



# Maine Bridges

Inspection, Management, Funding & Repair

Mid-Coast Regional Planning  
Commission  
Annual Meeting 2016

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# Outline

- MaineDOT Organization
- Maine Bridge Statistics
- Bridge Inspection
- Bridge Management
- MaineDOT Work Plan
- Funding
- Keeping our Bridges Safe
- Project Delivery

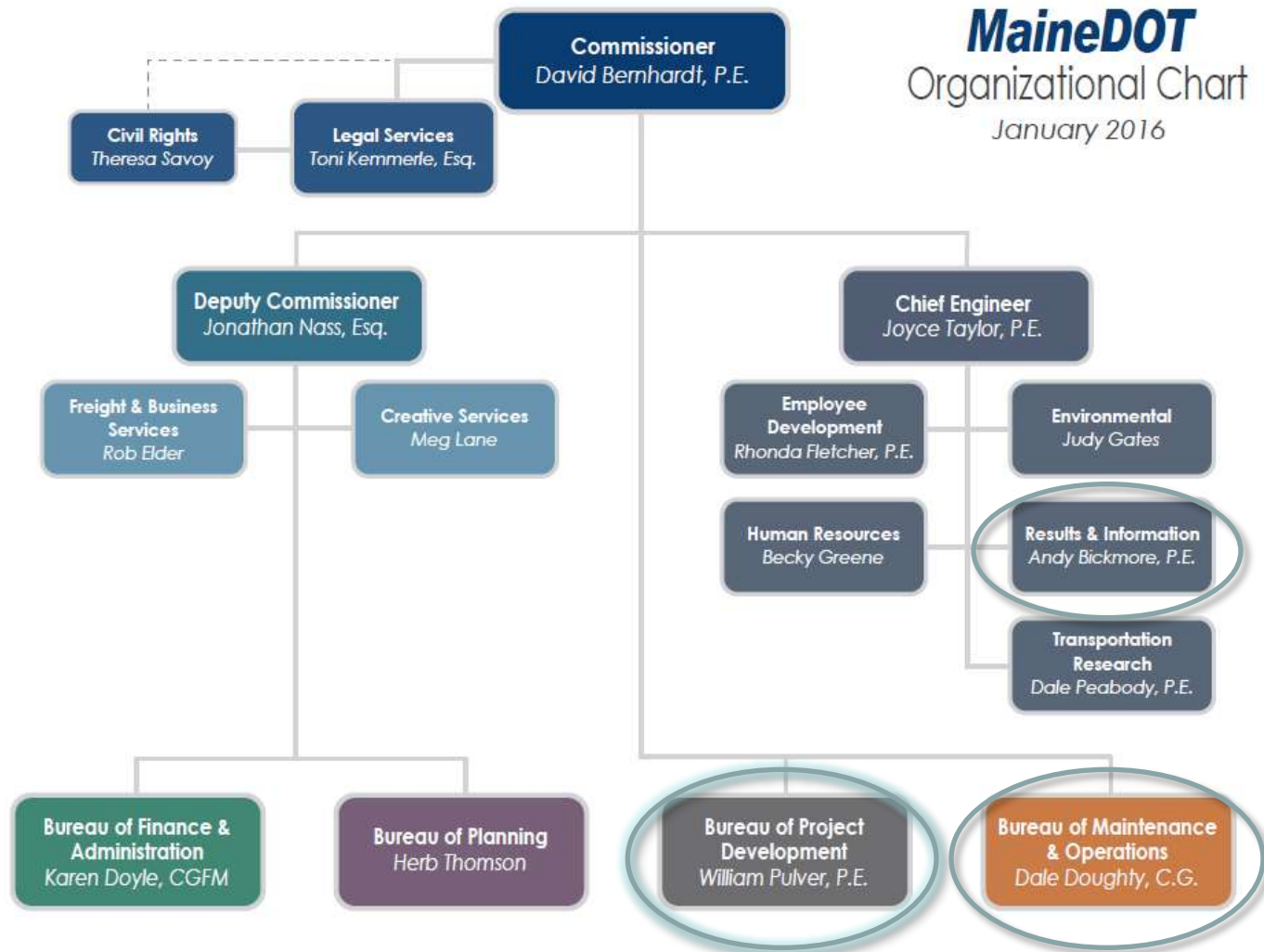


Thomaston, Wadsworth Street Bridge

