WOOD IN TRANSPORTATION

Historical Review
15 Year US Forest Service
Timber Bridge Program
Demonstration/Technology Transfer
Perspective

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Purpose of Presentation:

- **To provide an overview of the USDA Forest Service's Wood In Transportation Program from a Demonstration/Technology transfer perspective.**
- **1989 thru 2004**

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Key Topics

A. **Background and Related Items**

B. **Research**

C. **Demonstration Projects**

D. **Technology Transfer**

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Key Topic

A. **Background and Related Items**

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Focus:

- **To revitalize local economies by finding means and methods for using local wood, particularly under-utilized wood, for highway bridges and related applications**
- **Improve Stewardship of our Nation's forest**

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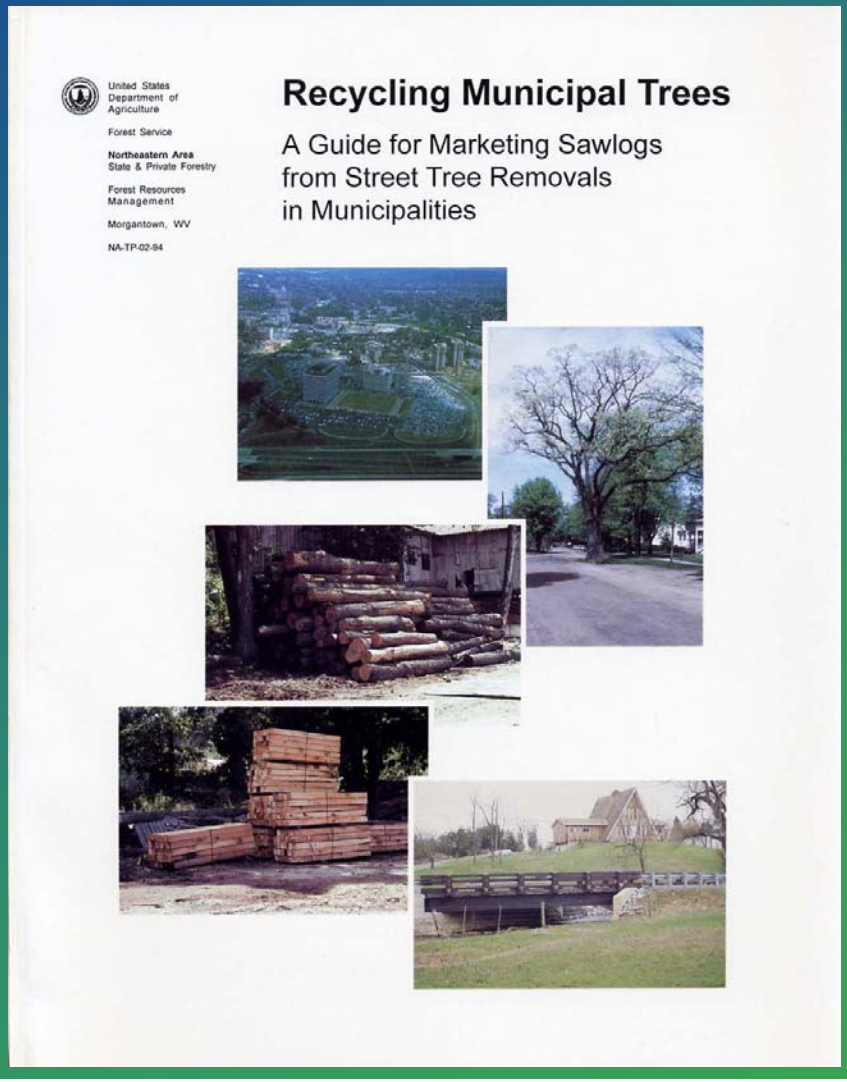

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Budget

- **$2.4 million early years of program**
- **$1.7 million in middle years**
- **$1.0 million towards the end of program**

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Partnerships

- County & local gov’ts
- State & federal gov’ts
- Universities
- Resource Conservation and Development Councils
- Private industry
- Foreign governments & organizations

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Program Components:

- **Research**
- **Demonstration Projects**
- **Technology Transfer**

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Key Topics

B. Research

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Key Topics

C. Demonstration Projects

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Demonstration Projects

Annual Competitive Grants Program

About $750,000 per year

Request for Proposals

Review & selection process

Implementation

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Projects selected for funding are based on:

