NEW MEXICO
SENTENCING COMMISSION

New Mexico Department of Public Safety Motor Transportation Division Staffing Study: Final Report

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INTRODUCTION

In November 2013 the New Mexico Department of Public Safety (DPS) contracted with the New Mexico Sentencing Commission (NMSC) to complete a staffing study involving the work of the New Mexico Motor Transport Police Department (MTPD). The main effort of the study involves a staffing study of the uniformed patrol officers and the non-patrol civilian transport inspectors of MTPD. The report contains three sections; each section addresses one of the three contracted topics, i.e., staffing study, bypass routes, and fee structure. The first section addresses the staffing study, beginning with a review of relevant literature, a methods section, a description of the sites and the MTPD in the study, an analysis section, a discussion of the results, and a conclusion. The second section describes the task of estimating the number of commercial vehicles bypassing the New Mexico ports of entry. This section begins with a description of past efforts to estimate the number of vehicles, a description of the method used in this study, results, and an analysis and recommendations. Finally, the third section contains a review of the complex issue of the fee structure used by New Mexico compared to other states using the International Fuel Tax Agreement [IFTA] and the International Registration Plan [IRP]) and provides recommendations to improve MTPD's revenue enforcement mission. This may include an estimate of commercial vehicle counts both intra-state and inter-state for the Albuquerque metropolitan area, if the budget and time permits.

The ability to prioritize work assignments and an ongoing workload assessment process are two key elements of allocation methods in the field of law enforcement. A well-developed progressive allocation plan must ensure the continued deployment of sufficient personnel to accomplish most critical tasks while also anticipating trends such as political intervention or fiscal constraints which could significantly impact allocation and future staffing capabilities (Butler, 2007).

To complete the staffing study a number of tasks were accomplished. We reviewed previous staffing studies of DPS (Bower, et al 2001; Department of Public Safety 2004, 2006, 2007); we also reviewed a 2013 study of the MTPD by the NM Legislative Finance Committee. We reviewed literature relating to law enforcement staffing study methods specifically dealing with staffing patrol agencies. During our staffing study of the NM State Police in 2012, we contacted various state law enforcement agencies and other law enforcement agencies regarding staffing studies they may have completed. We provide the results of that review in this study, as the findings are pertinent to the MTPD study.

In addition to collecting background information, we held several meetings with MTPD staff to discuss the study and focus the research. Based on this information and for a number of reasons, discussed later, we decided to use the established Police Allocation Model (PAM) to calculate staffing levels for the MTPD commissioned officer unit. To calculate staffing for the non-patrol civilian transportation inspectors (TI), we used a modified workload method. This is discussed in more detail later. We used a similar method to determine the staffing levels of the NMSP non-patrol units in our 2012 staffing study.

As stated, during the project we met with MTPD administrative staff to discuss the data needed to complete the staffing study and requested these data. This included data by unit being studied (MTPD commissioned and civilian TI), district level data (e.g., miles of road by type of road, road coverage, span of control), officer level data (e.g., calls for services, patrol time, administrative time, medical and vacation use), operations data (e.g., shift length, shift relief factors, and weekly work hours), performance objectives (e.g., administrative time, court time, proactive time, travel time, patrol intervals, commercial vehicle inspection time, credential booth time, and permit issuance time), and policy decisions (e.g., calls for service, minimum staffing

levels, patrol intervals, coverage per week, and immediate response availability). The data requests are discussed in more detail later.

The analysis section of the report describes the steps we took using PAM to calculate the staffing level of MTPD and the steps we took using the modified workload method to calculate the civilian TI staff level. We also discuss the results and provide a number of recommendations and a conclusion.

This final report was preceded by a draft report. Several discussions were held following the draft report and agreed upon changes have been incorporated into this final report. Assistance from DPS IT staff was instrumental in completing this study and without the assistance of MTPD commissioned officers and civilian TI staff in numerous ways including routine meetings with us, responding to numerous requests for information, providing the large majority of information used in the analyses, clarifying these data requests, discussing relevant policy issues, and commenting on sections of the report, this study would not have been possible.

FIRST SECTION – STAFFING STUDY

LITERATURE REVIEW

Early efforts to calculate the allocation of personnel in law enforcement agencies dealt primarily with the patrol and traffic functions. Today, agencies have found it is essential that all organizational units within an agency be incorporated into the agency's allocation method. The ability to prioritize work assignments and an ongoing workload assessment process are two key elements of contemporary allocation methods. A well-developed progressive allocation plan must ensure the continued deployment of sufficient personnel to accomplish most critical tasks while also anticipating trends such as political intervention or fiscal constraints which could significantly impact allocation and future staffing capabilities (Butler 2007).

According to Butler (2007) advances in the study of patrol allocation methods have been impacted by technological advances in radio communications and computerized patrol dispatch systems, (i.e., CAD systems). CAD systems have increased the ability of law enforcement agencies to efficiently deploy patrol units and implement allocation plans based on computer-generated data. Dispatchers are also able to use geographic information systems (GISs) to produce maps for dispatchers to use to provide responding units the most efficient travel route, and global positioning system (GPS) to track units in the field.

Methods for conducting police staffing and workload analyses include:

1. Early Workload Assessment Methods
2. Population-Based Rates
3. Authorized Strength
4. Minimum Staffing
5. Geographic Location Based
6. Comparison to Other States
7. Contemporary Workload/Performance Staffing

Early Police Workload Assessment Methods

Richard Larson began much of the police workload assessment and deployment modeling research in the 1970's with the development of the Law Enforcement Manpower Resource Allocation System (LEMRAS) (Larson 1972). Iterations of LEMRAS were first operationally used for allocating resources by the St. Louis Police Department, which then opened the door for further research and development based on this research.

Hazard

The Rand Institute published one of the first monographs chronicling the issue of patrol allocation in 1975 (Chaiken & Dormont 1975). Chaiken described the first two popular methods that are important to remember as we review workload assessment methods for allocating patrol staff. First, the traditional method for allocating police patrol units to geographical commands was the hazard formula. O.W. Wilson developed the earliest and best-known hazard formula in the 1930s. This formula identifies factors thought to be relevant for employee allocation. Factors frequently used included: the crime rate in each command, arrests, calls for service, and traffic accidents. Implied factors included: number of street/highway miles, and the number of doors to be checked. Wilson's method required that each factor received a "weight" of relative importance. The higher the weighted number the more importance was given to the factor in the final calculation. Problems occur in the final calculations if relatively unimportant factors receive a higher weight

than an important factor. The difficulty with Wilson's method was the weights were difficult to determine especially when averaged and applied across a large jurisdiction with variations in levels of crime and population (Chaiken & Dormont 1975).

Workload

The second early method was the workload formula, which used Wilson's process of assigning weights to certain factors. The factor weights reflected the number of employee-hours required to handle the factor. It was not easy to determine the workload weight for some factors, (e.g., what is the best weight to assign street miles or to checking a door). Also, it was easy to double-count employee hours, when factors overlapped. For example, a call for service for a felony resulting in two arrests, how should the employee hours be counted and weighted? Additionally, workload weights could be artificially inflated; for example, an efficiently managed command with a high arrest rate might receive additional staff, because the weight for arrests required more staff in the calculation.

Performance Measures

Subsequent to hazard and workload methods, were methods based on performance measures. The "St. Louis model," introduced in the mid-1960s by the St. Louis Police Department, was one of the first models to utilize a CAD system to track the distribution of calls for service and prioritizing them by perceived seriousness, and response based on need and not just time of call. With advances in CAD technology, other agencies developed workload assessment method that used the new technologies. One of these was Jan Chaiken, and in the 1970s she and staff at the Rand Institute developed a performance-based method. The Rand method was called the Patrol Car Allocation Model (PCAM). PCAM relied on computer resources to estimate the performance of the existing patrol allocation and calculate delays in calls for service, travel times, and workloads. After the agency provided: call rates and service time by hour and day, command area in square miles, response and patrol speed, crime rates, and the number of non-calls for service. The PCAM software estimated performance measures, such as: average units available, preventive patrol frequency, and the average travel time to calls. The PCAM improved on Wilson's methods but the technology and expertise required to run the PCAM was more than most police departments had available. The PCAM was used for an unknown period of time by the New York Police Department and the Seattle Police Department (Chaiken & Dormont 1975).

Population-Based

For years communities have used the technique of calculating an "officer per population rate. This is a simple method to estimate the appropriate number of police officers for a community. Although the FBI does not advocate this approach, by publishing the crime rates across the nation by locale and the number of sworn officers per jurisdiction, the FBI has perpetuated the population-based approach and communities have used these calculations as staffing benchmarks. Population ratios are a popular means of demonstrating police staffing allocations and are used by police executives to justify additional resources. The principal problem with the population-based approach is that it only addresses the quantity of police officers not how officers spend their time, the quality of officer efforts, or community conditions, needs, and expectations (AWC 2010).

Authorized Strength

Another common patrol allocation method is to set the number of police officers in a community based on budget allocation to an "authorized strength", or the number of officers that are authorized in the community budget. It may be problematic for an agency to use authorized strength as a benchmark for police staffing for a couple of reasons. First, it can be challenging for a department to remain at their authorized strength. Given the time required for selection and

training of new personnel it is often difficult to replace employees that resign or retire in a timely manner. As a result, departments will be below authorized strength. Additionally, when law enforcement executives and union officials openly complain that a department operates below authorized strength it sends a message to the citizens that the community is not adequately funding public safety (AWC 2010).

Minimum Staffing

Another popular approach to police resource allocation is "minimum staffing." In the minimum staffing approach, police departments define a minimum number of officers required to be on duty. If the number of officers on duty falls below that value, the agency must fill that vacancy.

There are two key justifications for minimum staffing levels. First, in many communities, leaders believe there is a minimum that is needed to ensure public safety. This is particularly common in small communities where there are relatively few citizen generated demands for law enforcement service, but the community, nevertheless, feels that there must be at least two or three officers on duty at all times. The second justification for minimum staffing levels is officer safety. Law Enforcement officers are increasingly insisting (oftentimes through collective bargaining) that a minimum number of officers be on duty (AELE Mo. L. J. 2010). These are both good reasons to maintain minimum staffing levels, but an agency adopting such an approach should understand the potential pitfalls.

First, minimum staffing levels are often only marginally related to demands for service. Second, the minimum staffing levels are sometimes set so high that it results in increasing demands for police overtime. Third, most police officers, given a choice, would prefer to have more officers on the street, and so for that reason, minimum staffing makes sense. However, it is important to acknowledge that increasing the minimum will not, in and of itself, improve the quality of agency performance, nor will it necessarily increase officer safety or public safety. Finally, in some agencies the minimum staffing level may become, by default, the optimal staffing level. Agencies often use the minimum level as a method to decide, for example, whether an officer can take a benefit day off. Others build work schedules so as to ensure that the minimum level is on duty, rather than optimizing the available resources (PAR Group 2008).

Geographic Location Based Analysis

Geographic location based analysis is a manpower analysis technique that calculates staffing needs based on a 24 hours a day and seven days a week presence in each geographic location. The geographic location can be any area adopted by the analyst, (e.g., county, NMSP district, etc.). The analysis assumes all taxpayers are entitled to at least an equal minimum level of service, and consequently, each jurisdiction should have around the clock service with at least one officer assigned to the geographic location for each hourly work shift. Allowances can be made in the calculations for weekends, annual leave, sick leave, etc. An additional assumption can be made to account for supervisory staff. This assumption can be made based on the department's span of control policy, (e.g., one supervisor for every six officers). This analysis is based on an equal minimum-patrol level in each geographic location and is based on arbitrary boundaries rather than workload indicators such a traffic volume or accident rates (Georgia 2011).

Comparison to Other Jurisdictions or States

A simple technique for calculating staffing needs and one that is used routinely because it is easy to perform, is to compare the staffing levels of one state or jurisdiction with another. An

alternative is to compile an average staffing level based on the staffing levels of several jurisdictions and compare the average to ones' own jurisdiction. This technique considers each jurisdictions differences by presenting the data in an "officer per capita" context, and may not adjust for the varying duties and responsibilities of each agency. The technique is fairly simple to perform and can be done quickly and routinely if required.

Contemporary Workload/Performance Based Methods

Many police administrators recognize that the design and implementation of an allocation model for their agencies is only the initial step in an effective personnel deployment strategy. To maintain efficiency, allocation plans must be followed by an ongoing workload assessment plan. Workload assessments are designed to improve efficiency by ensuring the equitable division of work assignments and allow for the most efficient allocation of personnel to meet the operational demands and service goals of the department.

The utilization of workload assessments as part of a personnel allocation plan can have a significant impact on the organizational structure and overall operational efficiency of a law enforcement agency, can assist in determining future staffing requirements, and can serve as a justification for requesting increases in fiscal appropriations to meet future staffing needs. Since it is to be expected that workloads may fluctuate due to any number of factors, such as changes in the demographics of a particular district, it is essential that workload assessments be conducted on a regular basis to maintain effective deployment of manpower and to maximize the utilization of resources.

Factors to be considered in any workload assessment include the number of employees needed to complete each particular assignment, the type of tasks, the complexity and the volume of tasks to be performed, and the time needed to complete the assignment. Another variable that must be addressed in any workload assessment is the relative importance of each task to the mission of the agency. The ability to effectively prioritize workload assignments, with a greater proportion of resources dedicated to tasks deemed to be of critical importance, is an essential element of any viable personnel allocation plan.

A critical aspect of workload assessment is choosing the correct method of evaluation. A faulty workload analysis can have detrimental long-term repercussions for a law enforcement agency, such as understaffing or inefficient deployment. Another potential problem can occur if an agency attempts to use one standard allocation format to assess all organizational units within the department. The assessment process to determine staffing needs may vary greatly in some organizational units within an agency. These may include but are not limited to traffic safety, patrol, investigations, homeland security, special operations, and administration functions. It is essential that each organizational unit of an agency be evaluated based on its own needs, and those requirements should be prioritized as part of the overall assessment strategy (Butler 2007).

