livestock; as well as public attitudes and practices such as conservation, land use or even driving habits. Following considerable discussion, committee members determined that the most appropriate manner to approach natural resource infrastructure is to define the term based on the following five components:

- Soil
- Water
- Air
- Ecosystems
- Culture

Soil

Agriculture is a large part of Iowa's economy. According to a study conducted by Dan Otto of Iowa State University Extension, agriculture represents approximately 27% of Iowa's overall economy. Further, Iowa has among the nation's highest percentage of land in cultivation and ranks 49th in the nation in the percentage of land in public ownership, according to the Natural Resources Council of Maine's report, *Public Land Ownership by State*. Given these facts, land use decisions in the state are largely driven by private land owners engaged in agriculture. Soil, as a natural resource and a vital part of the state's infrastructure was discussed at length. Issues considered under the category of soil include soil quality, such as water filtration, levels of organic matter, soil structure and carbon sequestration. Additional soil issues include soil and crop productivity, water and wind erosion, farming practices, and chemical management. Iowa's reliance on a strong agricultural economy, floodplain management, land use, and urban sprawl were also critical to the discussion on soil as it relates to Iowa's infrastructure and economies.

The Natural Resources Sector Committee identified the following priority issues related to soil:

- Iowa must enhance the long-term productive capacity and retention of top soil to ensure the viability of Iowa's economy and agricultural industries.

In addition to the production of food, emerging industries such as the production of some Iowa-based fuels (corn ethanol, cellulosic ethanol, biodiesel, etc.) also rely heavily on the long-term productive capacity of Iowa's rich soils. Efforts should be made to ensure the long term productive capacity of Iowa's soil is enhanced.

- Water infiltration and the absorptive capacity of soil must be increased to improve the ability to hold water, reduce the effects of flooding and decrease the levels of sediments, nutrients and bacteria in our water systems.

Dr. Rick Cruse of Iowa State University reports that Iowa's soil has lost up to 50% of its organic matter. According to Cruse, much of Iowa's crop soil has low organic matter, low infiltration and is susceptible to erosion. Increasing the absorptive capacity of soil would improve the ability to hold water where it falls, reducing soil loss and the effects of small to moderate sized floods in both rural and urban areas. In addition, clean water is vital to the health and wellbeing of our ecosystems. Clean drinking water and clean rivers and lakes are both necessities to our health and are quality of life issues that ensure Iowa remains an attractive option for vibrant and diversified populations. Further, the health of Iowa's ecosystems is largely reliant on having sources of clean water. Improving the ability of water infiltration in soil can help decrease levels of sediments, nutrients and bacteria – the three main categories of water pollution.

Water

Water infrastructure was defined by the sector committee to include issues of water quality and water quantity. Water quality included discussion on source water protection, drinking water quality, point and non-point pollution, federal clean water standards, watershed management and addressing the state's impaired waters. In addition, the state of waste water infrastructure in Iowa's communities was also considered. The discussions on water quantity included issues of adequate and excessive amounts of water. Issues including surface water erosion, controlling the flow of water, land use policy, agricultural practices and coordination of watershed plans were all considered. In addition, there was significant discussion on the water quantity needs of Iowa's communities and businesses including farming, energy, manufacturing and other vital industries in the state.

The Natural Resources Sector Committee identified the following priority issues related to water:

- Iowa must evaluate and manage its water resources for sustainable yield.

The climate and geography in Iowa are unique in that adequate annual rainfall amounts and access to adequate water supplies to support Iowa's industries are rarely an issue. However demand for adequate water supplies could change due to industry needs, climate changes, demand for water in other parts of the country or other unforeseen changes. As a state we must not take our water resources for granted. Water resources needed to support people and industries in the state must be evaluated and managed to ensure sustainable yields can be achieved now and in the future. Sustainable yields as defined by the natural resources sector is the condition attained when the quantity and quality of available water resources are sufficient to meet current and future community, economic, and ecosystem needs. It represents a long-term balance between resource conditions (supply) and beneficial uses (demand).

- Iowa must promote and implement source water protection for public water supplies.

