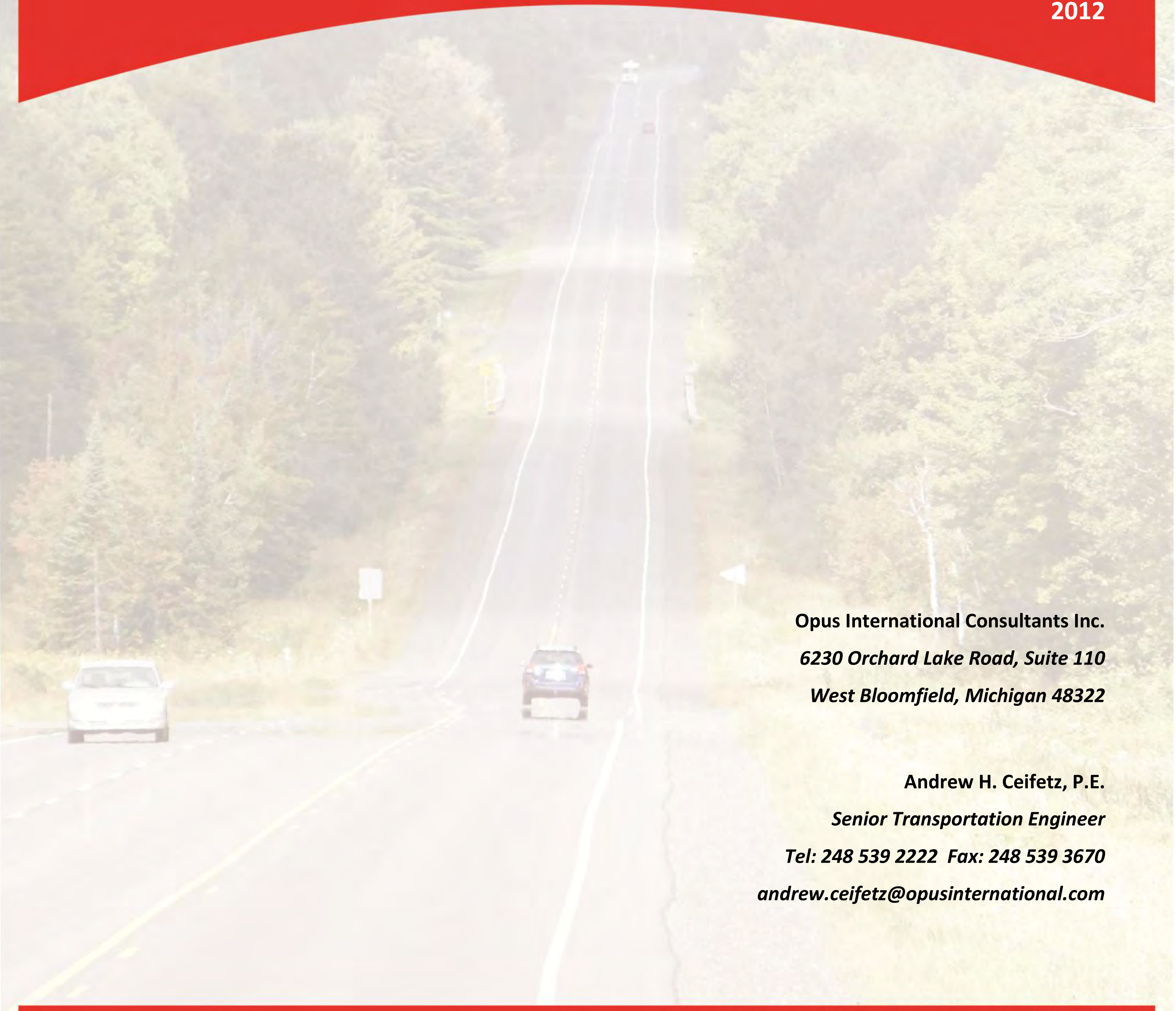
Crashes on Wisconsin Indian Reservations: Reporting, Conclusions, and Recommendations

Wisconsin Department of Transportation

Synthesis Report

2012



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Crashes on Wisconsin Indian Reservations: Reporting, Conclusions, and Recommendations

SYNTHESIS REPORT

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Executive Summary

The Wisconsin Department of Transportation (WisDOT) has a strong interest in improving transportation safety on tribal roadways throughout the state. To make appropriate investments in safety improvements, successful applications for safety funds from the Bureau of Indian Affairs (BIA), the Federal Highway Administration (FHWA) and the National Highway Traffic Safety Administration (NHTSA) are imperative. To achieve a high success rate for obtaining these safety funds, areas of concern must be well-documented with timely and accurately reported crash data.

After a comprehensive review of the state of tribal crash reporting and processes, crash data analysis, as well as comparisons to statewide information, recommendations for improving safety in Tribal areas in the State of Wisconsin have been compiled. These are made as a result of a multi-year effort between the Wisconsin Department of Transportation (WisDOT) Tribal Task Force, in consultation with stakeholders in leadership, law enforcement, and road officials, both Tribal and non-tribal alike.

The Wisconsin Strategic Highway Safety Plan (SHSP) currently devotes a single line to road safety within tribal areas, "Continue to create and implement Tribal Safety Plans." This report includes additional recommendations which could be incorporated into the SHSP to further enhance these safety efforts.

Significant findings include:

- Tribal crash reporting does not significantly differ from other rural areas in the state, other than the Menominee Nation, which does not operate under Public Law 280.

  The equipment and processes do not vary greatly; a useful benchmark was discussion with enforcement agencies (i.e. County Sheriffs) with responsibility both inside and outside tribal areas.

- Native Americans on all roads in Wisconsin were fatally injured at a rate more than three times higher than their relative percentage in 2009 (2.67 percent of vehicular fatalities vs. 0.86 percent of the state population).

- All crashes on tribal lands result in fatalities at almost four times the statewide rate (1.9 percent vs. 0.53 percent).

  Lane departure crashes were of significant note, being more than three times as prevalent in tribal areas as compared to the statewide average.

- Road Safety Audits (RSA) and Road Safety Plans have resulted in significant improvements to roads in tribal areas.

The safety edge was installed on STH 47 and 55 through the Menominee Nation, STH 13 was upgraded through Red Cliff, and sidewalk was constructed through Mole Lake, among other achievements.

Recommendations for inclusion in the SHSP are:

- Road Safety Audits (RSA) and Road Safety Plans should be performed in the tribal areas of Wisconsin that have not been previously investigated.
- The policy of reducing run-off-road and lane departure crashes, by installing measures aimed at keeping vehicles in their lane, should be rigorously enforced as included in the state's Highway Safety Plan (SHSP) to reduce the number of crashes affecting tribal areas.
- Continued education, such as the WisDOT Statewide Tribal Safety Education Campaign Project should be continued as a way of instilling better behaviors in younger drivers.

1.0 Introduction

The Wisconsin Department of Transportation (WisDOT) has a strong interest in improving traffic safety on tribal roadways throughout the state. To make appropriate investments in safety improvements, successful applications for safety funds from the Bureau of Indian Affairs (BIA), the Federal Highway Administration (FHWA) and the National Highway Traffic Safety Administration (NHTSA) are imperative. To achieve a high success rate for obtaining these safety funds, areas of concern must be well-documented with timely and accurately reported crash data.

To better understand how crash reporting is conducted within tribal communities, WisDOT retained Opus International Consultants to evaluate crash reporting procedures for incidents occurring on tribal lands and analyze the crash data currently being reported. The project initially included two phases; the first phase evaluated and presented the crash reporting methodology, interview results, significant findings, and recommendations for improving the crash reporting process for Wisconsin's Indian Tribes. The second phase of the project included documentation and analysis of the crash data for tribal areas and recommendations for common safety countermeasures for prevalent crash patterns identified in that analysis. This report comprises a third phase, synthesizing the prior efforts and concludes with a list of recommendations.

The crash data was provided to Opus by both the University of Wisconsin Traffic Operations and Safety Laboratory[1] as well as various tribal government agencies for the analysis phase of the project, and consequently was the best available at the time. Crash data from 2005-2009 was utilized within this study. Geocoding was performed in 2010 and 2011 specifically for this analysis. Data sources and dates are cited for information other than that provided by WisDOT.

1.1 Background

Currently, the vehicular fatality rate among Native Americans in the state of Wisconsin is more than twice as high as the rate for others in the state. The 2010 US Census reported that the approximate population of Native Americans, as a percentage of total population in Wisconsin, stands just under one percent[2]. However, the fatality rate for Native Americans has been calculated at over two percent of all fatal collisions as shown in Table 1.1. The review of these statistics has raised questions as to whether significant road safety concerns are prevalent on tribal lands and are going unrecognized as a result of the under reporting of crashes.

[1] http://www.topslab.wisc.edu/
[2] U.S. Census Bureau, http://quickfacts.census.gov/qfd/states/55000.html

Table 1.1 - Vehicle Fatality Statistics for the State of Wisconsin[3]

Year	Native American	White	Other	Total	Percent Native American
2009	15	474	72	561	2.67%
2008	11	531	63	605	1.82%
2007	14	631	111	756	1.85%
2006	16	611	97	724	2.21%
2005	22	746	47	815	2.70%
Total 5 Years	**78**	**2,993**	**390**	**3,461**	**2.25%**

The table below, Table 1.2, shows the percentage of Native American vehicular fatalities as compared to their percentage of the state population. Native Americans are fatally injured at a rate of two to three times their relative percentage of the population.

Table 1.2 - Population Statistics for the State of Wisconsin

Year	Population[4]			Vehicular Fatalities[5]		
	Native American	Total Population	**Percent Native American**	Native American	Total Fatalities	**Percent Native American**
2010	47,703	5,691,047	**0.84%**	*	572	*
2009	48,448	5,654,774	**0.86%**	15	561	**2.67%**
2008	48,496	5,627,968	**0.86%**	11	605	**1.82%**
2007	46,159	5,601,640	**0.82%**	14	756	**1.85%**
2006	47,727	5,556,506	**0.86%**	16	724	**2.21%**

* Not Available

[3] NHTSA, http://www-nrd.nhtsa.dot.gov/departments/nrd-30/ncsa/STSI/55_WI/2010/55_WI_2010.htm
[4] US Census Bureau, http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml
[5] NHTSA, http://www-nrd.nhtsa.dot.gov/departments/nrd-30/ncsa/STSI/55_WI/2010/55_WI_2010.htm

2.0 Crash Reporting Processes

2.1 Crash Reporting Study Objectives

The primary objective of the first phase was to collect and evaluate information pertaining to how each enforcement agency, either the Tribal Police Department or the corresponding County Sheriff's Department, processes vehicle crashes that occur on tribal lands. This also included distinguishing which agency has jurisdiction over crashes on each reservation, and if the agencies work together to report vehicle crashes.

Our evaluation team developed a questionnaire that was used in each interview with law enforcement, government, and tribal officials to maintain consistency in what information was discussed with each agency. The purpose of this questionnaire was to gain a full understanding of the crash reporting process that is used on tribal lands. The study team wanted to understand the specific steps taken in the crash reporting process, from the time the crash was called into dispatch to how and when each report was submitted to the state, if applicable. The target interviewees were law enforcement officials who were well versed in the crash reporting process and staff members from other agencies who utilize the crash report information.

The questionnaire was used to guide the conversations with stakeholders, but was not formally presented for comment. There is no tabulated list of responses or copies of the forms; the questions are listed in Appendix A.

Understanding how each agency handles crash reporting helps determine if and to what extent crashes may be under reported, over reported, or inaccurately reported. During the interviews the team also discussed current barriers or issues each agency experiences that impact the accurate and timely reporting of crashes.

2.2 Study Locations

The locations for our study centered on all eleven federally recognized tribes located in Wisconsin, as well as the corresponding counties that share a boundary with these tribal lands. Figure 2.1 illustrates the tribal lands and road network in Wisconsin. Ho-Chunk, Potawatomi, and St. Croix have non-contiguous tribal lands, as shown in the map.

Figure 2.1 - Locations of Tribal Lands[6]

[6] Map from: http://nativeamericanencyclopedia.com/wp-content/uploads/2011/01/Lac-Courte-Oreilles-Band-of-Lake-Superior-Chippewa.jpg

2.3 Crash Reporting Process Review Methodology

To achieve the study objectives, the following tasks were completed:

- Stakeholder meetings were conducted with all tribal law enforcement agencies. It was determined that of the eleven federally recognized Wisconsin tribes, eight had their own law enforcement agency responsible for crash reporting.

- Stakeholder meetings were conducted with ten county sheriff departments having tribal lands geographically located within their respective county boundaries.

- Phone conversations were held with the WisDOT tribal liaisons for those regions with reservations located in them to discuss any existing issues or recommended future solutions.

- A meeting was held with the Bureau of Indian Affairs (BIA) to discuss the current perception of crash reporting efforts on tribal lands.

- During the stakeholder meetings with tribal law enforcement officials and county sheriff department staff, the following key questions were posed and subsequently discussed with the personnel:

    - Which agency, tribal or county, has jurisdiction over crashes on tribal lands?
    - What crash reporting system or report is currently being used?
    - How is the crash report processed from beginning to end?
    - Are crash locations plotted either manually or electronically?
    - Does the agency currently work with other agencies to identify problem areas?
    - Is formal crash reporting training available to officers?
    - Does there exist any fear of double jeopardy or privacy concerns by tribal members involved in crashes.

In addition to the above listed key questions, other questions were raised and discussed with agency officials to ensure a thorough understanding of the complete crash reporting process currently used by the agency. A copy of the full questionnaire is located in Appendix A - Questionnaire. Anticipated future efforts by the agency in regards to updating their crash reporting system or process were also discussed with stakeholders.

3.0 Enforcement Agency Interview Results

As a result of the stakeholder meetings, several questions pertaining to the crash reporting process were answered by the police departments. Concerns raised by stakeholders in these meetings included:

- who is the responding agency for crash incidents;
- deputization of tribal police;
- format of the report that is used;
- geographic plotting of crashes; and,
- privacy concerns among the tribal members.

3.1 Police Jurisdiction/Responding Agency

Table 3.1 provides a summary of the process by which collision response is dispatched to the enforcement agencies. Crash reporting is generally handled by the Tribal police agencies, if they are available to respond to the scene of a collision. In communities without a Tribal police department, the local or county enforcement agency responds and completes the crash reporting. In Menominee, the crash reporting varies depending on if the people involved are tribal members.

Table 3.1 - Tribal Processes

Tribe	Police Jurisdiction	Responding Agency
Bad River Band of Lake Superior Chippewa	▲	Tribe, if available.
Forest County Potawatomi	⬬	Local/County
Ho-Chunk Nation	⬬	Local/County
Lac Courte Oreilles Band of Ojibwe	▲	Tribe, if available.
Lac du Flambeau Band of Lake Superior Chippewa	▲	Tribe only
Menominee Indian Tribe	★	Tribe, if available.
Oneida Nation of Wisconsin	▲	Tribe, if available.
Red Cliff Band of Lake Superior Chippewa	▲	Tribe, if available.
St. Croix Chippewa Indians of Wisconsin	▲	Tribe, if available.
Stockbridge Munsee Community	▲	Tribe, if available.
Sokaogon Chippewa of Mole Lake	⬬	County

▲ Tribal police agencies respond to crashes located within the reservation boundaries. If the tribe does not have available officers at the time of dispatch, county officers will respond to, and handle, the crash reporting.

★ Both the tribal and county police officers will respond to a crash on the reservation. Whether the participants of the collision are tribal members or non-tribal members dictate which agency handles the crash reporting. If a tribal member is part of the collision, the tribal police department will handle the reporting. Non-tribal citizens are handled by the county officer.

⬬ Relies solely on the County or local police for crash reporting.

The investigative team discovered that some tribal police officers are cross-deputized by the county in which the tribe is located, giving the tribal police officers the ability to aid the county sheriff department over the entire county, not just on tribal lands. Liability concerns from the counties and sovereignty concerns from the tribes were the main reasons cited for why several tribal police departments were not cross-deputized.

Table 3.2 provides a summary of the tribal police agencies currently deputized by the adjacent sheriff's department. Cross-deputization refers to the sharing of resources past reservation boundaries; for instance Oneida officers can assist officers in Brown County outside the limits of the reservation if requested.

Table 3.2 - Cross-Deputization

Tribe	Interviewee	Deputized
Bad River Band of Lake Superior Chippewa	Chief Joe Szwarek	N
Lac Courte Oreilles Band of Ojibwe	Chief Louis Gouge Jr.	Y
Lac du Flambeau Band of Lake Superior Chippewa	Chief Robert Brundenburg	N
Menominee Indian Tribe	Warren Warrington	N
Oneida Nation of Wisconsin	Chief Rich Van Boxtel	Y
Red Cliff Band of Lake Superior Chippewa	Chief Charlie Brissette	N
Stockbridge Munsee Community	Michael Micik	Y
St. Croix Chippewa Indians of Wisconsin	Jennifer Brugman	Y

3.2 Crash Reporting Systems

The predominant format used by the tribal police departments and county sheriff departments was the standard Wisconsin report form in its paper form, the MV4000, or through electronic submitting, the MV4000e as part of Badger TraCS (Traffic and Criminal Software)[7]. The MV4000 and MV4000e crash report form are generally compliant with the National Highway Traffic Safety Administration's (NHTSA) Model Minimum Uniform Crash Criteria (MMUCC). The only exception was the Menominee

[7] http://www.dot.state.wi.us/drivers/drivers/enforce/tracs/badgertracs.htm

Indian Tribe. Menominee Tribal Police Department utilizes the MV4000 to report all collisions resulting in a fatality; however, they utilize Cisco software to report all non-fatal collisions. Review of the crash reports produced by this (Cisco) system found that the data was not compliant with MMUCC standards.

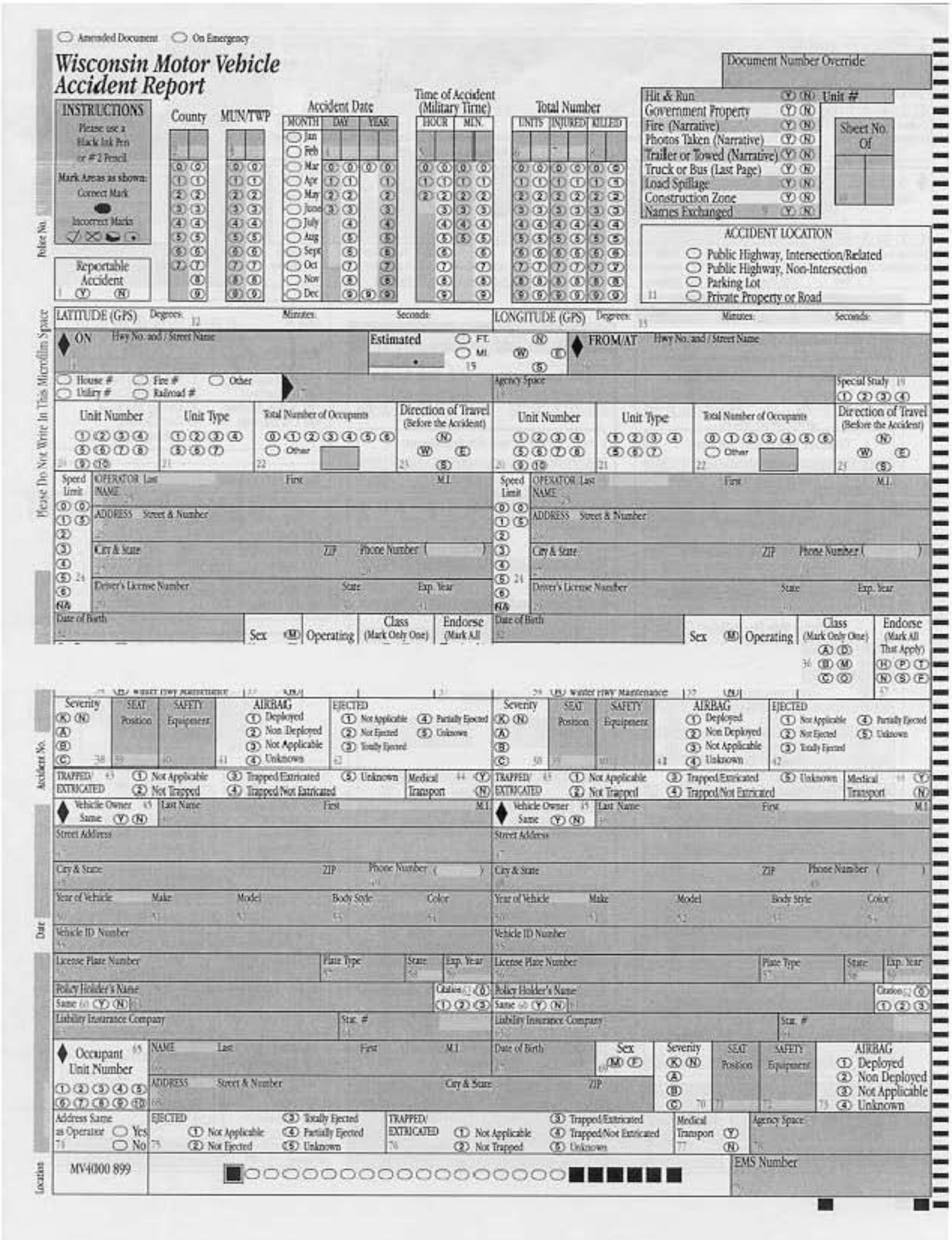

Figure 3.1 - MV4000 Wisconsin Motor Vehicle Accident Report (Page 1 of 8)

Wisconsin's crash data adhere to recognized standards and guidelines, including the national ANSI D-16.1 Manual on Classification of Motor Vehicle Accidents standard, Model Minimum Uniform Crash Criteria (MMUCC), Fatality Analysis Reporting System (FARS), and SafetyNet truck and bus data elements. More than 85% of Wisconsin's crash report data elements comply with the MMUCC standard.[8]

The *2010-2014 Traffic Records Strategic Plan* (TRSP) is being coordinated with Wisconsin's SHSP and the Highway Safety Performance Plan (HSPP) to create a statewide integrated data collection network. All agencies reporting crash data are expected to have upgraded to 100 percent electronic reporting by 2014 as part of this plan[9].

While agencies use the MV4000 form for all crashes, the officers mostly use the paper forms. Several county agencies are already using or are beginning to use the Badger TraCS electronic reporting system. For agencies using the Badger TraCS system, the reports are submitted electronically. The reporting officer usually has the option of completing the crash report in the field or at their desk using either a paper (MV4000) or electronic (MV4000e) form (if available) as illustrated in Table 3.3.

[8] http://wisconsinsafetydataportal.org/index.cfm/crash/introduction/
[9] State of Wisconsin HSPP, 2011. P49. http://www.nhtsa.gov/nhtsa/whatsup/safeteaweb/FY11/FY11HSPs/WI_FY11HSP.pdf

Table 3.3 - Crash Reporting Formats (2009-10 Data)

Agency	System	Car Laptops	Format
Bad River Band of Lake Superior Chippewa	MV4000	N	Manual
Lac du Flambeau Band of Lake Superior Chippewa	MV4000	N	Manual
Lac Courte Oreilles Band of Ojibwa	MV4000	N	Manual
Menominee Nation	Cisco	N	Manual
Oneida Tribe of Indians of Wisconsin	MV4000	N	Manual
Red Cliff Band of Lake Superior Chippewa	MV4000	N	Manual
St. Croix Chippewa Indians of Wisconsin	MV4000e	Y	Electronic
Stockbridge Munsee Community	MV4000e MV4000	Y	Electronic Manual
Ashland County	MV4000	Y	Manual
Bayfield County	MV4000	Y	Manual
Brown County	MV4000e MV4000	Y	Electronic Manual
Burnett County	MV4000e MV4000	Y	Electronic Manual
Forest County	MV4000	N	Manual
Menominee County	MV4000	N	Manual
Outagamie County	MV4000e	Y	Electronic
Sawyer County	MV4000e MV4000	Y	Electronic Manual
Shawano County	MV4000	Y	Manual
Vilas County	N/A	N/A	N/A

3.3 Crash Report Processing

After conducting all of the stakeholder meetings, a fairly consistent process for crash reporting emerged. Each of the agencies follows a similar path that is illustrated in Figure 3.2.

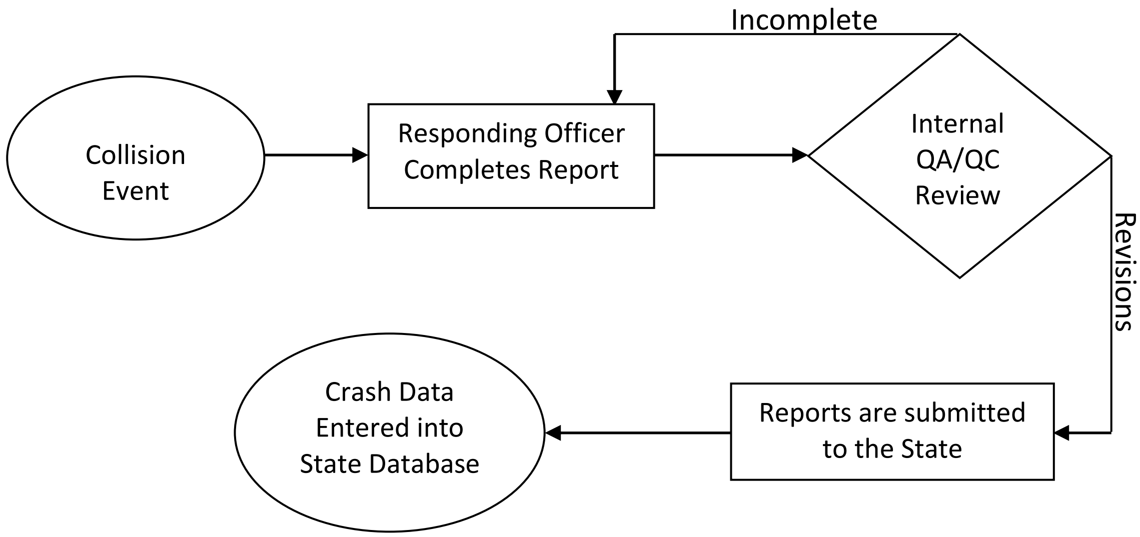

Figure 3.2 - Crash Reporting Process

Upon completion of the crash report, in most cases, it is then submitted to the state for processing. Quality Assurance/Quality Control (QA/QC) methods vary by agency; however they were all consistent in being reviewed either by an administrative professional, another officer, or upper management. Upon completion of the review, the report is filed with a hard copy or in an electronic filing system used by some enforcment agencies. Currently, all agencies with the exception of the Menominee Nation, submit crash reports to the state per state requirements. According to all agencies that submit data, they comply with the state regulation of the report being submitted within ten days of the crash. Overall, the reporting process for all of the agencies seemed to be thorough and timely with adequate oversight for quality.

3.4 Network Screening

As defined here, the purpose of a network screening is to identify the locations with high potential in crash reduction through highway improvement projects. Conducting road safety network screenings is critical in the process of identifying trends in crash data and effectively identifying high crash locations is necessary for road agencies to secure safety funding to address safety issues. Questions were asked during the stakeholder meetings related to the plotting of crashes and process of conducting network screenings to identify high crash areas. These questions were developed to better understand each agency's process for tracking crashes and identifying high-crash locations.

Geographic plotting of crash data can facilitate the identification of locations with significant crash patterns. For example, if there is a cluster of crashes in a particular area, the user may look at the crash reports that are represented by each point and determine the underlying safety issue associated with each crash. Crash plotting varied from agency to agency ranging from no plotting of any kind to using an electronic form of plotting crashes such as Geographic Information Systems (GIS). Some agencies used a manual system for plotting crashes by using a board with push pins. The following table outlines the findings for crash plotting. Tribes not listed in the table below do not have their own police departments.

Table 3.4 - Crashes Plotted

Agency	Crashes Plotted (Method of Plotting)
Bad River Band of Lake Superior Chippewa	Y (GPS)
Lac Courte Oreilles Band of Ojibwe	Y (LCO Community College, GIS)
Lac du Flambeau Band of Lake Superior Chippewa	N*
Menominee Indian Tribe	N*
Oneida Nation of Wisconsin	N
Red Cliff Band of Lake Superior Chippewa	N*
Sokaogon Chippewa of Mole Lake	N*
St. Croix Chippewa Indians of Wisconsin	N
Stockbridge Munsee Community	N
Ashland County	N
Bayfield County	Y (Manual)
Brown County	Y (Manual)
Burnett County	N
Forest County	N
Menominee County	N
Outagamie County	N
Sawyer County	Y (Manual)
Shawano County	Y (Manual)
Vilas County	N

*denotes that crashes have been plotted on GIS maps as part of Road Safety Audits or Plans.

Several of the agencies that were interviewed are plotting their crashes manually. This usually involves a large map of the jurisdiction where push-pins delineate the location of crashes. When asked whether or not the agency will move to using Global Positioning Systems (GPS) and GIS systems to plot their crashes in the future, most responded that currently there is not enough funding in their budget for this endeavor. The Lac Courte Oreilles Tribe crashes are plotted in GIS by a member of the local community college and the Bad River Tribe records their crash locations utilizing a GPS system installed in their squad cars, though the coordinates have yet to be transferred into a GIS database. During Phase

2 of this project, GIS crash maps were developed for all of the tribes on the basis of 2004-2008 crash data provided by WisDOT for the second phase of the project.

GPS plotting of crash locations is generally more accurate than manual reporting, as it removes the subjective error associated with estimating a crash location. The US Global Positioning System (GPS) has an accuracy of 7.8 meters (25.6 feet) at a 95 percent level of confidence[10]. Manual plotting may take a variety of forms, including pushpins on a map, as well as manually entering a crash onto an electronic map. GPS plotting of crashes requires officers responding to a crash to possess equipment which has a significant initial cost. The state is beginning to develop and implement the Incident Location Tool (ILT) with the TraCS software per Task #4, of the stated priority, “Continue to create and implement Tribal Safety Plans[11].”

The ILT utilizes the Wisconsin Information System for Local Roads (WISLR) for locating crashes; if tribal roads are not present in WISLR, then the ILT is not usable for geolocating the crashes.

Most of the tribal and county police forces reported that they currently work together with road and local authorities to identify and evaluate areas that experience concerns identified during the network screening. Many agencies are part of the County Highway Safety Committee which meets periodically to discuss safety issues that need to be looked at in more depth.

3.5 Formal Training

Accurate completion of the crash report form is crucial for usable crash data to be collected. Crash data is used in the identification of safety issues and justification of various safety fund applications from WisDOT and BIA. From the agency interviews, it appears that the majority of police officers responsible for completing the crash reports obtain their training in the police academy. Most agencies did not have additional formal training for crash report writing (beyond training provided at the academy). Overall, none of the agencies cited lack of training as a detriment to the crash reporting process or accuracy of the reports. All agencies felt that their officers were adequately trained to finish the reports on time and accurately. The following table lists the agencies that provided additional training (as of 2009-10).

[10] GPS Accuracy. http://www.gps.gov/systems/gps/performance/accuracy/

[11] Wisconsin Highway Safety Plan 2011 – 2013, p45. http://www.topslab.wisc.edu/resources/shsp2011-13.pdf

Table 3.5 - Crash Reporting Training

Agency	Add'l In-House Training
Bad River Band of Lake Superior Chippewa	N
Lac Courte Oreilles Band of Ojibwe	N
Lac du Flambeau Band of Lake Superior Chippewa	N
Menominee Indian Tribe	Y
Oneida Tribe of Indians of Wisconsin	Y
Red Cliff Band of Lake Superior Chippewa	N
Stockbridge Munsee Community	Y
St. Croix Chippewa Indians of Wisconsin	N
Ashland County	N
Bayfield County	N
Brown County	N
Burnett County	Y
Forest County	Y
Menominee County	N
Outagamie County	Y
Sawyer County	N
Shawano County	Y
Vilas County	N/A

In developing questions for the stakeholders meeting, the team reviewed other studies of this nature that have been conducted in other states. One potential area of contention in crash reporting on the reservations was the idea that tribal members may be sensitive to their personal information being forwarded to state departments and used in ways other than for crash reporting data. In addition to privacy concerns, a possible threat of double jeopardy could also be prevalent in tribal members who fear they could face fines and/or penalties from the tribal government in addition to the state government. Questions were asked of all the agencies pertaining to the fear of double jeopardy and/or privacy concerns. In addition, questions were asked of all of the agencies as to if different procedures were used for tribal versus non-tribal members.

The team determined that the non-tribal police departments reported or handled crashes when those involved in a collision were tribal members, with the exception of the Menominee Nation. All agencies except the Menominee Nation, responded that they have not heard of any fear from tribal members pertaining to double jeopardy or privacy and all those involved in the collisions were treated the same regardless of whether or not they are a tribal member.

3.6 Menominee Nation Processes

Menominee County contains two law enforcement agencies, the Menominee County Sheriff Department and the Menominee Nation Tribal Police Department. Unlike other tribes included in this study, the Menominee does not operate under Public Law (PL) 280. As a result, they have sovereign tribal courts, a justice system, and are not required to follow the same crash reporting procedures as other tribes that operate under PL 280.

Passed in 1953, Public Law 83-280 (commonly referred to as Public Law 280 or PL 280) was a transfer of legal authority (jurisdiction) from the federal government to state governments which significantly changed the division of legal authority among tribal, federal, and state governments. Congress gave six states (five states initially - California, Minnesota, Nebraska, Oregon, and Wisconsin; and then Alaska upon statehood) extensive criminal and civil jurisdiction over tribal lands within the affected states (the so-called "mandatory states")[12].

All tribal lands in Wisconsin were initially subject to PL 280, however Wisconsin retroceded jurisdiction over the Menominee Reservation in connection with the Menominee Restoration Act (Public Law 93-197).

PL-280 currently covers 23 percent of the reservation-based population and 51 percent of all tribes in the lower 48 states[13].

When a crash occurs in Menominee County, the Menominee Tribal Police Department conducts the investigation and writes the report for any tribal members involved in the collision. Menominee County Sheriff's officers investigates a collision and writes the crash report for non-tribal members involved in a traffic incident. Due to this arrangement, information regarding tribal members that were involved in the crash is handled by the Menominee Tribal Police Department. This arrangement keeps private information of tribal members from being forwarded to the state. Menominee County Sheriff's Department reported that there is a concern from tribal members that information from their crash data could be used against the tribe and this is a reason for not wanting to share this information with the State; conversely, the state will not accept crash reports without personal identifiers. There is also a concern that traffic crashes could be double-counted as separate crash reports were completed for tribal and non-tribal members (once by the tribe and once by the Sheriff), and would therefore erroneously be counted twice in the state statistics. Another concern was double-jeopardy, whereby offenses would be acted upon under both state and tribal laws.

3.7 Bureau of Indian Affairs

In a 2008 report, it was noted that "the BIA does not currently require full crash reports, although it does require incident reports[14]," consequently, they maintain no crash records.

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[12] http://www.tribal-institute.org/lists/pl280.htm
[13] *Ibid.*
[14] Transportation Research Record: Journal of the Transportation Research Board, No. 2078, Transportation Research Board of the National Academies, Washington, D.C., 2008, pp. 74

The BIA also generates an annual Highway Safety Plan. The 2011 plan correlates some of the difficulties that Wisconsin's tribes are encountering with crash data, noting that they are not unique to any one state; specifically, that "additionally, there is no one source of data for EMS, BAC, court records or other types of data that are generally available to States, as each Tribe is within itself a sovereign nation and are not required to share data within the Tribe or outside sources[15]."

One of the BIA goals for Fiscal Year 2011 was for traffic records:

- To establish TR systems, collecting all traffic crash data on not less than 10 reservations within Indian Country by the end of FY11[16]. At the time of this report, this goal has not yet been met.

3.8 Other Tribal Processes

Initially, the Sokaogon Chippewa of Mole Lake, Forest County Potawatomi and Ho-Chunk Nation were the only tribes interviewed that did not have a tribal police department, however Ho-Chunk incorporated a police department in 2010. Sokaogon Chippewa of Mole Lake and the Forest County Potawatomi are located within Forest County. Both of these tribes rely exclusively on the County Sheriff's Department for crash reporting. The Ho-Chunk Nation is spread throughout thirteen counties, and also additionally relies on local law enforcement for crashes occurring on their tribal land. Although we did not interview every county that the Ho-Chunk is located within, the information included in this report was provided by the Tribe.

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[15] BIA Highway Safety Plan, 2011, p8. http://www.nhtsa.gov/nhtsa/whatsup/safeteaweb/FY11/FY11HSPs/BIA_FY11HSP.pdf
[16] *Ibid*, p19.

4.0 Crash Reporting Significant Findings

After compiling all of the data from the stakeholder meetings a few significant common themes emerged from the results.

- Overall, from the stakeholder's point of view, the crash reporting process seems to be working efficiently with accurate reporting of the crashes when they occur.

  None of the agencies appeared to have any significant gaps or issues with their respective process other than wanting to have more funding to incorporate some of the new methods and procedures, such as Badger TraCS, GIS, GPS, etc. Even with the limited budgets and obstacles to upgrading to some of these items, all of the agencies believed their system was producing adequate reporting of the crashes.

- Excluding the Menominee Nation Tribal Police Department, all other agencies appear to be reporting their crashes to the state as required per the Public Law 280 agreement.

  In the Menominee Nation case, they have a separate confidentiality agreement with the WisDOT regional office staff to report their crash data directly to them for use in the identification of safety issues. This agreement between the Menominee Nation and WisDOT is renewed annually. There are still issues to be resolved in working to integrate the Menominee crash data into the state database.

- All police departments appear to take crash reporting seriously and are actively working to address issues in each of their own way depending on the relationship they have with the surrounding transportation agencies.

  Tribal police departments are no different from their non-tribal counterparts in that time and manpower are at a premium.

- BIA roads are not currently in the Wisconsin Information System for Local Roads (WISLR). This often creates areas where road crashes cannot easily be identified, which may also delay a crash from appearing in the state records.

  BIA roads should be added to the WISLR system to aid in geolocating crashes. Tribal agencies that currently have their own local maps may be able to provide the mapping data for easy integration into the WISLR system.

5.0 Follow-Up

As a result of the stakeholder meetings and the subsequent results that were obtained, the team developed the following steps for further analysis into the crash reporting process by the tribal governments.

- Additional stakeholder consultations should be held to gain other perspectives on the existing crash reporting procedures and the efficiency of the system.

  Gaining the view point of other agencies toward the existing efficiency and completeness of the crash reporting would provide valuable insight into any possible issues. The following agencies, among others, should be considered:

    - Wisconsin Department of Transportation (WisDOT)
        - Bureau of Traffic Operations (BTO)
        - Division of Motor Vehicles (DMV)
        - State Patrol
        - Bureau of Transportation Safety (BOTS)
        - Regional Offices
    - Wisconsin Traffic Operations and Safety Laboratory (TOPS Lab)
    - Bureau of Indian Affairs (BIA)
    - Federal Highway Administration (FHWA)
    - National Highway Traffic Safety Administration (NHTSA)

- Further analysis of the actual crash data for each of the tribes should be continually performed to validate that all crashes are being reported accurately and timely.

  By collecting the crash data from the tribes and reviewing the information, a judgment can be made whether all of the crashes occurring on the reservation are making it to the state system for accurate analysis of issues. This review could be annual, or at a frequency determined by the department. The depth of review could also vary; a request to the local enforcement agency about the number of crashes in the past period could be compared against the state database for a high-level comparison of crash numbers.

- Evaluate the annual agreement between WisDOT and Menominee to see if additional data could be shared without compromising privacy concerns.

  Timely and accurate reporting of crash data is essential in evaluating hotspot locations. Ensuring that the Menominee Nation is accurately represented in the state crash statistics is vital for transportation planning purposes as well as leveraging safety funds.

