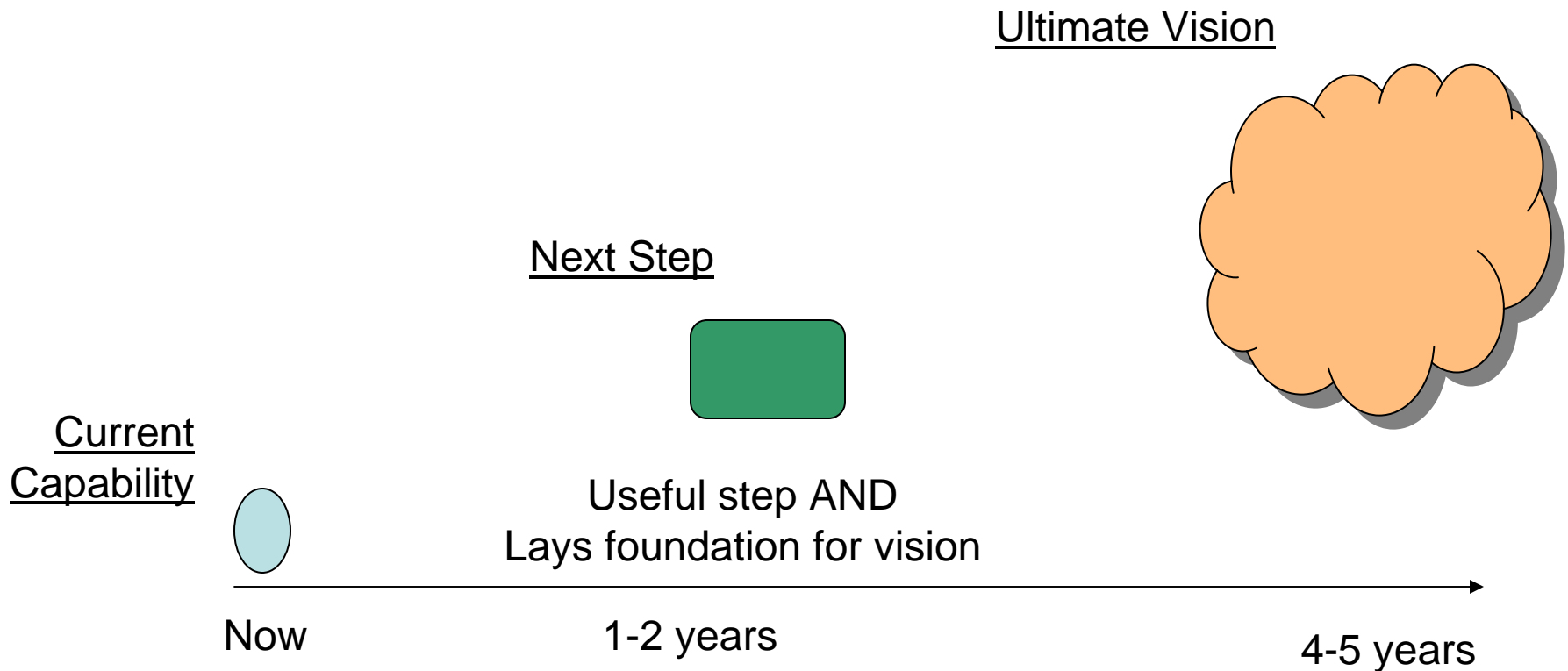# Matt Carlson, PE

- Wyoming Department of Transportation
- State Highway Safety Engineer
- Governor's Representative for Hwy Safety

