

PERFORMANCE AUDIT

DEPARTMENT OF PUBLIC SAFETY

HIGHWAY PATROL BUREAU

Report to the Arizona Legislature
By the Auditor General
June 1991
91-5

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STATE OF ARIZONA
OFFICE OF THE
AUDITOR GENERAL

June 24, 1991

Members of the Arizona Legislature

The Honorable Fife Symington, Governor

Colonel F. J. "Rick" Ayars, Director
Department of Public Safety

Transmitted herewith is a report of the Auditor General, A Performance Audit of the Department of Public Safety, Highway Patrol Bureau. This report is in response to a June 14, 1989, resolution of the Joint Legislative Oversight Committee and was conducted as a part of the Sunset Review set forth in Arizona Revised Statutes §§41-2351 through 41-2379.

This report is one in a series of reports to be issued on the Department of Public Safety (DPS). The report addresses the issues of staffing and staff utilization within the Highway Patrol Bureau. The Bureau expends 90 percent of its nearly \$34 million budget on salaries and employee-related expenditures. The Bureau believes that additional staff are needed. DPS requested an additional 63 positions in its 1991-92 budget request. Although the Bureau has requested additional staff, the number of additional staff actually needed is uncertain. However, we found that a new manpower model being tested by the Highway Patrol Bureau could help DPS and the Legislature determine the number of Highway Patrol officers needed. In addition, we found that the Department needs to enhance its Personnel Deployment System (PDEP) to allow it to ensure that Highway Patrol officers are being deployed in the most efficient and effective manner possible.

My staff and I will be pleased to discuss or clarify items in the report.

This report will be released to the public on June 25, 1991.

Sincerely,



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SUMMARY

The Office of the Auditor General has conducted a performance audit of the Arizona Department of Public Safety (DPS), Highway Patrol Bureau, pursuant to a June 14, 1989, resolution of the Joint Legislative Oversight Committee. This performance audit was conducted as a part of the Sunset Review set forth in Arizona Revised Statutes (A.R.S.) §§41-2351 through 41-2379.

This is one in a series of reports to be issued on the Department, and focuses on the functions of the Highway Patrol Bureau. The Bureau has four regionally organized patrol divisions that are responsible for patrolling Arizona highways and enforcing the State's traffic and criminal statutes. In addition, the Bureau contains a Special Services Division that enforces commercial vehicle safety standards and vehicle weight regulations, responds to accidents or incidents involving hazardous materials and commercial vehicles, and inspects school buses and tow truck companies. The Bureau is allocated 721 Full-Time Employees (FTEs) and has a budget of nearly \$34 million for fiscal year 1991.

Based on an overview of the Bureau, we identified staffing and staff utilization as the primary issues facing the Bureau. The Bureau expends 90 percent of its nearly \$34 million budget on salaries and employee-related expenditures. The Bureau believes that additional staff are needed -- DPS requested an additional 63 positions in its 1991-92 budget request. Although the Bureau has requested additional staff, it is uncertain at this time about the number of additional staff that are actually needed. Our preliminary review also identified issues relating to the efficient and effective utilization of staff. (Other issues affecting the Bureau, such as training and vehicle utilization, are being considered in our other audits of the Department.) Because of the concerns about the number of Highway Patrol staff needed and whether officers were being utilized efficiently and effectively, our audit focused on these two areas.

New Manpower Model Could
Eventually Improve Legislative
Oversight Of Highway Patrol Staffing (see pages 5 through 11)

How many police officers should patrol Arizona's highways? The Highway Patrol Bureau is testing a new manpower model that could help DPS and the Legislature answer this difficult question. Maintaining an adequate police force is the Bureau's number one priority and a growing agency concern. However, past attempts by the Bureau to objectively justify its police staffing needs have proven inadequate. The Highway Patrol Bureau, recognizing the need for a more objective analysis of police staffing requirements, participated in a Northwestern University Traffic Institute (NUTI) project to develop a staffing model suitable "for any agency whose primary mission is the delivery of traffic services." The manpower model developed by NUTI appears to provide a sound basis for assessing staffing needs.

Despite its potential value, the Highway Patrol Bureau should not use its new manpower model until several critical problems are addressed. Staffing needs can change significantly, depending on the data programmed into the model. For example, by lowering the projected response time to calls for service, one district's staffing needs changed from 54 FTEs to 68 FTEs. At a cost of over \$60,000 in salary, equipment, and other operating expenses for each additional Highway Patrol officer, even small differences in projections for the number of staff needed will be costly to the State. Our review of the model showed that the factors used by the Department in its initial application of the model did not correspond to any measurable performance objectives, that districts were using varying criteria, and that some of the automated data used for officer activity was either inaccurate or unavailable. Therefore, before using the model for budgetary purposes, the Bureau needs to develop: 1) realistic service levels, 2) more uniform standards, and 3) a more accurate and complete database. During the course of our audit, the Bureau began taking actions to address our concerns.