Today, the generally used approach to police staffing are workload/performance-based approaches that take advantage of current technology. The approaches we review have similar objectives. Basically, these approaches estimate the number of law enforcement officers required by examining how officers spend their time (AWC 2010). A determination of how many officers are needed is based on what the agency wants its officers to do. There are six steps in the process to produce a staffing estimate:

1. Examine distribution of calls for service by hour of day, day of week, and month
2. Examine the nature of the calls

3. Estimate time consumed on calls for service
4. Calculate agency relief factor
5. Establish performance objectives
6. Provide staffing estimates

Police Allocation Manual (PAM)

The Traffic Institute at Northwestern University developed the Police Allocation Manual (PAM), under a grant from the U.S. Department of Transportation and the National Highway Traffic Safety Administration. It is a widely used method of identifying patrol staffing needs for a variety of law enforcement entities (local, county, and state). The PAM methodology is designed to help agencies address the following questions:

1. What is the number of officers, field supervisors, and command personnel required to provide acceptable levels of patrol and traffic services?
2. How should patrol officers be allocated between geographic regions and shifts to maximize productivity?

The procedures for determining the number of personnel are based on an analysis of officer workload in terms of the amount of time required to complete various tasks. The PAM estimates the suitable staffing level for a complete jurisdiction or a specific patrol district by accounting for the time that officers need to perform patrol activities (Scottsdale 2004)

All on-duty patrol activities are assigned to one of the following categories:

1. Reactive (e.g. criminal and traffic related calls for service, traffic accidents, assists)
2. Proactive (e.g. self-initiated calls, community-oriented policing, traffic stops, criminal investigations, field interrogations, motorist assists)
3. Uncommitted (e.g. patrol in assigned area)
4. Administrative (e.g. office time, court time, training, meals, briefings, reports, etc.)

The PAM methodology relies on historical workload data and user-supplied performance objectives and policies. It is important to account for all the different patrol activities as well as the entire time spent on those patrol activities. This information is then compiled onto worksheets that guide the user to determine how many officers are needed to match the service needs of the population and the workload of patrol units.

The following data items illustrate the types of inputs required by the PAM:

1. Shift length (hours)
2. Average work week (hours)
3. Average number of paid off-duty hours per year per officer
4. Average number of on-duty hours spent on non-patrol temporary assignments per year per officer
5. Average number of officers to be supervised by each field supervisor
6. Percentage of field supervisor on-duty time spent in the field (i.e. not doing administrative duties)
7. Number of command personnel
8. Geographic area
9. Average driving speed by type of road
10. Average response speed for emergency calls
11. Average travel time for emergency activities

12. Average response speed for non-emergency calls
13. Average travel time for non-emergency activities
14. Total road distance by type of road
15. Patrol interval by type of road (hours)
16. Average number of accidents handled per day
17. Average service time per accident
18. Average number of service calls handled per day
19. Average service time per call
20. Proportion of patrol units staffed with two officers
21. Minimum number of on-duty officers required for patrol duties
22. Percentage of on-duty time spent on special assignments by patrol officers
23. Percentage of service calls that cannot be pre-empted
24. Percentage of administrative activities that cannot be pre-empted
25. Percentage of self-initiated activities that cannot be pre-empted
26. Average time spent on administrative activities per hour
27. Average time spent on self-initiated activities per hour
28. Average time spent on emergency calls per hour

Ultimately, the PAM approach can estimate the average number of on-duty officers needed each day in each district or "Autonomous Patrol Area" (APA). The PAM takes into account the number of field supervisors, the number of command staff, the proportion of two-officer units, minimum staffing requirements, special assignments, and time off.

The PAM approach is a model of police staffing that can recommend how many officers are needed. Each step is based on elementary mathematical and logical relationships between workload, expected patrol performance measures, the characteristics of the patrol area, and the number of officers required.

The PAM approach can determine "appropriate" staffing levels and assess the impact of hypothetical scenarios on the required staffing level (e.g. what will be the impact on staffing if the workload increases by 20% or if the target for the average travel time is reduced by 1 minute). However, the PAM can only prescribe how many officers are needed when performance objectives are provided (i.e. when someone decides what level of service is desired or expected). The PAM cannot be used as a predictive tool because:

1. It does not describe/predict the level of patrol performance (e.g. response time) by specifying a given number of officers, the workload, and other characteristics of the jurisdiction.
2. It does not predict changes in patrol performance or workload as staffing levels change.
3. It does not predict the future workload of a patrol area.
4. It does not determine if and or how the shifting and the scheduling patterns should be changed.

Additionally, the PAM cannot be used to assess the efficiency of current patrol operations. This is because:

1. PAM does not determine if and or how patrol districts should be redesigned.
2. PAM does determine the optimal proportion of two-officer units that should be deployed on patrol.
3. PAM does not assess whether the organization is internally consistent (e.g. whether patrol units spend too little or too much time on some calls, whether the average response time

to some calls is too long or comparatively too short, whether patrol officers process calls adequately, etc.) (Idaho 2007; Georgia 2011; Traffic Institute 1993; City of Vancouver 2007; Prox 2007).

Patrol Service Area (PSA)

A model we include as a contemporary performance based system is the Patrol Service Area program used by the Washington, D.C. Metropolitan Police Department (MPD). In 1997, the MPD implemented the PSA model, in which the District of Columbia was divided into 83 patrol service areas, with specific patrol units assigned to each area. The PSA model was introduced as part of that department's community policing initiative and was designed to strengthen bonds between police and the community by reducing the response area for each unit, thereby increasing the familiarity of the patrol units with the neighborhood and its residents. It was felt that this move away from traditional response-driven policing would better serve the community. An allocation formula was developed for Washington, D.C.'s PSA model, prioritizing each call for service based on its perceived seriousness. The PSA model is currently being reassessed and service areas are being merged to form fewer than ten PSAs in Washington D.C. (MPD 2005).

International City/County Management Association (ICMA)

In their web brochure, the ICMA states, ". . . (they) consistently find that the aggregate data produced by the typical Computer Assisted Dispatching systems (CAD) or the usual Records Management System (RMS) do not provide a clear picture of actual workload, as opposed to calls for service data. It is critical to fully understand true workload that is, the total time required to handle the work as opposed to calls for service, the number of calls requires a deep dive into the data. Few police or fire departments have the internal capability to do this" (ICMA 2011).

The ICMA process is to extract data from the police department's CAD system and convert calls for service data and identifies seasonal, weekday/weekend, and time-of-day variables into a police services workload. ICMA staff graph the police services workload data to better present the data. Using this information the police department can contrast actual workload with deployment and identify the amount of discretionary patrol time available, as well as time commitments to other police activities.

Leonard Matarese of ICMA explains that, police service workload is different from calls for service in that calls for service is a number reflecting recorded incidents. Workload is a time measurement, recording the actual amount of police time required to handle calls for service from inception to completion. Various types of police service calls require differing amounts of time and affect staffing requirements. As such, call volume (number of calls), as a percentage of total number of calls could be significantly different than workload in a specific area as a percentage of total workload (Matarese 2012)

Once the police service workload is determined, ICMA compares workload to available deployed hours and comparing those to the hours necessary to conduct operations, staffing expansion and or reductions can be determined and projected. ICMA also reviews and reports the agency's response times both cumulative as well as averages for all services. Additionally the time necessary to conduct proactive police activities (i.e., directed patrol, community policing, and selected traffic enforcement) are reviewed to provide the department with a meaningful methodology to determine appropriate costing allocation models (ICMA 2011).

The Managing Patrol Performance (MPP) Model

The Managing Patrol Performance (MPP) system is the Windows-based version of a DOS program created by the National Institute of Justice called Patrol/Plan, which has been available

to police agencies since the 1990s. MPP uses a mathematical model to help managers plan the deployment of patrol personnel.

The MPP approach is based on the idea that front-line staffing needs should be tied to service levels and workload. The MPP approach was developed by the Police Management Advisors (a California consulting group) to simulate how varying levels of workload and staffing can affect patrol performance. The MPP system is the main competitor to PAM and Deploy®. MPP is described by it's developers as a "state-of-the-art" method to make patrol deployment decisions and identify long-range patrol staffing needs. In essence, the MPP capability is a series of mathematical formulas designed to model the patrol force in any area, on any day of the week and during any time period. The MPP approach relies on queuing theory, probabilistic reasoning, and various results from operations research.

The MPP analyzes CAD data and matches staffing levels with patrol workload, while meeting specific performance goals. The MPP system computes patrol performance estimates from the CAD data.

The MPP model can calculate the following factors and estimates:

1. Number of units on patrol duties
2. Average travel time
3. Average service time
4. Average call rate
5. Number of units required by call
6. Average time spent by call
7. Average number of units deployed
8. Average time spent on administrative duties or other non-call related tasks
9. Percentage of priority 1, 2 and 3 calls
10. Area of each district
11. Average number of free units (available to answer calls or perform other patrol duties)
12. Average call time
13. Average utilization rate
14. Average response time
15. Percentage of time spent on uncommitted time
16. Proportion of calls handled by secondary units
17. Probability that all units will be simultaneously busy
18. Percentage of time during which all units will be simultaneously busy
19. Number of response units required to meet particular patrol performance characteristics
20. Optimal distribution of units across time blocks, days of the week or geographic areas

The MPP approach identifies how many units are needed and when or where they should be deployed based on how busy patrol officers are and what the service goals of the police agency are.

The number of units recommended by the MPP model can be adjusted by geographic region, day of week and time block. The goal of the MPP model is to link patrol resources with call workload (staffing to workload) and therefore maintain consistent service levels. The MPP approach can be used to ensure that officers have a chance to do proactive policing and work at a steady pace.

As opposed to PAM, the MPP model can be used to make empirical predictions, run simulations, or look at hypothetical scenarios. For instance, the MPP model can be used to show what will likely happen to priority 1 response times, the number of free units, and the amount of proactive

policing when the number of units deployed changes, the number of dispatched calls varies, or patrol shifts are reorganized.

The MPP method is used by the Seattle Police Department, the Los Angeles Police Department, the Charlotte-Mecklenburg (NC) Police Department, the Newport News (VA) Police Department, the Knoxville (TN) Police Department, the Winston-Salem (NC) Police Department and the Palm Beach (FL) County Sheriff's Office.

The MPP method is not very transparent. The underlying mathematical equations of the MPP model are based on theoretical results from queuing theory, operations research, and regression analysis. Unfortunately, without knowing what assumptions are used, it is difficult to assess how precise or how relevant are the results.

MPP is not very flexible. The MPP model is not designed to explore the call, dispatch, and deployment data in detail. For instance, the MPP model cannot be used to study discrepancies by patrol district, source of calls, call types (e.g. abandoned 9-1-1 calls) or case types (e.g. residential burglary, aggravated assault, etc.). Similarly, MPP cannot be used advantageously to study questions of a qualitative nature like the deployment of two-officer units, the design of the patrol districts, the creation of patrol-based specialty squads, or the establishment of service level standards (Sullivan 2001; Bellmio 2004; City of Vancouver 2007).

Ops Force: Deploy® (formerly Staff Wizard)

Deploy is a commercial computer program distributed by Corona Solutions. Like the MPP model, Deploy is based extensively on the Patrol/Plan software developed by the U.S. National Institute of Justice. Deploy uses results from queuing theory to analyze the patrol workload and generate key statistics that can assess staffing, deployment, and scheduling.

Using the patrol data, Deploy can estimate:

1. The expected number of citizen-generated calls for service by hour of the day and day of the week.
2. The average number of patrol units dispatched to each call for service.
3. The average service time.
4. The total workload by patrol district, by priority level, by hour of the day and by day of the week.
5. The average utilization rate by patrol district, by hour of the day and by day of the week.
6. The average number of available patrol units.
7. The average queuing delay, the average travel time and the average response time.
8. The expected probability that a call will have to be stacked in the waiting queue.
9. The expected average response time.

Deploy requires the following CAD type data to work correctly:

1. The priority code associated with each call.
2. Date and time stamps indicating when the call was received, dispatched and cleared.
3. Date and time stamps indicating when each unit was dispatched, enroute or at the scene and when each unit cleared.
4. A code differentiating between officer-initiated (on-view) and citizen-generated calls.

Deploy relies on user-specified performance objectives to determine the appropriate staffing level for patrol. For instance, the user provides:

1. The maximum probability that all patrol units will be busy and a call will have to be stacked.

2. Average utilization rate.
3. Average response time (by priority).
4. Average travel time (by priority).
5. Average queue delay (by priority).
6. Average number of available units.
7. Uncommitted time per unit per hour.

Deploy can then assign units to a computer-generated optimized schedule and or measure the efficiency of the user's original performance objectives.

Deploy can provide indicators and is a tool to describe and predict performance and efficiency. Unfortunately, Deploy faces the same problems as the MPP model. It is expensive, costing between $50,000 and $100,000 initially with additional yearly fees. Also, Deploy is not very transparent. Because it is a proprietary commercial software solution, Deploy does not describe the mathematical models it relies on or the assumptions it uses to generate the results.

It is also not very flexible. Deploy is not designed to explore questions of a qualitative nature like the deployment of two-officer units, the design of the patrol districts, the creation of patrol-based specialty units or the establishment of performance standards.

The Vancouver Police Department Patrol Deployment Approach (VPD)

Some Police Departments and State Law Enforcement agencies build on the methods of known systems and expand on those systems to create a method that is unique to that department or agency. One of the most documented of these Local Systems is the VPD. In 2006, the Planning and Research Section of the Vancouver Police Department in Vancouver Canada developed a patrol deployment system. Compared to other methods, the VPD approach to patrol deployment is more thorough in the sense that it considers many quantitative and qualitative, operational, and managerial issues that are not considered by the PAM, MPP, or Deploy methods. For instance, the VPD approach considers:

1. How long patrol officers spend on each call for service.
2. How many officers attend each call for service.
3. Whether some officers should be reassigned to front-line patrol functions.
4. Whether the calls that patrol officers currently attend need to be attended or whether some calls that are not currently attended should be attended.
5. Whether more or less two-officer units should be deployed.

Conceptually, the PAM approach, the MPP model, and Deploy take historical patrol data (including the call data, the dispatch data and the deployment data) and generate empirical predictions based on that data. The VPD approach improves on this method by analyzing the data before it is fed to the theoretical model. This leads to a better view of what is currently being done and, what is not being done or what should be done differently (City of Vancouver 2007; Prox 2007).

