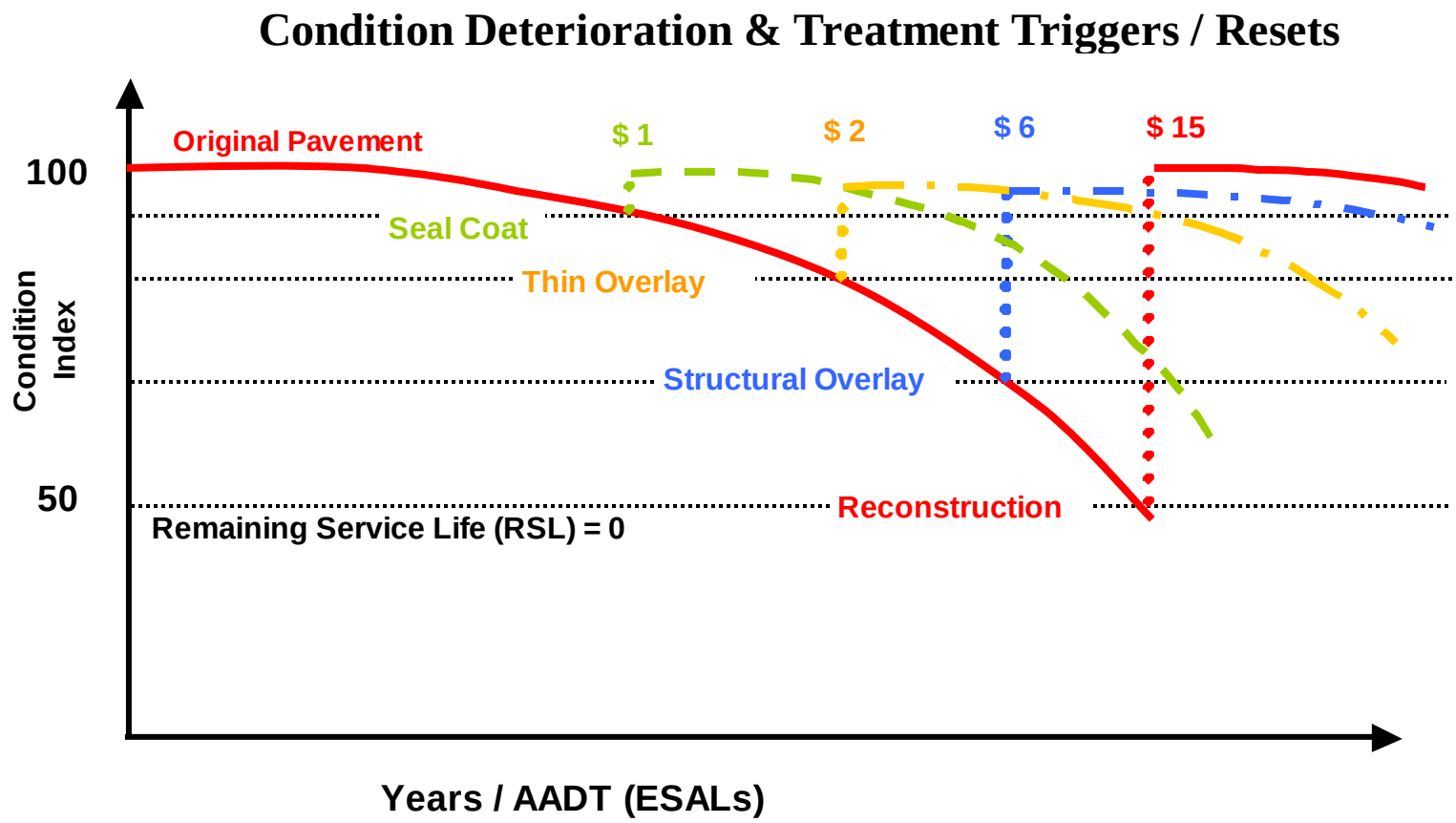
Using Results

Section 5

Section 5 Topics

- Project selection processes
- Using pavement management results effectively
  - To support pavement preservation
  - For strategic decision making
  - For other purposes

Getting the Most Bang for Your Buck



From Utah DOT

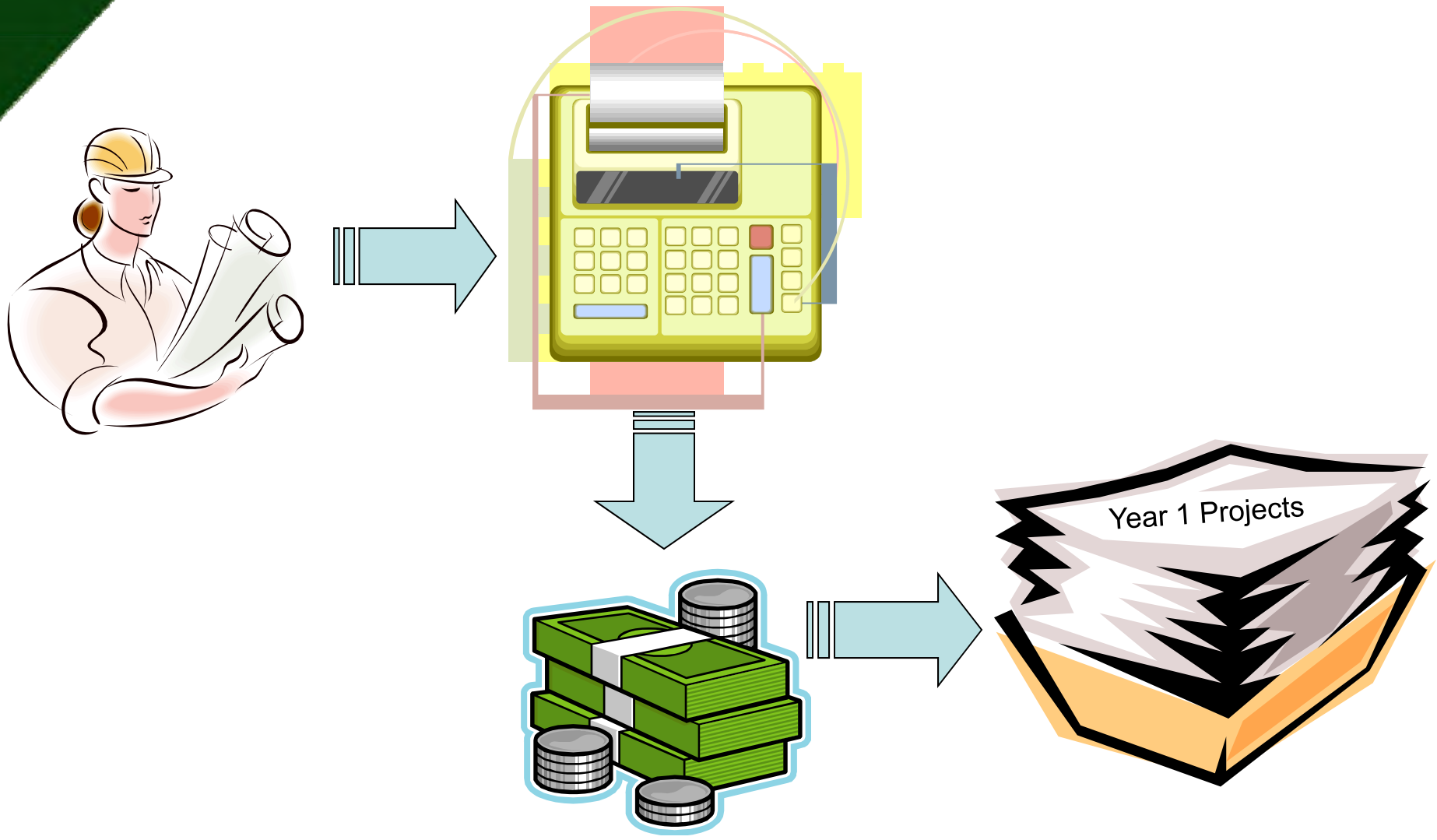
Project Selection Programs

- Spontaneous
- Ranking
- Multi-Year Prioritization
- Optimization

Typical Ranking Factors

- Condition
- Weighted Condition
  - Traffic volumes
  - Vehicle miles traveled
- Composite Factors
  - Economic contribution
  - Population
- Benefit/Cost Ratio