DPS Needs To Enhance Its
Personnel Deployment System (PDEP) (see pages 13 through 20)

At this time, DPS cannot adequately ensure that Highway Patrol officers are being deployed in the most efficient and effective manner possible. DPS has implemented an automated information system called PDEP (Personnel Deployment) for providing information on accidents and informing management of the specific activities officers are spending their time on. However, due to problems with PDEP, management's ability to analyze staff utilization is being hampered. Some of the data in the system is unreliable because officers are not coding their time accurately. Other information needed by management, such as where enforcement actions occur, and response time is not captured by PDEP. Finally, because Bureau goals and objectives are not related to officer activity, it is more difficult for DPS management to adequately determine whether the activities officers perform are accomplishing its goals.

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INTRODUCTION AND BACKGROUND

The Office of the Auditor General has conducted a performance audit of the Arizona Department of Public Safety (DPS), Highway Patrol Bureau, pursuant to a June 14, 1989, resolution of the Joint Legislative Oversight Committee. This performance audit was conducted as part of the Sunset Review set forth in Arizona Revised Statutes (A.R.S.) §§41-2351 through 41-2379. This is one in a series of reports on the Department.

Background

The Department of Public Safety (DPS) was established on July 1, 1969, to consolidate the functions and responsibilities of the Arizona Highway Patrol, the Enforcement Division of the Department of Liquor Licenses and Control, and the Narcotics Division of the Arizona Department of Law. Currently, DPS is organized into five bureaus: Highway Patrol, Criminal Investigation, Telecommunications, Administration, and Criminal Justice Support. The Department employs approximately 1,620 Full-Time Employees (FTEs) and has an annual budget of \$86 million.

The Highway Patrol Bureau consists of five Divisions: Northern Patrol, Southern Patrol, Metro Patrol, Central Patrol, and a Special Services division. The four patrol divisions are organized regionally into 15 districts and 71 area offices. The divisions are responsible for patrolling the Arizona highways and enforcing the State's traffic and criminal statutes. The Special Services division enforces commercial vehicle safety standards and vehicle weight regulations, responds to accidents or incidents involving hazardous materials and commercial vehicles, and inspects school buses and tow truck companies.

Scope

During the preliminary phase of our audit, we conducted a review of the Bureau's major operations to identify issues within the Bureau. Auditors visited Highway Patrol districts and areas throughout much of the State and met with the lieutenants and sergeants responsible for those areas. Further, we rode with many Highway Patrol officers during portions of

of their shifts to gain an understanding of their duties. During these visits, we also contacted several local law enforcement agencies to obtain their impressions of the Bureau's operations. The agencies we contacted commented that DPS was helpful and provided assistance when needed. In the rural areas of the State, both DPS and local law enforcement officials stressed the need for cooperation and mutual assistance because of the large geographical areas patrolled with a relatively small number of officers.

Our preliminary review identified staffing and staff utilization as the primary issues facing DPS. Other issues, including those related to vehicles, training, and the use of sworn officers in administrative positions, will be considered in our forthcoming audit of the DPS Administration Bureau. As shown in Table 1 (page 3), the Bureau is allocated 721 FTEs and expends 90 percent of its nearly \$34 million budget on salaries and employee-related expenditures. The Bureau believes that additional staff are needed. Nearly 21 miles of new metropolitan freeway were added to the road system in 1989 and 1990, and an additional 41 miles are planned to be completed during 1991 and 1992.⁽¹⁾ For fiscal year 1990-91, the Bureau was allocated seven additional officers to replace those officers who had been transferred from rural areas to patrol metropolitan freeways. However, the Bureau thinks more officers are needed (DPS asked for an additional 63 positions in its fiscal year 1991-92 budget request). Because of mandated budget cuts, the Bureau has been unable to fill the seven new positions and has left some of the other positions vacant.

(1) These figures include miles added to the I-10, Papago, Hohokam, Superstition, Agua Fria, Sky Harbor and other segments of metropolitan freeways.

TABLE 1
DEPARTMENT OF PUBLIC SAFETY
HIGHWAY PATROL BUREAU
STATEMENT OF FTEs AND ACTUAL AND BUDGETED EXPENDITURES
FISCAL YEARS 1988-89, 1989-90, AND 1990-91
(Unaudited)

	<u>1988-89</u> <u>Actual</u>	<u>1989-90</u> <u>Actual</u>	<u>1990-91</u> <u>Budgeted</u>
<u>FTE Positions</u>	718	714	721
<u>Expenditures</u>			
Personal Services	\$22,951,105	\$24,142,970	\$25,503,700
Employee-Related	4,637,012	4,527,519	5,182,700
Professional and Outside Services	18,679	14,151	29,200
Travel, In-State	211,241	221,557	237,600
Travel, Out-of-State	52,101	28,372	24,700
Equipment	2,758,536	2,614,025	2,578,800
Other Operating	<u>489,710</u>	<u>453,088</u>	<u>261,200</u>
TOTAL	<u>\$31,118,384</u>	<u>\$32,001,682</u>	<u>\$33,817,900</u>

Sources: Arizona Financial Information System reports for Fiscal Years 1988-89 and 1989-90; the State of Arizona Appropriations Reports for the Fiscal Years ending June 30, 1989, 1990, and 1991, as applicable.