Clean drinking water and clean rivers and lakes are essential to our health and are quality of life issues that ensure Iowa remains an attractive option for college graduates and working professionals. Further, the health of Iowa's ecosystems is largely reliant on having sources of clean water. Protecting water at its source from the ground, streams, rivers, springs or lakes in a watershed is vital to maintaining clean public water supplies.

- Iowa must maintain viable wastewater infrastructure to protect the public's health and comply with federal water quality standards.

As a state, much work is needed to ensure bodies of water in Iowa meet federal water quality standards. A critical step to reaching federal compliance is maintaining a viable wastewater infrastructure. Many communities across the state lack the economic resources necessary to bring their local wastewater infrastructure into compliance. Communities must make decisions to invest in local wastewater infrastructure to protect the health and wellbeing of the public and to ensure compliance with federal regulations.

- Iowa must assess, prioritize, and coordinate watershed plans to protect public health and meet federal water quality standards.

Needs and priorities must be assessed and developed for Iowa's watersheds. Coordination between watershed improvement plans and local water drainage districts will be necessary in order to bring Iowa's bodies of water within current and future federal water quality standards. Iowa has over 3,300 water drainage districts. Currently drainage districts are not federally regulated, however this change will likely be realized in the future. Improved coordination between local water drainage districts and regional and state efforts to improve watersheds is needed.

- Urban storm water management practices must be developed to address local flooding and water quality issues.

Coordinating urban storm water management with drainage district decisions and watershed improvement plans would further enhance efforts to address local flooding and water quality issues. Urban storm water management, including the adoption of alternative storm water management best practices must be a priority.

Air

Issues considered by the sector committee during discussions on air focused on issues of quality and capacity. Discussions on air quality included issues such as new changes to federal clean air standards, regional haze, non-attainment (exceeding allowable pollution standards), local and regional air pollution contributors and climate change. Public attitudes and practices such as driving habits, urban sprawl and energy use were also discussed. The carrying capacity of air as it relates to Iowa's agricultural and industrial needs was also a key point of discussion.

The Natural Resources Sector Committee identified the following priority issue related to air:

- Iowa must be prepared to meet current and future federal air quality standards to protect the public's health.

Federal air quality standards are changing rapidly. Nitrogen dioxide, sulfur dioxide, ozone, lead, and carbon monoxide standards are currently being re-evaluated. As federal standards become more stringent, the state will be forced to act quickly. Parts of the state may exceed allowable pollution standards, known as non-attainment. Once non-attainment has been reached, state and local governments must develop and implement a plan on how areas will attain and maintain federal clean air standards. Implementation of a plan to address non-attainment could adversely affect state and local economies if business, industry, and consumer practices are

forced to change immediately. As a state, Iowa must be proactive to ensure non-attainment is not reached. Energy planning, industrial growth, plant location, and supply chain logistics all play a critical role in improving the quality of Iowa's air. Further, smart growth practices and transportation planning in our communities also have a large effect on the quality of air. Coordination between business and industry developments, infrastructure investments and consumer activities will be required to ensure the health and wellbeing of Iowans are protected.

Ecosystems

The sector committee defined ecosystems by function, structure, and human impact. Issues considered as a function of ecosystems include climate, geography, topography, flora, and fauna that provide ecological services to one another. Issues considered as structures within an ecosystem include genetic diversity and the balance within and among species adjusting to ecological conditions in the state. The discussion of human impact on ecosystems encompassed environmental services, comprehensive land use planning, water quality, air quality, smart growth, agricultural practices, and the effects Iowa's vital industries such as agriculture, manufacturing, and energy have on Iowa's ecosystems.

The Natural Resources Sector Committee identified the following priority issue related to ecosystems:

- Iowa must consider the impact on ecosystems when making land use planning, infrastructure, and development decisions.

Iowa's ecosystems are at risk. Many factors including cost, access to energy, transportation routes, sewer and water infrastructure, and many others are considered when making development and infrastructure decisions. However, one critical factor is often overlooked – what is the impact on ecosystems as a result of the proposed development? A process for identifying the impact on ecosystems for state funded infrastructure developments, or local and privately funded urban, industrial, and agricultural developments should be created.

Culture

The sector committee's discussion on culture included issues such as public attitudes on energy conservation, recycling, lands restoration, and other practices that impact our natural resources. Discussion on culture also encompassed cultural traditions in Iowa such as farming, hunting, and an appreciation for the outdoors. Quality of life issues such as the availability of trails, parks, public areas, clean lakes and rivers, and clean air were also a focus of the discussion.