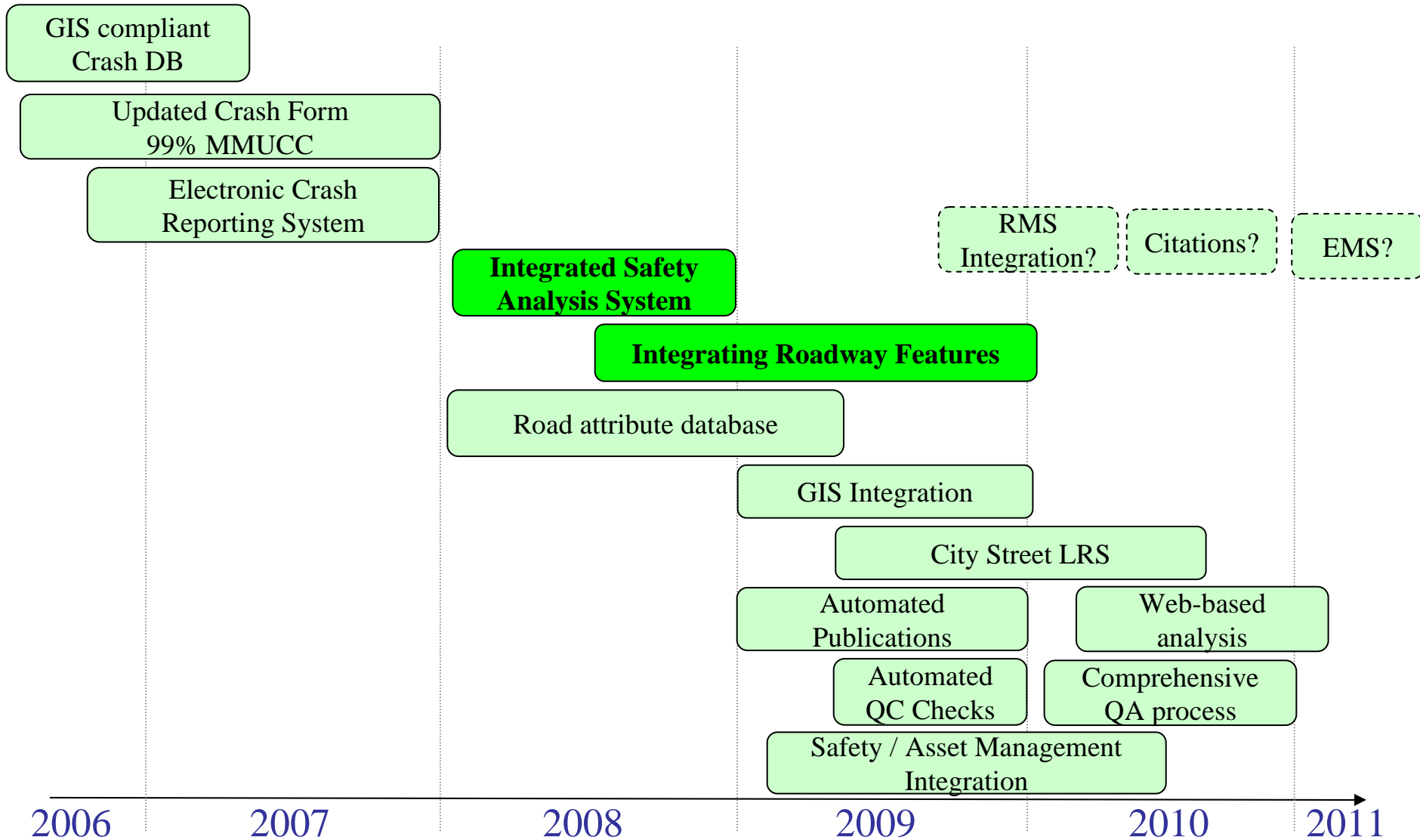# Projects, Prioritization and Asset Management