Although the Bureau has requested additional staff, we are uncertain at this time how many more staff are actually needed. The Bureau's previous methodology to determine staffing requirements for its budget requests was discredited by Arthur Young and Company in a report prepared for the Governor in 1988. Recognizing the need for a more objective analysis, the Bureau, along with police agencies in several other states, is in the process of implementing a new manpower assessment model developed by the Northwestern University Traffic Institute. Properly implemented and used, this model should be able to more accurately determine staffing needs.

Our preliminary review also identified issues relating to the efficient and effective utilization of staff. Those we spoke with raised the following questions: Were officers being used in the areas of greatest need? Were officers spending too much time on accident investigation,

report writing, and training? The Bureau developed an automated system several years ago to assist management in the efficient and effective deployment of officers. During the preliminary review, several DPS officials identified data and other problems with this automated system.

Because of the concerns about the number of Highway Patrol staff needed and whether officers were being utilized efficiently and effectively, our audit focused on two areas:

- the extent to which the Bureau's new manpower model could assist DPS and the Legislature in determining appropriate Highway Patrol officer staffing levels, and
- the need to enhance DPS's automated system for deploying Highway Patrol officers.

The audit was conducted in accordance with government auditing standards.

The Auditor General and staff express appreciation to the Director of the Department of Public Safety and the Assistant Director for the Highway Patrol Bureau and his staff for their cooperation and assistance throughout the audit.

FINDING I

NEW MANPOWER MODEL COULD EVENTUALLY IMPROVE LEGISLATIVE OVERSIGHT OF HIGHWAY PATROL STAFFING

How many police officers should patrol Arizona's highways? The Highway Patrol Bureau is testing a new manpower model that could help DPS and the Legislature answer this difficult question. Several critical problems need to be addressed, however, before the model can be used effectively.

New Manpower Model Could Lead To Systematic Evaluation Of Highway Patrol Staffing

A new manpower model developed by Northwestern University's Traffic Institute (NUTI) could help decide how many officers are needed on Arizona's highways. Although staffing is a growing agency concern, past attempts by the Highway Patrol Bureau to demonstrate police staffing requirements have been inadequate. If properly implemented, the NUTI model could address this shortcoming by providing a more systematic approach to Highway Patrol staffing.

Number one priority - Maintaining an adequate police force is the Bureau's number one priority, and a growing agency concern. Staffing is the predominant issue discussed in the Bureau's current three-year strategic plan. The plan states that "the level of police services ... will decline to the point where public welfare and officer safety is jeopardized" unless 143 additional officers are hired.

But are 143 additional officers really needed? Past attempts by the Bureau to objectively justify its police staffing needs have proven inadequate. The manpower model used by the Highway Patrol Bureau was severely criticized by Arthur Young and Company in a report prepared for the Governor in 1988. The report concludes that "in our opinion the ... model for Highway Patrol staffing is not valid and is not useful to any substantive degree as a determinant of personnel requirements." According to the report, the model's major deficiency was its failure to rely heavily enough on workload measures.

The Northwestern University model - The Highway Patrol Bureau recognized the need for a more objective analysis of police staffing requirements and participated in a NUTI project to develop a staffing model suitable "for any agency whose primary mission is the delivery of traffic services."⁽¹⁾

The manpower model developed appears to provide a sound basis for assessing staffing needs. NUTI surveyed over 50 police agencies and conducted an extensive literature search to gather information and produce a statistical model and handbook entitled the Police Allocation Manual (PAM). Eight state agencies, including Arizona's Highway Patrol Bureau, tested and evaluated PAM for validity and usability.⁽²⁾ Results have been positive. One test state, California, now uses the model to prepare its budget and justify staffing requests.

Our own review indicates the model is a logical and flexible approach for assessing police staffing requirements. PAM's statistical formulas are based on sound theoretical principles. Moreover, the model is adaptable. It can be applied to diverse demographic and geographic conditions. Finally, PAM addresses concerns raised in the Arthur Young report by relying on workload measures to appraise police staffing requirements.