- Ensure that Tribes are included in equipment and training related to the requirement that agencies are compliant with electronic records in 2014.

  The logistics of upgrading every agency by 2014 ensures a sequential approach to equipment upgrades and subsequent training; however, Tribal agencies should be included at the same rate and frequency as their non-Tribal peers. In 2009, only 54% of traffic crash records were reported to the DMV via Badger TraCS software[17]. An intermediate goal in the current SHSP increases the proportion of traffic crashes reported electronically to 80% by 2013.

- An implementation plan should be completed to include all final recommendations of the study that were a result of the completed analysis on crash data reporting on Indian Reservations.

  The statewide highway safety plan could include additional recommendations for safety improvements beyond the current language. The current SHSP includes ten priority areas, and subtasks; the last priority is "Create More Effective Safety Decision Processes – Improve Incident Management/Safe Travel in Bad Weather" with Task #8 (of nine) stating "Continue to create and implement Tribal Safety Plans[18];" there are no additional suggestions or performance measures currently mentioned regarding this task.

[17] Wisconsin Strategic Highway Safety Plan 2011 – 2013, p43. http://www.topslab.wisc.edu/resources/shsp2011-13.pdf
[18] *Ibid.*, Executive Summary p*v*.

6.0 Crash Analysis Summary

6.1 Injury and Collision Type

After combining the crash reports from all seven tribal reservations, the crash reports from the Mole Lake, Lac du Flambeau, and Lac Courte Oreilles reservations were added as well; subsequently, an overall analysis was performed. Crash data was provided from the state database, as reported by law enforcement. Crashes occurring on private property are not included in the state database, unless they include injuries and/or fatalities. Additionally, the data refers to crashes that occurred in tribal areas, and does not differentiate between local and transient drivers, or tribal and non-tribal drivers.

There were a total of 1,154 crashes occurring within the ten tribal reservations[19]. Of these crashes, 32.5 percent resulted in an injury; this is slightly higher than the 2004-2008 statewide average (29.1 percent)[20], however, the 1.9 percent fatality rate is almost four times the statewide rate from 2004-2008 (1.9 percent vs. 0.53 percent)[21]. The combined fatal/injury rate was 34.4 percent, compared to 29.7 percent for the same time period. Figure 6.1 displays the crash severity breakdown from the crash reports (Figure 6.2 displays the statewide crash severity breakdown for the same time period). There were seven types of crashes classified in the crash reports which were run-off-road, angle, rear-end, sideswipe-same, sideswipe-opposite, head-on, and other/unknown. Almost two-thirds (63 percent) of crashes were listed as running off the road (the statewide average was at 18 percent). Figure 6.3 illustrates the distribution of the crash types within the ten tribal reservations.

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[19] Menominee data is not included per the privacy agreement in place.
[20] 2009 Wisconsin Traffic Crash Facts, p2. http://www.dot.wisconsin.gov/safety/motorist/crashfacts/docs/crashfacts.pdf
[21] *Ibid.*

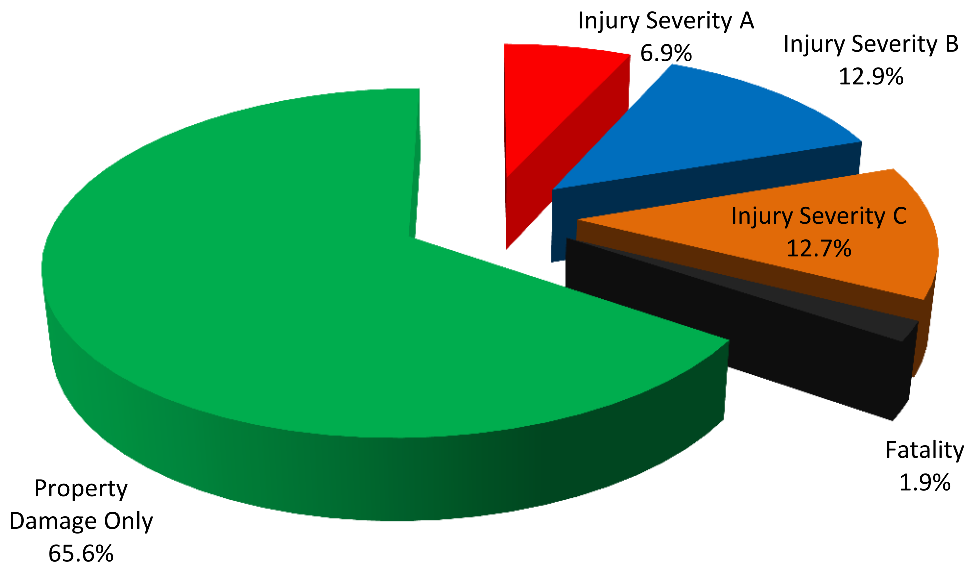


Figure 6.1 - Crash Severity Breakdown: Tribal Overall

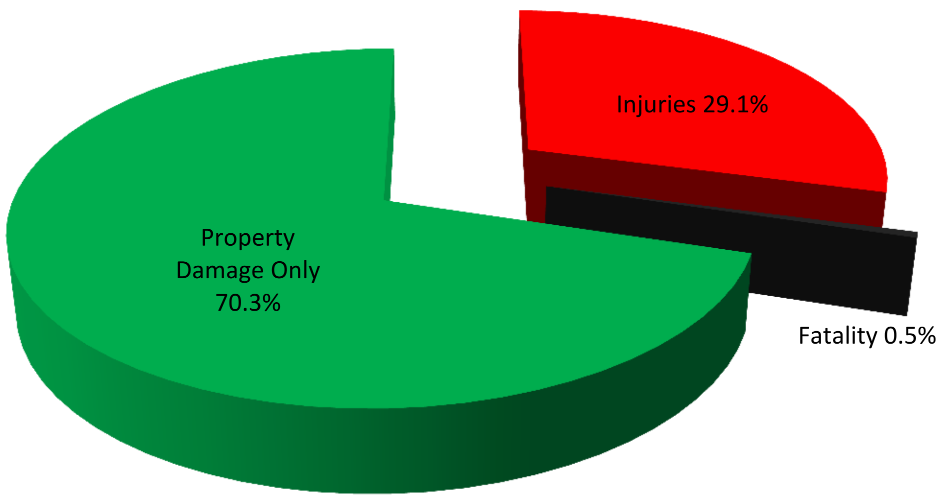


Figure 6.2 - Crash Severity Breakdown: Statewide Overall[22]

Injuries are assessed by police officers on the observational KABCO scale as follows. A **Fatal Injury** (K Injury) is an injury received which results in death within thirty days of the crash. An **Incapacitating Injury** (A Injury) is an injury, other than fatal, that prevents walking, driving, or performing other activities that were performed before the crash. A **Non-incapacitating Injury** (B Injury) is an injury, other than fatal or incapacitating, that is evident at the scene. Evidence includes known symptoms. A **Possible Injury** (C Injury) is any injury that is not evident at the scene but that is claimed by the individual or

[22] *Ibid.* Severity breakdown (A,B,C) was not available for statewide data.

suspected by the law enforcement officer. A **Property Damage Only** (O level) crash is a motor vehicle traffic crash involving property damage but no injury nor death.

A run-off-road, or "roadway departure" crash, is a non-intersection crash that occurs after a vehicle crosses an edge line or a center line, or otherwise leaves the travel way. A "sideswipe same" crash occurs when both vehicles are travelling in the same direction (overtaking or passing), while a "sideswipe opposite" crash involves vehicles travelling in opposite directions.

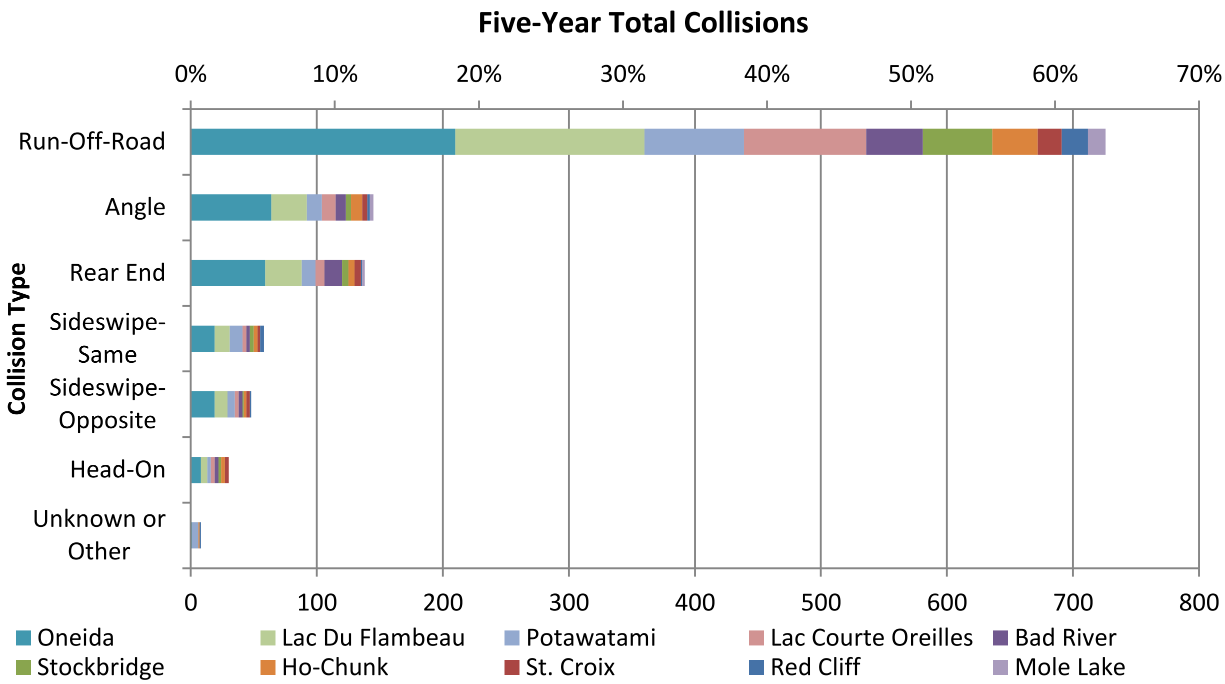


Figure 6.3 - Collision Type: Overall

6.2 Temporal and Environmental Distributions

Over the five-year period among all tribal crashes almost half (42 percent) of crashes took place during the wintertime months of November, December, January, and February, which is consistent with an increase in crashes related to winter weather. The large number of crashes in July could reflect heavy travel associated with tourists vacationing in the summer months. The distribution of the time of day when these crashes occurred had a peak three-hour period from 3:00 to 6:00 pm where 19 percent of the crashes took place. Over half (52 percent) of the crashes took place on Friday, Saturday, or Sunday. Over one-third (34 percent) of crashes noted the lighting condition as "Dark". Over one-third (41 percent) of crashes took place when the roadway condition was wet, muddy, icy or snowy (the statewide average was 30% per the Wisconsin SHSP[23]). Temporal and environmental conditions are summed based on the information coded in the state database; for instance, "Lighting Conditions" are coded as

[23] Wisconsin Strategic Highway Safety Plan 2011 – 2013, p43. http://www.topslab.wisc.edu/resources/shsp2011-13.pdf

“DARK”, “DAWN”, “DUSK”, “LIGT” which is artificially lit, “UNK” or unknown, or uncoded, which infers daylight.

Similarly, road (surface) conditions are coded by the officer reporting to the crash, with options including “MUD”, “SNOW”, “ICE”, “WET”, “UNK” or unknown, and uncoded, which infers a clear roadway.

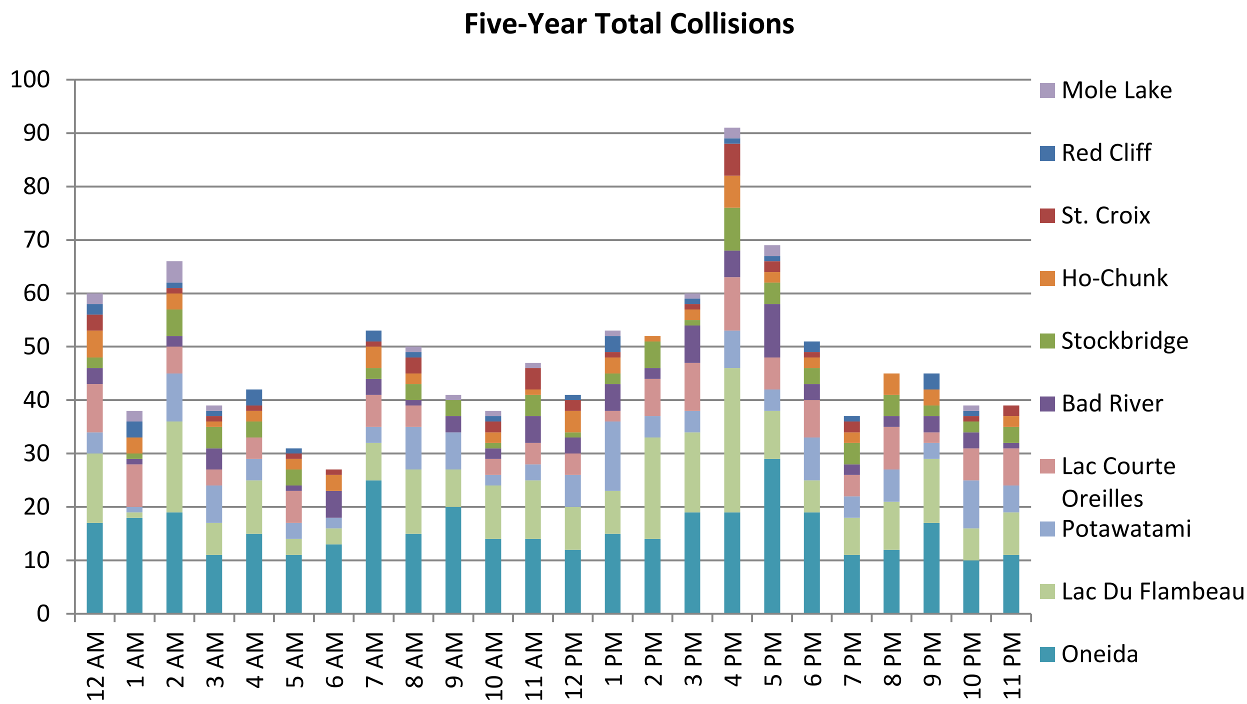


Figure 6.4 - Hourly Distribution: Overall

- There was a trending for the afternoon hours, possibly because of drivers getting out of work in the afternoon (3:00 – 6:00 pm)

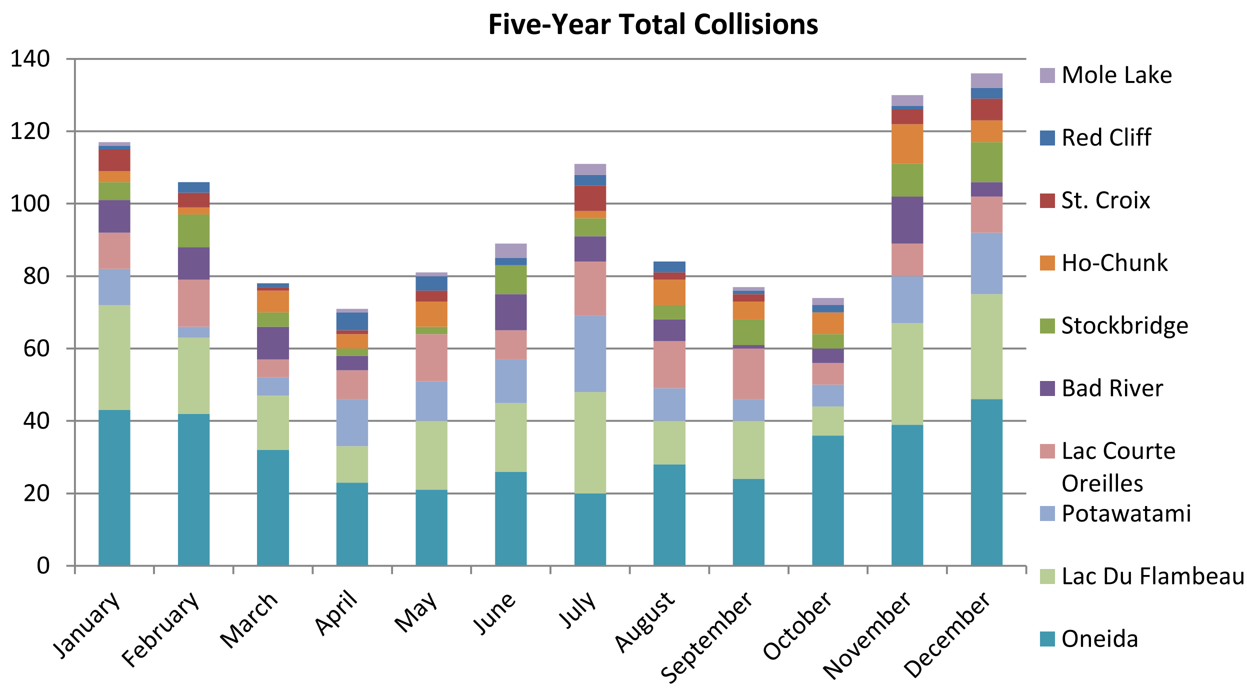


Figure 6.5 - Monthly Distribution: Overall

- The monthly crash distribution shows a trend during the winter months between November and February along with one peak summer month, July.

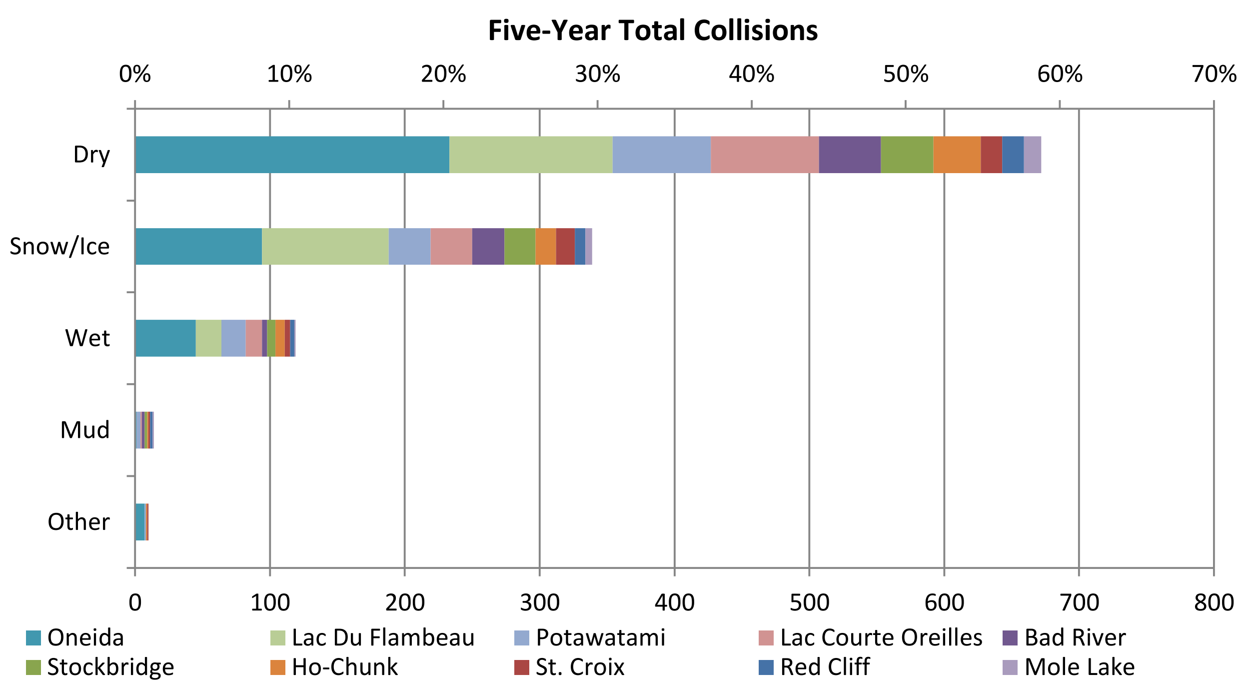


Figure 6.6 - Environmental Distribution: Overall

- 40 percent of collisions occurred during wet or snow/ice covered road conditions. These trends indicated that weather may be a contributing factor in collision frequency.

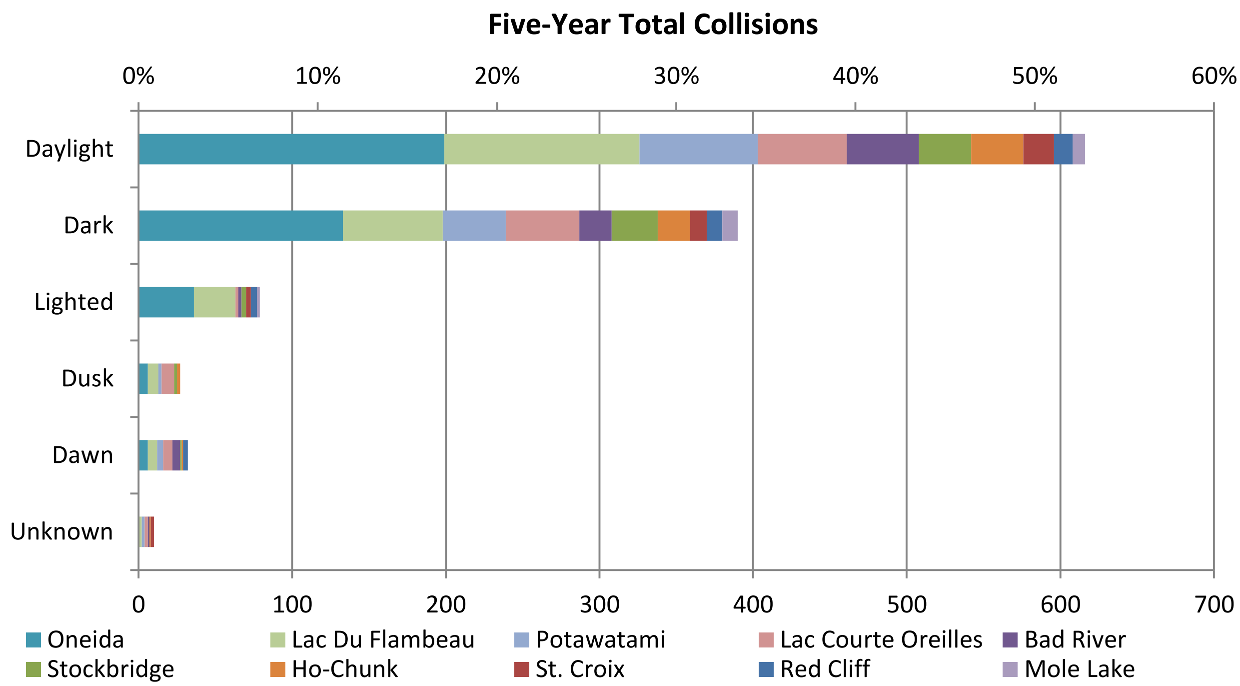


Figure 6.7 - Lighting Conditions: Overall

- Over one-third of collisions took place while it was dark out.

6.3 Summary of Key Contributing Factors

The key contributing factors for crashes occurring on the seven tribal reservations as noted are:

- Road conditions;

  Road conditions (dry, wet, snow- or slush-covered, icy, etc.) are a factor because just less than one-half of the crashes occurred when the roadway was not dry; this is comparable to the statewide average of 46 percent in 2009.

- Lighting conditions;

  Just above one-third (34 percent) of crashes were observed to occur when it was dark; in 2009, 26 percent of statewide crashes were reported with light conditions of "dark" (includes both lit and unlit). As travel generally tapers off during night-time hours, this may indicate a disproportionately high number of crashes because of dark roadways.

- Roadway geometry;

Roadway geometry, such as narrow (or no) shoulders, lack of clear zone, etc., is a contributing factor as well given that almost two-thirds (63 percent) of the crashes reported were classified as run-off-the-road and just below one-quarter of the crashes occurred within an intersection.

- Alcohol.

The last key contributing factor was alcohol considering that 235 of 1154 crashes had alcohol involved (20.4 percent). 2009 Statewide data indicated that of the 109,991 reported crashes, 5.8 percent involved alcohol[24]; alcohol-related crashes are more than three times higher in tribal lands as compared to the statewide data.

The Office of Applied Studies (part of the U.S. Department of Health & Human Services) cited Wisconsin (in 2006) as the state with the highest rate of driving under the influence of alcohol among adults aged 18 and older at 26.4 percent (compared to the national average of 15.1 percent)[25]. BIA analysis of data from the Fatality Analysis Reporting System (FARS) shows alcohol use among fatality crashes at approximately 58 percent[26].

6.4 Solution Strategies

Suggestions are offered for reducing crashes. FHWA crash reduction factors are provided to identify the impact an improvement may have on crashes; the crash reduction factors may be found on the Crash Modification Factors Clearinghouse website[27], unless otherwise noted. Not all solutions are applicable for all communities, but are presented as a series of options for evaluation.

6.4.1 Lane Departure Crash Strategies

The most common crashes experienced in tribal communities are the result of run off road. Almost two-thirds (63 percent) of crashes were listed as running off the road (the statewide average was at 18 percent). *Run off Road* is a term applied to all crashes that occur when a vehicle departs the roadway, such as a vehicle striking a tree, becoming overturned, or ending up in a ditch.

The Wisconsin SHSP identifies a reduction of lane departure crashes as a priority (Task #3) in the goal of "Reduc[ing] Head-On and Cross-Median Crashes – Prevent/Mitigate Roadway Departure Crashes."

[24] 2009 Wisconsin Traffic Crash Facts, p44. http://www.dot.wisconsin.gov/safety/motorist/crashfacts/docs/crash-alcohol.pdf

[25] State Estimates of Persons Aged 18 or Older Driving Under the Influence of Alcohol or Illicit Drugs, Office of Applied Studies. http://www.oas.samhsa.gov/2k8/stateDUI/stateDUI.cfm. National Survey on Drug Use and Health (NSDUH).

[26] BIA Highway Safety Plan, 2011, p25. http://www.nhtsa.gov/nhtsa/whatsup/safeteaweb/FY11/FY11HSPs/BIA_FY11HSP.pdf

[27] Crash Modification Factors Clearinghouse. http://www.cmfclearinghouse.org/

The following solutions will address the issue of run off road crashes. These solutions provide better guidance and feedback to drivers, enabling them to make better driving decisions. The solutions are presented in order of increasing planning and funding needs.

Provide and Maintain Pavement Markings

Pavement markings provide the most basic source of guidance to drivers. Pavement markings are an essential part of the traffic safety toolbox. Pavement markings are highly effective due to the way they establish the lane limits and guide drivers without requiring a high level of decision making. The placement of pavement markings provides a high level of positive guidance to drivers and can be particularly useful to drivers unfamiliar with the area.

Once pavement markings have been established, it is vital to maintain those markings. Pavement markings need to be evaluated on an annual basis to determine if the need to be replaced. Pavement markings on higher volume roads should be replaced on an annual to bi-annual basis. Intersections may need to have pavement marking maintenance on an annual basis due to the additional wear incurred in these areas. There are various crash reduction factors for different types of pavement marking improvements.

Well Maintained Pavement Markings: Opus

If edgelines were to be installed, the crash reduction factor is expected to be 11 percent for all injury types of Run off Road crashes.

Improve Signing and Delineation

Signing is a vital tool used to warn drivers of unexpected conditions and control traffic flow. While it is important to inform drivers of sudden changes in geometry, decisions points, or requirements (e.g. speed limits), it is equally important to guard against over use of signs. Too much signage can lead to driver overload and cause important messages to be lost. Signing, when most effective, draws a driver's attention to the important information they need to successfully navigate the road network. The installation of chevron signs and curve warning signs where needed (i.e. sharp horizontal curves), is expected to result in a crash reduction of 44 percent for all injury types of Run off Road crashes.

Flexible Post Delineators: FHWA

Delineation is particularly beneficial in locations where the road geometry is complex and confusing or in locations where drivers may benefit additional guidance. Delineators are defined by the Manual of Uniform Traffic Control Devices (MUTCD) as "retroreflective devices that are capable of clearly retroreflecting light under normal atmospheric conditions from a distance of 1,000 feet when illuminated by the high beams of standard automobile lights." The MUTCD also requires delineators to have a minimum dimension of 3 inches. Delineators are typically rigid or flexible, post mounted, and are placed according to Chapter F3 of the MUTCD. When used alone, delineators have no demonstrable increase in roadway safety, but when used in conjunction with edge- and centerlines they have been shown to reduce injury crashes by as much as 45 percent.

Provide Rumble Strips/Stripes

Rumble strips are raised or grooved patterns, typically milled in Wisconsin, on the roadway that provide both an audible warning (rumbling sound) and a physical vibration to alert drivers that they are leaving the lane. They may be installed on the roadway shoulder or on the centerline of undivided highways. If the placement of rumble strips coincides with centerline or edgeline striping, the devices are referred to as rumble stripes.

Edgeline Rumble Stripe: MoDOT

Shoulder rumble strips have effectively been utilized within Wisconsin on rural freeways and expressways. Paved shoulders are required to install shoulder rumble strips. Continuous shoulder rumble strips can be applied on many miles of rural roads in a cost-effective manner, and this solution strategy should be considered on a corridor by corridor basis.

Edgeline rumble stripes are similar to shoulder rumble strips as they typically are milled but are narrower. Rumble stripes are typically placed on the edge line and serve both the purpose to provide an audible signal to the driver as well as enhance the visibility of the painted edge line during dark and wet conditions. The first phase of this study found that the rumble stripes improved the longevity of the painted edge lines and that the visibility of the edge lines was improved during nighttime and wet.

The installation of shoulder rumble strips is expected to result in a crash reduction of 36 percent for Run off Road crashes, excluding PDO crashes. If edgeline rumble stripes are installed the crash reduction increases to 39 percent for Run off Road crashes, excluding PDO crashes.

Similar to shoulder rumble stripes, centerline rumble stripes provide an audible warning for vehicles as they cross the centerline. Centerline rumble strips/stripes have been shown to provide a crash reduction factor of 9 percent of all crashes and 12 percent of injury crashes on rural roads. All head-on and sideswipe crashes are expected to have a crash reduction of 37 percent.

Centerline Rumble Strip: FHWA

Rumble strips/stripes are installed on an existing paved surface, which makes them very cost effective. These treatments are ideally suited for rural corridors with dispersed crash history and potential for collisions. Inclusion of rumble strips/stripes in more populous areas should be carefully considered due to the negative impacts associated noise pollution can have on residences and businesses. Agencies that have installed them near residential areas have in many cases been forced to remove them.

Build Roads with Safety Edge

The Safety Edge is a specific asphalt paving technique where the interface between the roadway and graded shoulder is paved at an optimal angle to minimize vertical drop-off and provide a safer roadway edge. A Safety Edge shape can be readily attained by fitting resurfacing equipment with a device that extrudes and compacts the shape of the pavement edge as the paver passes. This mitigates shoulder pavement edge drop-offs immediately during the construction process and over the life of the pavement. This technique is not an extra procedure but merely a slight change in the paving equipment that has a minimal impact on the project cost. In addition, the Safety

Safety Edge Installation: FHWA

Edge improves the compaction of the pavement near the edge. Shoulders should still be pulled up flush with the pavement. The installation of a safety edge showed reductions of more than 5 percent of total crashes[28].

Include and Improve Shoulders

Shoulders provide drivers with extra time to recover if a vehicle departs the traveled way. Shoulders have been found to be a highly effective strategy in preventing fixed object crashes resulting from roadway departure.


Paved and Gravel Shoulder: Opus

Paved shoulders provided many safety benefits for vehicular and non-motorized road users. Paved shoulders improve roadway drainage and can reduce the costs associated with maintaining a gravel shoulder as well as provide space for broken-down vehicles. Paved shoulders also improve conditions for non-motorized road users by increasing the comfort level of bicyclists and providing a place for pedestrians to use when sidewalks cannot be provided. Stabilizing shoulders is expected to result in a crash reduction of 25 percent of all crashes.

Create Safer Roadsides

Safer roadsides are created by providing adequate clear zone and recoverable, or traversable, slopes. Roadway agencies can increase the likelihood that a roadway departure results in a safe recovery rather than a crash, and mitigate the severity of crashes that do occur, by providing these features.

Retaining tree lines on Tribal lands is often a cultural concern, so each case needs to be balanced comparing the safety benefits against the Tribe's desires.

A clear zone is an unobstructed, traversable roadside area that allows a driver to stop safely, or regain control of a vehicle that has left the roadway. According to the *Roadside Design Guide* a clear zone is the total roadside border area, starting at the edge of the traveled way, available for safe use by errant vehicles. It is an unobstructed, relatively flat area beyond the edge of the road that allows a driver to stop safely or regain control of their vehicle. The width of the clear zone should be based on risk, also called exposure, and is based on traffic volumes, vehicle speeds, and roadside geometry. Removing or relocating fixed objects outside of the clear zone is expected to result in a crash reduction of 38 percent of all crashes.

[28]The Safety Edge, FHWA Safety. **Website:** http://safety.fhwa.dot.gov/roadway_dept/pavement/safedge/brochure/

A recoverable slope is a slope on which a driver may, to a greater or lesser extent, retain or regain control of a vehicle by slowing or stopping. Slopes are described as the ratio of Vertical (V) to horizontal (H); slopes flatter than 1V:4H are generally considered recoverable. A non-recoverable slope is a slope which is considered traversable but on which an errant vehicle will continue to the bottom. Embankment slopes between 1V:3H and 1V:4H may be considered traversable but non-recoverable if they are smooth and free of fixed objects. A clear run-out area is the area at the toe of a non-recoverable slope available for safe use by an errant vehicle. Slopes steeper than 1V:3H are not considered traversable and are not considered part of the clear zone. Flattening sideslopes from 1V:3H to 1V:4H or 1V:4H to 1V:6H is expected to result in a crash reduction of 18 percent or 24 percent of all run off road crashes, respectively.


Guard Rail: Opus

Remove or Protect Roadside Hazards

It is always best to remove trees, rocks and other fixed objects located within the clear zone. Removing fixed objects from the clear zone will provide drivers who do leave their lane, and ultimately the roadway, adequate space to slow down and stop without striking a fixed object. Striking fixed objects leads to significantly higher injury levels; however, it may not be feasible to remove all of these objects from the clear zone.

Objects that cannot be removed from the clear zone need to be protected. While this statement may make it seem that the object is being protected, it is really the driver and passenger who are being protected. Fixed-objects in the clear zone can be protected through devices that deflect vehicles or bring vehicles to a controlled strop through impact attenuation. Other road hazards, such as non-traversable slopes, bridges, and bodies of water, need to be protected.

Longitudinal protection is used to deflect an errant driver from encountering a roadside hazard. Longitudinal protection is typically provided through the use of guard rail. If a guardrail is installed to protect drivers from striking a fixed object, the crash reduction factor is expected to be 58 percent.


Impact Attenuator: FHWA

The ends of longitudinal protection, and other types of single point hazards, benefit from the use of impact attenuating devices. These devices reduce the forces experienced by vehicle occupants by reducing vehicle speed in a controlled manner.

6.4.2 Intersection Crash Strategies

Intersection crashes are crashes that occur at, or within the influence area, of an intersection. Intersection crashes may include lane departure crashes, such as sideswipe crashes. Strategies covered in the previous section, such as centerline rumble stripes, mitigate these crashes. Intersection crashes also include angle, rear-end, and head-on left crash types. The two most common intersection crash types reported in tribal communities are angle and rear-end crashes, comprising 13 percent and 12 percent of total crashes, respectively.

Angle collisions are the second most common crash type in these communities (after lane departure crashes). They occur at intersections or driveways and typically consist of impact at a 90° angle. These crashes are commonly referred to as "T-bones".

Rear-end collisions are the third most common crash type. These crashes are most commonly associated with sudden stopping, right turning vehicles, and left turning vehicles.

The following set of solutions specifically addresses the intersection crashes. These solutions highlight the roadway and environmental factors that can contribute to intersection crashes. The solutions, as with the previous section, are presented in order of increasing planning and funding needs.

Signage and Intersection Conspicuity

Signs provide regulatory, warning, and guidance messages to drivers concerning traffic control, road alignment, warning for unexpected conditions, and notice of approaching intersections. Signs need to be properly placed to allow drivers the opportunity to process and react to their messages. Signs that are improperly placed or improperly maintained can lead to driver confusion and/or poor driver decision making, which can lead to crashes.

Retroreflectivity Examples: FHWA

Signs that are worn or beyond their useful life limit visibility and conspicuity, especially during nighttime hours. At these locations, driver guidance may be limited by the following items:

- Broken regulatory signs may not be visible as a result of having already been hit and not replaced.
- Faded or damaged warning signs may not provide adequate delineation and guidance.

Signs must be properly placed according to the Manual of Uniform Traffic Control Devices (MUTCD). Signs must also be properly maintained through vegetation control and scheduled replacement of signs to maintain retroreflectivity. Properly maintained retroreflectivity improves nighttime conspicuity and visibility. Signs installed to conform to the MUTCD are expected to result in a crash reduction of 15 percent for injury collisions and 7 percent for PDO collisions

Lighting

The crash history shows that 34 percent of all crashes occurred during dark (or non-illuminated) conditions. According to the FHWA, crashes that occur during low light conditions trend towards more severe injuries than daylight crashes. While the reasons for this trend are varied, a cost effective solution strategy is lighting.

Installing or upgrading lighting can provide significant safety benefits for nighttime road users. Lighting increases the ability for a driver to recognize that an intersection is ahead. Lighting also increases driver ability to successfully navigate turns and recognize other road users such as pedestrians and vehicles. Installing intersection lighting is expected to result in an injury crash reduction of 38 percent and a PDO crash reduction of 49 percent.

Sight Distance

The ability for drivers to see approaching intersections and other road users at intersections is vital to their ability to make appropriate decisions. Drivers should have an unobstructed view of all traffic control devices when approaching an intersection. Drivers also need to have an unobstructed view of other road users, particularly when stopped on an approach and determining when to enter the intersecting roadway.

The AASHTO policy on Geometric Design of Highways and Streets considers intersection sight distance in terms of sight triangles. *Sight Triangles* are triangular areas defined by a distance along an intersection approach legs that should be free of obstruction from objects that could affect a drivers ability to see. Sight triangles are established on the basis of approach speed and traffic control.

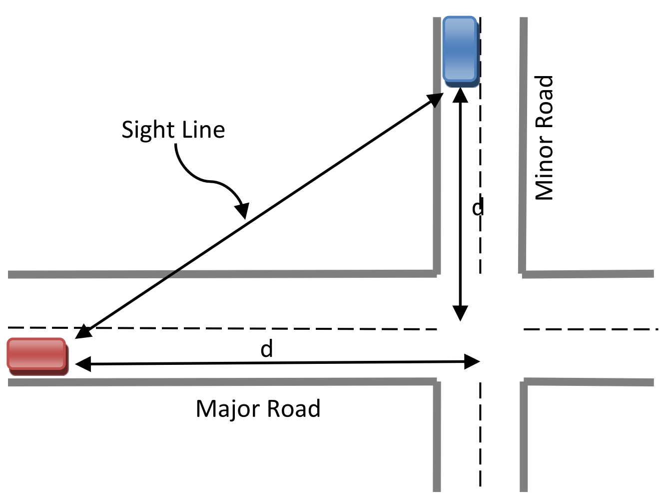


Figure 6.8 - Sight Triangle Example

Providing the appropriate intersection sight distance is often a matter of keeping these areas free of vegetation, which makes this a low-cost countermeasure. Occasionally an intersection will have a deficient design for the approach speeds, leading to higher initial costs for the solution. However, the maintenance of this solution is low-cost vegetation control.