International Association of Chiefs of Police (IACP)

The IACP is another organization that performs patrol staffing, deployment, scheduling, and productivity studies. The IACP process begins by reviewing the client agency's philosophies (e.g., policing style, service standards, response time standards, supervision style, etc.). IACP also collects information and data on a range of topics, including:

1. Number of calls for service
2. Population size and density

3. Composition of population, particularly age structure
4. Stability and transiency of population
5. Cultural conditions
6. Climate, especially seasonality
7. Policies of prosecutorial, judicial, correctional, and probation agencies
8. Citizen demands for crime control and non-crime control services
9. Crime reporting practices of citizenry
10. Municipal resources
11. Trends in the foregoing areas.

After information is collected in these topic areas the IACP staff create a five-phase work plan designed to accomplish the study. The phases are typically:

1. Staffing Requirements Training
2. Policy Preference Review
3. Patrol Staffing Data Collection
4. Staffing Requirements Projections
5. Report Preparation

After reviewing two studies performed by the IACP, we were not able to determine any extensive quantitative analysis in the IACP methodology. The studies we reviewed contained a large amount of narrative discussing policy issues and recommended procedural changes (IACP 2012; IACP 2009; IACP 2008).

Best Method

Our review of police allocation models resulted in a list of five contemporary options: the Police Allocation Manual (PAM), International Association of Chiefs of Police (IACP), Ops Force: Deploy®, the Managing Patrol Performance (MPP) Model, and the International City/County Management Association (ICMA). Of the five options we used the PAM model to study the New Mexico Motor Transportation Police Division commissioned officers. The strength of the PAM method is it's consistency with the previous DPS staffing studies, it is an established method, it is a quality method, the software is free, and it is commonly used by state law enforcement agencies.

The PAM method is used strictly as a tool for estimating the allocation of patrol operations. It cannot be used as a predictive tool, that is, it cannot be used to determine if or how the shift and scheduling patterns should be made. In addition to not predicting future patrol operations, PAM does not assess the efficiency of current patrol operations, (e.g., whether the average response time to some calls is too long or comparatively too short, or whether patrol officers process calls adequately). Despite the limitations of PAM as addressed later in this report, it is the best method to use for this study.

As noted in the PAM Manual (The Traffic Institute 1993, 1xixiii), like all staffing and deployment models, PAM is limited by the assumptions on which they are built and by the data used. The findings from this model are meant to be used by policy makers to inform staffing decisions and are meant to be used in combination with other factors like operational, economic and political factors to determine the final staffing levels.

PAM uses a variety of assumptions about the MTPD to find rational patterns that can be used by stakeholders and MTPD and NM Department of Public Safety administrators to arrive at an informed consensus of staffing needs. Staffing models have progressed since 1985 when John

Schuiteman moralized that, "Adequate police protection… lies in the eye of the beholder…" The mathematics, statistics, and available data used in models like PAM have improved but have not replaced the need for community leaders and police officials to decide on the level of patrol presence and service expected by the citizens of New Mexico and the resources available to the MTPD.

State Law Enforcement Agencies and Other Law Enforcement Agencies

As an adjunct to our 2012 staffing study of the NM State Police literature review we contacted state law enforcement agencies to conduct a census of staffing studies. While conducting this aspect of the study we also collected information from other law enforcement agencies, primarily municipal police departments.

In order to report on staffing studies performed by other state, and local (city/county) law enforcement agencies the studies were first searched for on the Internet. If a study was found on the web and it was not clear the report was current – at the time of our 2012 study - attempts at contacting the relevant law enforcement agency were made to confirm the study was the most current or to obtain the most current report if it was not. Once the Internet search was exhausted, attempts were made to contact law enforcement agencies by both email and phone in order to obtain staffing study reports. Contact information for the law enforcement agencies contacted was found via the Internet. Although numerous agencies were successfully contacted not all agencies had performed a staffing study and/or could not contact us with staff that were familiar with the study being performed by their agency.

Initially the focus was on state police agencies and on 'like' states and bordering states to New Mexico only. Numerous attempts to gather staffing reports from the five states that border New Mexico were taken. We also searched states, such as Idaho, Nebraska, and Wyoming, which were deemed 'like' New Mexico due to their low overall population and their population density to area ratio. During the search process for staffing reports it became apparent not as many state police agencies' staffing reports would be readily available as hoped, so the search was widened to other states, and local (city and county) police agencies as well. During the Internet search for staffing reports two international studies were found and were retrieved as pertinent literature for this study.

We attempted to locate staffing study reports from 37 law enforcement agencies. Nineteen were state agencies, 16 were local, and 2 were international. In total we were able to obtain 22 staffing study reports. The Internet search provided us with 18 reports (4 states, 12 local, and 2 international). Five additional reports were obtained through contacting the law enforcement agencies via email and phone (4 states, and 1 local). In all 25 law enforcement agencies were successfully contacted to try to obtain current staffing study reports and/or to confirm we had the most current staffing study report (18 state, and 6 local). Not all 25 agencies successfully contacted provided us with a report. Table 1 displays the law enforcement agencies we were able to obtain reports from, the type of methodology the agency used (PAM, MPP, IACP, etc.), and the report year.

Table 1. Obtained Staffing Study Reports			
State	**Agency**	**Method**	**Most Recent Reporting Year**
Arizona	Highway Patrol	Workload (unspecified method)	2010
	Gilbert Police Department	International Association of Chiefs of Police (IACP)	2012
	Glendale Police Department	International Association of Chiefs of Police (IACP)	2010
	Pinal County Sheriff's Department	Police Allocation Manual (PAM)	2008
British Columbia	Vancouver Police Department	Police Resource Model (PRM) & Managing Patrol Performance (MPP)	2007
Colorado	State Patrol	Trooper Allocation Model (TAM)	2012
	Longmont Police Department	Call for Service (CFS)/Workload	2006
Florida	Highway Patrol	Police Allocation Manual (PAM)	2011
	Multiple agencies in Charlotte County	Workload Analysis Review	2007
Georgia	State Police	Police Allocation Manual (PAM)	2011
Idaho	State Police	Police Allocation Manual (PAM)	2007
Illinois	Rockford Police Department	Call for Service (CFS)	2009
Iowa	Waterloo Regional Police Service	Managing Patrol Performance (MPP)	2009
Louisiana	Shreveport Police Department	Managing Patrol Performance (MPP)	2004
Michigan	Traverse City Police Department	Workload (unspecified method)	2010
New Zealand	New Zealand Police Department	Police Resource Model (PRM)	2007
North Carolina	Charlotte-Mecklenburg Police Department	Managing Patrol Performance (MPP)	2000
	Winston-Salem Police Department	Managing Patrol Performance (MPP)	2009
Virginia	State Police	Trooper Allocation and Distribution Model (TADM)	2003
Washington	State Patrol	Police Allocation Manual (PAM)	2010
	Seattle Police Department	Managing Patrol Performance (MPP)	2007
Washington DC	Metropolitan Police Department	Police Service Areas (PSA)	2004

METHODOLOGY

This portion of the report describes the two methods used to calculate an estimated number of staff for MTPD. Staff from the MTPD administration and TI staff assisted NMSC throughout the project. These staff provided data and expertise and helped NMSC through the subtleties of the MTPD data, duties, and organizational structure.

Literature Review

Based on the literature review and the fact the PAM model had been used in previous studies of DPS Divisions we decided to use the PAM model and a modified workload model. Combined, the two models addressed the needs of patrol divisions and non-patrol divisions of the MTPD.

Combining Models

The first feature of the MTPD staffing study is the PAM, a well-accepted method for estimating staffing levels in state law enforcement patrol agencies. In conjunction with using the PAM a

modified workload measurement process was used to calculate the staffing needs of the Transportation Inspectors of MTPD. The primary features of the PAM model includes categories of work activities such as:

- Reactive (e.g. emergency calls for service, criminal or traffic related calls for service, traffic accident calls for service, assists),
- Proactive (e.g. self-initiated calls, community-oriented policing, traffic stops, criminal investigations, field interrogations, motorist assists),
- Uncommitted (e.g. patrol in assigned area), and
- Administrative (e.g. office time, court time, training, meals, briefings, reports, etc.)

These activities are analyzed to calculate the estimated number of commissioned law enforcement personnel required in each MTPD district.

The second feature of the staffing study is a modified time study workload assessment model applied to the non-patrol civilian Transportation Inspectors working at the 12 NM State Ports of Entry.

The PAM results and the results from the non-patrol modified time study were combined to create an estimated staffing level for each of the these units of the MTPD.

Events in the Methodology

Diagram 1 provides the benchmark steps of the methodology for this Staffing Study. The sequence of events begins with identifying the required data to use in the PAM model application and data for the non-patrol model. PAM requires two types of data, from two sources, numeric data from the various datasets MTPD maintains and policy objectives. Policy information is derived from written formal policies and from performance measures and objectives set by MTPD administration.

We identified and collected the data required for the PAM and non-patrol model. Data types included, calls for service, accidents, and hours on and off duty. Where necessary we included policy decisions and/or current agency practice information. Because the Department's information systems are not designed to accommodate a study of this type extracting and compiling needed information took time. Time was spent gathering policy decision and current agency practice information. Because this process had been performed during the 2012 study for the NM State Police, the data collection process was not as lengthy or complex for the MTPD.

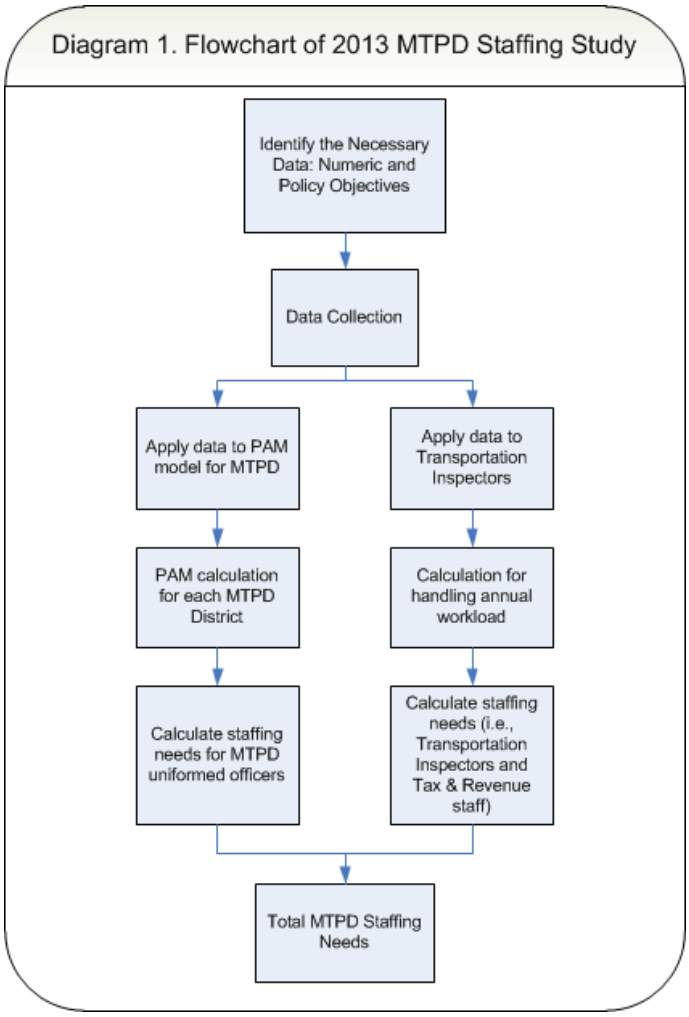
Both the PAM application and the non-patrol model formula are calculated using simple math, i.e., dividing the workload by the available time officers have to work.

Finally, the results of the PAM application and the non-patrol model were combined to produce the total MTPD staffing estimates for MTPD. It is important to remember the results of the study are estimates only.

Main Ideas of the Methodology

Both, the PAM and the modified workload model use the number of staff and available work hours along with the volume of work to produce staffing estimates. PAM is the more sophisticated tool incorporating the characteristics of the patrol area.

Staff available - The number of officers and sergeants available to perform the work tasks is incumbent on: 1) the amount of on-duty time for each staff member; 2) area of patrol responsibility; 3) response time objectives; 4) number of non-patrol special duties; and 5) work duties (e.g. answering calls for service, investigations, traffic stops, commercial vehicle inspections, etc.).



Volume of work – The question of, "how much work does the staff accomplish?" is answered by analyzing work activity, which includes calculations from time spent on calls for service, number of calls for service, patrol time, administrative time, and time per job activity.

Methodology Decisions and General Approach

Decisions were made at the beginning of the study and during the course of the data collection phase of the project. To begin, we used a recent review of the literature describing the existing police allocation models. This literature was used to guide the study. We also used staffing study information from state law enforcement agencies and other law enforcement agencies to supplement the information from the literature review regarding the use of the PAM method and other methods used by these agencies.

We adopted a one-year study period. The data for the PAM method was compiled for fiscal year 2013 to match the legislative budget year. National data used for determining the Transport Inspectors staff was available by calendar year and so the modified workload method incorporates a calendar year 2013 format. Using a years' worth of data is typical for these types of staffing studies. Because the entire population of data was at hand there was no need to sample data.

The aim of the PAM calculation was to determine the staffing level at the officer and sergeant level. Therefore we selected officer and sergeant level data for each MTPD district. TI data for each of the 12 state Ports of Entry was used in the modified workload calculation. The PAM application was used in the 2012 NMSP study.

NMSC requested the variables needed in the activity events and calls for service data from MTPD to complete the PAM steps. Data were entered into the PAM steps for each of the MTPD districts. In addition to focusing the PAM method on the sworn uniform MTPD officers, NMSC entered Transportation Inspector data in a modified workload method and road mileage data from the NM Department of Transportation (DOT) was entered. Discussions were held with MTPD staff to review preliminary findings and verify data points.