- **structural adequacy**
- **longevity**
- **serviceability**
- **environmental sensitivity**
- **economics**
- **approved design standards**

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Demonstration Projects

- **Emphasis on using local timber species, ie. hardwoods in eastern US and secondary softwood species**
- **Hardwoods – red maple, red oak, cottonwood, mixed hardwoods, black locust**
- **Secondary softwoods – red pine, ponderosa pine, eastern hemlock, yellow-cedar, white spruce**

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Demonstration Projects

- **Single Structure Projects**
- **Special Projects**
- **Commercialization Projects**

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Single Structure Projects

- **Vehicular Bridges**

over 200 projects funded

White County, GA, southern pine glulam timber bridge

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Single Structure Projects

- **Pedestrian Bridges**

over 100 projects funded

2002 Olympic Pedestrian Bridge
Heber City, Utah

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2002 Olympic Pedestrian Bridge Heber City, Utah

Specifications:

- **Year Constructed: 2001**
- **Length – 125 ft. Width – 12 ft.**
- **Design Live Load: 85 psf**
- **Wood Species: Coast Douglas fir**
- **UME supplied glulam/FRP beams**

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Rattlesnake Creek Bridge, Missoula, MT

- **Small diameter ponderosa pine and lodgepole pine**
- **Wood fiber - plastic composite decking**

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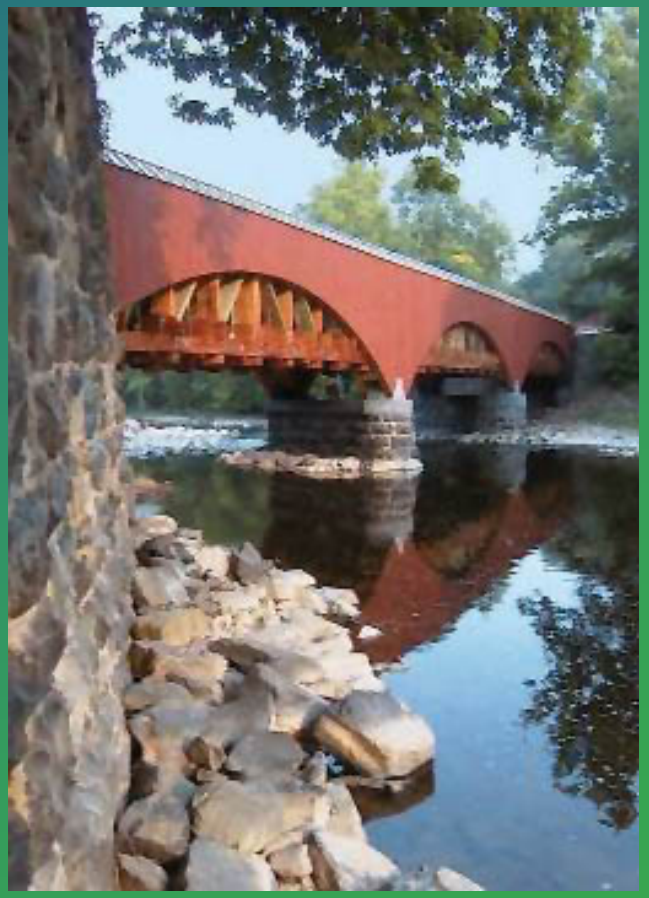
Special Projects

- **Over 100 Projects funded**



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Bar Harbor Pier Project, Maine

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Student Design Competition

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Commercialization Projects

- **1996 – demonstration projects**
  - **greater focus on economics by funding multi-structure projects**
- **Projects showcase wood-in-transportation technology**
  - **provide useful design and cost information**

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Commercialization Projects

- **31 projects funded**
- **2 highlighted completed projects:**
  - ***Ida County, Iowa***
  - ***West Virginia Division of Highways***

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Commercialization Project
Ida County, Iowa

- **Farm country in northwest Iowa**
- **725 miles of roads**
- **175+ bridges**
- **8,365 county residents**

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Commercialization project included:

- **4 glulam cottonwood decks supported by steel beams**
- **1 glulam cottonwood deck supported by wood beams**

Focus on using locally-grown cottonwood

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Bridge design details:

- **HS-20-44 live loads; span lengths of 25 ft, 35 ft**
- **Out-to-out width 26 ft with travel width of 24 ft**
- **Cottonwood deck panels – 7 inch thick glulam**

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Bridge design details (cont.):