Limited Sight Distance Example: Opus

Private and commercial driveways should also meet intersection sight distance guidelines. It is especially valuable to maintain appropriate sight distance on higher volume driveways. Commercial driveways may experience as much, or more, daily traffic as a side street.

Increasing sight distance is expected to result in an injury crash reduction of 48 percent and a PDO crash reduction of 11 percent.

Left turn Lanes

The addition of a left-turn lane can improve the operations and safety at an intersection. According to *Safety Effectiveness of Intersection Left- and Right-Turn Lanes*, a 2002 FHWA study, the addition of a left-turn lane can result in reductions of crashes from 7 to 48 percent. Left turn lanes provide benefits for through traffic by reducing delay on two-lane highways and minimizing conflicts for a through vehicle arriving behind a turning vehicle.

The decision to include a left turn lane should be based on guidelines that take conflict avoidance and safety into account. The classic guideline for this decision is the Hamerlink model (1967). NCHRP Report 457 (http://onlinepubs.trb.org/onlinepubs/nchrp/esg/esg.pdf) contains interactive features that can be used to perform this assessment.

6.4.3 General Strategies

Maintenance

Routine maintenance such as crack sealing or replacing worn pavement markings help prolong the life of transportation assets as well as modulate the expense needed to maintain and repair a road or structure. A schedule of routine maintenance will allow an agency to be proactive, rather only than responding to complaints from the public.

For instance, replacing pavement markings on an annual or biennial basis (depending on the traffic volumes) will help delineate the edges. As noted previously in Section 6.4.1, providing and maintaining pavement markings is linked to a crash reduction factor of 11 percent for all injury types of Run off Road crashes.

Winter maintenance is another recurring task that can tax the budgets of smaller communities or transportation departments. The short-term effects of all measures to control snow, slush, or ice have been linked to as much as a 50 percent reduction in all types of crashes[29]. Raising the standard for winter maintenance has shown as much as an 11 percent reduction in injury crashes and a 27 percent reduction in property damage only crashes[30].

[29] Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004)
[30] *Ibid.*

7.0 Crash Analysis by Tribe

For the second phase the Wisconsin Department of Transportation provided Opus with electronic crash data from the time period of January 2004 to December 2008 for the following seven tribes (as selected by the Department):

- Stockbridge Munsee Community
- Oneida
- Forest County Potawatomi
- Bad River
- Red Cliff
- St. Croix
- Ho-Chunk

With this information the following analyses were performed on the data:

- Geocoding location of the traffic crashes;
- crash frequency rate, critical rate, and severity analysis;
- temporal (hour, day, month, year) and spatial pattern summaries;
- road, weather, and light condition summaries;
- collision type summaries;
- summary of key contributing factors; and,
- collision diagrams at select locations (included as Appendix B).

The geocoding was performed by the GIS department at Lac Courte Oreilles Community College. The geocoding allowed for the development of graphical depictions of traffic crash trends. Crash severity and crash type maps were created for each of the study tribes.

7.1 Stockbridge Munsee Community

7.1.1 Background

The 22,139 acre Stockbridge-Munsee reservation is located in central Wisconsin and neighbors the near-by Menominee reservation to the northeast. The community of Shawano is the closest community center. Collector and county roads provide the majority of the access into and around the reservation. County Highway A and Reservation Highway 22 service the majority of the 1,565 person reservation.

Stockbridge currently has a Tribal Police Agency that dispatches officers to crashes within the reservation boundaries, although if there are no available officers, the county officers will respond. The reporting formats that are used for Stockbridge are the MV400 paper forms as well as the MV400e as part of the Badger TracCS system.

7.1.2 Crash Analysis

Within the five year period, there were a total of 70 crashes in which there was a high percentage of crashes that resulted in injuries. Figure 7.1 is the breakdown of all injuries from crashes in Stockbridge; 41.4 percent of crashes involved an injury or fatality, compared to 29.7 percent statewide. The breakdown of the types of crashes is displayed in Figure 7.2. Over three-fourths of crashes were classified as a vehicle running off the road (79 percent). The remainder of crashes were classified as angle, rear ends, sideswipe same, sideswipe opposite and head-on crashes. A GIS map of location and severity of traffic crashes for Stockbridge is included in Appendix B. The data was provided by WisDOT for analysis and not obtained as part of an RSA or safety plan.

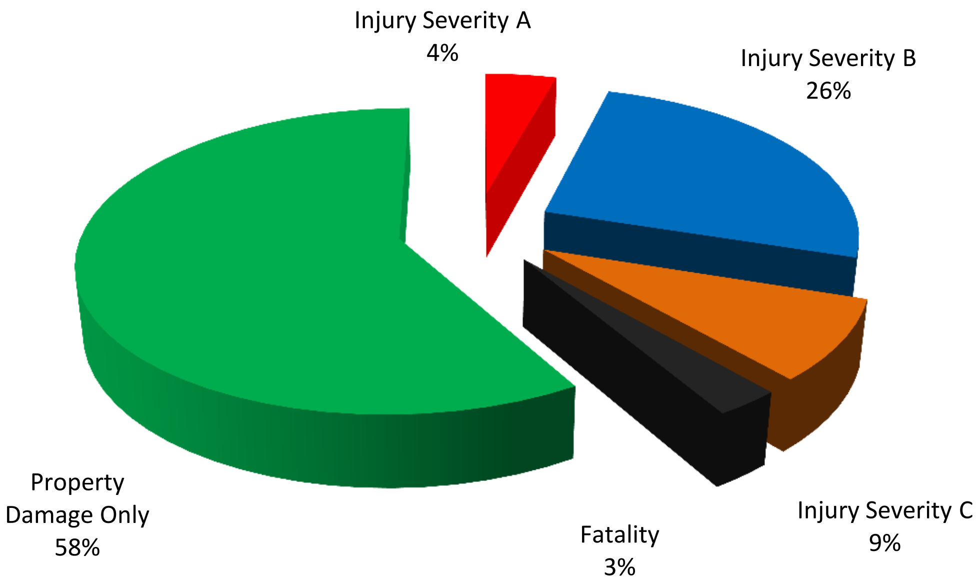


Figure 7.1 - Injury Severity Breakdown: Stockbridge

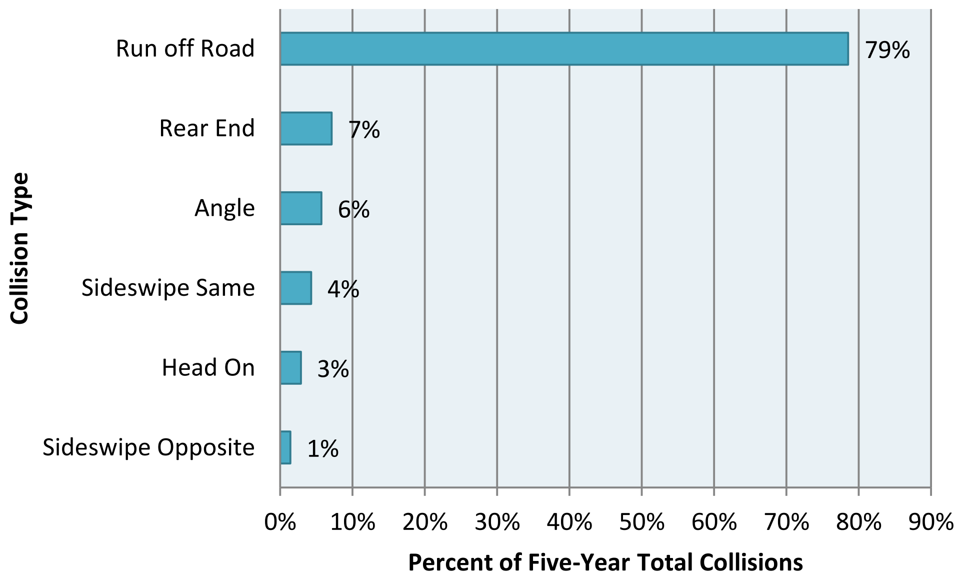
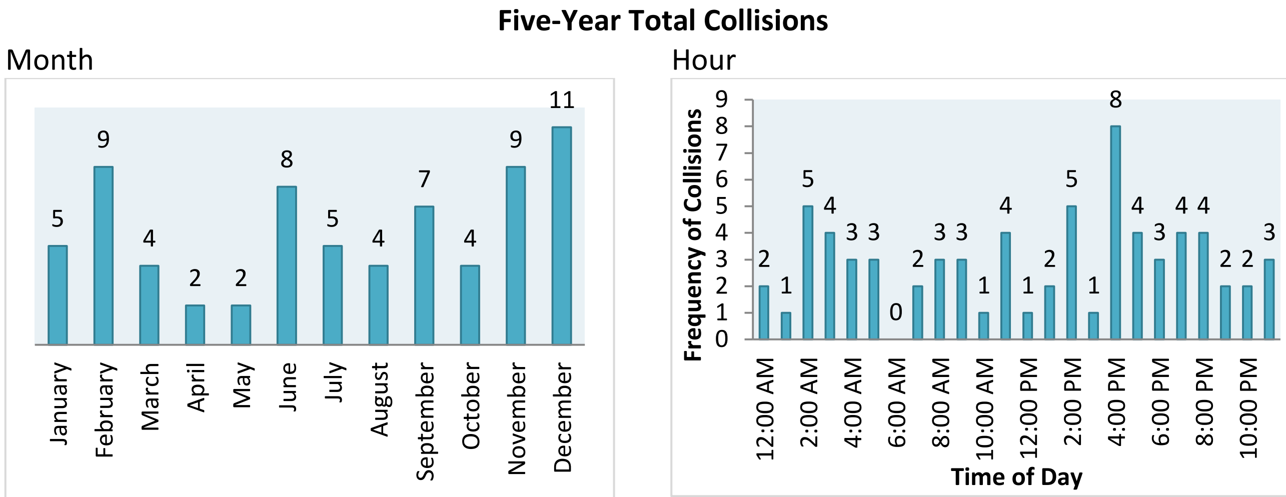


Figure 7.2 - Collision Type: Stockbridge

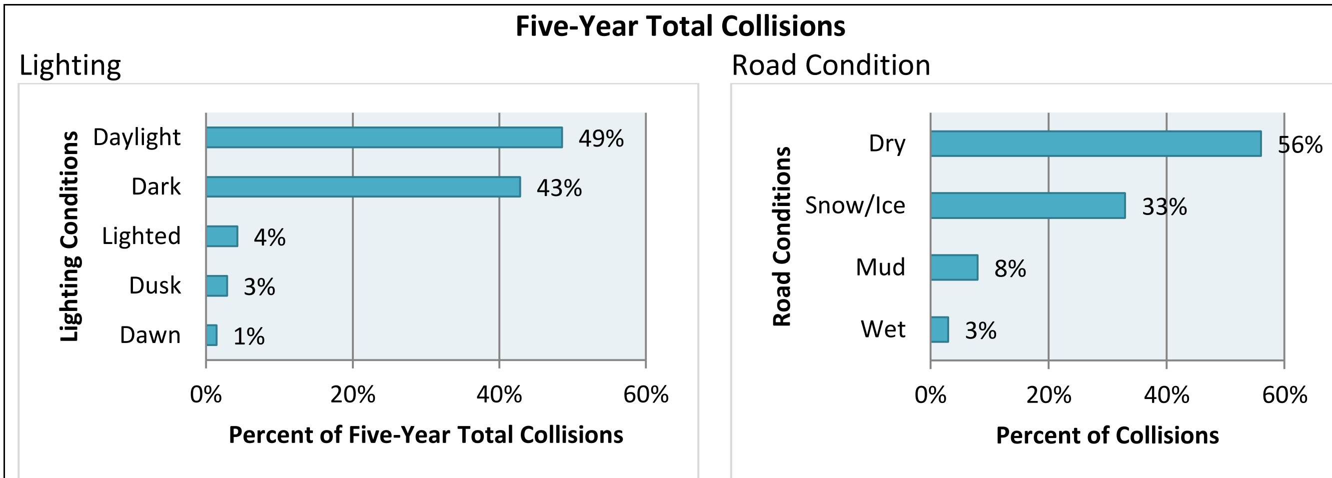
7.1.3 Temporal and Environmental Distributions

Temporal factors are in which time, day, and month may have an impact on collisions while environmental factors include the roadway conditions or geometry, weather conditions, and lighting conditions. These factors might have an influence on the collisions. Trending was revealed (as to which day of the week) for which day a collision transpired, 52 percent of collisions occurred on the days of Friday through Sunday. Just under half of the collisions occurred between November and February (49 percent); which could indicate that weather conditions may be a factor in the collisions. There was no year-over- year trend although 2008 had the highest number of crashes at 20. One-third of the collisions took place when the road condition was reported to have snow or ice on the roadway, once again suggesting that the weather may have been a factor in these collisions. Lighting condition information from the crash reports showed 43 percent of crashes occurred when it was dark. Temporal and environmental distributions are shown in Figure 7.3 and Figure 7.4.



- The monthly crash distribution shows a trend during the winter months between November and February.
- The majority of crashes occurred during nighttime hours, between 10:00 pm and 5:00 am. There was also a one hour period during the daytime that had a significant amount of crashes, 4:00 pm.

Figure 7.3 - Temporal Distribution: Stockbridge



- More than two in five collisions occurred during dark conditions.
- Over a third of collisions occurred during wet or snow/ice covered road conditions. These trends indicated that weather may be a contributing factor in collision frequency.

Figure 7.4 - Environmental Distribution: Stockbridge

7.1.4 Summary of Key Contributing Factors

Many factors come in to play regarding collisions. The key contributing factors for the Stockbridge crashes were roadway geometry, the environment, lighting conditions, road conditions, and alcohol. Roadway geometry was a factor considering that 79 percent of the crashes were classified as a vehicle running off the road. The roadway geometry must be analyzed to be certain which aspects must be changed in order to reduce the number of vehicles running off the roadway. Almost half of the crashes occurred during the winter months, November through February. Just below one-half of crashes were recorded to have dark conditions, hence the non-lighting of the roadway may have had an impact on crashes. More than one-third of crashes occurred while the road conditions were less than ideal. Within the five year time period there were 16 crashes out of 70 that listed alcohol as being a factor; meaning that 23 percent of the crashes occurring in Stockbridge were alcohol related.

7.2 Oneida

7.2.1 Background

The 65,472 acre Oneida reservation is located in northeastern Wisconsin's Outagamie and Brown Counties at the southern tip of the Green Bay. 21,321 tribal members reside on the reservation. Major collector and county roads provide the majority of the access into and around the reservation. Parts of the City of Green Bay are shared with the reservation.

Oneida currently has a Tribal Police Agency that tends to crashes within the reservation boundaries, although if there are no available officers, the county officers will respond. The reporting format used for Oneida is the MV400 paper form.

7.2.2 Crash Analysis

There were a total of 380 crashes that occurred on the Oneida reservation from January 2004 to December 2008. Of the 380 crashes 29.7 percent had an individual sustaining an injury or fatality, matching the statewide rate (also 29.7 percent). Figure 7.5 shows the breakdown of injury severity for Oneida. Over half of the crashes occurring in Oneida were classified as running off the road. There was also a high percentage of angle and rear end crashes, 17 and 16 percent, respectively. The remaining types of crashes were sideswipe same, sideswipe opposite, and head-on. Figure 7.6 displays the summary of the types of collisions occurring in Oneida. A GIS map of location and severity of traffic crashes for Oneida is included in Appendix B.

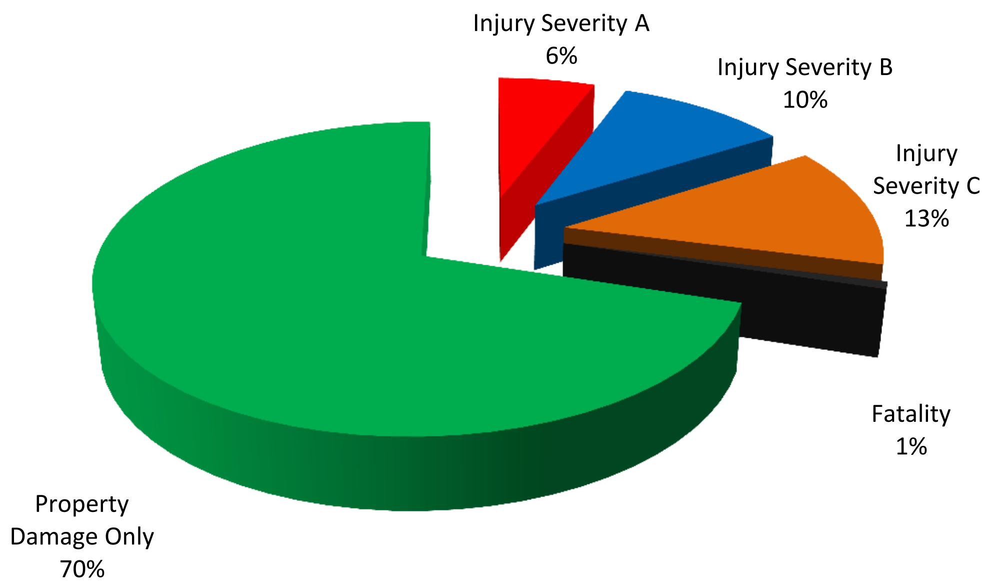


Figure 7.5 - Injury Severity Breakdown: Oneida

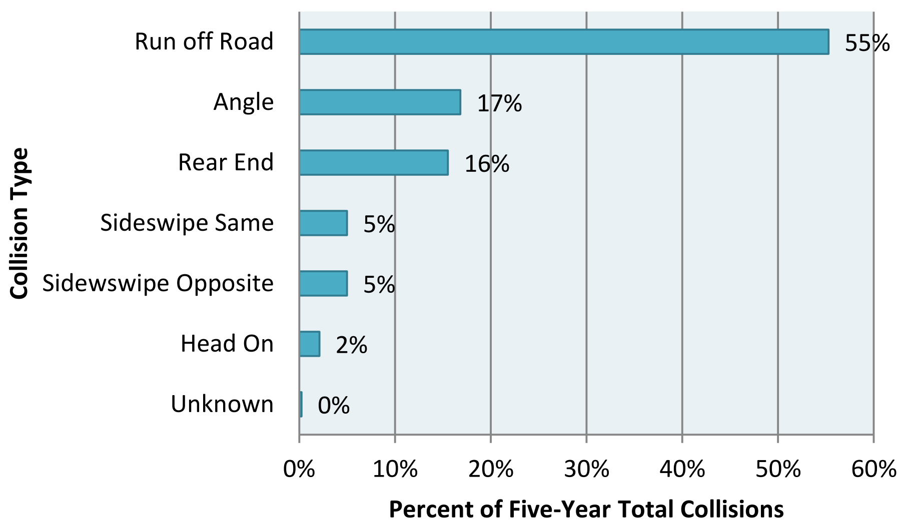
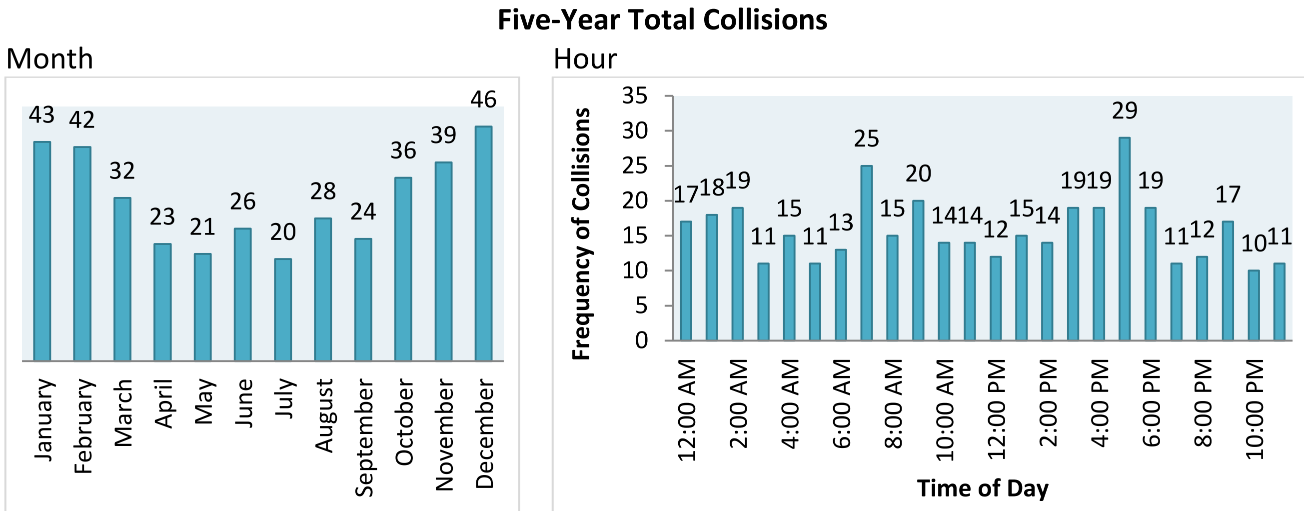


Figure 7.6 - Collision Type: Oneida

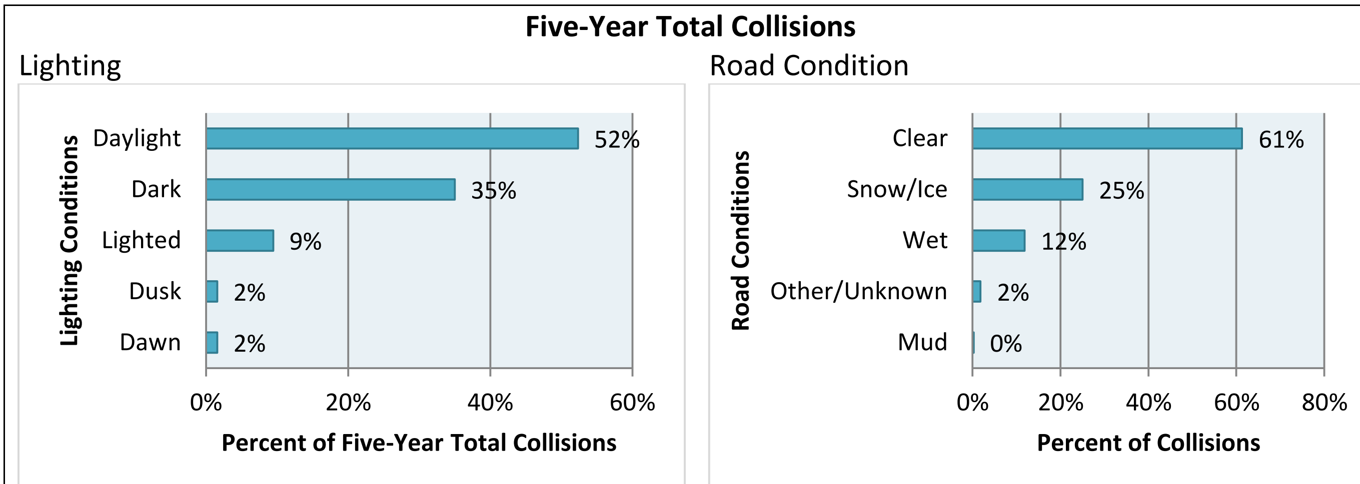
7.2.3 Temporal and Environmental Distributions

The crashes were evenly distributed over the days of the week; the highest amount was on Fridays, consisting of 17 percent while the lowest was Tuesdays where 12 percent of the crashes occurred. The monthly distribution showed a trend toward the winter months between November and February. This trend may be caused by environmental factors; which over one-third of the crashes occurred while the roadway was wet or covered with snow or ice. The yearly distribution was reduced from 104 crashes in 2004 to 53 in 2005 but then increases year over year to 85 in 2008. Over one-third of crashes took place during the nighttime hours. Temporal and environmental distributions are shown in Figure 7.7 and Figure 7.8.



- The monthly crash distribution shows a crash trend during the winter months between November and February.
- The majority of crashes are distributed evenly among all hours of the day except for two-one hour periods, 7:00 am and 5:00 pm.

Figure 7.7 - Temporal Distribution: Oneida



- Just over one-third of collisions occurred during dark conditions.
- Over one-third of collisions occurred during wet or snow/ice covered road conditions.

Figure 7.8 - Environmental Distribution: Oneida

7.2.4 Summary of Key Contributing Factors

For the Oneida reservation the key contributing factors were environment, road conditions, lighting conditions, roadway geometry, and alcohol. There was a trend in the crashes suggesting the environment was a factor. The road condition followed the environmental trend. A significant amount of crashes occurred while the lighting condition was classified as dark. Roadway geometry can also be listed as a contributing factor for multiple arguments; there was a substantial amount of crashes classified as vehicles running off the road as well as a significant number of rear end and angle crashes. Of the 380 crashes, 31 percent of the crashes took place within an intersection. Alcohol was a contributing factor in 17 percent of the crashes taking place on the Oneida reservation.

7.3 Forest County Potawatomi

7.3.1 Background

The 12,498 acre Forest County Potawatomi Indian Reservation in northern Wisconsin is made up of several non-contiguous plots of land and is located mainly in Oconto and Forest Counties, with over 9,000 acres of trust and more than 3,000 acres of fee land. In addition to the reservation that the tribe retains in the northern part of Wisconsin, there is a small 6.9 acre plot or trust land in the city of Milwaukee. While there are roughly 1,400 members of the Forest County Potawatomi Tribe, approximately 531 members reside on reservation, trust, or fee land.

The land along US-8, east of Crandon, is not included; the state DOT is performing a corridor study of this area.

Currently, the Forest County Potawatomi community does not have a Tribal Police Agency to attend to crashes within the reservation boundaries; they rely solely on the county for crash reporting. The reporting format that is used within Forest County is the MV4000 paper form.

7.3.2 Crash Analysis

Out of the 126 crashes that occurred in the Forest County Potawatomi 43 of these crashes resulted in an injury. Figure 7.9 is the breakdown of the injury severity levels, which illustrates that there were 34.1 percent of crashes that resulted in an injury, if not death, above the statewide average of 29.7 percent. There were six types of crashes that occurred during the five year period. The predominant type of crash in the area was run off road with 63 percent. There were also angle, rear end, sideswipe same, sideswipe opposite and head-on crashes. Figure 7.10 displays the breakdown of the type and amount of each crash. A GIS map of location and severity of traffic crashes for Forest County Potawatomi is included in Appendix B.

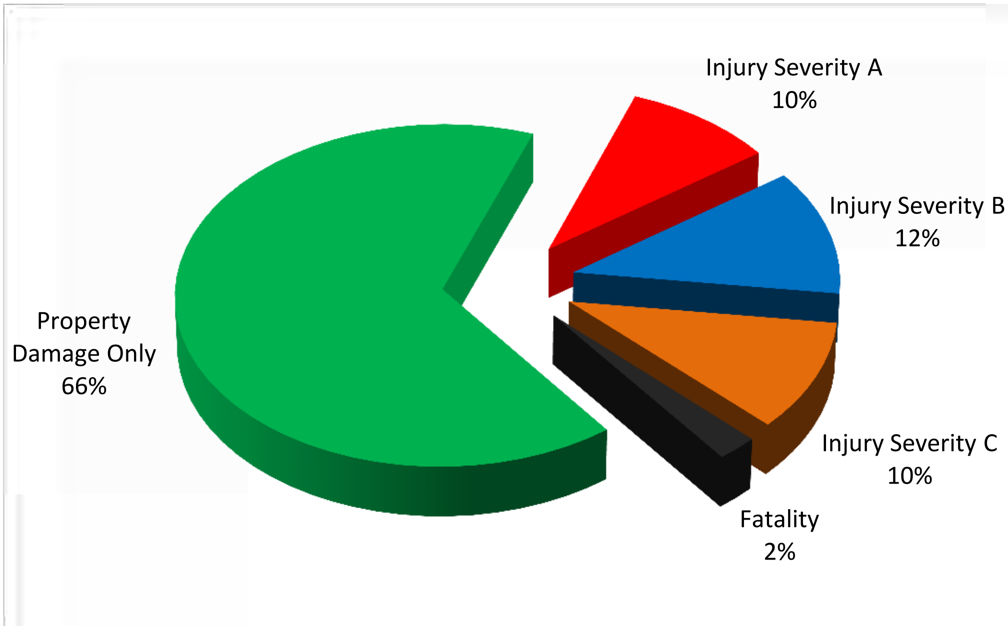


Figure 7.9 - Injury Severity Breakdown: Forest County Potawatomi

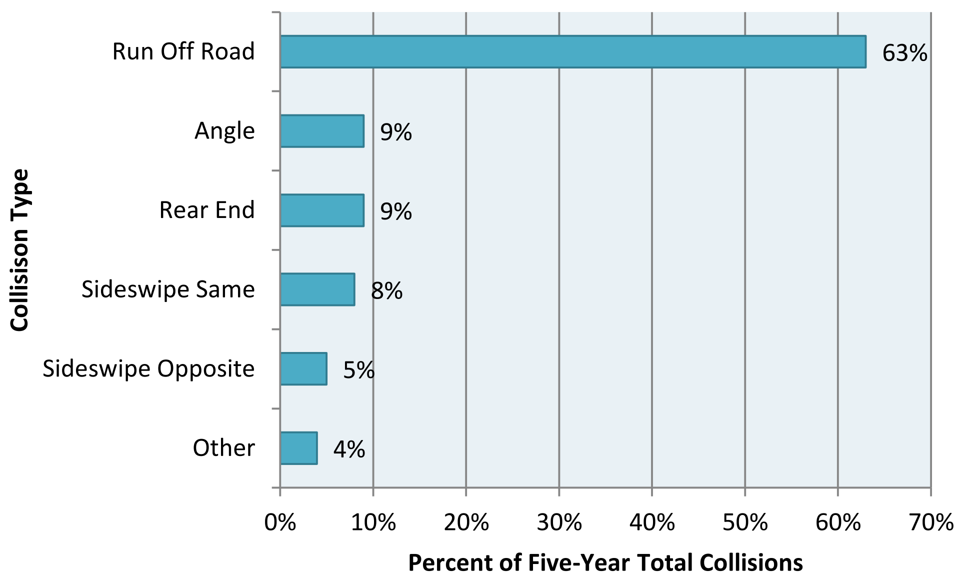
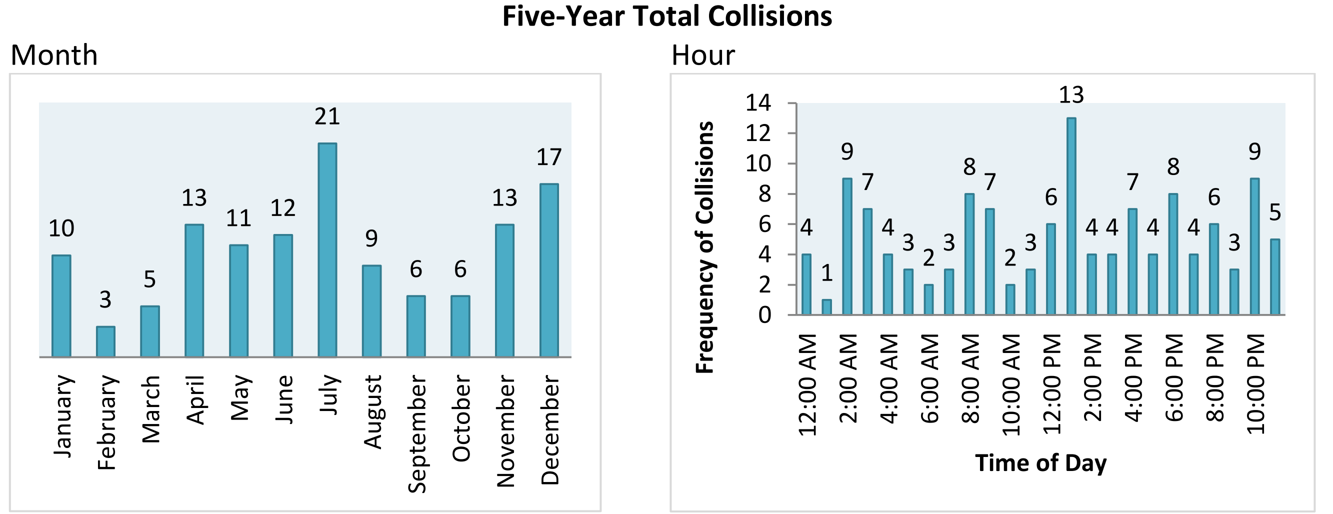


Figure 7.10 - Collision Type: Forest County Potawatomi

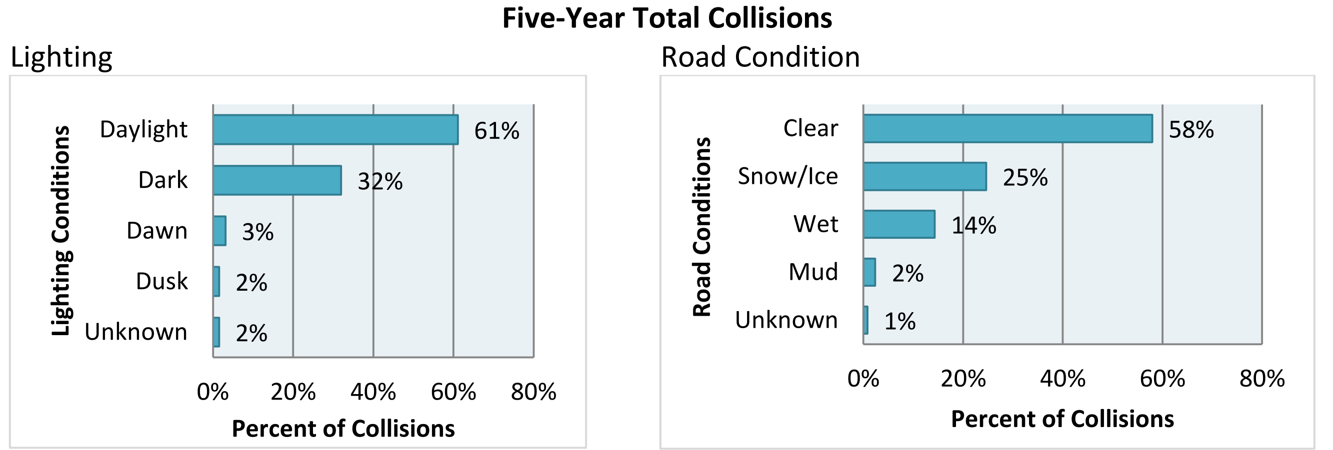
7.3.3 Temporal and Environmental Distributions

The monthly crash distribution shows an increasing crash trend during the winter months from November through January. July had the most crashes occurring in one month (21 crashes). Almost half of the crashes occur on Friday, Saturday, or Sunday (49 percent). There is no year over year trend; the crashes were evenly distributed among all five years. The road conditions that were observed when the crashes took place were clear, snow/ice, mud, wet, and unknown conditions. Over one-third of the crashes occurred when there were either snowy/icy or wet roadways. One-third of the crashes took place during nighttime hours. Figure 7.11 and Figure 7.12 shows the distribution of the crashes for the month, hour, lighting condition and roadway conditions.



- The monthly crash distribution shows a crash trend during the winter months between November and January and the month of July.
- Over one-third of crashes occurred during nighttime hours, between 10:00 pm and 5:00 am and had a peak in the daytime in a one hour period starting at 1:00 pm.

Figure 7.11 - Temporal Distribution: Forest County Potawatomi



- One third of collisions occurred during nighttime hours.
- One third of collisions occurred during wet or snow/ice covered road conditions. These trends indicate that weather may be a contributing factor in collision frequency.

Figure 7.12 - Enviromental Distribution: Forest County Potawatomi

7.3.4 Summary of Key Contributing Factors

The key contributing factors for the Forest County Potawatomi reservation were roadway geometry, environmental factors, lighting conditions, and alcohol. The roadway geometry is a contributing factor due to the reasoning that almost two-thirds of the crashes were categorized as a vehicle running off the road as well as having 24 percent of the collisions occurring within an intersection. There was a trend in the monthly distribution of crashes where there was an increase in the winter months of November, December, and January. Further proof of this trend is that 25 percent of the crashes took place when the road condition was listed as being snowy or icy. One-third of the crashes happened when the lighting conditions were said to be dark, thus suggesting lighting to be a factor. Lastly, alcohol was a contributing factor as 15 percent had alcohol associated with the crash.

7.4 Bad River

7.4.1 Background

The 124,655 acre Bad River reservation is located in northern Wisconsin on the south shore of Lake Superior in Ashland and Iron Counties; 57,884 acres are tribally owned, 2,970 are considered municipal, with the balance being fee land. Within the reservation, Odanah is the largest community center. Major collector and county roads provide the majority of the access into and around the reservation. County Highway A, US-2 and Government Road provide access to Odanah from the west, east and south, respectively.

Figure 24 - US-2 crossing the Bad River Reservation

Bad River currently has a Tribal Police Agency that tends to crashes within the reservation boundaries, although if there are no available officers, the county officers will respond. The reporting format that is used for Bad River is the MV400 paper form. Bad River officers are cross-deputized to serve on both tribal land and in Ashland County in conjunction with the Ashland County Sheriff's Department.

7.4.2 Crash Analysis

Bad River had 76 crashes occur in the five year period. Of those 76 crashes, there were 43.4 percent that resulted in an injury or fatality, well above the statewide average of 29.7 percent. The remaining crashes were reported to only sustain property damage. Figure 7.14 exhibits the division of each injury severity. There were also six different types of crashes within the Bad River jurisdiction. The different types included running off the road, rear end, angle, sideswipe same, sideswipe opposite, and head-on collisions. Over half of the crashes were classified as run off road, at 59 percent. Figure 7.15 illustrates what crash type had which percentage for the time period. A GIS map of location and severity of traffic crashes for Bad River is included in Appendix B.

