



Chicago Metropolitan
Agency for Planning

Bridge Conditions In the Chicago Region 2010 Update

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CMAA Congestion Management Process
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Executive Summary

Bridges provide important links that facilitate economic activity and overall regional mobility in the seven-county Chicago region of Northeastern Illinois. As a result, the physical condition of bridges is vital in terms of both public safety and in regards to the programming of local, state, and federal funds. While there have been significant reductions historically in the number of structurally deficient bridges, even as of 2010, one out of every ten bridges in the Chicago region is classified as structurally deficient; and over 60% of our bridges that carry Interstates are over 50 years old.

CMAP staff relied on 2010 data from FHWA's National Bridge Inventory (NBI) to update a previous CMAP report that was based on data from the 2007 NBI. The NBI was a primary source for national bridge condition data reported in the USDOT *2008 Conditions and Performance Reports to Congress (2008 C&P Report)*; which was intended to provide Congress with an objective national appraisal of the physical conditions and operational performance of the nation's highways and bridges. As such, the NBI includes information such as structure type, age, geometrics, and condition ratings and appraisals for bridges over 20 feet long that carry public roadways.

This report includes background on the NBI, a description of system characteristics, and an overview of bridge conditions in the Chicago region. Discussion includes the structurally deficient and functionally obsolete bridge classifications, and other key NBI data items such as structural evaluation and sufficiency ratings. Overviews were also provided regarding historical trends for the Chicago region; bridge condition summaries by county geography; and by ownership category. In addition, staff applied National Highway System (NHS) bridge performance measures as described in the *2008 C&P Reports* to NHS bridges in the Chicago region.

Primary observations of this report are summarized below:

As of 2010, the 2010 NBI reported that 3,396 bridges were located within in the seven-county Chicago region. The average bridge was built in 1966, with a 2010 average sufficiency rating of 82.6. Within the Chicago region, a total of 333 bridges (9.8%) were classified as structurally deficient, and another 778 (22.9%) as functionally obsolete. Region-wide, there were 30 (0.9%) bridges identified as "high priority for replacement," 74 (2.2%) "high priority for corrective action," and another 197 (5.8%) bridges that "meet minimum tolerable limits to be left in place as is."

Over the 3 year period 2007 to 2010, significant improvements for bridges in the Chicago region included: 29 fewer bridges classified as structurally deficient; nine fewer bridges classified as "high priority for replacement"; the average regional sufficiency rate improved by 0.7 from 81.9 to 82.6; new bridge construction and replacement of older bridges advanced the average bridge year of construction by 1.8 years. The only significant decline for the Chicago region included: 22 more bridges classified as "high priority for corrective action."

BRIDGE CONDITIONS IN THE CHICAGO REGION 2010 Update

1 Introduction

The purpose of this report is to provide a description of system characteristics, and an overview of bridge conditions in the seven-county Chicago region. Since CMAP does not conduct regional bridge inspections, this report relied on Illinois state-level data from the USDOT National Bridge Inventory (NBI)(1). CMAP staff extracted data for the Chicago region in order to develop a database for analysis purposes, and to generate summary-level GIS applications. This report provides an update to the previous CMAP bridge condition report (2) that was based on data from the 2007 NBI, and is intended to offer background for regional indicators related to bridge conditions in the Chicago region.

2 The National Bridge Inventory

The National Bridge Inspection Standard (NBIS) and the associated National Bridge Inventory (NBI) were established as part of the Federal-Aid Highway Act of 1970, due in part to the national concerns raised by the 1967 collapse of the Silver Bridge that spanned the Ohio River between West Virginia and Ohio. Today, the NBI is a FHWA-maintained database that contains over 90 data items for approximately 600,000 condition-rated bridges nationwide. The individual states are required to report data such as structure type, age, geometrics, and condition ratings and appraisals for bridges over 20 feet long that carry public roadways.

The NBI is considered the world's most comprehensive database of bridge information. The primary uses for the NBI database relate to the programming of transportation funding, and to provide data for the bi-annual USDOT *Conditions and Performance Reports to Congress (C&P Reports)*.

The NBI is publicly available as an end-of-the-year data report. As such, the NBI provides a snapshot of bridge conditions, but does not function as a "real-time" database. The NBI also contains descriptive data items pertaining to bridge design characteristics which are presented at summary level. As with any such large national-level database, there can always be issues regarding data use, data quality and coding consistency.

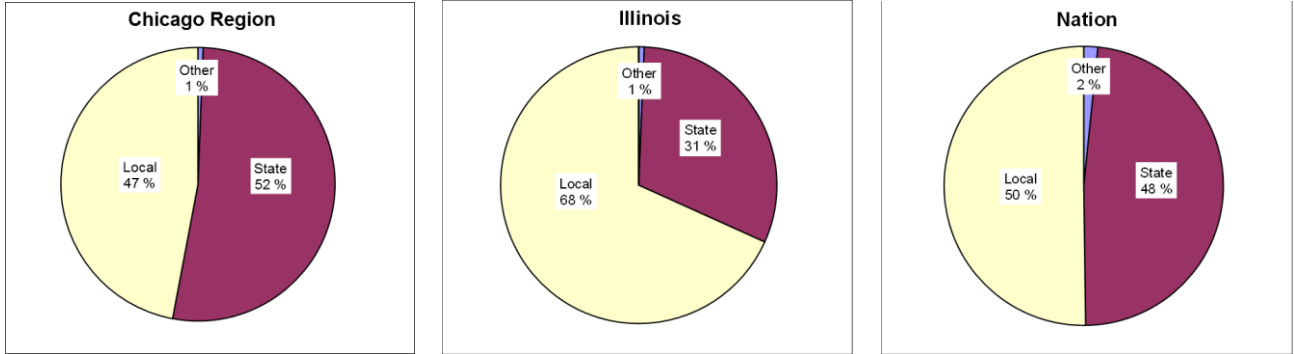
3 Regional Bridge System Characteristics

Key data items discussed in the *C&P Report* relate to bridge ownership, year built, functional class of roadway carried, average daily traffic (ADT) carried, and with a particular focus on bridges that carry National Highway System (NHS) routes.

3.1 Bridge Ownership

The bridge *owner* data field (NBI data item 22) included almost 30 owner agency categories, which are commonly collapsed into federal, state (DOT and other state agencies), local agencies (county, township, and municipal), and other owners (railroad, private, unclassified or unknown).

Exhibit 1: Bridge Ownership Comparison

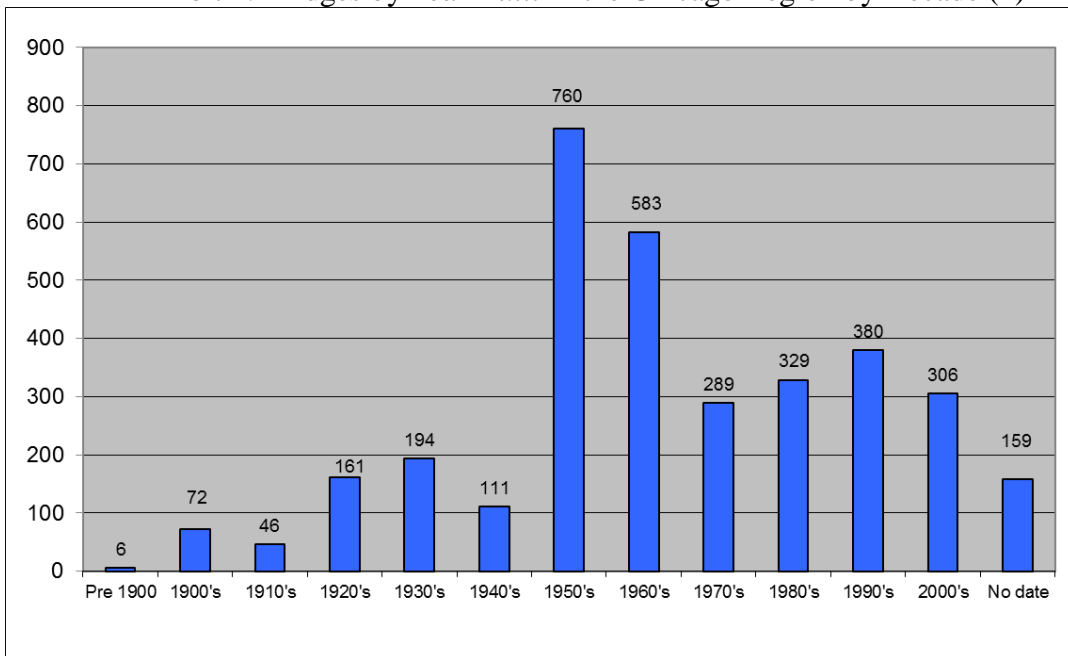


As shown in Exhibit 1, the bridge ownership pattern in the seven-county Chicago region more closely resembled the national ownership pattern, with an approximate 50/50 split between state and local agency ownership. Statewide, 68% of Illinois bridges were owned by local agencies while state agencies own only 31% of bridges in the state. Since the owner agency retains responsibility for bridge conditions, even in the event that a secondary agency is contracted for maintenance, it is important to note that local agencies bear substantial responsibility in both the Chicago region as well as statewide.

3.2 Age of Bridges

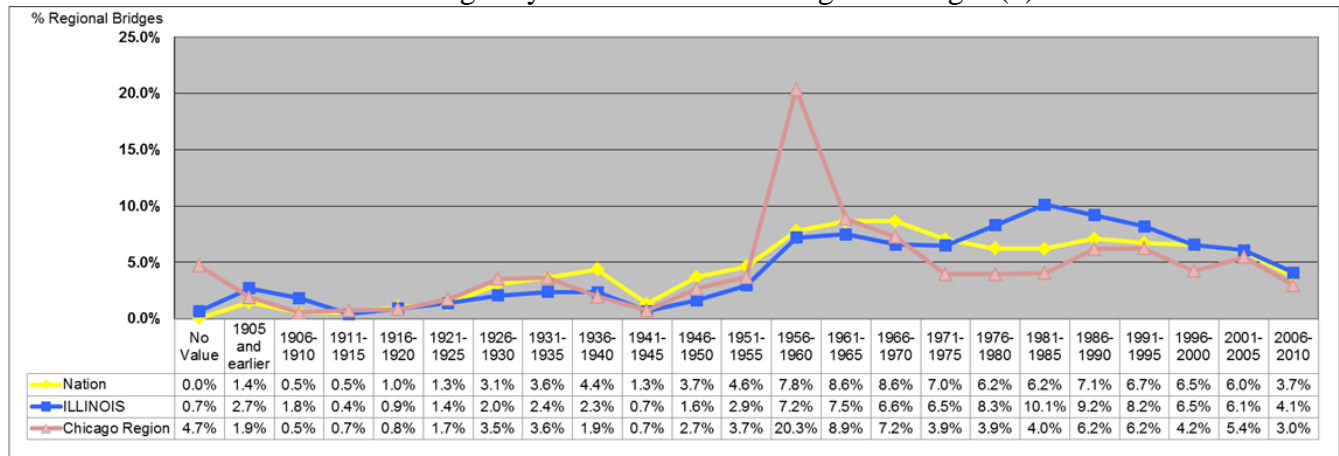
Based on CMAP analysis of the Illinois portion of the 2010 NBI dataset, the average year built for the State of Illinois was 1971 compared to 1966 for the Chicago region. Furthermore, as illustrated in Exhibit 2, NBI data indicated that 1,350 bridges in the Chicago region (39.7%) were built during the period 1950 through 1969.

Exhibit 2: Bridges by Year Built in the Chicago Region by Decade (4)



A five year breakdown of bridge construction is shown in Exhibit 3. This data, derived from the FHWA Year Built summary table (4), indicates that 20.3% (691) bridges in Chicago region were completed during the five year period 1956 through 1960, during the construction boom related to the development of Interstate Highway System. During the same period, less than 8% of national and Illinois bridges were built.

Exhibit 3: Bridges by *Year Built* - Percentage of Bridges (4)



As of the 2010 NBI, more than 42% of bridges in the Chicago region were over 50 years old compared to 26% for all Illinois bridges, and 33% of the nation's bridges.

3.3 Functional Classification

The *functional class of inventory route* data field (NBI data item 26) indicated the functional class of the roadway carried by bridges in the NBI database. As shown in Exhibit 4, bridges that carry vital Interstate routes account for approximately 9% of bridges across the nation and Illinois. Based on CMAP analysis of the Illinois portion of the NBI dataset, 21% of the bridges in the seven-county Chicago region carry Interstate routes, and another 41% of regional bridges carry arterial routes, many of which are on the National Highway System (NHS). The 62.4% of bridges in the Chicago region that carry high-level functional class Interstate and arterial routes is approximately double the percentage for the nation (34.1%) and the state of Illinois (28.2%).

Exhibit 4: NBI Functional Class of Roadway Carried

| <i>Bridges Count by Functional System, 2010</i> | | | | <i>Bridge % by Functional System, 2010</i> | | | |
|---|----------------|------------------|------------------------|---|-----------------|-------------------|-------------------------|
| Functional Classification | Nation 2010(a) | Illinois 2010(a) | Chicago Region 2010(b) | Functional Classification | Nation 2010 (a) | Illinois 2010 (a) | Chicago Region 2010 (b) |
| Interstate | 55,339 | 2,278 | 715 | Interstate | 9.2% | 8.6% | 21.1% |
| Other Arterial | 150,399 | 5,173 | 1,401 | Other Arterial | 24.9% | 19.6% | 41.3% |
| Collector | 161,236 | 5,417 | 498 | Collector | 26.7% | 20.6% | 14.7% |
| Local | 237,486 | 13,469 | 782 | Local | 39.3% | 51.1% | 23.0% |
| Total Bridges | 604,460 | 26,337 | 3,396 | Sources: (a) FHWA summary tables (4) , and (b) CMAP staff analysis. | | | |

Another aspect of functional class involves the urban and rural classifications of the FHWA's Highway Performance Management System (HPMS) (5). Rural roadways and bridges generally carry lower traffic volumes. The higher traffic volumes carried on urban roadways and bridges tend

to increase the overall rate of bridge deterioration, and tend to increase the likelihood for bridges to meet the criteria for functionally obsolete classifications. As shown in Exhibit 5, approximately 75% of national and Illinois bridges were classified as rural. Statewide, 76.6% of Illinois bridges carry rural roadways, while over 91% of the bridges in Chicago region carry urban roadways.

Exhibit 5: Functional Class Rural/Urban Split

| <i>Bridges Count by Functional System, 2010</i> | | | | <i>Bridge % by Functional System, 2010</i> | | | |
|---|-----------------------|-------------------------|-------------------------------|--|-----------------------|-------------------------|--------------------------------|
| Functional Classification | Nation 2010(a) | Illinois 2010(a) | Chicago Region 2010(b) | Functional Classification | Nation 2010(a) | Illinois 2010(a) | Chicago Region 2010 (b) |
| Rural | | | | Rural | | | |
| Interstate | 25,223 | 941 | 9 | Interstate | 4.2% | 3.6% | 0.3% |
| Other Arterial | 75,132 | 2,380 | 38 | Other Arterial | 12.4% | 9.0% | 1.1% |
| Collector | 140,925 | 4,547 | 74 | Collector | 23.3% | 17.3% | 2.2% |
| Local | 205,609 | 12,318 | 177 | Local | 34.0% | 46.8% | 5.2% |
| Subtotal Rural | 446,889 | 20,186 | 298 | Subtotal Rural | 73.9% | 76.6% | 8.8% |
| Urban | | | | Urban | | | |
| Interstate | 30,116 | 1,337 | 706 | Interstate | 5.0% | 5.1% | 20.8% |
| Other Arterial | 75,267 | 2,793 | 1,363 | Other Arterial | 12.5% | 10.6% | 40.1% |
| Collector | 20,311 | 870 | 424 | Collector | 3.4% | 3.3% | 12.5% |
| Local | 31,877 | 1,151 | 605 | Local | 5.3% | 4.4% | 17.8% |
| Subtotal Urban | 157,571 | 6,151 | 3,098 | Subtotal Urban | 26.1% | 23.4% | 91.2% |
| Total Bridges | 604,460 | 26,337 | 3,396 | Sources: (a) FHWA summary tables(4) , and (b) CMAP staff analysis. | | | |

3.4 National Highway System Bridges

The *highway system of inventory route* field (NBI data item 104) indicated bridges that carry National Highway System (NHS) routes. As shown in Exhibit 6, bridges that carry NHS routes account for approximately 19% of national and 14% of Illinois bridges. Based on CMAP analysis of the Illinois portion of the NBI dataset, 36% of the bridges in the Chicago region carry NHS routes, and about half of the Chicago region’s NHS bridges are Interstate routes.