Critical Problems Need To Be Addressed
Before New Manpower Model Can Be Used Effectively

Despite its potential value, the Highway Patrol Bureau should not use its new manpower model until several critical problems are addressed. Staffing appraisals can change significantly, depending on the data programmed into the model. Therefore, before using the model for budgetary purposes, the Bureau needs to develop: 1) realistic service

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- (1) After repeated requests for assistance by the law enforcement community, the National Highway Traffic Services Administration, a Federal service agency for police forces, hired NUTI to develop standardized staffing procedures.
 - (2) Thirty state police agencies expressed interest in testing PAM. Police agencies in eight states (California, Colorado, Florida, Illinois, Massachusetts, Nebraska, New York, and Arizona) were selected based on agency size, and geography, and the availability of workload data. At the present time, NUTI is near the end of its second and final test phase of the model as it pertains to state police agencies. A third test phase will evaluate the model's utility for local police agencies.

levels, 2) more uniform standards, and 3) a reliable and more complete database. Once problems are addressed, the new manpower model could assist in making budget decisions.

The Bureau is still in the early stages of implementing PAM, having just recently completed the model's first statewide application. During initial testing, each district patrol office used the model to assess its own manpower needs with minimal input from Bureau management.⁽¹⁾ The purpose of this initial testing was to allow each district to become familiar with the workings of the model and to identify problem areas. Not surprisingly, the test results indicate the Bureau needs to make substantial progress before the model can be used effectively.

Staffing needs can easily be altered - By simply changing several key data inputs, PAM can produce widely varying staff results. For example, during the model's initial testing:

- Lowering the response time to calls for service enable one district to increase its staffing requirements by 26 percent, from 54 Full Time Employees (FTEs) (including officers, support staff, and command personnel) to 68 FTEs.
- Increasing the frequency with which highways are patrolled enable a second district to increase its staffing requirements by 20 percent, from 54 to 65 FTEs.

Because the number of staff needed can vary so greatly as a result of the criteria applied, it is important that the model not be implemented prematurely. Even a minor error in projecting the number of staff needed will be costly to the State; the Bureau spends over \$60,000 in salary, equipment and other operating expenses for each Highway Patrol officer during his or her first year of employment. Therefore, the Bureau needs to proceed cautiously and address several key problem areas before attempting to use PAM to evaluate its staffing requirements.

(1) Applying the model at the district level is possible because PAM calculates staffing by "Autonomous Patrol Area (APA)," which can be any self-contained patrol unit. Overall staffing is determined by totaling each APA's staff assessment. Therefore, although the Highway Patrol Bureau has the option of applying the model to a bureau, district, or area level, the smaller the APA selected, the more precise the assessment.

Establish credible service levels - One key to implementing PAM effectively is for the Bureau to establish service levels that meet well-defined performance objectives.

Two areas of police service in particular should be based on well-defined and measurable objectives:

- Patrol frequency - This value represents the frequency in which an officer will pass a given point on a highway or the average amount of time a stranded motorist will have to wait for an officer to come by on patrol.
- Response time - This value represents the amount of time it takes an officer to arrive at the scene in response to a call for service or an accident.

During DPS' initial application of the model, the patrol frequencies and response times selected DID NOT correspond to any measurable performance objectives.⁽¹⁾ This was a major deficiency in the Bureau's effort because of the impact these service levels have on the number of officers needed as calculated by PAM. As Table 2 indicates, the difference between patrolling one district's highways every 15 minutes and every hour is an additional 17 officers. Likewise, Table 3 (see page 9) shows that the difference between responding to a call for service in 5 minutes versus 20 minutes (for that same district) is an additional 14 officers.

TABLE 2

**IMPACT OF PATROL FREQUENCY
ON STAFF REQUIREMENTS
(For one district office)**

<u>Patrol Frequency</u>	<u>Staff Requirement</u>
15 minutes	23 officers
30 minutes	12 officers
45 minutes	8 officers
1 hour	6 officers

Sources: Northwestern University's Traffic Institute, Police Allocation Manual (PAM); values submitted by the Arizona Department of Public Safety, Highway Patrol Bureau district personnel.

(1) DPS lacks information on its current response times and patrol frequencies.

TABLE 3

**IMPACT OF RESPONSE TIME
ON STAFF REQUIREMENTS
(For one district office)**

<u>Response Time</u>	<u>Staff Requirement</u>
5 minutes	19 officers
10 minutes	10 officers
15 minutes	6 officers
20 minutes	5 officers

Source: Northwestern University's Traffic Institute, Police Allocation Manual (PAM); values submitted by the Arizona Department of Public Safety, Highway Patrol Bureau district personnel

Consequently, selecting realistic patrol frequencies and response times should be a high priority for the Bureau. Since there are no national standards or criteria against which to measure these two service levels, DPS will have to develop its own criteria. However, logical first steps in this process include determining Arizona's current levels of service and conducting a survey of service levels of other states using the PAM model.

