Maintenance, Construction & Secondary Roads

Terry Gibson, PE – State Highway Administrator

February 15, 2011

- State versus local responsibility
- Division structure
- Allocations
- Flexibility in funding
- Implications of not fully funding

- State versus local responsibility

North Carolina State Highway System

NCDOT responsible for the Planning, Design, Construction, Maintenance and Operation of…

- 79,185 road miles
  - Approximately 15,000 primary
  - Approximately 64,000 secondary
- 160,630 paved lane miles
- 4,592 miles of unpaved roads
- 18,205 structures
  - 88.1 M square feet bridge deck area
- 8,900 signals

In accordance with Work Program, Principals of Asset Management, Targeted Levels of Service

Municipal Street Aid - Powell Bill Funds

- Funds allocated from the Highway Fund and Highway Trust Fund to provide financial assistance for municipal maintained streets - $128.9 Million for 2010 ($90.8M HF/$38.1M HTF)
- Eligible activities
  - Construction and Maintenance
  - Sidewalks & bike lanes
  - Traffic Control Devices
  - Municipal Street Bond Debt Service

Municipal Street Aid - Powell Bill Funds

- Allocation – 75% Population + 25% Miles
- Strong incentive to grow in population, less of incentive to add miles to their system
- Seven municipalities receive funds but have no mileage
- NC Accountability Report (NCAR) identified this as an area of concern:

"Powell Bill Funding performance not linked to DOT short or long-term goals"

County Responsibility

- Zero miles for maintenance/operations
- Concur with expenditures of Secondary Road Construction Program (G.S. 136-44.7)
- Can provide funds for improvements on the state highway system (G.S. 136-66.3, 136-44.53, 143B-350)

- Division structure

History of NCDOT Division Structure

- In 1915, State Highway Commission created 10 districts based on funds and mileage
- In 1919, districts adjusted from 10 to 7 by State Highway Commission (federal aid was to 4 Divisions)
- In 1921, General Assembly adjusted districts from 7 to 9 based on road miles, population and land area
- In 1930, General Assembly adjusted districts (became 5 Divisions with 5 districts each)
- In 1937, Governor's Office increased Division number to 10
- In 1950's, General Assembly authorized a study group and Divisions were reorganized to 14 in number based on miles and geography

Recent Division Boundary Consideration

- Internal study in 1998 looked at aligning divisions with MPOs. MPO boundaries are dynamic. Found that realignment would be disruptive to operations.

- In 2007 NCDOT hired McKinsey & Company to review NCDOT. After an in-depth look at the organization, based on significant internal and external stakeholder feedback, over 30 strategic recommendations were made as to how to improve NCDOT. After reviewing McKinsey's initial recommendation for centralized expertise and decentralized delivery and consultation with McKinsey's worldwide resources, it was determined that the current structure was consistent with this model and Division realignment was not among McKinsey's final recommendations.

Division Boundary Consideration

- The primary purpose of the Highway Division is to maintain and operate the elements of the state highway system.
- In the 1950's NCDOT went from 10 to 14 divisions. This provided a fair and equitable administration of a representatively equal number of miles of roads with a physical presence that would have been as close as if the counties were to have responsibility for the roads and an organizational structure that efficiently utilized personnel and materials.
- As in their earliest days, NCDOT's current division boundaries continue to be based on efficient maintenance and operations based on geography and road mileage. In 2011, NCDOT Division staffing levels are based on the number of employees and pieces of equipment necessary to achieve the desired outcomes.