# MaineDOT

## Organizational Chart

January 2016



Delivery of Capital  
Projects  
Design &  
Construction



- Bridge Inspection
- Load Rating
- Posting
- Maintenance Repairs/Preservation



- Asset Management
- Work Plan Development

# Maine Bridge Data

- 2,515 Bridges (span longer than 20')
- 1,374 Minor spans ( spans 10 to 20')
- State of Maine owns and manages 2,744 bridges (70%)
- Maine's bridge network replacement cost - \$7.56 Billion
- Average service life of traditional bridges is 70 years
- Average service life of metal culverts is 50 years
- MaineDOT inspects about 2,000 bridge each year with a staff of ±12
- 265 bridges and minor spans in Knox and Waldo Counties



# Average Bridge Age

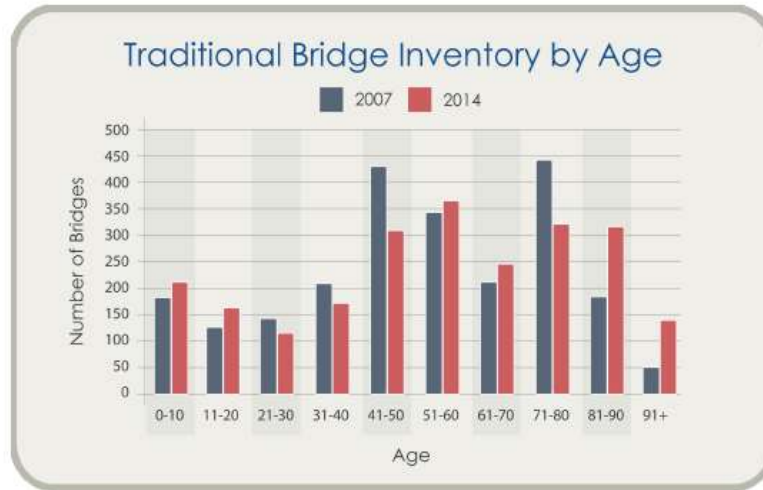
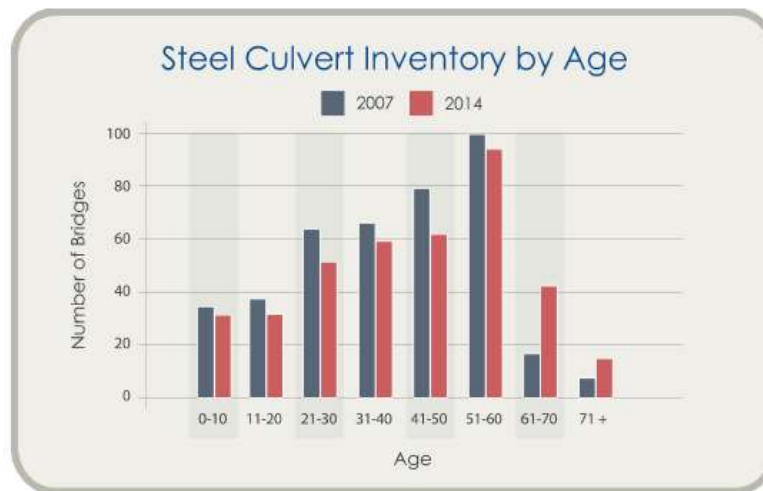
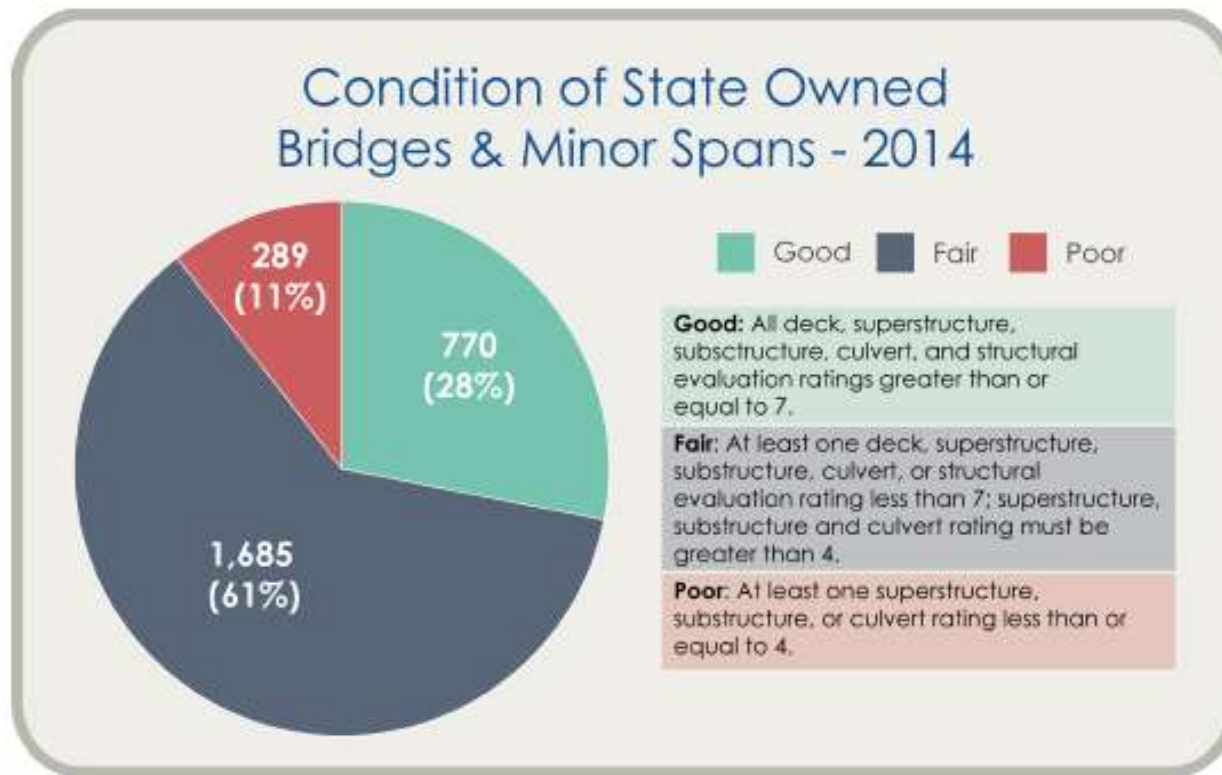