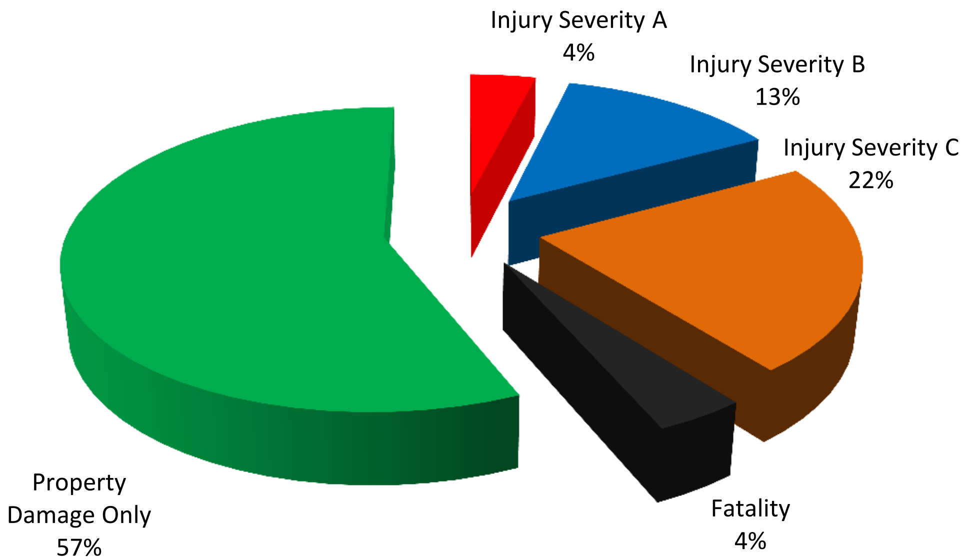


Figure 7.14 - Injury Severity Breakdown: Bad River

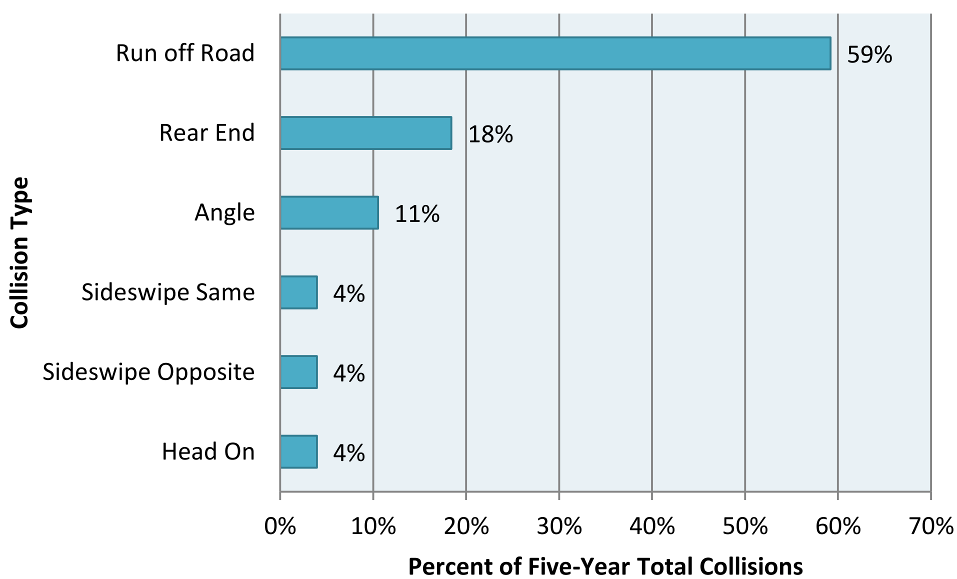
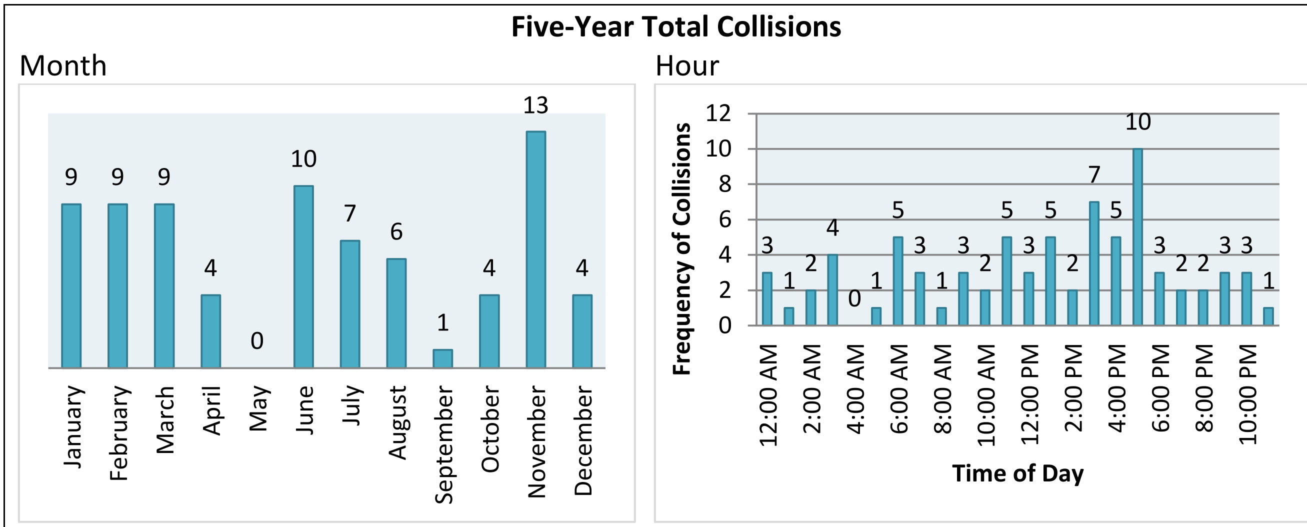


Figure 7.15 - Collision Type: Bad River

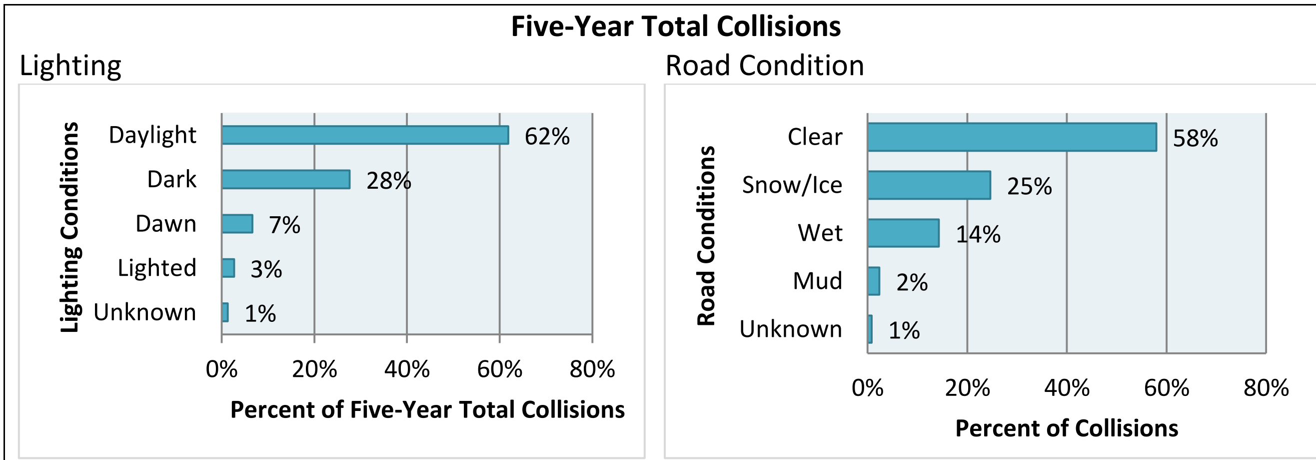
7.4.3 Temporal and Environmental Distributions

The monthly breakdown of crashes shows a trend in the winter months from November to March as well as in the summer months of June, July, and August. From year to year there was no trend, although 2004 had the least amount of crashes. There was a trend as to the day of the week considering 64 percent of the crashes occurred on Friday, Saturday, or Sunday. The hourly distribution shows no trend. The crashes are evenly distributed with the exception the greatest volume occurring during the 5:00 pm hour. Over one-third of crashes occurred when the road conditions were either snowy/icy or wet. Almost one-third of the crashes took place during dark roadway conditions. Although there was a trend with the road conditions, there was no trend in the monthly crash distribution. Temporal and environmental distributions are shown in Figure 7.16 and Figure 7.17.



- The monthly crash distribution shows a crash trend during the winter months between November and March and the summer months during June, July and August.
- There is no trend in the hourly data however; 3:00 pm and 5:00 pm had higher crash incidents than any other time period.

Figure 7.16 - Temporal Distribution: Bad River



- Almost one-third of collisions occurred during dark roadway conditions.
- Over one-third of collisions occurred during wet or snow/ice covered road conditions. These trends indicated that weather may be a contributing factor in collision frequency.

Figure 7.17 - Environmental Distribution: Bad River

7.4.4 Summary of Key Contributing Factors

The key factors that contributed to crashes occurring on the Bad River reservation included environmental elements, roadway conditions, roadway geometry, and alcohol. Environmental elements were a factor as the majority of crashes occurred during the winter months. In addition, roadway conditions can be attributed as well considering almost one-third of the crashes were classified as taking place on a roadway that was either snowy or icy. Roadway geometry is also a factor, for there were a substantial number of vehicles running off the road (59 percent) as well as 20 percent of crashes located in intersections. Among the 76 crashes there were 13 (17 percent) that had alcohol involved.

7.5 Red Cliff

7.5.1 Background

The Red Cliff reservation is located on the northern-most tip of the State of Wisconsin on Lake Superior, and totals 14,541 acres between tribal, fee, and individually allotted plots. The Red Cliff reservation is located in Bayfield County. Within the reservation, the town of Red Cliff is largest community center. Major collector and county roads provide the majority of the access into and around the reservation. State Highway 13 and County Highway K provide access to the Red Cliff Reservation.

Figure 29 - ATV usage on Blueberry Road, Red Cliff Reservation

Red Cliff also has a Tribal Police Agency that tends to crashes within the reservation boundaries, although if there are no available officers, the county officers will respond. The reporting format that Red Cliff uses is the MV400 paper form.

7.5.2 Crash Analysis

There were a total of 29 reported crashes that took place within the Red Cliff reservation; conversations during visits to the area indicated there may be crashes that were not included in the state database. Among the 29 crashes, there was one crash that resulted in a fatality. The crashes that obtained only property damage were 62 percent (injuries and the fatality combined for 37.9 percent of crashes); the fatal/injury rate was greater than the statewide rate of 29.7 percent. Figure 7.19 demonstrates the breakdown of injury severity levels. The majority of crashes were classified as a vehicle running off the road at 73 percent of all crashes. There were also crashes classified as sideswipe same, angle, sideswipe opposite, and rear end; comprising the remaining crashes. Figure 7.20 shows the breakdown of collision types. A GIS map of location and severity of traffic crashes for Red Cliff is included in Appendix B.

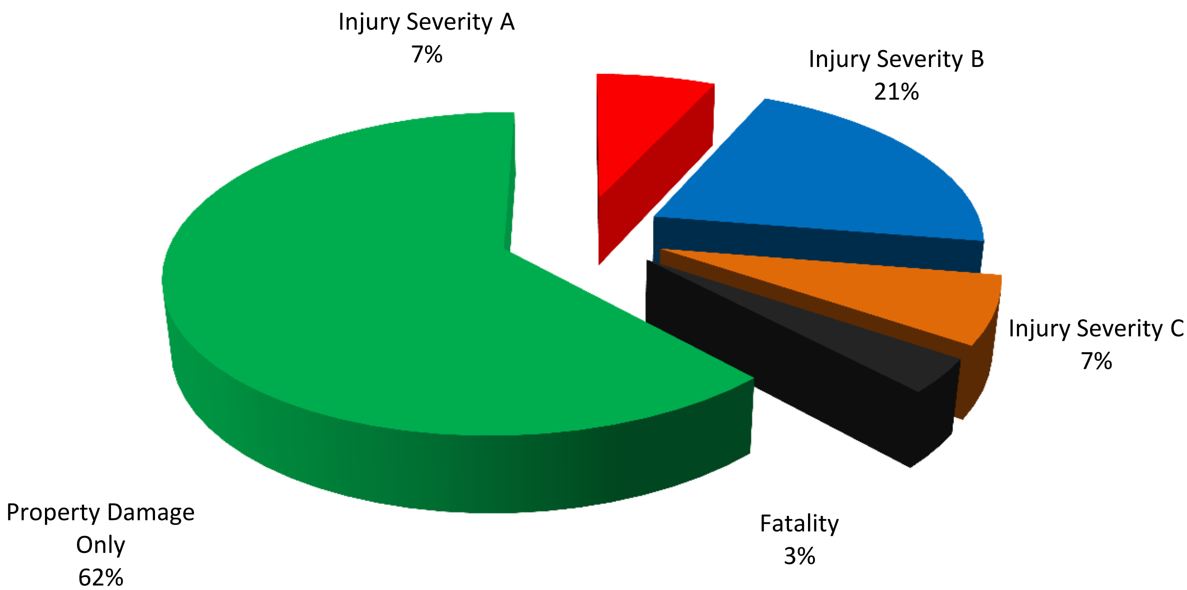


Figure 7.19 - Injury Severity Breakdown: Red Cliff

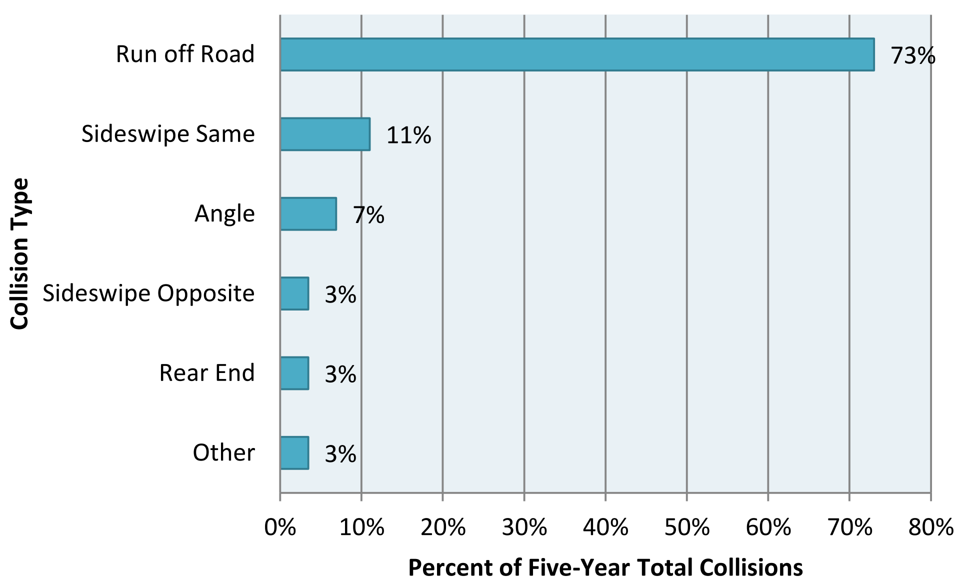
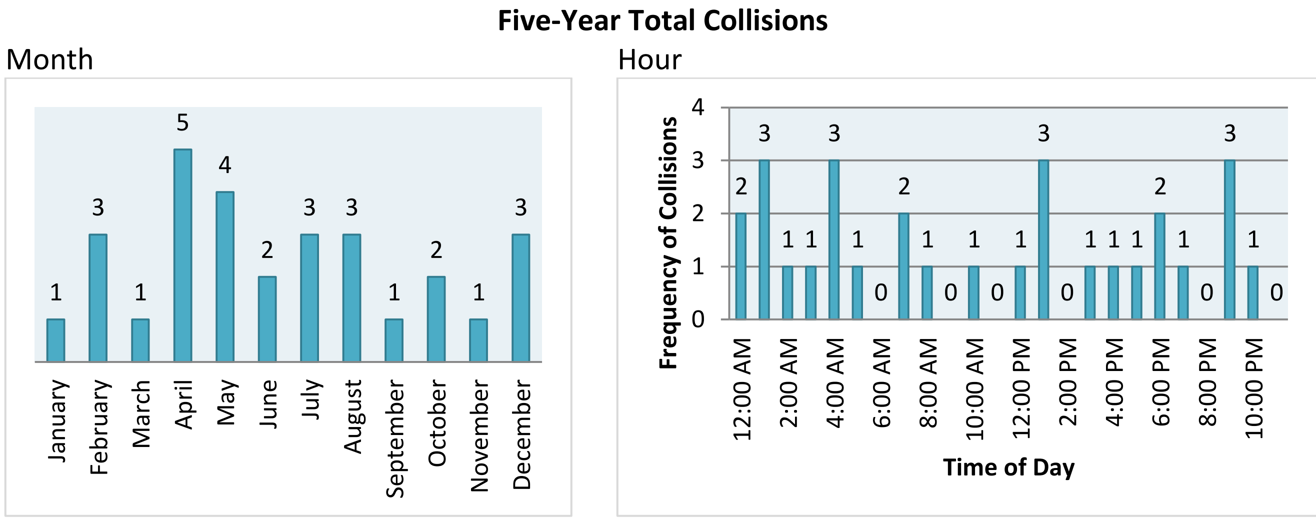


Figure 7.20 - Collision Type: Red Cliff

7.5.3 Temporal and Environmental Distributions

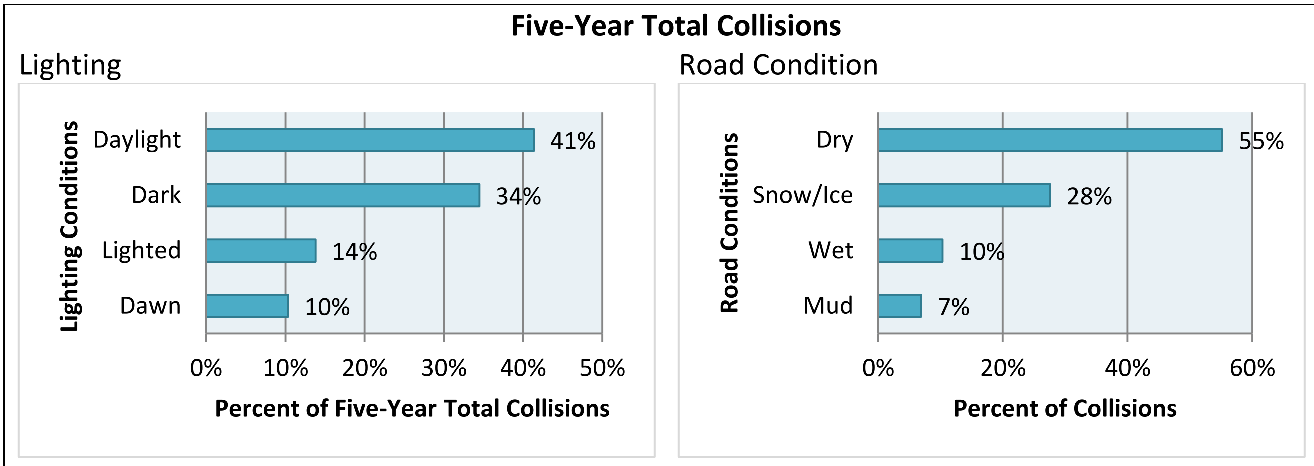
There were four hourly periods that had three crashes apiece which was the highest number of crashes per hour. These hours were 1:00 am, 4:00 am, 1:00 pm, and 9:00 pm. Over half of the 29 crashes in Red Cliff, took place on the days of Friday, Saturday and Sunday (55 percent). There was no trend for the monthly distribution however, the months of April and May had the highest amount of crashes totaling 31 percent. The yearly distribution showed a trend of decreasing crashes; during the years of 2004 through 2006 82 percent of the crashes took place. Years 2007 and 2008 compiled the remaining

18 percent. Just over one-third of the crashes occurred during dark roadway conditions. Also, 45 percent of the crashes took place when the roadway was snowy/icy, wet or muddy. This may suggest that the roadway conditions impacted the number of crashes occurring. The temporal and environmental distributions are shown in Figure 7.21 and Figure 7.22.



- The monthly crash distribution shows a crash trend during the spring months of April and May.
- There were four peak hours in the hourly distribution; 1:00 am, 4:00 am, 1:00 pm, and 9:00 pm.

Figure 7.21 - Temporal Distribution: Red Cliff



- One third of collisions occurred during dark roadway conditions.
- Almost one half of collisions occurred during wet, muddy, or snow/ice covered road conditions. These trends indicated that road conditions may be a contributing factor in collision frequency.

Figure 7.22 - Environmental Distribution: Red Cliff

7.5.4 Summary of Key Contributing Factors

The key contributing factors involving collisions on the Red Cliff reservation were roadway geometry, road condition, lighting condition, and alcohol. A vast majority of the crashes were classified as run off the road at 73 percent. Also noted was that 21 percent of the crashes occurred within an intersection. Although there was no trend in the monthly distribution of crashes, the roadway condition did appear to have an impact as 45 percent of crashes happened when the roadway did not have dry conditions. Lighting conditions of the roadway was also a factor as there were just over a third of the collisions occurring when it was dark. The last factor was alcohol, with 9 of the 29 crashes (31 percent) noted as having alcohol related in the crash.

7.6 St. Croix

7.6.1 Background

The 1,200 member tribe of the St. Croix Chippewa Indians resides mainly in northwestern Wisconsin in the communities of Big Sand Lake, Danbury, Round Lake, Maple Plain, Gaslyn, Bashaw, Clam Lake, and Balsam Lake (trust land is located in Barron, Burnett, and Polk Counties). This area is serviced mostly by US Highways 63, 53 and 8 and is approximately 30 minutes from the Minnesota state border.

St. Croix currently has a Tribal Police Agency that tends to crashes within the reservation boundaries, although if there are no available officers, the county officers will respond. The reporting format used for St. Croix is the Badger TracCS system (MV4000e electronic form); their police vehicles are equipped with laptops. Some tribal officers participate in an Memorandum of Understanding (MOU) with the Burness County Sheriff's Department and the Barron County Sheriff's Department.

7.6.2 Crash Analysis

There were a total of 36 crashes over the five year period in St. Croix. Figure 7.23 depicts the breakdown of injury severity levels for these 36 crashes. There were zero fatalities during this period and there were eight crashes involving an injury (22 percent), which is below the statewide injury average of 29.1 percent. The crashes were categorized in six different collision types; these were run off the road, rear end, angle, sideswipe opposite, head-on, sideswipe same. The majority of the crashes were classified as a vehicle running off the road, 53 percent were listed as this. Figure 7.24 displays the breakdown of collision types. A GIS map of location and severity of traffic crashes for St. Croix is included in Appendix B.

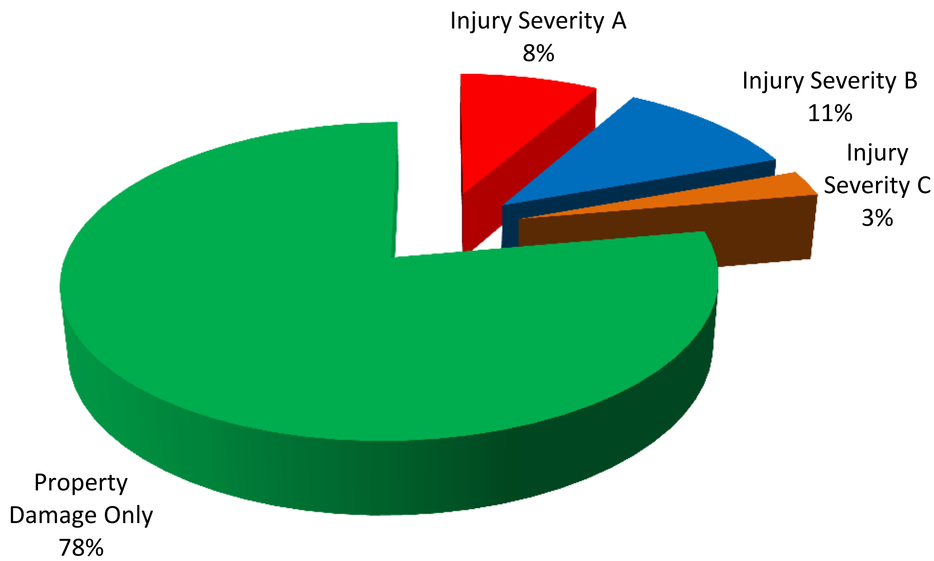


Figure 7.23 - Injury Severity Breakdown: St. Croix

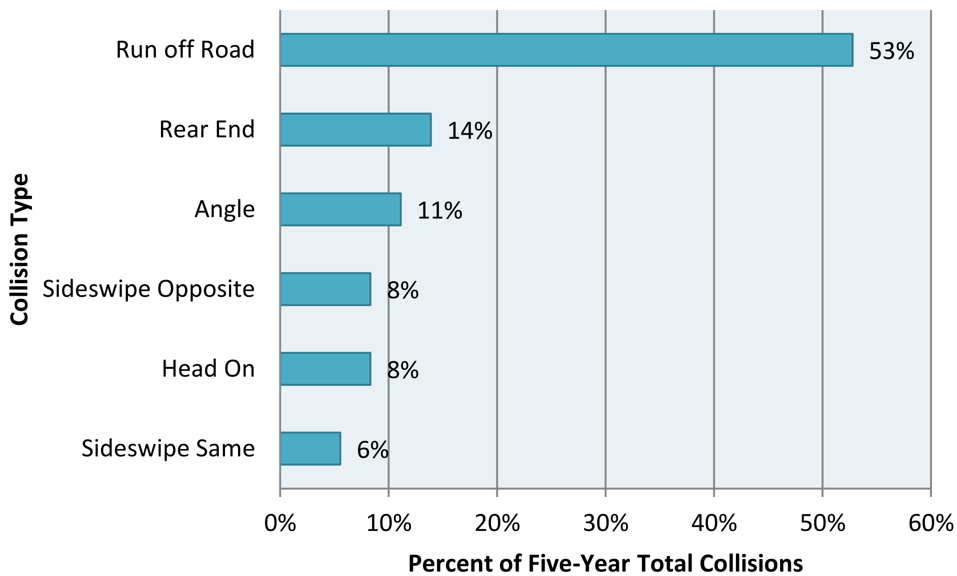
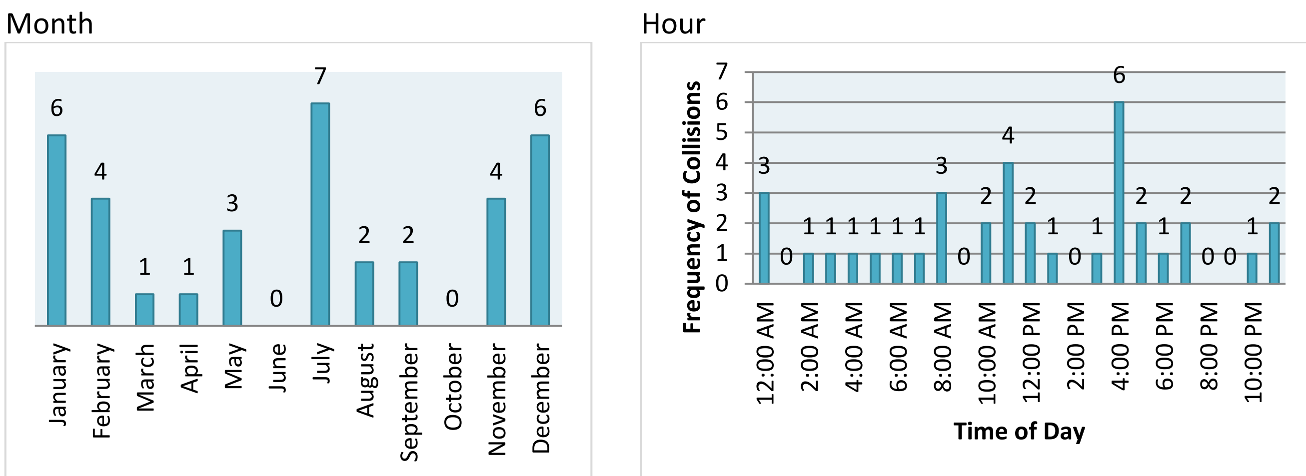


Figure 7.24 - Collision Type: St. Croix

7.6.3 Temporal and Environmental Distributions

The trend for the tribal reservations previously discussed has been that the majority of crashes occur during the nighttime hours. St. Croix does not have this trend, in fact, the trend is the opposite; the majority of crashes take place between 8:00 am and 4:00 pm. Half of the crashes occurred on Friday, Saturday or Sunday. Another high frequency day was Monday as it had 22 percent of the crashes. There was also a monthly trend as there was a high amount of crashes during the winter months from November to February. July had a significant amount of crashes as well. There was no yearly trend although 2008 had only one crash. Less than half of the collisions occurred while the road condition was dry. This trend might lead to the road condition being a factor for these collisions. The reporting furthermore shows that one-third of the crashes occurred when the weather condition was either snowing or raining. Temporal and environmental distributions are shown in Figure 7.25 and Figure 7.26.

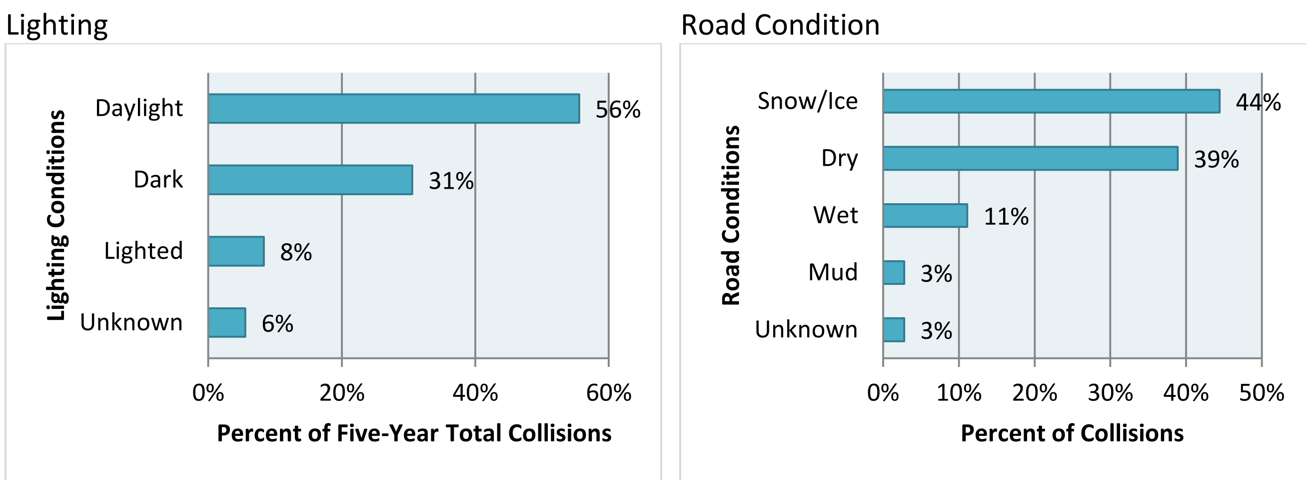
Five-Year Total Collisions



- The monthly crash distribution shows a crash trend during the winter months between November and February and the month of July.
- The majority of crashes occurred during daytime hours, between 8:00 am and 4:00 pm.

Figure 7.25 - Temporal Distribution: St. Croix

Five-Year Total Collisions



- Just under one-third of collisions occurred during dark roadway conditions.
- Over half of collisions occurred during wet, muddy, or snow/ice covered road conditions. These trends indicated that weather may be a contributing factor in collision frequency.

Figure 7.26 - Environmental Distribution: St. Croix

7.6.4 Summary of Key Contributing Factors

The key contributing factors for St. Croix crashes were environmental elements, roadway conditions, lighting condition, roadway geometry, and alcohol. Over half of the crashes take place during the wintertime months (November through February). Considering the environmental elements, this led to roadway conditions becoming a contributing factor as well. The majority of crashes actually occurred when the condition of the roadway was not ideal (i.e., wet, muddy, snow or ice), which is the first reservation that had this outcome. Roadway geometry was a key contributor due to the fact that over half of the crashes were vehicles running off the roadway; as well as one-third of crashes were located within intersections. Alcohol was deemed to be a factor also given that 14 percent of the crashes were related to alcohol.

7.7 Ho-Chunk

7.7.1 Background

This tribe headquartered in Black River Falls, Wisconsin, was formerly known as the Wisconsin Winnebago Tribe; they subsequently changed their name to the Ho-Chunk Nation. As of May 23, 2011, there were 5,042 tribal members living in Wisconsin and an additional 2,150 living elsewhere. The tribe has 3,535 acres of trust land in parts of 14 counties (Adams, Clark, Crawford, Dane, Eau Claire, Jackson, Juneau, La Crosse, Marathon, Monroe, Sauk, Shawano, Vernon, and Wood) in Wisconsin and also in the State of Illinois; and additional 5,328 acres are fee simple.

Ho-Chunk communities rely solely on the counties they reside in to tend to crashes occuring in their jurisdiction, predominently because of the fact that their land is not in one concentrated or contiguous area; the Ho-Chunk Nation Police Department was incorporated in 2010 after the first two phases of this report. As their land was spread out between multiple counties, not all locations were interviewed; thus, all information is not known for the overall formatting of the crash reports. Crash information was provided from the state database.

7.7.2 Crash Analysis

For the five year period analyzed there were a total of 59 crashes that occurred within the Ho-Chunk community jurisdiction. Of these 59 crashes, 69 percent consisted as reporting property damage only while the remaining 31.0 percent of the crashes were reported as having an injury, slightly above the statewide rate of 29.1 percent. There were zero fatalities reported during this period of time. Figure 7.27 depicts the injury severity breakdown. There were seven types of collisions that were classified in the reports, which were run off road, rear end, angle, sideswipe-same, sideswipe-opposite, head-on, and unknown. The majority of the crashes were considered to be in the run-off-the-road category coming in at 61 percent of all crashes. The angle crash also had a significantly high percentage at 15.

Figure 7.28 shows the breakdown of the collision types. A GIS map of location and severity of traffic crashes is included in Appendix B.

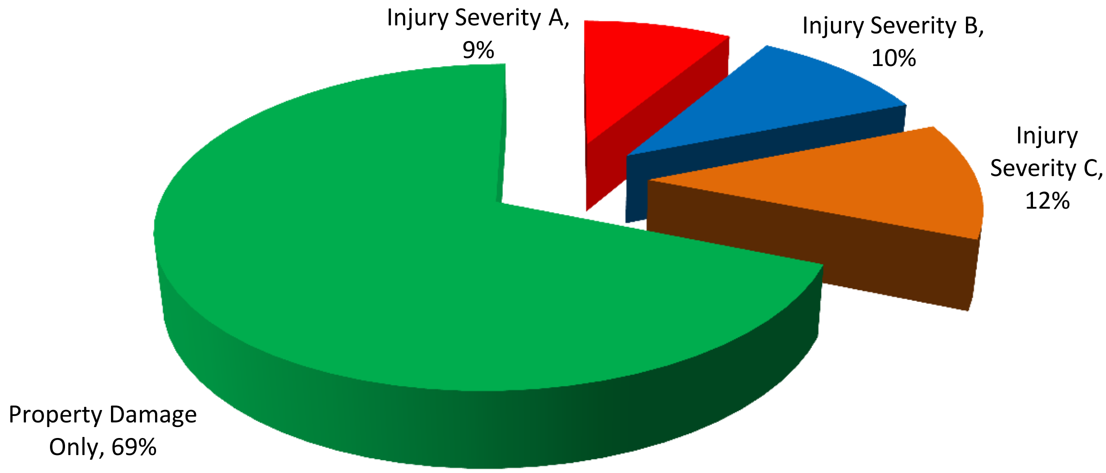


Figure 7.27 - Injury Severity Breakdown: Ho-Chunk

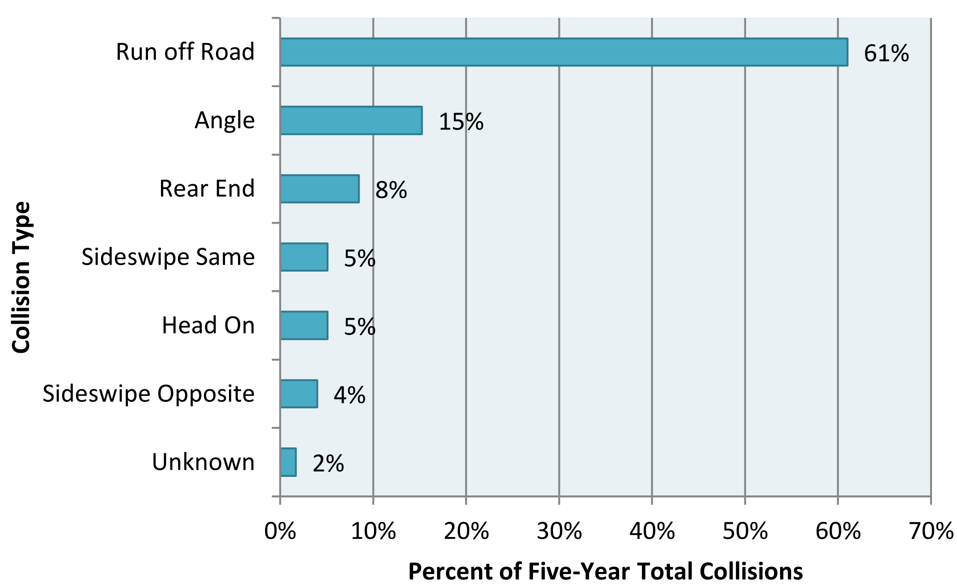
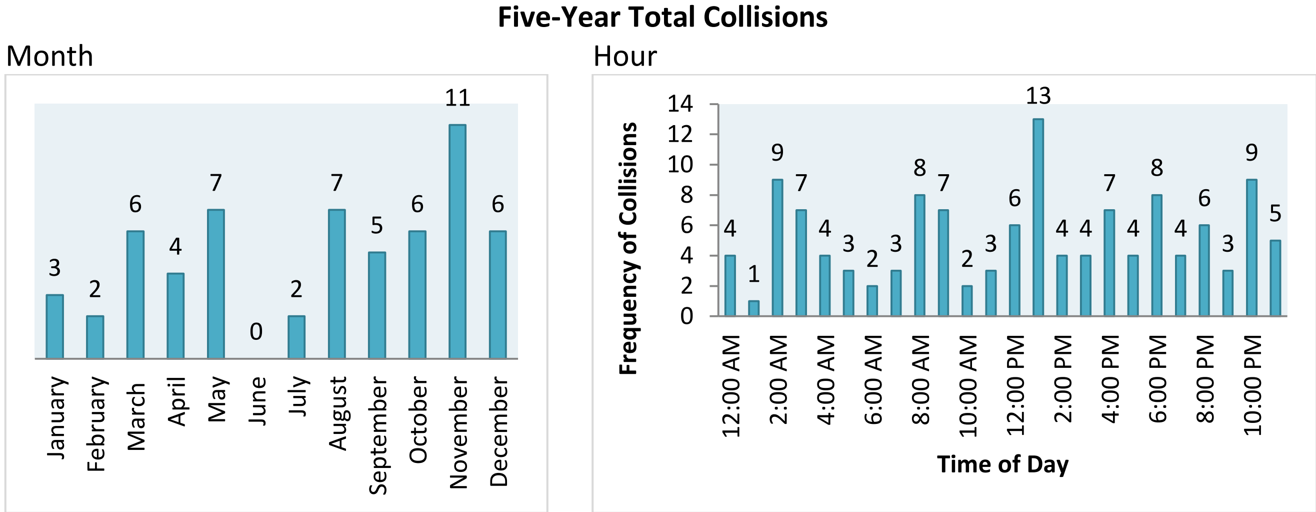


Figure 7.28 - Collision Type: Ho-Chunk

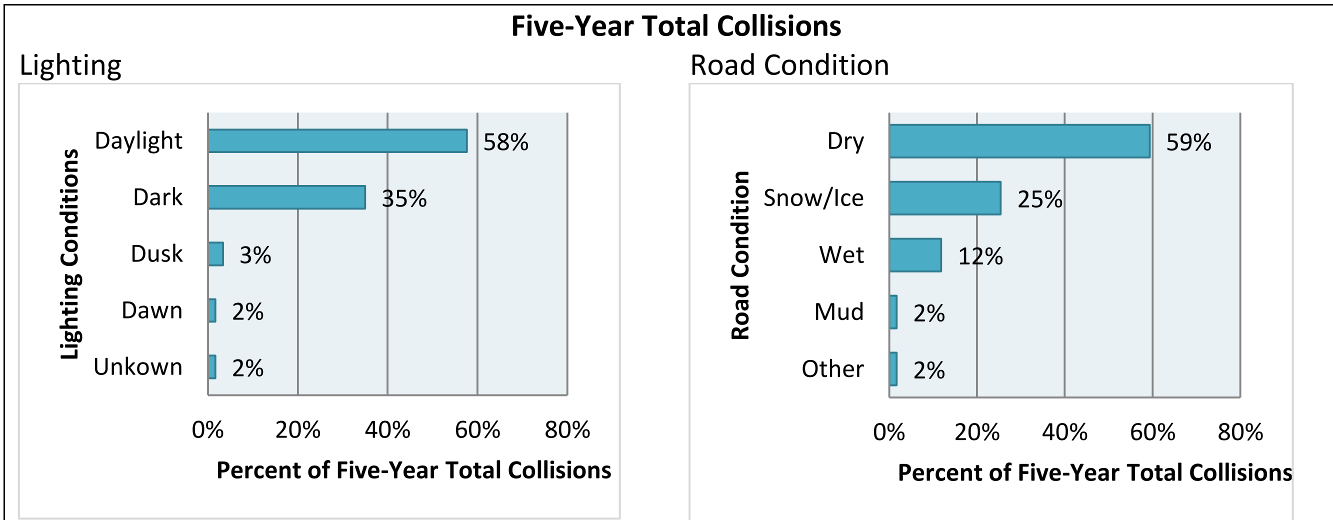
7.7.3 Temporal and Environmental Distributions

The distribution of the crashes by hour seemed to show no trend as there were five hours with a higher number of crashes but was generally evenly distributed throughout the entire day. The highest peak hour for crashes was 4:00 pm. Crashes tended to occur towards the weekend, with over half (56 percent) of the crashes having taken place on Friday, Saturday, or Sunday. The monthly distribution shows no significant trend. There are four months that have low crash frequencies; January, February, June, and July while November has the highest frequency. The yearly distribution demonstrated no trend as well. One-third of the crashes took place during the nighttime hours, as displayed in the lighting conditions graph. There were 39 percent of the collisions that took place when the condition of the roadway was not ideal. Temporal and environmental distributions are shown in Figure 7.29 and Figure 7.30.