Bridge Deck Surface Area per Division

Div. 11 (4.41%)
1320
4004091.2

Div. 9 (6.50%)
775
5906881.8

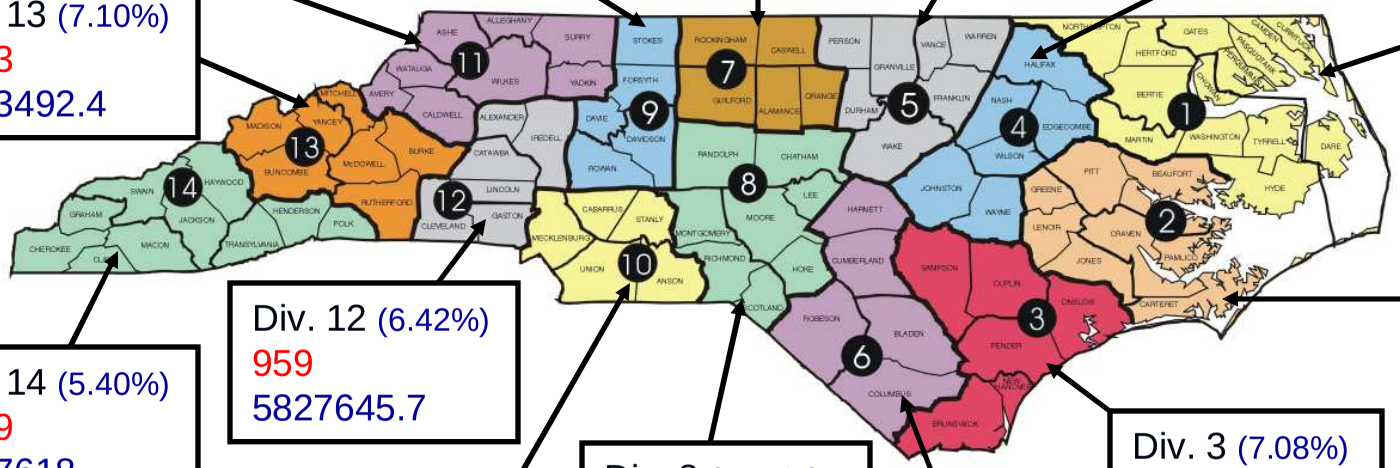
Div. 7 (8.08%)
948
7338929.1

Div. 5 (10.09%)
985
9166867.1

Div. 4 (6.85%)
938
6223034.6

Div. 13 (7.10%)
1593
6443492.4

Div. 1 (10.98%)
550
9968601.3



Div. 14 (5.40%)
1569
4907618

Div. 12 (6.42%)
959
5827645.7

Div. 2 (7.47%)
616
6784148.3

Div. 10 (8.73%)
949
7932399

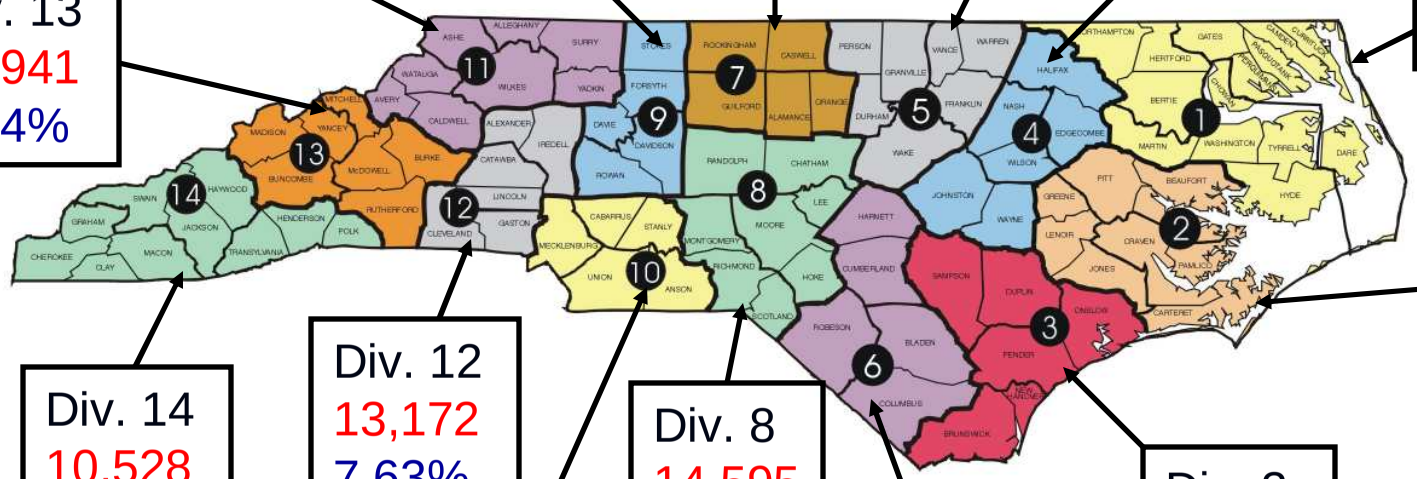
Div. 8 (5.74%)
911
5208954.2

Div. 3 (7.08%)
647
6426595.2

Div. 6 (5.15%)
730
4675842.7

State Totals
13490 Structures
90815101 Total Square Footage
(Percent Total Square Footage)

Road Lane Miles



Div. 11
12,670
7.34%

Div. 9
11,238
6.51%

Div. 7
12,261
7.10%

Div. 5
14,717
8.52%

Div. 4
13,760
7.97%

Div. 1
10,901
6.31%

Div. 13
10,941
6.34%

Div. 2
10,825
6.27%

Div. 14
10,528
6.10%

Div. 12
13,172
7.63%

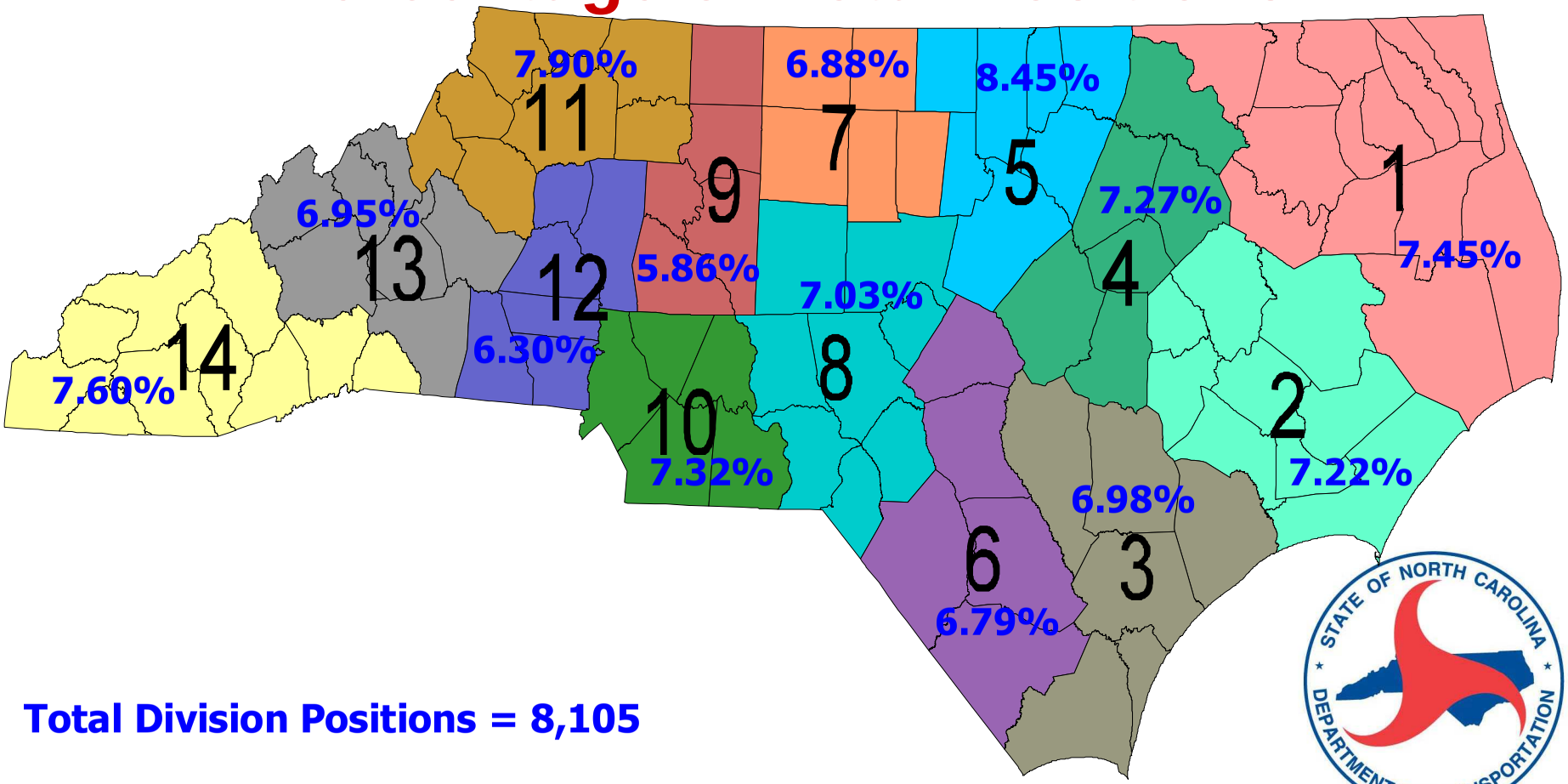
Div. 8
14,595
8.45%

Div. 10
11,669
6.76%

Div. 6
13,299
7.70%

Div. 3
12,077
6.99%

Percentage of Total Positions



Total Division Positions = 8,105

Employee Per Mile: State Comparison

State	Employees	Mileage	Employees per Mile
Maryland	10,779	5,148	2.09
Florida	6,971	12,084	0.58
Alabama	4,756	10,938	0.43
Mississippi	3,338	10,973	0.30
Pennsylvania*	11,466	39,862	0.29
Tennessee	4,068	13,881	0.29
Georgia	4,955	17,997	0.28
Louisiana	4,502	16,685	0.27
Missouri	6,114	33,677	0.18
North Carolina*	12,354	79,466	0.16
Texas	11,907	80,067	0.15
West Virginia	4,758	34,369	0.14
Virginia	6,808	57,918	0.12
US Average (based on 41 states reporting)	4,746	17,598	0.42

* Includes the Division of Motor Vehicles in their employee count

Summary

- Only in 1989 did funding strategies (i.e. equity funding) become aligned with operational boundaries. As equity funding and maintenance funding are unrelated, a thorough analysis would need to be conducted to determine whether or not any recommended boundary changes were being drawn to take advantages of equity formula benefits. If equity is primary concern for division realignment, it would be best to evaluate the equity formula than to redraw current maintenance and operational boundaries.