Chart 1





# Bridge Condition



# Bridge inspection

MaineDOT inspects all bridges and minor spans on public ways at least once every 24 months in accordance with National Bridge Inspection Standards (NBIS)

- Inspections are reported annually to FHWA
- Data used to determine the safe load capacity of our bridges and candidates for MaineDOT's capital and maintenance work





# National Bridge Inspection Standards (NBIS)

- Federal regulations establishing requirements for:
  - Inspection Procedures
  - Frequency of Inspections
  - Qualifications of Personnel
  - Inspection Reports



First established in the 1971 as a result of the collapse of the 2,235 foot Silver Bridge, at Point Pleasant, West Virginia

# Types and Frequency of Inspections

- Initial (Inventory) – The first inspection of a new bridge or an existing bridge after a major rehabilitation
- Routine – Regularly scheduled inspections to determine the physical and functional condition of the bridge (not to exceed every 24 months)
- Damage – unscheduled inspection to assess structural damage (as needed)
- In-Depth – A close up, hands-on inspection to identify deficiencies not readily detectable using Routine Inspection (as needed)
- Special – Used to monitor known or suspected deficiencies such as settlement, scour or fatigue (typically 6 to 12 months)

1 ID/Admin 2 Design 3 Roads 4 Structure Units 5 Classification	<b>Deck Information:</b>		<b>Span Information:</b>	
	Deck Structure Type (107):	1 Concrete-Cast-in-Plac	Number of Main Spans (45):	2
	Deck Surface Type (108A):	6 Bituminous	Main Span Material (43A):	1 Concrete
	Deck Membrane Type (108B):	2 Preformed Fabric	Main Span Design (43B):	01 Slab
	Deck Protection (108C):	None	Number of Approach Spans (46):	0
	Curb/Sidewalk Width: Left (50A):	1.524 m	Approach Span Material (44A):	
	Right (50B):	1.524 m	Approach Span Design (44B):	Unknown (P)
	Deck Width (52):	13.259 m	Maximum Span Length (48):	6.096 m
	Bridge Median (33):	0 No median	Structure Length (49):	14.326 m
	Skew (34):	40 degrees	Deck Area:	189.949 sq.m
	Structure Flared (35):	0 No flare	Total Length:	14.326 m

Inventory Items – bridge characteristics such as location, structure type, measurements, age, inspection dates, etc.



Bridge: 2981 Find... Inspections (9): 08/19/2014 Metric English Reports... Save

1 CONDITION 2 NOTES 3 WORK 4 APPRAISAL 5 INVENTORY 6 MAINE DOT 7 SCHEDULE 8 MEDIA

1 Other Ratings

2 Load Ratings

### Structure Appraisal:

Open/Posted/Closed (41): A Open, no restriction  
 Approach Alignment (72): 8 Equal Desirable Cr  
 Bridge Railings (36a): 0 Substandard  
 Transitions (36b): 0 Substandard  
 Approach Guardrail (36c): 0 Substandard  
 Appr Guardrail Ends (36d): 0 Substandard  
 Pier Protection (111): Not Applicable (P)  
 Scour Critical (113): 5 Stable w/in footing

### Minimum Vertical Clearances:

Over Structure (53): 99.900 m  
 Under (Reference) (54a): N Feature not hwy or  
 Under Clearance (54b): 0.000 m

### Navigation Data:

Navigation Control Exists (38): Permit Not Required  
 Nav Vertical Clr (39): 0 m

### NBI Appraisal Ratings - calculated:

Structural Eval (67): 4 Minimum Tolerable  
 Deck Geometry (68): 4 Tolerable  
 Underclearances (69): N Not applicable (NBI)  
 SD / FO Status: Structurally Deficient  
 Sufficiency Rating: 49.6  
 Health Index: 81.8

### Minimum Lateral Underclearance:

Reference Feature (55a): N Feature not hwy or  
 Right Side (55b): 99.900 m  
 Left Side (56): 99.900 m  
 Nav Horizontal Clr (40): 0.000 m  
 Min Vert Lift Clr (116): 0 m

Appraisal Ratings – rating of a bridge components adequacy  
 Examples – under clearance, waterway adequacy, geometry

**Bridge Inspection Mode: Edit Type: Regular NBI Key: LWKO**

Bridge: 2981 Find... Inspections (9): 08/19/2014 Metric English Reports... Save

1 CONDITION 2 NOTES 3 WORK 4 APPRAISAL 5 INVENTORY 6 MAINE DOT 7 SCHEDULE 8 MEDIA

NBI Rating: Deck (58): 4 Poor Substructure (60): 6 Satisfactory Culvert (62): N N/A (NBI)  
 Superstructure (59): 4 Poor Channel (61): 6 Bank Slumpir Waterway (71): 8 Equal Desirat  
 Unrepaired spalls: -1.000 sq.m. Review Needed: ☒ Status: New

Create Element Edit Element Remove Element NBI Translator Suff Rate Validate Quantity Percent