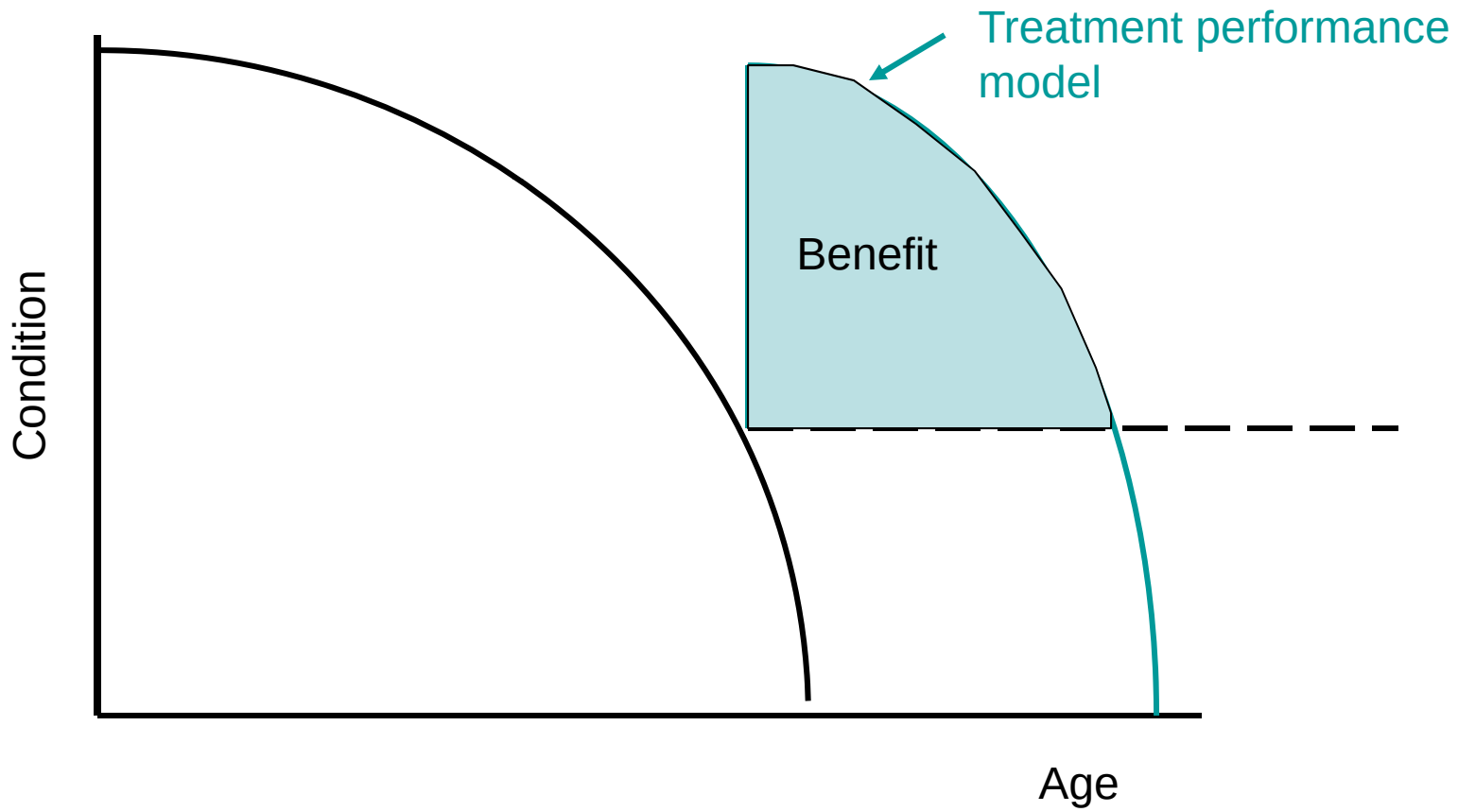
Ranking Approach



Multi-Year Prioritization

- Near optimal solutions (heuristic)
- Addresses what-if questions
  - Is it better to spend the budget on roads in poor condition OR spend some on roads in poor condition and some on roads in fair condition?
  - What is the consequence of postponing a project for two years?

Benefit Calculation

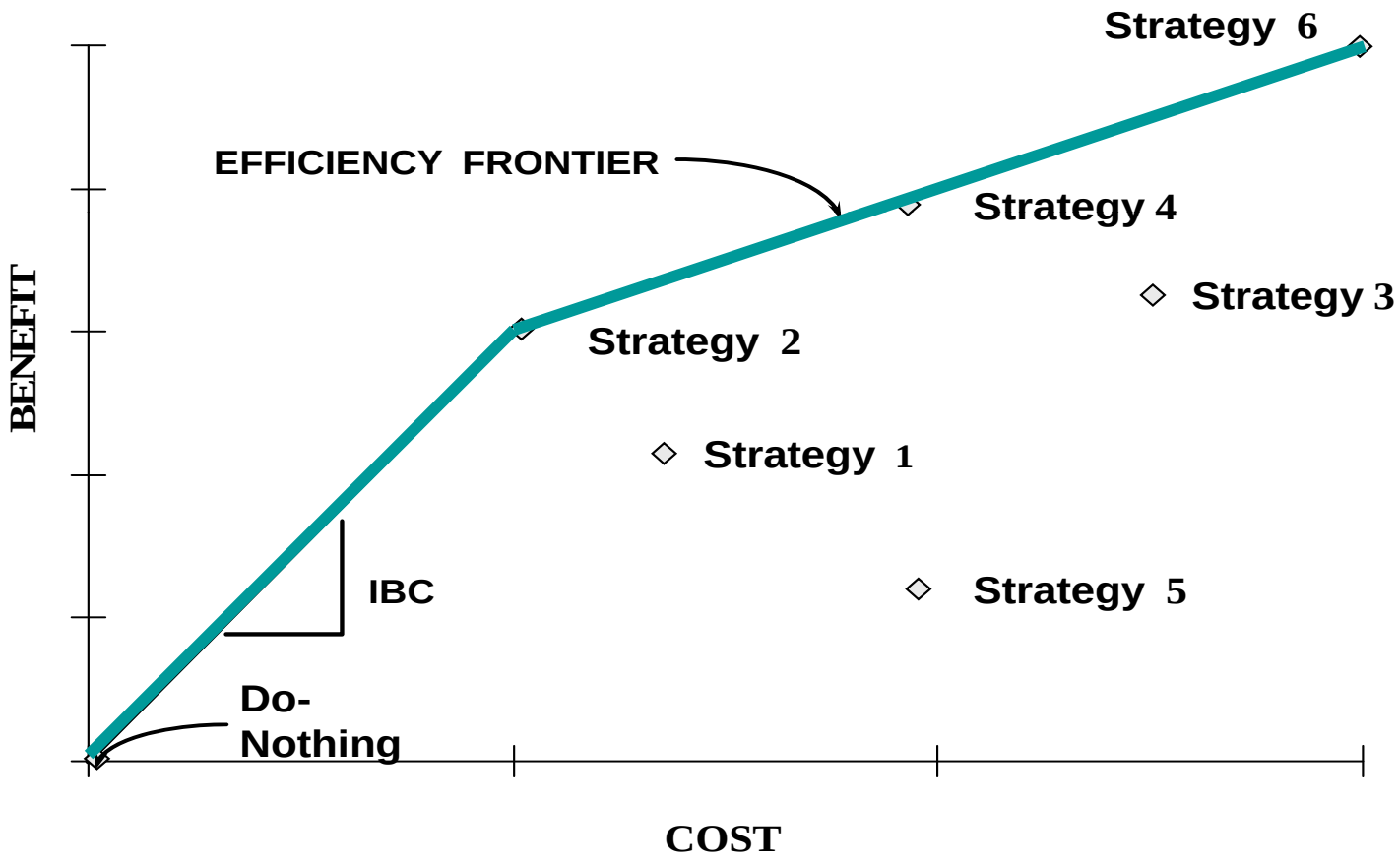


Multi-Year Prioritization Approach

Year 1

Year 2

Efficiency Frontier



from Deighton Associates Ltd.

Optimization

- Uses mathematical programming methods to determine the optimal solution
  - Linear or non-linear programming
  - Dynamic programming
- Solves an objective function within any constraints given
- Typically a two-step analysis

Sample Objective Function

- Maximize overall network conditions so that no interstate highway has a condition index that drops below 70 and no more than $50 million dollars are spent in each year
  - What is the goal?
  - What are the constraints?
  - How might this be expressed mathematically?