- The monthly crash distribution does not show a crash trend, although the months of January, February, June, and July had the fewest number of crashes.
- The hours that had the highest amount of crashes were 12:00 am, 7:00 am, 12:00 pm, 4:00 pm and 8:00 pm. This shows no significant trend.

Figure 7.29 - Temporal Distribution: Ho-Chunk



- Over one-third of collisions occurred during nighttime hours.
- Over one-third of collisions occurred during wet or snow/ice covered road conditions. These trends indicate that weather may be a contributing factor in collision frequency.

Figure 7.30 - Environmental Distribution: Ho-Chunk

7.7.4 Summary of Key Contributing Factors

The factors that contributed to the crashes that took place in Ho-Chunk comunities are roadway geometry and design, roadway conditions, lighting conditions, and alcohol. Over half of the crashes occurring in Ho-Chunk communities were vehicles that ran off the roadway, which take account into the roadway geometry. Another aspect showing that roadway geometry was a factor is that almost one quarter of the crashes occurred at intersections. Although there was no trending as to the time of year crashes took place, the roadway conditions did indeed produce a trend; 39 percent of crashes occurred when conditions were adverse. Alcohol was the last contributing factor to the crashes in Ho-Chunk communities, with 15 percent of all crashes listed as having alcohol as a component.

8.0 Next Steps from Data Analysis

It is suggested that WisDOT and the eleven Wisconsin tribes use this data for the following purposes listed below:

- As background information for safety related funding applications.

  This may include Highway Safety Improvement Program (HSIP), High Risk Rural Roads (HRRR), Safe Routes to School, and Section 402 from both WisDOT and the BIA.

- Identify sites with disproportionately high numbers of traffic crashes or trends.

  It is suggested that Road Safety Audits (RSA) and Road Safety Plans continue to be developed to identify safety issues and countermeasures.

- Using the information to develop targeted public information and education campaigns to address areas with high crashes, such as the risks of speeding or driving under the influence.

  In 2011, WisDOT signed an Inter-governmental Agreement (IGA) with Lac Courte Oreilles Tribe to produce culturally tailored transportation safety education materials and increase safety awareness within Wisconsin Native American communities.

- Based on the locations exhibiting greater concerns (numbers of crashes, severe injuries or fatalities), develop engineering plans to address infrastructure improvements.

  In 2011, Oneida Total Integrated Enterprises (OTIE) was contracted to prepare a transportation system management plan for the WIS 47 and WIS 55 corridors on the Menominee Reservation in Menominee and Shawano Counties; it involved reviewing the existing Road Safety Audit, conducting additional safety and geometric design analysis, identifying deficiencies and needs, and summarizing all of the information in an existing conditions report.

8.1 Funding Improvements

The Indian Reservation Roads Program mission is to provide safe and adequate transportation and public road access to and within Indian reservations in the Great Plains Region, Indian lands and communities for Native Americans, visitors, recreationists, resource uses and others while contributing to economic development, self-determination, and employment of Native Americans.

The IRR is part of the Federal-Aid Highway Program and is funded from the Highway Trust Fund. It is Authorized under the Federal Lands Highway Program, 23 United States Code (USC) 204. Use of IRR Program funds is defined in 23 USC. This program is jointly administered by the BIA and the Federal Highway Administration. Tribal communities prepare a Transportation Improvement Program (TIP), a

5-year plan for improvements on each reservation. The TIP is then submitted to the BIA Division of Transportation (BIADOT) for review and approval. BIADOT reviews, approves, and forwards the TIP to FHWA Federal Lands Highway Office (FLHO) for approval. Once the TIP is approved by the FHWA, there are projects that costs can be charged to. All projects using BIA funding have to be on the approved TIP.

Each State must develop the State Transportation Improvement Program (STIP) in consultation with tribes and BIA in those areas under Indian tribal jurisdiction. This includes providing for a fully coordinated transportation planning process that coordinates transportation planning efforts carried out by the State with transportation planning efforts carried out by tribes. The statewide and metropolitan planning organization requirements are in 23 USC 134 and 135. Regulations can be found at 23 CFR part 450.

There is a variety of Federal funding available for a tribe's highway safety activities. These currently include:

- The Tribes' IRR Program allocations under 23 U.S.C. 204;
- Highway Safety Program funds under 23 U.S.C. 402;
- Occupant protection program funds under 23 U.S.C. 405;
- Alcohol traffic safety program funds under 23 U.S.C. 408;
- Traffic safety information system improvement grants under 23 U.S.C. 408;
- Alcohol-impaired driver countermeasures under 23 U.S.C. 410;
- Funding for highway safety activities from the U.S. Department of Health and Human Services (HHS);
- Indian Highway Safety Program 25 CFR 181; and
- Other funding that Congress may authorize and appropriate.

Safety projects eligible for IRR funding could include:

- Highway alignment improvement;
- Bridge widening;
- Pedestrian paths/sidewalks and bus shelters;
- Installation and replacement of signs when designated as, or made part of, a highway safety project;
- Construction improvements that enhance and promote safe travel on IRRs, such as guardrail construction and traffic markings;
- Development of a safety management system;
- Education and outreach highway safety programs, such as use of child safety seats, defensive driving, and Mothers Against Drunk Drivers;

- Development of a highway safety plan designed to reduce traffic accidents and deaths, injuries, and property damage;
- Collecting data on traffic-related deaths, injuries and accidents;
- Impaired driver initiatives;
- Child safety seat programs; and
- Purchasing necessary specific traffic enforcement equipment, such as radar equipment, breath-alyzer, or video cameras.

The State and Community Highway Safety Formula Grant Program (Section 402) was developed to provide funding to implement initiatives targeted at improving safety. Section 402 funds are typically used to fund safety projects related to enforcement, education, and EMS, and can be used for a variety of safety initiatives including conducting data analyses, developing safety education programs, and conducting community-wide pedestrian safety campaigns. These funds are administered by each state's department of transportation or highway safety office; additional information is available at http://safety.fhwa.dot.gov/policy/section402/ (August, 2011).

The Section 408 State Traffic Safety Information System Improvement Grant program is administered by NHTSA and encourages states to improve the timeliness, accuracy, completeness, uniformity, integration and accessibility of their state safety information; encourages linkage of data systems; and improves the compatibility of state and national data.

Federal funds within the Highway Safety Improvement Program (HSIP) may be used to implement the infrastructure based improvements identified within a safety plan. HSIP funding is administered by each state's department of transportation. In most states there is an application process required to secure funding to make improvements or fund various safety initiatives. This funding is intended to assist agencies in implementing safety improvements to their transportation system. More information about HSIP can be found on the FHWA and WisDOT websites:

- http://safety.fhwa.dot.gov/hsip/ (August, 2011); and
- http://www.dot.wisconsin.gov/localgov/highways/hsip.htm (August, 2011).

Other local, state, federal, and private funding sources may be available for safety projects. Contacting the state's department of transportation or other county and local transportation entities may help identify other funding opportunities.

The Wisconsin Local Roads Improvement Program[31] (LRIP) was established in 1991 and assists local governments in improving seriously deteriorating county highways, town roads, and city and village

[31] Local Roads Improvement Program, http://www.dot.wisconsin.gov/localgov/highways/lrip.htm

streets. LRIP is a reimbursement program, which pays up to 50% of total eligible costs with local governments providing the balance.

Wisconsin has nine Regional Planning Commissions (RPCs). All but five counties in the state (Columbia, Dodge, Jefferson, Rock, Sauk) are served by an RPC. WisDOT works closely with RPCs to ensure a comprehensive, coordinated approach to local, regional and state issues affecting transportation planning.

In Wisconsin, RPCs are formed by executive order of the governor and provide intergovernmental planning and coordination for the physical, social and economic development of a region. A board, typically appointed by county boards and the governor, directs commission activities[32].

One example is the Northwest Regional Planning Commission (NWRPC), created in 1959 by local units of government of Northwest Wisconsin. It is the oldest planning commission in Wisconsin and one of the first multi-county planning commissions in the nation. The Commission is a cooperative venture of Ashland, Bayfield, Burnett, Douglas, Iron, Price, Rusk, Sawyer, Taylor, and Washburn Counties and the tribal nations of Bad River, Red Cliff, Lac du Flambeau, Lac Courte Oreilles, and St. Croix[33]. The NWRPC covers five of the eleven tribes in Wisconsin.

The FY 2011 BIA Highway Safety Plan included $265,000 for the Menominee Tribe to reduce the number of motor vehicle crash injuries and fatalities attributed to Operating Under the Influence and moving violations on the Menominee Reservation. Specific performance measures for gauging the effectiveness of the goal included reducing the number of alcohol-related motor vehicle crashes by 18% from the FY09 number of 47 to 39 by the end of 2011; and, to reduce the number of motor vehicle crashes by 20% from the FY09 number of 268 to 214 by the end of 2011[34].

A similar goal aimed at decreasing the number of injuries and fatalities attributed to motor vehicle crashes on the Lac Courte Oreilles Reservation included $100,000. Performance measures for LCO were to maintain the number of motor vehicle fatalities at 0 through the end of FY11, and to reduce motor vehicle crashes by 20% from the FY09 number of 25 to 20 by the end of FY 2011[35].

[32] http://www.dot.wisconsin.gov/projects/planorg/rpc.htm
[33] Northwest Regional Planning Commission, http://www.nwrpc.com
[34] BIA Highway Safety Plan, 2011, p57. http://www.nhtsa.gov/nhtsa/whatsup/safeteaweb/FY11/FY11HSPs/BIA_FY11HSP.pdf
[35] *Ibid.*, p64.

9.0 Road Safety Audits and Plans

Road Safety Audits (RSA) and Road Safety Plans both help interpret safety concerns and recommendations by evaluating the crash history and investigating local conditions. Part of the ongoing commitment to Tribal road safety included conducting audits and developing plans for some of the tribes within Wisconsin. Copies of these plans are available by contacting Tribal Affairs at WisDOT.

Working with tribal communities is not always analogous to working with other rural communities. There are important cultural differences which may have led to miscommunications. Tribes are not merely geographic distinctions but sovereign governments, and tribal leaders should be accorded respect on par with their positions as heads of nations.

Face-to-face meetings hold a much greater value than impersonal electronic communications, and teams working within tribal communities should be prepared to modify their approach to working with stakeholders rather than expecting the stakeholders to bend to their preconceptions. One of the difficulties in coordinating the RSAs and Road Safety Plans was meeting with stake-holders. Emails or phone calls aimed at setting up meetings or visits would often go unanswered, and when finally coordinated, there would be few stakeholders in attendance who could help facilitate the process.

Formal introductions and solid relationships are key in gaining trust and building community rapport, and future endeavors will have to be mindful of these points when working with Wisconsin's Tribes. The long-term positive relationships between the WisDOT Tribal Liaisons and the tribes were often the key to cooperation. For this initiative to continue to be successful, it needs to leverage those relationships.

9.1 Road Safety Audits

Road Safety Audits have been conducted for the following tribes:

- Bad River Band of Band of Lake Superior Chippewa
- Lac Courte Oreilles Band of Lake Superior Chippewa
- Lac du Flambeau Band of Lake Superior Chippewa
- Menominee Nation
- Red Cliff Band of Band of Lake Superior Chippewa
- Sokaogon Chippewa of Mole Lake

This process kicked off in 2008 with an RSA conducted for the Sokaogon Chippewa of Mole Lake. An RSA is a formal safety performance of an existing or future road or intersection by an independent and multi-disciplinary team[36]. This RSA was based off a set of pilot tribal RSA's completed by the Federal Highway Administration (FHWA). The team that facilitated the RSA was involved in preparing several of the FHWA case studies. Following the success of the Mole Lake RSA, similar RSA's were completed with the Menominee Nation (2009), Lac du Flambeau (2009), Red Cliff (2009), Lac Courte Oreilles (2010), and Bad River (2011).

What is the difference between RSA and a Traditional Safety Review?

Table 9.1 - RSA vs. Traditional Safety Review[37]

Road Safety Audit	Traditional Safety Review
Performed by a team independent of the project	The safety review team is usually not completely independent of the design team.
Performed by a multi-disciplinary team	Typically performed by a team with only design and/or safety expertise.
Considers all potential road users	Often concentrates on motorized traffic.
Accounting for road user capabilities and limitations is an essential element of an RSA	Safety Reviews do not normally consider human factor issues.
Always generates a formal RSA report	Often does not generate a formal report.
A formal response report is an essential element of an RSA	Often does not generate a formal response report.

Each RSA included a comprehensive review of roadways within each reservation. Crash data, and a review of the reservation's crash history, was an integral part of targeting locations for each RSA. Geometric, operational, road user and environmental issues were identified and documented during each RSA. The process also included a comprehensive stakeholder consultation process with representatives of the:

- Tribe
- WisDOT (Region and Central Office);
- Local governments (counties, towns, cities, etc.);
- Law Enforcement (tribal and Sheriff);
- BIA
- Others (University of Wisconsin Extension, Lac Courte Oreilles Community College, School District, etc.)

9.2 Road Safety Plans

The Wisconsin Department of Transportation (WisDOT) Tribal Task Force commissioned a Consultant to create a multi-faceted Tribal Highway Safety Plan for tribes within the state. These plans are a re-

[36] FHWA. Road Safety Audits. http://safety.fhwa.dot.gov/rsa/
[37] *Ibid.*

flection of WisDOT's commitment to road safety and maps out a unified strategy to address the important issue of highway safety on Tribal lands. The Tribal Highway Safety Plans envision cooperation by various agencies including WisDOT, counties, and other departments which have the authority and responsibility to build and maintain a safe road system. Some challenges associated with implementing the Plans may include being able to provide sustainable funding and developing partnerships with organizations that can assist with the education and enforcement aspects of the Plan. Recommendations provided in the Tribal Road Safety Plans focus on proven safety strategies.

These documents should be considered "living documents" that will be updated over time. Persons who were not directly involved in the development of the Tribal Highway Safety Plans will need to understand how they were developed and the concerns they address. The included sections clearly lay out the data used to develop the plans and the processes used to determine the focus areas. The Plans will also reference other documents that may prove useful in implementing the safety strategies.

These plans were designed to complement the strategies within the Wisconsin Strategic Highway Safety Plan (WisDOT), which offers strategies to address many of the areas targeted in the Statewide Plan. The plans were also designed to be compatible with the Zero In Wisconsin safety initiative to reduce the number of traffic deaths annually in Wisconsin[38].

Road Safety Plans have been completed for the following tribes:

- Sokaogon Chippewa of Mole Lake
- Menominee Nation
- Lac du Flambeau Band of Lake Superior Chippewa
- Lac Courte Oreilles Band of Lake Superior Chippewa
- Red Cliff Band of Band of Lake Superior Chippewa

9.3 Outcomes and Success Stories

When the objectives of the RSA (and Road Safety Plan) process were embraced by the community, notable achievements were recognized:

- In Mole Lake, one of the issues identified in the Road Safety Plan was a significant pedestrian safety issue on a section of WIS 55 where it crosses the Swamp Creek. As a result of the Road Safety Plan and an RSA which was also conducted, Mole Lake was able to get ARRA funding to build a non-motorized bridge parallel to WIS 55 over the Swamp Creek. In addition, sidewalk and marked pedestrian crossings were installed throughout the reservation. WisDOT and the tribe have also been in discussions about installing gateway treatments at the two entrances to

[38] Zero In Wisconsin, http://www.zeroinwisconsin.gov/index.html

the reservation on WIS 55. The process was championed by Pete McGeshick, who was the tribal planner and also on the tribal council.

- In Lac du Flambeau, safety concerns noted in the RSA process were incorporated into the STH-47 construction plans, including extending the sidewalk network, upgrading other non-motorized facilities, object protection and guardrail, and improving signs.

- STH 13 through Red Cliff was reconstructed in 2010, and incorporated improvements recommended in the 2009 RSA. These improvements included new pavement, a new sidewalk separated from the highway by a buffer strip, installation of right- and left-turn lanes, and continuous lighting. Access management at Pike Road and the Casino entrance were also enhanced.

STH 13 Upgrades: Opus

Figure 9.1 - STH 13 upgrades through Red Cliff

- Through the Menominee Nation, STH 55 and 47 was improved with a safety edge based on recommendations from the RSA; it was selected as a pilot location by WisDOT based on the high number of lane departure crashes.

- The Ho-Chunk Nation launched a culturally tailored motor vehicle injury prevention program (MVIPP) to improve safety and reduce injuries and deaths among tribal members. This award-winning program addressed these issues by working closely with local county police departments and providing special training for police officers. The MVIPP also conducted a media campaign and held community education events. The program and police worked together to conduct child safety seat clinics and perform safety seat checks. After the program was implemented, driver and passenger seat belt use and the use of child safety seats increased substantially[39].

[39] “Ho-Chunk Nation Launches Road Safety Program”, National Center for Injury Prevention and Control. http://www.cdc.gov/injury/pdfs/ss/Wisconsin_mvs-a.pdf

10.0 Human Factors

There are certain aspects when driving that one cannot accommodate for, generally described as the human factor. A 2009 study by NHTSA found that there were 6 major factors included in a single motor vehicle crash. These factors include: sleepy, inattentive, overcorrecting of the vehicle, avoiding an object, distractions inside the vehicle, and other driver performance related factors (mentally challenged, following improperly, failure to signal intensions, etc.).[40]

The statistics show that the percentages of sleepy (91.2%), inattentive (75.4%), over correction of the vehicle (85.6%), and crash avoiding (79.8%) drivers involved in fatal single-vehicle run-off-road (ROR) crashes are significantly greater ($p < 0.0001$) than the drivers with 'Other driver performance-related factors' that account for 67 percent of ROR crashes." This shows that the resulting numbers prove that these factors are the greatest contributing driver related run-off-road crashes.[41]

The crash data provided by WisDOT does not include information about sleepy, inattentive, over correction, nor crash avoidance.

10.1 Alcohol

Alcohol (and drug use) is a major concern within tribal communities; 20 percent of the reviewed crashes involved alcohol (compared to 7% of crashes statewide[42]). Nationally, there are many tribes that have instilled programs educating and using intervention tactics to minimize the substance abuse concern. For instance, the Southern Ute Tribe in southwestern Colorado has DUI checkpoints throughout their jurisdiction and uses the legal limit of 0.08 BAC. The Saint Regis Mohawk Tribe of New York has a drug and alcohol rehabilitation center that people throughout the state of New York go to. These are key examples of tribes becoming more aware of the issues of alcohol abuse and trying to address a solution.[43]

There were two categories for this report; sober and alcohol involved where the BAC ≥ .01. When alcohol is a factor 86.5% of fatal crashes were categorized as run off road where as 58.3% of sober drivers were noted as a run off the road crash. These statistics provide a logical assumption that when alcohol is involved there is a higher probability that a vehicle will run off the road.

[40] Factors Related to Fatal Single-Vehicle Run-Off-Road Crashes US-DOT, NHTSA, November 2009
[41] *Ibid.*
[42] http://www.dot.wisconsin.gov/safety/motorist/crashfacts/docs/alcohol-intro.pdf
[43] NCHRP Synthesis 366: Tribal Transportation Programs, 2007

The White Earth Indian Reservation surrounding Mahnomen County, Minnesota, has a population of 5,044. Mahnomen County in Minnesota is a rural area that has a recorded high rate of crashes with alcohol being a factor as well as low usage of safety belts and child restraints. The White Earth Indian Reservation paired with the county government in order to educate drivers as well as work together to improve the safety of the residents; calling the effort a Cooperative Law Enforcement Agreement in 1999. The objectives were to:

- Establish a process by which county officials and the White Earth Band can work together cooperatively to enhance public safety on the White Earth Reservation;
- Provide the ability for county deputies to process violations of Tribal regulatory offenses in the Tribal Court; and
- Enable Tribal officers to enforce state criminal violations in the State Court.

In order to achieve these goals and objectives there were strategies used such as the tribal police and county officers teaming up to have double the law enforcement available within the jurisdiction; which in turn increased the probability of violators to be apprehended.

The results of the Mahnomen County Cooperative Law Enforcement Agreement showed an increase in safety belt use across the county and there was a significant increase of arrests for motorists driving while under the influence of alcohol. Since the objectives were all met, this agreement has been extending to more tribes across the state of Minnesota.[44]

- A similar agreement between law enforcement and Wisconsin Tribes could help reduce traffic crashes involving alcohol.

The inter-governmental agreement with Lac Courte Oreilles has led to the development of culturally tailored transportation safety education materials aimed at increasing safety awareness within Wisconsin Native American communities. A youth public service announcement and other educational materials focused on the dangers of impaired driving, including online videos, posters, and other marketing, were developed by Lac Courte Oreilles Ojibwa Community College (LCOOCC) and the College of Menominee Nation’s National Summer Transportation Institute.

[44] Minnesota Mahnomen County Cooperative Law Enforcement Agreement

11.0 Conclusions and Recommendations

- The crash reporting process is not deficient in the eyes of the parties involved.

  In general, the crash reporting process seems to be working well based on conversations with involved parties, and does not appear to be significantly different from other rural areas in Wisconsin.

- Technology and training should be provided to Tribal law enforcement agencies at the same rate as non-tribal agencies.

  As equipment and technology are improved, a system of geocoding the location of crashes will help ensure accurate plotting of crashes, which could help improve identification of high-crash locations and trends. Additionally, the move from paper to electronic reporting may help reduce errors in transcribing records and speed the process of crash data being added to the state database, as part of the goal of Wisconsin having fully-electronic crash reporting by 2014.

- Native Americans are fatally injured at a rate far above their relative population.

  In 2009, Native Americans represented 2.67 percent of the state's vehicular fatalities while only comprising 0.86 percent of the population; the following recommendations should be implemented to reverse this trend.

- Road Safety Audits (RSA) and Road Safety Plans should be performed in the tribal areas of Wisconsin that have not been previously investigated.

  As shown in Section 9.3, Road Safety Audits and Plans have identified strategies that when implemented, directly led to significant improvements in safety.

- The policy of reducing run-off-road and lane departure crashes, by installing measures aimed at keeping vehicles in their lane, should be rigorously enforced as included in the state's Highway Safety Plan (SHSP) to reduce the number of crashes affecting tribal areas.

  Review of the crash data as part of the second phase of this process, along with the additional reviews conducted as part of the Road Safety Audits and Road Safety Plans indicated that run-off-road crashes occurred in tribal areas at more than three times the state average (63 percent vs. 18 percent). Strategies that aim to reduce these lane departure crashes, such as upgrading edgelines, improving signage, and installing rumblestrips and -stripes could significantly reduce these crashes. Potential funding sources for these improvements are listed in Section 8.1.

- Continued education, such as the WisDOT Statewide Tribal Safety Education Campaign Project should be continued as a way of instilling better behaviors in younger drivers.

  Alcohol-related crashes are three times higher in tribal crashes than the state-wide average. Close coordination between the Tribes and law enforcement could help reduce alcohol-related crashes, such as the culturally-tailored programs developed by Lac Court Oreilles Community College and the Ho-Chunk Nation Division of Health.

Appendix A – Questionnaire

Crash Data Questionnaire

1) Who has police jurisdiction over tribal lands?

2) When a crash happens on tribal land, what agency responds to the crash?

3) Which agency gets dispatched to the crash?

4) What happens when the person involved in the crash is a tribal member? Non-member?

5) What do you in case of deer crashes?

6) Is there a minimum crash reporting threshold?

7) How is crash location determined?

8) Who is responsible for reporting the crash, filling out crash report?

9) What form of crash report does the reporting agency use? Electronic? Manual?

    a. If electronic, which software is used? Is it compatible with WisDOT software? Is it compatible with the MV4000 reporting processes?

        i. Is the report completely filled out or are some parts left out?

        ii. Does the officer have a laptop in car or is report completed later?

    b. If manual, what reports are used? MV4000?

10) How is the data processed? What is the chain of events from the time of a crash to when the data is submitted?

11) Is the data submitted to a higher agency? County, State, etc.?

12) Is there an agreement in place between agencies for crash data reporting?

13) What is the information sharing relationship with DOT?

14) After the crash data report is submitted, does the reporting agency ever see the data again?

15) Does your agency plot the crashes to keep track of the data?

16) Do you work with County, DOT, etc. to evaluate problem areas? How do you ID the areas?

17) What issues/barriers do you see in the crash data reporting process? Training Issues? Software Issues? Staffing Issues?

18) What is the turnaround time from the time of the crash to when the report is filed?

19) Is there formal training available for officers filling out the crash reports?

20) Is there any fear of double jeopardy for tribal members?

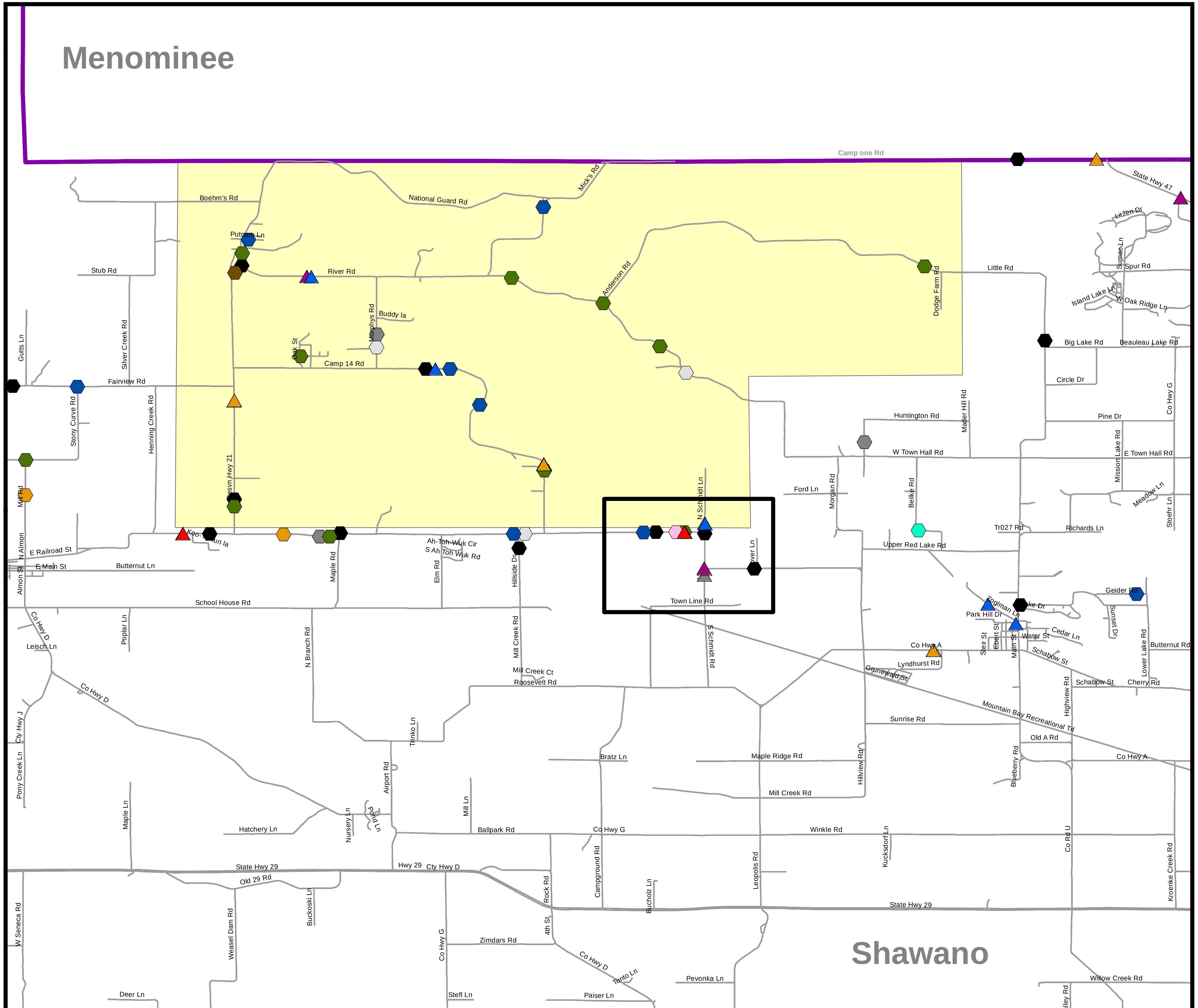
21) Are there privacy concerns with regards to information in the crash report?

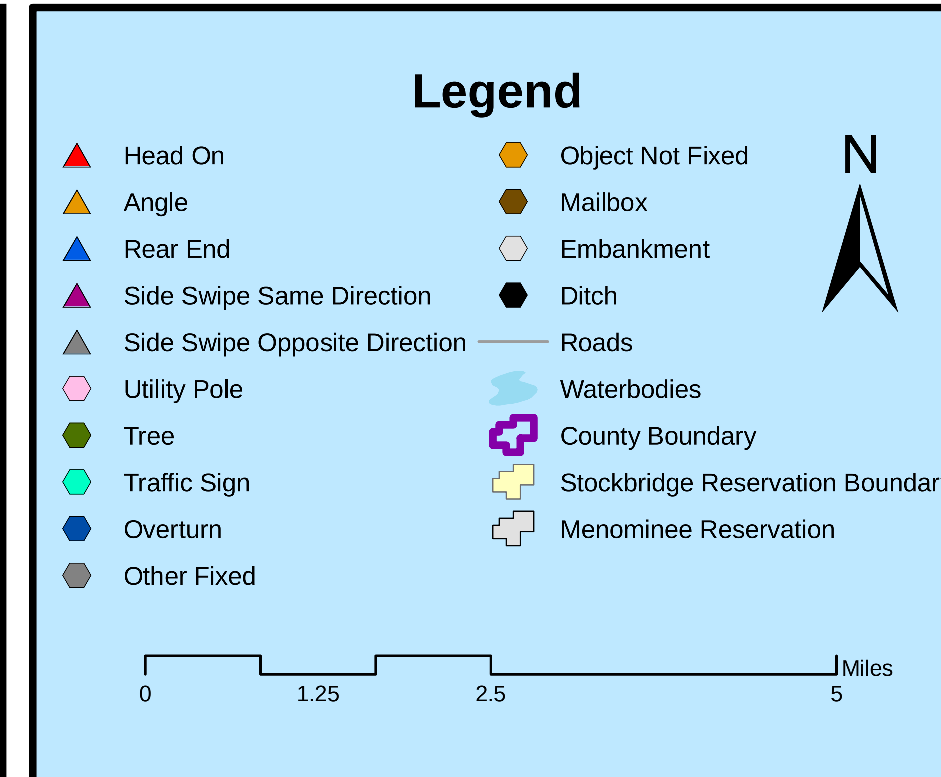
22) Where and how long are reports kept? Who has access to the reports?

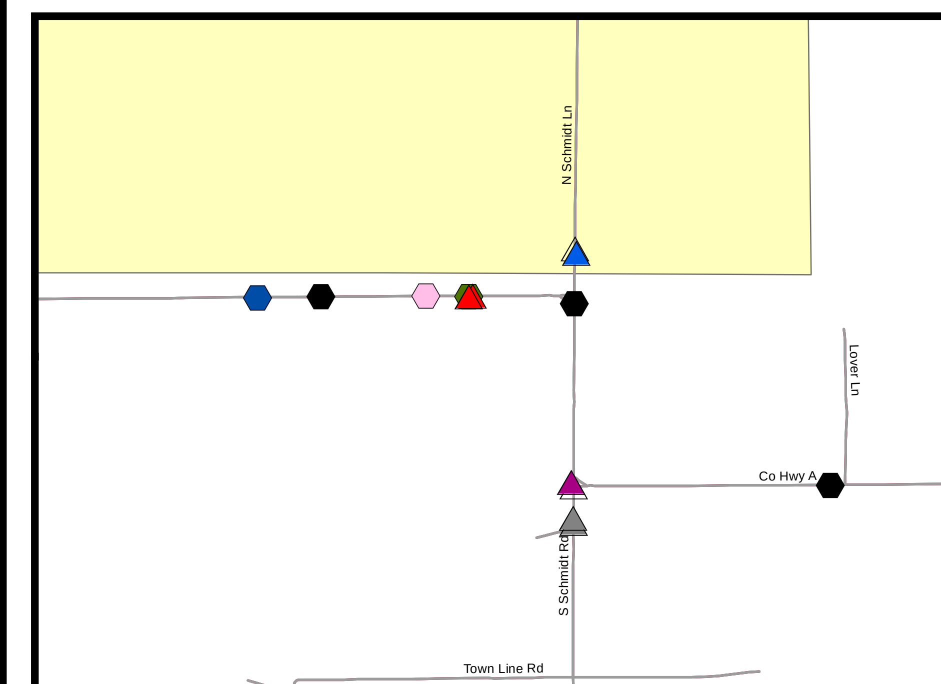
23) If a problem area is called in, how do you address this area? How do you get the data?

Appendix B – GIS Crash Maps

Motor Vehicle Crashes on the Stockbridge Reservation Manner of Collision 2004-2008

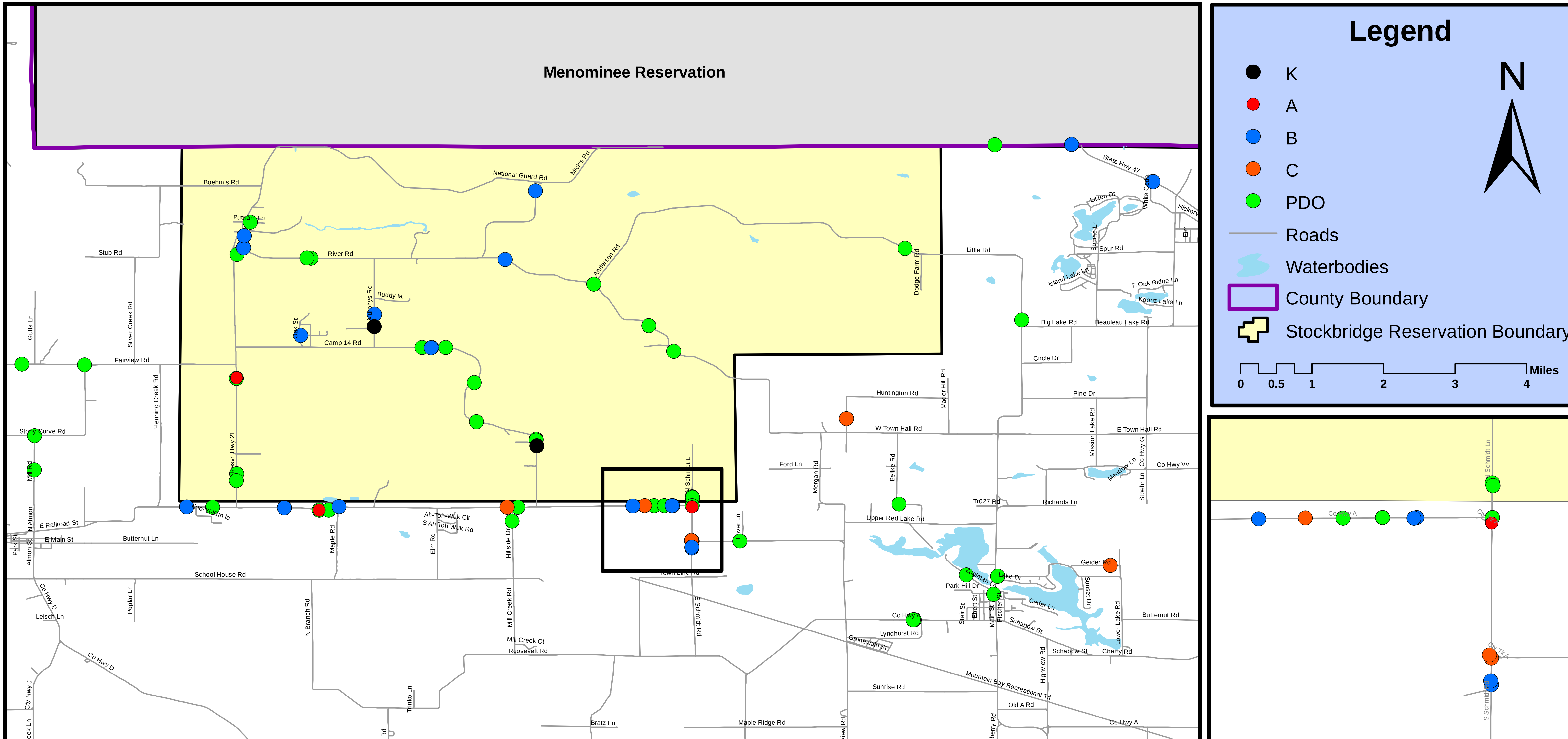






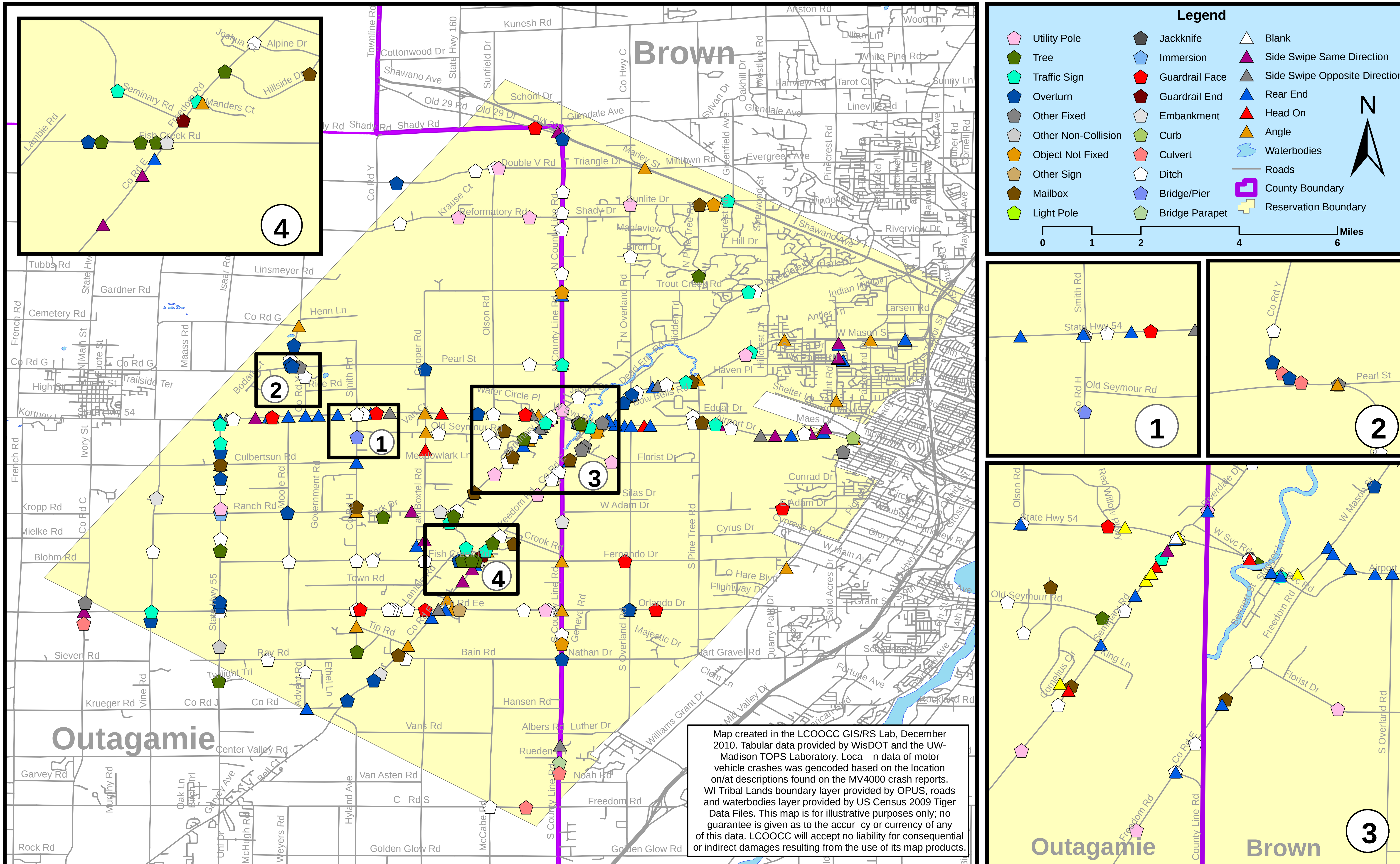
Map created in the LCOOCC GIS/RS Lab, December 2010.Tabular data provided by WisDOT and UW-Madison TOPS Laboratory. Location data of MVCs was geocoded based on the on/at description provided in the MV4000 crash reports. WI Tribal Lands boundary layer provided by OPUS; roads and waterbodies layer provided by US Census 2009 Tiger Data Files. This map is for illustrative purposes only; no guarantee is given as to the accuracy or currency of any of its data. LCOOCC will accept no liability for consequential or indirect damages resulting from the use of its map products.