During the 2012 study, NMSP provided a copy of the 2005 and 2007 DPS Workload studies with accompanying data files, a copy of the NM Legislative Finance Committee's 2006 report on DPS management practices and staffing levels, and the 2004 PAM user's manual. NMSC used this information as background and context for the 2012 study and some of these materials were relevant in the present study of the MTPD. Additionally, NMSC referenced the 2013 NM Legislative Finance Committee Review of the MTPD Mission and Organization in the present study.

NMSC met with MTPD staff on several occasions to provide updates on the progress of the study and to discuss the need for additional or corrected data. MTPD staff decided policy data issues and objectives necessary to complete certain sections of the PAM model and the modified workload model.

PAM Data

This section briefly describes how the data was gathered for the PAM model. This study is based on the PAM method described in the updated 2007 manual (Stenzel 2007). The method described in the updated manual contains eight worksheets and other materials that describe the data entry, calculations, and reasoning for the updated manual. The original model was developed in 1991 (Northwestern University 1993).

Data Sources

The primary data source for this study was departmental databases that involved officer/sergeant activity for the period of July 2012 through June 2013 and calls for service data for the same time period. Additional information was collected by MTPD district for current staffing levels and additional duties and responsibilities. Roadway mileage by type of road (interstate, state highway, U.S. highway, and county) and MTPD district area square miles was provided by the New Mexico Department of Transportation.

The PAM model requires data elements from two sources; numeric data and policy decisions derived from written organizational policies or agency performance objectives. The PAM steps comprise 38 numeric variables and 24 policy variables (see Appendix A for a complete list of the

data and policy variables). Six data sources were used to acquire the data necessary to complete the PAM steps. Table 2 describes the data sources.

Table 2 Data Sources for PAM model and Non-Patrol model

Data Label	Description	Department	Source
CAD Statistics	MTPD Calls for Service by MTPD District	MTPD	DPS IT
Activity Codes and Time (7/1/12 to 6/30/13)	Officer activity documented by code for FY2013	MTPD	MTPD
Average Work Week	Typical work week for officers	MTPD	MTPD
District Personnel	Count, name, and call number of commissioned MTPD officers per District. Count and name of Transportation Inspectors per District.	MTPD	MTPD
STPOL_Mileage_District-w-sqmiles.xls	Highway miles in each MTPD district. Includes Interstate miles, US Routes, Frontage roads, NM Routes, and County roads.	MTPD	NM Dept. of Transportation
Transportation Inspectors Time Sheets	2-week period of data collection of TI's work activities at 12 Ports of Entry, between Feb. 6, 2014 and March 21, 2014.	MTPD	MTPD
FMCSA Motor Carrier Management Information System (MCMIS) data	Inspection Levels 1, 2, and 3 for CY2013	-	Federal Motor Carrier Safety Administration (FMCSA)

Non-Patrol (Transportation Inspectors) Modified Workload Method

In 2005, the Legislative Finance Committee stated in its *Review of Management Practices and Staffing Levels*, " . . . the (PAM) model is not conducive to staffing and allocation of police officers performing investigative functions." The PAM model is designed for patrol functions and limited special assignments. PAM was an appropriate tool for calculating patrol staffing levels for MTPD but not for calculating the workload of the Transportation Inspectors (TI) stationed at the Ports of Entry (POE). In view of the fact that TI workloads needed to be calculated we designed a workload assessment procedure to calculate their workloads. This non-patrol workload model is a modified procedure for identifying the number of TIs necessary and the work that is related to inspections and tax and revenue collection.

The method is described below beginning with the selection of the participating MTPD units. Time information for calculating work type activities can be measured several ways. We performed a Time Study of the TIs at each of the 12 state Ports of Entry. During the time study period we collected work time and activity types for the MTPD TI staff over a two-week period (10 working days). MTPD Administration provided the number leave hours, which the TIs used during FY13. We used the types of work activities the TIs performed during the Time Study period, the number of activity events, and the time it took to accomplish each event to calculate the proportion of TI time required to perform the current workload.

Selection of participating divisions

NMSC staff chose the PAM method and the MTPD sworn officers to participate as well as to evaluate the TI staff at the Ports of Entry using the modified workload method. The decision to include the TI's in the modified workload method was based on the fact that TI's are not primarily involved in patrol activity.

Study period length

Specifically, TI data from calendar year 2013 was used in the calculations for the TIs in the modified workload method. The time study process started with a team of researchers from ISR visiting seven Ports of Entry and training the TI staff how to fill-out the Time Study data collection form. The Gallup POE was the first port visited on February 6, 2014 and the last visit was made on March 5, 2014 to the San Jon POE. TI employees reported their time for a 2-week (10-day) period. NMSC staff trained a total of 27 TI's at seven of the state's 12 Port facilities. TI's from the other five Ports attended the training sessions. Ultimately, NMSC staff of by staff that NMSC had trained total of 80 port staff. These 80 staff submitted time sheets during the study period. The 80 staff reported 7,549 individual work "events" during the study period.

Despite the reluctance on the part of some TIs to participate in the time study, the officers submitted time sheets on time. Three port supervisors were contacted at least once to remind them to submit their time sheets. The quality of the data collected was good for the most part. NMSC staff spent approximately three weeks cleaning the data and the result of this process was beneficial to the quality of the data.

Categorization of the workload

The types of work responsibilities for TIs were discussed with the MTPD Administration. Work types were also identified from observing the TI's work during previous visits to several Ports of Entry and from discussions with TI and MTPD staff. The work types and related activities for TIs are listed in Table 3. TI work types can be grouped into two categories, Transportation Inspector Activities and Port Revenue Activities.

Table 3 Transportation Inspector and Port Work Activities
Transportation Inspector Activities
Inspection Level 1
Inspection Level 2
Inspection Level 3
Escort Vehicle Inspection
Report Writing and Preparation
Scheduling and routine HR documentation
Non-work Time: Office/Activities/Phone Calls/Computer
Weight Enforcement
Miscellaneous Duties
Port Revenue Activities
Financial Activity
Credential Booth
Issue Permit
Worked Counter

Employee year value

After determining the type of work and activities performed by the TIs, it was necessary to determine the employee year value, i.e., how much time is available to do the work, or essential work related activities. MTPD Administrative staff reported actual hours worked using the DPS Information System described in Table 2. NMSC estimated the employee year value by determining how many days per year were available for employees to work (the employee year).

The employee year value begins with 260 workdays (2,080 hours). This was calculated using 2,080 total available work hours in a standard year divided by 8 work hours per day. Employees are not able to actually work this many hours during the year, because of holidays and time off the job for various reasons. MTPD Administrative staff provided the total leave time for FY13 for all TI employees. The leave time was subtracted from the total available work hours to arrive at the Total Available Time per TI, for the year. For TIs, leave Time averaged 216 days per year and an average of 7 training days per year (See Table 4). The number of days used in each category was subtracted from 260 resulting in 226 days or 1,808 hours of time available per employee per year to accomplish the Work Type Workload. This calculation was used for the average amount of work time available even though it is understood that TI staff work more than eight-hour days due to limited staff.

Table 4 Actual Work Days In a Year for TIs

Time Category	Days
Available Work Days Per Year	260
Subtract Non-Work Days and Non-Work Type Activities	
Leave Time (includes all leave types, i.e., vacation, holiday, sick, etc.)	-27
Training	-7
Total Work Days Per Year	226

Time to perform each work type activity

The number of activities (e.g., permits sold, Level 1 inspections, etc.) performed during 2013 in each work type category was counted when known or estimated when the number of activity events was not known. Table 5 shows the list of Work Types, describes the weight calculation used and the source or justification of the event count used. Known event counts (e.g., Inspection Levels 1, 2, and 3) were acquired from data on the Federal Motor Carriers Safety Administration website (USDOT, 2014) and from MTPD data (i.e., number of Permits Issued). When event counts did not exist in available data, two techniques were used to estimate the annual counts from the Time Study data. Two Work Types, (i.e., Escort Vehicle Inspections and Report Writing) were calculated based on the number of times they occurred during the Time Study and extrapolated to a full year. An estimate of the annual time to accomplish six Work Types (i.e., Scheduling, Credential Booth, Non-work Time, Weight Enforcement, Miscellaneous Duties, and Worked Counter) was calculated using the proportion of total activities reported in the Time Study by the TIs. There was an average of 493 entries for these six events, which was adequate for our estimates.

A time weight in minutes was created for each Work Type – except for the six proportional work types – based on the average time reported by the TIs in the Time Study. For example, 95, 'Level 1 Inspections' were reported during the Time Study taking an average of 45 minutes to accomplish. The 'Escort Vehicle Inspections and 'Report Writing' were calculated by using the number reported during the two-week Time Study multiplied by 26, (i.e., the number of two-week periods in a year) (See Table 6). TIs reported the six remaining Work Types but times to

accomplish each of these event activities varied widely. These Work Types were reported an average of 493 times by the TIs during the Time Study. The proportion of observed time from the Time Study was multiplied by the total available minutes in a year and the product was the proportion of minutes in a year used to accomplish the Work Type.

Table 5 Transportation Inspector and Port Work Types		
Transportation Inspector Activities		
Work Type	**Weight Calculation**	**Source or Justification of Event Counts**
Inspection Level 1	Time Study average	US DOT
Inspection Level 2	Time Study average	US DOT
Inspection Level 3	Time Study average	US DOT
Escort Vehicle Inspection	Time Study average	Time Study events extended to a year
Report Writing and Preparation	Time Study average	Time Study events extended to a year
Scheduling and routine HR documentation	Time Study proportion reported	Proportion of minutes per year
Non-work Time: Office/Activities/Phone Calls/Computer	Time Study proportion reported	Proportion of minutes per year
Weight Enforcement	Time Study proportion reported	Proportion of minutes per year
Miscellaneous Duties	Time Study proportion reported	Proportion of minutes per year
Port Revenue Activities		
Financial Activity	Time Study average	Time Study events extended to a year
Credential Booth	Time Study proportion reported	Proportion of minutes per year
Issue Permit	Time Study average	MTPD data
Worked Counter	Time Study proportion reported	Proportion of minutes per year

The basics of the modified time study method were discussed with the MTPD and DPS administration.

Table 6 Work Time Weights in Minutes for Transportation Inspectors and Port Revenue Agents for 2013	
Work Types	**Work Type Weights (minutes)**
Inspection Level 1	45
Inspection Level 2	30
Inspection Level 3	15
Escort Vehicle Inspection	10
Report Writing and Preparation	20
Scheduling and routine HR documentation	Time Study proportion (67,366 mins.)
Non-work Time: Office/Activities/Phone Calls/Computer	Time Study proportion (247,009 mins.)
Weight Enforcement	Time Study proportion (561,384 mins.)
Miscellaneous Duties	Time Study proportion (112,277 mins.)
Financial Activity	15
Credential Booth	Time Study proportion (1,871,280 mins.)
Issue Permit	7
Worked Counter	Time Study proportion (598,810 mins.)

Calculation of the workload

Multiplying the case weights by the annual number of activities produced a workload for each specific Work Type category. The sum of all Work Type workloads is the 'Total Activity Specific Workload.' This represents the total number of minutes to complete the annual workload.

The 'Total Activity Specific Workload' was converted to hours and divided by the 'Available Time for Work Types Workload.' The result of this calculation was the number of full time equivalents (FTE) needed to handle the entire CY2013 workload. Table 7 shows the steps in the calculation.

Table 7 Calculation of the Workload

Calculating the workload:

Case weights X Annual Number of Activities Opened = Workload

Add the Workload for each Work Type, the result is the Total Activity Specific Workload

Calculate the Officer Demand:

Total Activity Specific Workload ÷ Available Time for Work Type Workload = Officer Demand

The detail for the modified workload method calculation is shown in the Analysis of the Staffing Study, under the heading 'Transportation Inspector Results.'

SITE DESCRIPTION

New Mexico is the fifth largest state in the U.S. comprised of 33 counties with a land area of 121,298 square miles and a 2010 population of 2,059,179 (36th most populous and 6th least densely populated) with a population per square mile of 17 persons. In 2011 New Mexico's average age of residents was 35.3 years of age with a median income of $43,820 with 20.2% of the population living below the poverty level (US Census Bureau, 2012). The poverty rate was 15% nationwide in 2011. In New Mexico, 451,000 people were estimated to be living in poverty in 2011 or 22.2% of the population. That was the highest percentage nationally (Massey, 2012). The level of poverty impacts the rural communities in New Mexico. As of 2012, approximately 16 small communities statewide have been forced to close their local police department and rely on the county sheriff and the DPS to provide law enforcement services in their communities (UNM-ISR, 2012)

In 2010, slightly more than 50% (50.6%) of the population was female and Hispanics accounted for 46.3% of the population of the state, followed by Whites (40.5%) and American Indians (9.4%). Bernalillo County had the largest population of 662,564 people with a population per square mile of 570.8 and Harding County had the smallest population of 695 with a population per square mile of 0.3.

New Mexico can be split into 6 regions: Central, North Central, Northeast, Northwest, Southeast, and Southwest. Below is a listing of counties that make up the different regions and the 2010 total population of each region.

1. Central – Bernalillo, Sandoval, Torrance and Valencia Counties: 887,077
2. North Central – Los Alamos, Rio Arriba, Santa Fe and Taos: 235,303

3. Northeast – Colfax, Guadalupe, Harding, Mora, Quay, San Miguel and Union Counties: 66,996
4. Northwest – Cibola, McKinley and San Juan Counties: 228,749
5. Southeast – Chaves, Curry, De Baca, Eddy, Lea, Lincoln, Otero and Roosevelt Counties: 338,739
6. Southwest – Catron, Dona Ana, Grant, Hidalgo, Luna, Sierra and Socorro Counties: 302,315

New Mexico Motor Transportation Police

The MTPD is authorized by the Motor Transportation Act (Chapter 65, NMSA 1978) to ensure the safe and legal operation of commercial motor vehicles, to prevent the introduction of illicit contraband into the state and to facilitate trade and promote safety on state highways by providing law enforcement traffic services to the public.

MTPD is a division of the New Mexico Department of Public Safety with complete statewide law enforcement jurisdiction; MTPD enforces federal safety regulations as well as state motor vehicle and criminal codes.