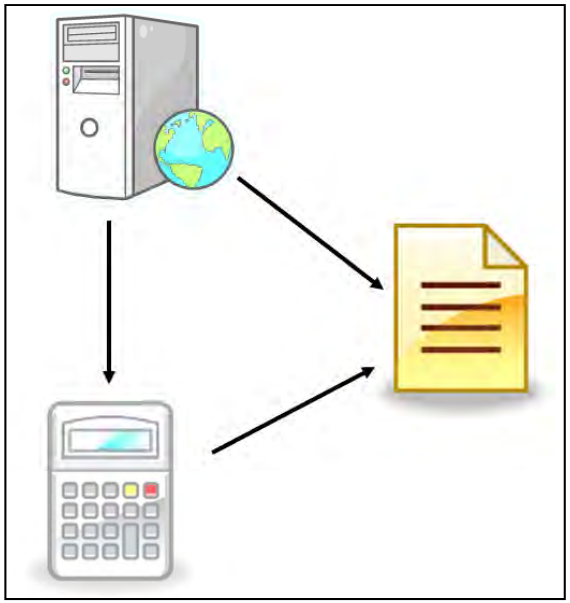
Typical Results – Step 1

From Condition States	To Condition States			
	1	2	3	4
1				
2				
3	50 mi	25 mi		
4	25 mi			

Which Approach?

- Most agencies in the US use multi-year prioritization – simpler, less variables, close to optimal solution
- A few use optimization – must have resources to maintain data needs
- Select the one that meets your needs

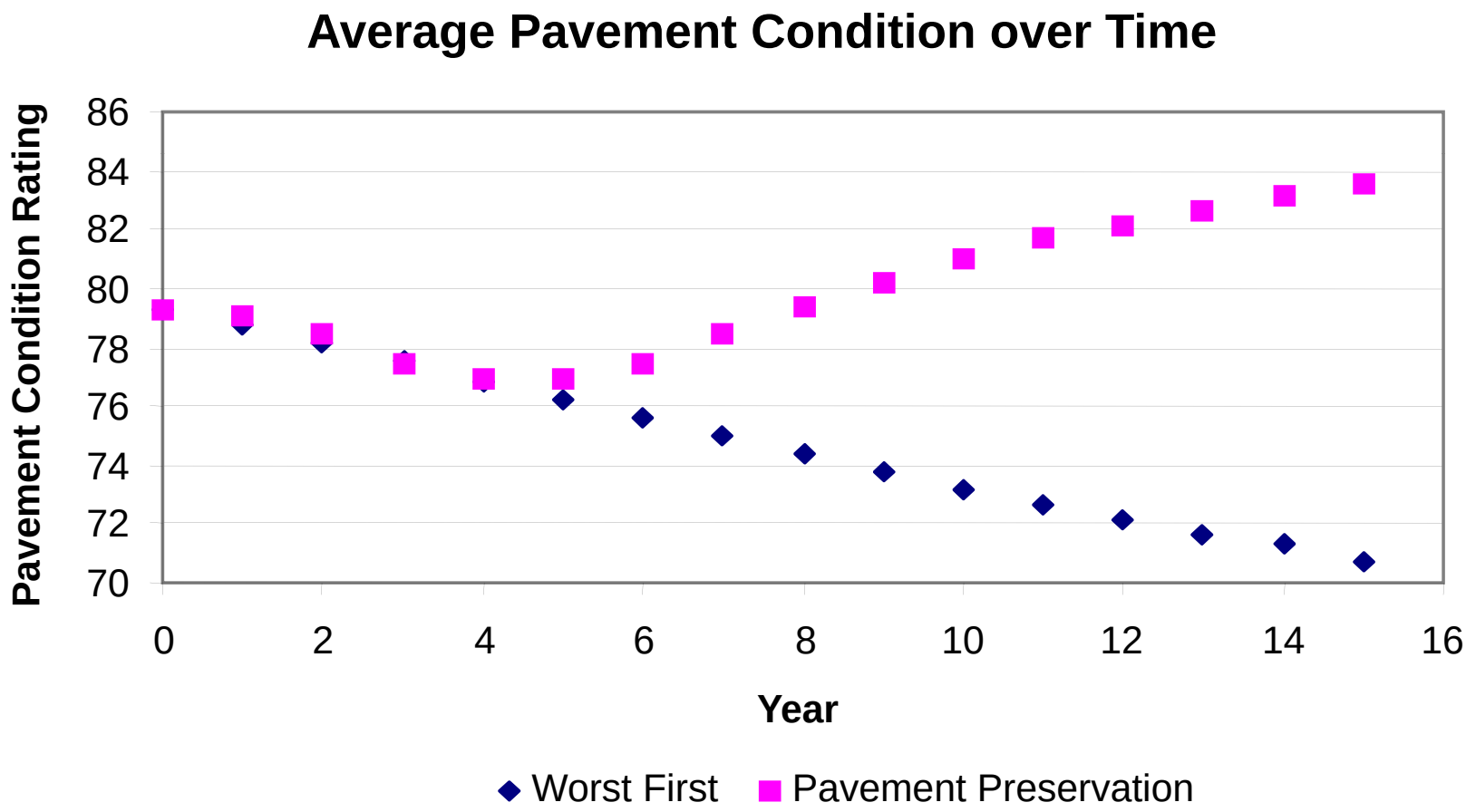
Other Uses of Pavement Management Information



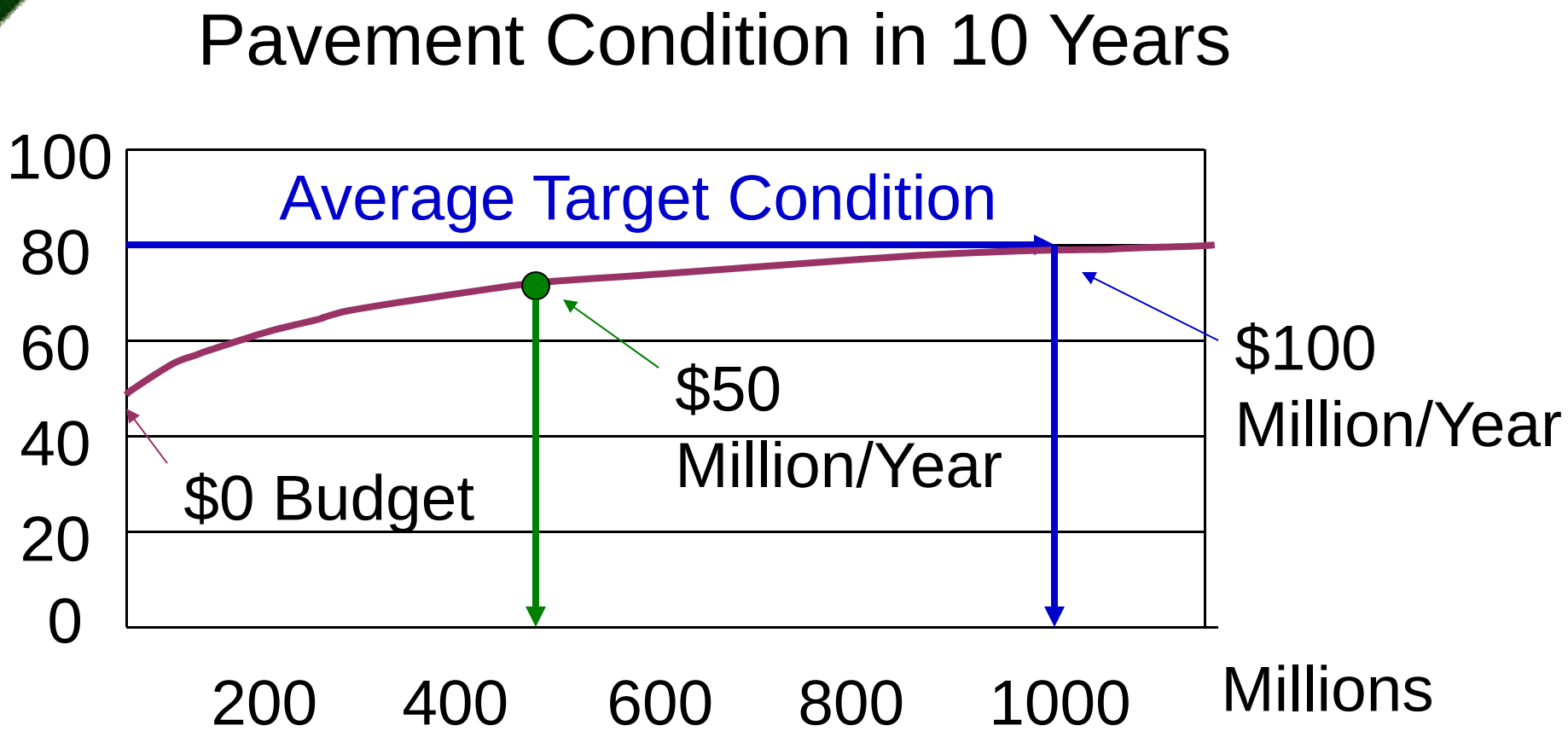
Support For Pavement Preservation – Minnesota