- There have been similar suggestions to realign Division boundaries to match Economic Development regions boundaries, MPO boundaries, COG boundaries, etc. Again, NCDOT feels that the primary basis of the Division structure is to equitably and efficiently handle the day to day maintenance and operations of our highway system. With the added focus on providing accessibility of NCDOT Division staff to local governments, maintaining a working knowledge of local issues, and being available to provide quick answers to pressing questions, it appears the current structure is working well.

- Allocations

NCDOT - Division of Highways

Funding Formulas for Maintenance and Construction Programs

- Highway Maintenance
- Contract Resurfacing
- Secondary Road Construction
- Bridge Maintenance
- Bridge Rehabilitation and Replacement
- Traffic Operations
- Roadside Environmental
- System Preservation
- Interstate Maintenance Preservation Program
- General Maintenance Reserve
- Disaster Response
- Access and Public Service
- Spot Safety

Highway Maintenance Program

Revenue Source - Highway Fund

FY 2011 Appropriation - $385,158,843 (includes primary and secondary roads)

- Funds appropriated to DOT by primary and secondary systems
- Serves as primary funding source for all routine highway maintenance operations:
  - Mowing
  - Patching
  - Drainage
  - Snow Removal
  - Operation of rest area and welcome centers
  - Guardrail Repair
  - Litter Pickup
  - Shoulder Work
- Funds allocated to highway divisions in accordance with Board of Transportation approved formulas

Primary System

$$\text{Statewide Available Funds} \times \frac{\text{Division Lane Miles}}{\text{State Total Lane Miles}}$$

Secondary System
(Individual County Allocation)
$50,000 Uniform Allocation to each county

$$90\% \quad \text{Total Available Sec. Maint. Funds} \times \frac{\text{County Road Miles}}{\text{State Sec. Rd. Miles}}$$

$$10\% \quad \text{Total Available Sec. Maint. Funds} \times \frac{\text{County Population}}{\text{State Population}}$$

Contract Resurfacing

Revenue Source - Highway Fund
FY 2011 Appropriation - $300,000,000

- Statewide appropriation to DOT for asphalt overlays
- Performed by Contract
- Provide renewed driving surface
- Improves ride quality
- Reduces patching and frequent maintenance
- Allocated to highway divisions in accordance with Board Of Transportation approved formula
- Formula considers pavement needs, lane mileage and population

Contract Resurfacing Allocation Formula for the Divisions

Resurfacing Appropriation

- **50% Need**
  - Pavement Condition Needs = $\frac{\text{Division Need}}{\text{Statewide Need}}$
- **37.5% Lane Miles**
  - Lane Miles = $\frac{\text{Division Lane Miles}}{\text{Statewide Lane Miles}}$
- **12.5% Pop.**
  - Pop. = $\frac{\text{Division Population}}{\text{Statewide Population}}$

Secondary Road Construction

Revenue Source – Highway and Highway Trust Fund

FY 2011 Appropriation - $144,882,954 ($59,233,796 HF; $85,649,158 HTF)

- Funds allocated to each county in accordance with G.S. 136-44.2A and G.S. 136-44.5
- Funds used to pave unpaved roads and modernize the paved secondary system
- Presented to County Commissioners annually for concurrence

Allocation Formula:

$$\frac{\text{Total miles of secondary roads in County}}{\text{Total miles of secondary roads in State}}$$

Bridge Maintenance

Revenue Source – Highway Fund

FY 2011 Allocations - $ 70M (Primary and Secondary)

- Funds used to maintain structural integrity and replacement for critical small bridges and pipes
- Division allocation formula based on maintenance needs and number of deficient bridges

Bridge Rehabilitation/Replacement

Revenue Source – Federal Funds/State Match
Annual Allocation – $105M grows to $208M by year 2020

Rehabilitation:

- Restore Bridge Components
- More Expensive than Preservation
- Cost Effective on some bridges

Replacement:

- Data driven prioritization process
- Central Let Program
- Division Managed Small Bridge Replacement Program

Traffic Operations

Revenue Source: Federal Funds and Highway Fund

Annual Appropriation $43M ($37M Federal, $6M HF)

- Traffic Signal Maintenance
- Pavement markings
- Overhead Dynamic message Boards
- Camera Systems
- Speed Detection Devices
- Motorist Assistant Patrol (I-MAP)
- 511 Program

Roadside Environmental

Revenue Source: Federal Funds, Highway Fund, Specialized License Plates

Annual Allocations - $11.7M ($8.2m Federal, $3.5M State Funds)

- Roadside Environmental provides:
  - Sedimentation/erosion control plans for Construction/Maintenance projects
  - Wastewater management compliance activities for Department's National Pollution Discharge Elimination System (NPDES) Program Permit
  - Rest area maintenance/preservation/renovation
  - Roadside Vegetation Management
  - Roadside Plantings

System Preservation

Revenue Source – Highway Fund

FY 2011 Appropriation - $100,000,000 (Primary and Secondary)

- Funds used for chip seals, crack sealing, pavement markings and markers, painting structural steel, replacing expansion joints and waterproofing bridge decks
- $28 million allocated to Divisions based on pro-rata share of bridge deck area for bridge preservation activities ($2M per Division)
- Remainder allocated to Divisions based on pro-rata share of total paved lane miles

Interstate Maintenance Preservation

Revenue Source – Federal Funds

Annual Appropriation - $10M ($10M years 1-3 ramp up to $15M years 4-10)

- Cost effective preventative activities to keep assets in "Good" condition
- Pavement, Bridge, and Positive Guidance assets
- Allocation to each Division is based on Lane Miles and Bridge Deck Area

General Maintenance Reserve

Revenue source – Highway Fund

FY 2011 Appropriation - $78M (Primary and Secondary)

- Beginning in 1999, the General Assembly has provided additional maintenance dollars to help address maintenance needs identified by the Department's Maintenance Condition Assessment Program.
- These funds are used to supplement other maintenance dollars.
- These funds are allocated to the Divisions based on a pro-rata share of Division paved lane miles.

Disaster Response

Revenue Source – Highway Fund

FY 2011 reserve $40M

- Snow and ice
- Hurricanes
- Floods
- Rock Slides

Access & Public Service Fund

Revenue Source - Highway Fund

FY 2011 Appropriation - $2.0 Million

- Funds used statewide to construct bus driveways and bus parking areas for new schools and construct new access roads or improve existing access for new industry
- Pave Driveways for new Fire and Rescue facilities
- Funds may be used on any system

Spot Safety Fund

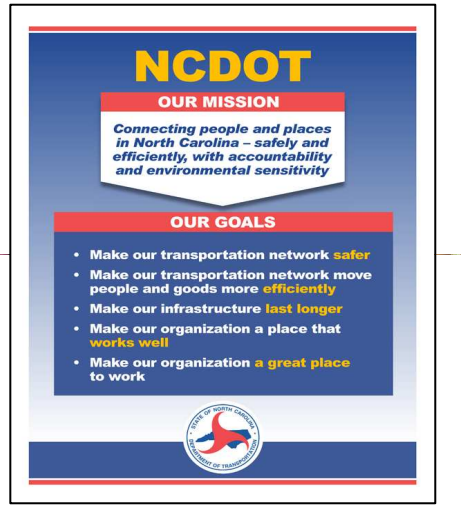
Revenue Source - Highway Fund and Federal Aid