Exhibit 6: Bridges that Carry NHS Routes

| | NHS Bridges | All Bridges | % NHS |
|----------------------------|--------------------|--------------------|--------------|
| Nation 2010 | 116,669 | 604,460 | 19.3% |
| Illinois 2010 | 3,672 | 26,337 | 13.9% |
| Chicago Region 2010 | 1,216 | 3,396 | 35.8% |

The NHS consists of the Interstate system, principal arterials, intermodal connectors, and the Strategic Highway Network (STRAHNET) and its connectors. According to the [FY2008 C&P Report](#) (2), while the NHS makes up only 4% of total U.S. mileage, the NHS carried more than 44% of total U.S. travel in 2006. Although only about 20 % of all U.S. bridges carried NHS routes, these bridges had almost 50% of total deck area on all bridges, and carried more than 70% of total bridge traffic in 2006 (2). In the Chicago region almost 36% of all regional bridges carried NHS routes, which accounted for approximately 58% of regional bridge deck area. As a result of these relationships, FHWA has emphasized bridges that carry the NHS with regards to national performance measures. Frequently these measures are defined in terms of the number of deficient bridges, sometimes only in terms of structurally deficient bridges, and in some cases FHWA performance measures include reference to total bridge deck area and traffic volumes carried.

4 NBI Bridge Condition Categories

In Chapter 3 of the 2008 *C&P Report* (6), bridge performance was primarily discussed in terms of “deficient” and “not deficient” bridges. The NBI coding manual (7) specifies criteria for two types of deficient bridges, either structurally deficient or functionally obsolete. Bridges that do not meet either criteria are classified as bridges that are not deficient. The NBI *status* data field contains the bridge condition rating.

Bridge inspections are typically conducted on a bi-annual basis, with some *fracture critical* bridges (bridge designs with non-redundant structural elements) inspected annually. Also, FHWA may permit four-year inspection cycles for some recently built and highly rated bridges. Bridge owners are required to report inspection and condition information, annually at a minimum. Condition ratings range from a low of 0 up to 9 and are used to determine the final bridge condition *status* rating.

4.1 Structurally Deficient Bridges

The structurally deficient (SD) classification refers to bridges with one or more structural defects that require attention. While a bridge classified as SD is the most severe condition, it does not necessarily mean that a bridge is unsafe. In some cases it may be required that SD bridges be posted for vehicle weight restrictions. NBI criteria for a structurally deficient bridge classification are shown in Exhibit 7. Additional information on appraisal rating codes is included in section 4.3.

Exhibit 7: Criteria for Structurally Deficient Classification

Source: [FHWA FAPG 23 CFR 650, Subpart D Non-Regulatory Supplement \(8\)](#)

| | |
|---|--|
| <p><u>A condition rating of 4 or less for any of the following data items:</u></p> <ul style="list-style-type: none"> • Item 58 Deck Rating, or • Item 59 Superstructure Rating, or • Item 60 Substructure Rating, or • Item 62 Culvert & Retaining Wall Rating | <p><u>Or a condition appraisal rating of 2 or less for any of the following data items:</u></p> <ul style="list-style-type: none"> • Item 67 Structural Evaluation, or • Item 71 Waterway Adequacy |
|---|--|

A full listing of condition ratings as described in the NBI Coding manual is shown below:

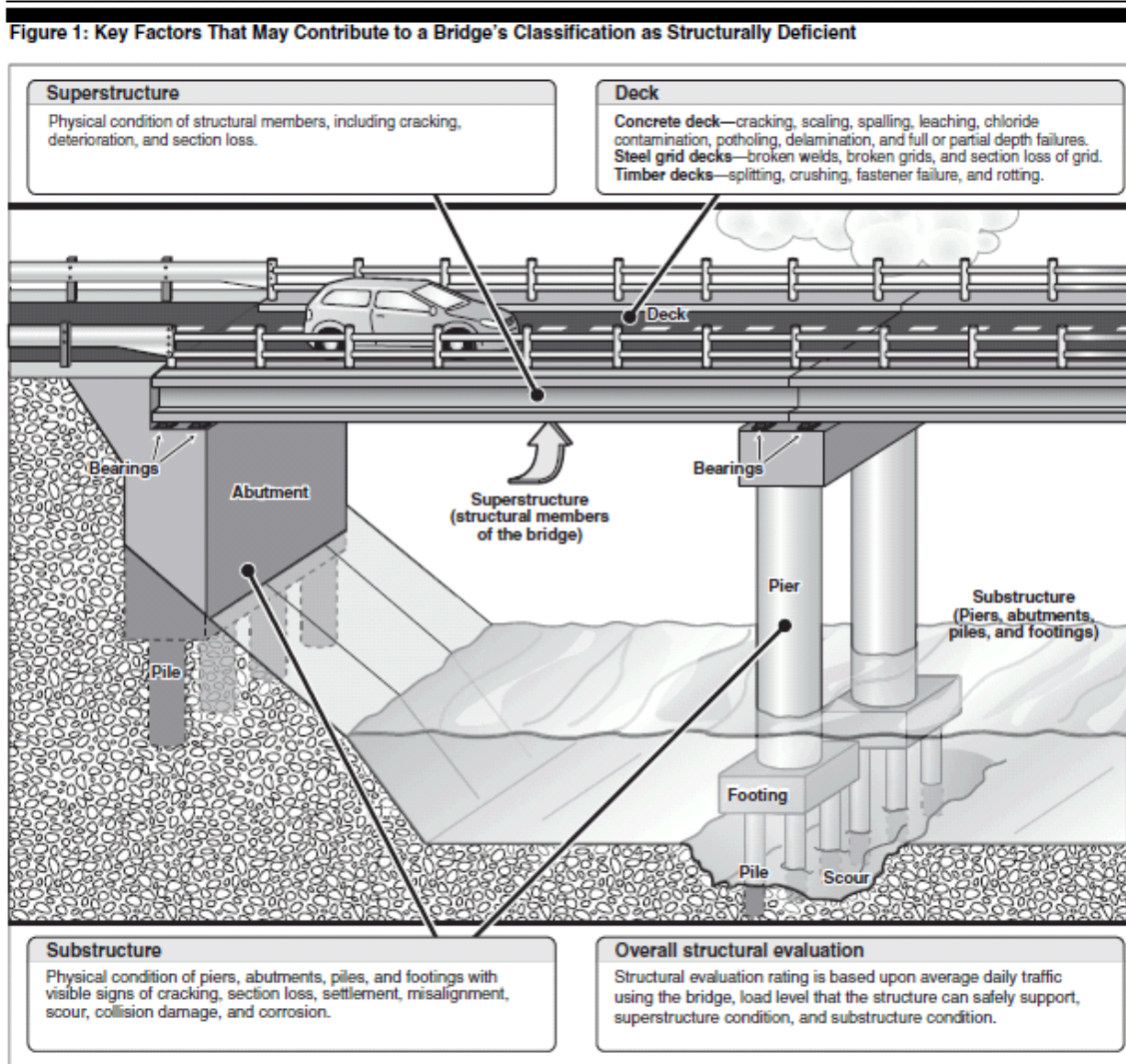
- 9 EXCELLENT CONDITION
- 8 VERY GOOD CONDITION - no problems noted.
- 7 GOOD CONDITION - some minor problems.
- 6 SATISFACTORY CONDITION - structural elements show some minor deterioration.
- 5 FAIR CONDITION - all primary structural elements are sound but may have minor section loss, cracking, spalling or scour.
- 4 POOR CONDITION - advanced section loss, deterioration, spalling or scour.
- 3 SERIOUS CONDITION - loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
- 2 CRITICAL CONDITION - advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
- 1 "IMMINENT" FAILURE CONDITION - major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put back in light service.

0 FAILED CONDITION - out of service - beyond corrective action.

Exhibit 8 presents a graphic example of key factors affecting SD classification, and also provides examples of some of the most common types of deterioration that impact bridge condition.

Exhibit 8: Key Factors for Classification as Structurally Deficient Bridge

Source: GAO-08-1043, pg13, September 2008 (9)



Source: GAO.

4.2 Functionally Obsolete Bridges

The functionally obsolete (FO) classification refers to bridges with existing geometric issues that do not meet current design criteria based on current traffic demands. While these bridges are considered deficient, a bridge classified as FO does not necessarily mean that a bridge is unsafe. It is possible for a bridge to meet the criteria for both SD and FO, in which case the bridge condition is classified as the more serious structurally deficient condition.

As part of any highway or bridge design process, geometric design criteria/guidelines are typical. However, even for new bridges, there may be specific geometric design variations or exceptions that are deemed to be desirable or necessary which are approved for the final design. Some of these

variations may actually trigger a functionally obsolete classification for a new bridge. NBI criteria for a functionally obsolete bridge rating are shown in Exhibit 9.

Exhibit 9: Criteria for Functionally Obsolete Classification

Source: [FHWA FAPG 23 CFR 650 Subpart D, Non-Regulatory Supplement \(8\)](#)

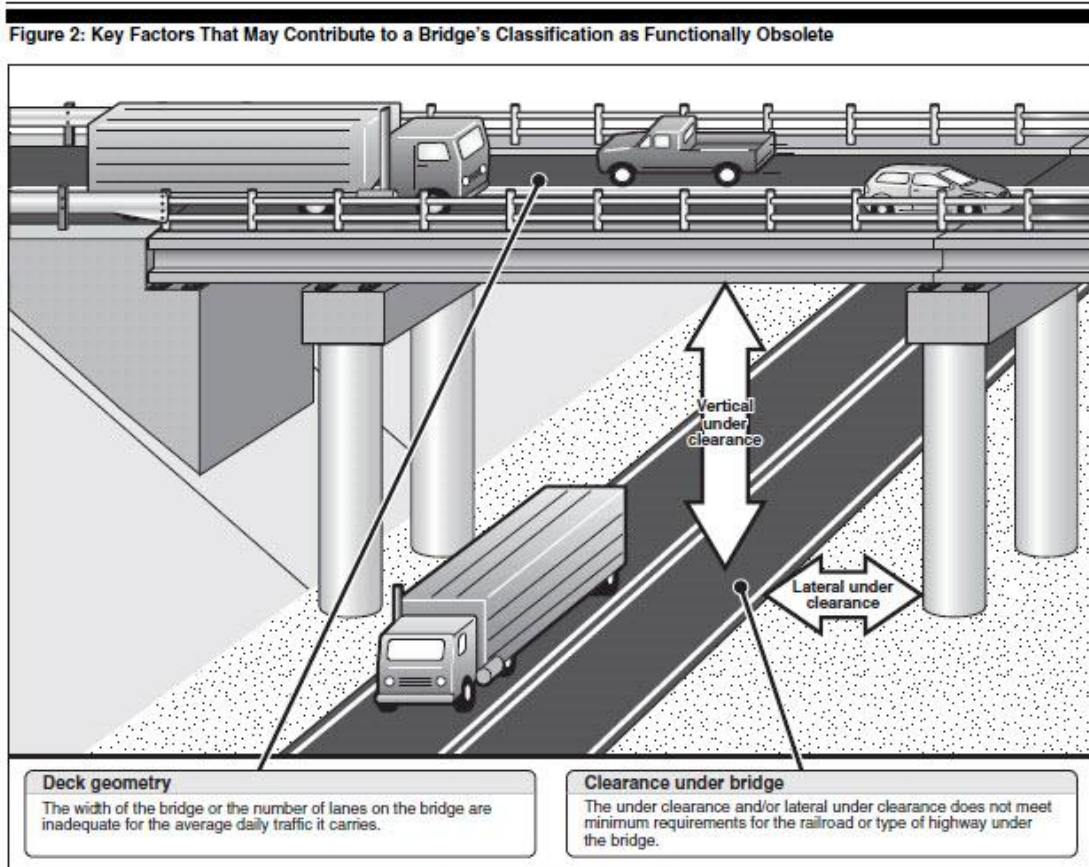
| | |
|---|--|
| <p><u>A condition rating of 3 or less for any of the following data items:</u></p> <ul style="list-style-type: none"> • Item 68 Deck Geometry Rating, or • Item 69 Underclearance Rating, or • Item 72 Approach Roadway Alignment Rating | <p><u>Or a condition appraisal rating of 3 or less for any of the following data items:</u></p> <ul style="list-style-type: none"> • Item 67 Structural Evaluation, or • Item 71 Waterway Adequacy |
|---|--|

The same condition descriptions described in the previous section also apply to the functionally obsolete bridge classification. Additional detail regarding the appraisal rating descriptions will be included in section 4.3 *Structural Evaluation*.

Exhibit 10 provides a graphic example of key factors affecting FO classification, which also provides examples of some of the most common types of geometric and clearance issues related to the functionally obsolete classification.

Exhibit 10: Key Factors for Classification as Functionally Obsolete Bridge

Source: [GAO-08-1043, pg 15](#), September 2008 (9)



Source: GAO.

4.3 Structural Evaluation

The *structural evaluation* data field (NBI data item 67) is an appraisal rating that describes bridge condition relative to current design criteria, and identifies bridges requiring priority treatment.

The structural evaluation data item is calculated based on reported condition ratings from the field inspection report. A full listing of the range of condition appraisal ratings as described in the NBI Coding manual is shown below:

- 9 Superior to present desirable criteria
- 8 Equal to present desirable criteria
- 7 Better than present minimum criteria
- 6 Equal to present minimum criteria
- 5 Somewhat better than minimum adequacy to tolerate being to be left in place as is
- 4 Meets minimum tolerable limits to be left in place as is
- 3 Basically intolerable requiring high priority of corrective action
- 2 Basically intolerable requiring high priority of replacement
- 1 This value of rating code not used
- 0 Bridge closed

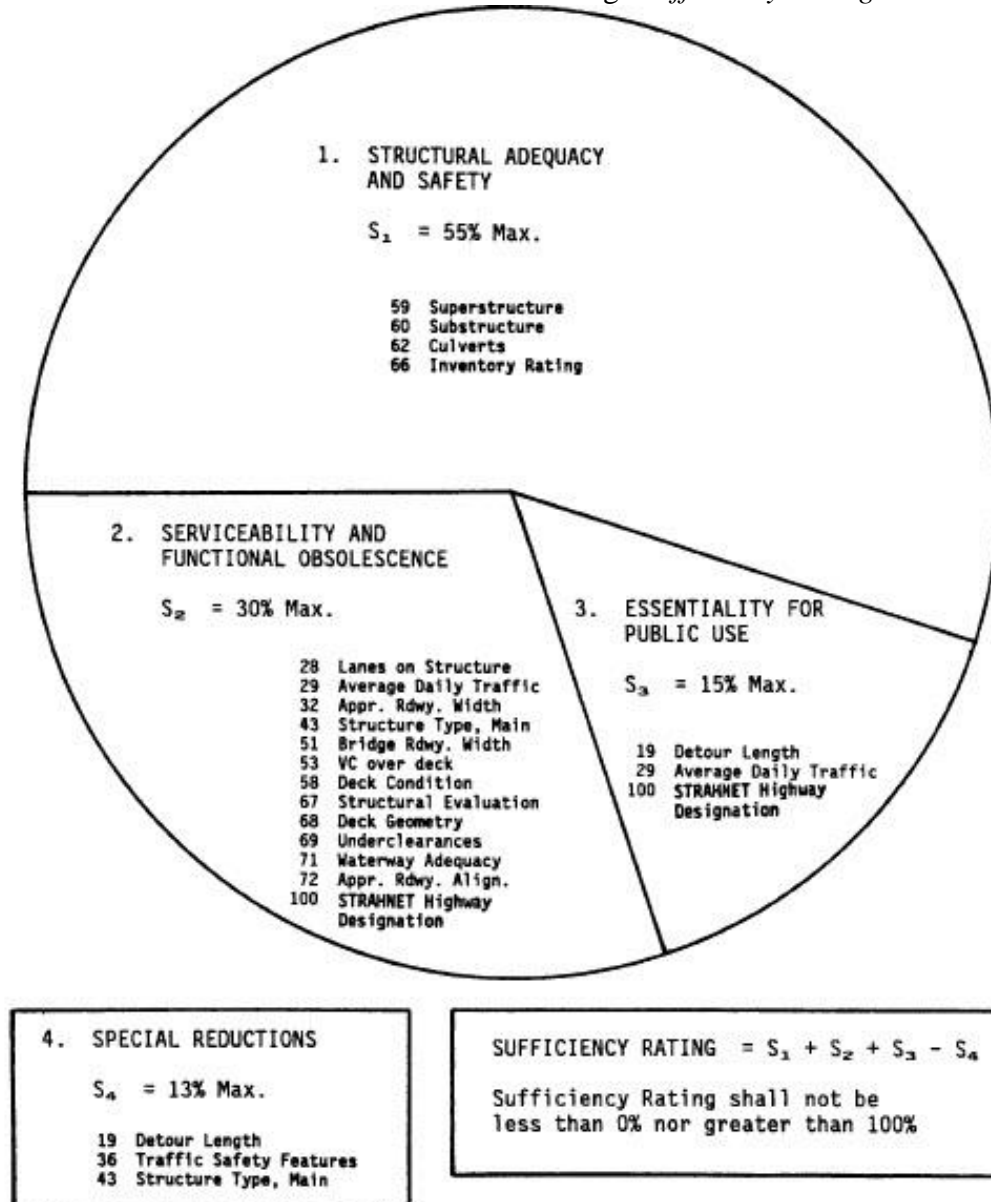
The *structural evaluation* data item rates bridges relative to current design criteria, adds a prioritization perspective, and is considered by some to be the truest single measure of the structural fitness of a bridge. This data item provides an overall rating of bridge condition based on the separately rated structural components of the bridge.