- Candidates for preventive maintenance triggered by pavement management
- Districts identify preventive maintenance projects they want to construct
- Pavement management must sign off

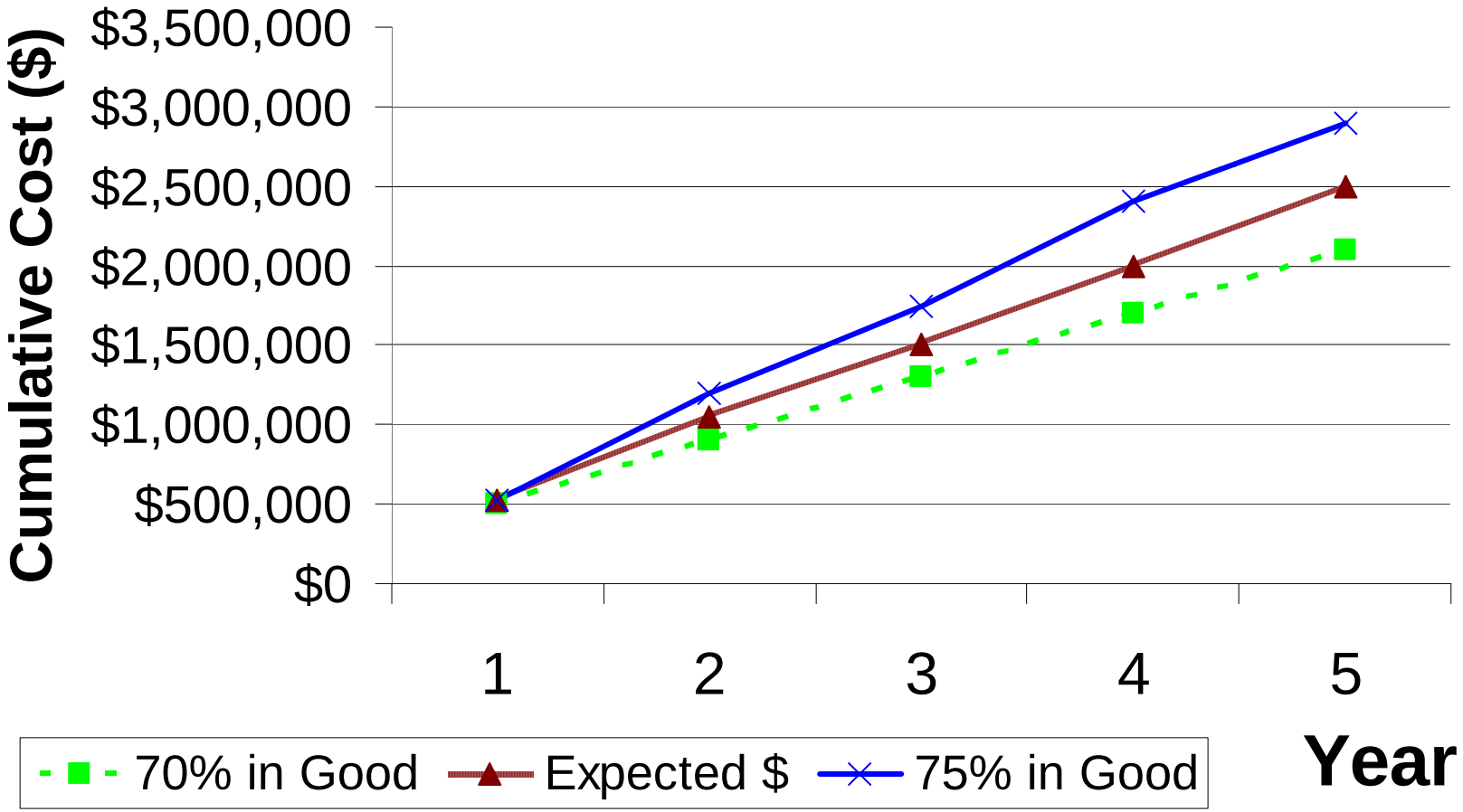
Demonstrating Pavement Preservation Benefits