The MTPD consists of sworn uniformed officers and certified civilian Transportation Inspectors. MTPD uniformed officers are authorized to enforce the criminal code, especially the commercial vehicle safety and enforcement. They have full police authority under New Mexico law. Transportation Inspectors perform commercial vehicle inspections as well as collect tax and revenue at 12 Ports of Entry in the state. Our study included sworn uniformed officers and sergeants and transportation inspectors. MTPD currently has 98 actual sworn personnel assigned to eight districts statewide. Table 8 shows the number of MTPD authorized and actual sergeants and Officers by district. During 2014, the authorized strength for all district MTPD officers and sergeants was 129. The actual total was 98 or 76% of the authorized level. Districts 4 and 7 have the same number of actual as authorized staff.

Table 8 MTPD Sergeants & Officers Authorized and Actual by District for 2014

District	MTPD Total Authorized 2014	Actual 2014	Actual as % of Authorized
D1	17	12	70.6
D2	17	13	76.5
D3	10	3	30.0
D4	14	14	100.0
D5	19	13	68.4
D6	33	27	81.8
D7	12	12	100.0
D8	7	4	57.1
Total	129	98	76.0

Source: MTPD Personnel data March 2014

For operational purposes, the MTPD divides New Mexico into eight Districts (See Figure 1). Each district has a main office with a commanding officer overseeing day-to-day operations. District offices provide an access point for citizens and a physical location where commercial haulers may seek information on matters of law enforcement, state or federal commercial vehicle regulations, as well as information regarding the transportation of radioactive materials across the state.

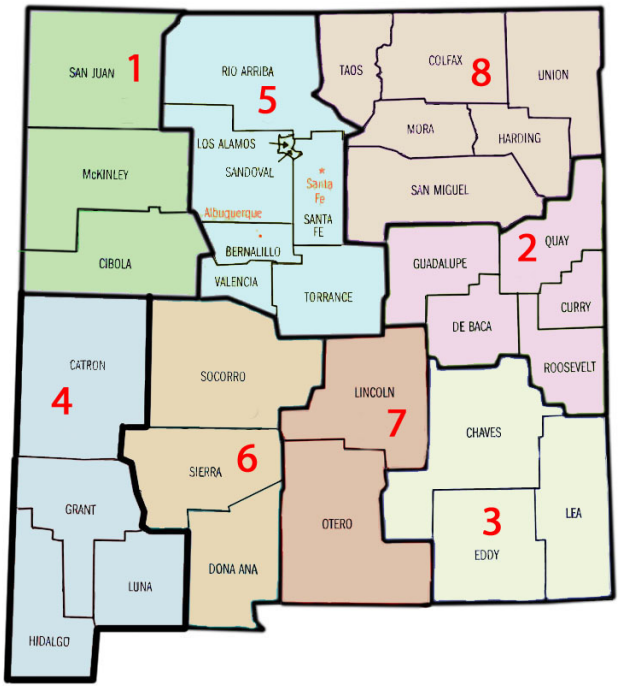
MTPD maintains 12 Ports of Entry across the state. Five Ports of Entry are designated as major ports because they are located on Interstate roadway points of entry into New Mexico. The five major ports are: Gallup, San Jon, Lordsburg, Anthony, and Raton. Each of these ports are open 24 hours a day, seven days a week, except Raton which closes at 2:00 a.m. each night. The remaining seven ports are: Clayton, Nara Visa, Texico, Hobbs, Carlsbad, Orogrande, and Santa Teresa. These ports maintain various hours of operation. Most are open five days a week and close each evening. Each of the eight Districts contains at least one POE, except District 5, which does not have a POE.

In 2014, the authorized strength for all Port Supervisors and Transportation Inspectors was 74. During our two-week TI Time Study there were actually 74 port employees, (i.e., 100% of the authorized strength). Table 9 shows the number of authorized staff and actual staff as a percentage of authorized by district. Districts 3, 6, and 8 reported having 100% of authorized staff.

Table 9 MTPD Port Supervisors & Transportation Inspectors Authorized and Actual by District for 2014

District	Port Sup & TIs Total Authorized 2014	2014 Reported as Actual	Actual as % of Authorized
D1	14	12	85.7
D2	18	17	94.4
D3	2	2	100.0
D4	12	11	91.7
D5	0	0	-
D6	13	13	100.0
D7	6	5	83.3
D8	9	9	100.0
TOTAL	74	69	93.2

Figure 1 MTPD Districts



ANALYSIS

This section reports the analyses for both the MTPD sworn officers and sergeants and the Transportation Inspectors. The PAM analysis of the MTPD begins this portion of the study followed by the modified workload method of the Transportation Inspectors.

MTPD Results

Table 10 reports the actual and PAM estimated number of officers and sergeants for each of the eight MTPD districts. The table also shows a select number of the variables used in the PAM to calculate the estimated number of staff. Particularly, the time to handle dispatched motor vehicle crashes, time for other calls for service (e.g., crimes, criminal investigations, traffic emergencies), time for self-initiated contacts (e.g., traffic stops, field interrogations, motorist assists traffic stops), and the shift relief factor (i.e., the average number of officers required to staff one shift position per day, 365 days a year) are important in the calculations. The amount of time for self-initiated contacts is lengthy for MTPD because the CAD call for commercial vehicle inspections is included in the category. The next to last row in the table shows the average number of officers required per day to meet the daily workload. This is the total number of officers required to handle accidents and other calls for service during the hours of coverage in each district, and is based on the total time to handle the workload. The last row shows the total number of estimated officers in each district required per day to handle area and line patrol responsibilities and is based on the number of roadway miles in the patrol area, patrol intervals, patrol response time and speed. Area patrol is a reference to officers assigned to handle emergencies and non-

emergencies in the district. Line patrol is referred to as the time officers are assigned to patrol specific roadway segments with little or no responsibilities for police services off the roadway (Stenzel 2007, 44). PAM does not distinguish between moving and stationary patrol time.

The number of officers required to meet the patrol level for each roadway type is based on:

- The number of roadway miles (see Appendix B),
- The hours of patrol coverage per week (168 per week),
- The average patrol speed (75 mph for Interstates, 65 mph for US/NM roads, and 55 mph for County roads),
- The shift length (hours), and
- The patrol interval (hours) set by agency policy (10 for Interstates, 24 for US/NM roads, and 96 for County roads).

Table 10 Significant Select PAM Variables by District for FY2013

	DISTRICTS							
	Dist1	Dist2	Dist3	Dist4	Dist5	Dist6	Dist7	Dist8
Actual Officers & Sergeants (FY2014)	12	13	3	14	13	27	12	4
PAM Estimated Officers & Sergeants	27	35	18	22	54	27	16	44
The shift length (hours)	10	10	8	10	10	10	8	8
Select Number of Self-Initiated Contacts per Shift per Officer Performance Objective	5	5	5	5	5	5	5	5
Number of crash calls for service dispatched to MTPD	84	33	26	73	61	76	43	19
Average hours to handle each dispatched crash call for service	1.4	2.3	2.7	2	1.2	6	2.6	7.4
Number of other calls for service (excluding crashes) dispatched to MTPD	272	219	80	676	438	460	211	75
Average minutes to handle each dispatched other CFS (excluding crashes) to MTPD	1.4	1.3	2.5	2.3	2.5	2.5	1.5	1.8
Number of self-initiated contacts	1,534	2,151	751	5,290	3,558	3,611	4,086	1,196
Total hours spent on self-initiated contacts	646	1,043	276	1,974	1,884	1,281	1,531	563
Average minutes to handle self-initiated contact	142.6	123.8	163.1	160.8	113.3	169.1	160.1	127.6
Shift Relief Factor	2.9	2.8	1.7	1.8	2.6	2.9	1.9	2.4
Average number of officers required per day to meet the daily workload	.14	.1	.1	.6	.3	.4	.15	.1
Total number of officers required per day for area and line patrol	5	6	6	7	10	5	4	9

Table 11 reports the time in minutes to complete types of activities by activity type. Types of activities include administrative, self-initiated, reactive, and patrol. The sum of activity types must equal 60 minutes. Administrative time shows the average number of minutes each officer spent on administrative activities (e.g., criminal reports and court time) during the study period. Reactive time reports the total time officers spent handling dispatched crash calls, including officer's time on the scene and subsequent investigation time as well as the total time in minutes per hour per officer to handle all calls for service except crashes and traffic stops and commercial

vehicle inspections or other self-initiated tasks. Self-initiated time reports the time officers spent on self-initiated activities while on patrol, (e.g., issuing violations and assisting disabled motorist) and patrol time shows the time officers had for uncommitted time including patrol activity (min/hr. per officer). In total this table reports how much time each officer spent on average per hour on each of the work categories: administrative, reactive (i.e., crashes and other CFS), self-initiated, and patrol.

The general structure of the PAM is based on the assumption that administrative time and self-initiated time do not account for a majority of each available hour. That is these two categories are not recommended to account for more than 30 minutes per hour. As evidenced by Table 11 these two activities do not account for more than 30 minutes in any district. The amount of time available for patrol varies by district. Districts 3, 4, and 6 are above the average number of minutes available for patrol time and Districts 2, 5, 7, and 8 are below the average.

Table 11 Service Times in Minutes Per Officer Hour by District

District	Administrative Time	Reactive Time (traffic crash and other calls for service time)	Self-Initiated Time	Patrol Time
1	10.0	1.06	12.6	36.3
2	9.8	0.57	14.5	35.0
3	7.3	0.62	13.8	38.3
4	2.7	3.38	14.0	40.0
5	8.9	1.10	15.9	34.1
6	5.8	3.31	10.6	40.3
7	10.0	1.33	14.1	34.6
8	9.9	0.34	17.6	32.1
Average	8.0	1.46	14.2	36.3

After entering the data variables into the PAM application a separate estimate for the number of officers and field supervisors (i.e. sergeants) for each of the eight MTPD Districts was produced. These district totals were summed to provide the estimate for the MTPD. Table 12 shows the results of the PAM calculations for officers and supervisors for each district and all of MTPD and compares the 2014 PAM estimates to the 2014 authorized and actual number of staff in each district and all of MTPD.

The PAM estimate of 243 officers and sergeants is an increase of 145 above the actual number of 98 officers and sergeants and 114 above the 129 authorized officers and sergeants. The PAM estimate of staff is an 88% increase over the authorized number of staff. As stated throughout the report, the PAM calculations are based on the data provided by the agency in four main categories, (i.e., reactive time, proactive time, administrative time, and uncommitted or patrol time). Based on the PAM calculations, the estimate of officers is driven by several variables. For example, the number of roadway miles, the size of Districts, the number and time spent handling self-initiated contacts, the "select" number of self-initiated contacts, leave time and overtime are associated with the PAM staffing requirements.

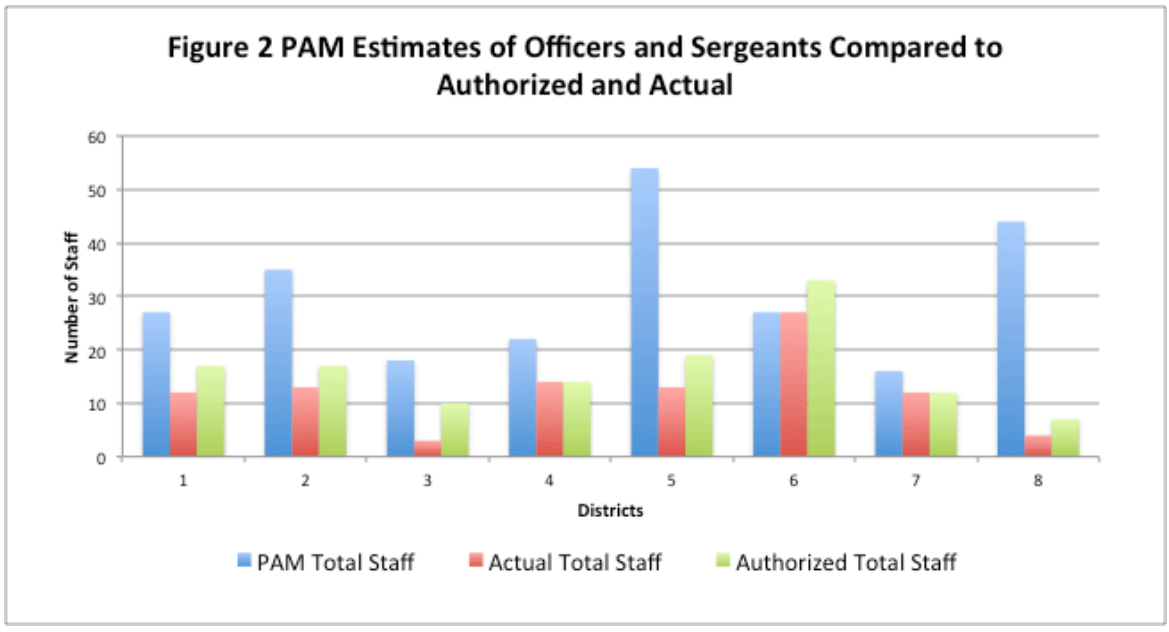
The largest difference between the PAM estimate and the number of authorized officers and sergeants was found in District 8 (37 staff), District 8 (35 staff), and District 2 (18 staff). Interestingly District 6 showed a decrease from the estimated number of officers and sergeants to authorized number of officers and sergeants (-6). It is also important to note District 7 is the only

district with an actual number of officers that is greater than the authorized number and shows the largest decrease from the authorized and actual to the estimated. The PAM estimates for the total number of required staff by percentage was highest in Districts 8, 5, and 2.