Forecasting the rate of bridge deterioration is a complex issue that involves a wide range of considerations including local climate, bridge design type and materials, bridge length, various detailed bridge characteristics, as well as overall traffic and truck volumes. Predictive models, such as Pontis, are usually involved in the forecast process as part of statewide bridge management systems. For additional information regarding national initiatives for prioritizing bridge replacement and rehabilitation, see [House Report 110-750](#) (10). This report, which is also known as the *National Highway Bridge Reconstruction and Inspection Act of 2007*, proposed and promoted an improved risk-based and data-driven process for states to assign priority for the replacement and rehabilitation of all federal-aid bridges.

4.4 Sufficiency Rating

Sufficiency rating (SR) represents a measure of a bridge's sufficiency to remain in service. This measure is determined based on a formula that evaluates highway bridge data by calculating four separate factors to obtain a numeric value which can range from a low value of 0 to a high value of 100. The SR data item is determined through a calculation process as illustrated in Exhibit 11. The calculation of this data item is fully described within Appendix B of the NBI coding manual, [Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, FHWA 1995](#). (7)

Exhibit 11: Calculation of NBI Bridge *Sufficiency Rating*



Source: Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, FHWA, 1995

The sufficiency rating is used to establish the Federal Eligible Bridge list, which then is used to program the annual Highway Bridge Replacement and Rehabilitation Program (HBRRP). If a Bridge Conditions in the Chicago Region 2010 Update

bridge has a sufficiency rating of 80 or less, and it is classified as a deficient bridge (either structurally deficient or functionally obsolete) then it becomes eligible for HBRRP funding, as shown in Exhibit 12.

Exhibit 12: Sufficiency Rating Criteria for HBRRP Funding Eligibility

Source: GAO-08-1043, pg 16, September 2008 (9)

Figure 3: Process for Designating Bridges as Eligible for HBP Funding

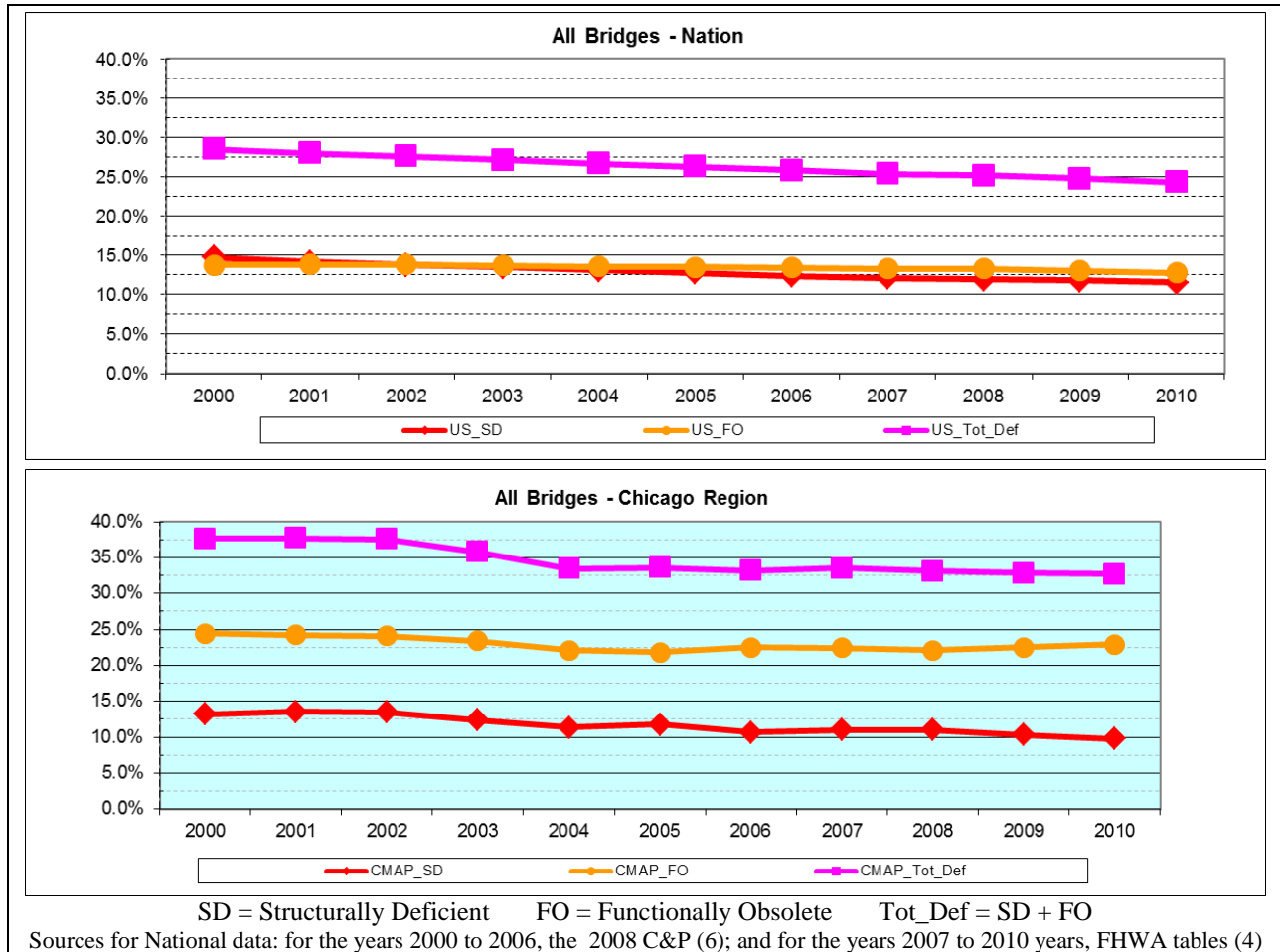
| Bridge classification | Sufficiency rating | Eligibility for Highway Bridge Program funds |
|---|------------------------|--|
| <p>Not deficient Bridges with acceptable condition, configuration, and design</p> | <p>81 - 100</p> | <p>Not eligible (classified as not deficient and/or having a higher than 80 sufficiency rating)</p> |
| or | | |
| <p>Deficient</p> <p>Structurally deficient Bridges in poor condition.</p> <p>or</p> <p>Functionally obsolete Bridges with poor configuration and/or design.</p> | <p>50 - 80</p> | <p>Eligible for rehabilitation (classified as structurally deficient or functionally obsolete with a sufficiency rating of 80 or less)</p> |
| and | | |
| | <p>0 - 49</p> | <p>Eligible for replacement or rehabilitation (classified as structurally deficient or functionally obsolete with a sufficiency rating of less than 50)</p> |

Sources: GAO analysis of FHWA data.

5 Bridge Conditions: Historical Trends and 2010 Conditions

According to NBI data, on the national level, there has been almost a 40% decline in the number of structurally deficient bridges over the period 1992 through 2010. The NBI reported over 120,000 structurally deficient bridges across the nation in 1992, compared to 69,223 in 2010. Over the same time period, structurally deficient bridges in Illinois declined by 43%, and by 35% within the Chicago region. These improvements were achieved despite significant increases in traffic volumes over the same 18 year time period.

Exhibit 13: Historic Trends: Chicago Region and the Nation

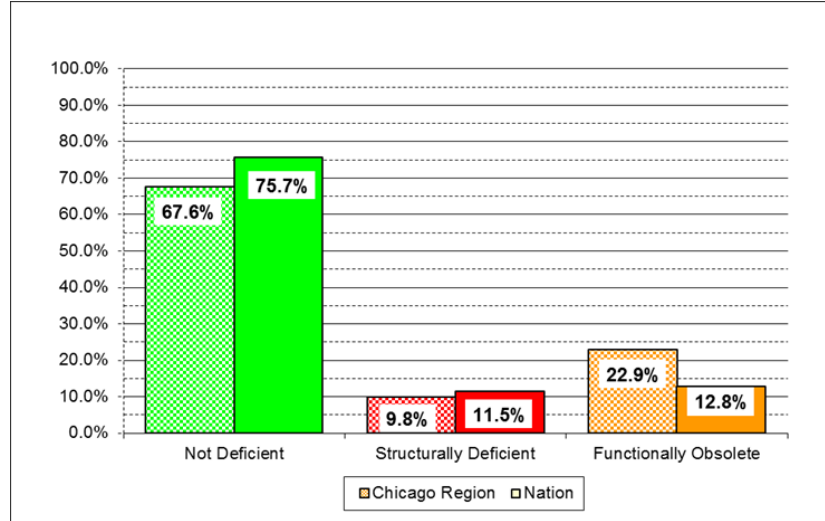


As shown in Exhibit 13, bridge conditions in the seven-county Chicago region show similar overall progress compared to national trends, but there is a significant difference related to the large component of functionally obsolete bridges in the Chicago region. The percentage of structurally deficient bridges for both the Chicago region and nation were similar, and have both generally declined from 15% to 10%. The percentage of functionally obsolete bridges also declined for the Chicago region, although the regional rate is almost double the national rate.

A comparison of 2010 bridge conditions between the Chicago region and the nation is shown in Exhibit 14. Based on review of the 2010 NBI database, the percentage of structurally deficient bridges (9.8%) in the Chicago region is actually lower than the national percentage of 11.5%. However, 22.9% of bridges in the Chicago region have met the criteria for functionally obsolete

bridges, compared to only 12.8% nationwide. Although the structurally deficient category is the most serious concern, functionally obsolete bridges are also considered deficient. As a result, 75.7% of the nation's bridges were reported as not deficient, while only 67.6% of bridges in the Chicago region were not deficient.

Exhibit 14: 2010 Bridge Condition: Chicago Region and the Nation



Further review of NBI data shows a clear relationship between the age of bridges and the onset of deficient bridge conditions. As shown in Exhibit 15, the number bridges classified as deficient rise sharply with bridges built in the 1950's and 1960's. In the 2008 C&P (11), on page 11-4, a focus was placed on bridge service life based on an assumption of a 50-year design life. As discussed in section 3.2, one in five (20%) the bridges in the Chicago region were built in the period 1956 to 1960, and these bridges turned 50 years old over the period 2006 through 2010.

Exhibit 15: Chicago Regional Bridge Condition by Decade of Construction

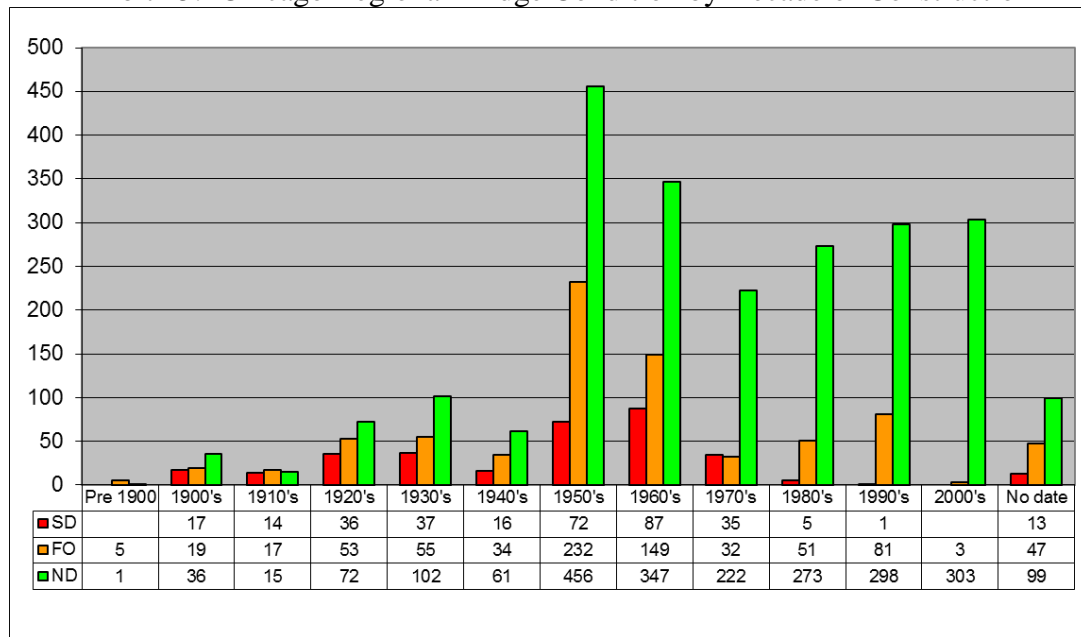
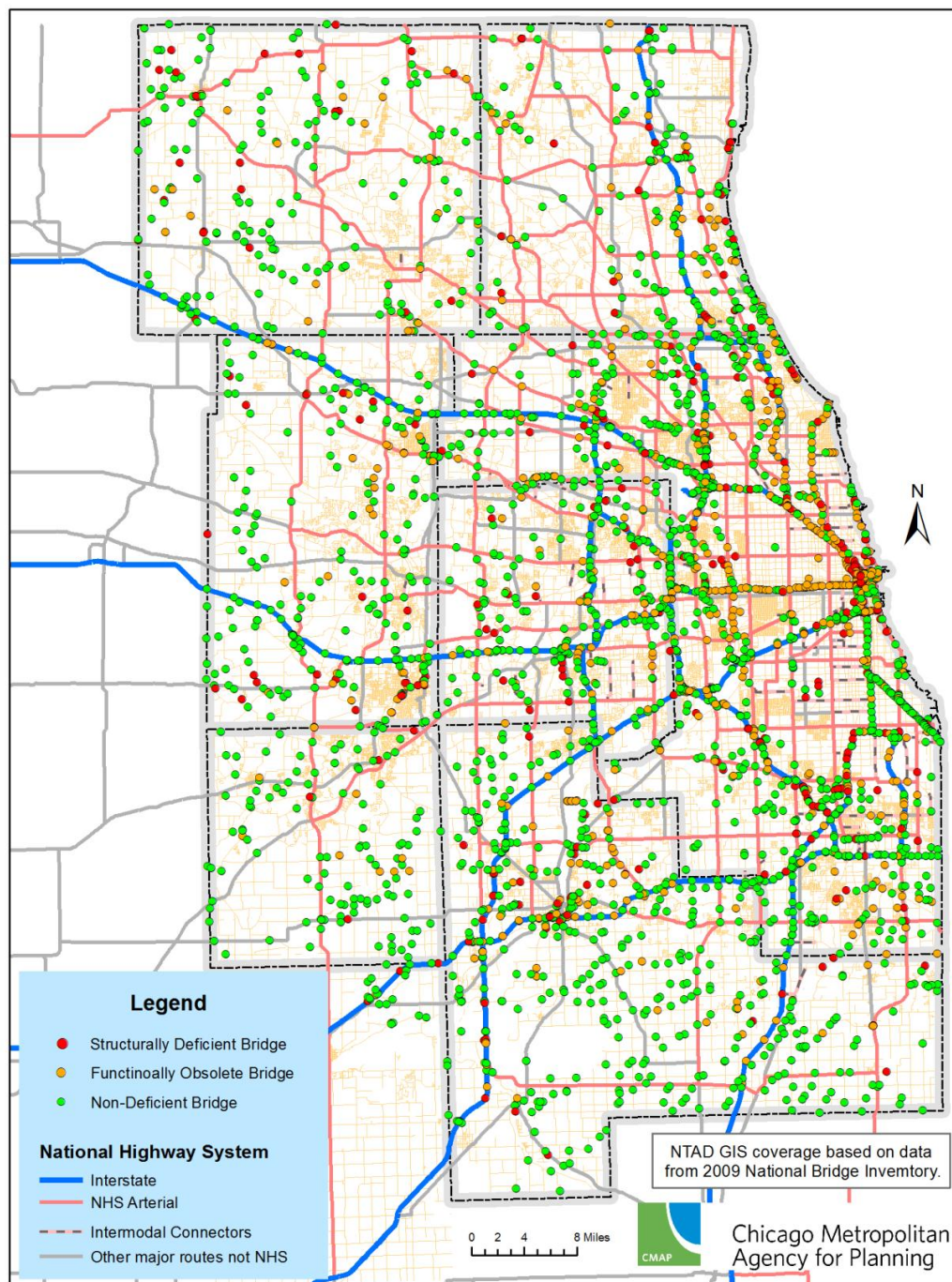


Exhibit 16, and others included in Appendix A, map NBI bridge conditions in the seven-county Chicago region. These exhibits rely on shapefile data downloaded from the 2010 National Transportation Atlas (NTAD) (12). Although included as part of the 2010 NTAD dataset, the bridge data appears to be linked to 2009 NBI data. Recently, the NTAD GIS coverage has improved significantly and currently includes over 98% of the NBI bridge locations in the Chicago region. The mapping data is one year earlier than the analysis data referenced in this report.