The Natural Resources Sector Committee identified the following priority issues related to culture:

- Iowa must make the state more attractive to a vibrant and diverse population.

Access to trails, parks, public lands, and other outdoor areas help provide a high quality of life. In addition resources such as clean air, water, lakes and rivers also help to create an attractive environment to retain and attract professionals. Demographics and populations in Iowa are shifting. The population of Iowans over the age of 60 is increasing and many in the baby boomer generation are nearing retirement. Iowa is also experiencing an outmigration of young workers who will be raising our future generations. Further, Iowa is working hard to position itself as a

home for emerging industries with high paying jobs. As a state, Iowans must do all that is possible to enhance the beauty of our communities and outdoor areas. In addition, clean resources such as clean air, water, lakes and rivers will also help create a wonderful home to retain and attract a vibrant and diverse population.

- Iowa must create connections between the public and outdoor activities to help increase the funding, care and volunteering necessary to protect our public areas.

Iowa's heritage is connected strongly to the outdoors from agriculture to hunting, fishing, biking and other outdoor activities. Further, our trails, parks and public lands are a wonderful attraction for residents and tourists around the world. Unfortunately federal, state, and local funding for our public outdoor attractions is woefully inadequate. According to the Sustainable Natural Resource Funding Study mandated in HF 2792 by the Iowa General Assembly in 2006, Iowa ranks 49th of 50 for agriculture and natural resource funding. More opportunities are needed to connect residents and tourists with Iowa's natural and cultural heritage to help increase the funding, care, and volunteering necessary to protect our public areas.

Relationships to Other Sectors

Natural Resources are integrated into the interests and work of the other sectors involved in this planning effort. In many ways, the priority issues identified by the Natural Resource Committee define critical considerations that must be addressed to make infrastructure development decisions. All of our natural resources are limited in quantity and capacity and must be managed to protect the public's health. Soil has a limited productive capacity to support agriculture. Soil also has a limited absorptive capacity to control surface water runoff. In addition there are limitations in the ability of soil to infiltrate surface water. As a result, the issues the Sector Committee identified regarding soil, address strategies to maximize capacities of soil that will support the sustainable production of crops, reduce the effects of local flooding, and improve the quality of source water. Clean water is also a limited resource. Infrastructure investments, urban planning, business and industry needs, and other economic decisions will have an impact on the demand for a limited resource. Sector Committee issues focus on responsibly managing our water resources and working to improve the quality of water in Iowa. Responsible management also includes strategies to control excess amounts of a resource. The Sector also identified issues and recommendations to reduce the effects of flooding, which in turn protects our state's infrastructure systems. Like soil and water, air also has limited capacities that must be managed to protect the public's health and ensure the viability of Iowa's businesses and industries. Issues identified by the Sector related to air address appropriately managing the capacity of air, ensuring federal public health standards are not exceeded, and businesses and industries are able to operate sustainably.

Issues related to ecosystems recognize that all land use planning, infrastructure, and development decisions have an impact on ecosystems. Impacts on ecosystems are not necessarily negative or positive, but must be measured and addressed to ensure balance within an ecosystem is maintained. Culture is also vital to the future of Iowa's economies. Issues identified by the Sector related to culture address strategies to embrace Iowa's outdoor heritage and promote a quality of life that is attractive to a vibrant and diverse workforce. High growth industries will only be developed in Iowa if a healthy and active lifestyle also can be supported.

Recommendations

The Natural Resource Sector Committee has put forward the following six recommendations to ensure that Iowa's infrastructure works to support the state's economic viability, competitiveness, sustainability, and quality of life now and in the future. The recommendations developed in response to priority issues should be considered as a whole, with each viewed as critical by the Committee to ensure a strong future economy for Iowa. As part of discussions, the Natural Resources Sector Committee emphasized the importance of future economic development, disaster recovery, and the application of the recommendations across planning sectors of Buildings and Vertical Infrastructure, Energy, Telecommunications and Transportation. These considerations, as well as context and explanations identified by Natural Resource Sector members are outlined below.