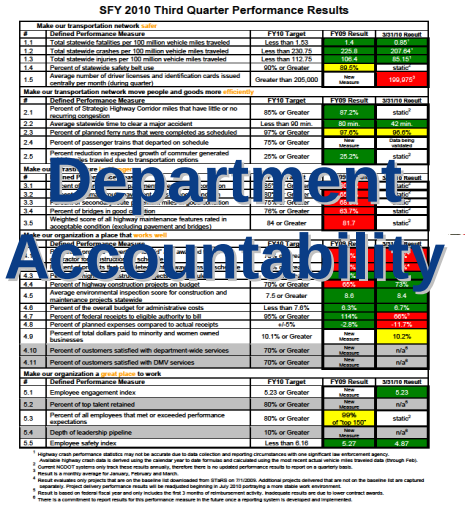
FY 2011 Appropriation – 40M ($9.1 Million HF and $30.9M Federal aid)

- Funds used statewide on all systems to provide safety and operational improvements
- Typical projects include traffic signals, turn lanes, guardrail and signing
- Projects considered based on accident history and severity, traffic volumes and signal warrants
- Projects are prioritized by benefit/cost ratios

- Flexibility in Funding
  - *Outcome based performance measurement*

Setting Priorities, Managing Performance and Achieving Results





SFY 2010 Third Quarter Performance Results

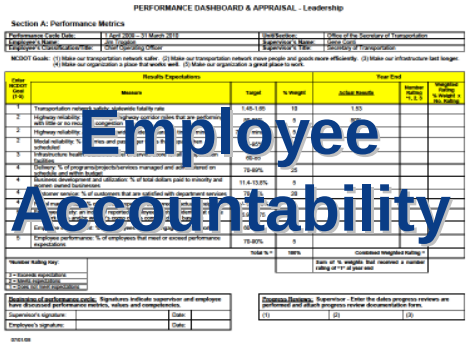
#	Defined Performance Measure	FY10 Target	FY09 Result	3/31/10 Result
Make our transportation network safer				
1.1	Total statewide fatalities per 100 million vehicle miles traveled	Less than 1.53	1.4	0.85[1]
1.2	Total statewide crashes per 100 million vehicle miles traveled	Less than 230.75	225.8	207.64[1]
1.3	Total statewide injuries per 100 million vehicle miles traveled	Less than 112.75	106.4	85.15[1]
1.4	Percent of statewide safety belt use	90% or Greater	89.5%	static[2]
1.5	Average number of driver licenses and identification cards issued centrally per month (during quarter)	Greater than 205,000	New Measure	190,975[3]
Make our transportation network move people and goods more efficiently				
2.1	Percent of Strategic Highway Corridor miles that have little or no recurring congestion	85% or Greater	87.2%	static[2]
2.2	Average statewide time to clear a major accident	Less than 90 min.	90 min.	42 min.
2.3	Percent of planned ferry trips that were completed as scheduled	97% or Greater	97.6%	96.6%
2.4	Percent of passenger trains that departed on schedule	75% or Greater	New Measure	Data being validated
2.5	Percent reduction in expected growth of commuter generated vehicle miles traveled due to transportation options	25% or Greater	25.2%	static[2]
Make our infrastructure last longer				
3.1	[illegible]	[illegible]	[illegible]	[illegible]
3.2	[illegible]	[illegible]	[illegible]	[illegible]
3.3	[illegible]	[illegible]	[illegible]	[illegible]
3.4	Percent of bridges in good condition	76% or Greater	69.7%	static[2]
3.5	Weighted score of all highway maintenance features rated in acceptable condition (excluding pavement and bridges)	84 or Greater	81.7	static[2]
Make our organization a place that works well				
4.1	[illegible]	[illegible]	[illegible]	[illegible]
4.2	[illegible]	[illegible]	[illegible]	[illegible]
4.3	[illegible]	[illegible]	[illegible]	[illegible]
4.4	Percent of highway construction projects on budget	70% or Greater	66%	79%
4.5	Average environmental inspection score for construction and maintenance projects statewide	7.5 or Greater	8.6	8.4
4.6	Percent of the overall budget for administrative costs	Less than 7.6%	6.3%	6.1%
4.7	Percent of federal receipts to eligible authority to bill	95% or Greater	114%	60%[7]
4.8	Percent of planned expenses compared to actual receipts	+/-5%	-2.9%	-11.7%
4.9	Percent of total dollars paid to minority and women owned businesses	10.1% or Greater	New Measure	10.2%
4.10	Percent of customers satisfied with department-wide services	70% or Greater	New Measure	n/a[8]
4.11	Percent of customers satisfied with DMV services	70% or Greater	New Measure	n/a[8]
Make our organization a great place to work				
5.1	Employee engagement index	5.23 or Greater	New Measure	5.23
5.2	Percent of top talent retained	80% or Greater	New Measure	n/a[8]
5.3	Percent of all employees that met or exceeded performance expectations	80% or Greater	99% of Top 150[9]	static[2]
5.4	Depth of leadership pipeline	10% or Greater	New Measure	n/a[8]
5.5	Employee safety index	Less than 6.16	5.27	4.67

[1] Highway crash performance statistics may not be accurate due to data collection and reporting circumstances with one significant law enforcement agency.
[2] Average highway crash data is derived using the calendar year to date formula and calculated using the most recent actual vehicle miles traveled data (through Feb).
[3] Data is NCDOT's current monthly average for January, February and March.
[4] Result evaluates only projects that are on the baseline list downloaded from STaRS on 7/1/2009. Additional projects delivered that are not on the baseline list are captured separately. Project delivery performance results will be readjusted beginning in July 2010 portraying a more stable work environment.
[5] Result is based on federal fiscal year and only includes the first 3 months of reimbursement activity. Inadequate results are due to lower contract awards.
[6] There is a commitment to report results for this performance measure in the future once a reporting system is developed and implemented.

Department Accountability

Tying it all together…

Performance Reporting



PERFORMANCE DASHBOARD & APPRAISAL - Leadership

Section A: Performance Metrics

Performance Cycle Date	1 April 2009 – 31 March 2010	Unit/Section:	Office of the Secretary of Transportation	
Employee's Name:	Jim Gaither	Supervisor's Name:	Lance Lunsford	
Employee's Position/Title:	Chief Operating Officer	Supervisor's Title:	Secretary of Transportation	

NCDOT Goals: (1) Make our transportation network safer. (2) Make our transportation network move people and goods more efficiently. (3) Make our infrastructure last longer. (4) Make our organization a place that works well. (5) Make our organization a great place to work.