Exhibit 16: Geographic Distribution of NBI Bridges in the Chicago Region
(Based on 2009 NBI data)

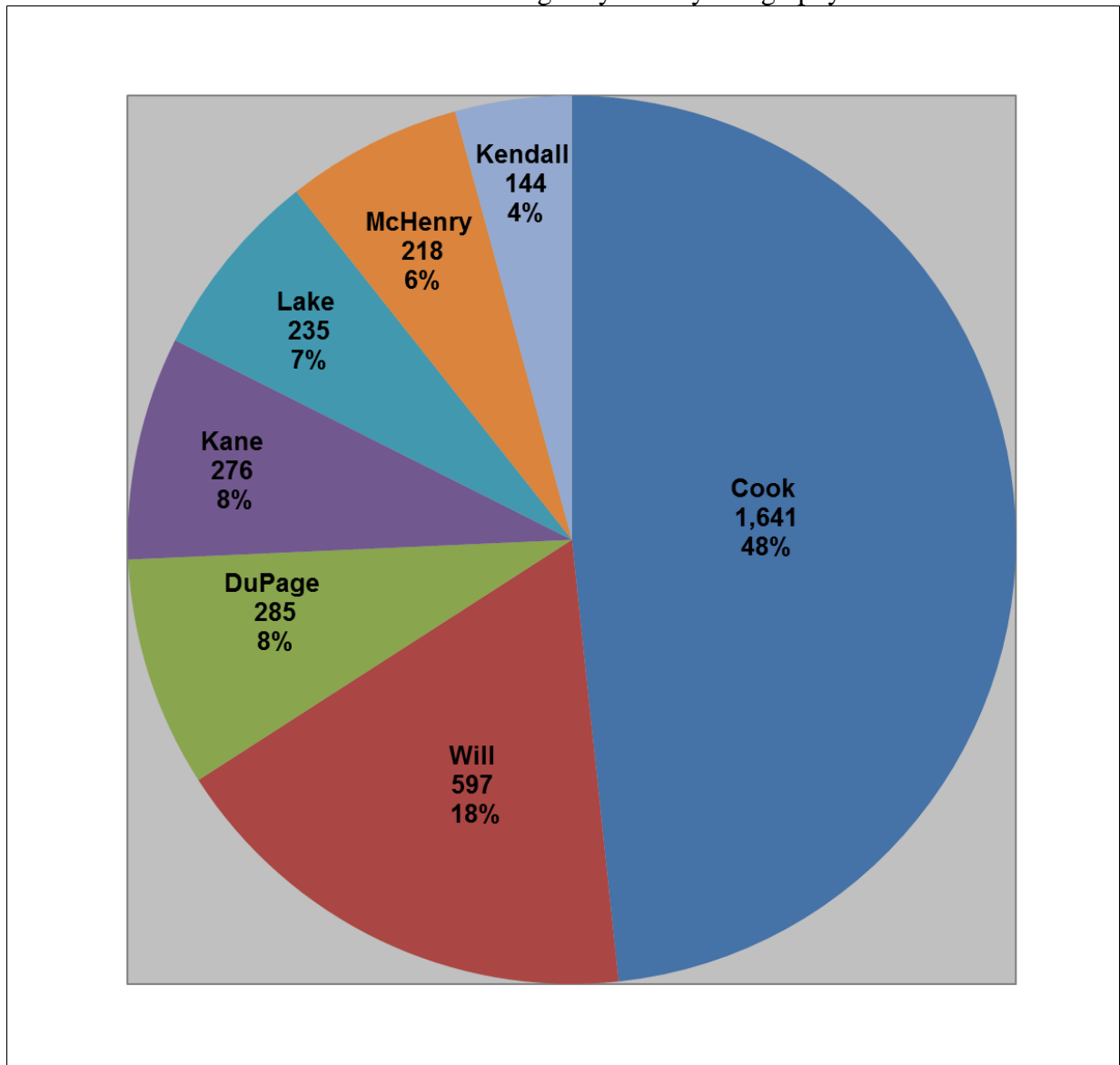


6 2010 Bridge Condition by County Geography

This section summarizes 2010 bridge conditions based on county geography, and provides a spatial perspective on bridge conditions – with a focus on “where” bridges are located. For example, discussion of “Cook County” bridge conditions presents a summary of overall conditions within the county, and should not be interpreted to mean that the Cook County Highway Department owns or is responsible for all of these bridges.

The Chicago region consists of seven full counties: Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will, in addition to one township in Grundy County (Aux Sable) which has also been included in the Chicago transportation planning area. For the purposes of this report, Aux Sable Township bridges will be included with Kendall County totals and averages. A distribution of bridges by county geography is shown in Exhibit 17.

Exhibit 17: NBI Bridges by County Geography



Section 6.1 summarizes the Chicago region from the perspective of county geographies based on information from Exhibit 18. The individual county geographies are discussed in sections 6.2 through 6.8.

Exhibit 18: 2010 Bridge Condition Statistics by County Geography

| <u>Number of Bridges</u> | Cook | DuPage | Kane | Kendall* | Lake | McHenry | Will | Chicago Region |
|---|--------------|---------------|-------------|-----------------|-------------|----------------|--------------|-----------------------|
| Structurally Deficient | 162 | 22 | 30 | 4 | 27 | 32 | 56 | 333 |
| Functionally Obsolete | 518 | 47 | 43 | 10 | 42 | 18 | 100 | 778 |
| Deficient | 680 | 69 | 73 | 14 | 69 | 50 | 156 | 1,111 |
| Not Deficient | 961 | 216 | 203 | 130 | 166 | 168 | 441 | 2,285 |
| Total NBI Bridges | 1,641 | 285 | 276 | 144 | 235 | 218 | 597 | 3,396 |
| % Total Chicago Region NBI Bridges | 48.3% | 8.4% | 8.1% | 4.2% | 6.9% | 6.4% | 17.6% | |
| High Priority Replacement | 13 | 4 | 2 | 0 | 4 | 4 | 3 | 30 |
| High Priority Corrective Action | 33 | 9 | 7 | 1 | 8 | 7 | 9 | 74 |
| Meets Minimum Tolerable Limits | 85 | 10 | 20 | 4 | 17 | 24 | 37 | 197 |
| Carries NHS route | 775 | 123 | 60 | 12 | 72 | 40 | 134 | 1,216 |
| <u>Percentages of Bridges</u> | Cook | DuPage | Kane | Kendall* | Lake | McHenry | Will | Chicago Region |
| Structurally Deficient | 9.9% | 7.7% | 10.9% | 2.8% | 11.5% | 14.7% | 9.4% | 9.8% |
| Functionally Obsolete | 31.6% | 16.5% | 15.6% | 6.9% | 17.9% | 8.3% | 16.8% | 22.9% |
| Not Deficient | 58.6% | 75.8% | 73.6% | 90.3% | 70.6% | 77.1% | 73.9% | 67.3% |
| High Priority Replacement | 0.8% | 1.4% | 0.7% | 0.0% | 1.7% | 1.8% | 0.5% | 0.9% |
| High Priority Corrective Action | 2.0% | 3.2% | 2.5% | 0.7% | 3.4% | 3.2% | 1.5% | 2.2% |
| Meets Minimum Tolerable Limits | 5.2% | 3.5% | 7.2% | 2.8% | 7.2% | 11.0% | 6.2% | 5.8% |
| Carries NHS | 47.2% | 43.2% | 21.7% | 8.3% | 30.6% | 18.3% | 22.4% | 35.8% |
| <u>County Averages</u> | Cook | DuPage | Kane | Kendall* | Lake | McHenry | Will | Chicago Region |
| Sufficiency rating | 80.8 | 84.2 | 82.4 | 90.1 | 81.6 | 81.0 | 85.9 | 82.6 |
| Year Built | 1960.7 | 1971.8 | 1965.7 | 1981.5 | 1967.2 | 1970.9 | 1972.8 | 1966.1 |
| ADT | 35,076 | 32,572 | 10,510 | 3,792 | 12,943 | 4,773 | 10,056 | 23,919 |
| % Trucks (estimated traffic) | 7.8% | 6.2% | 7.6% | 6.1% | 6.5% | 8.3% | 6.9% | 7.4% |

Kendall* includes bridges in Kendall County and from Aux Sable Township in Grundy County.

6.1 Chicago Region by County Geography

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|-------|---------------------------------|--------|-------|-------------------|----------|
| # | % | | # | % | Count | Status |
| 362 | 11.1% | Structurally Deficient | 333 | 9.8% | -29 | Improved |
| 737 | 22.5% | Functionally Obsolete | 778 | 22.9% | +41 | Declined |
| 2,175 | 66.4% | Not Deficient | 2,285 | 67.3% | +110 | Improved |
| 3,274 | - | Total NBI Bridges | 3,396 | - | +122 | - |
| 39 | 1.2% | High Priority Replacement | 30 | 0.9% | -9 | Improved |
| 52 | 1.6% | High Priority Corrective Action | 74 | 2.2% | +22 | Declined |
| 207 | 6.3% | Meets Minimum Tolerable Limits | 197 | 5.8% | -10 | Improved |
| 1,196 | 36.5% | Carries National Highway System | 1,216 | 35.8% | - | - |
| 81.9 | | Sufficiency Rating (Average) | 82.6 | | +0.7 | Improved |
| 1964.3 | | Year Built (Average) | 1966.1 | | +1.8 | n.a. |
| 24,884 | | ADT (Average) | 23,919 | | - | - |
| 7.7% | | % Trucks (Average) | 7.4% | | - | - |

n.a. not applicable

The 2010 NBI reported that 3,396 bridges were geographically located within the Chicago region. The average bridge was built in 1966, with a 2010 average sufficiency rating of 82.6. Within the Chicago region, a total of 333 bridges (9.8%) were classified as structurally deficient, and another 778 (22.9%) as functionally obsolete. Region-wide, based on the structural evaluation field (NBI data item 67), there were 30 (0.9%) bridges identified as “high priority for replacement,” 74 (2.2%) bridges identified as “high priority for corrective action,” and another 197 (5.8%) identified as bridges that “meet minimum tolerable limits to be left in place as is.”

Major observations regarding bridges within the Chicago region by county geography include:

- **Structurally Deficient Bridges:** 333 bridges in the region (9.8%) were classified as structurally deficient. Over 75% of SD bridges were located within three counties: Cook 49%, Will 17%, and McHenry 10%.
- **Functionally Obsolete Bridges:** 778 bridges in the region (22.9%) were classified as functionally obsolete. Almost 80% were located within two counties: Cook 67% and Will 13%.
- **High Priority for Replacement:** 30 bridges in the region (0.9%) were identified as “high priority for replacement.” 13 of these bridges were located in Cook County. The remaining counties had up to four such bridges, though none were identified in Kendall County.
- **High Priority for Corrective Action:** 74 bridges in the region (2.2%) were identified as “high priority for corrective action.” 33 of these bridges (almost 45%) were located with Cook County. The remainder of counties each had between seven and nine such bridges, except Kendall County, where only one was identified.
- **Year Built:** The average bridge in the region was built in 1966. County averages ranged from 1960 in Cook County to 1981 in Kendall County.
- **Sufficiency Rating:** The regional 2010 average bridge sufficiency rating was 82.6. County averages ranged between low ratings of 80.8 in Cook and 81.0 McHenry Counties up to 90.1 in Kendall County.

- ADT Carried: The average bridge in the region carried an ADT of 23,919. ADT ranges as high as 300,000 vehicles per day; and 140 bridges (4%) carried more than 100,000 vehicles per day. More than 97% of these bridges were located within 2 counties: Cook 84% and DuPage 14%. A total of 1,571 bridges, 46% of total regional bridges, carried traffic levels below 10,000 ADT.
- % Truck Traffic Carried: Bridges in the region carried an average of 7.4% truck traffic, which calculates to an average of 1,830 truck ADT per bridge. Based on 2010 NBI data, there were 126 bridges that carried average truck volumes in excess of 10,000 trucks per day, with 67% reported within Cook County with another 23% in DuPage County.
- Fracture Critical Bridges: 99 bridges in the region (2.9%) were classified as fracture critical bridges. More than 90% of these fracture critical bridges were located within Cook (81%) or Will (12%) Counties.
- Navigation Control Required: 116 bridges in the region (3.4%) were classified as requiring navigational control on a waterway. All 116 of these bridges were located within Cook or Will Counties, with 102 and 14 respectively.

Over the three-year period 2007 to 2010, significant changes for bridges in the Chicago region included:

- 29 fewer bridges were classified as structurally deficient.
- Nine fewer bridges were classified as “high priority for replacement.”
- The average sufficiency rating improved by 0.7 from 81.9 to 82.6.
- New bridge construction and replacement of older bridges advanced the average bridge year of construction by 1.8 years.
- 22 more bridges were classified as “high priority for corrective action.”

6.2 Cook County

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|-------|---------------------------------|--------|-------|-------------------|----------|
| # | % | | # | % | Count | Status |
| 191 | 12.0% | Structurally Deficient | 162 | 9.9% | -29 | Improved |
| 476 | 29.9% | Functionally Obsolete | 518 | 31.6% | +42 | Declined |
| 923 | 58.1% | Not Deficient | 961 | 58.6% | +38 | Improved |
| 1,590 | - | Total NBI Bridges | 1,641 | - | +51 | - |
| 14 | 0.9% | High Priority Replacement | 13 | 0.8% | -1 | Improved |
| 26 | 1.6% | High Priority Corrective Action | 33 | 2.0% | +7 | Declined |
| 101 | 6.4% | Meets Minimum Tolerable Limits | 85 | 5.2% | -16 | Improved |
| 769 | 48.4% | Carries National Highway System | 775 | 47.2% | - | - |
| 80.2 | | Sufficiency Rating (Average) | 80.8 | | +0.6 | Improved |
| 1960.1 | | Year Built (Average) | 1960.7 | | +0.6 | n.a. |
| 36,662 | | ADT (Average) | 35,076 | | - | - |
| 8.3% | | % Trucks (Average) | 7.8% | | - | - |

The 2010 NBI reported that 1,641 bridges, 48.3% of bridges in the Chicago region, were geographically located within Cook County. The average bridge in Cook County was built in 1960, with a 2010 average sufficiency rating of 80.8. A total of 162 bridges (9.9%) were classified as structurally deficient, and another 518 (31.6%) as functionally obsolete. Based on the structural evaluation field (NBI data item 67), there were 13 (0.8%) bridges identified as “high priority for replacement,” 33 (2.0%) identified as “high priority for corrective action,” and another 85 (5.2 %) identified as bridges that “meet minimum tolerable limits to be left in place as is.”

Over the three-year period 2007 to 2010, significant changes for bridges geographically located within Cook County included:

- 29 fewer bridges were classified as structurally deficient.
- The average sufficiency rating improved by 0.6 from 80.2 to 80.8.
- New bridge construction and replacement of older bridges advanced the average bridge year of construction by 0.6 year.
- Seven more bridges were classified as “high priority for corrective action.”