Key: 1		Structure Unit ID: 1		Type: M Main					
Elem / Env	Element Description	Quantity	UOM	Qty1	Qty2	Qty3	Qty4	Qty5	
40 / 2	P Conc Slab/AC Ovly (ea)	189.99	sq.m.	0.00	0.00	0.00	189.99	0.00	
331 / 2	Conc Bridge Railing	28.65	m.	0.00	25.79	2.87	0.00	0.00	
210 / 2	R/Conc Pier Wall	16.15	m.	12.92	2.42	0.81	0.00	0.00	
215 / 2	R/Conc Abutment	32.31	m.	25.52	4.85	1.62	0.32	0.00	
218 / 2	Undefined Wall Elem.	14.63	m.	10.24	2.93	1.46	0.00	0.00	
383 / 2	Wear.Surf- AC+Membr.	131.83	sq.m.	19.77	92.28	19.77	0.00	0.00	

Compare: 8/19/2014 LWKO 0.00 0.00 0.00 189.99 0.00

Element Condition Wearing surface has approximately 15% cracking bituminous. Curb has moderate cracking & staining areas. Bottom of slab has a high percentage of cracking & staining. See previous reports for deck photos.

State: 2 Distr.<25% VWS & Slab Patched areas and/or potholes or impending potholes or cracking exist in the slab surface. The comb

Condition Ratings – Assigns a good, fair, or poor rating to major bridge elements such as the deck, superstructure, substructure, channel or culverts



Roadway looking South



Wearing Surface



Upstream end



Downstream end

2981

Camden

Bakery

4-26-13

# Bridge Management

## Data Driven Asset Management

Bridge Management is responsible for analyzing available bridge data to:

- Select and prioritize Work Plan candidates
- Long term asset planning

<http://www.maine.gov/mdot/about/assets/hwy/>





# Bridge Management

- Starts with Agency Collected Inspection Data
- Deighton dTIMS Bridge Management software
- Analysis focuses on condition of:
  - Condition Ratings
  - Appraisal ratings
  - Corridor Priority
  - Customer Service Level



**Asset  
Management**

[Highway Prioritization  
& Customer Service  
Levels](#)

[Glossary](#)

[Search Map by Town](#)

[Documents](#)

# MaineDOT Asset Management - Highways

Below is MaineDOT's methodology to provide a fair, structured framework to prioritize programs and projects. There are two parts - the *Highway Corridor Priority (HCP)*, and the *Customer Service Level (CSL)*.

See the [glossary](#) for the descriptions of each level in the priorities.

This data is available for viewing in the MaineDOT Map Viewer. Go to our "[Search Map by Town](#)" page to view maps by town.

<a href="#">Highway Corridor Priority (HCP)</a>	<a href="#">Customer Service Level (CSL)</a>	<a href="#">CSL Mileage Summary</a>
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## Customer Service Level (CSL)

The second part of the method is determining the [Customer Service Level \(CSL\)](#) that measures MaineDOT managed highway assets (Priority 1-5) in three areas. The CSL uses customer-focused engineering measures to track highway (1) Safety, (2) Condition and (3) Serviceability, and grades them similar to a report card (A – F). The information below lists the individual measures that make up the overall service level grade. To view this data in our map viewer, click on a header below.

### Safety

[Crash History](#)

[Pavement Rutting](#)

[Paved Roadway Width](#)

[Bridge Reliability](#)

# Bridge Management

Typical Bridge scopes include:

- Culvert Rehab and Culvert Replacement
- Bridge Rehab and Bridge Replace
- Deck Rehab and Deck Replace
- Substructure Replacement
- Superstructure Replacement
- Joint Repair and Replace
- Paint Replace
- Wearing Surface Repair and Wearing Surface Replace
- Scour Countermeasures

dTIMS can also be used to determine long term funding levels needed to keep our bridge inventory in a state of good repair





# Work Plan

*Calendar Years 2016-2017-2018*

January 2016

# Work Plan Development

- 3 Year plan
- The final prioritization of projects for the Work Plan is done by the Bridge Committee
- Office and field reviews are conducted throughout the year to further refine candidate list
- Committee also reviews funding and scope for the first two years