- **Minimum of five steel beams spaced at 5.6 ft on center with flange widths of 10.2 in. Beams were salvaged.**
- **Treatment – Pentachlorophenol**
- **Wearing surface – asphalt**
- **Installation – Ida County Secondary Roads crew**
- **Abutments – steel H piling and sheet**

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Costs for 25 ft. Bridge

Design & Related Work	5,028
Substructure	26,976
Superstructure	24,954
Site/Approach Work	2,965
Surfacing	1,616
TOTAL	$61,539

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Commercialization Project
West Virginia Division of Highways

- **Numerous low-volume roads and bridges not maintained by any government entity**

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Commercialization Project
West Virginia Division of Highways

- **1998 West Virginia Legislature began the Orphan Road and Bridge Program**
  - ***3,216 orphan roads adopted***
  - ***769+ miles serving 25,000 families***
  - ***Over 25 bridges completed***

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Bridge design details:

- **HS-20-44 live loads; average length is 25 ft, average width is 14 ft**
- **Superstructure includes steel beams supporting plank timber deck**
- **Wood type is southern pine or red oak; treated with chromated copper arsenate**
- **Wearing surface – none**

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Bridge design details (cont.):

- **Railing system – curbing**
- **Abutments – primarily gabion baskets filled with stone**
- **Installation – Division of Highways maintenance crews within one week**
- **Average cost – $25,000 per bridge**

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Results

Projects become more effective as cooperators learn to improve the process with each additional bridge designed and constructed.

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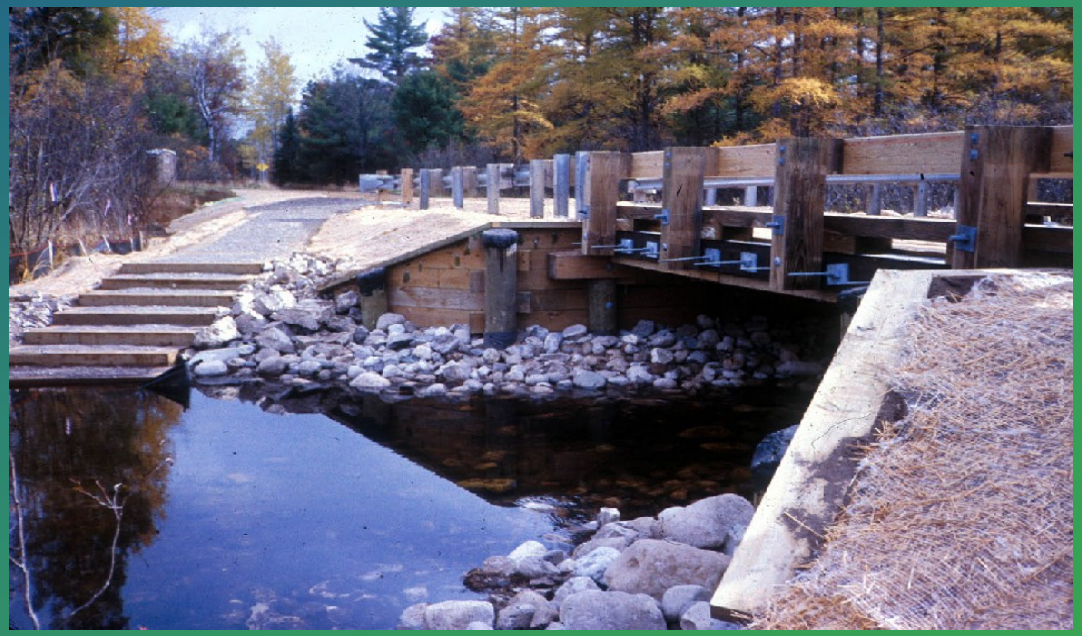
Michigan's Timber Bridge Program

- **Over 20 structures completed**
- **Emphasis on using red pine**
- **Stress-lamination technology**