Evolutionary Vision & Steps

Start with an articulation of the long term goals, and use that "Ultimate Vision" to drive the expression of the strategic direction as well as the next tactical step(s)
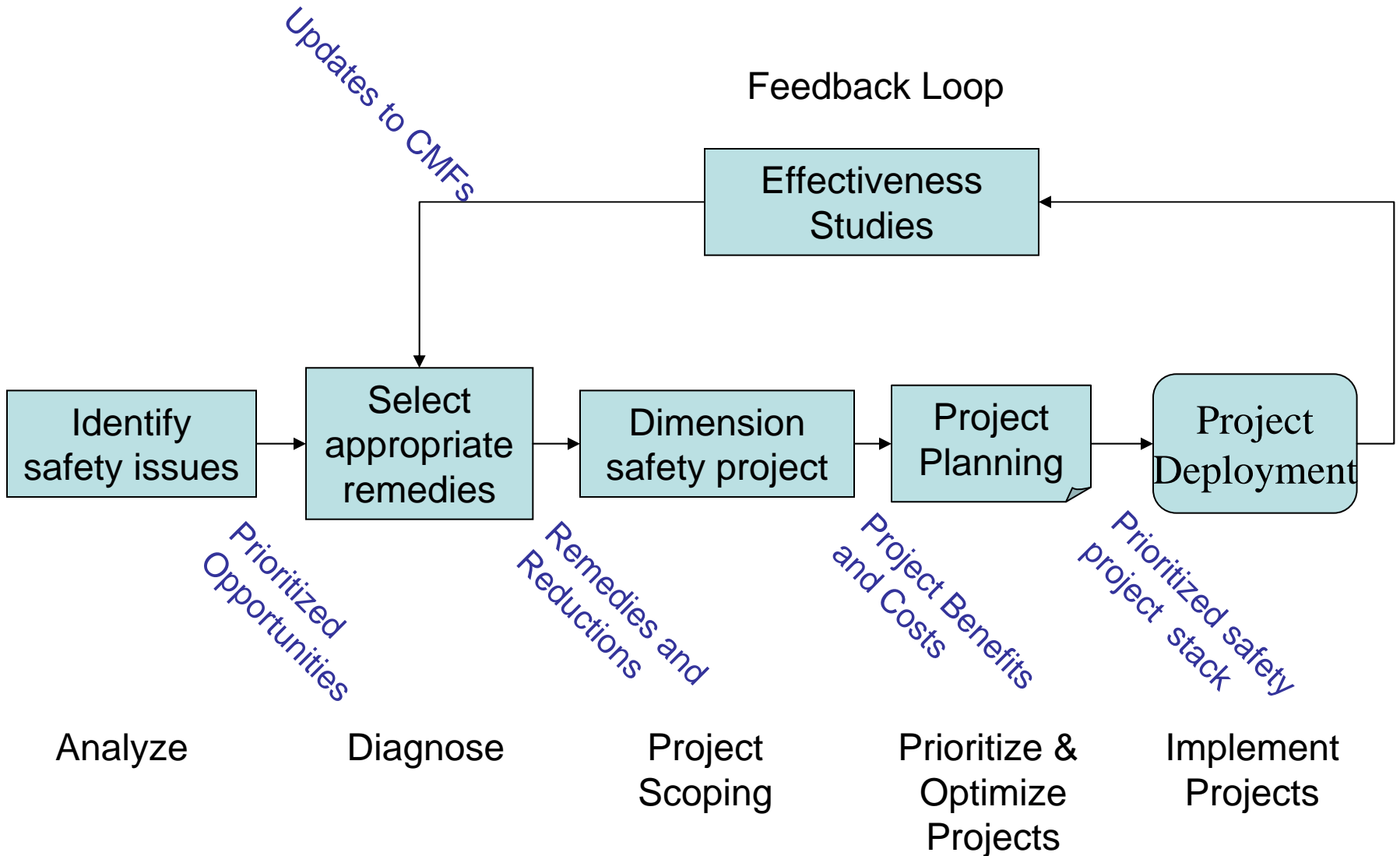
This is an iterative process; e.g. each year, refine long-term vision, current capability, and appropriate next step
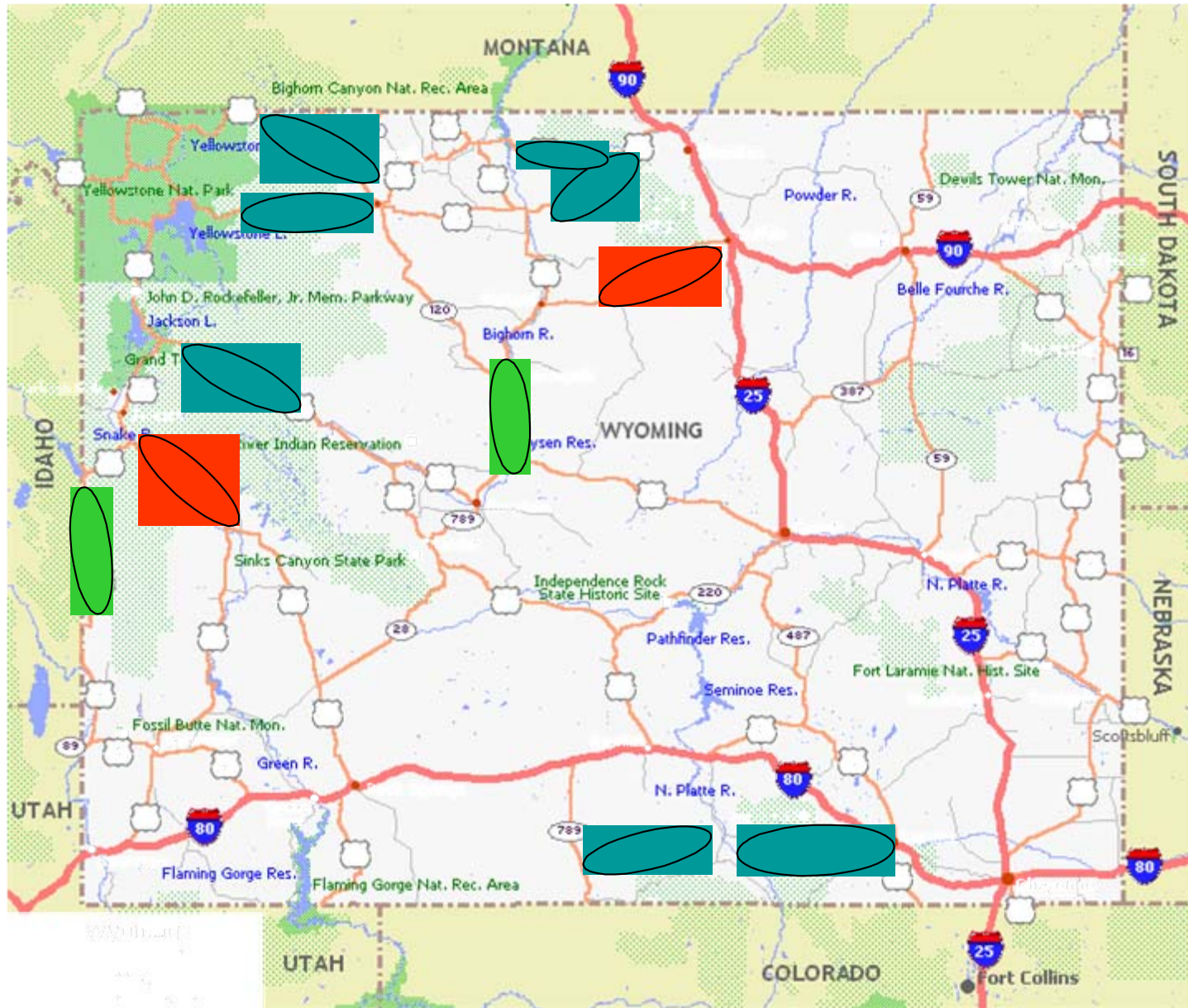
Ultimate Vision