Value NCDOT Goal (1-5)	Measure	Target	% Weight	Year End: Actual Results	Number Rating (1, 2, 3)	Weighted Rating % Weight x No. Rating
Results Expectations						
1	Transportation network safety: statewide fatality rate	1.45-1.65	10	1.53		
2	Highway reliability: % of highway corridor miles that are performing with little or no recurring congestion	85%	10			
2	Highway reliability: [illegible]	[illegible]	[illegible]			
2	Modal reliability: % lines and [illegible] scheduled	[illegible]	[illegible]			
3	Infrastructure health: [illegible] facilities	65-69				
4	Delivery: % of programs/projects/services managed and administered on schedule and within budget	75-80%	25			
4	Business development and utilization: % of total dollars paid to minority and women owned businesses	11.4-13.6%	5			
4	Customer service: % of customers that are satisfied with department services	75-80%	20			
[illegible]	[illegible]	[illegible]	[illegible]			
5	Employee safety index: [illegible]	[illegible]	[illegible]			
5	Employee performance: % of employees that meet or exceed performance expectations	75-80%	5			
		Total % =	100%			Combined Weighted Rating =

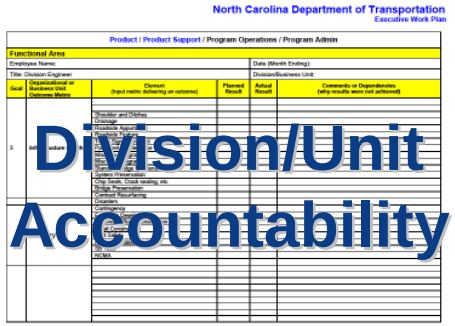
*Number Rating Key:
3 = Exceeds expectations
2 = Meets expectations
1 = Does not meet expectations

Designation of performance goals: Signatures indicate supervisor and employee have discussed performance metrics, values and competencies.

Supervisor's signature: Date:
Employee's signature: Date:

Progress Reviews: Supervisor - Enter the dates progress reviews are performed and attach progress review documentation form.
(1) (2) (3)

Employee Accountability



North Carolina Department of Transportation
Executive Work Plan

Product / Product Support / Program Operations / Program Admin

Functional Area

Employee Name: Date (Month Ending):
Title: Division Engineer Division/Business Unit:

Goal	Organizational or Business Unit Outcome Metric	Element (input metric delivering an outcome)	Planned Result	Actual Result	Comments or Dependencies (why results were not achieved)
3	Infrastructure	Shoulder and Ditches			
		Drainage			
		Roadway Aesthetics			
		Roadway Safety			
		Signs			
		Guardrail			
		Signs - Logo			
		System Preservation			
		Chip Seals, Crack sealing, etc.			
		Bridge Preservation			
		Contract Resurfacing			
		Dropders			
		Contingency			
		Bridge Replacement			
		Contract Resurfacing			
		NCMA			

Division/Unit Accountability

Performance Based Management

Benefits include:

- Moving towards uniformly constructed, maintained and operated Highway System
- Data driven decision making
- Increased focus on preventive maintenance
- Targeting Level Of Service by system
- Highest and best use of resources
- Challenging and rewarding workplace
- Accountability

Performance Measures

Sets clearly defined outcomes such as:

- No unsealed cracks in pavements
- Bridge decks rating in good condition
- No pipes blocked or damaged
- Pavement markings visible at night

Since 2008:

- Reviewed targets to ensure accuracy
- Made modifications as necessary
- Simplified and streamlined