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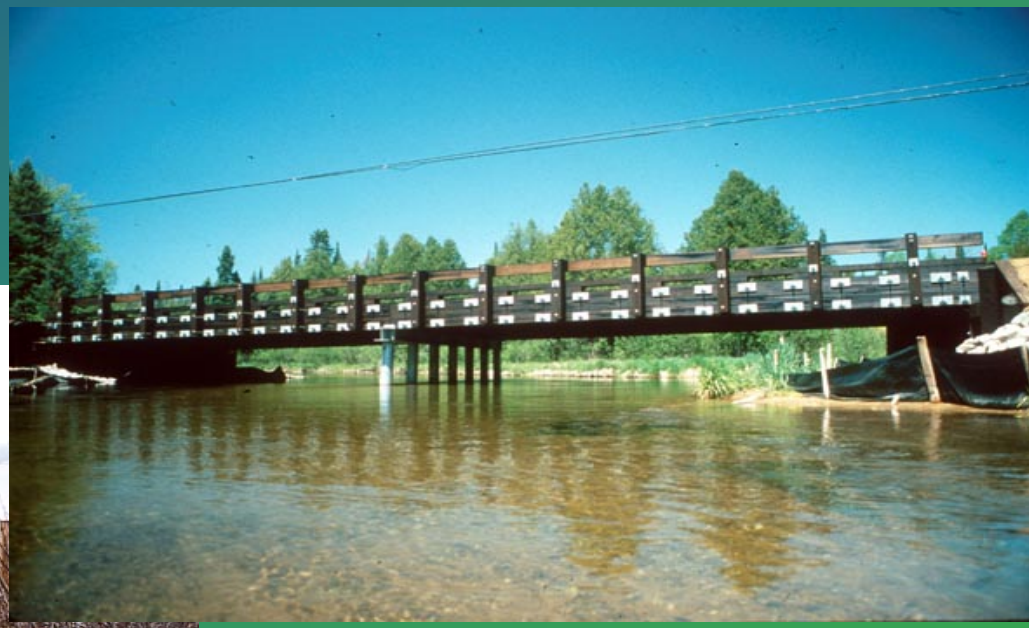
Michigan's Timber Bridge Program



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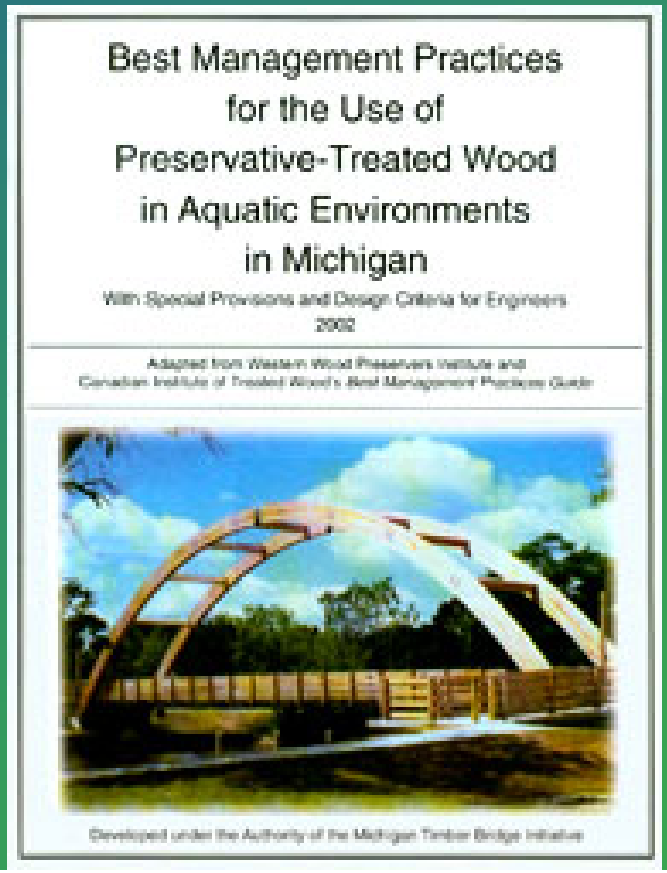
Michigan's Timber Bridge Program

- **Best Management Practices**
- **Serves as a guide for engineers and highway officials**
- **Minimize environmental risks**



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Key Topic

D. Technology Transfer & Information Management

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Technology Transfer

- **National Wood In Transportation Information Center, Morgantown, West Virginia – provides technical and educational information to bridge engineers and highway officials**

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Technology and Information Transfer

Development & distribution of pubs:

- **National Wood In Transportation Information Center, Morgantown, WV**
- **Forest Products Laboratory, Madison, WI**
- **Federal Highway Administration, Washington, DC**