Next Step

Current
Capability

Useful step AND
Lays foundation for vision

Now   1-2 years   4-5 years

Traffic Records - Project Overview

GIS compliant Crash DB

Updated Crash Form 99% MMUCC

Electronic Crash Reporting System

Integrated Safety Analysis System

RMS Integration?

Citations?

EMS?

Integrating Roadway Features

Road attribute database

GIS Integration

City Street LRS

Automated Publications

Web-based analysis

Automated QC Checks

Comprehensive QA process

Safety / Asset Management Integration
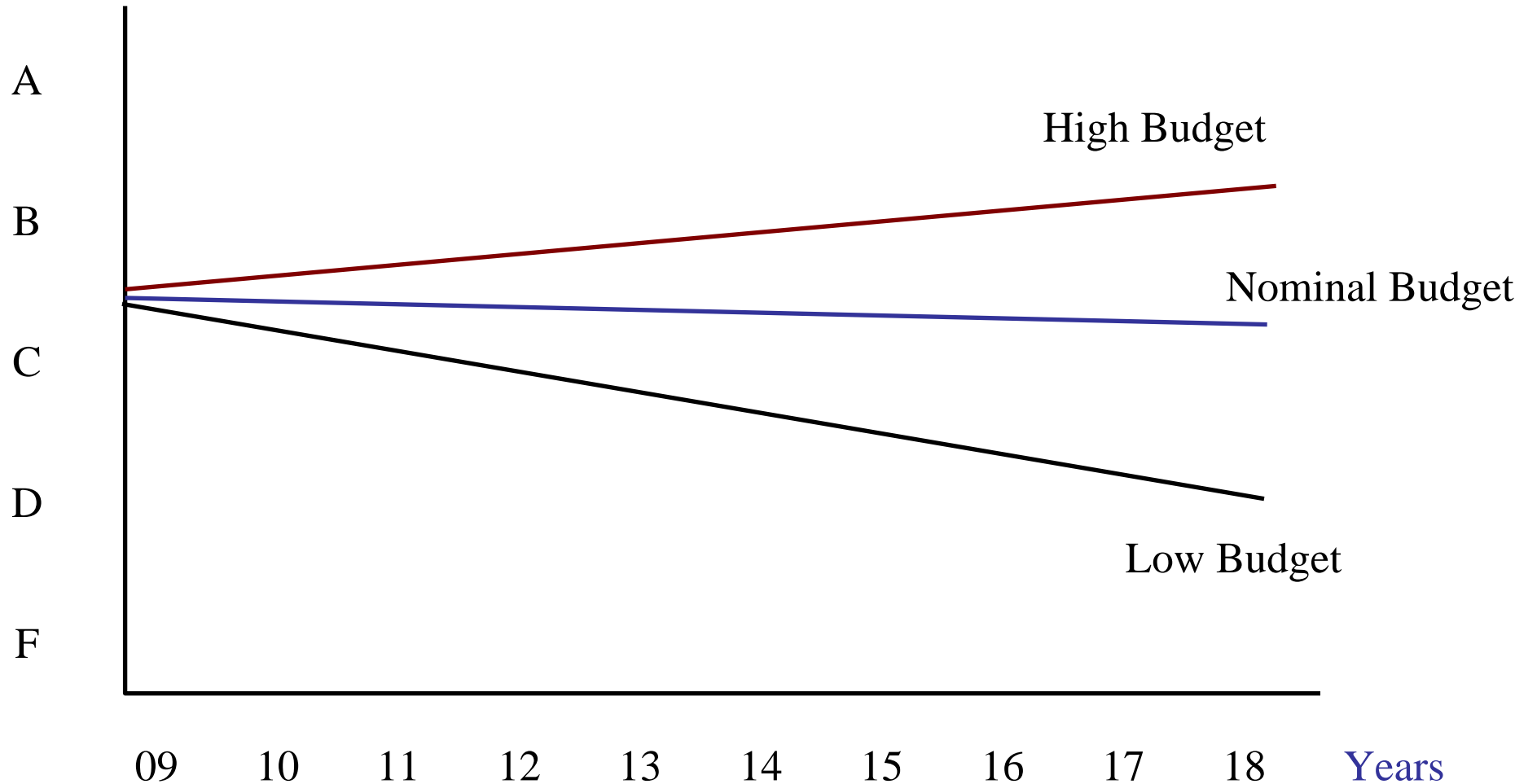
2006   2007   2008   2009   2010   2011