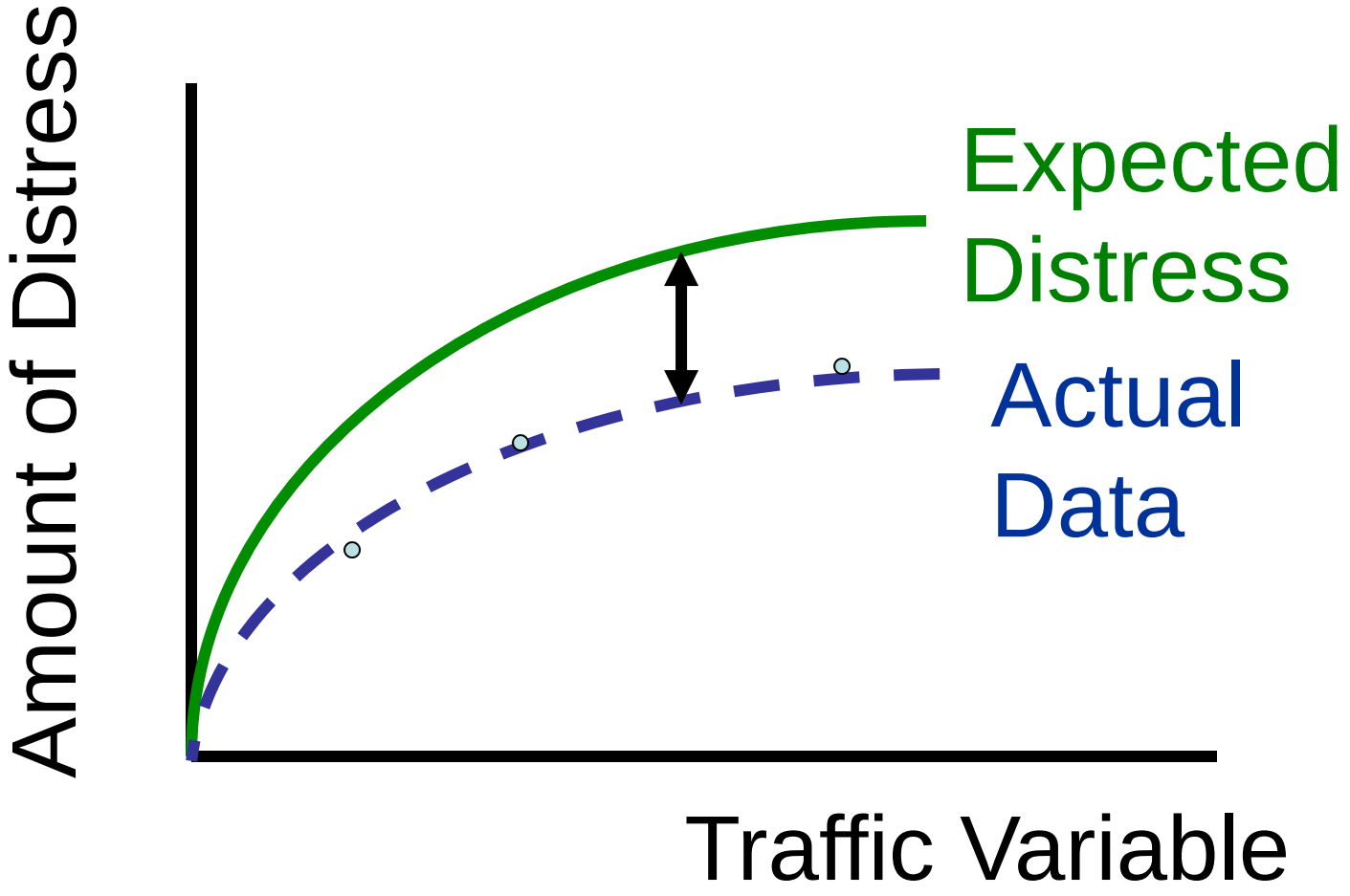
Setting Investment Levels



Setting Agency Goals



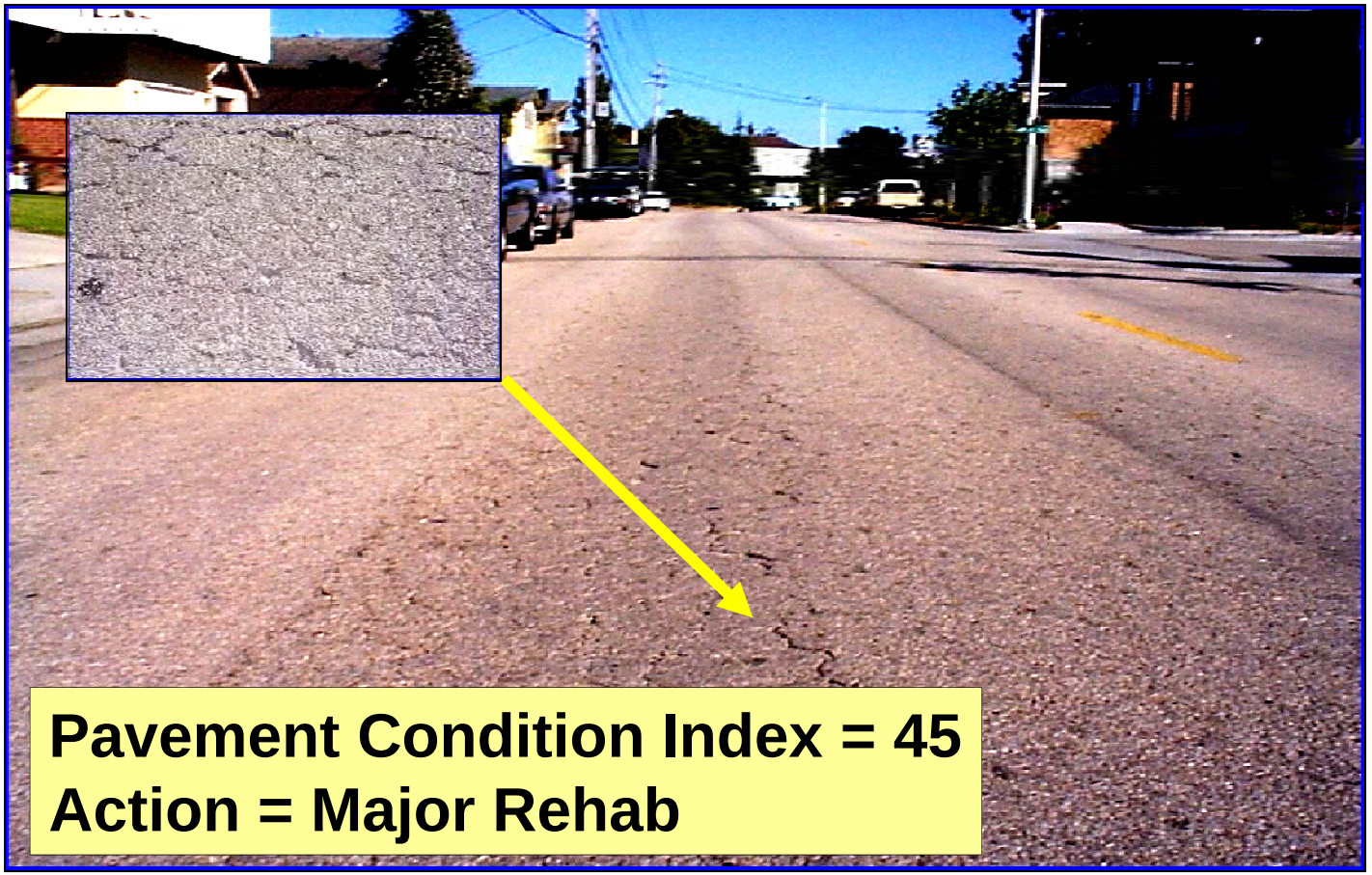
Engineering & Economic Analysis



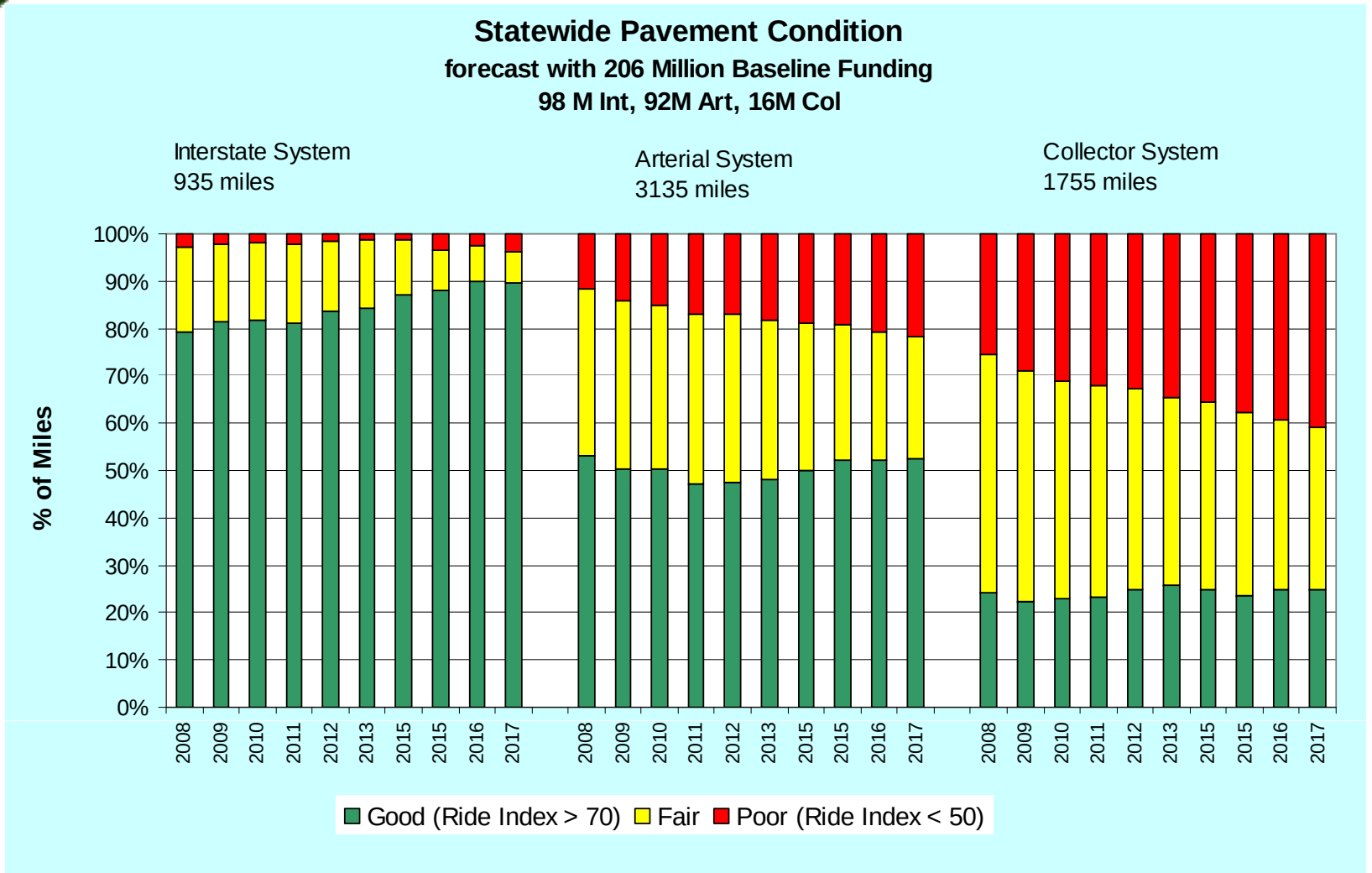
Presenting Results to Stakeholders

- ***Network Level***
- Legislature/Highway commission
- Senior agency management
- Public
- ***Project Level***
- Design engineers
- Mid-level management