1. Increase organic carbon levels in soil.
2. Manage watersheds and water resources to sustain quality and quantity necessary to meet community, business and ecological uses.
3. Manage watersheds and floodplains to reduce the impacts of flooding.
4. Implement practices to ensure Iowa's air will meet new federal public health and welfare standards.
5. Require that the impact on ecosystems be determined and considered in infrastructure planning and development.
6. Create opportunities to increase the use, enjoyment, and appreciation of Iowa's natural and cultural heritage.

Context and Explanation of the Recommendations

Recommendation 1: Increase organic carbon levels in soil.

The Natural Resources Sector committee believes that increasing organic carbon levels in soil will address two key priority issues identified by the Sector Committee. Firsthand, increasing organic carbon levels will enhance the long-term productive capacity and retention of top soil. Secondly, increasing organic carbon levels in soil will improve the water infiltration and absorptive capacity of soil.

Agriculture remains a key component of Iowa's economy, representing approximately 27% of Iowa's overall economy, as reported by Dan Otto, Iowa State University Extension. In addition to the production of food, emerging industries such as the production of some Iowa-based fuels (corn ethanol, cellulosic ethanol, biodiesel) also rely heavily on the long-term productive capacity of Iowa's soils. Unfortunately much of Iowa's topsoil is lost each year due to water and wind erosion, affecting the productive capacity of soil and the quality of water in Iowa's lakes,

rivers and streams. Further, Dr. Rick Cruse of Iowa State University's Agronomy Department reports that Iowa's soil has lost as much as 50% of its organic matter. Soil with low levels of organic matter reduces infiltration capacity and is more susceptible to erosion further exacerbating the loss of topsoil. Increasing organic carbon levels in soil will increase infiltration and reduce erosion. If agriculture is going to remain a key component of Iowa's economy, sustainable practices to increase organic carbon levels must be utilized. Further, emerging industries such as the production of Iowa-based fuels will also require sustainable practices that increase organic carbon levels.

Increasing organic carbon levels will also improve water infiltration of soil. Sediments, nutrients, and bacteria are the primary categories of water pollution. Improved water infiltration in soil will help to decrease levels of all three water pollutants. Clean drinking water and clean rivers, lakes and streams is both a necessity to public health, and the health of our ecosystems. In addition, clean water enhances the quality of life in Iowa, presenting our state as an attractive home for a productive workforce. Further, raising organic carbon levels will increase the absorptive capacity of soil and improve the ability to hold water where it falls. Increasing absorptive capacity of soil will reduce the loss of top soil and reduce the effects of small to moderate sized flooding in rural and urban areas.

In a heavily cultivated state where land use is largely determined by private land owners, it will be imperative that agricultural practices embrace efforts to increase organic carbon levels. No-till practices, use of cover crops, crop rotation, filter strips, restoring wetlands, and enrolling acres in the federal conservation reserve program (CRP) are all practices that will help increase organic carbon levels in soil. Utilizing green spaces, enhancing the tree canopy, utilizing smart growth principles, and storm water best management practices will help increase the organic carbon levels of soil in urban areas.

Recommendation 2: Manage watersheds and water resources to sustain quality and quantity necessary to meet community, business and ecological uses.

The demand for clean water is increasing across the nation. Iowa is blessed in that adequate water supplies to support Iowa's communities and industries are rarely an issue. However, the demand for adequate water supplies could change due to industry needs, climate change, regional demand across the county, or other unforeseen changes. Adequate water supply is rarely a consideration in the process of determining infrastructure and development decisions. Industries in Iowa such as the production of energy, agriculture, manufacturing and transportation all place demands on a limited supply of water. As the demand for water increases, water resources to support communities and industries in the state must be evaluated and managed to ensure sustainable yields can be achieved now and in the future. Federal, regional and local coordination of watersheds will be required to ensure a long-term balance between water resources (supply) and beneficial uses (demand).

There are many components to creating clean supplies of water in the state. Firsthand, it is important to acknowledge that federal water quality standards are changing. Not only will federal water quality standards continue to become more stringent, greater coordination will be required across watersheds and the components that make up a watershed such as tributaries, wetlands, drainage districts, floodplains, and wastewater infrastructure. Iowa must assess, prioritize, and coordinate watershed plans to meet changing federal water quality standards.