Rating the Condition of the Highway System

Maintenance Condition Survey

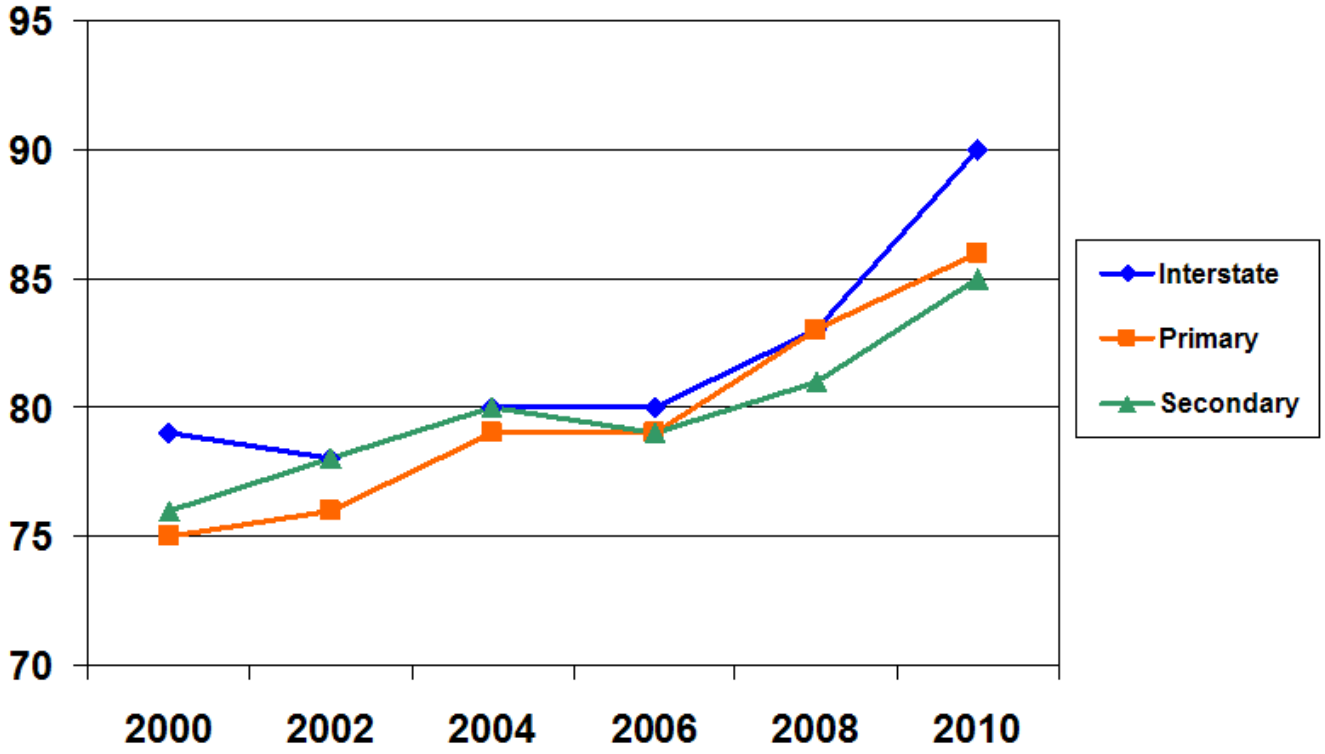
Bridge Condition Survey

Pavement Condition Survey

Maintenance Condition Survey Results

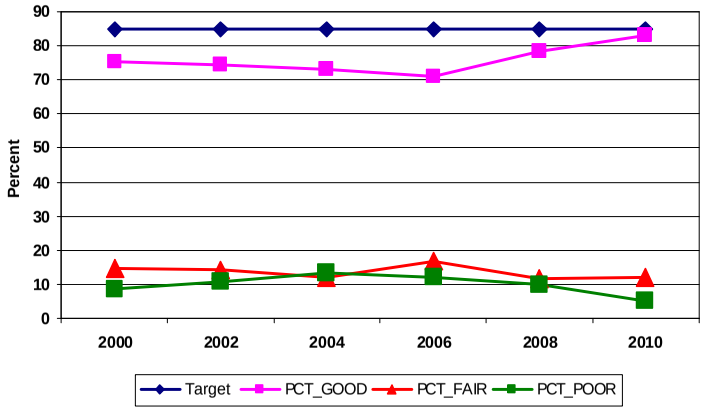
Roadway			Interstate		Primary		Secondary	
			2010	State Average	2010	State Average	2010	State Average
FEATURE	ELEMENT	PERFORMANCE MEASURE	Target	Score	Target	Score	Target	Score
	Unpaved Shoulders	No drop-offs greater than 3" and no shoulder higher than 2"	95	91	90	89	85	91
	Ditches	No blocked or eroded ditches	95	98	90	94	85	94
	Crossline Pipe (Blocked)	Greater than 50% diameter open	95	87	90	78	85	74
	Crossline Pipe (Damaged)	No damage or structural deficiency	95	93	90	95	85	91
	Curb & Gutter (Blocked)	No obstruction > 2" for 2 feet	95	97	90	96	85	96
DRAINAGE	Boxes (Blocked or Damaged)	Not blocked > 50%, damaged or broken	95	82	90	87	85	85
	Vegetation (Brush & Tree)	Cleared to Freeway and Non-Freeway standards	90	90	85	85	80	80
	Vegetation (Turf Condition)	Areas free of erosion	95	84	90	83	85	86
	Stormwater Devices (NPDES)	Functioning as designed	90	94	90	94	90	94
	Landscape Plant Beds	Minimum condition score of 2	90	90	80	90	N/A	N/A
ROADSIDE	Rest Areas & Welcome Ctrs	Condition rating of 90	90	96	90	95	N/A	N/A
	Long Line Pavement Markings	Present, visible	90	93	85	90	80	81
	Words and Symbols	Present, visible	90	73	85	85	80	77
	Pavement Markers	Present and reflective	90	84	85	59	N/A	N/A
	Ground Mounted Signs	Visible and legible	90	94	85	91	85	85
TRAFFIC	Overhead Signs	Visible and legible	92	93	85	80	85	100
	NBIS Culverts	Condition rating ≥ 6	85	86	85	86	85	89
	Non-NBIS Culverts	Condition rating = Good	80	84	80	74	80	56
BRIDGE	Overhead Sign Structure	Condition rating = Good	95	95	95	93	95	88
	Totals		91.27	89.79	87.28	86.04	84.49	85.04

Performance Measure Trends
(Maintenance Condition Survey Results)