Motor Vehicle Crashes on the Stockbridge Reservation Severity Rating 2004-2008

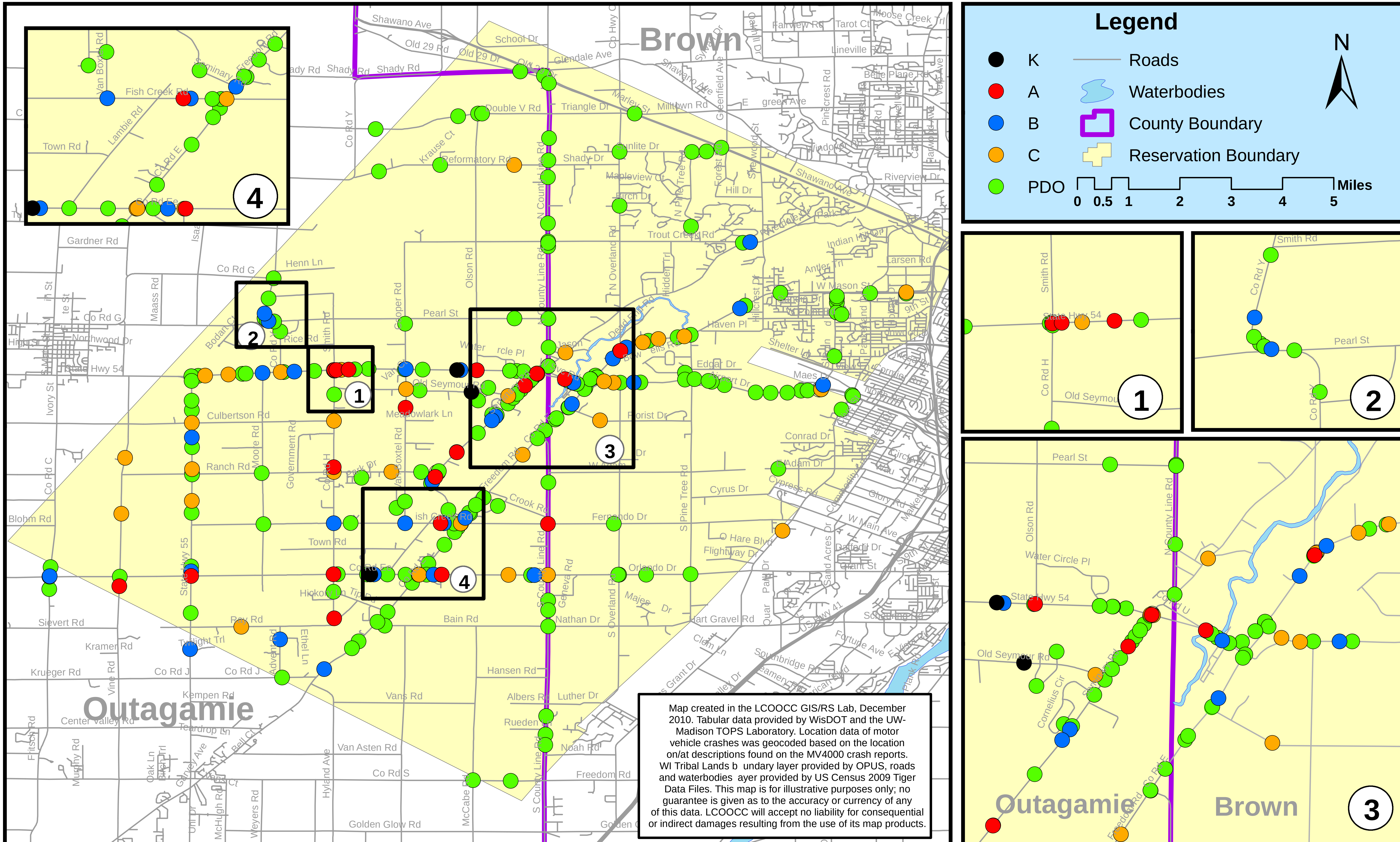


Map created in the LCOOCC GIS/RS Lab, December 2010. Tabular data provided by the WisDOT and the UW-Madison TOPS Laboratory. Location data of motor vehicle crashes was geocoded based on the location on/at description found on the MV4000 crash reports. WI Tribal Lands boundary layer provided by OPUS, roads and waterbodies layer provided by US Census 2009 TigerData Files. This map is for illustrative purposes only; no guarantee is given as to the accuracy or currency of any of its data. LCOOCC will accept no liability for consequential or indirect damages resulting from the use of its map products.

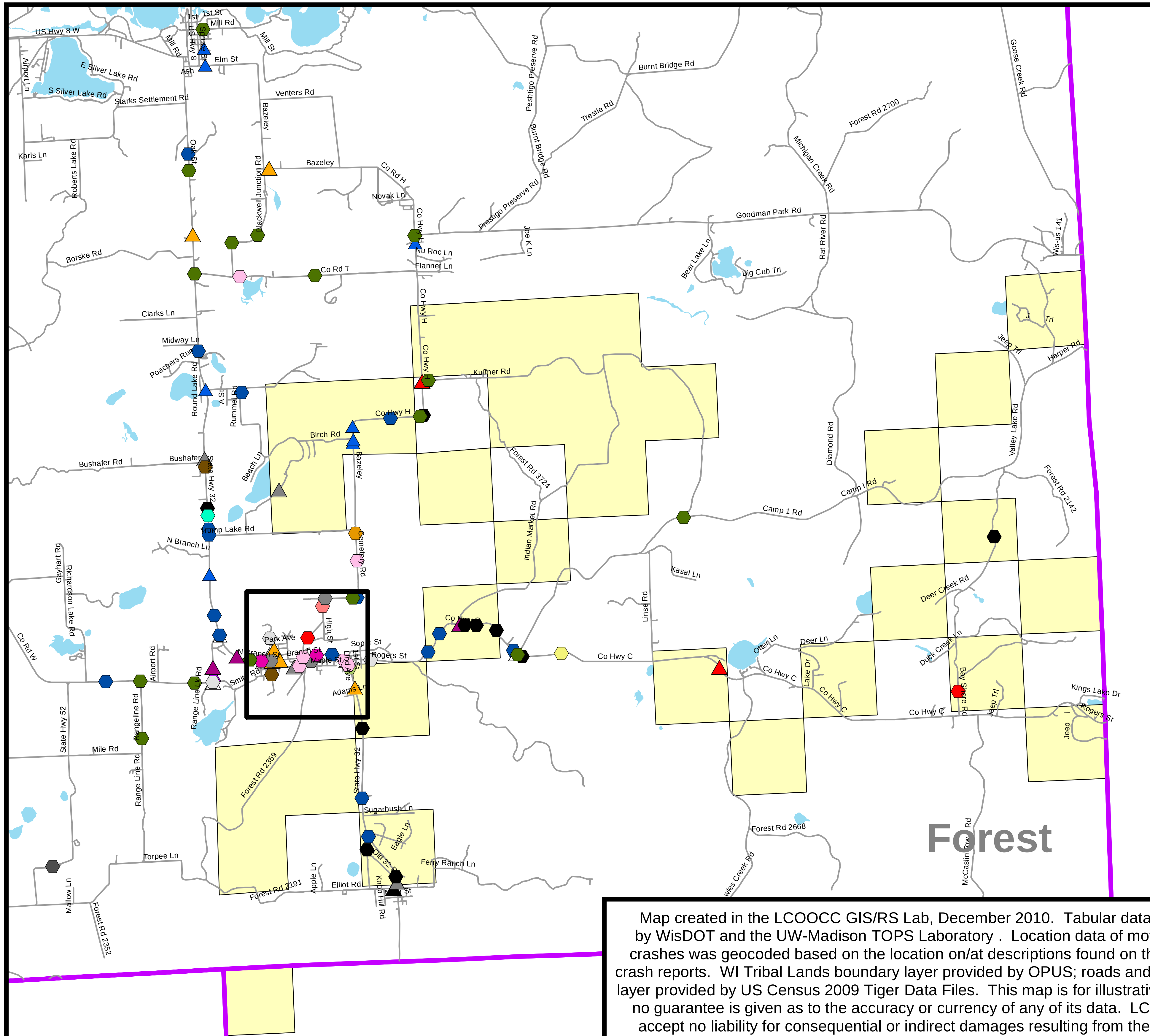
Motor Vehicle Crashes on the Oneida Reservation Manner of Collision 2004-2008



Motor Vehicle Crashes on the Oneida Reservation Severity Rating 2004-2008



Motor Vehicle Crashes on the Forest County Potawatomi Reservation
Manner of Collision 2004-2008

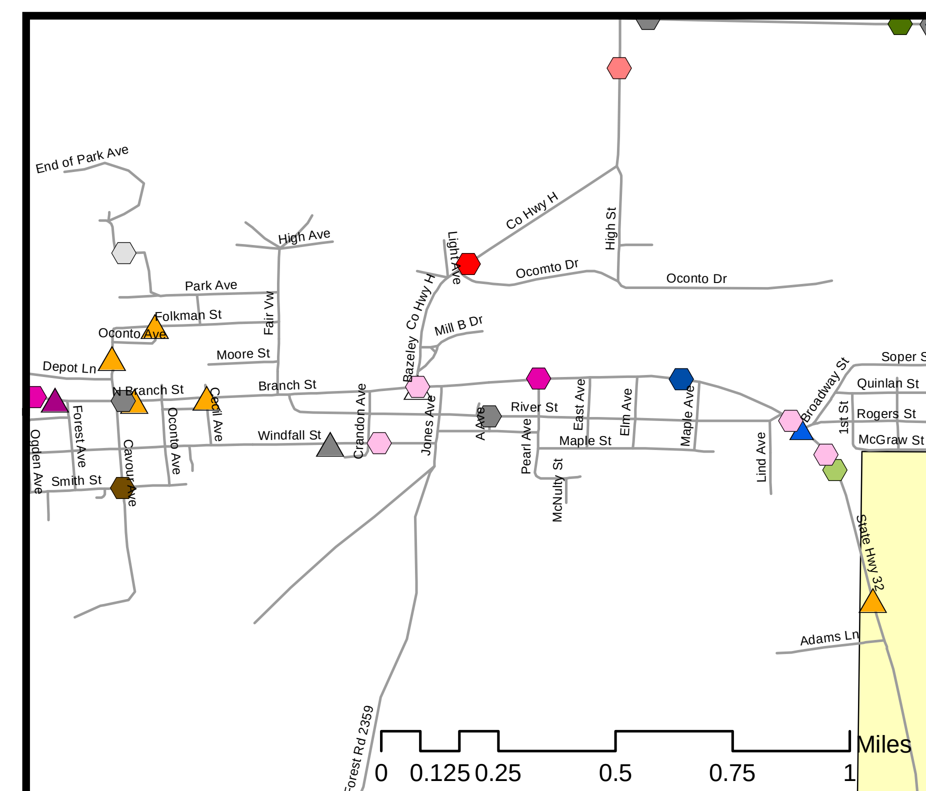


Legend

- Head On
- Angle
- Rear End
- Side Swipe Same Direction
- Side Swipe Opposite Direction
- Blank
- Utility Pole
- Tree
- Traffic Sign
- Parked Vehicle
- Overturn
- Other Fixed
- Other Post
- Object Not Fixed
- Mailbox
- Jackknife
- Guardrail Face
- Embankment
- Curb
- Culvert
- Ditch
- Fence
- Roads
- County Boundary
- Reservation Boundary
- Waterbodies

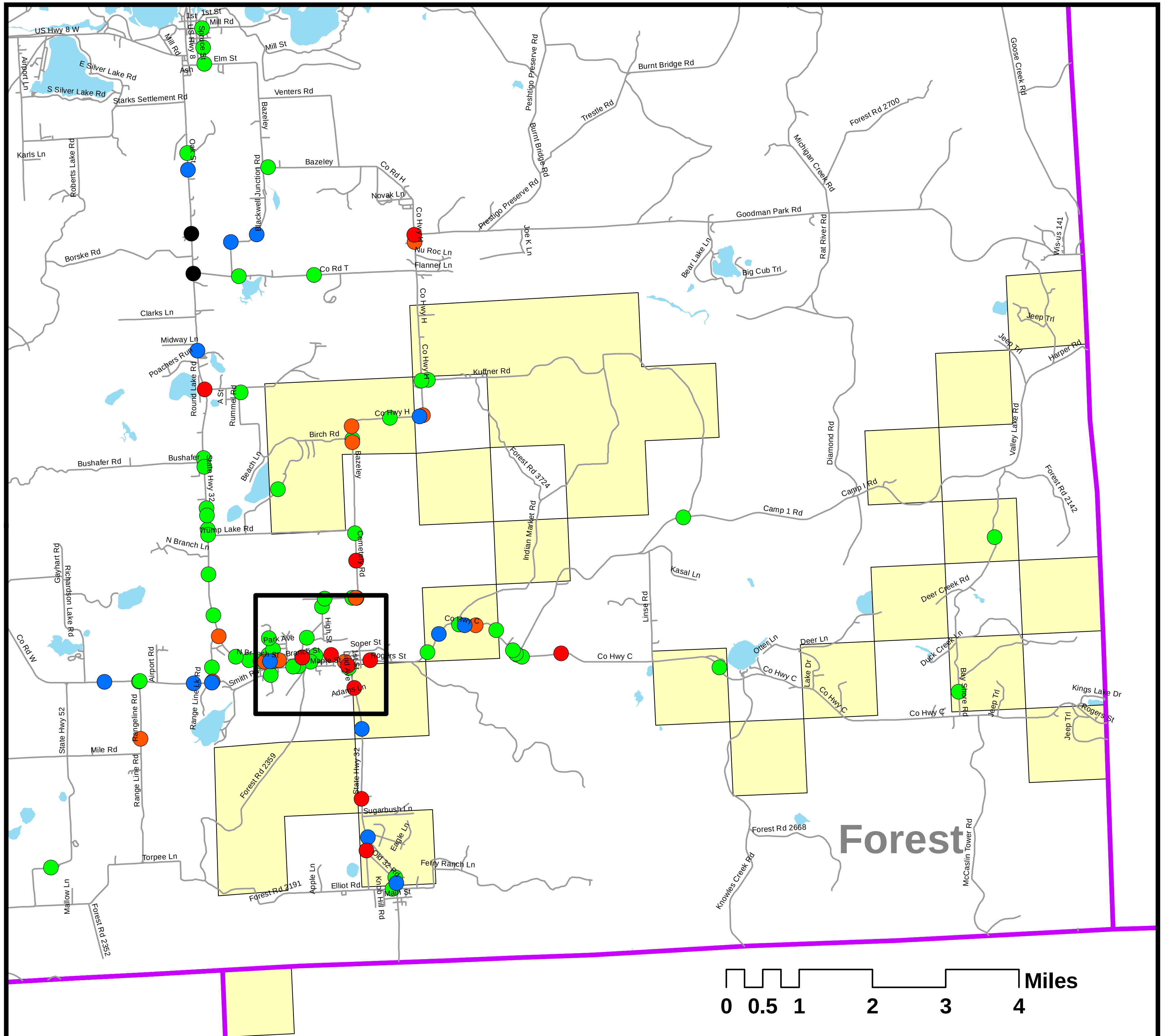
N

0 1 2 4 6 8 Miles



Map created in the LCOOCC GIS/RS Lab, December 2010. Tabular data provided by WisDOT and the UW-Madison TOPS Laboratory . Location data of motor vehicle crashes was geocoded based on the location on/at descriptions found on the MV4000 crash reports. WI Tribal Lands boundary layer provided by OPUS; roads and waterbodies layer provided by US Census 2009 Tiger Data Files. This map is for illustrative purposes; no guarantee is given as to the accuracy or currency of any of its data. LCOOCC will accept no liability for consequential or indirect damages resulting from the use of its map products.

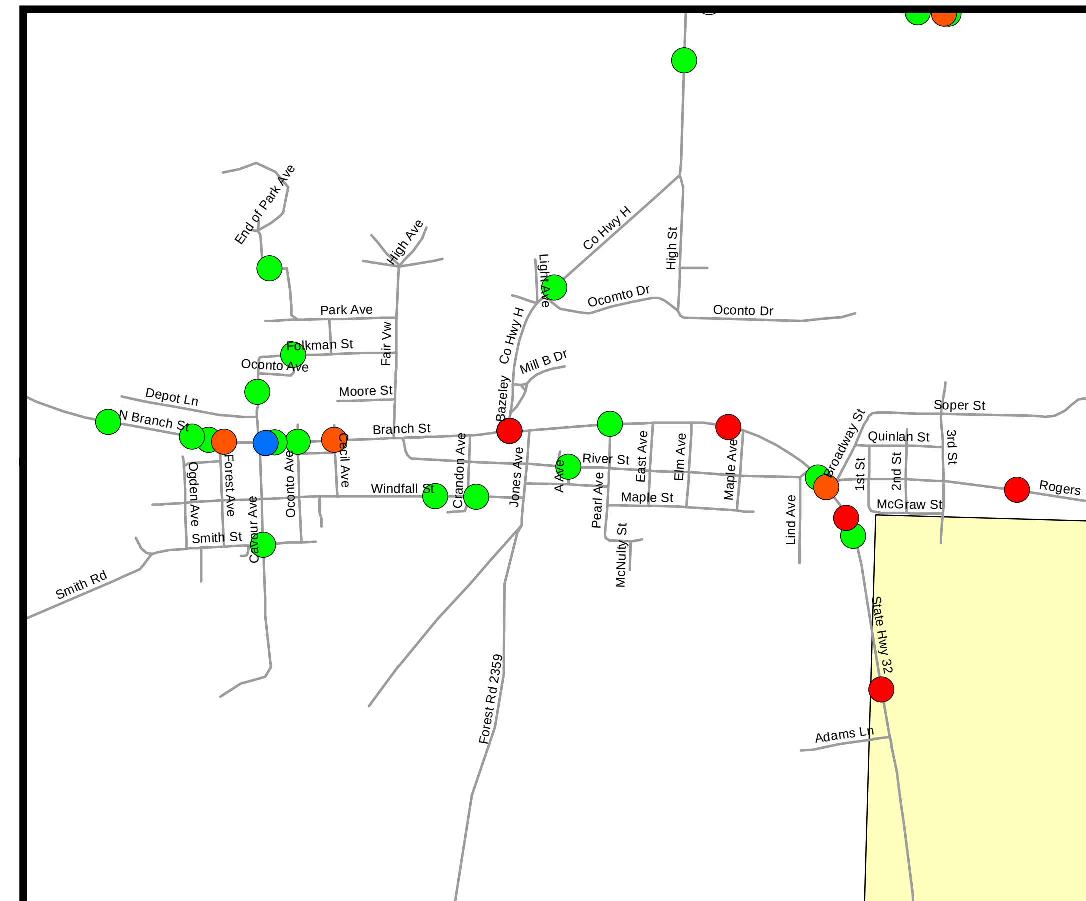
Motor Vehicle Crashes on the Forest County Potawatomi Reservation
Severity Rating 2004-2008



Legend

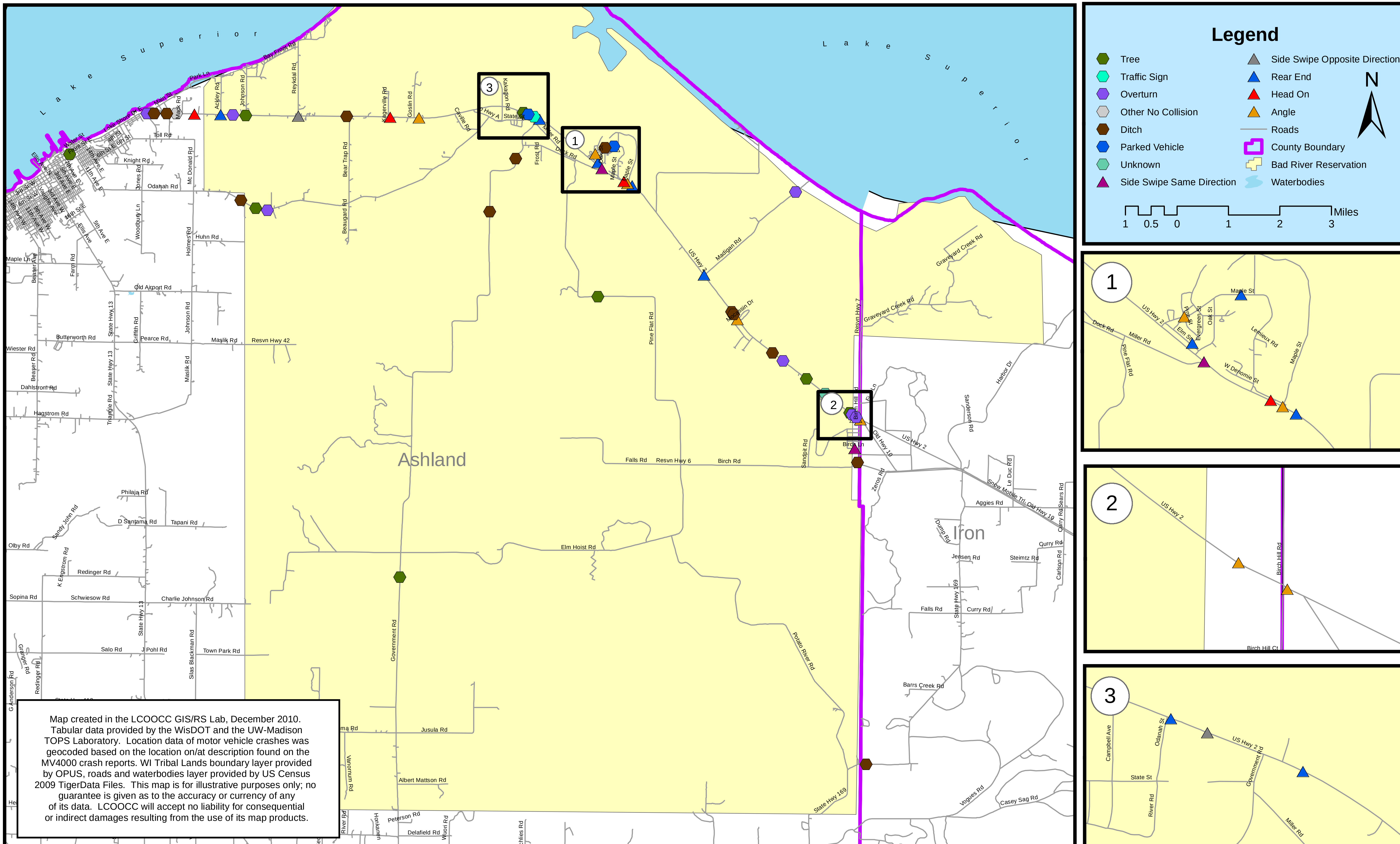
- K
- A
- B
- C
- PDO
- Roads
- County Boundary
- Reservation Boundary
- Waterbodies

N



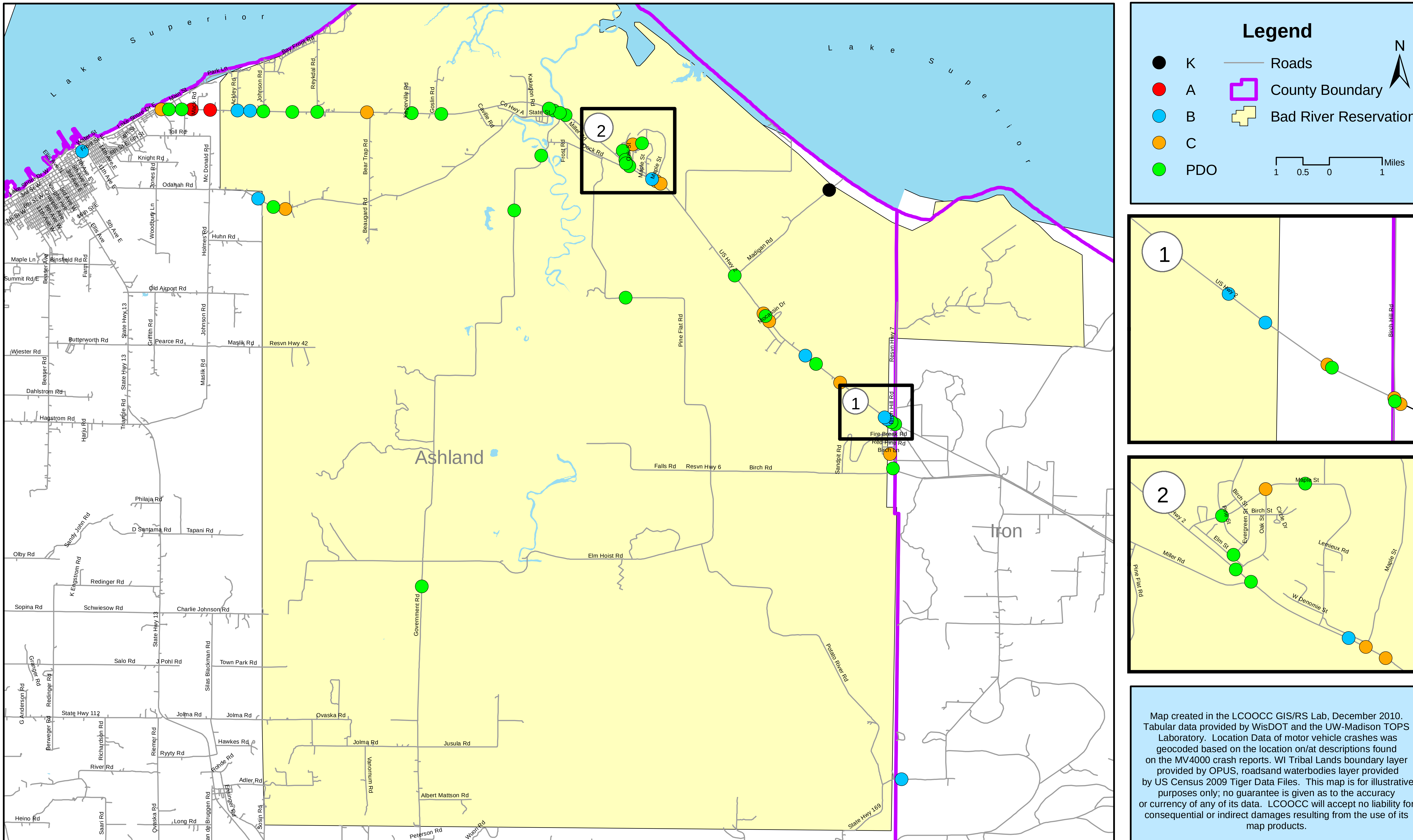
Map created in the LCOOCC GIS/RS Lab, December 2010. Tabular data provided by WisDOT and the UW-Madison TOPS Laboratory . Location data of motor vehicle crashes was geocoded based on the location on/at descriptions found on the MV4000 crash reports. WI Tribal Lands boundary layer provided by OPUS; roads and waterbodies layer provided by US Census 2009 Tiger Data Files. This map is for illustrative purposes; no guarantee is given as to the accuracy or currency of its data. LCOOCC will accept no liability for consequential or indirect damages resulting from the use of its map products.

Motor Vehicle Crashes on the Bad River Reservation Manner of Collision 2004-2008



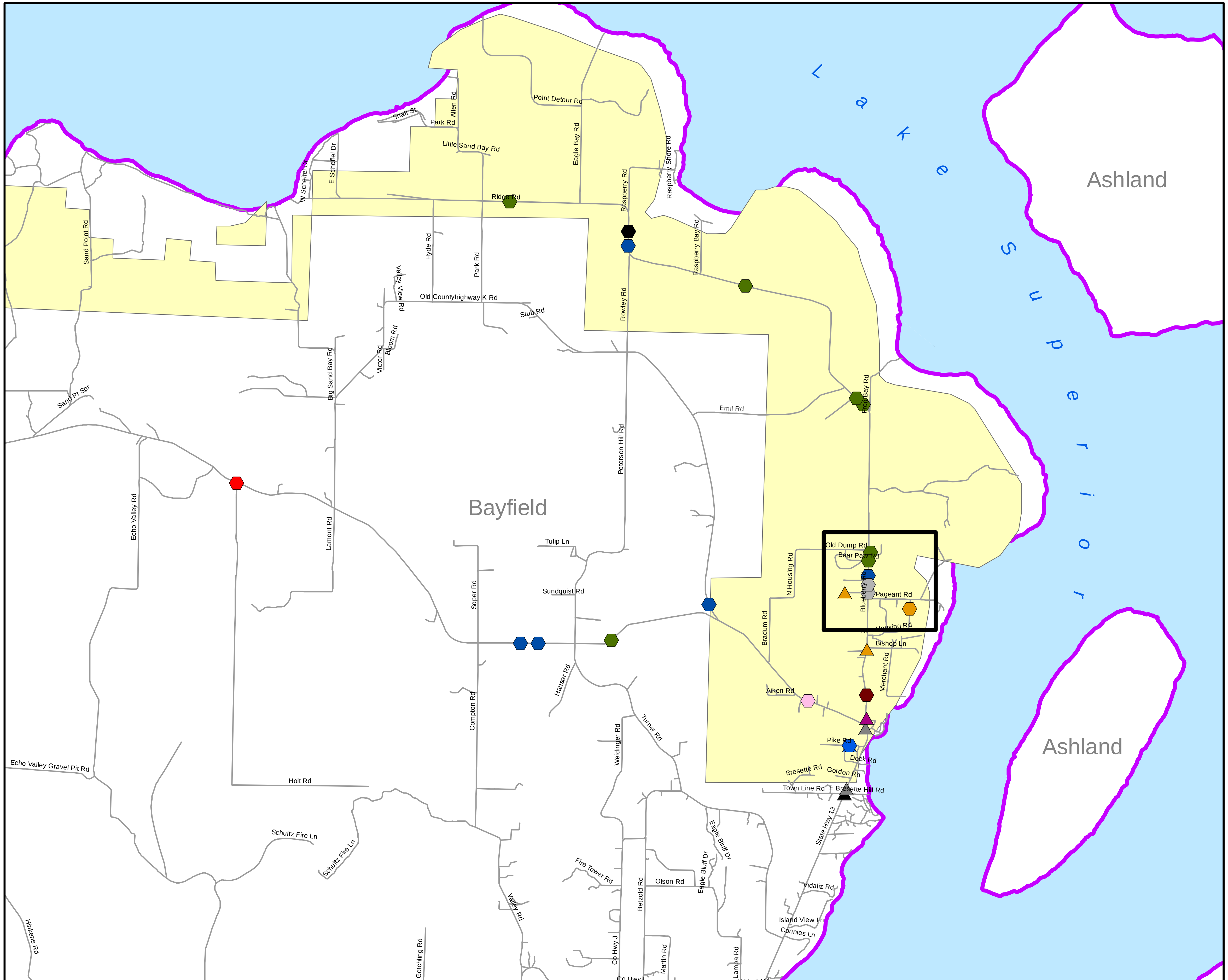
Map created in the LCOOCC GIS/RS Lab, December 2010. Tabular data provided by the WisDOT and the UW-Madison TOPS Laboratory. Location data of motor vehicle crashes was geocoded based on the location on/at description found on the MV4000 crash reports. WI Tribal Lands boundary layer provided by OPUS, roads and waterbodies layer provided by US Census 2009 TigerData Files. This map is for illustrative purposes only; no guarantee is given as to the accuracy or currency of any of its data. LCOOCC will accept no liability for consequential or indirect damages resulting from the use of its map products.

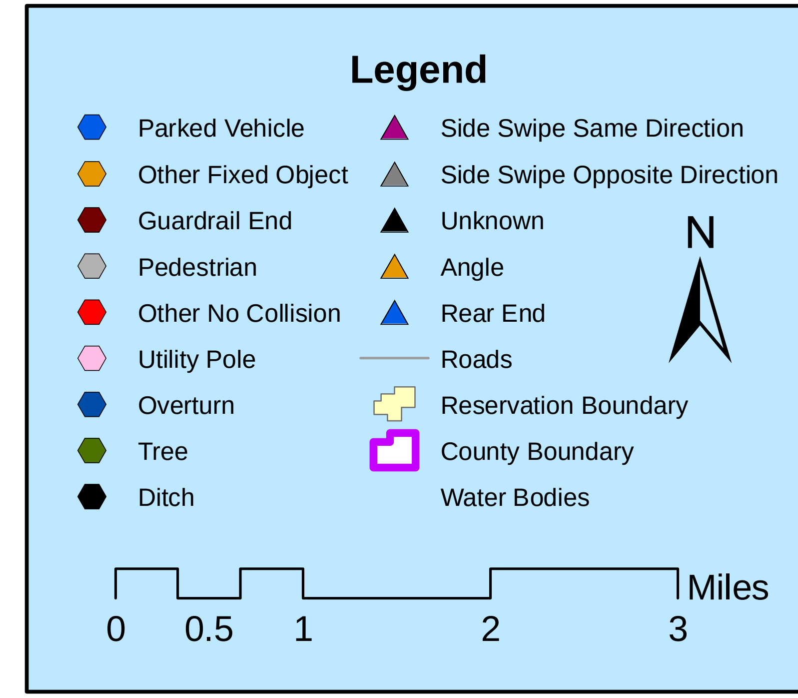
Motor Vehicle Crashes on the Bad River Reservation Severity Rating 2004-2008

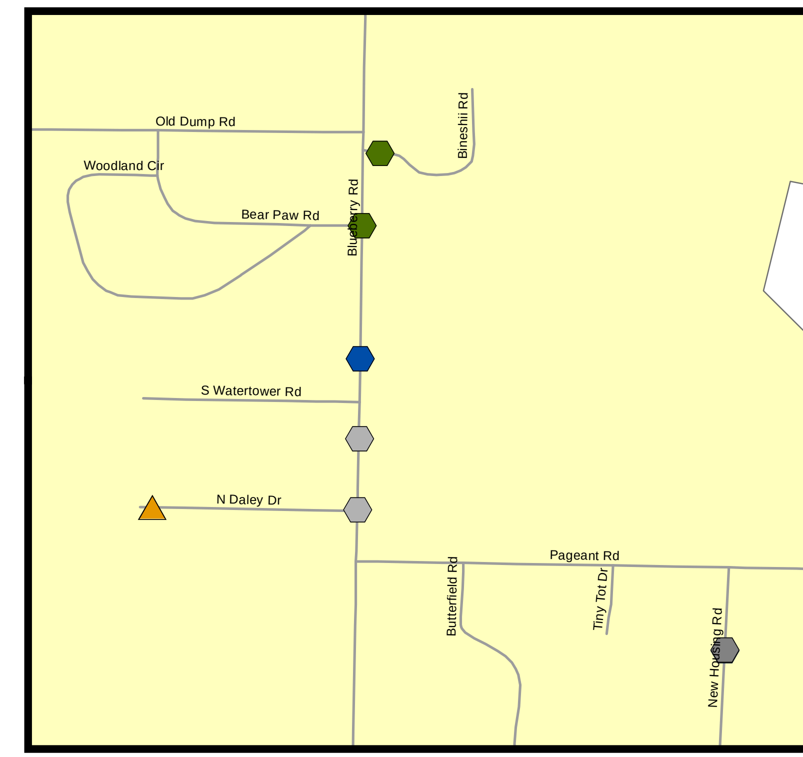


Map created in the LCOOCC GIS/RS Lab, December 2010. Tabular data provided by WisDOT and the UW-Madison TOPS Laboratory. Location Data of motor vehicle crashes was geocoded based on the location on/at descriptions found on the MV4000 crash reports. WI Tribal Lands boundary layer provided by OPUS, roadsand waterbodies layer provided by US Census 2009 Tiger Data Files. This map is for illustrative purposes only; no guarantee is given as to the accuracy or currency of any of its data. LCOOCC will accept no liability for consequential or indirect damages resulting from the use of its map products.