Creating clean water supplies starts with the promotion and implementation of source water protection practices. Protecting water at its source from the ground, streams, rivers, springs or lakes in a watershed is vital to maintaining clean public water supplies. In addition viable wastewater infrastructure must be maintained. Many communities across the state lack the economic resources necessary to bring their local wastewater infrastructure into compliance. It is often said that a system is only as strong as its weakest component. Inadequate wastewater infrastructure is a critical contributor to source water pollution. Communities must make decisions to invest in local wastewater infrastructure to protect the public's health and to ensure compliance with federal regulations.

Appropriate management of watersheds and water resources will ensure adequate clean water supplies are available to meet the needs of Iowa's communities, businesses and ecosystems. Clean drinking water and clean rivers and lakes are a necessity to the public's health and the quality of life available in Iowa's communities.

Recommendation 3: Manage watersheds and floodplains to reduce the impacts of flooding.

The prevalence of all sizes of floods (small, moderate, and large) has increased in Iowa and the Midwest. Land use decisions, agricultural practices, storm water management, the absorptive capacity of soil, snow and rain accumulation, and many other factors contribute to flooding. Although many causes of flooding cannot be managed, some can. As a state, Iowa must manage its watersheds and floodplains to reduce the impacts of flooding. Decisions on how to manage watersheds and their components such as drainage districts, flood plains, wastewater infrastructure, headwaters, surface runoff and many other integral parts of a watershed must be prioritized and managed to reduce the impacts of flooding. Urban planning to reduce the impacts of flooding must also be integrated into the management of watersheds and floodplains. Specifically, urban storm water management practices must be developed to address local flooding and water quality issues. Coordinating urban storm management with drainage district decisions and watershed improvement plans would further enhance efforts to address local flooding and would assist efforts to improve water quality. Although some flooding is inevitable, Iowa must manage its watersheds and floodplains to reduce the devastating physical, emotional, and economic impacts flooding leaves behind.

Recommendation 4: Implement practices to ensure Iowa's air will meet new federal public health and welfare standards.

Iowa must be prepared to meet current and future federal air quality standards. Currently, federal standards for nitrogen dioxide, sulfur dioxide, ozone, lead, and carbon monoxide are being re-evaluated. As federal standards change, the state will be forced to act quickly to ensure that non-attainment is not reached. If non-attainment is reached in Iowa, state and local governments will be required to develop and implement a plan on how areas will reach and maintain federal clean air standards. The effects of implementing non-attainment plans could be devastating to Iowa's economy and wellbeing. Foremost, non-attainment of federal clean air standards will put the public's health at risk. In addition, non-attainment could be devastating to the operations of Iowa's businesses and industries if immediate changes are required. Energy planning, industrial growth, plant location, farming practices, and supply chain logistics will all play a critical role in improving the quality of Iowa's air. Further, smart growth practices and transportation planning in our communities also have a large effect on the quality of air.

Coordination between business and industry developments, infrastructure investments and consumer activities will be required to ensure the health and wellbeing of lowans is protected and compliance with federal air quality standards is achieved.

Recommendation 5: Require that the impact on ecosystems be determined and considered in infrastructure planning and development.

Ecosystem are made up of a complex relationship of life including living resources, humans, plants, animals, water, soil, and other microorganisms. Each part of an ecosystem is dependent on other species, yet plays a unique role as an integral and functional component in nature. In fact, ecosystems represent how the other areas of focus (soil, water, air and culture) impact and integrate with each other. Affecting even one component can result in the deterioration or proliferation of an entire ecosystem. Sector committee members recognized that Iowa's ecosystems are at risk. Every day development and infrastructure decisions are made based on a variety of factors including cost, access to energy, transportation routes, availability of raw materials, etc. Unfortunately the impact a decision will have on an ecosystem is often not considered. Iowa must consider the impact on ecosystems when making land use planning, infrastructure and development decisions. Simply reacting to the impact that a decision has had on an ecosystem is highly inadequate. The function of ecosystems could be disrupted, species could be lost and even the health of our communities could be put at risk. The cost to restore balance to an ecosystem could be incredibly expensive and in some cases, not feasible. A process for identifying the impact of ecosystems for state funded infrastructure developments, or local and privately funded urban, industrial and agricultural developments should be considered. The purpose of this recommendation is not intended to pit environmentalists against developers and businesses leaders. The purpose is to ensure that the balance of our ecosystems is maintained and the health and wellbeing of lowans is protected.

