Chapter 4
Public Perspective: Economic, Environmental and Social Concerns

All Federal agencies proposing legislation and other major actions significantly affecting the quality of the human environment consult with other agencies having jurisdiction by law or special expertise over such environmental considerations, and thereafter prepare a detailed statement of these environmental effects.

National Environmental Policy Act of 1969

Carl D. Martland, *Toward More Sustainable Infrastructure*

Public Perspective:
Economic, Environmental and Social Concerns

- Public vs. private perspectives
- Benefit/cost analysis
- Economic impacts
- Environmental impacts
- Social impacts

Public vs. Private Perspectives

	Private	Public
Primary Objectives	Financial	Socio-economic
Environmental concerns	Constraints on development	Stewardship
Public involvement	If legally required	Essential
Time frame	Short- to medium term	Long-term
Important measures	Profit, ROI; efficiency	Success in meeting needs; Cost-effectiveness

Issues Likely to be More Important When Evaluating Public Projects

- Equity in the distribution of costs and benefits
  - Across regions
  - Across groups of people
  - Across generations
- Aesthetics and integration within the community
- Disruption related to construction or operation
- Long-term impacts on land use and quality of life

Public Projects:
Multi-purpose, Multiple Measures

	Purposes	Measures
Transportation	Mobility Accessibility Regional growth & competitiveness	Service levels Costs Energy Safey Emissions
Water & Sewage	Clean water for consumption Water for industry Irrigation	Volume of water available Cleanliness (risks of disease) Cost per unit

Benefit/Cost Analysis

- Total benefits should exceed total costs:
  - If not, then this would be a bad project.
  - If so, then this ***might*** be a good project, so long as there are not:
    - Better ways to meet the project's goals.
    - More worthy goals to addressed via different types of projects.
- Governments often require B/C for projects:
  - Rational allocation of limited government funds.
  - Defense against mismanagement, stupidity and corruption.
- Government regulations may stipulate how to measure costs and benefits

Measurement Problems

- Comparing current and future cash flows
- Estimating monetary values for non-cash costs and benefits.
- Dealing with aesthetics and other issues that cannot be expressed in monetary terms.

An Example of Monetarizing Benefits: Construction of a Highway

- Some benefits are readily evaluated, such as **reductions in travel time**:
  - Traffic engineers use models to predict travel times before and after construction.
  - The economic value of time savings can be estimated using:
    - Average hourly wages in the region
    - Average hourly costs of truck operations and average hourly value of the contents of the truck
- People may debate the values of time and the inputs to the engineering models, but the methodology is easily understood, widely used, and generally accepted.

An Example of Monetarizing Benefits: Construction of a Highway

- **Safety** benefits are readily quantified, but not easily converted to economic terms:
  - Models can predict reductions in accidents, injuries and fatalities.
  - Mathematically, it is easy to apply monetary weights to come up with an economic value for safety improvements, e.g. $2.5 million per expected fatality.
  - However, there is no way to determine who will avoid having an accident, nor is there any generally accepted way to put a value on a human life.
- People may debate not only the parameters used, but also the validity of any approach that is used.

An Example of Monetarizing Benefits: Construction of a Highway

- Some benefits are essentially impossible to evaluate, such as **aesthetics**:
  - There are no measures of beauty.
  - Human judgment will be necessary to determine what types of aesthetic improvements are worth while:
    - Artists renditions of various options
    - Public hearings
    - Design competions
- People may debate not only the methods and the parameters, but also the objective itself.

Economic Benefits

- Direct Benefits
  - Construction jobs and income
  - Jobs and income related to operations
  - Productivity benefits for users
  - Economic growth (Gross Regional Product)
- Indirect Benefits
  - Multiplier effect of construction
  - Multiplier effect of operations

Economic Costs

- Direct Costs
  - Disruption related to construction
  - Disruption related to operations
  - Slower growth in some areas (Gross Regional Product)