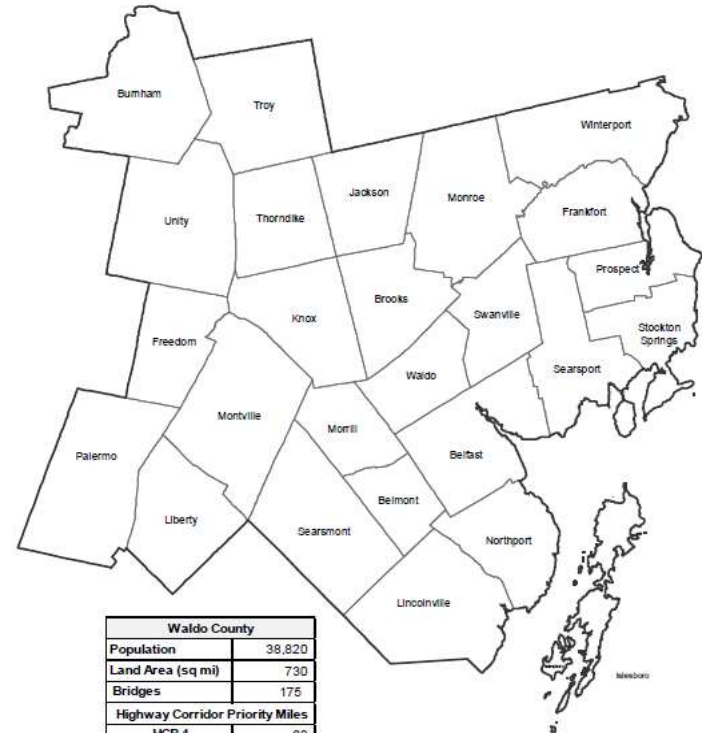
# Knox



Knox County	
Population	39,668
Land Area (sq mi)	365
Bridges	90
Highway Corridor Priority Miles	
HCP 1	24
HCP 2	34
HCP 3	1
HCP 4	81
HCP 5	85
Total HCP 1-5	226