Recommendation 6: Create opportunities to increase the use, enjoyment, and appreciation of Iowa's natural and cultural heritage.

Iowa must make the state more attractive to a vibrant and diverse population. Access to trails, parks, public lands, and other outdoor areas help provide an enhanced quality of life. Further, resources such as clean air and clean water also contribute to the health and wellbeing of our residents. Access to both must be increased to position Iowa as an attractive home to ever changing populations. It is well known that demographics and populations are shifting in the state. The population of lowans over the age of 60 continues to increase and many baby boomers are nearing retirement. Simultaneously, Iowa is experiencing an outmigration of young workers as college graduates educated in Iowa, move to other areas of the country to develop careers and raise families. In addition, emerging industries in the state will require a vibrant and diverse workforce. Enhancing the beauty of Iowa's communities and outdoor areas will help to create an attractive home for current and prospective residents in addition to creating an appealing destination for visitors. Efforts such as enhancing our existing park infrastructure and increasing the quality and quantity of the tree canopy are essential to the high quality of life available in Iowa.

Federal, state, and local funding for Iowa's trails, parks, and public outdoor attractions is critically insufficient. If additional funding is not provided, the future of many state, county, and municipal parks is at risk. Efforts should be targeted to create connections between the public and outdoor activities to help increase the funding, care and volunteering necessary to protect

the state's public areas. As lowans we must embrace our outdoor heritage and work to ensure our park and public outdoor infrastructure can be utilized for current and future generations.

Infrastructure Planning Process

Across Iowa, economic strength and competitiveness depends, in part, on our state's infrastructure. In his 2008 Condition of the State address, Governor Chet Culver highlighted the need for a statewide infrastructure plan to ensure all of Iowa is ready for the economy of the future. At that time Iowans could not have foreseen the tragic disasters of 2008 or the seriousness of the economic recession, but their impacts underscored the need for integrated and strategic priorities for Iowa's infrastructure in future years.

Those challenges resulted in a short-term infusion of more than \$6 billion for Iowa over a three-year period through the American Recovery and Reinvestment Act (ARRA), I-JOBS, and federal disaster recovery funds. These funds are being spent effectively and as expeditiously as possible on clear priorities for disaster recovery, jobs creation, economic recovery, and other infrastructure and non-infrastructure priorities for the near term.

Iowa also must be poised for the longer-term through strategic and visionary planning for the economy of the future. Iowa needs to continue to make investments in infrastructure, seeking value and success competing in an international economy. The planning process builds on the significant impact of past and current initiatives, opportunities, issues, and challenges.

Iowa Department of Economic Development (IDED) was charged with developing a plan for Iowa. Funding for the planning initiative was provided by US Department of Commerce, Economic Development Administration as part of the disaster recovery grant to the State of Iowa. Under a competitive Request for Proposals process, State Public Policy Group, Inc. (SPPG) was awarded a contract for managing, facilitating, and developing the issues-focused plan under the direction of IDED and project director Thomas W. Hart.

The planning activities span August 2008 through April 2010 when the statewide plan for infrastructure to support Iowa's future economy will be completed. The process for developing the infrastructure strategy was designed to challenge and encourage Iowans to suggest strategies that link infrastructure sectors and position Iowa to shape and fully participate in the economy of the future. With guidance from state leaders in the five sectors of focus, stakeholders with a diversity of perspectives and experiences from across Iowa were engaged in the activities to develop an issue-focused plan with relevance to the public, private, and nonprofit sectors throughout the state.

Five sectors of focus were determined by IDED: Buildings and Vertical Infrastructure, Energy, Natural Resources, Telecommunications, and Transportation.