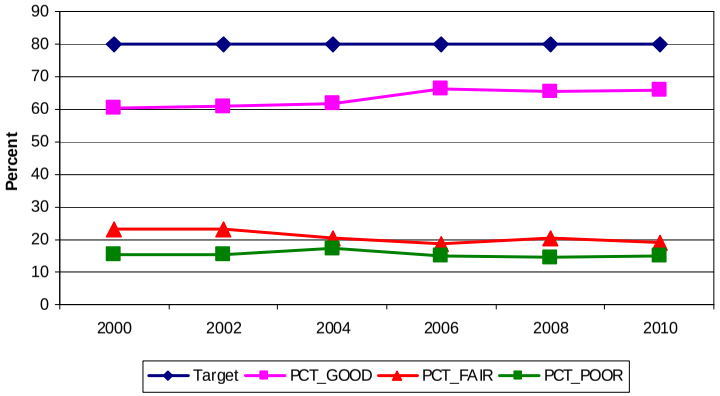


Pavement Condition
2000 - 2010

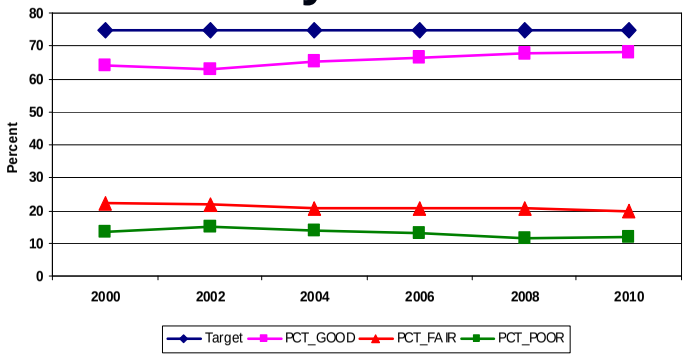
Interstate



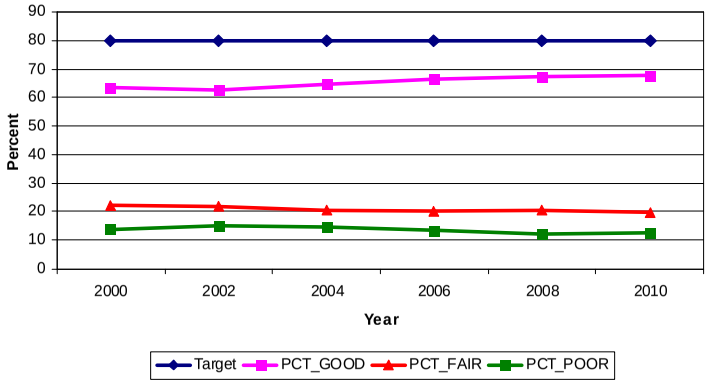
Primary



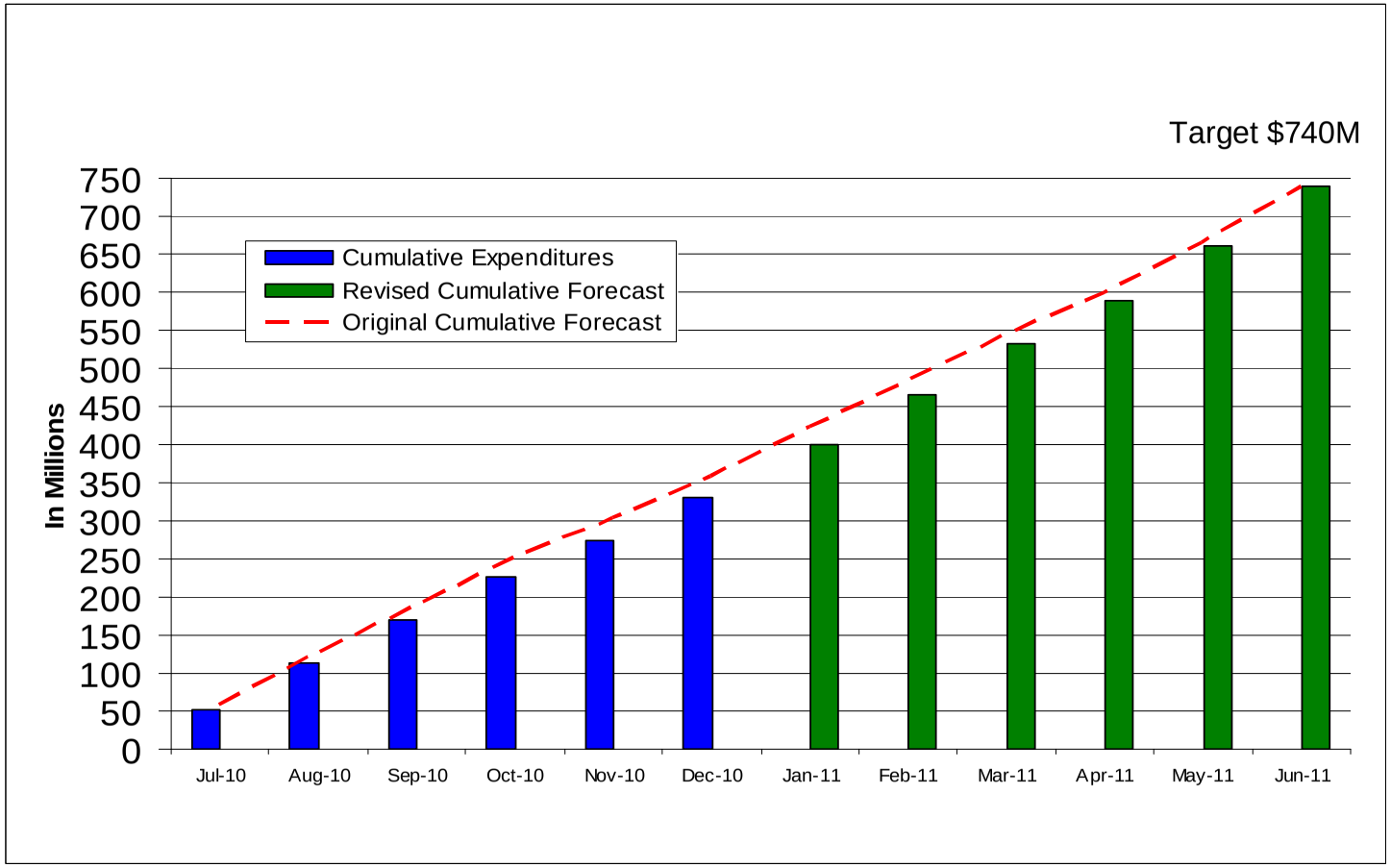
Secondary



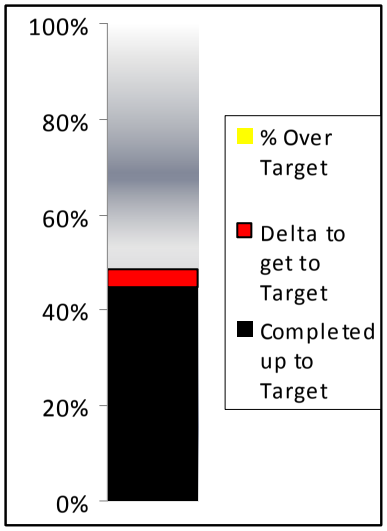
Total



Summary Maintenance Expenditures
Actuals as of December 31, 2010



% TARGET COMPLETE

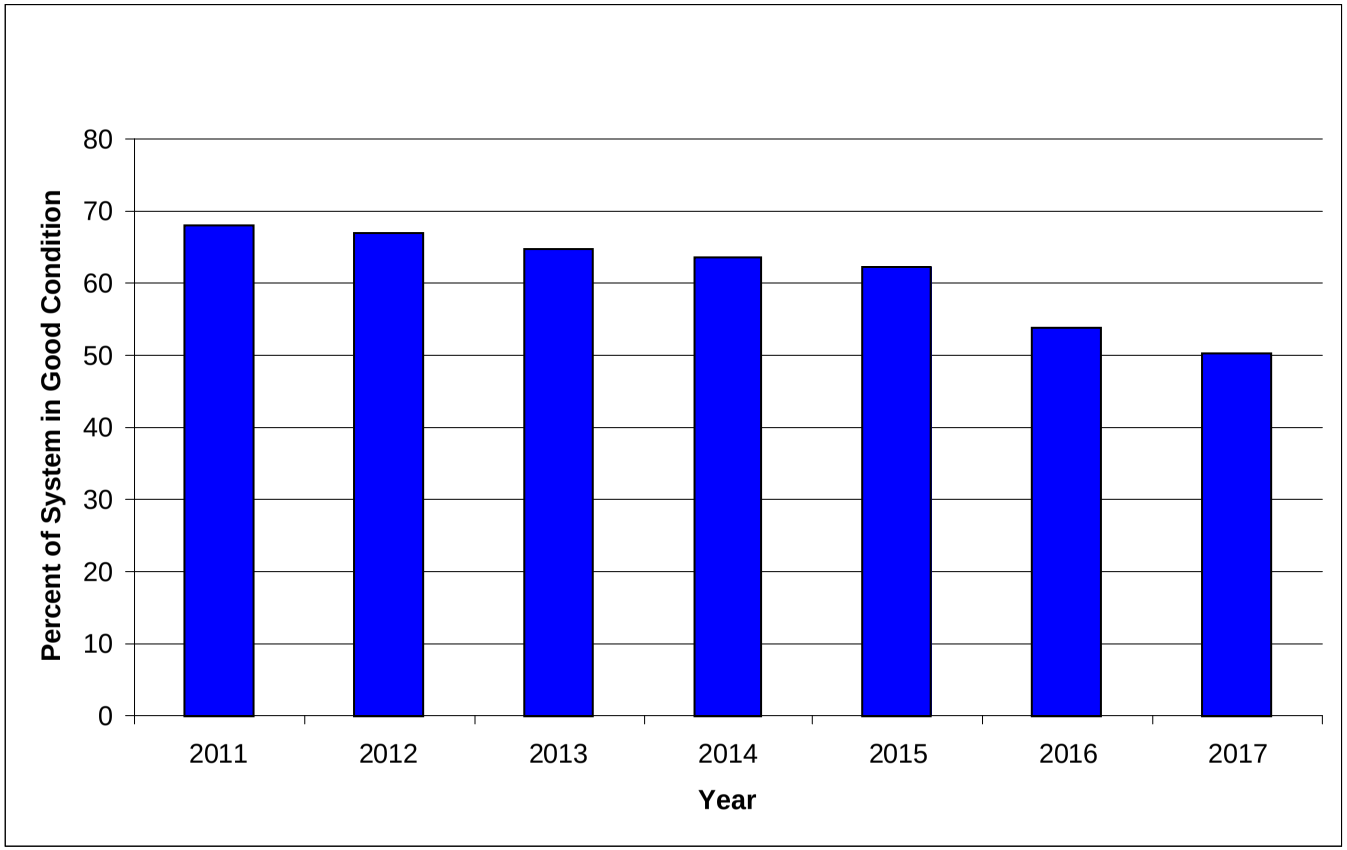


Flexibility In Funding

- NCDOT has worked hard to tie the vision and goals of the Department to levels of service, to business unit performance, and to employee accountability.
- NCDOT conducts independent surveys of the condition of the system and reports against the desired targeted level of service.
- NCDOT is trending in the right direction over time.
- NCDOT is actively tracking expenditures in order to maximize investment in the system.
- Flexible funding allows NCDOT to address differing needs across all geographic areas of the State to maximize the return on investment.