Key Environmental Concepts

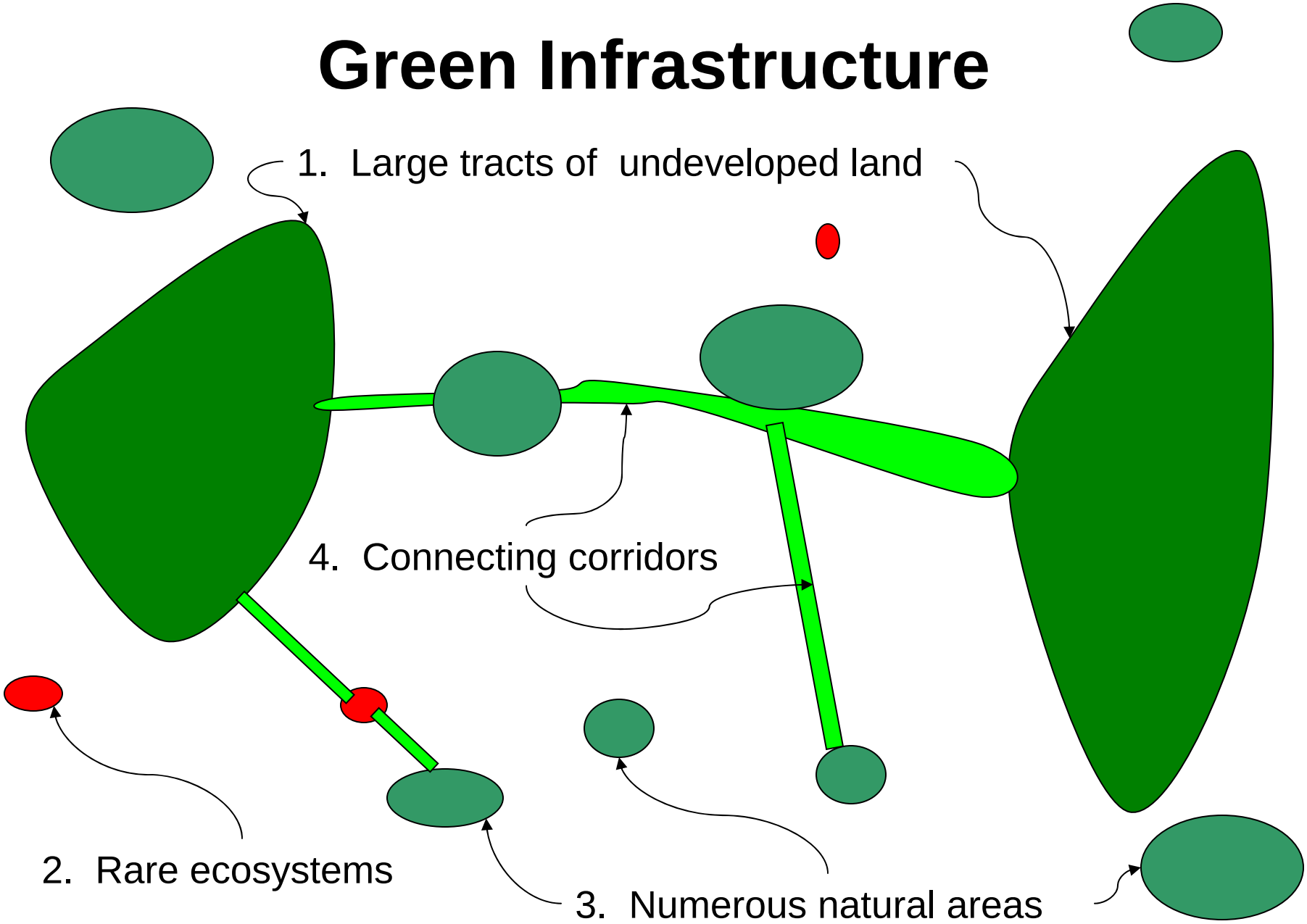
- Ecosystems
- Pollution
- Wetlands, acquifers, and drainage
- Wildlife habitat
- Renewable vs. non-renewable resources
- Climate change

Disruption of Ecosystems

- Pollution
- Disruption to the flow and retention of water
- Fragmentation
- Loss of habitat
- Introduction of alien species

Wildlife Crossing, Trans-Canada Highway, Banff National Park

Green Infrastructure



Environmental Impacts of Projects

- Use of materials in construction and operations
- Pollution: air and water quality, soil toxicity
- Loss of habitat and disruption of ecosystems
- Impacts on the local environment (noise, shade, aesthetics)
- Long-term concerns with sustainability

Environmental Impact Assessment: Overview

- Objective: reduce negative environmental impact of projects
- Basic steps:
  - Require ***Environmental Impact Statements*** for major projects or changes in policy.
  - Make statements available for public review.
  - Have professional review to ensure statement is complete and properly done.
  - Create a professional agency with power to stop projects with unacceptable environmental impacts.