Motor Vehicle Crashes on the Red Cliff Reservation Manner of Collision 2004-2008

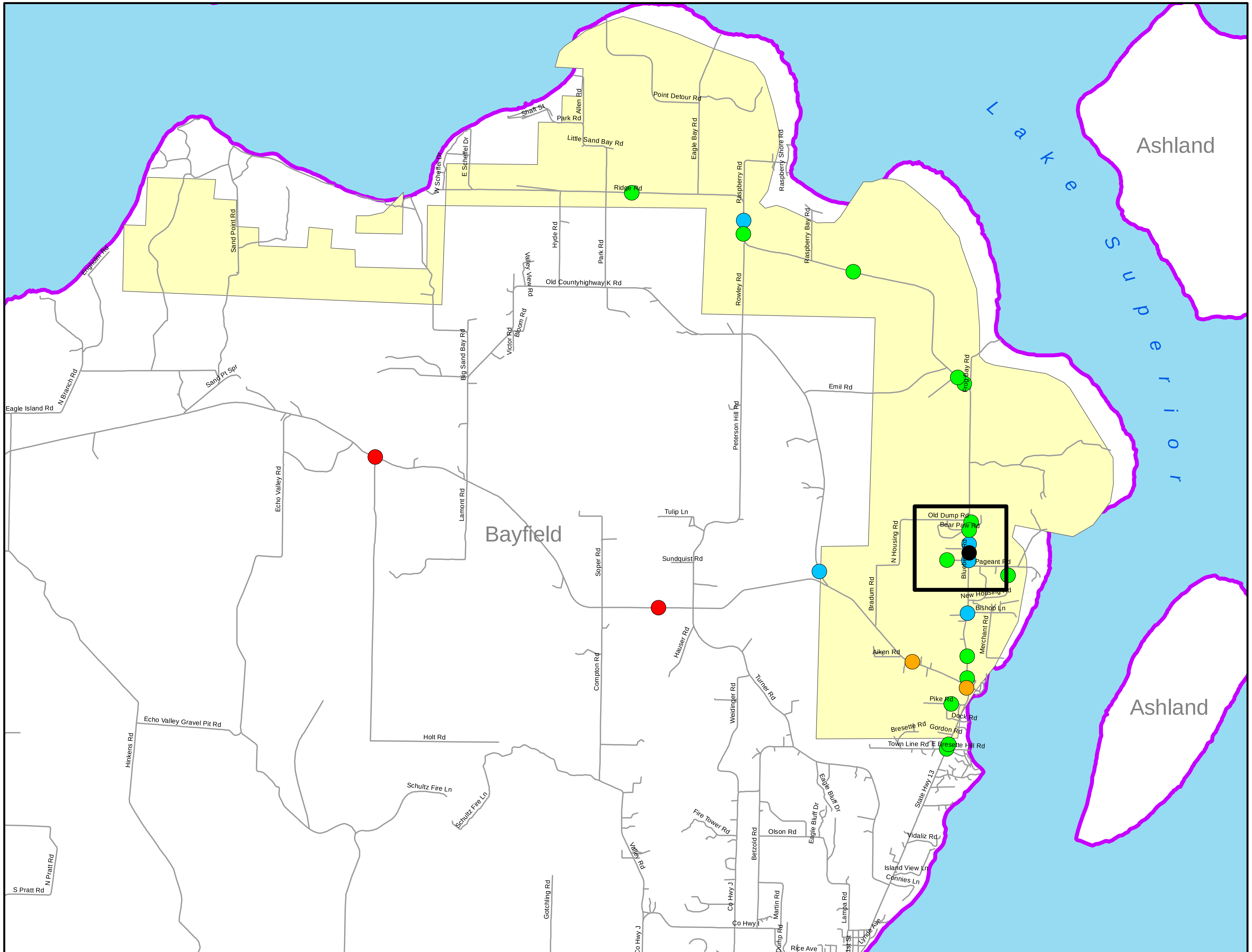


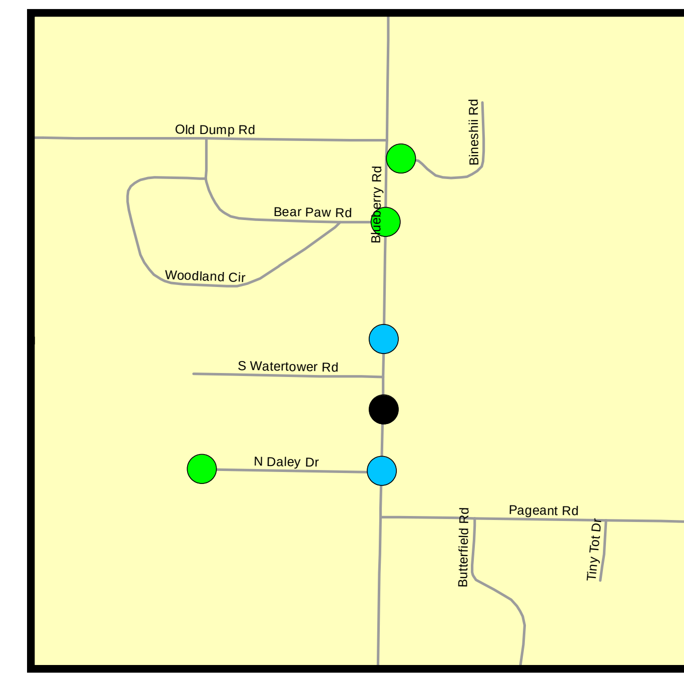




Map created in the LCOOCC GIS/RS Lab, December 2010. Tabular data provided by WisDOT and the UW-Madison TOPS Laboratory. Location Data of motor vehicle crashes was geocoded based on the location on/at descriptions found on the MV4000 crash reports. WI Tribal Lands boundary layer provided by OPUS, roads and waterbodies layer provided by US Census 2009 Tiger Data Files. This map is for illustrative purposes only; no guarantee is given as to the accruracy or currency of any of its data. LCOOCC will accept no liability for consequential or indirect damages resulting from the use of its map products.

Motor Vehicle Crashes on the Red Cliff Reservation Severity Rating 2004-2008





Legend

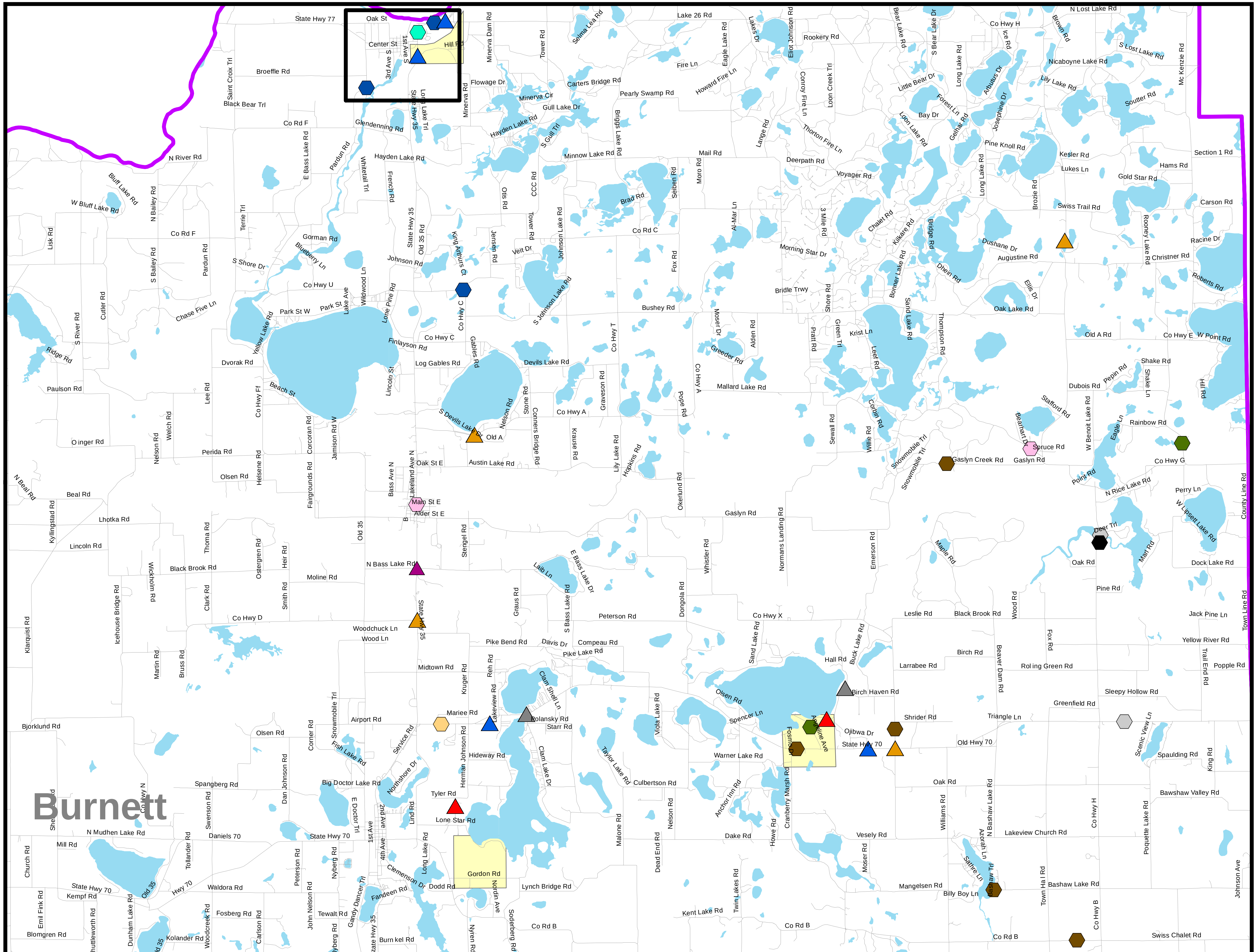
- K
- A
- B
- C
- PDO
- Roads
- Reservation Boundary
- Water Bodies
- County Boundary

N

Miles: 0 0.5 1 2 3

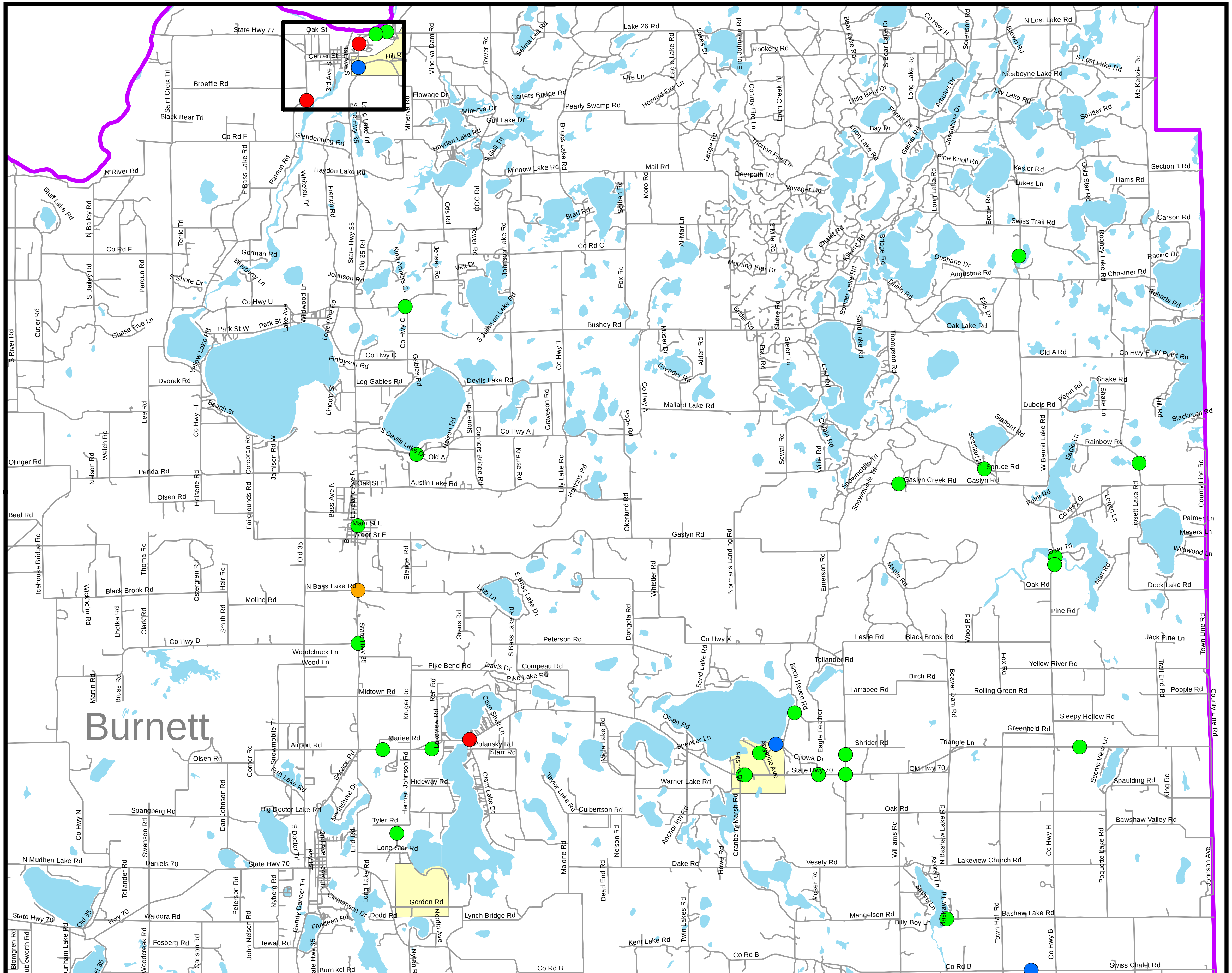
Map created in the LCOOCC GIS/RS Lab, December 2010. Tabular data provided by WisDOT and the UW-Madison TOPS Laboratory. Location Data of motor vehicle crashes was geocoded based on the location on/at descriptions found on the MV4000 crash reports. WI Tribal Lands boundary layer provided by OPUS, roads and waterbodies layer provided by US Census 2009 Tiger Data Files. This map is for illustrative purposes only; no guarantee is given as to the accuracy or currency of any of its data. LCOOCC will accept no liability for consequential or indirect damages resulting from the use of its map products.

Motor Vehicle Crashes on the St. Croix Reservation Manner of Collision 2004-2008



Map created in the LCOOCC GIS/RS Lab, December 2010. Tabular data provided by WisDOT, and St. Croix Police Department. Location data of MVCs was geocoded based on the location on/at descriptions found on the MV4000 crash reports. WI Tribal lands boundary layer provided by OPUS, roads and waterbodies layers provided by US Census 2009 Tiger Data Files. This map is for illustrative purposes only; no guarantee is given as to the accuracy or currency of any of its data. LCOOCC will accept no liability for consequential or indirect damages resulting from the use of its map products.

Motor Vehicle Crashes on the St. Croix Reservation Severity Rating 2004-2008

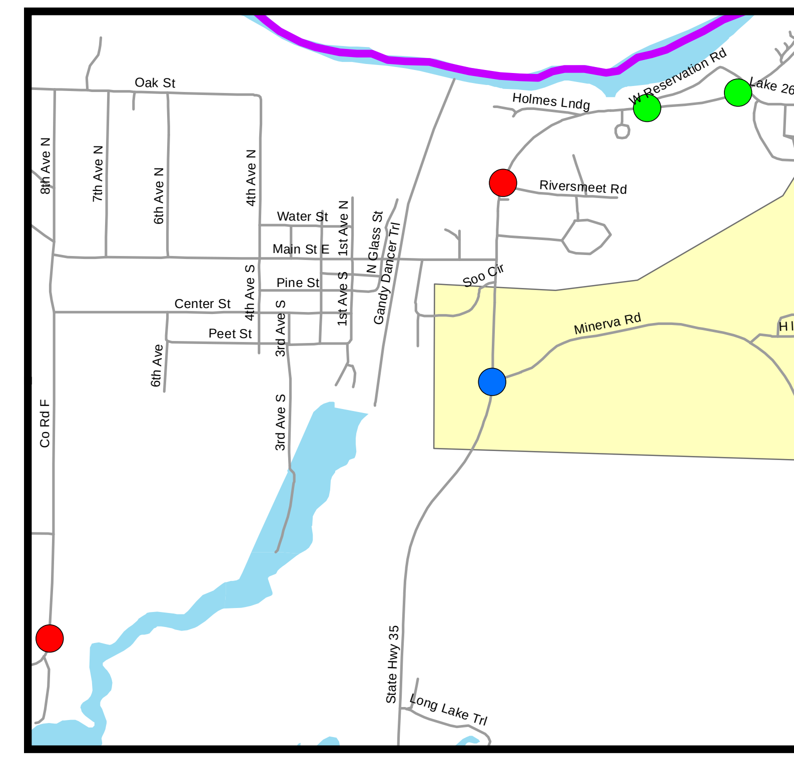


Legend

- A
- B
- C
- PDO
- Roads
- County Boundary
- Waterbodies
- Reservation Boundary

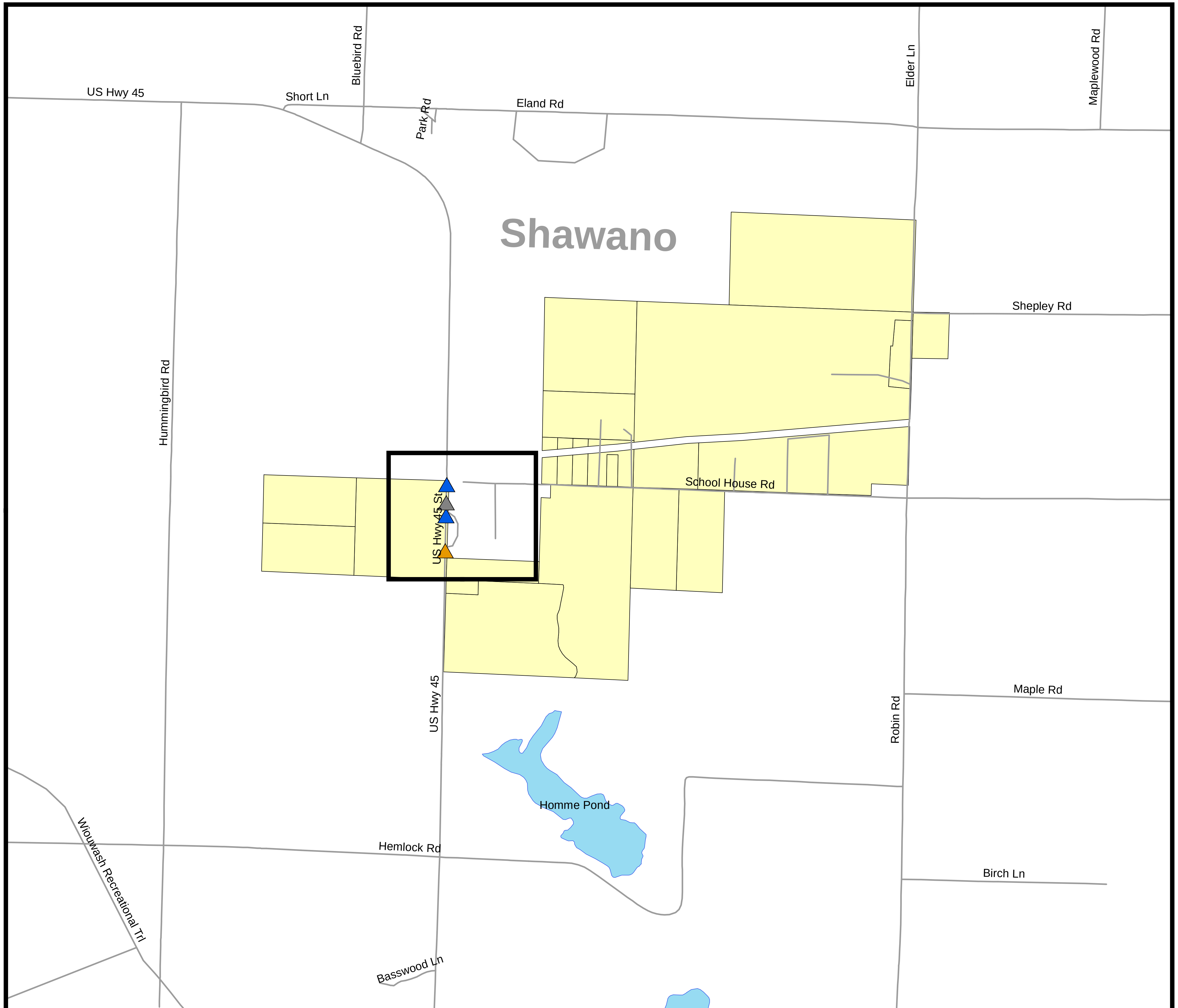
N

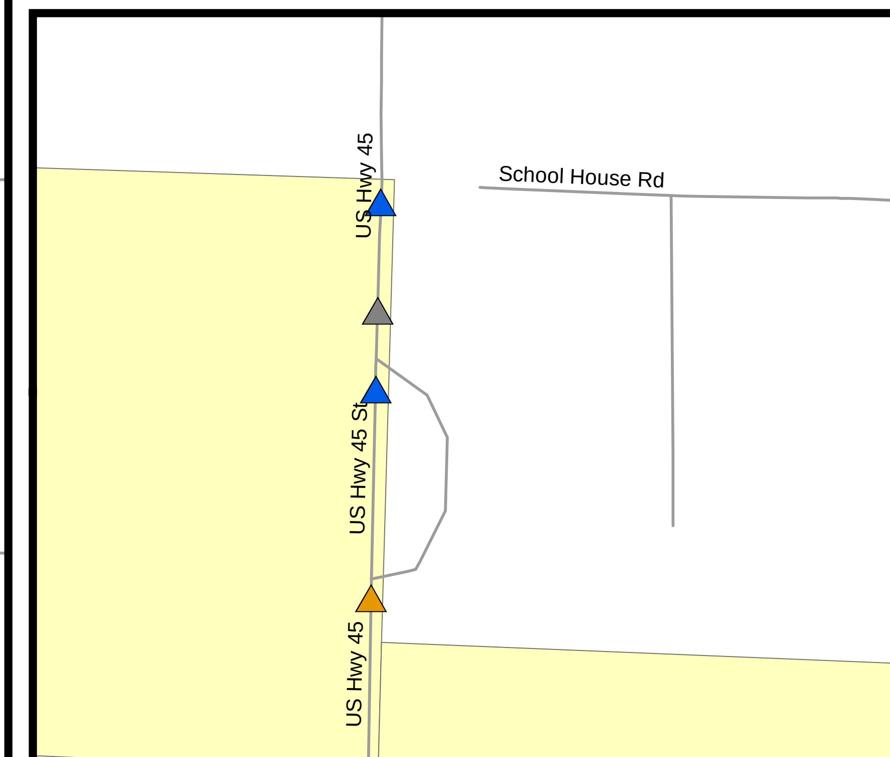
Miles: 0 1 2 4 6



Map created in the LCOOCC GIS/RS Lab, December 2010. Tabular data provided by WisDOT and St. Croix Police Department. Location data of MVCs was geocoded based on the location on/at descriptions found on the MV4000 crash reports. WI Tribal Land boundary layer provided by OPUS, roads and waterbodies layers provided by US Census 2009 Tiger Data Files. This map is for illustrative purposes only; no guarantee is given as to the accuracy or currency of any of its data. LCOOCC will accept no liability for consequential or indirect damages resulting from the use of its map products.

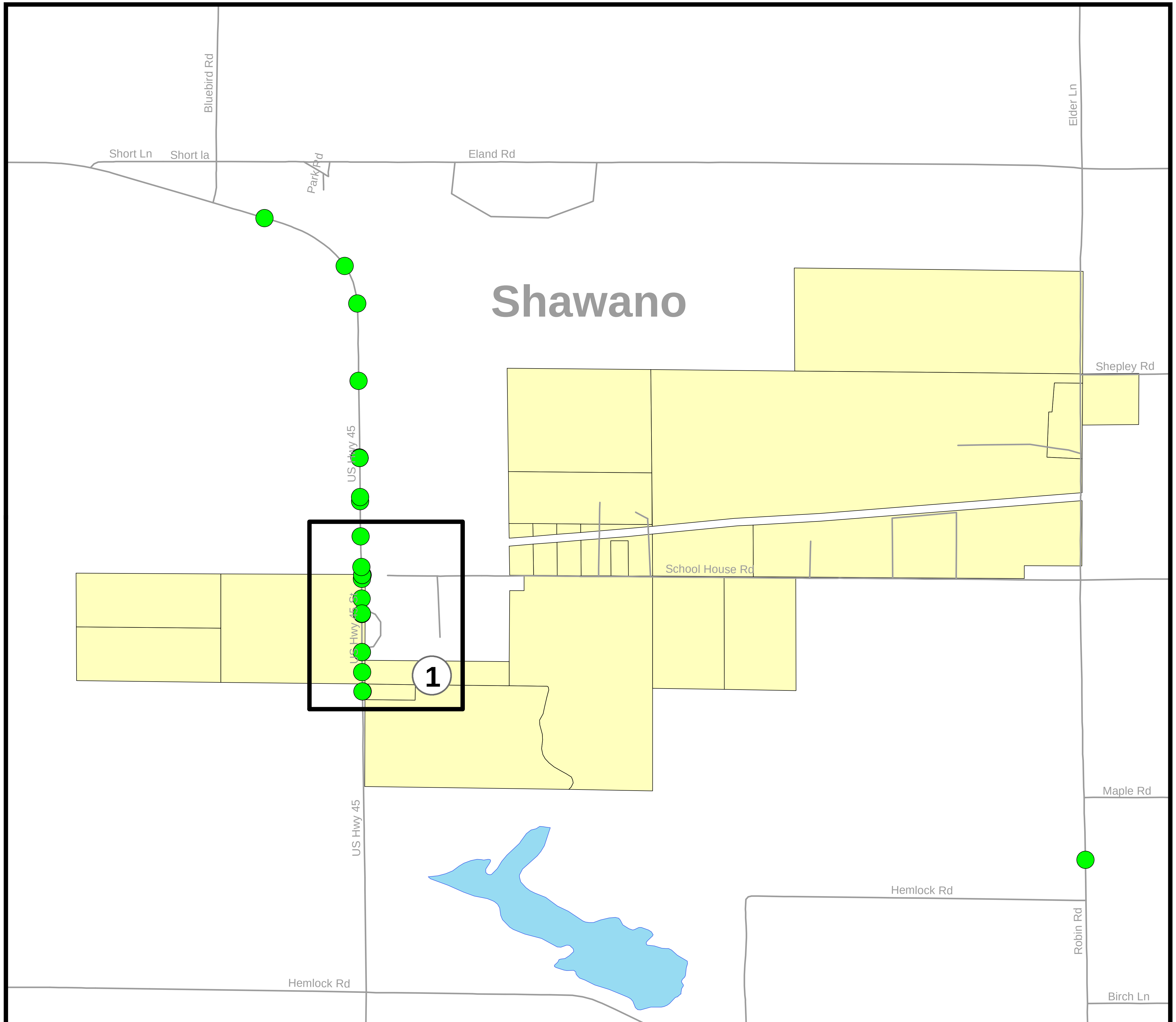
Motor Vehicle Crashes in the Ho-Chunk Nation Manner of Collision 2004-2008

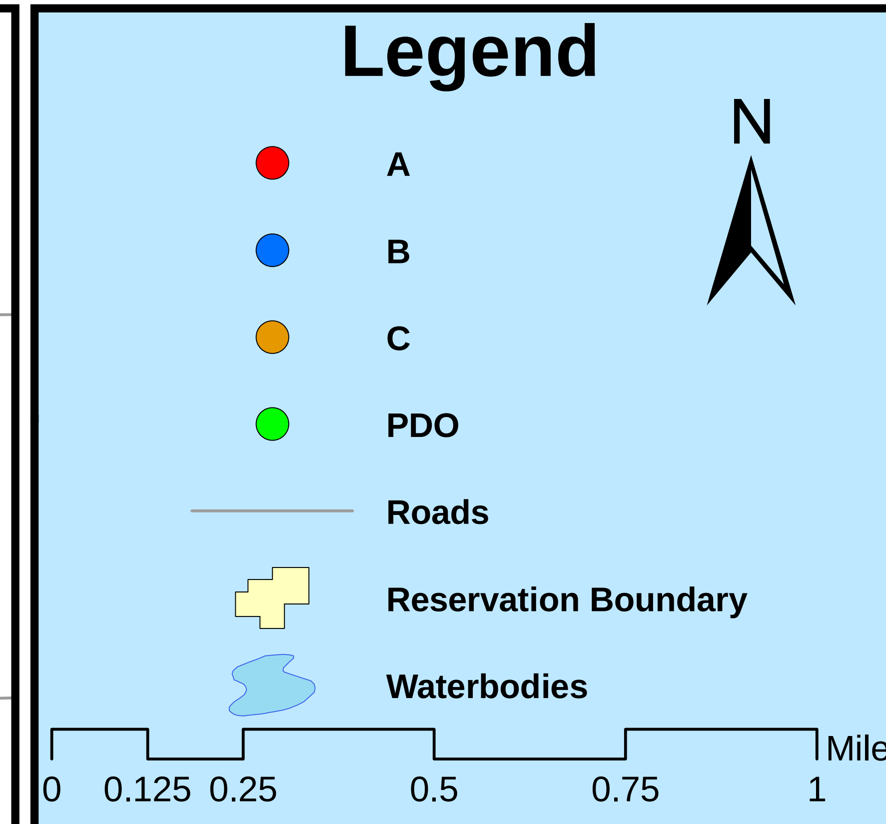


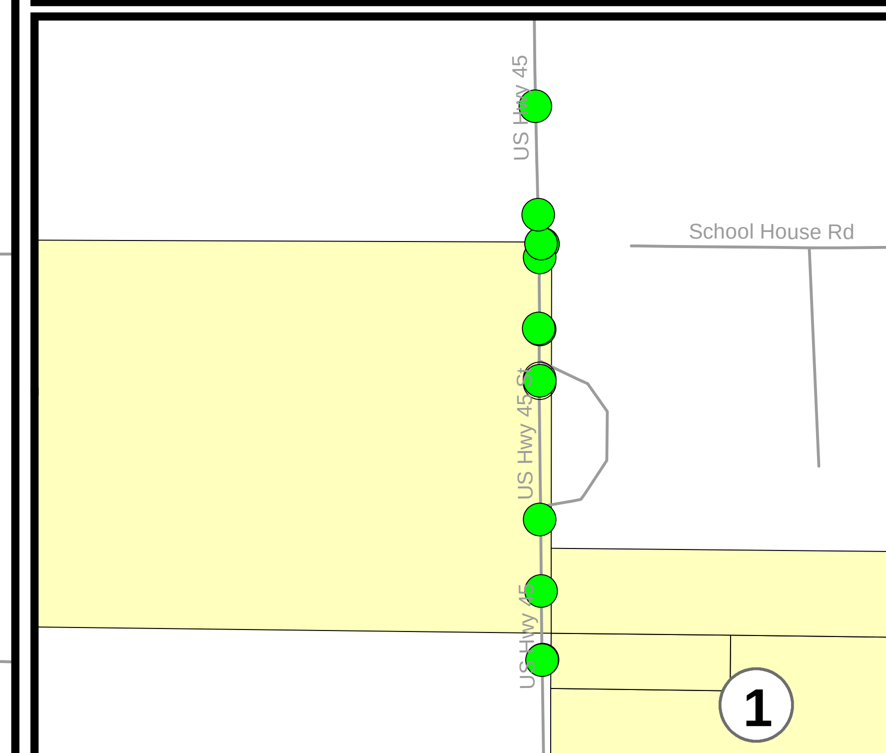


Map created in the LCOOCC GIS/RS Lab, December 2010. Tabular data provided by WisDOT and the UW-Madison TOPS Laboratory. Location data of motor vehicle crashes was geocoded based oon the location on/at descriptions found on the MV4000 crash reports. WI Tribal Lands boundary layer provided by OPUS, roads and waterbodies layer provided by US Census 2009 Tiger Data Files. This map is for illustrative purposes only; no guarantee is given as to the accuracy or currency of any of this data. LCOOCC will accept no liability for consequential or indirect damages resulting from the use of its map products.

Motor Vehicle Crashes on the Ho-Chunk Nation Severity Rating 2004-2008

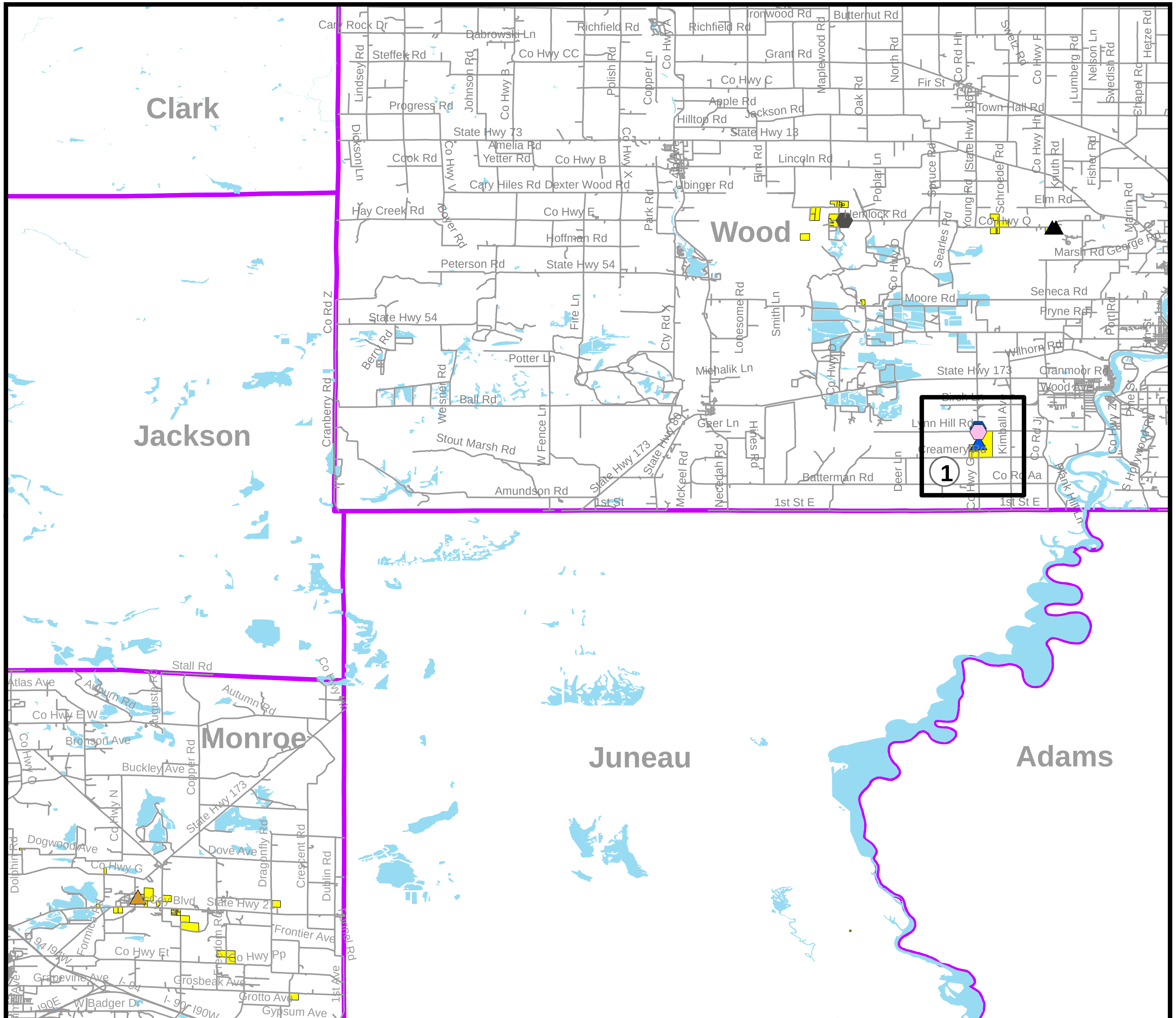


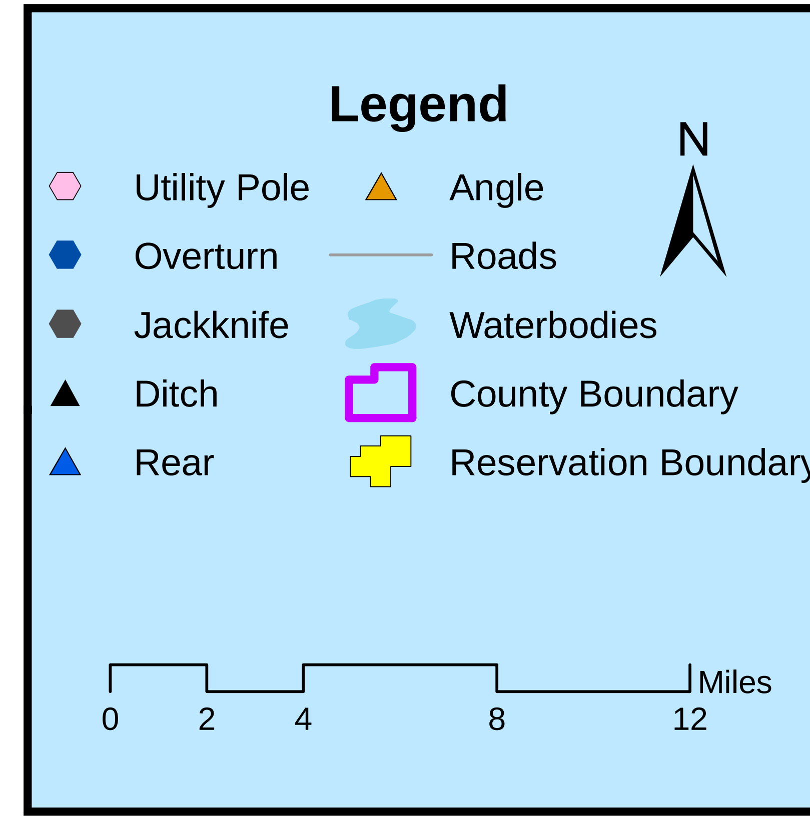


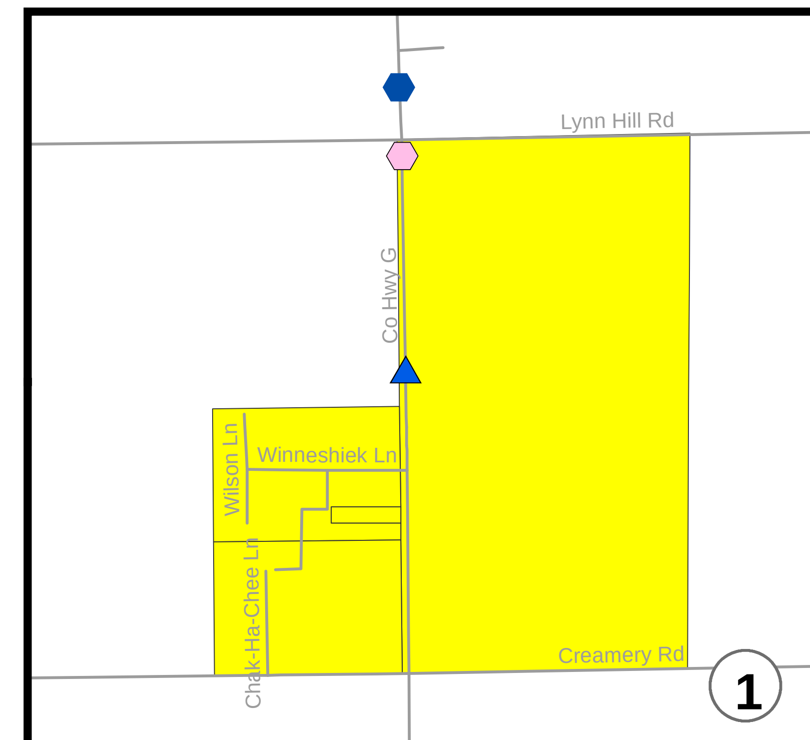


Map created in the LCOOCC GIS/RS Lab, December 2010. Tabular data provided by WisDOT and the UW-Madison TOPS Laboratory. Location data of motor vehicle crashes was geocoded based oon the location on/at descriptions found on the MV4000 crash reports. WI Tribal Lands boundary layer provided by OPUS, roads and waterbodies layer provided by US Census 2009 Tiger Data Files. This map is for illustrative purposes only; no guarantee is given as to the accuracy or currency of any of this data. LCOOCC will accept no liability for consequential or indirect damages resulting from the use of its map products.