Table 12 PAM Estimate for Officers and Sergeants by District Compared to Actual and Authorized

RESULTS TYPE	MTPD DISTRICTS								
	Dist 1	**Dist 2**	**Dist 3**	**Dist 4**	**Dist 5**	**Dist 6**	**Dist 7**	**Dist 8**	**TOTAL**
PAM Number of Officers	23	29	15	18	45	23	13	37	203
PAM Number of Sergeants	4	6	3	4	9	4	3	7	40
PAM Total Staff	27	35	18	22	54	27	16	44	243
Actual Number of Officers	10	10	2	11	11	23	10	2	79
Actual Number of Sergeants	2	3	1	3	2	4	2	2	19
Actual Total Staff	12	13	3	14	13	27	12	4	98
Difference (PAM Estimate - Actual)	15	22	15	8	41	0	4	40	145
Authorized Number of Officers	14	14	7	11	16	29	10	5	106
Authorized Number of Sergeants	3	3	3	3	3	4	2	2	23
Authorized Total Staff	17	17	10	14	19	33	12	7	129
Difference (PAM Estimate - Authorized)	10	18	8	8	35	-6	4	37	114

Figure 2 is a graphic comparison showing the PAM estimated number of officers and sergeants, the authorized number for each district, and the actual number of officers and sergeants by district.



Patrol Allocation

In their 2009 study of the staffing and allocation needs of the Corpus Christi Police Department, Freesmeyer, Stenzel, and Gielow state, "(that) while no rigid guidelines exist for the "proper" value for either reactive time or proactive time, past studies have reflected a desire by agencies to maintain a reactive value of 25 to 35 minutes per hour." There are several reasons for this even

split. One, balancing the officer's time controls the officer from handling only calls for service and allows the officer to do patrol activities. Two, while handling calls for service officers have a longer response time to new calls. Three, handling reactive duties lengthens the time between patrol intervals, (i.e., the interval of time between two consecutive passes by the same location by officer units while on random patrol). The officer is handling the call and is effectively out-of-service and cannot respond to an emergency as quickly as when on patrol.

The IACP suggests allocating patrol resources as follows: 20 minutes of each hour to be allocated to calls for service, 20 minutes of each hour to be allocated for administrative duties, and 20 minutes of each hour should be free for proactive patrol response (IACP 2010).

A review of Table 11 shows that during FY2013, MTPD officers spent on average approximately 2 minutes every hour handling reactive tasks, (i.e., dispatched calls for service, dispatched traffic accidents), approximately 8 minutes on average handling administrative duties, and approximately 14 minutes each hour performing proactive traffic stops and commercial vehicle inspections. This left an average of approximately 36 minutes for routine patrol each hour.

Transportation Inspector Results

The estimated number of Transportation Inspectors required to accomplish the current annual workload is approximately 81 TIs. During the study period there was an average of 74 actual staff. The difference in the estimate to the actual is 7 staff. This estimate is based on a separation of duties – discussed later in the study – at the Ports of Entry.

To begin, Table 13 shows the Work Type Weight in minutes for each Work Type category along with the number of events for each category during calendar year 2013. Below the Work Type Categories is the total workload in hours (130,105). The annual available time is shown (2,080 hours) and this amount is reduced by the average annual leave time and training per TI. The result is the amount of time available to accomplish the workload 2013. The total workload hours (130,105) was divided by the amount of time available per officer (1,808) and the result shows 71 TIs to handle the 2013 workload. This number is very close to the number of actual current TI work staff of 74 FTEs.

Table 13 Transportation Inspector Needs at CY2013 Inspection Levels		
Work Type Category	**Work Type Weight (minutes)**	**Number of Work Type Events in CY2013**
Inspection Level 1	45	4,351
Inspection Level 2	30	30,908
Inspection Level 3	15	43,739
Escort Vehicle Inspection	10	1,000
Report Writing and Preparation	20	16,724
Scheduling and routine HR documentation	Time Study proportion (72,248 mins.)	
Office/Activities/Phone Calls/Computer	Time Study proportion (264,908 mins.)	
Weight Enforcement	Time Study proportion (602,064 mins.)	
Miscellaneous Duties	Time Study proportion (120,413 mins.)	
Financial Activity	15	16,724
Credential Booth	Time Study proportion (2,006,880 mins.)	
Issue Permit	7	226,000
Worked Counter	Time Study proportion (642,202 mins.)	
Description		**Hours**
Total Activity Specific Workload (Weights X Events)		127,753
Port of Entry Transportation Officer Average Annual Availability		2,080
All Leave Time (-27 days)		216
Training (-7 days)		56
Available Time for Work Type Workload		1,808
Total FTE Port of Entry Officer Resource Predicted Demand		71
Current FTE POE Officer Resource		74
Difference		-3

The amount of work to be performed by the POE Transportation Inspectors is shown in Column three 'Number of Work Type Events in CY2013' in Table 13. The number of Escort Vehicle Inspections was calculated using the number of these inspections reported during the two-week Time Study. Report Writing and Financial Activity were calculated as occurring one time each workday for each TI. The Issue Permit category uses the actual number of permits sold at the POE's in 2013.

Inspection Levels 1-3 were found on the Federal Motor Carriers Safety Administration website as 'roadside inspections by state.' New Mexico set a goal of 67,750 inspections for CY2013 and the MTPD was able to perform 82,134 during 2013. The number performed included 7,487 Level 1 inspections. Each MTPD sworn officer is required for certification purposes to perform at least 32 Level 1 inspections per year. These inspections are performed at the Ports. This amounts to 3,136 Level 1 inspections performed by current 79 MTPD Officers.

A possible change to the assigned Work Types at the Ports of Entry was discussed with MTPD Administration. The notion was to separate the Work Types related mostly to 'tax and revenue collection' from the 'safety and inspection' Work Types at the POEs. Table 16 shows a possible scenario separating the Work Types and describing the number of FTEs necessary to handle all the work. MTPD Administration suggested that four Work Types are primarily related to 'tax and revenue' while the remainder is related to 'safety and inspections.' The tax and revenue Work Types are: Financial Activity, Credential Booth, Issue Permit, and Worked Counter. Table 14 shows the 'Tax and Rev Calculation.' This calculation shows the four Tax and Rev Work Types,

the number of minutes associated with each and the number of work type events. The resulting calculation shows approximately 41 FTEs are needed to perform the four taxation and revenue Work Types.

Table 14 Tax and Rev Calculation Needs at CY2013		
Work Type Category	**Work Type Weight (minutes)**	**Number of Work Type Events in CY2013**
Financial Activity	15	16,724
Credential Booth	Time Study proportion (2,006,880 mins.)	
Issue Permit	7	226,000
Worked Counter	Time Study proportion (642,202 mins.)	
Description		**Hours**
Total Activity Specific Workload (Weights X Events)		74,699
Port of Entry Transportation Officer Average Annual Availability		2,080
All Leave Time (-27 days)		216
Training (-7 days)		56
Available Time for Work Type Workload		1,808
Total FTE Predicted Demand		41
Current FTE POE Officer Resource		0
Difference		41

A discussion with MTPD Administration disclosed that each year the annual goal of inspections is agreed upon with the FMCSA and is based largely on the previous years' goal (e.g., CY2013 goal was 67,650, CY2014 goal is 67,775) and the rationale for setting the goal is based on TI staffing levels. In addition to staffing levels, the highway safety figures into the inspections goal. Potentially, the more inspections that are possible, the more vehicles will be discovered to be in violation and taken out-of-service until repaired or reckoned to satisfy federal regulations. According to FMCSA, of the 7,487 Level 1 inspections performed by NM, 24% were taken out-of-service.

In determining the number of inspections, a method was used in this study that uses a percentage of the total number of estimated trucks passing through the 12 POEs. The calculation used is based on NM Department of Transportation (NMDOT) data. The number of trucks in nine Federal Highway Administration vehicle classifications was counted at each POE and the number for the year was approximately 6,093,310 trucks. In CY2013, MTPD inspected 82,134 or 1.3% of the estimated 6,093,310 eligible vehicles. A full 2% of the total number of trucks would equal 121,866 trucks. Table 15 shows the calculation at four percentage points - 1.3% through 3% - and a breakdown of the split between Level 1 inspections, Level 2, and Level 3.

Table 15 Count and Percentage of Inspections by Level Based on Count of Commercial Vehicles								
Total Percent of Comm. Veh. Inspected for Year	Total number of Commercial Vehicles through the State POE's during CY13	Count of Level 1's Per Year and %		Count of Level 2's Per Year and %		Count of Level 3's Per Year and %		Total Count of Inspections
1.3%	6,093,310	7,487	9%	30,908	38%	43,739	53%	82,134
2.0%	6,093,310	12,187	10%	48,746	40%	60,933	50%	121,866
2.5%	6,093,310	15,233	10%	60,933	40%	76,166	50%	152,333
3.0%	6,093,310	18,280	10%	73,120	40%	91,400	50%	182,799

Finally, Table 16 shows the calculation of the approximate number of FTEs necessary to complete all the work at the POEs. The work is split into two groups 'Safety and Inspections' and Tax and Revenue. In addition to splitting the work into two groups, the calculation is predicated on 2% of the Commercial Vehicles passing through the POEs would receive an inspection. The calculation shows that a total of 81 FTEs are necessary to perform all the work, 40 FTEs to complete the 'Safety and Inspections' work and 40 FTEs to complete the 'Tax and Revenue' work.

Table 16 FTE Needs at 2% Inspection Levels				
Work Type Category	Work Type Weight (minutes)	Number of Work Type Events in CY2013	Safety & Inspections	Tax & Rev
Inspection Level 1	45	12,187	548,398	
Inspection Level 2	30	48,746	1,462,394	
Inspection Level 3	15	60,933	913,997	
Escort Vehicle Inspection	10	1,000	10,000	
Report Writing and Preparation	20	16,724	334,480	
Scheduling and routine HR documentation	72,248 mins.		72,248	
Office/Activities/Phone Calls/Computer	264,908 mins.		264,908	
Weight Enforcement	602,064 mins.		602,064	
Miscellaneous Duties	120,413 mins.		120,413	
Financial Activity	15	16,724		250,860
Credential Booth	2,006,880 mins.			2,006,880
Issue Permit	7	226,000		1,582,000
Worked Counter	642,202 mins.			642,202
		Total Hours:	**4,328,901**	**4,481,942**
Description			**Hours**	
Total Activity Specific Workload (Weights X Events)			72,148	74,699
Port of Entry Transportation Officer Average Annual Availability			2,080	2,080
All Leave Time (-27 days)			216	216
Training (-7 days)			56	56
Available Time for Work Type Workload			1,808	1,808
Total FTE Port of Entry Officer Resource Predicted Demand			40	41
Current FTE POE Officer Resource			74	
Difference			-7	

CONCLUSION

This staffing study produced staffing estimates of Officers and Sergeants for MTPD and Transportation Inspectors and involved a number of tasks. Tasks included a review of law enforcement staffing and personnel allocation literature, the selection of a patrol staffing method, the design of a staffing method for the non-patrol TIs, design, administration and analysis of a two-week time study of TI activities, the collection and review of several data sets dealing with calls for service and work activities, the collection of policy level data, the use of the PAM model for estimating MTPD staffing numbers by district and total, and determining staffing needs for the Ports of Entry using the non-patrol method.

The literature review and survey of state patrol and other law enforcement agencies confirmed PAM is a widely used and accepted method for determining patrol allocations. In addition, PAM had been used by NMSP in past studies for estimating NMSP staffing needs. For these reasons we chose to used PAM and it worked well for determining the MTPD patrol needs. The modified workload method we settled on was applicable for Transportation Inspectors at the Ports of Entry and worked well. Both methods met the requirements of the study.

Prior to this study, we are not aware of another comprehensive staffing study involving the MTPD and Port of Entry staff. Another instance of a staffing study should be performed in a reasonable period of time. An interval of six years between studies is acceptable. As an example the NM Judiciary has successfully conducted full staffing studies every five to seven years. The Judiciary includes an annual update. We recommend the DPS adopt a similar schedule for both the NMSP and MTPD. Updates could be done on an annual basis and full reviews conducted at least every five years or when laws, policies, or workloads increase substantially to justify a full review before five years.

Using the PAM method for the MTPD we found the PAM estimate of 234 officers and sergeants is an increase of 145 above the actual number of 98 officers and sergeants and 114 above the 129 authorized officers and sergeants. The PAM estimate of officers is an 88% increase over the authorized number of staff and 148% greater than the actual number of staff.

On average, MTPD officers spent approximately 2 minutes every hour handling reactive tasks and approximately 8 minutes each hour for administrative tasks, and approximately 14 minutes each hour performing proactive traffic stops and commercial vehicle inspections. This left an average of approximately 36 minutes for routine patrol each hour.

IACP has suggested that there should actually be an average of 30 minutes per hour of free un-obligated time for patrol. Significant benefits may be gained from officers having 30 minutes of un-obligated time to allow more time for proactive community policing, crime prevention, and reduce the likelihood of traffic accidents as officers rush from call to call. Patrol officer staffing requirements to support a standard of 30 minutes of “proactive” patrol, however, are costly and few government organizations can afford this under normal budget conditions.

Using the modified workload method we estimated the POEs need 81 FTE to complete the annual workload, which includes inspecting at least 2% of the approximately 6 million commercial vehicles passing through the POEs during the year. During the study period there were approximately 74 TIs working the POEs. The difference in the estimate to the actual is 7 TIs or an increase of 9.5% in the number of FTEs.

Available data and the quality of data is always a factor to some extent in a study of this type. The DPS CAD data was easily acquired from DPS. Personnel data and Time and Activity data were not easily linked to the CAD calls for service data.

As noted several times earlier in the report PAM is designed for patrol functions and limited special assignments and is appropriate for calculating patrol-staffing levels for MTPD. Just as in our 2012 study of the SID and IB of the DPS, we designed a modified workload assessment procedure to calculate the TI workload. This method was adequate for this study and we believe it worked well to estimate the number of FTEs needed to complete the work assigned to the POEs. The modified workload assessment procedure also worked to explore the scenario of splitting the duties at the POE's into 'safety and inspections' and 'tax and revenue.'

In future, CAD data that accounts for work time every day could be analyzed to identify the workload by hour of the day. The workload could then be compared to the staffing schedule. It is possible a change to the staffing schedule could have the effect of handling the workload more efficiently than the current 8, or 10-hour schedule used by MTPD. One possibility is to incorporate a 12-hour schedule. Other agencies responsible for 24 hour 7 days per week coverage (i.e., hospital nursing units, emergency medical services, police departments) have adopted a 12-hour scheduling format. Scheduling seems mundane but an efficient schedule that matches the workload could potentially have the effect of bringing proactive time more in line with reactive time each hour (Freesmeyer, et.al, 2009).