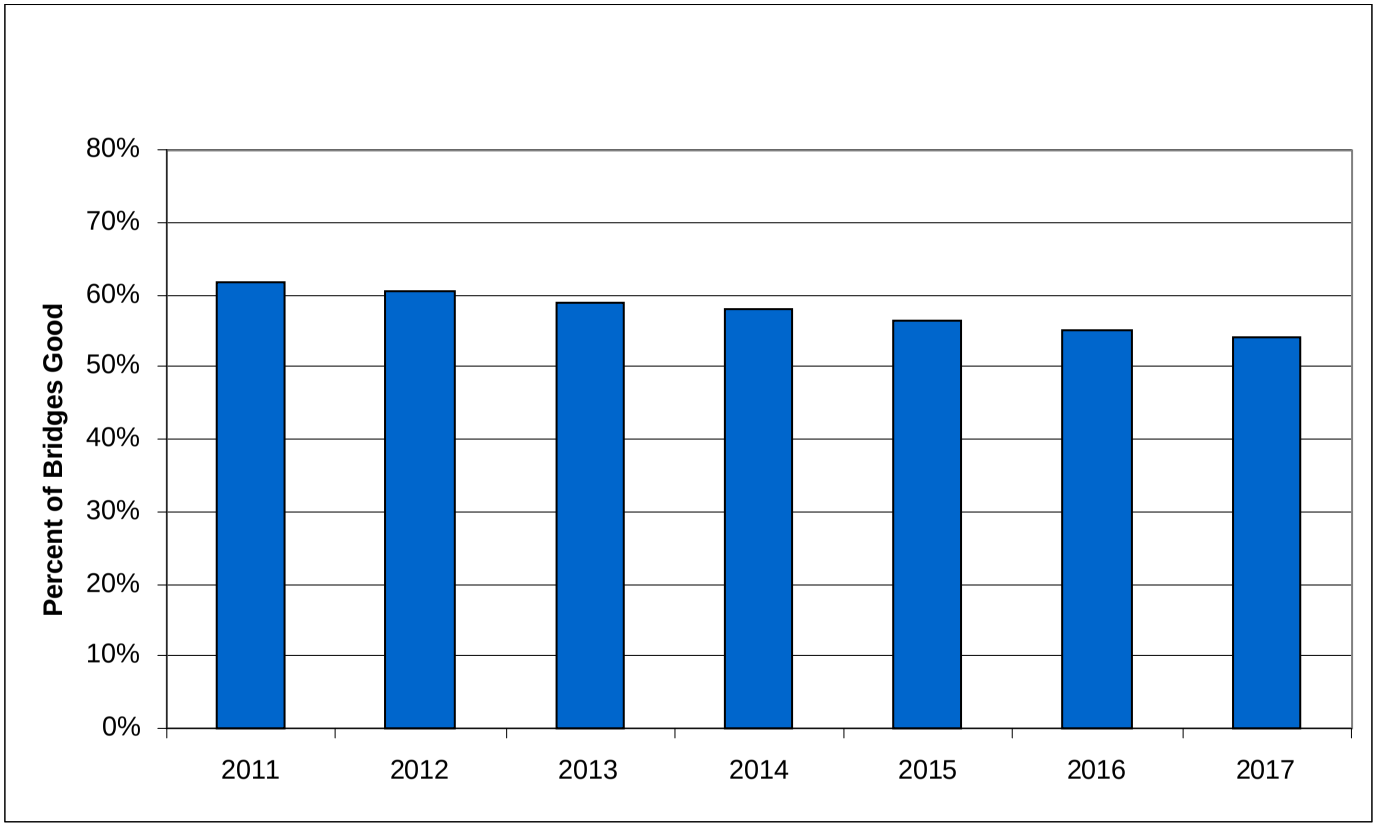
- Implications of not fully funding

Percent of Pavements in Good Condition at Current Budget Levels



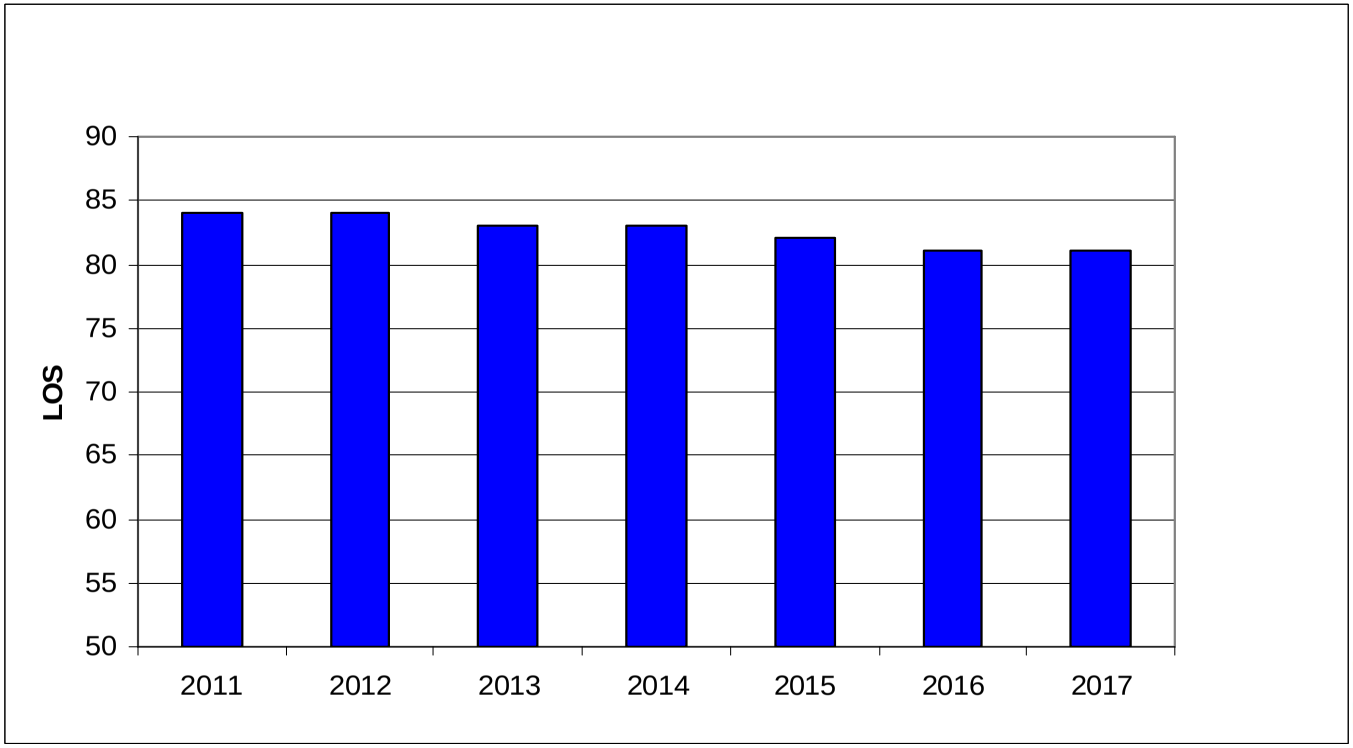
Source: PMS System

Percent of Bridges in Good Condition at Current Budget Levels



Source: BMS System

Roadway Level of Service at Current Budget Levels (Excludes bridges/pavements)



Based on CPI of 2.2%

Source: SRMU based on MCAP Assessment

Questions?