Motor Vehicle Crashes on the Ho-Chunk Nation Manner of Collision 2004-2008

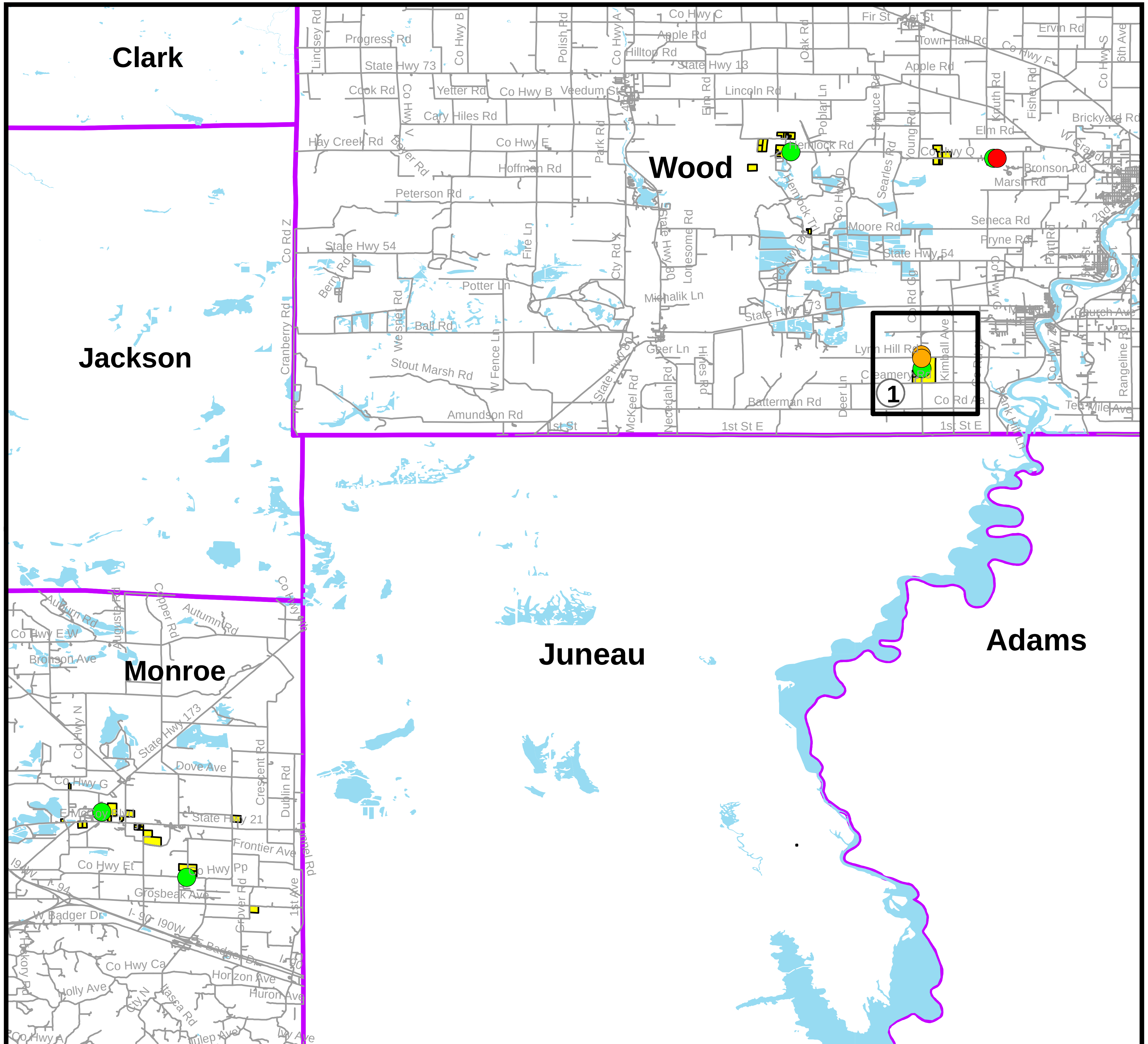


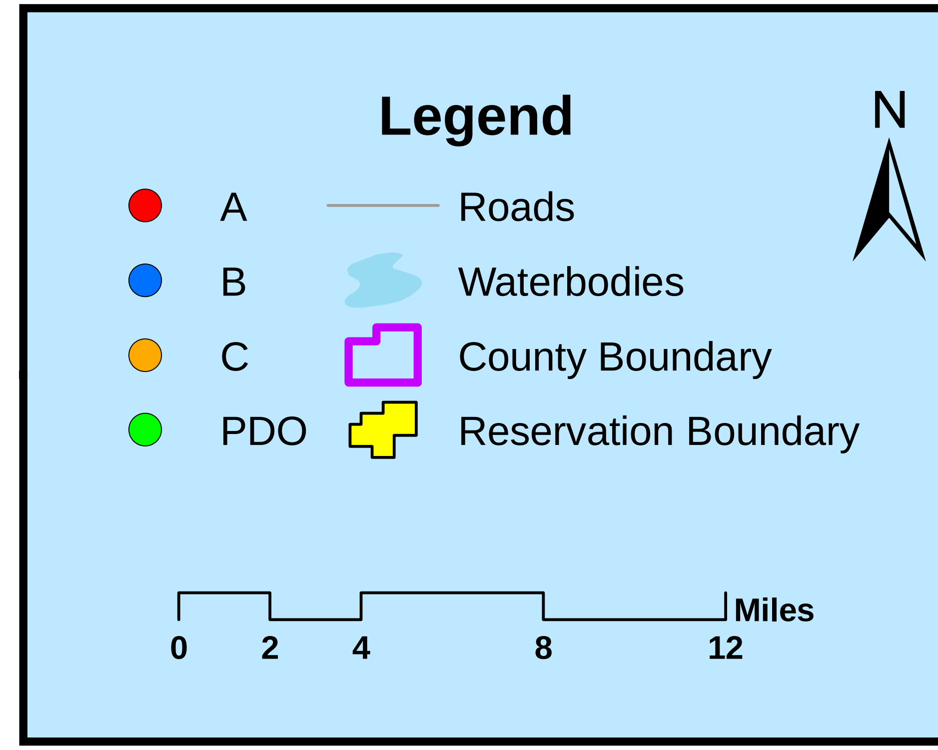


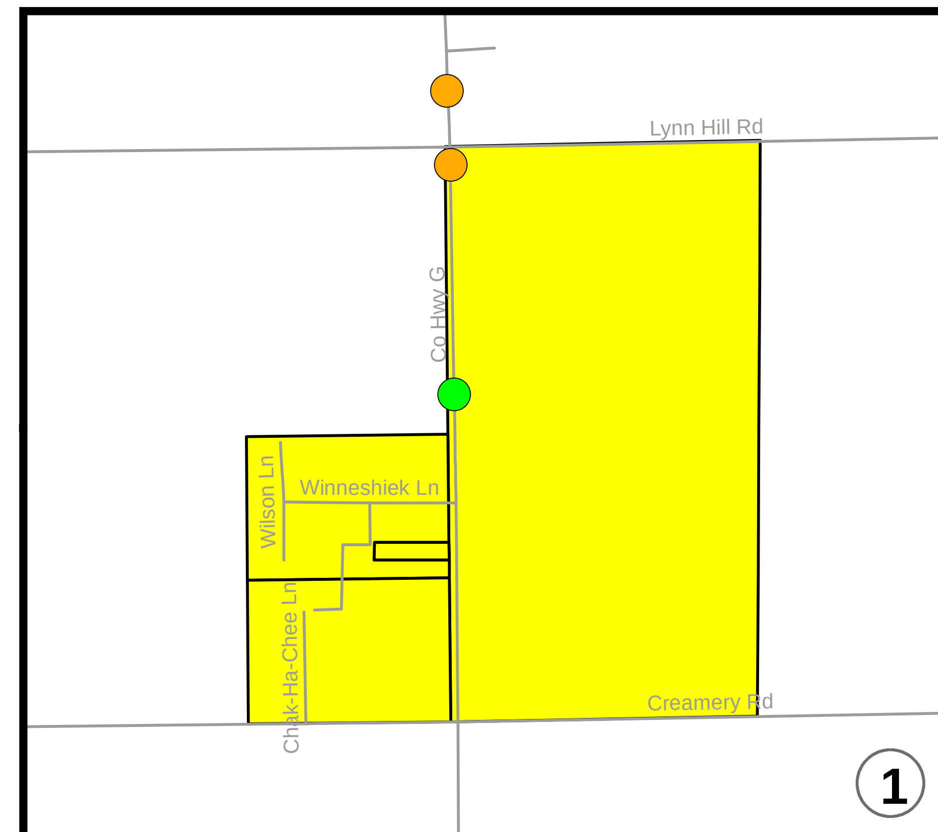


Map created in the LCOOCC GIS/RS Lab, December2010. Tabular data provided by WisDOT and the UW-Madison TOPS Laboratory. Location data of motor vehicle crashes was geocoded based on the location on/at descriptions found on the MV4000 crash reports. WI Tribal Lands boundary layer provided by OPUS, roadsand waterbodies layer provided by US Census 2009 Tiger Data Files. This map is for illustrative purposes only; no guarantee is given as to the accuracy or currency of any of this data. LCOOCC will accept no liability for consequential or indirect damages resulting from the use of its map products.

Motor Vehicle Crashes on the Ho-Chunk Nation Severity Rating 2004-2008







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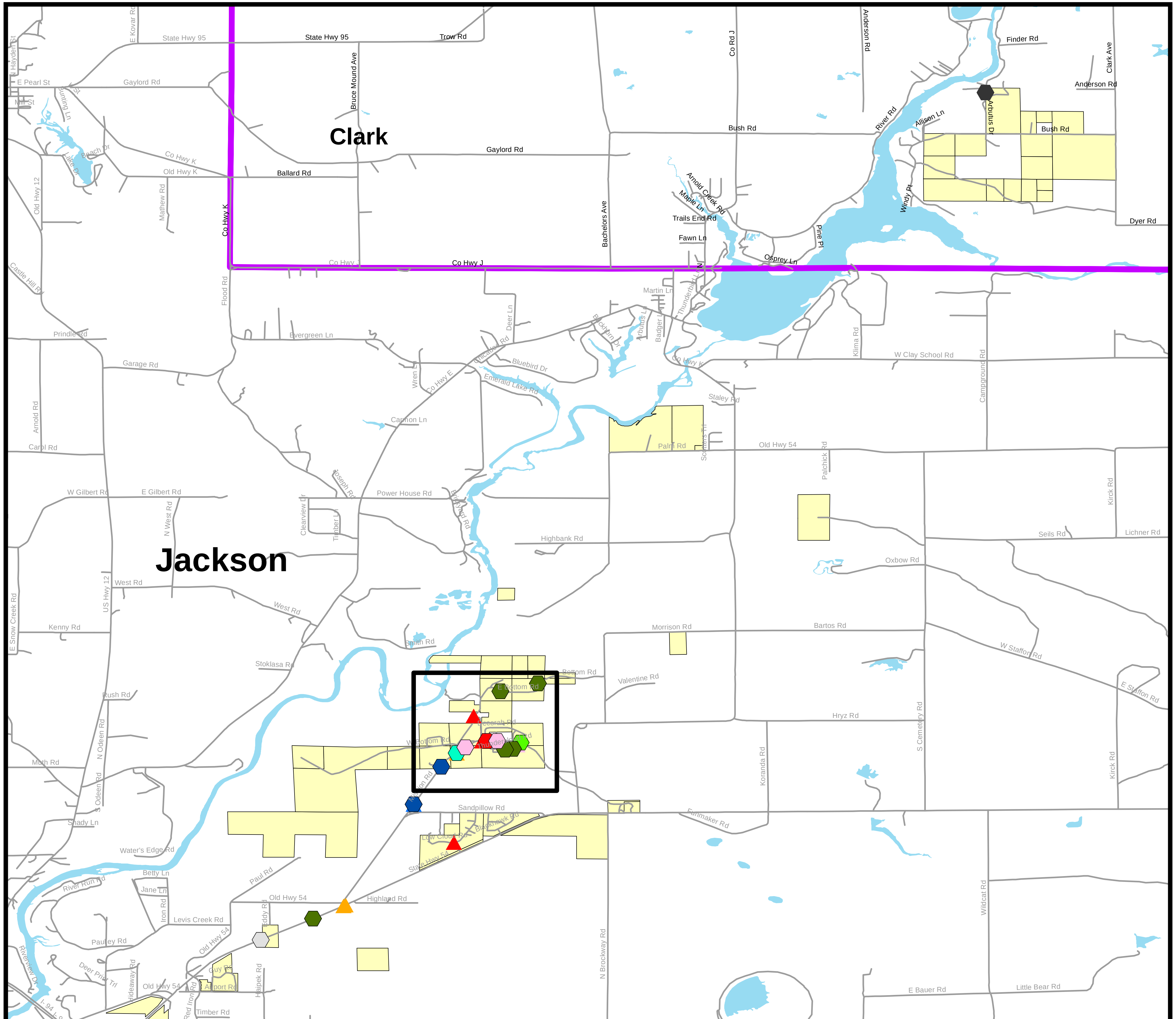
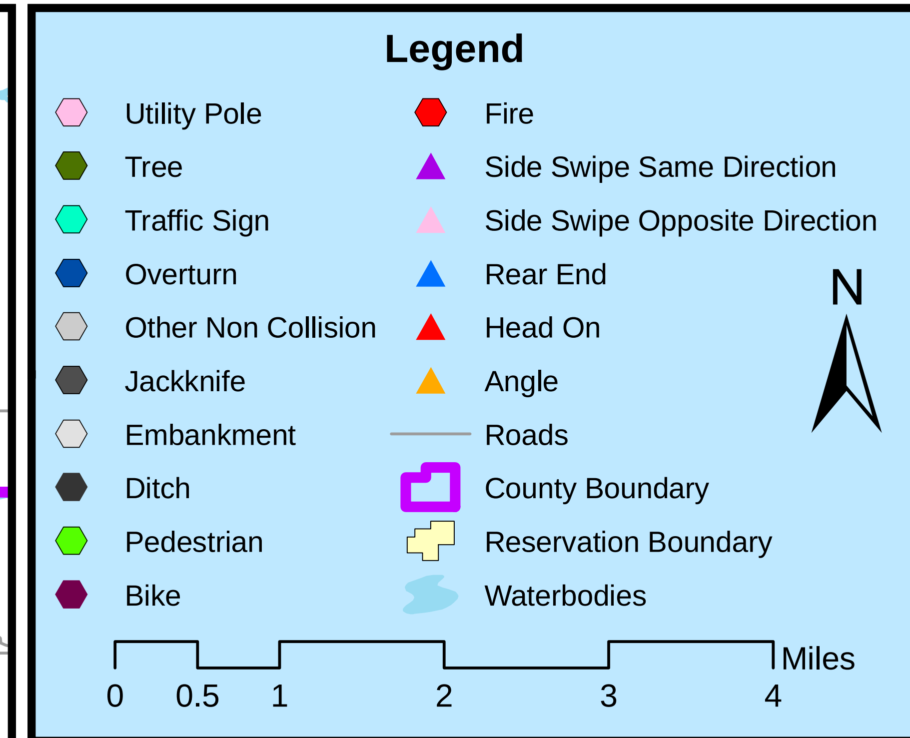
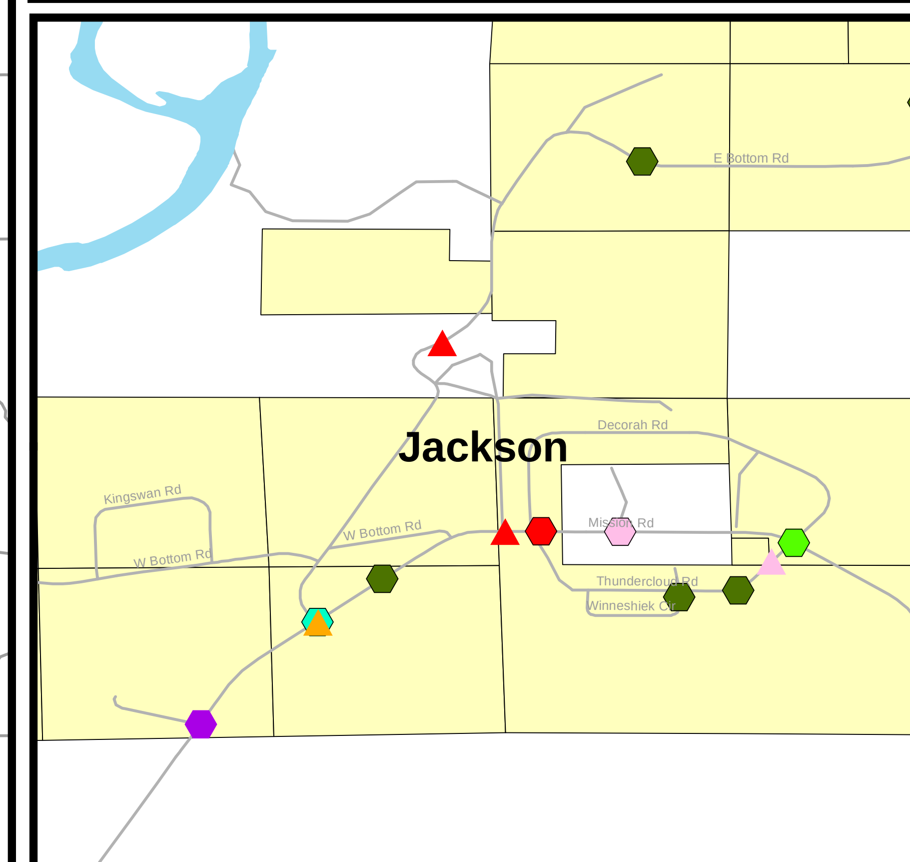
Motor Vehicle Crashes on the Ho-Chunk Nation Manner of Collision 2004-2008

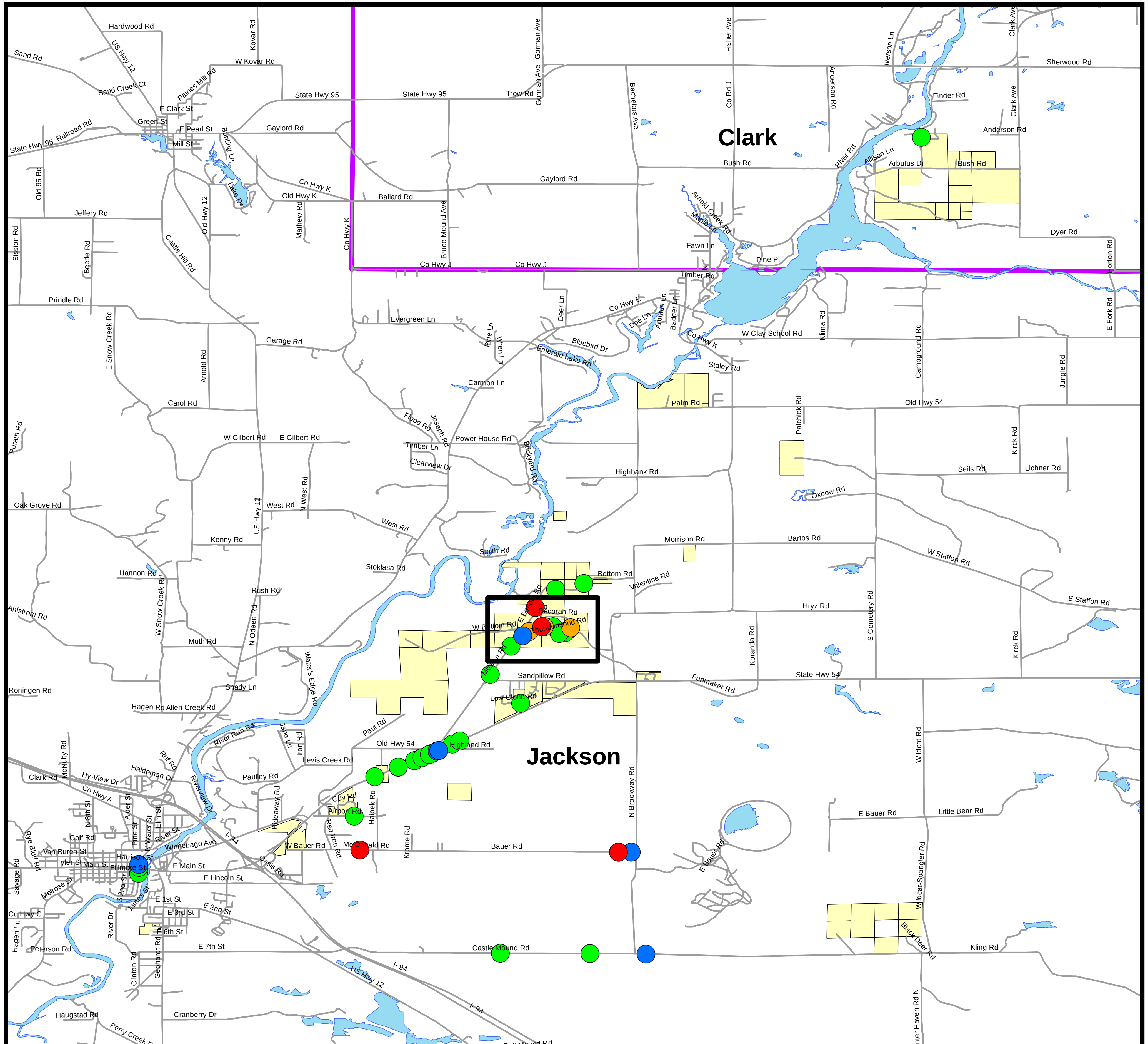


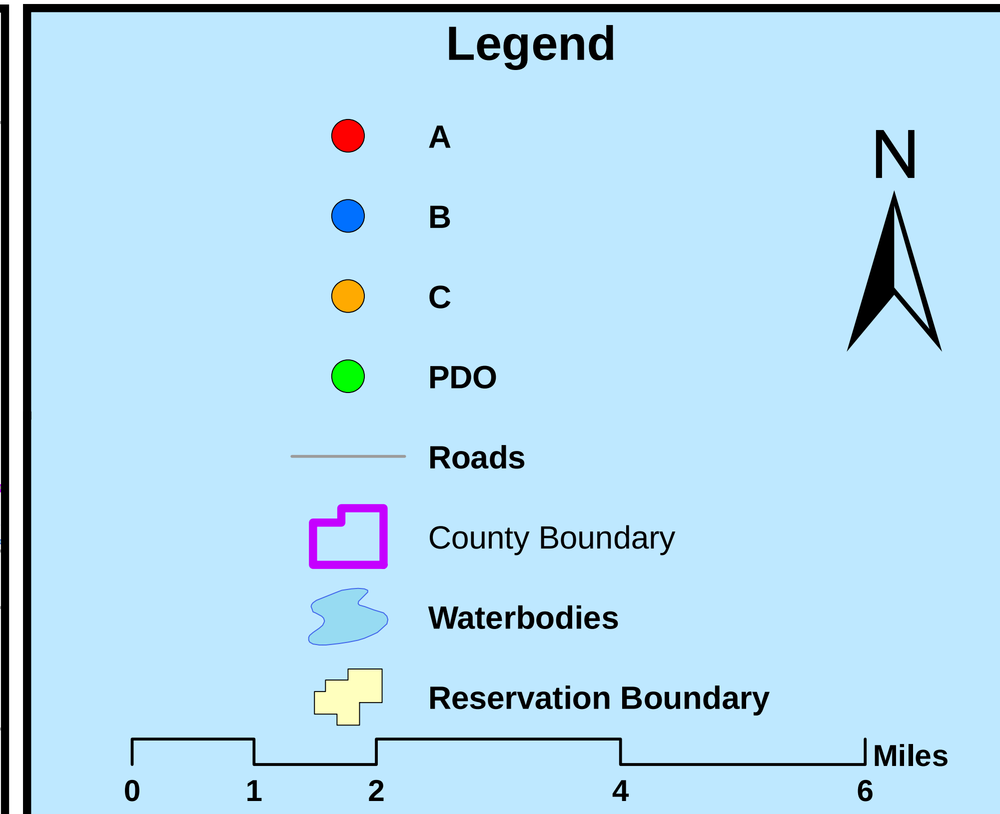


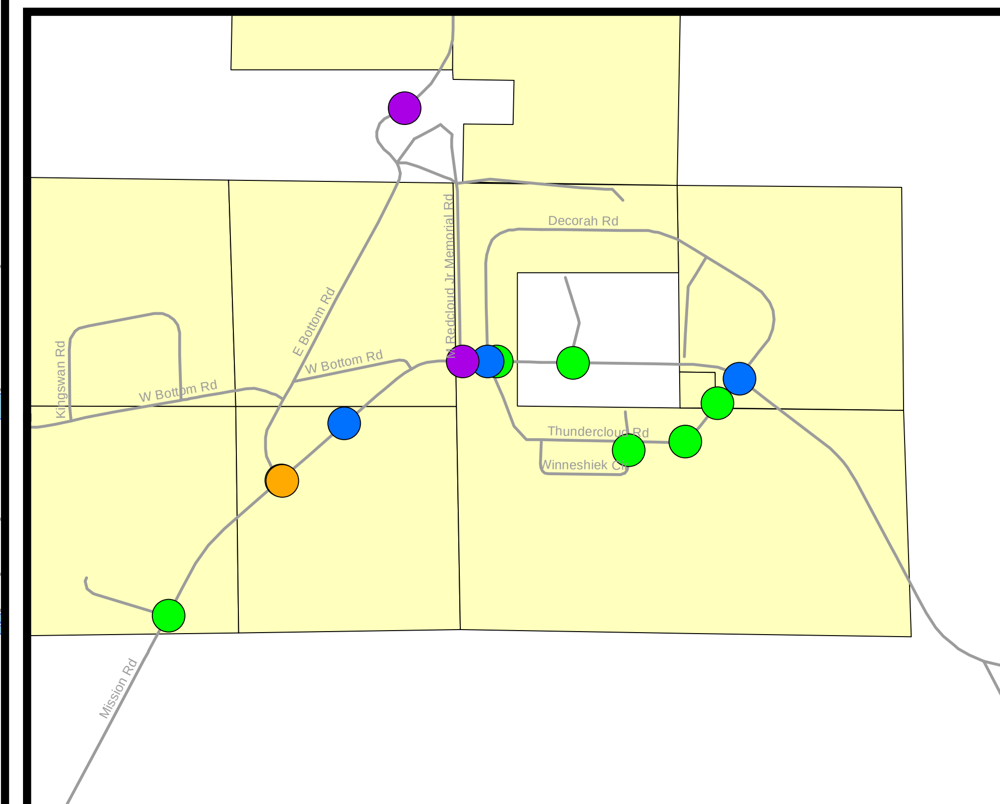


Map created in the LCOOCC GIS/RS Lab, December 2010. Tabular data provided by WisDOT and the UW-Madison TOPS Laboratory. Location data of motor vehicle crashes was geocoded based oon the location on/at descriptions found on the MV4000 crash reports. WI Tribal Lands boundary layer provided by OPUS roads and waterbodies layer provided by US Census 2009 Tiger Data Files. This map is for illustrative purposes only; no guarantee is given as to the accuracy or currency of any of this data. LCOOCC will accept no liability for consequential or indirect damages resulting from the use of its map products.

Motor Vehicle Crashes on the Ho-Chunk Nation Severity Rating 2004-2008

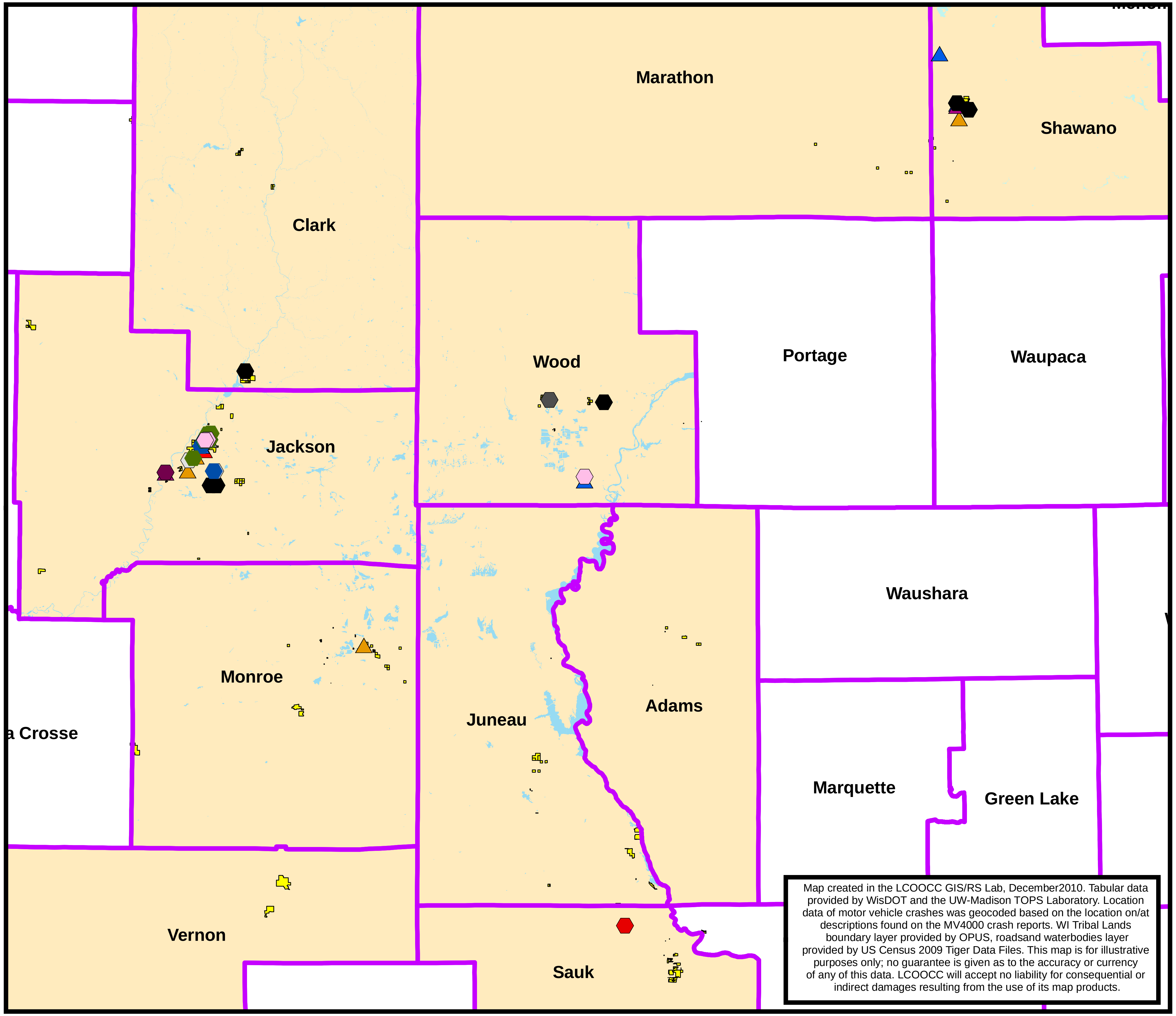


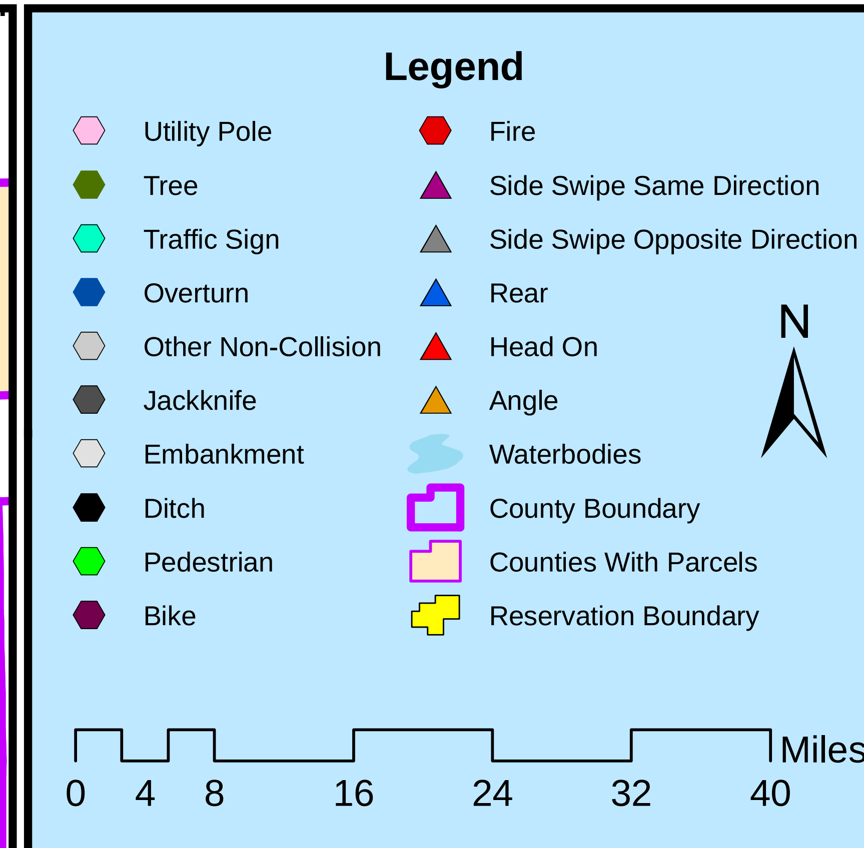


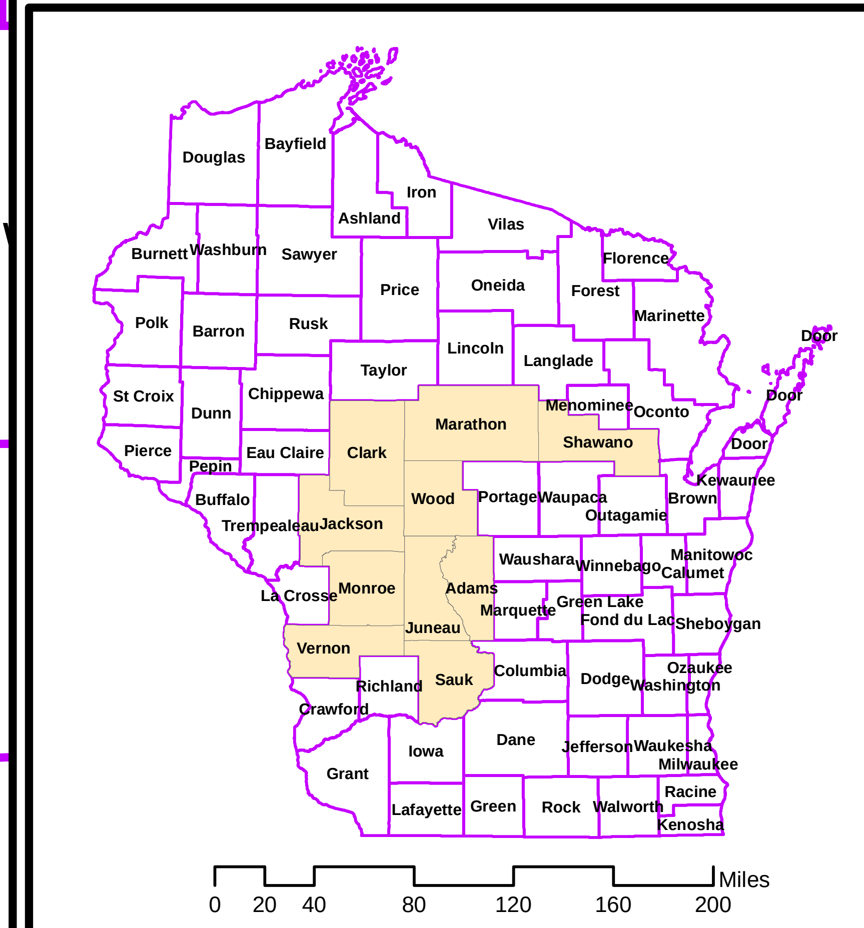


Map created in the LCOOCC GIS/RS Lab, December 2010. Tabular data provided by WisDOT and the UW-Madison TOPS Laboratory. Location data of motor vehicle crashes was geocoded based on the location on/at descriptions found on the MV4000 crash reports. WI Tribal Lands boundary layer provided by OPUS, roads and waterbodies layer provided by US Census 2009 Tiger Data Files. This map is for illustrative purposes only; no guarantee is given as to the accuracy or currency of any of this data. LCOOCC will accept no liability for consequential or indirect damages resulting from the use of its map products.

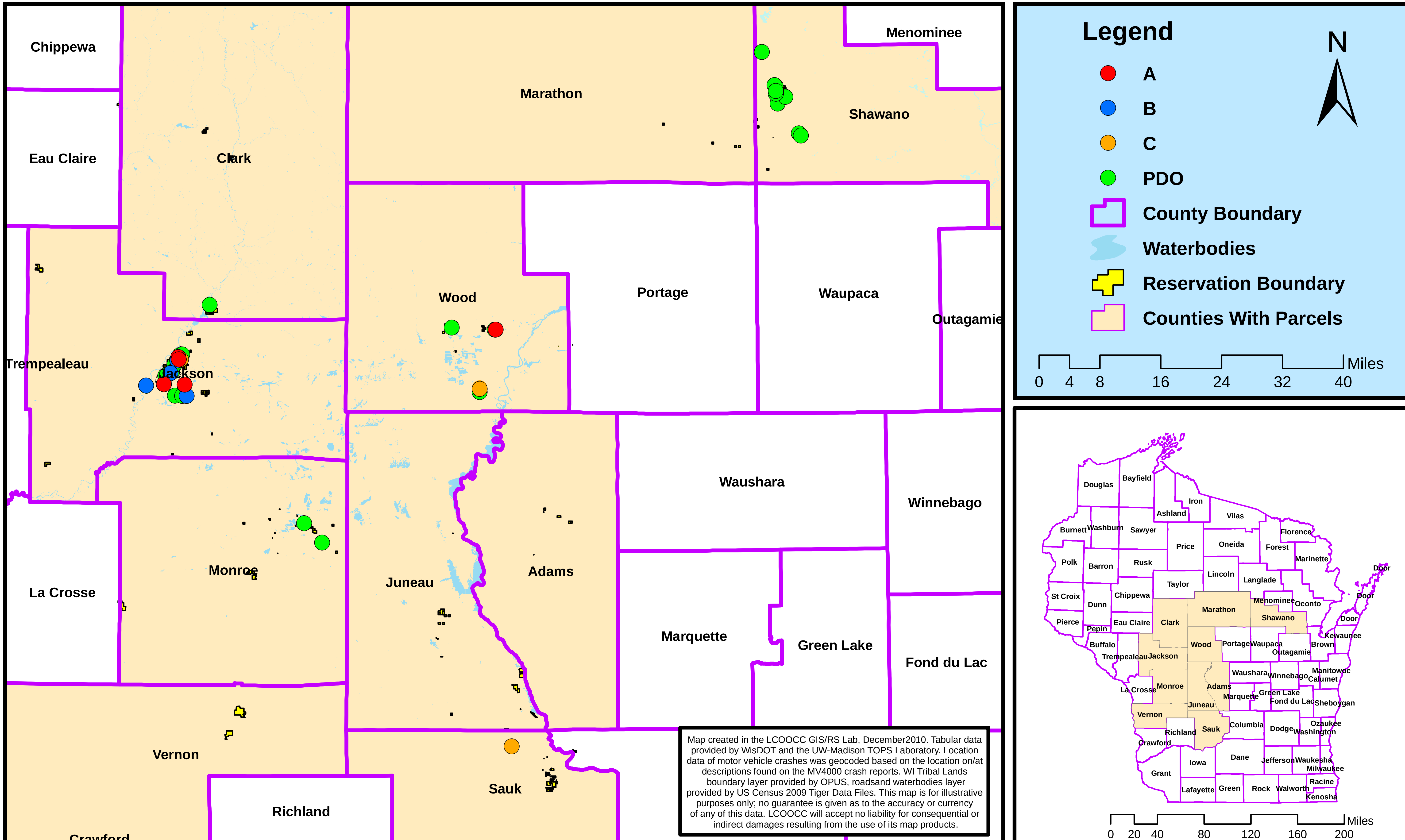
Motor Vehicle Crashes on the Ho-Chunk Nation Manner of Collision 2004-2008







Motor Vehicle Crashes on the Ho-Chunk Nation Based on Severity Rating 2004-2008



OPUS