6.3 Will County

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|-------|---------------------------------|--------|-------|-------------------|-----------|
| # | % | | # | % | Count | Status |
| 56 | 10.0% | Structurally Deficient Bridges | 56 | 9.4% | 0 | No Change |
| 96 | 17.1% | Functionally obsolete Bridges | 100 | 16.8% | +4 | Mixed |
| 409 | 72.9% | Not Deficient Bridges | 441 | 73.9% | +32 | Improved |
| 561 | - | Total Bridges | 597 | - | +36 | - |
| 7 | 1.2% | High Priority Replacement | 3 | 0.5% | -4 | Improved |
| 6 | 1.1% | High Priority Corrective Action | 9 | 1.5% | +3 | Declined |
| 30 | 5.3% | Minimum Tolerable Condition | 37 | 6.2% | +7 | Declined |
| 123 | 21.9% | Carries National Highway System | 134 | 22.4% | - | - |
| 85.6 | | Sufficiency Rating (Average) | 85.9 | | +0.3 | Improved |
| 1970.0 | | Year Built (Average) | 1972.8 | | +2.8 | n.a. |
| 10,157 | | ADT (Average) | 10,056 | | - | - |
| 7.5% | | % Trucks (Average) | 6.9% | | - | - |

The 2010 NBI reported that 597 bridges, 17.6% of bridges in the Chicago region, were geographically located within Will County. The average Will County bridge was built in 1972, with a 2010 average sufficiency rating of 85.9. A total of 56 bridges (9.4%) were classified as structurally deficient, and another 100 (16.8%) as functionally obsolete. Based on the structural evaluation field (NBI data item 67), there were three (0.5%) bridges identified as “high priority for replacement,” nine (1.5%) identified as “high priority for corrective action,” and another 37 (6.2%) identified as bridges that “meet minimum tolerable limits to be left in place as is.”

Over the three-year period 2007 to 2010, significant changes for bridges geographically located within Will County included:

- Four fewer bridges were classified as “high priority for replacement.”
- The average sufficiency rating improved by 0.3 from 85.6 to 85.9.
- New bridge construction and replacement of older bridges advanced the average bridge year of construction by 2.8 years.
- Three more bridges were classified as “high priority for corrective action.”

6.4 DuPage County

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|-------|---------------------------------|--------|-------|-------------------|----------|
| # | % | | # | % | Count | Status |
| 30 | 10.9% | Structurally Deficient | 22 | 7.7% | -8 | Improved |
| 38 | 13.8% | Functionally Obsolete | 47 | 16.5% | +9 | Declined |
| 207 | 75.3% | Not Deficient | 216 | 75.8% | +9 | Improved |
| 275 | - | Total NBI Bridges | 285 | - | +10 | - |
| 3 | 1.1% | High Priority Replacement | 4 | 1.4% | +1 | Declined |
| 8 | 2.9% | High Priority Corrective Action | 9 | 3.2% | +1 | Declined |
| 16 | 5.8% | Meets Minimum Tolerable Limits | 10 | 3.5% | -6 | Improved |
| 120 | 43.6% | Carries National Highway System | 123 | 43.2% | - | - |
| 83.1 | | Sufficiency Rating (Average) | 84.2 | | +1.1 | Improved |
| 1969.2 | | Year Built (Average) | 1971.8 | | +2.6 | n.a. |
| 35,137 | | ADT (Average) | 32,572 | | - | - |
| 6.9% | | % Trucks (Average) | 6.2% | | - | - |

The 2010 NBI reported that 285 bridges, 8.4% of bridges in the Chicago region, were geographically located within DuPage County. The average DuPage County bridge was built in 1971, with a 2010 average sufficiency rating of 84.2. A total of 22 bridges (7.7%) were classified as structurally deficient, and another 47 (16.5%) as functionally obsolete. Based on the structural evaluation field (NBI data item 67), there were four (1.4%) bridges identified as “high priority for replacement,” nine (3.2%) identified as “high priority for corrective action,” and another ten (3.5%) identified as bridges that “meet minimum tolerable limits to be left in place as is.”

Over the three-year period 2007 to 2010, significant changes for bridges geographically located within DuPage County included:

- Eight fewer bridges were classified as structurally deficient.
- The average sufficiency rating improved by 1.1 from 83.1 to 84.2.
- New bridge construction and replacement of older bridges advanced the average bridge year of construction by 2.6 years.

6.5 Kane County

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|-------|---------------------------------|--------|-------|-------------------|----------|
| # | % | | # | % | Count | Status |
| 22 | 8.2% | Structurally Deficient | 30 | 10.9% | +8 | Declined |
| 45 | 16.9% | Functionally Obsolete | 43 | 15.6% | -2 | Improved |
| 200 | 74.9% | Not Deficient | 203 | 73.6% | +3 | Mixed |
| 267 | - | Total NBI Bridges | 276 | - | +9 | - |
| 1 | 0.4% | High Priority Replacement | 2 | 0.7% | +1 | Declined |
| 0 | 0.0% | High Priority Corrective Action | 7 | 2.5% | +7 | Declined |
| 18 | 6.7% | Meets Minimum Tolerable Limits | 20 | 7.2% | +2 | Declined |
| 60 | 22.5% | Carries National Highway System | 60 | 21.7% | - | - |
| 82.5 | | Sufficiency Rating (Average) | 82.4 | | -0.1 | Declined |
| 1964.0 | | Year Built (Average) | 1965.7 | | +1.7 | n.a. |
| 10,848 | | ADT (Average) | 10,510 | | - | - |
| 7.7% | | % Trucks (Average) | 7.6% | | - | - |

The 2010 NBI reported that 276 bridges, 8.1% of bridges in the Chicago region, were geographically located within Kane County. The average Kane County bridge was built in 1965, with a 2010 average sufficiency rating of 82.4. A total of 30 bridges (10.9%) were classified as structurally deficient, and another 43 (15.6%) as functionally obsolete. Based on the structural evaluation field (NBI data item 67), there were two (0.7%) bridges identified as “high priority for replacement,” seven (2.5%) identified as “high priority for corrective action,” and another 20 (7.3%) identified as bridges that “meet minimum tolerable limits to be left in place as is.”

Over the three-year period 2007 to 2010, significant changes for bridges geographically located within Kane County included:

- New bridge construction and replacement of older bridges advanced the average bridge year of construction by 1.7 years.
- Eight more bridges were classified as structurally deficient.
- Seven more bridges were classified as “high priority for corrective action.”

6.6 Lake County

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|-------|---------------------------------|--------|-------|-------------------|----------|
| # | % | | # | % | Count | Status |
| 38 | 16.3% | Structurally Deficient | 27 | 11.5% | -11 | Improved |
| 46 | 19.7% | Functionally Obsolete | 42 | 17.9% | -4 | Improved |
| 149 | 63.9% | Not Deficient | 166 | 70.6% | +17 | Improved |
| 233 | - | Total NBI Bridges | 235 | - | +2 | - |
| 9 | 3.9% | High Priority Replacement | 4 | 1.7% | -5 | Improved |
| 6 | 2.6% | High Priority Corrective Action | 8 | 3.4% | +2 | Declined |
| 18 | 7.7% | Meets Minimum Tolerable Limits | 17 | 7.2% | -1 | Improved |
| 74 | 31.8% | Carries National Highway System | 72 | 30.6% | - | - |
| 79.6 | | Sufficiency Rating (Average) | 81.6 | | +2.0 | Improved |
| 1962.2 | | Year Built (Average) | 1967.2 | | +5.0 | n.a. |
| 14,210 | | ADT (Average) | 12,943 | | - | - |
| 5.2% | | % Trucks (Average) | 6.5% | | - | - |

The 2010 NBI reported that 235 bridges, 6.9% of bridges in the Chicago region, were geographically located within Lake County. The average Lake County bridge was built in 1967, with a 2010 average sufficiency rating of 81.6. A total of 27 bridges (11.5%) were classified as structurally deficient, and another 42 (17.9%) as functionally obsolete. Based on the structural evaluation field (NBI data item 67), there were four (1.7%) bridges identified as “high priority for replacement,” eight (3.4%) identified as “high priority for corrective action,” and another 17 (7.2%) identified as bridges that “meet minimum tolerable limits to be left in place as is.”

Over the three-year period 2007 to 2010, significant changes for bridges geographically located within Lake County included:

- Eleven fewer bridges were classified as structurally deficient.
- Five fewer bridges were classified as “high priority for replacement.”
- The average sufficiency rating improved by 2.0 from 79.6 to 81.6.
- New bridge construction and replacement of older bridges advanced the average bridge year of construction by 5.0 years.
- Two more bridges classified as “high priority for corrective action.”

6.7 McHenry County

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|-------|---------------------------------|--------|-------|-------------------|-----------|
| # | % | | # | % | Count | Status |
| 20 | 9.9% | Structurally Deficient | 32 | 14.7% | +12 | Declined |
| 23 | 11.3% | Functionally Obsolete | 18 | 8.3% | -5 | Improved |
| 160 | 78.8% | Not Deficient | 168 | 77.1% | +8 | Mixed |
| 203 | - | Total NBI Bridges | 218 | - | +15 | - |
| 4 | 2.0% | High Priority Replacement | 4 | 1.8% | 0 | No Change |
| 6 | 3.0% | High Priority Corrective Action | 7 | 3.2% | +1 | Declined |
| 20 | 9.9% | Meets Minimum Tolerable Limits | 24 | 11.0% | +4 | Declined |
| 38 | 18.7% | Carries National Highway System | 40 | 18.3% | - | - |
| 80.7 | | Sufficiency Rating (Average) | 81.0 | | +0.3 | Improved |
| 1965.8 | | Year Built (Average) | 1970.9 | | +5.1 | n.a. |
| 5,112 | | ADT (Average) | 4,773 | | - | - |
| 8.4% | | % Trucks (Average) | 8.3% | | - | - |

The 2010 NBI reported that 218 bridges, 6.4% of bridges in the Chicago region, were geographically located within McHenry County. The average McHenry County bridge was built in 1970, with a 2010 average sufficiency rating of 81.0. A total of 32 bridges (14.7%) were classified as structurally deficient, and another 18 (8.3%) as functionally obsolete. Based on the structural evaluation field (NBI data item 67), there were four (1.8%) bridges identified as “high priority for replacement,” seven (3.2%) identified as “high priority for corrective action,” and another 24 (11.0%) identified as bridges that “meet minimum tolerable limits to be left in place as is.”

Over the three-year period 2007 to 2010, significant changes for bridges geographically located within McHenry County included:

- The average sufficiency rating improved by 0.3 from 80.7 to 81.0.
- New bridge construction and replacement of older bridges advanced the average bridge year of construction by 5.1 years.
- Twelve more bridges classified as structurally deficient.

6.8 Kendall* County

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|-------|---------------------------------|--------|-------|-------------------|-----------|
| # | % | | # | % | Count | Status |
| 5 | 3.4% | Structurally Deficient | 4 | 2.8% | -1 | Improved |
| 13 | 9.0% | Functionally Obsolete | 10 | 6.9% | -3 | Improved |
| 127 | 87.6% | Not Deficient | 130 | 90.3% | +3 | Improved |
| 145 | - | Total NBI Bridges | 144 | - | -1 | - |
| 1 | 0.7% | High Priority Replacement | 0 | 0.0% | -1 | Improved |
| 0 | 0.0% | High Priority Corrective Action | 1 | 0.7% | +1 | Declined |
| 4 | 2.8% | Meets Minimum Tolerable Limits | 4 | 2.8% | 0 | No Change |
| 12 | 8.3% | Carries National Highway System | 12 | 8.3% | - | - |
| 89.8 | | Sufficiency Rating (Average) | 90.1 | | +0.3 | Improved |
| 1978.9 | | Year Built (Average) | 1981.5 | | +2.6 | n.a. |
| 3,737 | | ADT (Average) | 3,792 | | - | |
| 6.7% | | % Trucks (Average) | 6.1% | | - | |

Kendall County* includes bridges in Kendall County and from Aux Sable Township in Grundy County.

The 2010 NBI reported that 144 bridges, 4.2% of bridges in the Chicago region, were geographically located within Kendall County. The average Kendall County bridge was built in 1981, with a 2010 average sufficiency rating of 90.1. A total of four bridges (2.8%) were classified as structurally deficient, and another ten (6.9%) as functionally obsolete. Based on the structural evaluation field (NBI data item 67), there were no bridges identified as “high priority for replacement,” one (0.7%) identified as “high priority for corrective action,” and another four (2.8%) identified as bridges that “meet minimum tolerable limits to be left in place as is.”

Over the three-year period 2007 to 2010, significant changes for bridges geographically located within Kendall County included:

- One less bridge was classified as structurally deficient.
- One less bridge was classified as “high priority for replacement.”
- The average sufficiency rating improved by 0.3 from 89.8 to 90.1.
- New bridge construction and replacement of older bridges advanced the average bridge year of construction by 2.6 years.

7 2010 Bridge Condition by Ownership

This section summarizes 2010 bridge conditions with a focus on “who” owns the bridges. As noted in section 3.1, the owner agency retains responsibility for bridge conditions, even if a secondary agency was contracted for bridge maintenance.

For the purposes of this report, the Chicago region was considered with the following ownership categories: Illinois Department of Transportation (IDOT), Illinois Tollway, county (combined), townships (combined), municipalities (combined), and other owners (federal, railroad, private). IDOT and Illinois Tollway are specific bridge owner categories. The “other” category was omitted from this analysis, since this group was responsible for only 1% of regional bridges. As a result, the summaries presented in the following sections compare only these five major ownership categories. The distribution of bridge ownership categories is shown in Exhibit 19.

A separate section was included to summarize conditions for bridges owned by the City of Chicago. Although already considered as part of municipal ownership, a query of the NBI database indicated that a significant share of bridges in the region (8.6%) was owned by the City of Chicago. A second section was included to summarize conditions for movable bridges, which comprise 15% of bridges owned by the City of Chicago. Finally, a section was included to summarize conditions for bridges that carried National Highway System (NHS) routes in the Chicago region.

Exhibit 19: NBI Bridges by Ownership Category

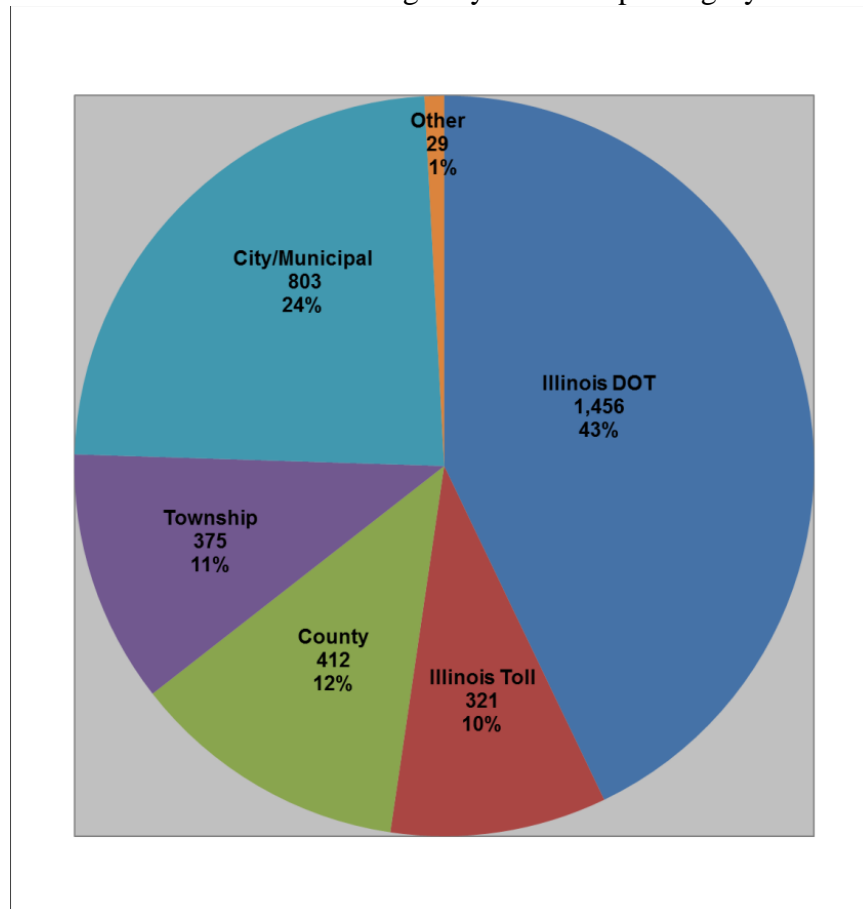


Exhibit 20 summarizes bridge conditions based on bridge ownership categories. The individual ownership categories are discussed in sections 7.1 through 7.6. Please note that the 2010 NBI data used for these summaries is over 1 year old, and the individual agencies would be the definitive source for current bridge conditions.