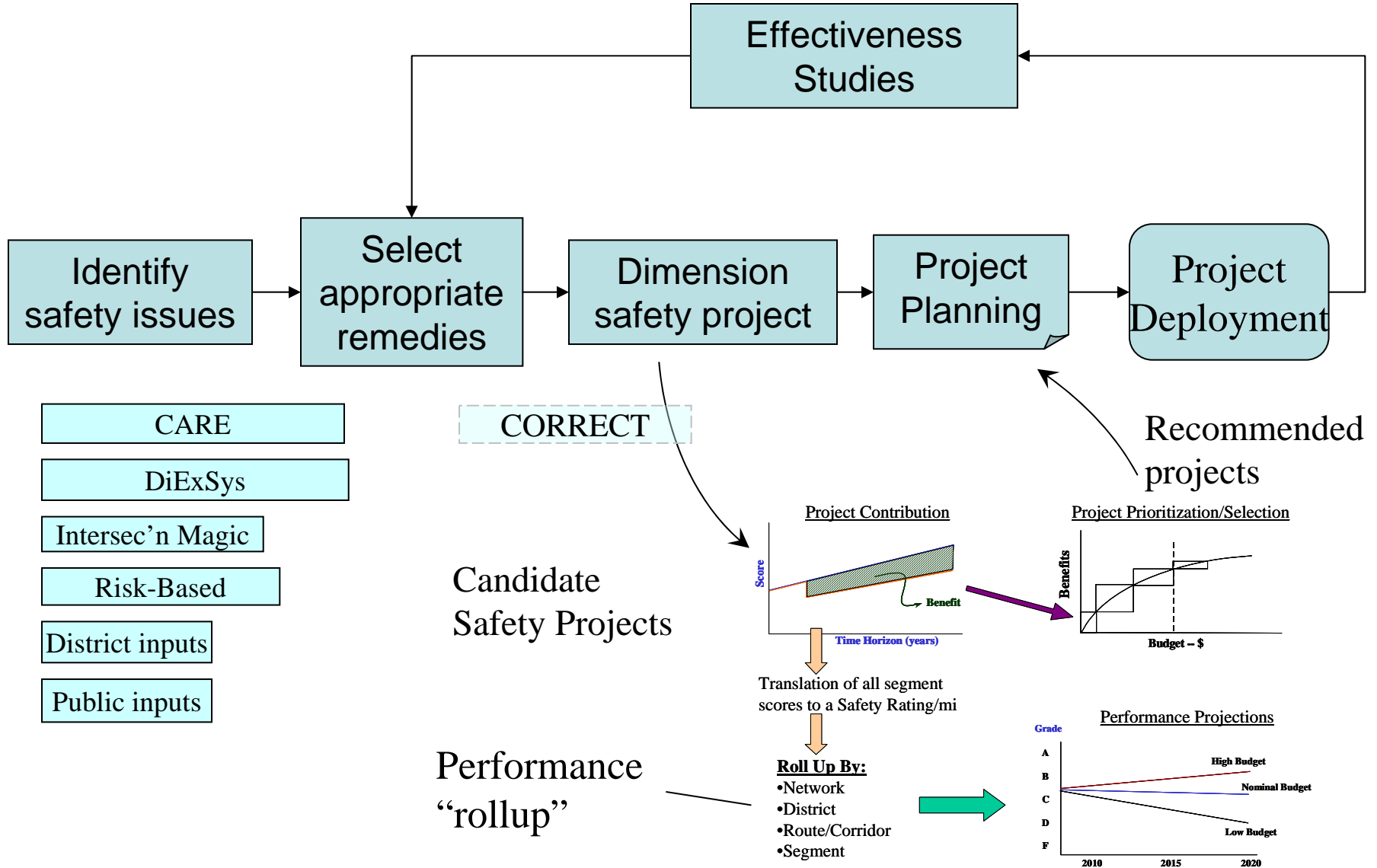# Safety Projects – Overall Process

Example Safety Condition Graph

Overview – Safety Index

- Reflects how Safety Performance is understood by wide audience
  - to WYDOT exec Staff, commissioners, legislature, public
- "Report Card" grade; A-F (A is best)
- Maps directly from the Performance Measure
  - Much like PSR is mapped to Poor / Fair / Good / Excellent for pavement

Safety Analysis, Project Selection & Rollup

Effectiveness Studies

Identify safety issues → Select appropriate remedies → Dimension safety project → Project Planning → Project Deployment

CARE

DiExSys

Intersec'n Magic

Risk-Based

District inputs

Public inputs

CORRECT

Recommended projects

Candidate Safety Projects