# Waldo

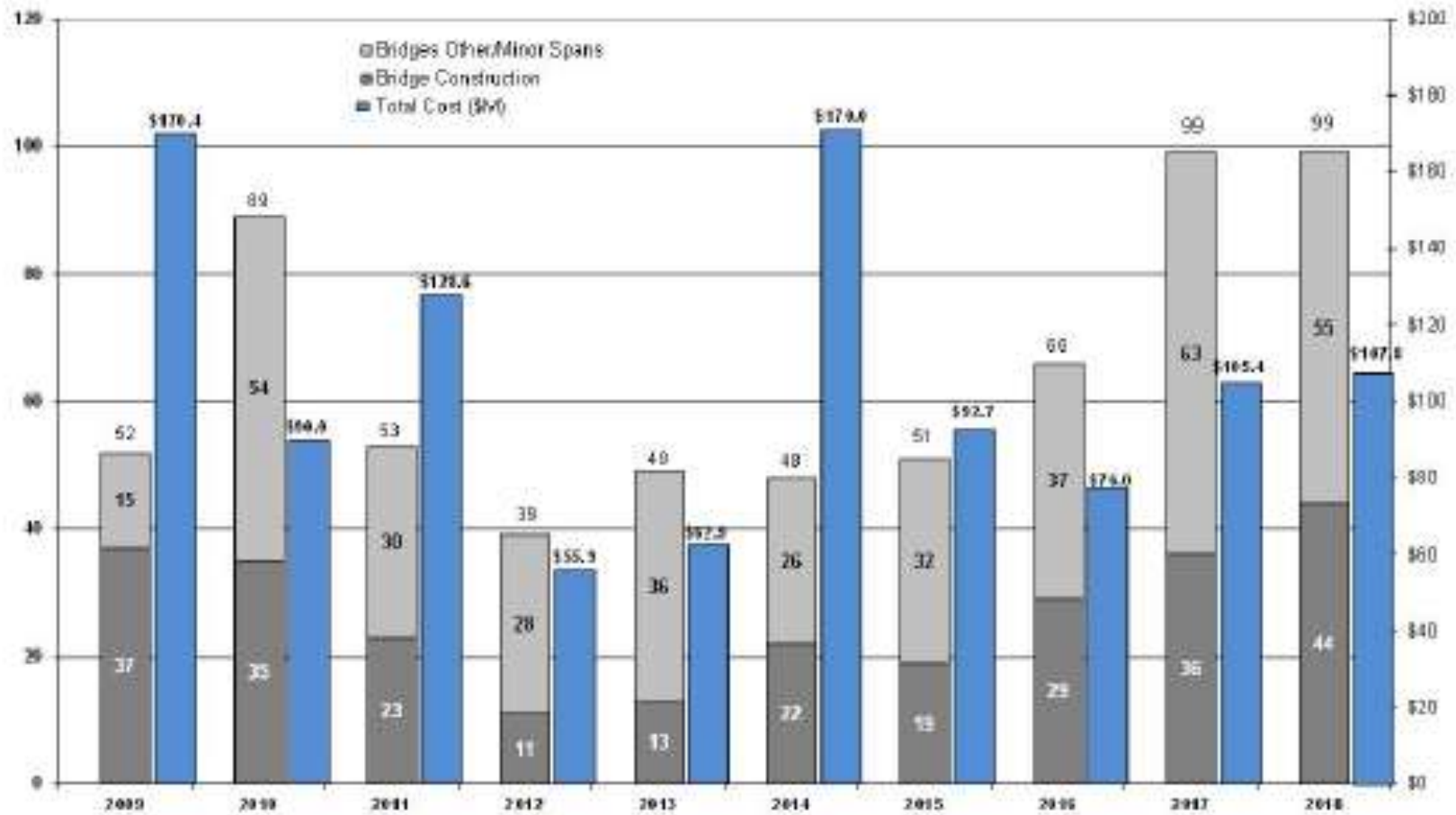


Waldo County	
Population	38,820
Land Area (sq mi)	730
Bridges	175
Highway Corridor Priority Miles	
HCP 1	63
HCP 2	16
HCP 3	58
HCP 4	114
HCP 5	120
Total HCP 1-5	372



[http://www.maine.gov/mdot/projects/workplan/docs/2016/MaineDOTWorkPlan2016\\_2017\\_2018.pdf](http://www.maine.gov/mdot/projects/workplan/docs/2016/MaineDOTWorkPlan2016_2017_2018.pdf)

## Bridge Projects by Calendar Year





## Funding, Resource Assumptions and Resource Allocation

### Funding

Development of the *Work Plan* requires that the funding that is available to support the work described first be identified and categorized according to eligibility. The major funding sources that combine to provide the financial resources that support the *Work Plan* include:

- Federal Highway Administration (FHWA) Formula Funds
- Federal Transit Administration (FTA) Formula Funds
- Federal Aviation Administration (FAA) Formula and Entitlement Funds
- USDOT TIGER and Other Federal Competitive Grant Programs
- Federal Highway Administration Grant Anticipation Revenue (GARVEE) Bonds
- State Highway Fund
- State TransCap Revenue Account
- State Multimodal Transportation Accounts
- State General Obligation Bonding
- Funds Transferred from Other State Agencies
- Municipal and Private Funds