Exhibit 20: 2010 Bridge Condition Statistics by Ownership Category

| <u>Number of Bridges</u> | IDOT | County | Township | Municipal | Illinois Tollway | City of Chicago | Chicago Region (1) |
|---|---------------|---------------|-----------------|------------------|-------------------------|------------------------|---------------------------|
| Structurally Deficient | 139 | 29 | 24 | 118 | 14 | 40 | 333 |
| Functionally Obsolete | 398 | 58 | 30 | 207 | 77 | 114 | 778 |
| Deficient | 537 | 87 | 54 | 325 | 91 | 154 | 1,111 |
| Not Deficient | 919 | 325 | 321 | 478 | 230 | 139 | 2,285 |
| Total NBI Bridges | 1,456 | 412 | 375 | 803 | 321 | 293 | 3,396 |
| % Total Chicago Region NBI Bridges | 42.9% | 12.1% | 11.0% | 23.6% | 9.5% | 8.6% | |
| (1) Chicago regional totals. Chicago of Chicago bridges are also included under the Municipal category. A total of 29 bridges owned by other agencies are not broken out in this table. | | | | | | | |
| High Priority Replacement | 10 | 2 | 3 | 14 | 0 | 5 | 30 |
| High Priority Corrective Action | 25 | 12 | 3 | 31 | 0 | 8 | 74 |
| Meets Minimum Tolerable Limits | 66 | 29 | 18 | 68 | 10 | 22 | 197 |
| Carry NHS route | 733 | 53 | 0 | 142 | 285 | 131 | 1,216 |
| <u>Percentages of Bridges</u> | IDOT | County | Township | Municipal | Illinois Tollway | City of Chicago | Chicago Region |
| Structurally Deficient | 9.5% | 7.0% | 6.4% | 14.7% | 4.4% | 13.7% | 9.8% |
| Functionally Obsolete | 27.3% | 14.1% | 8.0% | 25.8% | 24.0% | 38.9% | 22.9% |
| Not Deficient | 63.1% | 78.9% | 85.6% | 59.5% | 71.7% | 47.4% | 67.3% |
| High Priority Replacement | 0.7% | 0.5% | 0.8% | 1.7% | 0.0% | 1.7% | 0.9% |
| High Priority Corrective Action | 1.7% | 2.9% | 0.8% | 3.9% | 0.0% | 2.7% | 2.2% |
| Meets Minimum Tolerable Limits | 4.5% | 7.0% | 4.8% | 8.5% | 3.1% | 7.5% | 5.8% |
| Carry NHS route | 50.3% | 12.9% | 0.0% | 17.7% | 88.8% | 44.7% | 35.8% |
| <u>Owner Averages</u> | IDOT | County | Township | Municipal | Illinois Tollway | City of Chicago | Chicago Region |
| Sufficiency rating | 82.3 | 84.7 | 88.0 | 79.8 | 83.5 | 78.6 | 82.6 |
| Year Built | 1966.1 | 1972.4 | 1974.7 | 1960.7 | 1963.1 | 1953.5 | 1966.1 |
| ADT | 32,546 | 10,147 | 901 | 12,924 | 58,599 | 27,801 | 23,919 |
| % Trucks (estimated traffic) | 7.8% | 7.5% | 6.0% | 5.5% | 11.3% | 9.2% | 7.4% |

7.1 IDOT

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|-------|---------------------------------|--------|-------|-------------------|----------|
| # | % | | # | % | Count | Status |
| 169 | 12.0% | Structurally Deficient | 139 | 9.5% | -30 | Improved |
| 354 | 25.1% | Functionally Obsolete | 398 | 27.3% | +44 | Declined |
| 890 | 62.9% | Not Deficient | 919 | 63.1% | +29 | Improved |
| 1,413 | - | Total NBI Bridges | 1,456 | - | +43 | - |
| 19 | 1.3% | High Priority Replacement | 10 | 0.7% | -9 | Improved |
| 27 | 1.9% | High Priority Corrective Action | 25 | 1.7% | -2 | Improved |
| 74 | 5.2% | Meets Minimum Tolerable Limits | 66 | 4.5% | -8 | Improved |
| 716 | 50.7% | Carries National Highway System | 733 | 50.3% | - | - |
| 81.3 | | Sufficiency Rating (Average) | 82.3 | | +1.0 | Improved |
| 1964.5 | | Year Built (Average) | 1966.1 | | +1.6 | n.a. |
| 32,898 | | ADT (Average) | 32,546 | | - | - |
| 9.4% | | % Trucks (Average) | 7.8% | | - | - |

The 2010 NBI reported that 1,456 bridges, 42.9% of bridges in the Chicago region, were owned by IDOT. The Chicago region consists of all of IDOT District 1, plus Kendall County and one township in Grundy County from District 3. The average IDOT bridge was built in 1966, with a 2010 average sufficiency rating of 82.3. A total of 139 IDOT bridges (9.5%) were classified as structurally deficient, and another 398 (27.3%) as functionally obsolete. Based on the structural evaluation field (NBI data item 67), there were ten (0.7%) bridges identified as “high priority for replacement,” 25 (1.7%) identified as “high priority for corrective action,” and another 66 (4.5%) identified as bridges that “meet minimum tolerable limits to be left in place as is.”

Over the three-year period 2007 to 2010, significant changes for bridges owned by IDOT in the Chicago region included:

- 30 fewer bridges were classified as structurally deficient.
- Nine fewer bridges were classified as “high priority for replacement.”
- The average sufficiency rating improved by 1.0 from 81.3 to 82.3.
- New bridge construction and replacement of older bridges advanced the average bridge year of construction by 1.6 years.

7.2 County

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|-------|---------------------------------|--------|-------|-------------------|-----------|
| # | % | | # | % | Count | Status |
| 28 | 7.0% | Structurally Deficient | 29 | 7.0% | +1 | Declined |
| 54 | 13.4% | Functionally Obsolete | 58 | 14.1% | +4 | Declined |
| 320 | 79.6% | Not Deficient | 325 | 78.9% | +5 | Improved |
| 402 | - | Total NBI Bridges | 412 | - | +10 | - |
| 2 | 0.5% | High Priority Replacement | 2 | 0.5% | 0 | No Change |
| 4 | 1.0% | High Priority Corrective Action | 12 | 2.9% | +8 | Declined |
| 30 | 7.5% | Meets Minimum Tolerable Limits | 29 | 7.0% | -1 | Improved |
| 52 | 12.9% | Carries National Highway System | 53 | 12.9% | - | - |
| 85.1 | | Sufficiency Rating (Average) | 84.7 | | -0.4 | Declined |
| 1970.9 | | Year Built (Average) | 1972.4 | | +1.5 | n.a. |
| 10,608 | | ADT (Average) | 10,147 | | - | - |
| 6.9% | | % Trucks (Average) | 7.5% | | - | - |

The 2010 NBI reported that 412 bridges, 12.1% of bridges in the Chicago region, were owned by counties. The average county-owned bridge was built in 1972, with a 2010 average sufficiency rating of 84.7. A total of 29 county bridges (7.0%) were classified as structurally deficient, and another 58 (14.1%) as functionally obsolete. Based on the structural evaluation field (NBI data item 67), there were two (0.5%) bridges identified as “high priority for replacement,” twelve (2.9%) identified as “high priority for corrective action,” and another 29 (7.0%) identified as bridges that “meet minimum tolerable limits to be left in place as is.”

Over the three-year period 2007 to 2010, significant changes for bridges owned by counties included:

- New bridge construction and replacement of older bridges advanced the average bridge year of construction by 1.5 years.
- Eight more bridges were classified as “high priority for corrective action.”
- The average sufficiency rating declined by 0.4 from 85.1 to 84.7.

7.3 Illinois Tollway

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|-------|---------------------------------|--------|-------|-------------------|-----------|
| # | % | | # | % | Count | Status |
| 30 | 9.6% | Structurally Deficient | 14 | 4.4% | -16 | Improved |
| 59 | 18.8% | Functionally Obsolete | 77 | 24.0% | +18 | Declined |
| 225 | 71.6% | Not Deficient | 230 | 71.7% | +5 | Improved |
| 314 | - | Total NBI Bridges | 321 | - | +7 | - |
| 0 | 0.0% | High Priority Replacement | 0 | 0.0% | 0 | No Change |
| 0 | 0.0% | High Priority Corrective Action | 0 | 0.0% | 0 | No Change |
| 15 | 4.8% | Meets Minimum Tolerable Limits | 10 | 3.1% | -5 | Improved |
| 280 | 89.2% | Carries National Highway System | 285 | 88.8% | - | - |
| 81.7 | | Sufficiency Rating (Average) | 83.5 | | +1.8 | Improved |
| 1961.6 | | Year Built (Average) | 1963.1 | | +1.5 | n.a. |
| 63,306 | | ADT (Average) | 58,599 | | - | - |
| 10.0% | | % Trucks (Average) | 11.3% | | - | - |

The 2010 NBI reported that 321 bridges, 9.5% of bridges in the Chicago region, were owned by the Illinois Tollway. The average Illinois Tollway bridge was built in 1963, with a 2010 average sufficiency rating of 83.5. A total of 14 Illinois Tollway bridges (4.4%) were classified as structurally deficient, and another 77 (24.0%) as functionally obsolete. Based on the structural evaluation field (NBI data item 67), there were no bridges identified as “high priority for replacement,” and no bridges identified as “high priority for corrective action.” However, there were ten (3.1%) bridges identified as meeting “minimum tolerable limits to be left in place as is.”

Over the three-year period 2007 to 2010, significant changes for bridges owned by the Illinois Tollway included:

- 16 fewer bridges were classified as structurally deficient.
- The average sufficiency rating improved by 1.8 from 81.7 to 83.5.
- New bridge construction and replacement of older bridges advanced the average bridge year of construction by 1.5 years.

7.4 Township

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|-------|---------------------------------|--------|-------|-------------------|-----------|
| # | % | | # | % | Count | Status |
| 16 | 4.2% | Structurally Deficient | 24 | 6.4% | +8 | Declined |
| 45 | 11.8% | Functionally Obsolete | 30 | 8.0% | -15 | Improved |
| 321 | 84.0% | Not Deficient | 321 | 85.6% | 0 | No Change |
| 382 | - | Total NBI Bridges | 375 | - | -7 | - |
| 3 | 0.8% | High Priority Replacement | 3 | 0.8% | 0 | No Change |
| 3 | 0.8% | High Priority Corrective Action | 3 | 0.8% | 0 | No Change |
| 13 | 3.4% | Meets Minimum Tolerable Limits | 18 | 4.8% | +5 | Declined |
| - | 0.0% | Carries National Highway System | 0 | 0.0% | - | - |
| 87.9 | | Sufficiency Rating (Average) | 88.0 | | +0.1 | Improved |
| 1971.9 | | Year Built (Average) | 1974.7 | | +2.8 | n.a. |
| 902 | | ADT (Average) | 901 | | - | - |
| 4.9% | | % Trucks (Average) | 6.0% | | - | - |

The 2010 NBI reported that 375 bridges, 11.0% of bridges in the Chicago region, were owned by townships. The average township bridge was built in 1974, with a 2010 average sufficiency rating of 88.0. A total of 24 township bridges (6.4%) were classified as structurally deficient, and another 30 (8.0%) as functionally obsolete. Based on the structural evaluation field (NBI data item 67), there were three (0.8%) bridges identified as “high priority for replacement,” three (0.8%) identified as “high priority for corrective action,” and another 18 (4.8%) bridges identified as meeting “minimum tolerable limits to be left in place as is”.

Over the three-year period 2007 to 2010, significant changes for bridges owned by the townships included:

- The average sufficiency rating improved by 0.1 from 87.9 to 88.0.
- New bridge construction and replacement of older bridges advanced the average bridge year of construction by 2.8 years.
- Eight more bridges were classified as structurally deficient.

7.5 Municipal

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|------------------------------|---------------------------------|--------|-------|-------------------|----------|
| # | % | | # | % | Count | Status |
| 108 | 14.8% | Structurally Deficient | 118 | 14.7% | +10 | Declined |
| 216 | 29.5% | Functionally Obsolete | 207 | 25.8% | -9 | Improved |
| 408 | 55.7% | Not Deficient | 478 | 59.5% | +70 | Improved |
| 732 | - | Total NBI Bridges | 803 | - | +71 | - |
| 12 | 1.6% | High Priority Replacement | 14 | 1.7% | +2 | Declined |
| 17 | 2.3% | High Priority Corrective Action | 31 | 3.9% | +14 | Declined |
| 68 | 9.3% | Meets Minimum Tolerable Limits | 68 | 8.5% | 0 | Mixed |
| 144 | 19.7% | Carries National Highway System | 142 | 17.7% | - | - |
| 79.2 | Sufficiency Rating (Average) | | 79.8 | +0.6 | Improved | |
| 1958.1 | Year Built (Average) | | 1960.7 | +2.6 | n.a. | |
| 13,907 | ADT (Average) | | 12,924 | - | - | |
| 5.4% | % Trucks (Average) | | 5.5% | - | - | |

The 2010 NBI reported that 803 bridges, 23.6% of bridges in the Chicago region, were owned by municipalities. The average municipal bridge was built in 1960, with a 2010 average sufficiency rating of 79.8. A total of 118 bridges (14.7%) were classified as structurally deficient, and another 207 (25.8%) were classified as functionally obsolete. Based on the structural evaluation field (NBI data item 67), there were 14 (1.7%) bridges identified as “high priority for replacement,” 31 (3.9%) identified as “high priority for corrective action,” and another 68 (8.5%) bridges identified as meeting “minimum tolerable limits to be left in place as is.”

Over the three- year period 2007 to 2010, significant changes for bridges owned by municipalities included:

- the average sufficiency rating improved by 0.6 from 79.2 to 79.8.
- new bridge construction and replacement of older bridges advanced the average bridge year of construction by 2.6 years.
- ten more bridges classified as structurally deficient.
- two more bridges classified as “high priority for replacement.”
- 14 more bridges classified as “high priority for corrective action.”

7.6 City of Chicago

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|-------|---------------------------------|-------------|-------|-------------------|----------|
| # | % | | # | % | Count | Status |
| 42 | 14.8% | Structurally Deficient | 40 | 13.7% | -2 | Improved |
| 123 | 43.5% | Functionally Obsolete | 114 | 38.9% | -9 | Improved |
| 118 | 41.7% | Not Deficient | 139 | 47.4% | +21 | Improved |
| 283 | - | Total NBI Bridges | 293 | - | +10 | - |
| 3 | 1.1% | High Priority Replacement | 5 | 1.7% | +2 | Declined |
| 5 | 1.8% | High Priority Corrective Action | 8 | 2.7% | +3 | Declined |
| 29 | 10.2% | Meets Minimum Tolerable Limits | 22 | 7.5% | -7 | Improved |
| 134 | 47.3% | Carries National Highway System | 131 | 44.7% | - | - |
| 77.0 | | Sufficiency rating (Average) | 78.6 | | +1.6 | Improved |
| 1951.6 | | Year Built (Average) | 1953.5 | | +1.9 | n.a. |
| 28,226 | | ADT (Average) | 27,801 | | - | - |
| 9.1% | | % Trucks (Average) | 9.2% | | - | - |

The 2010 NBI reported that 293 bridges, 8.6% of bridges in the Chicago region, were owned by City of Chicago. The average City of Chicago bridge was built in 1953, with a 2010 average sufficiency rating of 78.6. A total of 40 City of Chicago bridges (13.7%) were classified as structurally deficient, and another 114 (38.9%) as functionally obsolete. Based on the structural evaluation field (NBI data item 67), there were five (1.7%) bridges identified as “high priority for replacement,” eight (2.7%) identified as “high priority for corrective action,” and another 22 (7.5%) identified as bridges that “meet minimum tolerable limits to be left in place as is.”

Over the three-year period 2007 to 2010, significant changes for bridges owned by the City of Chicago included:

- Two fewer bridges were classified as structurally deficient.
- The average sufficiency rating improved by 1.6 from 77.0 to 78.6.
- New bridge construction and replacement of older bridges advanced the average bridge year of construction by 1.9 years.
- Two more bridges were classified as “high priority for replacement.”
- Three more bridges were classified as “high priority for corrective action.”