Institute uniform definitions - The Bureau also needs to develop more uniform standards and definitions upon which to base its staffing requirements.⁽¹⁾ As noted previously, each district calculated its own manpower needs using their own criterion to set patrol frequencies and response times. In addition:

- Districts calculated the time spent on calls for service differently. For example, one district included the time needed to write offense reports in its calculations; other districts did not. Another district included in its calculations the amount of time it spent assisting other police agencies with accident investigations, other districts did not. Finally, some districts considered their

(1) To help ensure uniformity, California has established separate "patrol environments," that it uses to identify the individual service requirements for its various demographic regions. For example, California developed different regional requirements for patrol frequencies, response times, and the number of hours of patrol coverage. Missouri has adopted a similar classification scheme.

time spent in investigative activities as being a call for service and included this time in their calculations; at least one district did not.

- District representatives also expressed concern that districts were not classifying highways or counting roadway miles in the same manner.

All these inconsistencies can impact PAM's staffing calculations.

The Bureau's upper management should consider taking a more active role in implementing PAM. Until staffing requirements developed through PAM conform to uniform guidelines, they will lack credibility. Although district personnel have formed a three-man committee to address some of the problems with uniformity, more aggressive Bureau involvement might speed up this process. According to one NUTI project coordinator, the police agencies that "have gone the farthest" with PAM, have employed a more centralized "top down" management approach than the Bureau.

Develop a more accurate and complete database - Finally, the Highway Patrol Bureau needs a more accurate and complete database to successfully implement PAM. As indicated on page 6, the model relies in part on workload measures to assess staffing needs. Consequently, accurate staff appraisals depend on the Bureau's ability to reliably input the time spent by officers investigating accidents, assisting motorists, attending meetings, directing traffic, and participating in other routine activities. The Bureau is deficient in this area. For example:

- **Some data is inaccurate** - A survey of field officers conducted by our office revealed chronic under- and overreporting of workload data. For example, administrative activities such as vehicle maintenance, in-house meetings and other miscellaneous office work is being overreported by 23 percent. The Bureau will have to take steps to increase the accuracy of its database before PAM can be used reliably.
- **Data is unavailable** - In several instances, PAM requires data that the Bureau's management information system is not set up to capture. For example, PAM requires user agencies to calculate the amount of time officers spend issuing citations and assisting motorists. The Bureau's system currently lacks this capability. Agency personnel have said the system can be modified to capture this information.

Model could assist in making budget decisions - If the problems described in our report can be resolved, the Bureau's new manpower model could eventually be used to develop the Highway Patrol's budget (and budget alternatives) based on service levels. For example, PAM would enable the Bureau to report the cost of responding to an accident in 5 minutes versus 10 or 15 minutes. The Bureau should even be able to provide information about the extent to which faster response times would alleviate traffic congestion, or save lives. With this type of information available, the legislative and executive branches would be able to weigh the relative costs and benefits of various service levels, and make policy and budget decisions related to Highway Patrol staffing in a more effective manner than is now possible.

RECOMMENDATIONS

1. DPS should continue efforts to implement its new manpower model.
2. DPS should not attempt to use the model to assess Highway Patrol staffing until it develops the following:
 - service levels based on realistic performance objectives,
 - more uniform standards, and
 - a more accurate and complete database.
3. Once the model is workable, the Legislature should consider requiring DPS to present in its budget various service options related to highway patrol, along with the relative costs and benefits of these options.

FINDING II

DPS NEEDS TO ENHANCE ITS PERSONNEL DEPLOYMENT SYSTEM (PDEP)

At this time, DPS cannot adequately ensure that Highway Patrol officers are being deployed in the most efficient and effective manner possible. A comprehensive management information system (MIS) could assist DPS in the proper utilization of staff and provide information to determine appropriate staffing levels. The Department's current MIS system, called PDEP (Personnel Deployment), has data problems and has never been completed. In this finding we outline several steps and actions DPS must take to enhance PDEP into a useful decision-making tool.