From the 2012 NMSP Staffing Study and this study of the MTPD, more resources are necessary for these agencies of the NM Department of Public Safety to meet the calls for service workload and line patrol needs of the state. As pointed out in our description of the state, the downturn in the economy has impacted public services provided by rural communities in New Mexico. Since 2007 approximately 15 towns in the state have closed their police departments. This means that NMSP and MTPD officers now have to handle law enforcement services in these communities, which has increased their workloads.

Similarly, it is clear Transportation Inspectors at the state Ports of Entry need more resources to complete their workload. Based on their current workload and the need for safer highways, Ports of Entry do not have enough staff.

The recommendation regarding CAD data could make future staffing studies less time consuming and more representative of the actual workload.

SECOND SECTION – BYPASSING PORTS OF ENTRY

INTRODUCTION

A review of the MTPD published in 2013, by the NM Legislative Finance Committee (LFC) supports the notion that a large number of commercial vehicles are evading the NM weight-distance tax by circumventing the state Ports of Entry. The report noted the number of vehicles evading the tax is unknown and the situation should be reviewed. As a result of the LFCs review, the MTPD contracted with the NMSC to provide a preliminary estimate of the number of commercial vehicles bypassing New Mexico Ports of Entry.

A brief discussion with MTPD Administration provided background information on the size and complexity of the problem of commercial vehicles bypassing POEs. A plan was developed with the help of MTPD Administration to sample three bypass routes and infer the significance of the statewide situation. From the results of the sample, the recommendation is an extensive statewide analysis is warranted to address the situation.

Commercial vehicle companies pay various taxes to states to use the highways. New Mexico participates in three sources of revenue. Four states, (New Mexico, Oregon, Kentucky, and New York) use a weight-distance tax (WDT) structure as a source of revenue. In New Mexico, commercial trucking companies operating in the state pay the WDT quarterly. The WDT is based on the weight of loads and the miles driven in the state by the commercial trucking company.

In addition to the WDT New Mexico participates in the International Fuel Tax Agreement (IFTA) and the International Registration Plan (IRP), which apportion taxes paid by an interstate vehicle among the states traveled. Because most states do not collect a WDT but rely on the IFTA and IRP taxes, they charge significantly higher vehicle registration fees and vehicle fuel taxes than New Mexico.

New Mexico collects a single-use permit allowing a commercial vehicle to use the state highways one-time. This “Single Trip Permit” is a method for collecting all assessments at one-time from the commercial vehicle. The Single Trip Permit combines the WDT assessment, as well as the IRP and IFTA assessments and consequently it is expensive for the motor carrier when paid at the POE (LFC, 2013). The commercial vehicle company can also pay the Single Trip Permit online to the state Taxation and Revenue Department (TRD). Once the Single Trip Permit is paid it is entered in the TRD database. The POE staff checks this database when the truck passes the Port and if the truck is not in the database the driver must stop at the Port and pay the Single Trip Permit.

METHOD

Based on the Single Trip Permit collection process and the route of commercial traffic through the state, we designed a method to observe commercial vehicles. We chose three points in the state from which to observe commercial traffic. We devised a method to determine if observed trucks were in the TRD database and had paid the Single Trip Permit. The extent of the situation – statewide – coupled with the best method available for observing trucks was an expensive endeavor. Consequently, we had to limit our observations to three sites.

From discussions with MTPD Administration we determined from the estimated 61 bypass routes in the state which sites would give us a good sample of the extent of the bypass situation. We decided on three sites, 1) Vaughn, NM at the intersection of US285/60 and US54, 2) north of Shiprock, NM on southbound US491, and 3) east of Eunice, NM, on westbound NM234/176.

MTPD Administration suggested the site at Vaughn. Vaughn is a crossroads location. Three popular US highways (i.e., US285, US60, and US54) meet at Vaughn. It is possible for a vehicle to enter the state on any of these three highways and circumvent the state POEs. Even though US54 has a POE at Nara Visa, NM, a vehicle can avoid the Port by coming through when the Port is closed. Commercial traffic at Vaughn could approach our observation point from north, south, east, or west. In addition to its location, we reviewed the 2007 NMDOT Statewide Milepost/point Map and the associated report of Annual Average Daily Traffic (AADT) to estimate the percentage of Heavy Motor Vehicle traffic (HMV) at our Vaughn observation point. We estimated that 202,466 Heavy Motor Vehicles (i.e., vehicles larger than a car, passenger truck, or motorcycle) passed this point per year. We were able to calculate the possible number of HMVs we would see during our observation at this site. Thus the number of potential commercial vehicles and the fact that vehicles approach Vaughn from all directions without necessarily having gone through a POE helped us decide Vaughn was a good choice as a sample observation site.

Shiprock was chosen as an observation site because of its location on the northern border of New Mexico, its distance from any POE, and the single entry route into the state without an opportunity to avoid our observation point. We estimated that 198,056 HMVs passed this point per year.

According to MTPD staff and by all accounts, the oil fields in southeast New Mexico are very busy. Oil fields are serviced by HMVs. This was a significant reason for selecting Eunice NM as an observation site. NM234/176 is a popular entry point into the state and we did not have a problem locating a good observation point on the side of the highway. We estimated that 294,190 HMVs passed this point per year.

Before traveling to the three sites we chose a more convenient site to test our method of observing vehicles. In December 2013, a team of two observers from the NMSC traveled to US60 just west of Socorro, NM and observed eastbound traffic for four hours between 10:30a.m. and 2:30p.m. It was determined that these vehicles were coming out of Arizona and were possibly circumventing the POE at Gallup, NM. During this time, the team observed approximately 50 vehicles. They recorded the complete plate numbers of 16 trucks. Of the 16 trucks only 1 truck (6%) had a Single Trip Permit account on record with the TRD. This test suggested that the team could see identifying information from a position close to the highway where the approaching truck had to slow to a stop. However, a portable plate reader would make the task much easier and would increase the percentage of recorded plates and DOT numbers. We asked the MTPD for assistance to use one of their portable plate readers but MTPD could not fulfill this request. As an alternative we purchased a digital camera capable of taking a picture of the approaching truck license plate. We acquired the camera and used it successfully at the Shiprock and Eunice locations.

ANALYSIS

Between April 24, 2014 and May 8, 2014, the team observed truck traffic for six hours at each of the three locations. Table 18 describes the number of trucks observed at each location and the

number of trucks in the TRD database (i.e., Yes, the truck is in the database and has paid a Single Trip Permit). In total 337 trucks were observed, 175 (52%) were in the TRD, and 162 (48%) were not in the TRD, 48 trucks could not be identified sufficiently to search in the TRD data and in the table these are designated as missing.

Table 18 Commercial Vehicle Observations at 3 Sites and Single Trip Permit

Location	Yes		No		Missing	TOTAL	NMDOT 1 Yr. Est.	% of 1 Yr. Est. not in TRD
	Count	Percent	Count	Percent				
Vaughn	42	32%	89	68%	48	131	202,466	137,677
Shiprock	54	76%	17	24%	0	71	198,056	47,533
Eunice	79	59%	56	41%	0	135	294,190	120,618
TOTAL	175	52%	162	48%	48	337	694,712	

From these observation data is appears that approximately half of the HMVs passing these sites are not in the TRD database and have not paid the Single Trip Permit. When these percentages are applied to the NMDOT estimated number of HMVs passing these sites it is interesting to note the potential circumvention problem. At the Vaughn site in one year approximately 68% of HMVs not in the TRD database would equal 137,677 vehicles.

A very rough estimate of the impact of the circumvention problem can be made using Single Trip Permit data from the TRD and MTPD. Provisionally, we assume in FY 2014 approximately 134,881 Single Trip Permit permits were sold at the 12 POEs. In FY 2013, the TRD collected $5,689,000 in Single Trip Permit revenue. We assume in the region of 25% ($1,422,250) of the Single Trip Permit in FY13 was collected at the POEs. Using these data the average Single Trip Permit was approximately $10.50. By applying our Single Trip Permit of $10.50 to the estimated number of non-permitted Commercial Vehicles observed at the three sites we estimate approximately $3,224,797 in foregone revenue to the state at these three sites. Assuming these sites are partially representative of the entire state, then as the LFC has noted, "… tax evasion could be a significant problem in New Mexico."

CONCLUSION

We observed commercial vehicles at three very different sites during the Spring of 2014. At each site we identified vehicles that had not paid the NM Single Trip Permit and were possibly not in compliance with NM law. The total percentage of non-permitted vehicles we observed should not be generalized statewide. We observed a wide variance by site, for example 68% of the vehicles we observed at Vaughn were non-permitted, while 24% of the vehicles at Shiprock were out of compliance.

Our observation certainly point out that a large number of vehicles are circumventing the Ports of Entry. However, the problem seems to vary by location.

The LFC noted in their 2013 review of MTPD, that since 2009, the MTPD, the LFC, and a NM Legislative Technical Committee had performed informal estimates of WDT foregone revenue. These three groups estimated between 20% to 45% of the WDT was foregone (i.e., lost) to the state (LFC, 2013).

Our goal was to estimate the number of commercial vehicles bypassing the Ports of Entry. From a convenience sample of three sites, observing these sites once for only six hours, we found large

numbers of vehicles bypassing the Ports (i.e., from 68% to 24%). As limited as our performance was, we used a valid method to estimate the number of vehicles at the sites we observed. A larger observation using portable plate reader equipment would reduce some of the data gathering problems we experienced.

THIRD SECTION – FEE STRUCTURE REVIEW

INTRODUCTION

This section is a cursory review of the Weight/Distance Tax used by New Mexico compared to other states, which use the International Fuel Tax Agreement [IFTA] and the International Registration Plan [IRP] and provides recommendations to the MTPD's revenue enforcement mission.

The approach used in this brief review includes a description of the state WDT as well as a description of the WDT in the three other states using WDT. A description of the IFTA and the IRP is provided as well as a list of advantages and disadvantages of the three tax structures. The section ends with a conclusion and several recommendations.

THE WEIGHT DISTANCE TAX

The owners and operators of [commercial] motor vehicles using New Mexico highways who have a declared gross weight or gross vehicle weight over 26 thousand pounds are subject to the weight distance tax (7-15A-3, NMSA 1978). The Weight Distance Tax (WDT) is a unit tax generating approximately $70 million per year for the State Road Fund. The WDT is the fourth-largest contributor to the State Road Fund, after the gasoline tax, the special fuel tax, and vehicle registration fees. The tax is based on the weight of the vehicle and the number of miles traveled on New Mexico roads. New Mexico utilizes graduated tax rates based on the declared gross vehicle weight. The tax rate ranges from $0.01101 per mile for a vehicle weighing between 26,001 to 28,000 pounds to $0.04378 per mile for a vehicle weighing 78,001 pounds or more. Discounted rates apply (66% of the stated rate) for vehicles used primarily for one-way hauling, vehicles for which 45% of more of travel within a year is traveled without a load, and for any vehicles that are individually classified by the department to be eligible for the reduced rates.

Before 2003 the WDT rate had not increased in 20 years. In 2003, the WDT generated approximately $50 million. Pursuant to 2003 legislation, the WDT was raised by 38%; consequently in 2007 the state collected approximately $88.4 million in weight-distance tax revenue. More recently, the WDT brought in $72.8 million in 2012. The fiscal impact statement related to the 2003 rate increase included a statement by the NMDOT. They reported that a 38% increase in 2003 would increase revenue by $21,200,000. The increase was scored at the 2003 collection level. The NMDOT noted that increased enforcement and collection would result in additional revenue (LFC, 2003).

WDT AROUND THE NATION

Only four states in the nation – including New Mexico – use tax structure based on the weight of the vehicle and the distance or mileage the vehicle travelled within the state. Below is a description of the WDT in those four states, (i.e., Kentucky, New York, and Oregon).

Kentucky

The Kentucky Highway Use Tax is a weight-distance tax based on the mileage traveled by heavy trucks traveling within the state of Kentucky. The Highway Use Tax is applicable to vehicles with combined gross weight or licensed weight in excess of 59,999 pounds, excluding farm licensed vehicles. The weight distance tax is set at $0.0285 per mile. Highway Use Tax collections in 2010 and 2009 totaled $70.4 and 75.0 million, respectively.

New York

The New York Highway Use Tax is a weight and distance based tax charged on vehicles with either a gross weight of more than 18,000 pounds or an unloaded truck/tractor weight of more than 8,000 or 4,000 pounds, respectively. All mileage within the state, except those miles traveled on the toll-paid portion of the New York Thruway, is subject to the Highway Use Tax. The primary tax rates used start at $0.0084 per mile for vehicles weighing between 18,001 to 20,000 pounds. The tax rate per mile for vehicles weighing 78,001 to 80,000 pounds is $0.0546 per mile. For vehicles over 80,001 pounds, an additional tax of $0.0028 is added per ton. During state fiscal year 2008-2009 the Highway Use Tax generated approximately $81,000,000.

Oregon

The state of Oregon currently charges a weight-mile tax on vehicles with a gross weight of over 26,000 pounds. Tax rates per mile vary according to the gross weight of the vehicle. Unlike other states that charge a weight-mile tax, Oregon does not collect diesel taxes on heavy trucks. As such, weight-mile tax rates in Oregon are higher than in other states. Tax rates range from $0.0492 per mile for vehicles weighing 26,001 through 28,000 pounds to $0.1638 per mile for vehicles weighing between 78,001 and 80,000 pounds. For vehicles over 80,000 pounds rates range from $0.1296 to $0.2304 and vary according to weight and number of axles. The 2009-2011 Oregon DOT budget assumed that the weight-mile tax would generate a total of $630 million. These funds are deposited into the State Highway Fund, which distributes funds to State, Counties, and Cities at a ratio of 60%, 24%, and 16%.

INTERNATIONAL REGISTRATION PLAN and INTERNATIONAL FUEL TAX AGREEMENT

There are two dominant tax structures used by states in the United States and Canadian provinces to collect revenue from commercial motor carriers. The International Registration Plan (IRP), a registration reciprocity agreement among states, the District of Columbia, and provinces of Canada provides payment of apportionable fees on the basis of total distance operated in all states and provinces. IRP member jurisdictions collect registration fees from their 'home based' interstate trucking companies on behalf of each member jurisdiction in which the companies operate and must register. State budgets and revenue agencies do not typically refer to the IRP in documents, but any reference to vehicle registration of heavy motor vehicles is connected to that state's IRP membership.