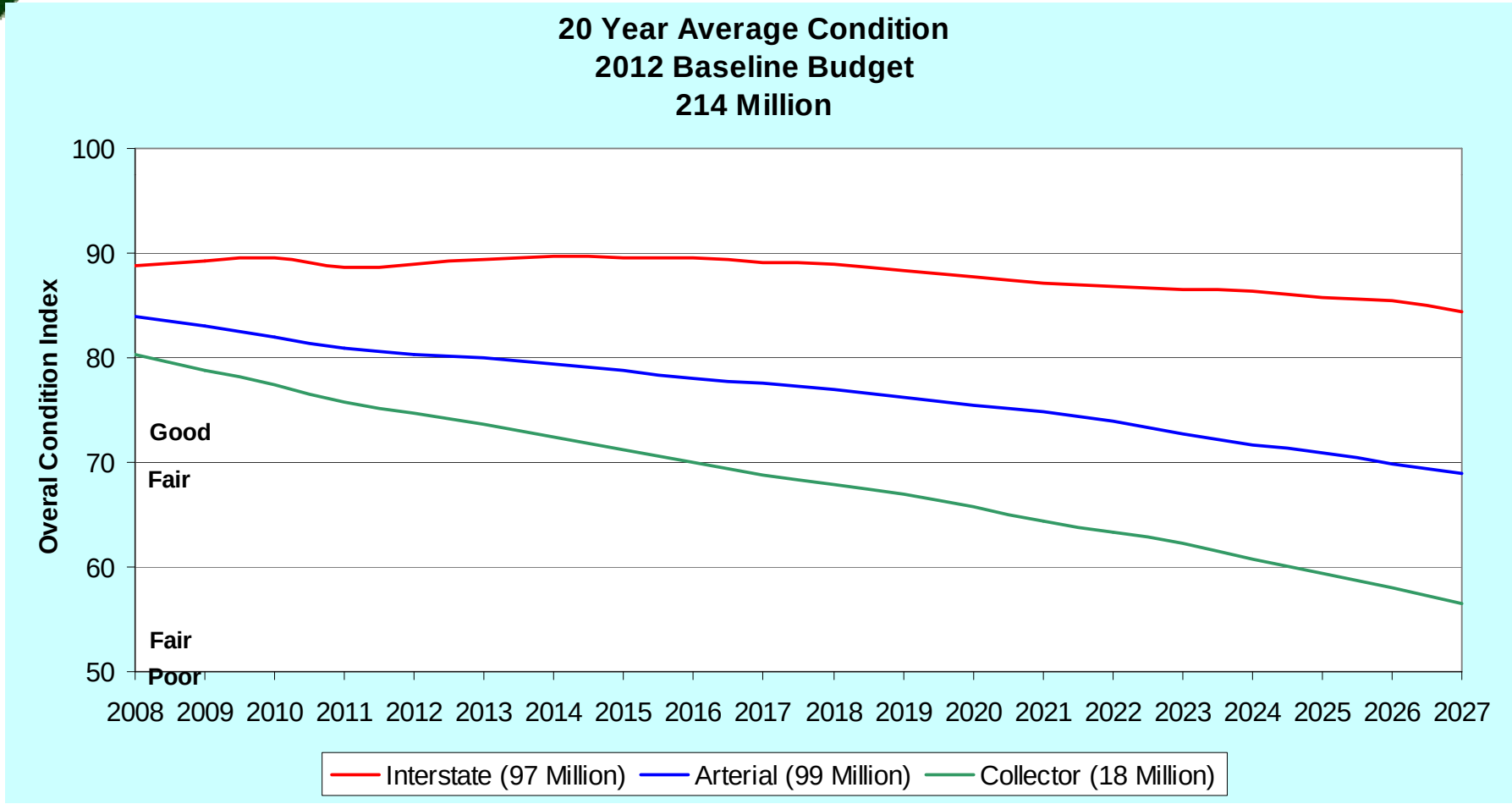
What is Pavement Distress?