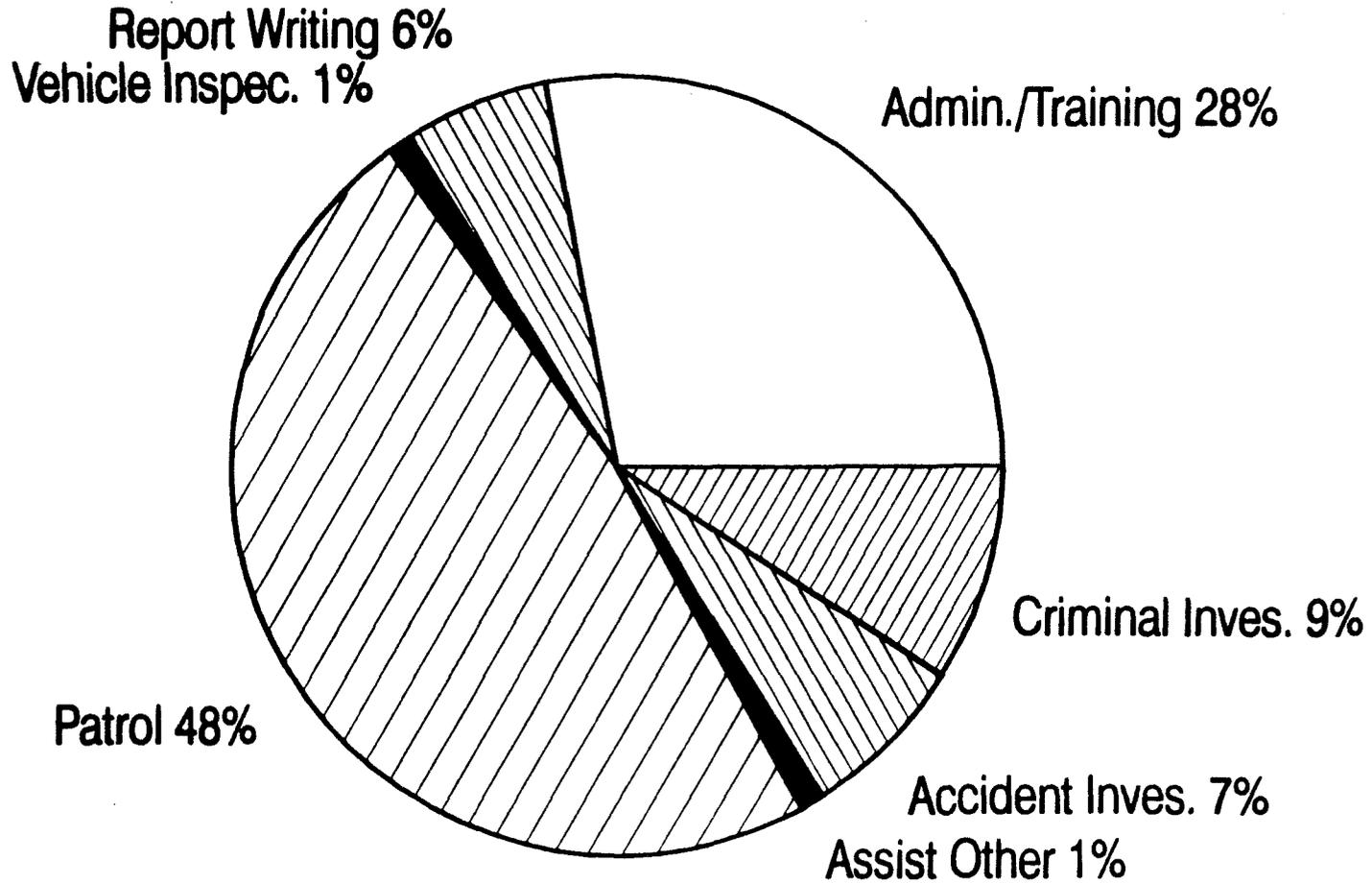
The Highway Patrol Bureau's management information system, PDEP, is a computer database containing accident information and officer time and activity data. It is used by management to monitor accidents and staff activity and also deploy staff. PDEP serves a different role than the Patrol Allocation Model (or PAM, as discussed in Finding I). The PAM staffing formula determines the number of staff needed for a certain patrol area. PDEP information then assists management in appropriately deploying staff within that patrol area.

PDEP Can Contribute To Better Highway Patrol Management

Currently, DPS officers spend 28 percent of their on-duty time performing administrative functions and spend 48 percent of their time on patrol. Is this the appropriate combination of activities to achieve the Highway Patrol Bureau's goals and objectives? In fiscal year 1989-90 the Bureau was authorized 714 staff, and the Bureau's expenditures were \$32 million. Without a comprehensive management information system, DPS has difficulty determining whether its resources are being utilized efficiently and effectively. Figure 1, page 14 shows a breakdown of how DPS Highway Patrol Officer Is and IIs spent their time during fiscal year 1989-90.

FIGURE 1

**DPS HIGHWAY PATROL OFFICERS I AND II
ON-DUTY TIME DISTRIBUTION
FISCAL YEAR 1989-90**



Source: Auditor General staff review of Highway Patrol Bureau PDEP data.

According to the Northwestern University Traffic Institute (NUTI), a well-designed management information system provides useful information in a form appropriate for decision making. It also provides a historical record of traffic operations for assessing trends and provides a "track record" of operations. In addition, it establishes conditions for enhancing efficiency and effectiveness of operations because managers can readily see if objectives are being achieved, and they can respond appropriately.

Problems With PDEP Impact Management's Ability To Efficiently And Effectively Utilize Staff

Our review found several problems with the Department's PDEP management information system. First, some of the data in the system is of limited use to management because officers are not coding their time accurately. Second, some information needed by management is not captured by PDEP. Third, it is more difficult for DPS management to determine whether its deployment of officers is indeed efficient and effective because there is no formal relationship between the Bureau's goals and the functions officers are actually performing.