The International Fuel Tax Agreement (IFTA) is an agreement between the lower 48 states of the United States and the Canadian provinces, to simplify the reporting of fuel use by motor carriers that operate in more than one state or province. The IFTA charges cents per gallon tax on motor fuels, including some alternative fuels. Each jurisdiction determines which types of fuel are considered special fuels, and sets the tax rate for each type of special fuel. In New Mexico, diesel

is the only type of fuel considered as a special fuel to be reported on IFTA returns and has a tax rate of approximately 61 cents per gallon.

The IFTA has several advantages and also some disadvantages. The advantages of the IFTA include: 1) the collection and administration of the IFTA process are already in place on a national basis and are organized for each jurisdiction to participate; 2) the tax fee structure is generally proportional to system usage by the commercial carrier; 3) IFTA generates revenue by base companies even when the carrier is out-of-state at the same time generating revenue for the base jurisdiction when the carrier is operating in a member jurisdictions; and 4) the tax is paid by all commercial users of the highway system.

Some of the disadvantages of the IFTA are: 1) as heavy motor vehicles increase fuel efficiency member jurisdictions experience lower fuel sales and lower tax revenue; 2) higher fuel prices lead to reduced driving and reduced fuel tax collections for the member jurisdictions; 3) fees are fixed in the IFTA plan and do not adjust for price changes or inflation; and, 4) freight costs increase for New Mexico shippers.

The IRP has an advantage and several disadvantages. The advantage of the IRP is similar to the IFTA, in regard to the system already being in place for collecting and administering the plan. There are a few disadvantages, for example, the system is not proportional to usage by the trucking company. For instance, a small trucking company may not own or operate a large number of vehicles but may total more highway miles than a larger company. Also, member jurisdictions report having high administrative and enforcement costs, and the plan seems to encourage trucking companies to retain vehicles for a longer time before replacing their fleet.

The WDT has advantages and disadvantages as well. The most popular advantage of a WDT appears to be that WDT is a benefits tax that assesses a user fee on commercial vehicles that are seen as doing the most harm to the highway infrastructure. The WDT is highly related to needs for capacity and system preservation. As travel and revenue increases, the need for capacity and highway improvements increase. In 2003, a NM blue ribbon tax reform committee stated, "… [a WDT] is therefore, an appropriate tax to raise for additional road maintenance and construction revenue." The blue ribbon suggested the tax capacity of the WDT in 2003 was as much as 80%. The resulting action in the 2003 Special Session raised the WDT tax rate by 38%.

The WDT is viewed as a direct measure of actual costs incurred by the motor carrier. Additionally, the tax rate can be graduated based on the vehicle size, weight, emissions, or other characteristics. New Mexico deposits all WDT revenues in the state road fund and increased revenues automatically accrue to the SRF. The 2003 blue ribbon committee estimated that 80% of the WDT was exported to out-of-state users, because New Mexico is considered a "bridge" state, (i.e., most shipments neither originate nor terminate in NM, but motor carriers merely cross through the state). Finally, improvements to the New Mexico transportation system paid by the WDT, aids in economic development and the competitive position of NM. Motor carriers, who pay the WDT, benefit from the economic development.

There are also disadvantages of the WDT. For instance, states must have a method established to administer and collect the WDT revenues. There are potentially high administrative, compliance (i.e., enforcement) costs, and infrastructure costs. These costs have been impacted as technology has matured. Online services have changed the way jurisdictions administer the WDT, (e.g., reducing the high costs of using a "bricks and mortar" infrastructure). Technology has also changed the compliance/enforcement costs associated with the WDT in most jurisdictions. However, technology is costly both in hardware/software costs and personnel costs to oversee the

technology. Finally, because the WDT is directly associated to commercial motor carriers any increase is a burden on the trucking industry and should be analyzed in conjunction with all the taxes impacting commercial motor vehicle operators and owners.

CONCLUSION

The WDT is a sizable amount of revenue – fourth largest amount according to LFC – allocated to New Mexico's state road fund. Generating approximately $70 million in revenue each year. The WDT is not a burden on New Mexico truckers only, 80% of non-New Mexico commercial haulers are impacted by the WDT. The WDT is highly related to the need for capacity and highway improvements. The WDT is a flexible tax structure. It can be graduated based on vehicle size, weight, and other options. The WDT is not inflation proof but it is not impacted as much as the IFTA and the IRP by fuel prices and efficiencies and by vehicle prices. Despite the fact that 46 states in the nation rely on the IFTA and the IRP, these tax structures are not a complete solution to the tax revenue needs of New Mexico. The state of Iowa has recently considered a per-mile tax as well as a severance tax on ethanol, toll roads, and public-private partnerships, to support their highway maintenance and construction needs.

The downside of the WDT is the enforcement and administration of the system. Collecting tax obligations from the users is a complex effort and catching "freeloaders" abusing the system is expensive. The 2013 LFC report points out that a significant amount of revenue is foregone because of the limitation of the current enforcement efforts to catch violators.

During this study, NMSC observers saw 20 non-permitted commercial vehicles in Vaughn, NM. This was approximately 22% of our sample at that site. This situation suggests that WDT violators are intrastate motor carriers as well as interstate haulers. The LFC suggested the Taxation and Revenue Department add auditors focusing on intrastate WDT enforcement to their Audit Bureau.

In addition to focusing on enforcement efforts, the state has implemented technology to improve the TRD's ability to easily administer the WDT. Up to now the TRD has used the state's webpage to make it easier for truckers to pay the WDT, but kiosks are also being considered to make it easier for truckers to purchase the WDT or Single Trip permits.

The WDT is a viable tax structure for generating revenue. It is not an out-of-date structure or beyond the capability of the TRD or the MTPD to administer or enforce. Before 2003, the WDT had not been adjusted in 20 years. It's now been 10 years since the WDT rate was adjusted.

RECOMMENDATIONS

The task of this section of the staffing study was to review the Weight/Distance Tax used by New Mexico compared to other states and offer recommendations to improve the MTPD's revenue enforcement of the WDT. The short answer to this assignment, in a staffing study that has concluded that the sworn officer force and corps of transportation inspectors should be increased, is to increase these personnel. An increase in personnel at the Ports of Entry would allow more ports to be open longer hours, thus observing more commercial carriers and identifying more WDT violators. More personnel patrolling the highways and observing more of the bypass routes will also result in identifying more WDT violators.

Specific to a recommendation for increasing the number of personnel is to permanently assign some FTEs to collect TRD revenue at the Ports of Entry and increase the numbers of auditors investigating state trucking firms. This duty was successfully performed by the TRD in the past but was retired according to MTPD administrators.

The last rate adjustment to the WDT was 38% in 2003 or an average of less than 2% over the previous 20 years. The WDT rate could be adjusted another 19% - an average of 1.9%. The state government should review the WDT rate routinely.

In the several month while this study has been underway, the MTPD has cross-trained a few NMSP officers to perform Level 3 inspections of commercial drivers. This is very similar to the method used successfully in Texas by the Department of Public Safety. This effort increases the number of officers around the state that are able to at least accomplish the basic inspection on the roadside.

Finally, the last recommendation is the one the state of Oregon adopted. Oregon Department of Transportation has installed cameras and portable license plate readers at virtually every road leading into the state. This "high tech" answer is something for the state of New Mexico to consider. However, the lesson to be learned by Oregon is to use available technology.

About the New Mexico Sentencing Commission and the Institute for Social Research

The Institute for Social Research is a research unit at the University of New Mexico. The Institute includes several centers including the Center for Applied Research and Analysis, the Statistical Analysis Center, and the New Mexico Sentencing Commission. The Institute for Social Research conducts high quality research on a variety of local, state, national, and international subjects. The critical issues with which the Institute works includes traffic safety, DWI, crime, substance abuse treatment, education, homeland security, terrorism, and health care.

This and other NMSC reports can be found and downloaded from the Institute for Social Research, Center for Applied Research and Analysis web site: (http://nmsc.unm.edu/nmsc_reports/)

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APPENDICES

Appendix A:

PAM Data and Policy Variables

PAM DATA and POLICY VARIABLES		
VARIABLE NUMBER	VARIABLE DESCRIPTION	TYPE
1.1.	Autonomous Patrol Area	D
1.2.1	Shift Length	D
1.2.2	Average Work Week	P
1.2.3	Average Number of Officers to be Supervised by each Field Supervisor	P
1.2.4	Percentage of Field Supervisor on-duty time spent on patrol activities	P
1.2.5.1	Coverage per Week C1 Roads	P
1.2.5.2	Average Patrol Speed C1 Roads	P
1.2.5.3	Patrol Interval Performance Objective C1 Roads	P
1.2.6.1	Coverage per Week C2 Roads	P
1.2.6.2	Average Patrol Speed C2 Roads	P
1.2.6.3	Patrol Interval Performance Objective C2 Roads	P
1.2.7.1	Coverage per Week C3 Roads	P
1.2.7.2	Average Patrol Speed C3 Roads	P
1.2.7.3	Patrol Interval Performance Objective C3 Roads	P
1.3.1	Total Number of Days in the Data Collection Period	P
1.3.2	Total Number of Crashes Handled by the Agency During the Hours of Coverage During Data Collection	D
1.3.3	Average Service Time (Hours) for Each Crash During the Hours of Coverage	D
1.3.4	Total Number of Crashes Handled by the Agency During the Hours of Non-Coverage During data Collection	D
1.3.5	Average Service Time (Hours) for each Crash During the Hours of Non-Coverage	D
1.3.6	Total Number of Other CFS Handled by the Agency During the Hours of Coverage During Data Collection	D
1.3.7	Average Service Time (Hours) for Each Other CFS During the Hours of Coverage	D
1.3.8	Total Number of Other CFS Handled by the Agency During the Hours of Non-Coverage During Data Collection	D
1.3.9	Average Service Time (Hours) for Each Other CFS During the Hours of Non-Coverage	D
1.3.10	Percentage of Crashes that Cannot be Preempted (%)	P
1.3.11	Percentage of Other CFS that Cannot be Preempted (%)	P
1.3.12	Percentage of Administrative Activities that Cannot be Preempted (%)	P
1.3.13	Percentage of Self-Initiated/COP Activities that Cannot be Preempted (%)	P
1.3.14	Total Time (Hours) Spent by Officers on Regularly-Scheduled Time to Handle Crashes in the APA	D
1.3.15	Total Time (Hours) Spent by Officers on Overtime to Handle Crashes in the APA During Hours of Coverage	D
1.3.16	Total Time (Hours) Spent by Officers on Overtime to Handle Other CFS in the APA	D
1.3.17	Total Time (Hours) Spent by Officers on Overtime to Handle Other CFS in the APA During Hours of Coverage	D
1.4.1	Roadway C1 Miles	D
1.4.2	Roadway C2 Miles	D
1.4.3	Roadway C3 Miles	D
1.5.1	Average Number of Regularly-Scheduled On-Duty Hours Off Assignment Per Year Per Officer	D
1.5.2	Average Number of Overtime Hours Worked on Assignment During Hours of Coverage Per Officer Per Year	D
1.5.3	Average Number of Comp Time Hours Taken Per Officer Per Year	D
2.2.1	Total Time (Hours) Spent on Admin Activities Within the APA During Data Collection Period	D
2.2.2	Total On-Duty Hours by Patrol Officers Within the APA During the Data Collection Period	D
4.2.1	Total Number of Self-Initiated Contacts Within the APA During the Data Collection Period	D
4.2.2	Total Time (Hours) Spent on Self-Initiated Contacts in the APA by All Officers on Patrol During Data Collection	D
4.2.4	Select Number of Self-Initiated Contacts per Shift per Officer Performance Objective	D
4.3.1	Total Time (Hours) Spent on Self-Initiated Contacts in the APA by All Officers on Patrol During Data Collection	D
4.3.2	Total On-Duty Hours by Patrol Officers Within the APA During the Data Collection Period	D
5.2.1.2	Coverage per Week (Hours)	P
5.2.3.1	Performance Objective, Percentage of Crashes and Other CFS Activities	P
5.3.1.2	Coverage per Week (Hours)	P
5.3.2.1	Area (Square Miles) of APA	P
5.3.2.2	Average Response Speed (Emergencies)	P
5.3.2.3	Average Travel Time (Emergencies)	P

5.4.2	Coverage per Week (Hours)	P
5.4.3	Area (Square Miles) of APA	D
5.4.4	Average Response Speed (Non-Emergencies)	D
5.4.5	Average Travel Time (Non-Emergencies)	D
7.2.1.2	Average number of on-duty officers per day on specialized assignment 1	D
7.2.1.3	Percentage of on-duty time spent on patrol activities by officers assigned to special assignment 1	D
8.2.3.1	Average Annual Vacation Leave Per Officer (Hours)	D
8.2.3.2	Average Annual Holiday Leave per Officer (Hours)	D
8.2.3.3	Average Annual Sick Leave Per Officer (Hours)	D
8.2.3.4	Average Annual Other Leave Per Officer (Hours)	D
8.5.1	Current Number of Officers and Field Supervisors Within the APA	D
8.5.2	Current Number of Staff and Command Personnel Within the APA	D

Appendix B:

Road Mileage For MTPD Districts

Roadway Miles in 8 MTPD Districts				
District	Miles of Interstate	Miles of US and NM Routes	Miles of County Road	Total Miles
1	282	1,225	4,415	5,922
2	383	1,471	5,764	7,618
3	0	1,769	4,950	6,719
4	282	1,207	6,218	7,707
5	618	2,147	10,244	13,009
6	601	872	4,608	6,081
7	0	943	3,080	4,023
8	457	1,959	5,308	7,724

Appendix C:

Square Mile Area of MTPD Districts

Square Miles per MTPD District	
District	MTPD
1	15,556
2	12,103
3	14,659
4	17,339
5	17,209
6	14,699
7	11,451
8	18,587