7.7 Movable Bridges

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|-------|---------------------------------|--------|-------|-------------------|-----------|
| # | % | | # | % | Count | Status |
| 15 | 27.3% | Structurally Deficient | 16 | 29.6% | +1 | Declined |
| 26 | 47.3% | Functionally Obsolete | 24 | 44.4% | -2 | Improved |
| 14 | 25.5% | Not Deficient | 14 | 25.9% | 0 | No Change |
| 55 | - | Total NBI Bridges | 54 | - | -1 | - |
| 2 | 3.6% | High Priority Replacement | 4 | 7.4% | +2 | Declined |
| 1 | 1.8% | High Priority Corrective Action | 1 | 1.9% | 0 | No Change |
| 11 | 20.0% | Meets Minimum Tolerable Limits | 10 | 18.5% | -1 | Improved |
| 21 | 38.2% | Carries National Highway System | 20 | 37.0% | - | - |
| 64.8 | | Sufficiency Rate (Average) | 61.3 | | -3.5 | Declined |
| 1933.0 | | Year Built (Average) | 1932.4 | | -0.6 | n.a. |
| 19,501 | | ADT (Average) | 19,770 | | - | - |
| 12.2% | | % Trucks (Average) | 12.6% | | - | - |

The 2010 NBI reported that 54 bridges, 1.6% of bridges in the Chicago region, were movable bridges. More than 80% of the movable bridges were owned by City of Chicago. The 2010 NBI reported that the average movable bridge was built in 1932, with a 2010 average sufficiency rating of 61.3. A total of 16 movable bridges (29.6%) were classified as structurally deficient, and another 24 (44.4%) as functionally obsolete. Based on the structural evaluation field (NBI data item 67), there were four (7.4%) bridges identified as “high priority for replacement,” one (1.9%) identified as “high priority for corrective action,” and another ten (18.5%) identified as bridges that “meet minimum tolerable limits to be left in place as is.”

Over the three-year period 2007 to 2010, significant changes for movable bridges within the Chicago region included:

- One more bridge was classified as structurally deficient.
- Two more bridges were classified as “high priority for replacement.”
- The average sufficiency rating declined by 3.5 from 64.8 to 61.3.
- New bridge construction and replacement of older movable bridges with fixed bridges reduced the average bridge year of construction by 0.6 year.

7.8 National Highway System

| 2007 | | Bridge Category | 2010 | | 3 Year Net Change | |
|--------|--------|---------------------------------|--------|--------|-------------------|-------------|
| # | % | | # | % | Count | Status |
| 124 | 10.4% | Structurally Deficient | 99 | 8.1% | -25 | Improvement |
| 260 | 21.8% | Functionally Obsolete | 289 | 23.8% | +29 | Decline |
| 810 | 67.8% | Not Deficient | 828 | 68.1% | +18 | Improvement |
| 1,194 | - | Total NBI Bridges | 1,216 | - | +22 | - |
| 6 | 0.5% | High Priority Replacement | 6 | 0.5% | 0 | No Change |
| 12 | 1.0% | High Priority Corrective Action | 16 | 1.3% | +4 | Decline |
| 63 | 5.3% | Meets Minimum Tolerable Limits | 53 | 4.4% | -10 | Improvement |
| 1,194 | 100.0% | Carries National Highway System | 1,216 | 100.0% | - | - |
| 82.1 | | Sufficiency Rating (Average) | 82.7 | | +0.6 | Improvement |
| 1964.7 | | Year Built (Average) | 1965.7 | | +1.0 | n.a. |
| 53,823 | | ADT (Average) | 52,554 | | - | - |
| 11.0% | | % Trucks (Average) | 9.4% | | - | - |

The 2010 NBI reported that 1,216 NHS bridges (33.1% of all NHS bridges in the state) were geographically located within in the Chicago region. The average NHS bridge was built in 1965, with a 2010 average sufficiency rating of 82.7. Within the Chicago region, a total of 99 NHS bridges (8.1%) were classified as structurally deficient, and another 289 (23.8%) as functionally obsolete. Region-wide, based on the structural evaluation field (NBI data item 67), there were six (0.5%) NHS bridges identified as “high priority for replacement,” 16 (1.3%) identified as “high priority for corrective action,” and another 53 (4.4%) identified as NHS bridges that “meet minimum tolerable limits to be left in place as is.”

Over the three-year period 2007 to 2010, significant changes for NHS bridges in the Chicago region included:

- 25 fewer NHS bridges were classified as structurally deficient.
- The average sufficiency rating for NHS bridges improved from 82.1 to 82.7.
- New NHS bridge construction and replacement of older bridges advanced the average bridge year of construction by 1.0 year.
- Four more NHS bridges were classified as “high priority for corrective action.”

8 National Highway System Bridge Performance Measures

The National Highway System (NHS) consists of more than 163,000 centerline miles of the nation's most important roadways. As of 2006, while the NHS represented only about 4% of the nation's total roadway mileage (3), it also carried almost 45% of Nation's vehicle miles of travel (VMT). Nationally, bridges that carry NHS routes account for almost 20% of the bridges in the NBI, and comprise almost half of the Nation's total bridge deck area. In Illinois, about 14% of the bridges in the state carry NHS routes, which comprised about 42% of the state's bridge deck area. In the seven-county Chicago region, about 36% of the bridges carry NHS routes. These bridges comprise almost 70% of the bridge deck area in the region.

In the *2008 Condition & Performance Report to Congress*, Chapter 11: *NHS Bridge Performance Projection* (11) presented a range of potential alternative management strategies to maintain the nation's bridge system over the next 50 years. Bridge performance measures for the year 2006 were identified, and were then utilized as inputs for the National Bridge Investment Analysis System (NBIAS). Bridge conditions and associated funding needs were projected on the national level to the year 2056 under a range of potential alternative scenarios. This study also included the basic assumption of a maximum NHS bridge design life of 50 years. While this assumption may not apply to bridges that have been subject to timely maintenance and rehabilitation that effectively extend bridge service life, bridge age remains as a valid concern.

NHS bridge performance measures that were identified included:

- average bridge sufficiency rating,
- % of bridges with deck condition rating of fair or better,
- % of bridges with superstructure condition rating of fair or better,
- % of bridges with substructure condition rating of fair or better, and
- average bridge health index.

Both the sufficiency rating and health index involve complex calculations that result in one number (ranging from a high of 100 to a low of 0) that represents overall bridge condition. However, only sufficiency ratings were included within the NBI database. Regarding bridge condition ratings, as discussed in Chapter 11, it was assumed that it would be "highly desirable to implement actions" before the key bridge component condition ratings fall below the fair condition.

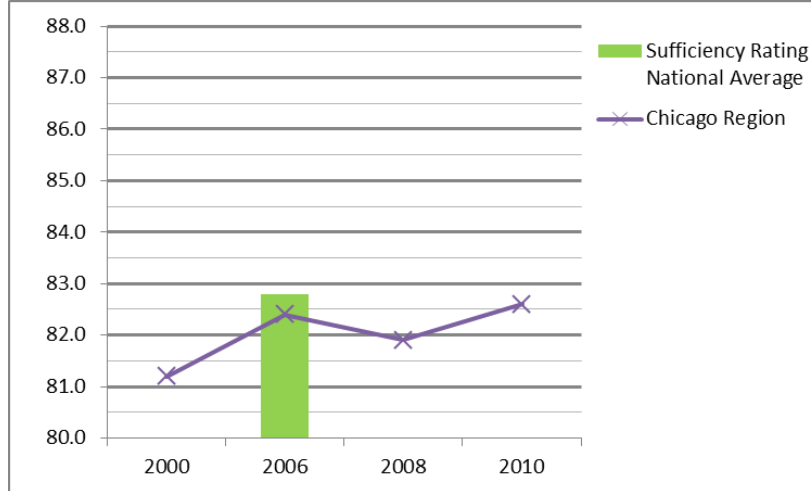
Since the National Bridge Inventory (NBI) included data items that can be used to calculate all of these measures (with the exception of the health index), CMAP staff was able to generate comparable statewide and local averages that may serve as benchmarks for current conditions and can be compared to the 2006 national averages that were identified in the 2008 C&P report. Since CMAP staff did not have knowledge of or access to the NBIAS, local and statewide projections were not done. For the purposes of this report, staff applied the NHS performance measures to NHS bridges in the Chicago region, and compared regional trends to national averages reported in the 2008 C&P report (11).

On the national, state and regional levels there have been significant reductions in the number of structurally deficient bridges.

8.1 Sufficiency Rating Performance Measure

According to the 2008 C&P Report to Congress, the national average for sufficiency rating reported for NHS bridges in 2006 was 82.6 as of the 2006 NBI. Using the NBI sufficiency rating data item from the years 2000, 2006, 2008 and 2010, CMAP staff calculated the following regional averages:

Exhibit 21: NHS Bridge Performance Measure for Sufficiency Rating

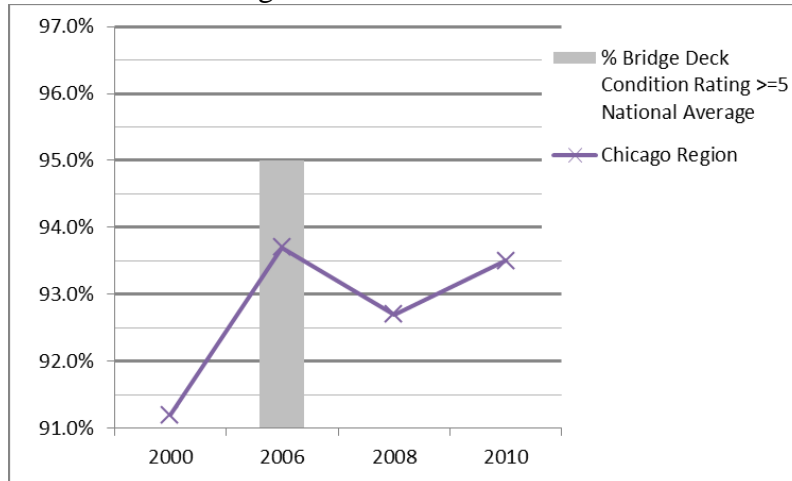


As of 2006, the Chicago regional average was below the national average. However, since 2000, there has been an improvement in terms of average sufficiency ratings with an upward trend from 81.2 to 82.6.

8.2 Condition Ratings Performance Measures

According to the 2008 C&P Report to Congress, at the national level, 95.0% of NHS bridges had a deck condition rating of fair or better as of the 2006 NBI (data item 58: deck condition rating ≥ 5). Using the NBI deck condition rating data item from the years 2000, 2006, 2008 and 2010, CMAP staff calculated the following regional averages:

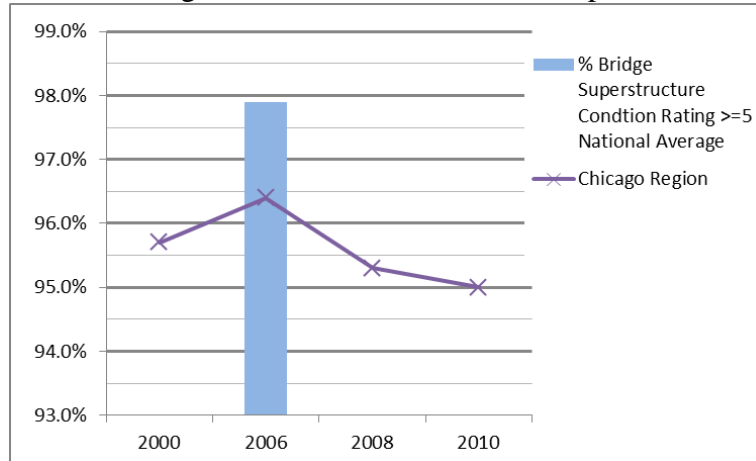
Exhibit 22: NHS Bridge Performance Measure for Deck Condition



As of 2006, the Chicago regional deck condition rating performance measure was below the national average. However, since 2000, there has been a regional improvement in the percentage of NHS bridge deck conditions of fair or better with an upward trend from 91.2% to 93.5%.

According to the 2008 C&P Report to Congress, at the national level, 97.9% of NHS bridges had a superstructure condition rating of fair or better as of the 2006 NBI (data item 59: superstructure condition rating ≥ 5). Using the NBI superstructure condition rating data item from the years 2000, 2006, 2008 and 2010, CMAP staff calculated the following regional averages:

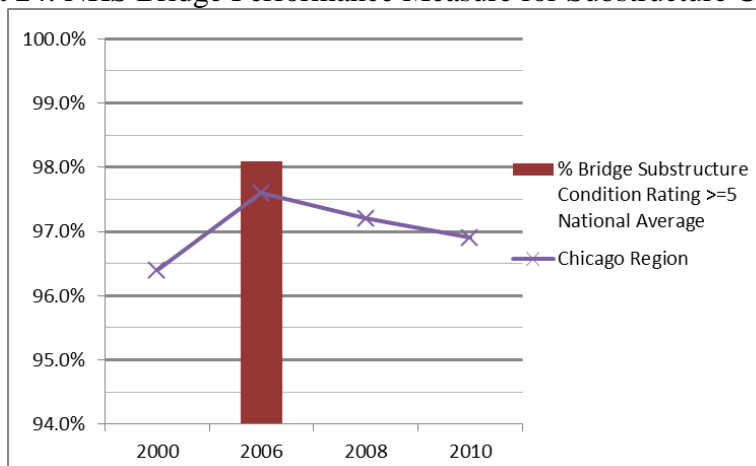
Exhibit 23: NHS Bridge Performance Measure for Superstructure Condition



As of 2006, the Chicago regional superstructure condition rating performance measure was below the national average. In addition, since 2000, there has been a regional decline in the percentage of NHS bridge superstructure condition of fair or better from 95.7% to 95.0%.

According to the 2008 C&P Report to Congress, at the national level, 98.1% of NHS bridges had a substructure condition rating of fair or better as of the 2006 NBI (data item 60: substructure condition rating ≥ 5). Using the NBI substructure condition rating data item from the years 2000, 2006, 2008 and 2010, CMAP staff calculated the following regional averages:

Exhibit 24: NHS Bridge Performance Measure for Substructure Condition

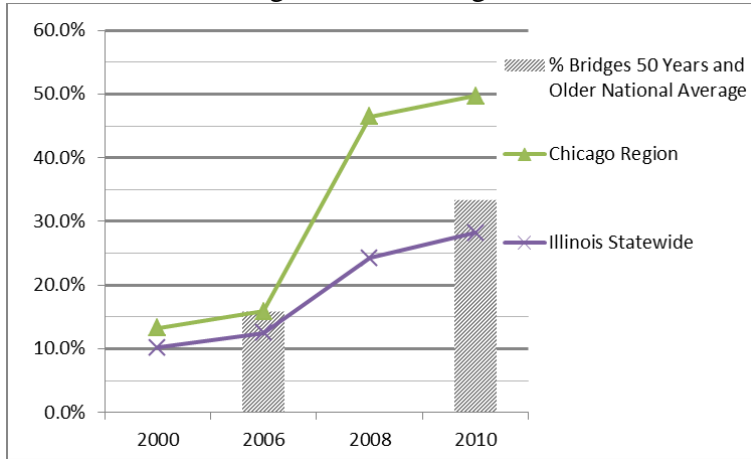


As of 2006, the Chicago regional substructure condition rating performance measure was below the national average. Since 2000, there has been a regional improvement in the percentage of NHS bridge substructure condition of fair or better with an upward trend from 96.4% to 96.9%.