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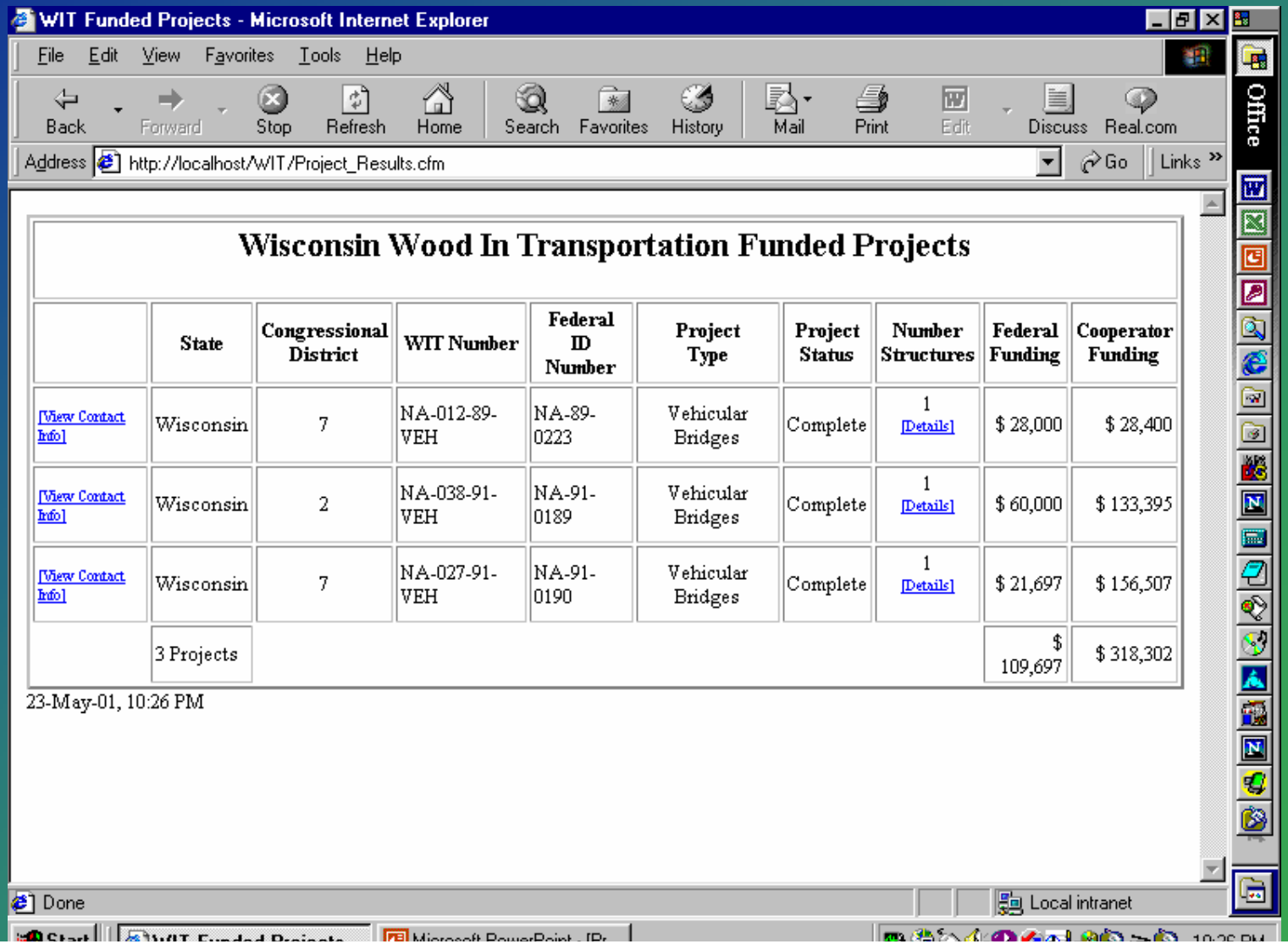

Wisconsin Wood In Transportation Funded Projects

	State	Congressional District	WIT Number	Federal ID Number	Project Type	Project Status	Number Structures	Federal Funding	Cooperator Funding
[View Contact Info]	Wisconsin	7	NA-012-89-VEH	NA-89-0223	Vehicular Bridges	Complete	1 [Details]	$ 28,000	$ 28,400
[View Contact Info]	Wisconsin	2	NA-038-91-VEH	NA-91-0189	Vehicular Bridges	Complete	1 [Details]	$ 60,000	$ 133,395
[View Contact Info]	Wisconsin	7	NA-027-91-VEH	NA-91-0190	Vehicular Bridges	Complete	1 [Details]	$ 21,697	$ 156,507
	3 Projects							$ 109,697	$ 318,302

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Questions and/or Comments

Where do we go from here?