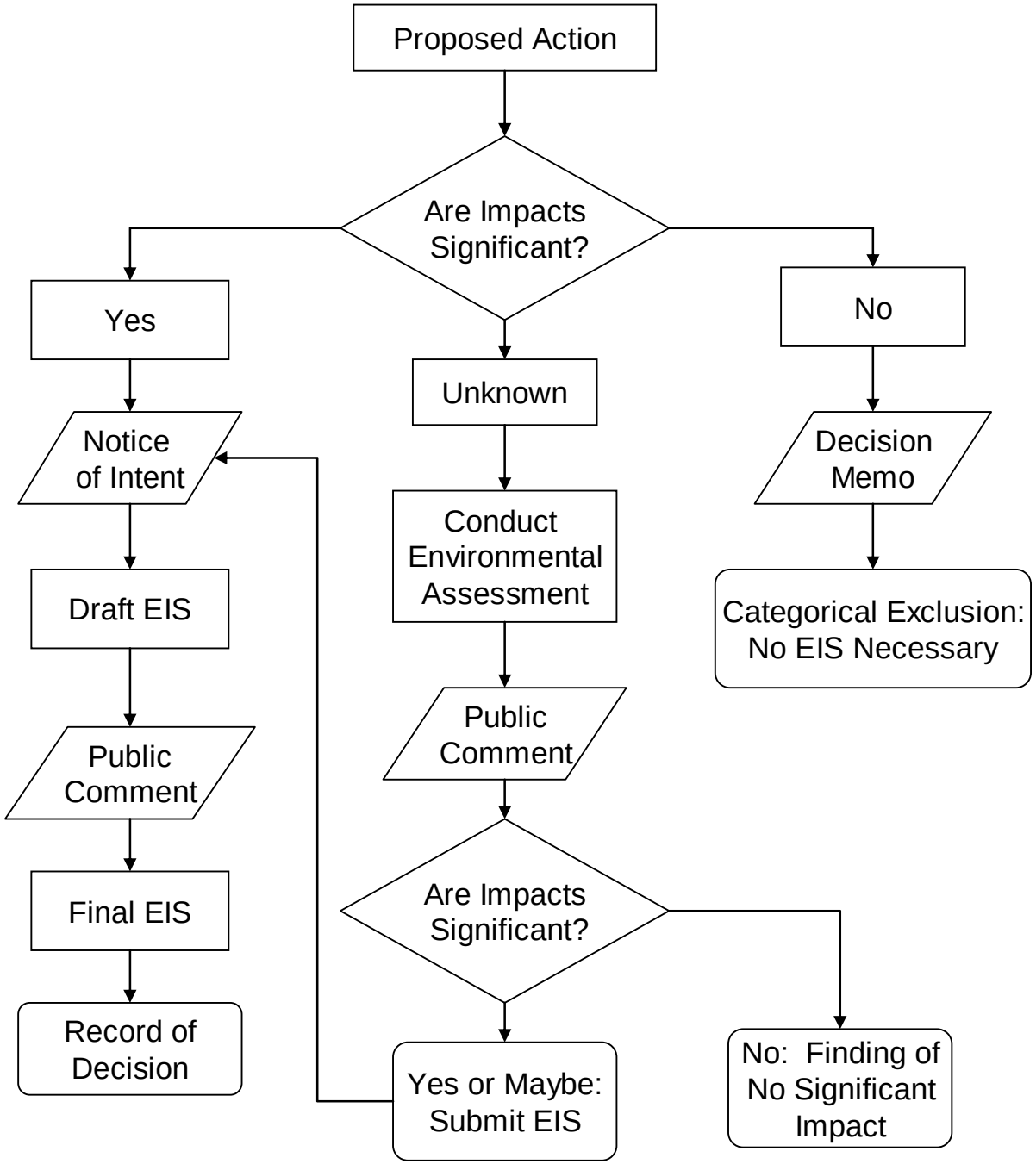
U.S. National Environmental Policy Act of 1969

- Created Environmental Protection Agency
- Requires EIS for any major federal policy or project
- Draft EIS must be made available for public comment and review by EPA
- Final EIS must be approved before project can be approved

Review of Draft EIS: Four Possible Outcomes

- Lack of objections
- Environmental concerns
- Environmental objections
  - Violation of EPA or agency guidelines
  - Significant degradation that could be mitigated
  - Bad precedent for future actions
- Environmentally unsatisfactory
  - Substantive or long-term violation of national environmental standard
  - No standards exist, but severe, long-term or widespread impacts
  - Threat to national environmental resources or policies

Summary of EPA Decision Process



Routing Interstate 93 through Franconia Notch, New Hampshire

Franconia Notch Parkway

Social Impacts

By social impacts, we mean the consequences to human populations of any public or private actions that alter the ways in which people live, work, play, relate to one another, organize to meet their needs and generally cope as members of society. The term also includes cultural impacts involving changes to the norms, values, and beliefs that guide and rationalize their cognition of themselves and their society.