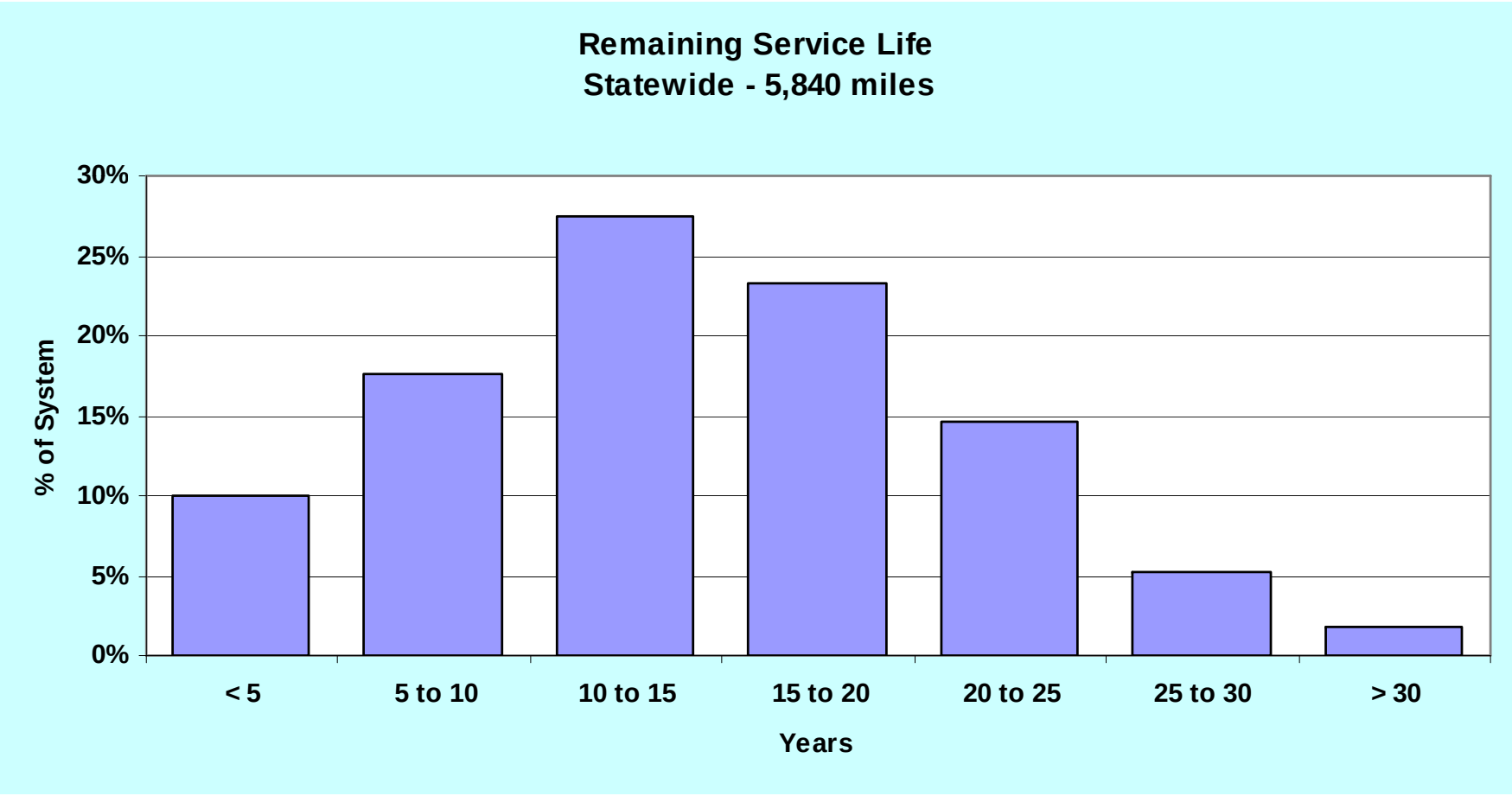
Projected Conditions



Projected Average Condition

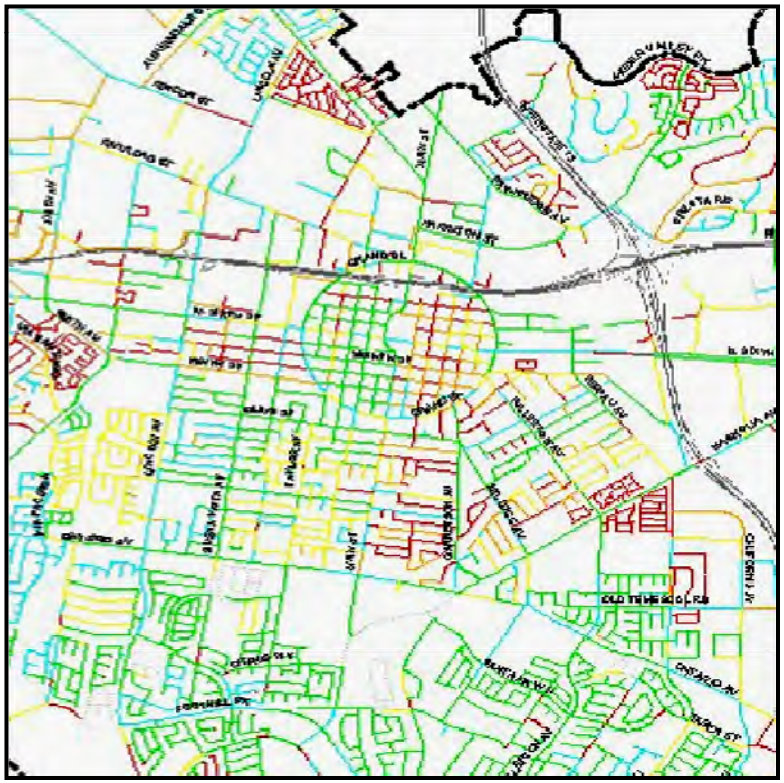


Remaining Service Life



A Picture is Worth a Thousand Words

2007
Current Conditions



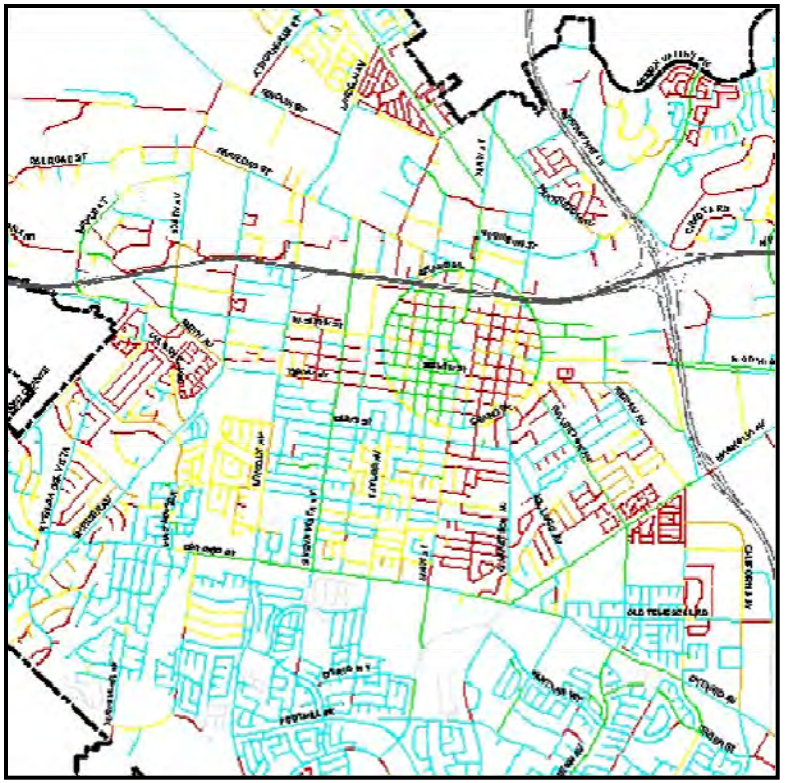
Good

Fair

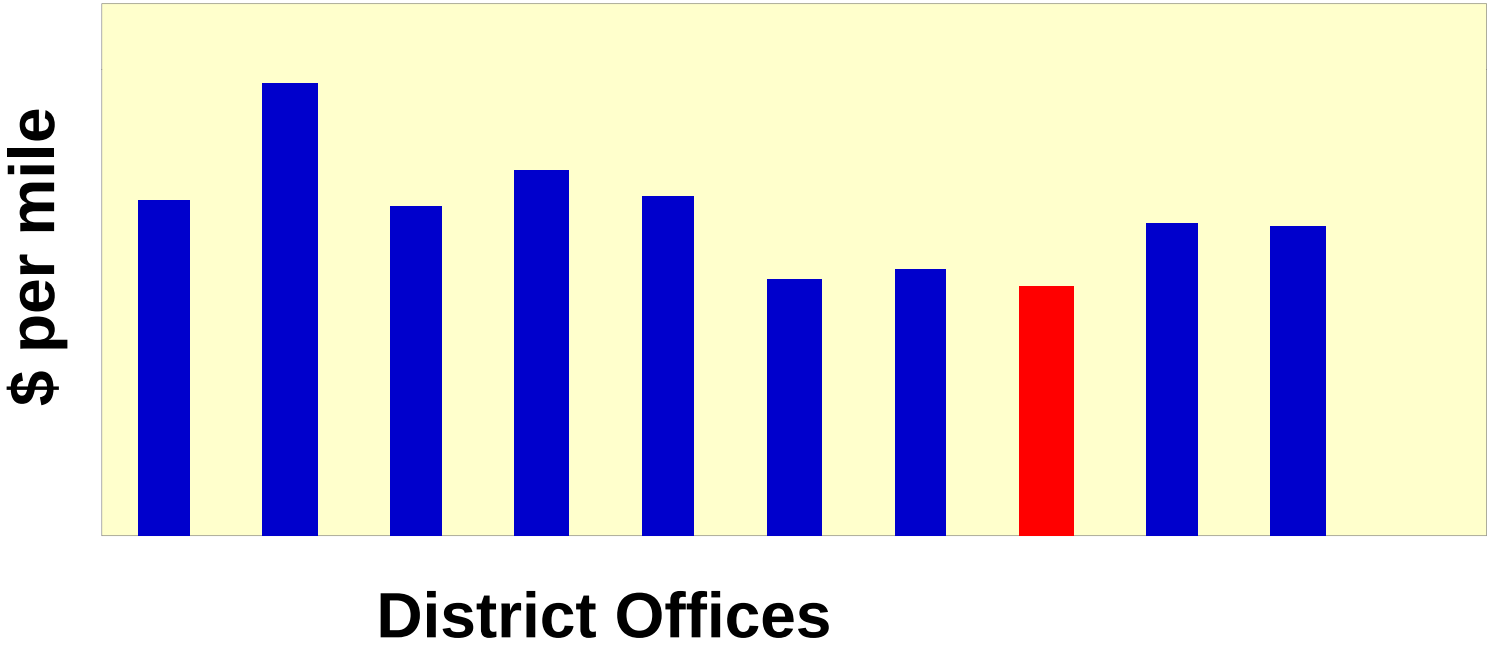
Poor

Failed

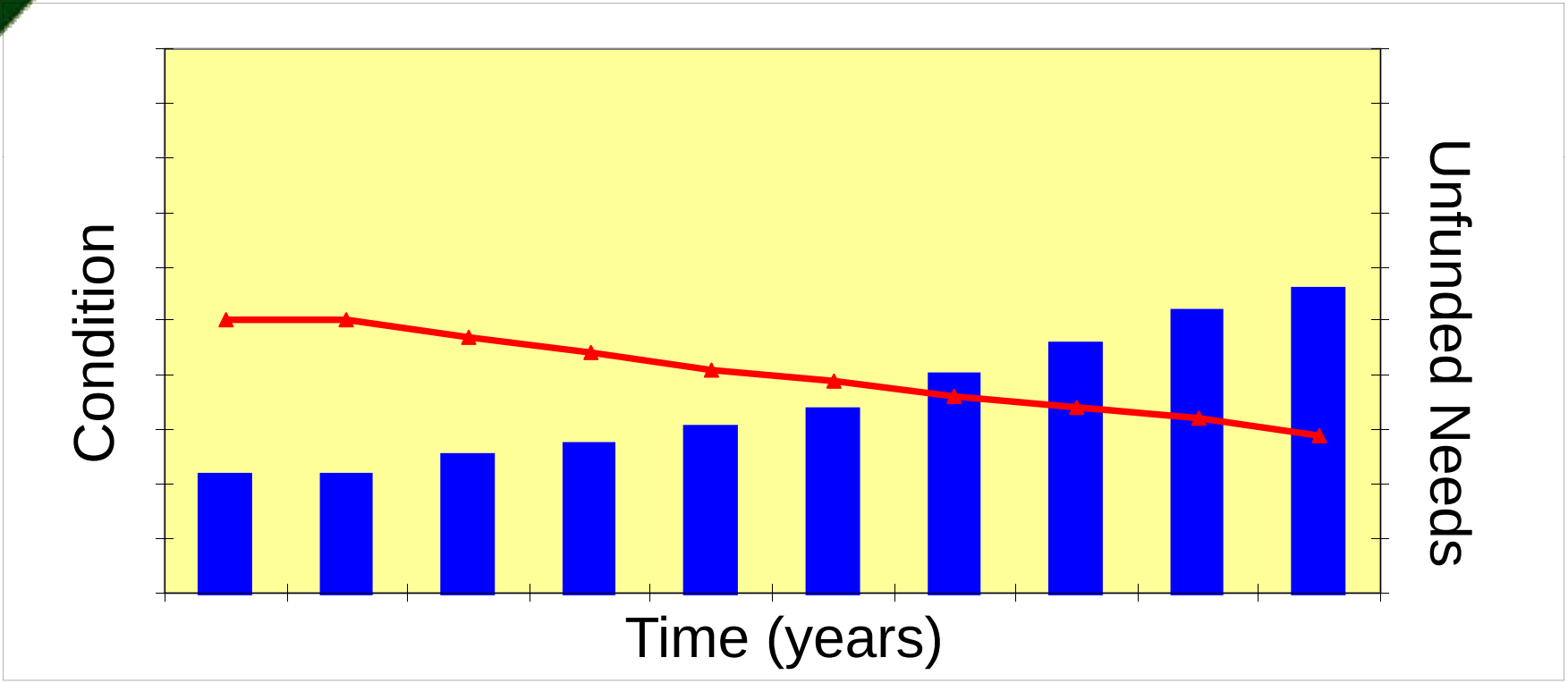
10 years later