Evolution of PDEP - DPS began a project to develop the PDEP system in 1977. At that time, information about accidents, officer activity, etc. was not available to management in a usable format or in a manner timely enough to impact decision making. The goal of the project was to design a deployment system for selective enforcement that would assist management in distributing, assigning, and projecting manpower needs. DPS envisioned an ongoing process of assigning personnel, performing duties, measuring and evaluating results, and then reassigning personnel as needed. The system was to be developed in four phases. Phase I involved automating accident information. Phase II automated officer time and activity information. Both of these Phases have been completed since 1982. However, to complete the system, Phases III and IV require automating enforcement and other information.

Problems with current data - In our review we found significant problems with the current information in PDEP. Our survey of Highway Patrol officers indicates that many of them did not record their time and activities accurately.⁽¹⁾ In practice, officers are required to charge their time and activities to any of approximately 50 codes on a weekly time sheet. The information is then put onto the PDEP system. The survey indicates that both overreporting and underreporting occurred by up to as much as 23 percent per code.

Officers listed several reasons they either overreported or underreported the time they spent on various activities. Many officers wrote that they were under pressure from management to keep patrol time up or expand patrol time and keep charges for administrative activities down. Officers also wrote that they were pressured to maintain a balance between the number of enforcement activities and the number of hours spent on those activities (such as maintaining an average of one enforcement action for every hour spent on patrol). Additional reasons cited included covering uncoded time, covering downtime, covering the lack of sufficient time allowed for certain activities, and unclear codes.

Improper coding of time for whatever reason seriously impacts the validity and usability of PDEP data for management decision making. Because of the extent of miscoding, in some cases, management does not receive an accurate picture of how resources are being utilized in the field. For example, one important measure of activity used by management is the percentage of time officers spent on proactive enforcement activities (patrol) as opposed to the time spent on reactive activities (responding to accidents or assisting motorists). Our review of PDEP information revealed that the percentage of time spent on patrol for the 15 Bureau districts averaged 47 percent in fiscal year 1989-90. The Department's goal for patrol activities is 65 percent. If patrol is indeed overreported by 22 percent as shown by the survey, then DPS may be even further from meeting its patrol goal than indicated in PDEP.

(1) We surveyed 484 Officer Is and IIs only; management positions were excluded. We received 191 responses (43 percent of those surveyed).

Important management information not captured by PDEP - PDEP does not capture some critical information needed by management. For instance, information regarding where enforcement actions occur is not recorded. Without this information, it is more difficult for management to monitor whether officers are actually performing enforcement functions in the areas assigned. Information about response time i.e., the time it takes for the officer to arrive at the scene, is also not captured in the system. Management needs this information both for making deployment decisions and for calculations performed by the PAM staffing allocation model.

Patrol goals and objectives not related to PDEP - Because Bureau goals and objectives are not related to officer activity, DPS management cannot adequately determine whether the activities officers perform significantly impact whatever goal they are trying to accomplish. The Bureau has established five goals and 14 objectives. The goals are wide-ranging -- from reducing the rate of traffic accidents Statewide to promoting officer participation in physical fitness programs. DPS goals and objectives, however, are not linked to officer activity. DPS should relate its goals and objectives to officer activity using performance measures. NUTI has developed several performance measures that relate to traffic supervision goals and objectives. For example, one of NUTI's performance measures for the goal of reducing accidents is the ratio of the number of citations (citing for a specific violation known to cause accidents in the area) to the number of accidents for a certain area.⁽¹⁾ For instance, if the management information system indicates that the number of citations remains low when the accident rate remains high, management can then ask officers to focus their efforts in that area. However, if the accident rate is not affected by a certain type of enforcement, management will then know that it should identify and attempt other options.

(1) Other highway patrol activities also relate to accident reduction including, for example, things such as DUI checkpoints, Violator Directed Patrol (VDP) and public information. These activities could also be translated into performance measures.

What DPS Needs To Do To Enhance PDEP

To properly enhance PDEP, DPS must address several different issues so that it can provide useful information on which to base its decisions. First, time coding and data problems must be resolved. Second, the system needs to be completed so that all necessary information is captured. Third, measurable goals, objectives, and performance indicators need to be adopted. Fourth, management needs to make a commitment to develop and utilize the system as well as provide training to those using it.

Resolve PDEP data problems - DPS needs to address problems with officers miscoding time sheets. For the system to provide meaningful information for management decision making, officers must code their time accurately. DPS needs to review the results of our officer survey to determine the reasons for miscoding and then develop strategies for resolving the problem. For example, our survey indicated that pressure from management was one of the primary reasons for miscoding. HPB management needs to convey to supervisors that officers should be encouraged to code their time accurately.