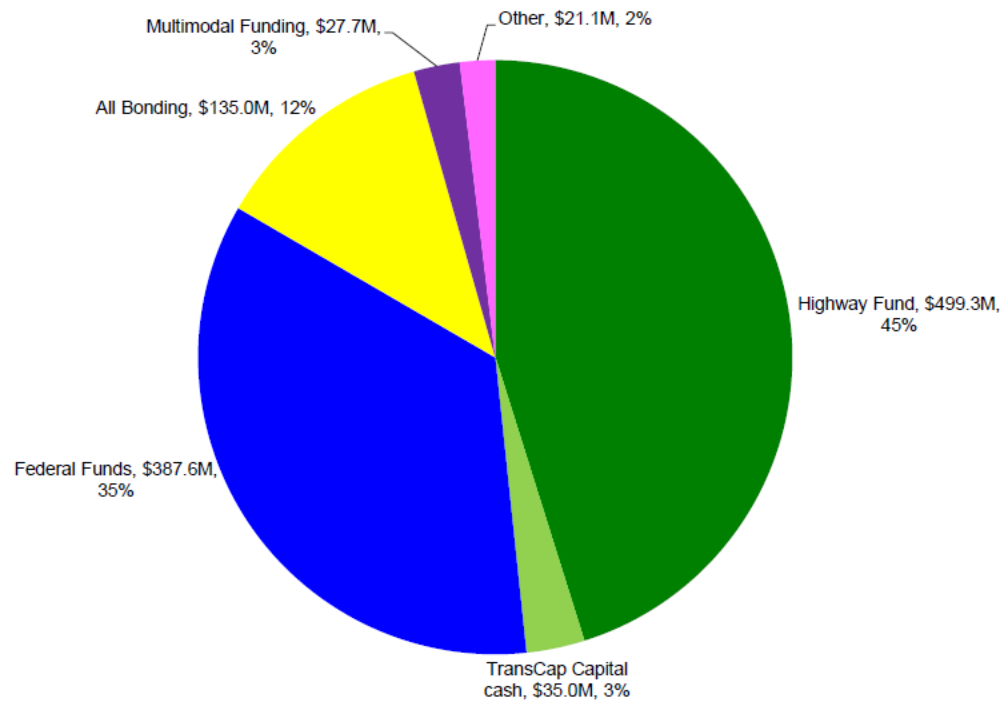
These funding sources must generally be directed to specific uses, with some restrictions:

- ➡ • FHWA dollars must be used on federally eligible highway and bridge projects and programs, allocated by category (e.g., the National Highway System and bridges, Surface Transportation Program (STP), and Highway Safety Improvement Program.)
- FTA dollars can be used on federally eligible buses and bus facilities, certain ferry systems, passenger rail and transit operations.
- FAA dollars must be used for federally eligible projects on Maine's public airports.
- ➡ • State Highway Fund dollars must be used to support the highway and bridge system, and cannot be used to support non-highway-and-bridge needs.
- ➡ • State General Obligation Bond funding must be used on capital projects and is often directed to specific uses.
- Legislative requirements exist for certain uses (e.g., Local Road Assistance Program.)

## MaineDOT Sources of All Funds FY16-FY17

**\$1,105.6 Million**

FY16/17 budget with estimated statewides, \$50M GARVEE and pending \$85M GO bond



# Funding

## 1. TIGER Grants (Transportation Investment Generating Economic Recovery)

- Three bridge projects for approximately \$30M

## 2. Federal Funding

- Reauthorization of the federal surface transportation programs (the FAST Act) has a modest increase in federal funding

## 3. State Funding

- \$100M in general Obligation bonding for CY2017 has been approved to voters in November





## Keeping Our Bridges Safe 2014 Report



- Report on progress since 2007 report (scour, improved inspections, load rating & posting)
- Define current status of our bridges
- Establish strategies to improve overall condition of bridges
- Find opportunities to impact cost
- Identify funding needs

2007 KOBs resulted in increased bridge funding from roughly \$70M to \$110M over a four year period

<http://www.maine.gov/mdot/pdf/kobs2014.pdf>



# KOBS Report 2014

- Status of bridges 2007-2014
  - # bridges older than the average (70 yrs) increased by 4%
  - Condition
    - 2% increase in good condition bridges
    - 4% decrease in fair bridges
    - 2% increase in poor bridges
- 2014 KOBS focuses on extending the life of our bridges through timely preservation and designing new bridges for longer life through quality designs, construction and materials
- Recommends a funding level of \$140M per year to improve poor bridges and preserve fair and good bridges