Current Budget



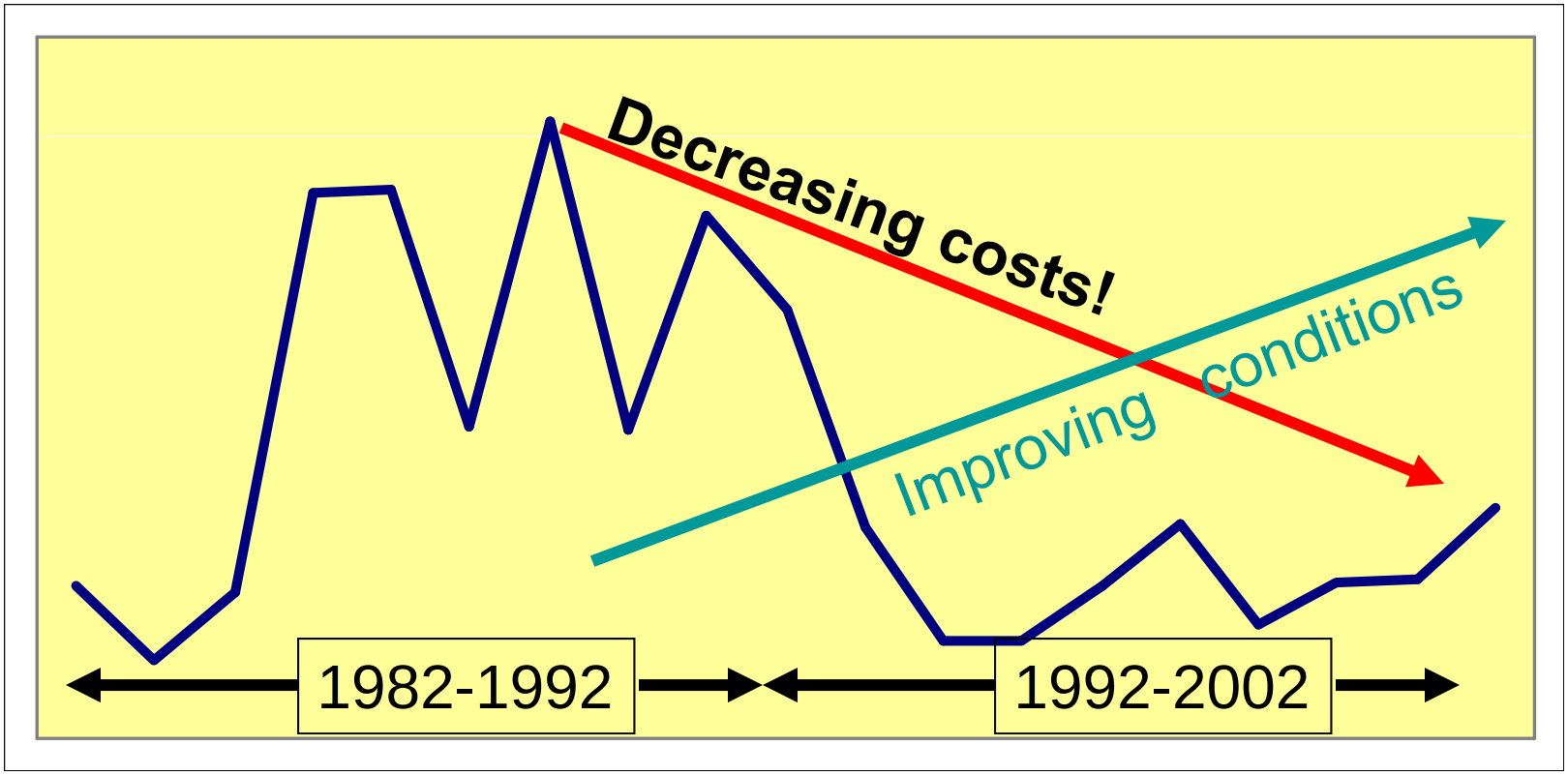
How Do We Compare?



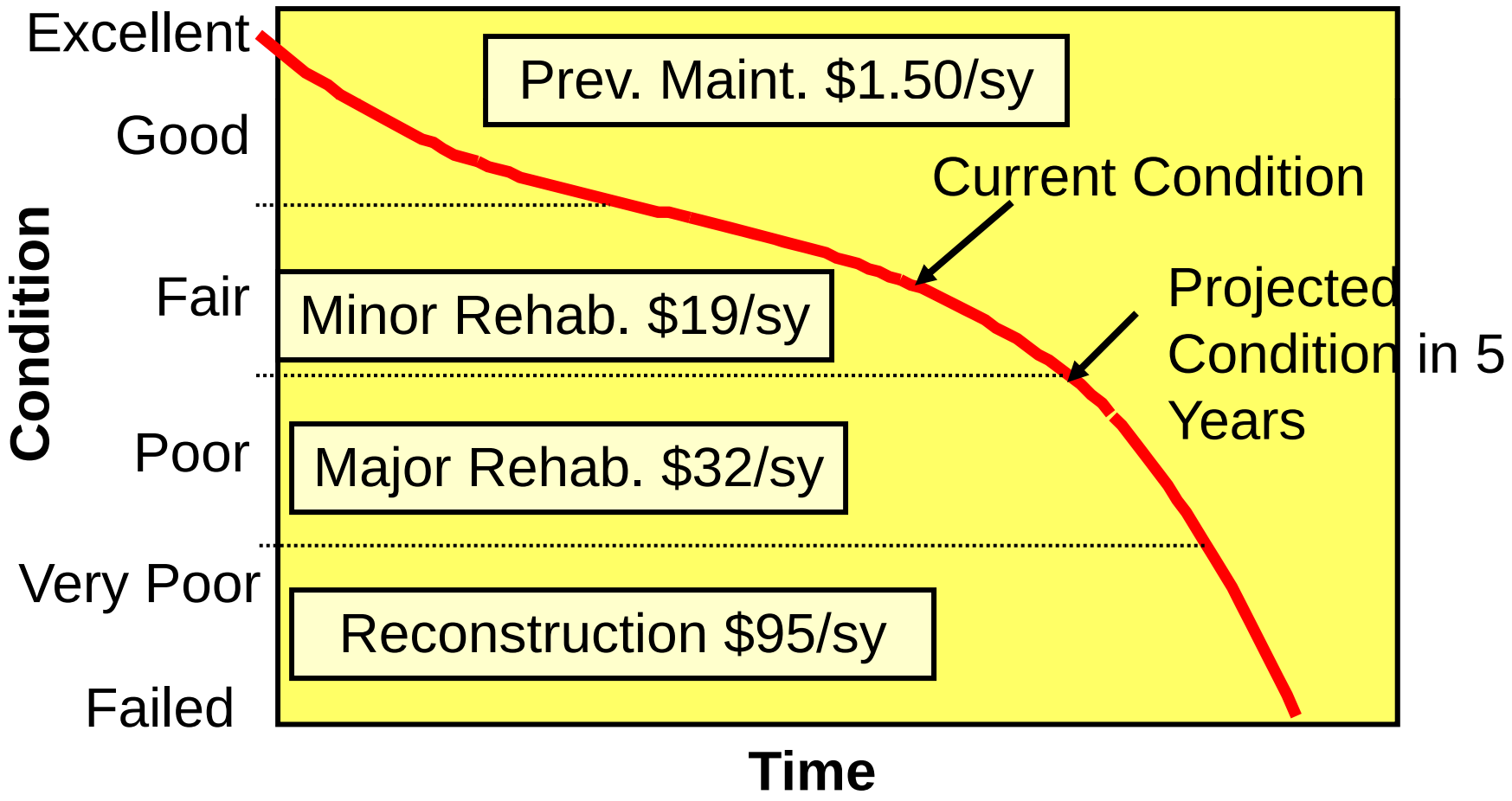
Impacts of Funding Levels



Good Pavements Cost Less



Pay Now or Pay More Later



Other Uses of Pavement Management Information

- What other applications for using pavement management information will be most useful in your organization?
  - _____
  - _____
  - _____