The Interorganizational Committee on Principles and Guidelines for Social Impact Assessment

Social Impact Assessment (SIA)

- Major projects may have far-reaching social consequencs that are difficult or impossible to quantify or comprehend.
- In the U.S., SIA is required as part of the EIA.
- Major purpose:
  - Understand and respond to potential negative impacts of proposed policies, programs or projects.

Principles for Social Impact Assessment

- Achieve extensive understanding of people and regions that will be affected.
- Focus on key elements of human environment.
- Base the SIA upon sound and replicable scientific research
- Provide quality information for use in decision-making
- Ensure that environmental justice issues are fully described and analyzed
- Following implementation, monitor social impacts and propose mitigation measures if needed

The Interorganizational Committee on Principles and Guidelines for Social Impact Assessment

Examples of Negative Social Impacts

Relocation of People	• Entire villages displaced for the construction of a dam • Hundreds of people and small businesses relocated to allow the construction of a highway through a city.
Deaths and Injuries During Construction	• Deaths of more than 20,000 from tropical disease in the various efforts that eventually led to the Panama Canal. • Deaths resulting from workers falling off bridges or buildings in situations where safety nets were not installed.

Examples of Negative Social Impacts

Deaths, injury or illnesses resulting during normal operation of infrastructure	• Millions of people severely injured or killed in highway accidents • Bridges and tall buildings serving as jump-off points for suicides • Asthma and other illnesses resulting from air pollution caused by emissions from power plants, automobiles, or home heating • Tens of thousands of people injured or killed annually worldwide in grade crossing accidents between highway vehicles and trains

Examples of Negative Social Impacts

Deaths and injuries after infrastructure failure	• Thousands of deaths and destruction of cities resulting from dam failures. • Loss of life from buildings and structures that collapse in earthquakes
Disruption of neighborhoods	• Limited access highways serving as barriers within urban neighborhoods. • Loss of property values following construction of large, noisy, or ugly buildings or infrastructure. • Creation of suburbs and decline of central cities following construction of better highways and policies that encouraged home ownership.

Examples of Negative Social Impacts

Loss of livelihood as a result of environmental damage or introduction of competition	• Destruction of fishing and shell-fishing areas following construction of bridges, port facilities, or oil spills • Decline in use of informal taxis and buses following opening of new subway lines in large cities in Latin America and Asia. • Bankruptcy of canal companies following construction of railroads. • Bankruptcy of railroads following construction of highways and invention of cars, trucks and airplanes. • Decline of newspapers following widespread use of internet

Examples of Negative Social Impacts

Loss of privacy	• Disruption of the life of native peoples following construction of roads or railroads through their previously remote homelands
Reduced quality of life	• Noise and dust resulting from construction of a highway • Shade resulting from construction of tall buildings • Views ruined by construction of high voltage direct current power lines

A Framework for Social Assessment:
Consider Impacts over the Life of the Project

Category of Impact

- Population Change
- Community and Institutional Structures
- Political and Social Resources
- Community and Family Changes
- Community Resources

Stage of Project

- Preliminary evaluation of needs and alternatives
- Detailed planning
- Construction
- Operations and Maintenance
- Decommissioning or abandonment

Strategies for Mitigating Social Impacts

- Adjust the design so as to avoid or reduce the negative social impacts
- Require mitigation as a condition for approval of the project
- Compensate those who are hurt by the project

Key Factors For Sustainable Infrastructure

- Financial feasibility: will there by sufficient money to construct, maintain and operate the project?
- Economic impact: what are the economic impacts to the region in terms of jobs, income and opportunity for growth?
- Environment impact: what are the immediate and long-term resource requirements and impacts on the environments?
- Social Impacts: will society be willing to support the project, once the potential social impacts are understood?

1.011 Project Evaluation

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