Performance "rollup"

Project Contribution

Score

Benefit

Time Horizon (years)

Project Prioritization/Selection

Benefits

Budget -- $

Translation of all segment scores to a Safety Rating/mi

Roll Up By:
•Network
•District
•Route/Corridor
•Segment

Performance Projections

Grade

A
B
C
D
F

High Budget

Nominal Budget

Low Budget

2010   2015   2020

Objective: Safety stack of projects

Expected: A prioritized list of projects with their associated Benefits and Costs…

In order to:
- Prioritize between safety projects
- Trade off between programs
- Consolidate with other program projects (at the margin)

Cum Benefit

Cumulative Cost -- $
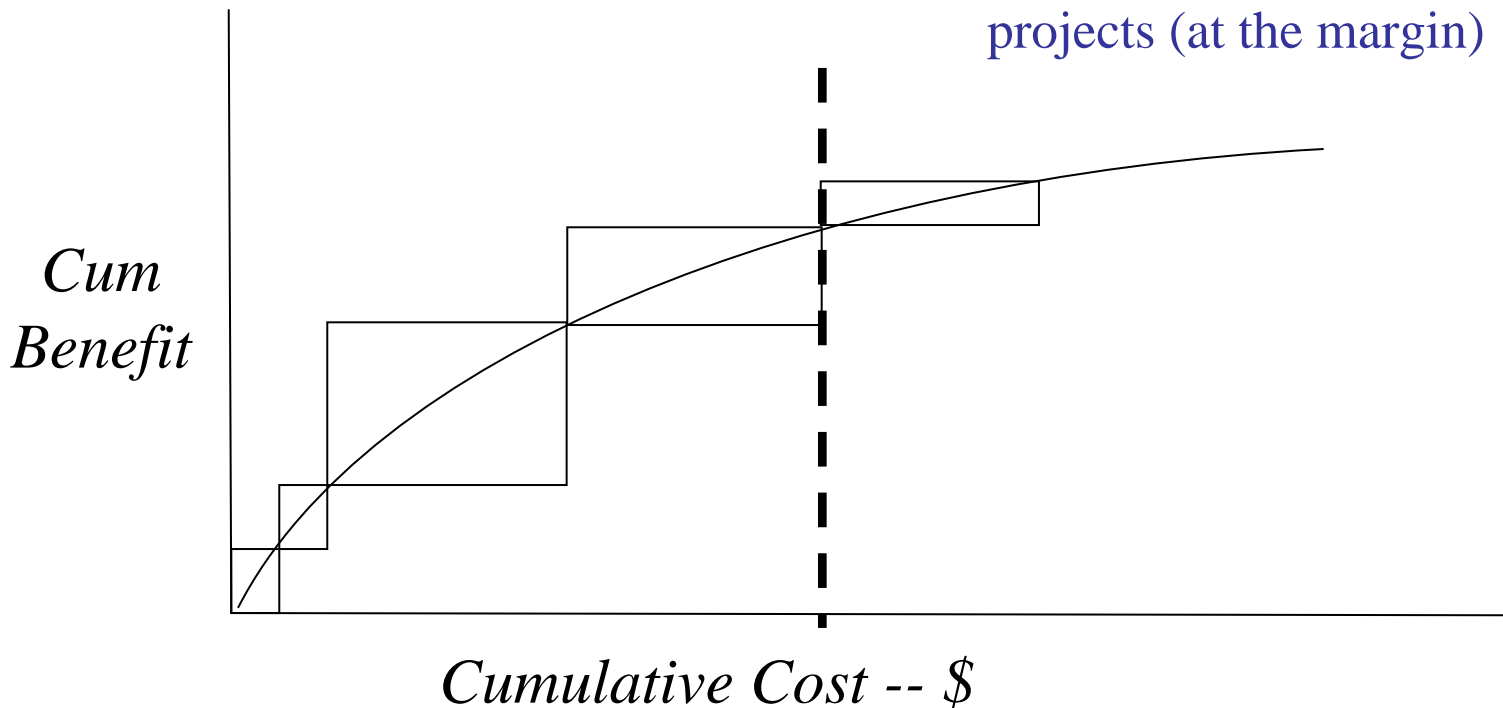
Calculating Project Benefit