Leadership of the project was provided by a Sector Chairs Group comprised of state agency directors representing each sector. Sector Chairs met regularly throughout the planning process to ensure consistency in the work of each Sector Committee and to address overarching issues. The following individuals serve on the Sector Chairs group working closely with IDED and SPPG:

- Thomas W. Hart, Iowa Department of Economic Development, Project Director, Sector Chairs Group Chair, and Task Force Chair

- Joseph Cassis, Iowa Communications Network, Telecommunications Sector Committee Co-Chair
- Steve Flagle, The University of Iowa, Telecommunications Sector Committee Chair
- Richard Leopold, Iowa Department of Natural Resources, Natural Resources Sector Committee Chair
- Bret Mills, Iowa Department of Economic Development, Buildings and Vertical Infrastructure Sector Committee Co-Chair
- Joe O'Hern, Iowa Finance Authority, Buildings and Vertical Infrastructure Sector Committee Co-Chair
- Nancy Richardson, Iowa Department of Transportation, Transportation Sector Committee Chair
- Roya Stanley, Iowa Office of Energy Independence, Energy Sector Committee Chair

Additional individuals with special expertise related to the planning initiative participated on the Sector Chairs Group and the Task Force:

- Elisabeth Buck, Iowa Workforce Development
- Emily Hajek, Rebuild Iowa Office
- David Miller, Iowa Homeland Security and Emergency Management Division
- Jon Murphy, Iowa Office of the Governor

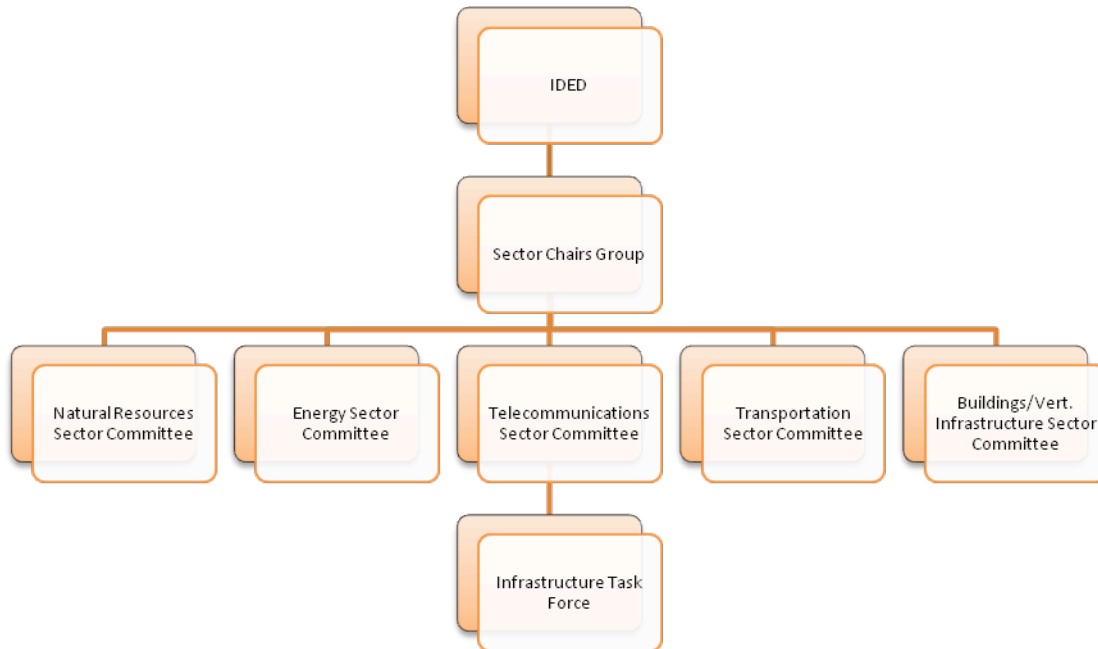
Each Sector Committee met four times in day-long deliberations between November 2009 and February 2010. Sector Committee membership was comprised of private, academic, issue-based, and public representatives providing a diversity of perspectives and strategic vision. Each committee was chaired by the respective member(s) of the Sector Chairs Group. Each of the five Sector Committees was responsible for defining the sector for purposes of this initiative, identifying issues, and developing recommendations based on research, experience, and information reviewed by each committee. Sector Committees were also charged with considering each sector's interaction and integration with the other sectors. Sector Committees were guided by the Essential Elements of Iowa's Future Economy and the common understanding of Iowa's economic situation and forecast described earlier in this report. The findings of each sector were detailed in five separate Sector Committee Reports.