8.3 Age of NHS Bridges

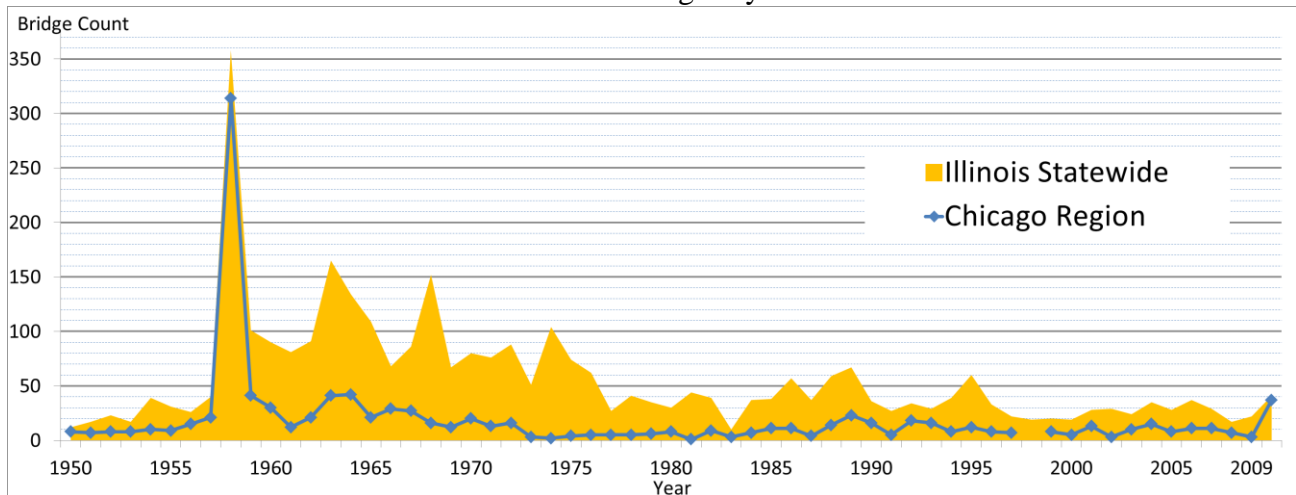
According to the 2008 C&P Report to Congress, at the national level, 15.7% of NHS bridges were 50 years and older as of the 2006 NBI (data item 27: year built substructure condition rating 1956 and older). Using the NBI year built data item from the year 2000, 2006, 2008 and 2010, CMAP staff calculated the following percentages:

Exhibit 25: Percentage of NHS Bridge 50 Years and Older



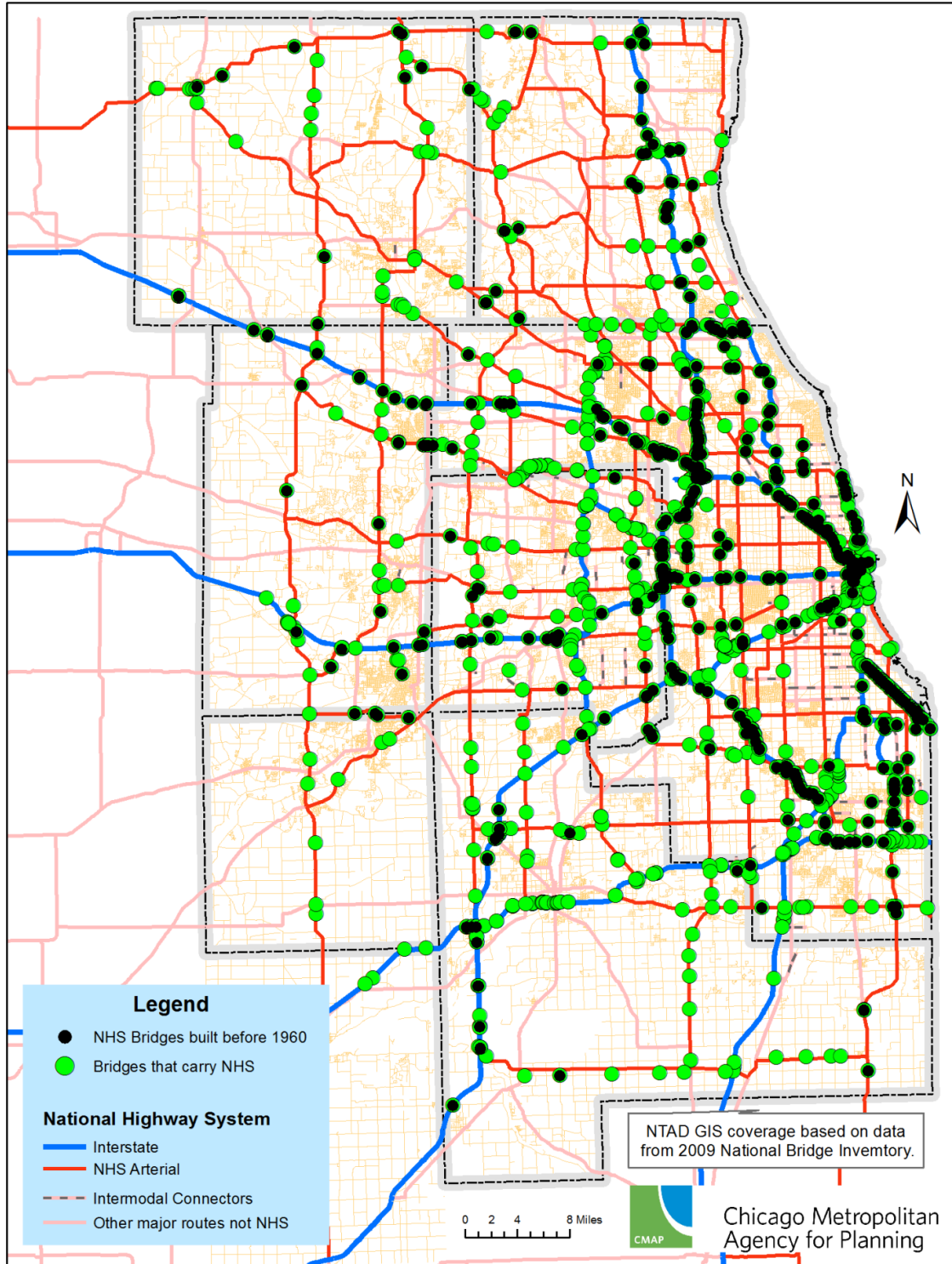
As of 2006, at the national level, 15.7 % NHS bridges were 50 years and older; while at the state and regional level the percentages were 12.5% and 15.9%, respectively. By 2010, the percentage of NHS bridges that were 50 years and older rose to 28.2% at the statewide level, while the percentage for the Chicago region rose sharply to almost 50%. As shown in Exhibit 26, NBI data indicated that, in 1958, there were over 300 NHS bridges built in the Chicago region, which represented approximately 88% of all bridges built in all of Illinois in that year. By 2008, all of these bridges turned 50 years old.

Exhibit 26: NHS Bridges by Year Built



The 2010 NBI reported that 604 (49.7%) of the 1,216 NHS bridges in the Chicago region were built in 1960 or earlier. All told, 60.7% of the NHS bridges that carried Interstates, and 36.3% of the NHS bridges that carry principal arterials and other NHS routes, were built in 1960 or earlier. As shown in Exhibit 27, most of the NHS bridges that are 50 years and older are concentrated in or near Cook County.

Exhibit 27: Geographic Distribution of NHS Bridge 50 Years and Older



9. References

1. NBI ASCII file download site: <http://www.fhwa.dot.gov/bridge/nbi/ascii.cfm>
2. *Bridge Conditions in the Chicago Region as of 2007*, CMAP, June 2009. Available for download at: <http://www.cmap.illinois.gov/documents/20583/95707a47-4ab0-4e2f-ad28-d9279e23e8e8>
3. *2008 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance Report to Congress*, U.S. Department of Transportation, Washington, DC, 2009, Chapter 2. Available for download at: <http://www.fhwa.dot.gov/policy/2008cpr/pdfs.htm>
4. FHWA Bridge Programs NBI Data, Tables of Frequently Requested NBI Information are available for download at: <http://www.fhwa.dot.gov/bridge/britab.cfm>
5. *Highway Performance Management System (HPMS) Field Manual*, Federal Highway Administration, U.S. Department of Transportation, Washington, DC, 2005, pp. IV-12 and 13. HPMS functional classification names and codes are available for download at: <http://www.fhwa.dot.gov/ohim/hpmsmanl/pdf/chap4.pdf>. The HPMS manual is available at: <http://www.fhwa.dot.gov/ohim/hpmsmanl/hpms.cfm>
6. *2008 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance Report to Congress*, U.S. Department of Transportation, Washington, DC, 2009, Chapter 3. Available for download at: <http://www.fhwa.dot.gov/policy/2008cpr/pdfs.htm>
7. *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges*, Report No. FHWA-PD-96-001. Available for download at: <http://www.fhwa.dot.gov/bridge/mtguide.pdf>
8. *Federal-aid Policy Guide Non-Regulatory Supplement NS 23 CFR, Part 650 D*, September 30, 1992, Transmittal 5. Available for download at: <http://www.fhwa.dot.gov/bridge/0650dsup.cfm>
9. *Highway Bridge Program Clearer Goals and Performance Measures Needed for a More Focused and Sustainable Program*, GAO, September 2008. Available for download at: http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=c03cd0ad-d02f-40e7-8996-c891be75d43a
10. House Report 110-75. Available for download at: [http://thomas.loc.gov/cgi-bin/cpquery/R?cp110:FLD010:@1\(hr750\)](http://thomas.loc.gov/cgi-bin/cpquery/R?cp110:FLD010:@1(hr750))
11. *2008 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance Report to Congress*, U.S. Department of Transportation, Washington, DC, 2009, Chapter 11. Available for download at: <http://www.fhwa.dot.gov/policy/2008cpr/pdfs.htm>
12. National Transportation Atlas Database 2010 (NTAD), National Bridge Inventory, Region 5, Available for download at: http://www.bts.gov/publications/national_transportation_atlas_database/2010/

APPENDIX A

Exhibit A1: Structurally Deficient Bridges in the Chicago Region
(Based on 2009 National Bridge Inventory)

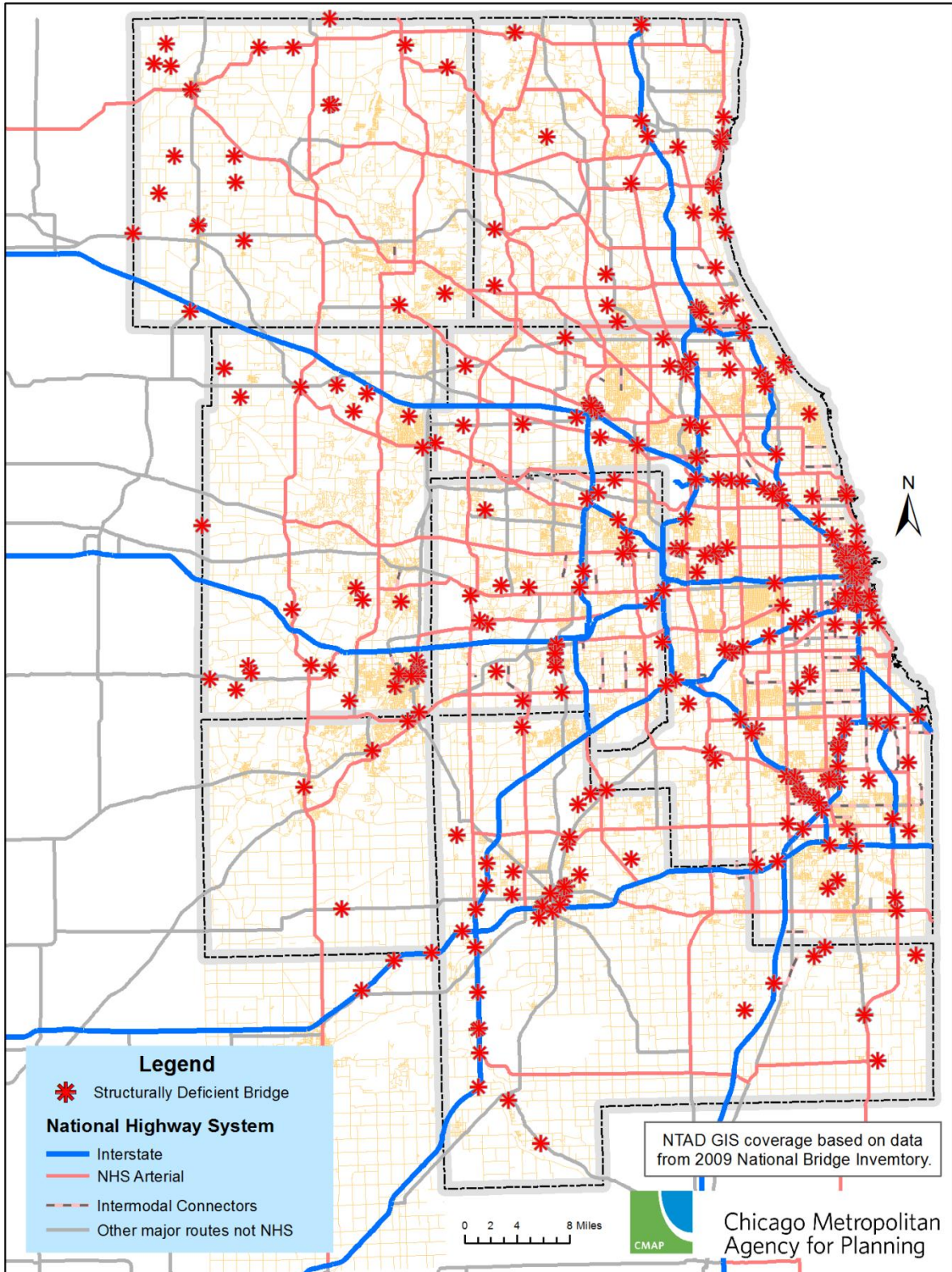


Exhibit A2: Functionally Obsolete Bridges in the Chicago Region
(Based on 2009 National Bridge Inventory)

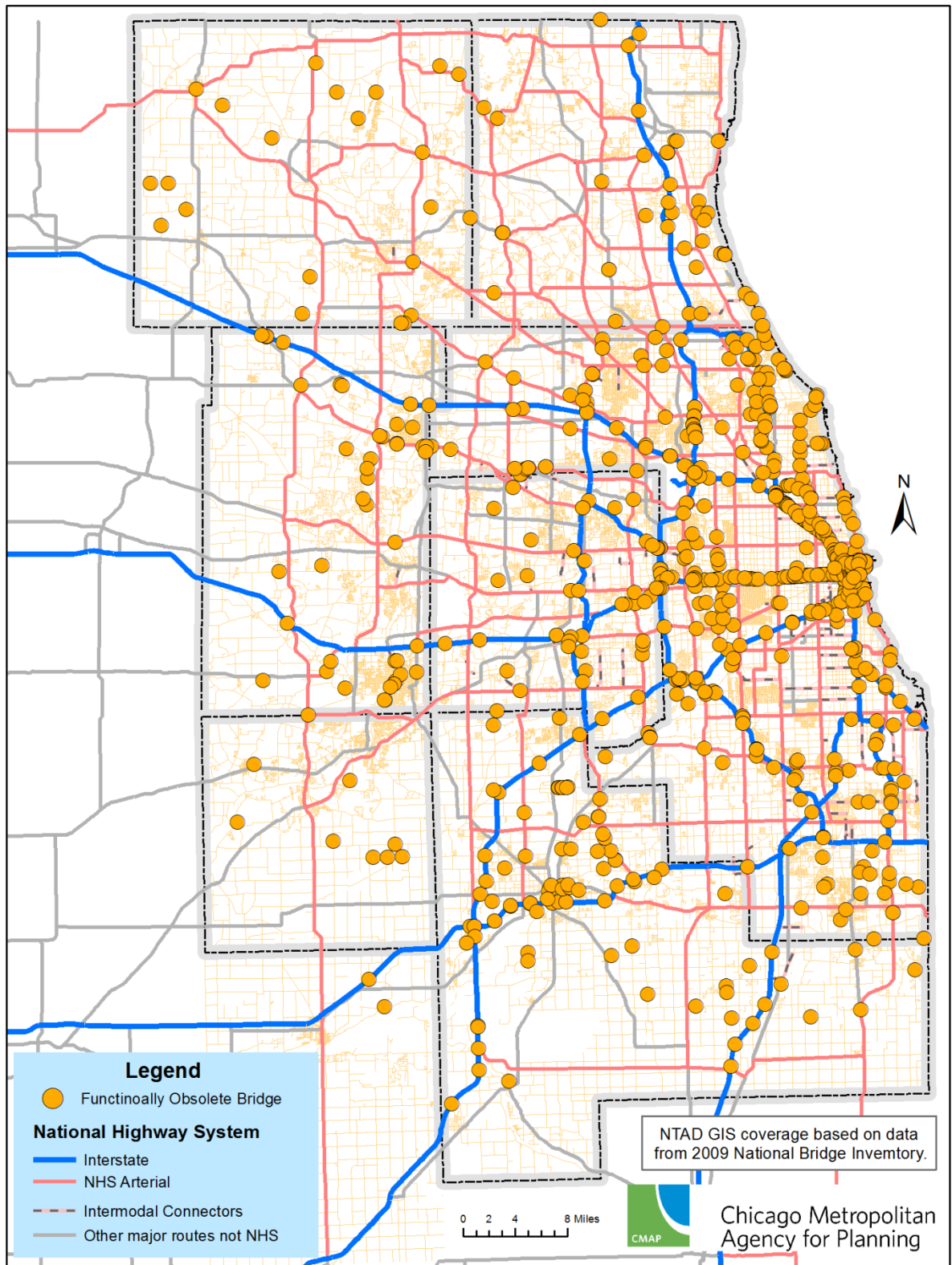


Exhibit A3: High Priority Bridges in the Chicago Region
(Based on 2009 National Bridge Inventory)