- Benefit = expected reduction in frequency and/or severity of future crashes, based on
  - Severity of the problem
    - Current frequency of PDO, Injury, Fatality
  - Selected remedies
  - Expected improvements on crashes
    - Published CMF (e.g. NCHRP Digest 299)
    - Adapted for Wyoming experience
  - Expected reduction percentage for each severity;
    - Proportional to crashes (based on % of crashes that result in injuries/fatalities),
    - Decoupled from crashes (e.g. cable median barriers)
  - Weight based on federal standard costs for each severity
  - Expected life of remedy
  - Future traffic growth

Benefit of Safety Projects
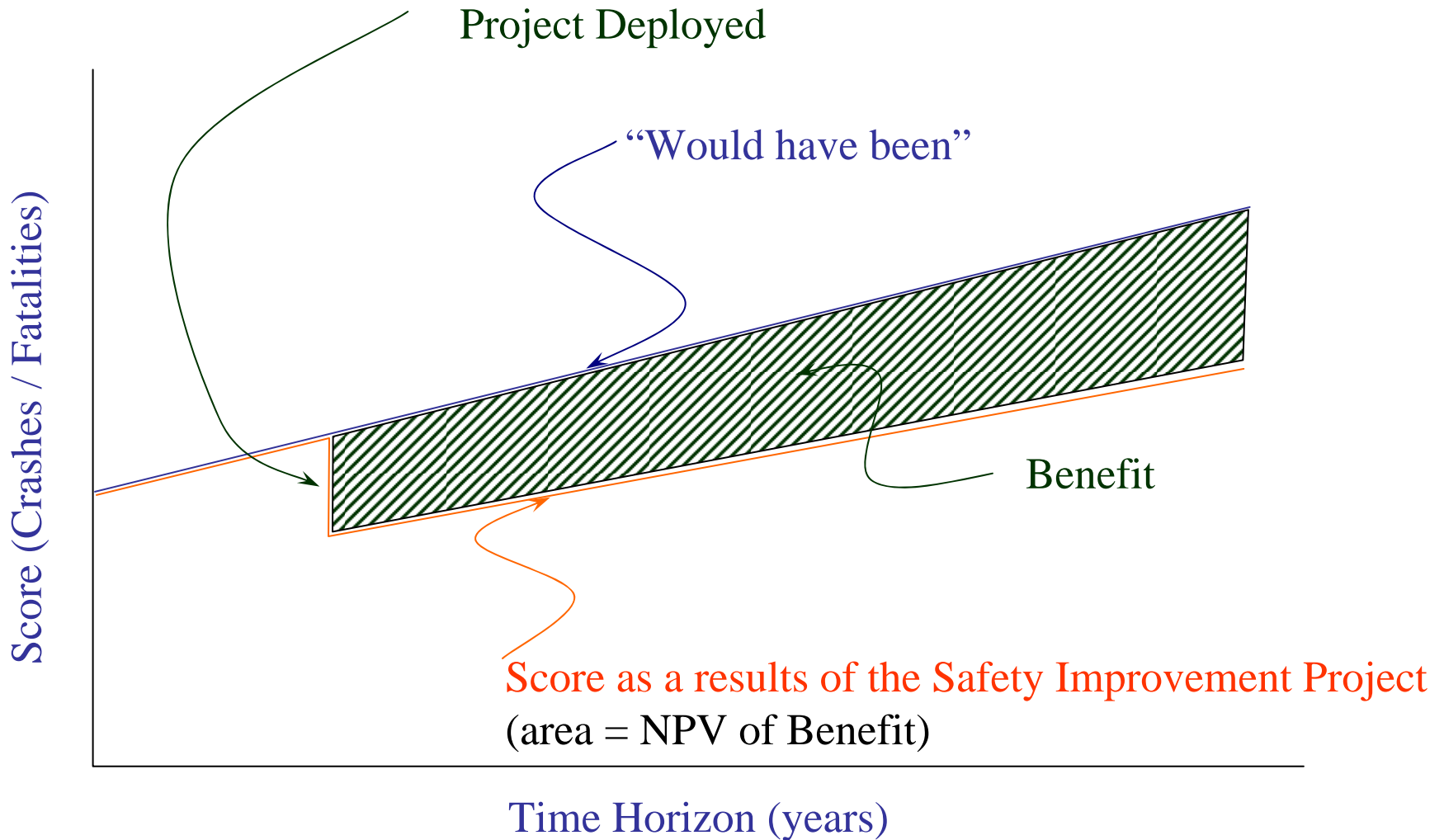
Safety Management System