Six community forums were held in Johnston, Coralville, Ottumwa, Dubuque, and Sioux City, with an ICN session conducted at 10 sites statewide. ICN sites were in Atlantic, Carroll, Clinton, Council Bluffs, Creston, Dubuque, Fairfield, Mason City, Storm Lake, and Urbandale. The forum in Dubuque was canceled due to winter weather, but rescheduled as an ICN site. These community forums were structured to elicit public input regarding the initial issues and ideas developed by the Sector Committees, and to inform the process going forward. Comments and suggestions from stakeholder proved very informational and beneficial to the overall process. The input from these community forums was integrated into each Sector Committee Report and Recommendations. Sector Committee reports were completed by March 1, 2010, and forwarded to the Task Force.

The Infrastructure Planning Task Force is charged with developing the statewide strategic plan, outlining priorities to achieve a strong and competitive economy. The Task Force, chaired by project director Thom Hart, includes all members of the Sector Chairs Group and several

individuals from each Sector Committee and will meet three times during March and April. The plan and recommendations of the Infrastructure Task Force will be presented to IDED in May 2010.

Below is a graphic depiction of the relationship of all components of the process for developing the Infrastructure Strategy for Iowa's Future Economy.



The Infrastructure Strategy for Iowa's Future Economy will outline the Task Force's consensus direction for Iowa's buildings and vertical infrastructure, energy, natural resources, telecommunications, and transportation as sectors integrate with one another and as they impact the economic strength and competitive position for Iowa. This information should be of practical value to policymakers at all levels, state and local government agencies, the private sector, non-profit organizations, issue-based organizations, and the public.

The planning process created a clear understanding that Iowa's infrastructure as it exists and is funded today is neither sustainable nor affordable. The Infrastructure Strategy provides insights for all stakeholders as they shape their future.

Conclusion

Members of the Natural Resources Committee have emphasized that the impact on ecosystems be determined and considered in infrastructure planning and development. Natural resources including soil, water, and air are limited quantity and must be managed sensibly to meet the long term needs of Iowa's communities, businesses and ecosystems. This approach will ensure Iowa's economic viability, competitiveness, sustainability, community vitality and quality of life for the future. As plans are developed during the Infrastructure Strategy Task Force process, the importance of coordinated planning and the identification of shared priorities between sectors should be foremost on the agenda. Only through this coordinated, comprehensive approach can Iowa's challenges be addressed for the overall goal of Iowa's growth, prosperity, and recovery.

Supporting Documents

Meeting Notes

- November 19, 2009
- December 14, 2010
- January 25, 2010
- February 25, 2010

Presentations and Handouts

- Carbon 101 Carbon Essentials, Dick Schultz and Rick Cruse, College of Ag & Life Sciences, Iowa State University
- Iowa's Economy in a Difficult Time, Dave Swenson, Economics, Iowa State University
- What is an Ecosystem? Father Bud Grant, Saint Ambrose University

Other Resources

- ARRA Report 2009, Iowa ARRA 1512 Reporting Team, <http://www.iowa.gov/recovery/media/reportoctober.pdf>
- Iowa Climate Change Advisory Council 2009, Public Interest Institute, <http://www.limitedgovernment.org/publications/pubs/studies/ps093.pdf>
- Iowa Watershed Task Force Report 2001, Iowa Watershed Task Force, http://www.rio.iowa.gov/wrcc/assets/flood_plain_prior_recommendations.pdf
- Iowa Watershed Quality Task Force of 2007, Watershed Quality Planning Task Force, http://www.iowadnr.gov/water/taskforce/files/wqptf_final_report.pdf
- Keep Iowa Beautiful Report 2006, Keep Iowa Clean and Beautiful Task Force, http://www.dps.state.ia.us/commis/pib/PDFS/KeepIowaCleanandBeautifulTaskForceReport_FINAL_9506.pdf
- State Wildlife Action Plan 2005, Iowa Department of Natural Resources Wildlife Bureau, http://www.iowadnr.gov/wildlife/diversity/files/iwap_part1.pdf
- Water Resources Advisory Council 2009, Water Resources Coordinating Council, http://www.rio.iowa.gov/wrcc/assets/Final_Subcommittee_Flood_Plain_Recommendations.pdf