- ## DATA DRIVEN
  - Turn data into useable information about a roadway segment

- ## NEED TO DEVELOP INFORMATION FOR DECISION MAKING
  - Don't need everything, just some critical data
  - All roads are competing for limited resources
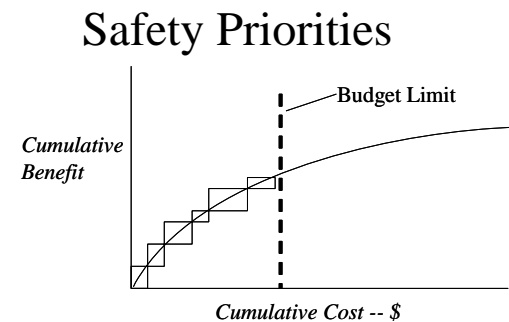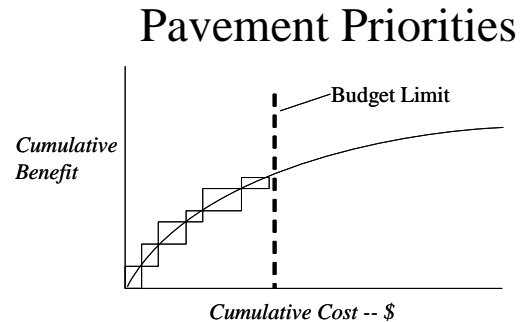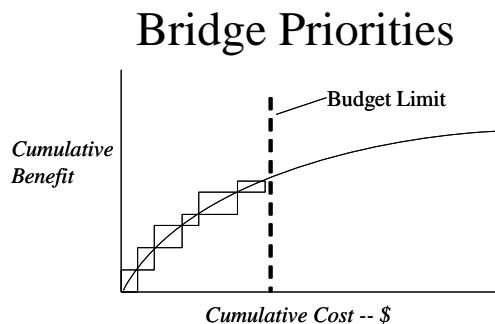 - Need to know how they stack up against one another

Safety Management System

- ## Safety Analysis
  - ### Hazard/Problem Identification
  - ### Prioritization/Trade-offs
  - ### Evaluation of Strategies

- ## Reporting of Info to Decision Makers

- ## Compatible with the SHSP

- ## Integrate with other Management Systems

Resulting Capabilities

1. Program-to-Program Tradeoff Analysis – How to Invest $ across programs
   a) Program-to-program tradeoffs
   b) Functional Class splits

2. Project-to-Project Scenario Analysis -- Benefit-to-Cost "At the Margin" for each asset class/program, for final Programming

Bridge Priorities

Budget Limit

Cumulative Benefit

Cumulative Cost -- $

Pavement Priorities

Budget Limit

Cumulative Benefit

Cumulative Cost -- $

Safety Priorities

Budget Limit

Cumulative Benefit

Cumulative Cost -- $

Engineering

- You can't build your way out of all your safety issues

- There are Safety Problems that can be addressed with engineering solutions, BUT

- A large percentage of the Safety Problems on our roadways are HUMAN BEHAVIOR related…
- BELTS, BOOZE & SPEEDING

Excellence in Transportation