Expand PDEP to capture needed information - DPS needs to expand the PDEP information base to capture other vital information relating to enforcement, and response time. DPS originally planned to obtain this information through implementation of PDEP Phases III and IV. Implementation of Phase III would allow DPS to track the location of enforcement actions and calls for service, thus allowing management to determine whether staff were deployed to priority areas. Implementation of Phase IV would provide response times to calls for service, and would also relate staff activities to broader goals and objectives. However, at the present time neither phase has been implemented and there is no firm timetable to do so. According to the assistant directors for both the HPB and the Telecommunications Bureau (TCB, which handles system development), other Department priorities have superseded implementation of these phases. Currently, only two to three staff are available for programming; all other EDP staff provide system maintenance. Recently,

the HPB has again requested implementation of Phase III. According to TCB, they will be able to address Phase III using the in-house programming staff in fiscal year 1991-92 if DPS does not suffer budget cuts. Little if any additional hardware will be needed.

Refine goals and objectives, add performance measures - To fully benefit from a management information system, DPS needs to refine its goals and objectives and add performance measures.

Management information systems are being recommended and considered as a more efficient and effective method for managing resources both nationally and within Arizona. NUTI has developed a management information system to be utilized by organizations such as DPS for traffic patrol. In fact, DPS participated in the NUTI study and served as one of the test agencies. The NUTI system provides measurable goals, objectives, and performance indicators.

In Arizona, proposed State budget reform measures would require State agencies to develop goals, objectives, and evaluation criteria for each budget program. The evaluation criteria must relate to program goals and objectives, and emphasize results. In addition, agencies would be required to develop management information systems to evaluate the success or failure of each budget program in achieving its goals and objectives. Initially, DPS could consider using the NUTI goals, objectives, and performance measures to meet these requirements.

Provide training and commitment - To help ensure that a resource management system is utilized and is effective, DPS needs to address other issues. Those utilizing the system for decision-making purposes need to be trained in the system's use and capabilities. To date, first line supervisors have been given very little training in the use of PDEP. In addition, DPS needs to provide Bureau orders and management manuals for further guidance. At the present time, there are no Bureau orders or guidelines for management for using PDEP.

Finally, commitment from upper management is needed to make this system work. Without commitment, the system will not be utilized by managers in the field. DPS needs to carefully plan, support, and sustain its efforts in developing an effective system. Nine years have passed since DPS completed Phase II of PDEP. Since that time, DPS has not automated any of the information required for PDEP's later Phases III and IV. If additional programming resources and hardware are needed to bring these phases on-line, DPS needs to develop options internally or seek additional funding.

RECOMMENDATIONS

1. In order to enhance its PDEP management information system, DPS should consider the following recommendations:
 - a. Resolve officer miscoding problems.
 - b. Expand PDEP to capture information about the location of enforcement actions, and response time.
 - c. Utilize the NUTI system as the basis for developing goals, objectives, and performance measures.
 - d. Develop sufficient training for all management personnel who will be using the system.
 - e. Develop Bureau orders and management manuals for using the PDEP system.
 - f. Provide a management commitment to the implementation and utilization of the PDEP system.

2. DPS needs to determine if additional programming resources and hardware are needed to complete the PDEP system. If so, DPS needs to develop funding options internally or seek additional funding from the Legislature.

OTHER PERTINENT INFORMATION

During our audit we obtained information about methods to improve the efficiency of accident investigation and report writing. In addition, we also obtained information on the use of photo radar.

Accident Investigation And Report Writing

Time spent is considerable and varies between districts - DPS officers spend a significant amount of time in both investigating accidents and writing accident reports. In fiscal year 1989-90, the Highway Patrol Bureau investigated 14,738 accidents and prepared 12,904 accident reports. In addition, Bureau staff completed 15,195 offense reports, some of which were related to accident investigation. According to DPS records, Bureau staff spent 77,678 hours on the activities mentioned above. This equates to 43.5 full-time employees. The amount of time spent on these activities may be even higher than reported. Our survey of officers found that underreporting the amount of time spent on these activities occurs either because not enough time is allocated for them or officers are pressured by management to keep non-patrol time low.

We found that the amount of time spent on these activities varied among districts. Generally, personnel in the metropolitan Phoenix area districts spent less time investigating accidents than personnel in rural districts. The reasons given for these differences are that urban area districts need to investigate accidents quickly in order to expedite traffic movement on the freeways, while in rural areas, districts tend to conduct more comprehensive investigations on all types of accidents. According to DPS, some rural district commanders think comprehensive investigations provide useful training for officers. At the present time, because the Bureau has no standards for determining how comprehensive an investigation or report must be, district commanders establish their own criteria for these activities.

New categories and reports may save time - The Bureau is considering adopting new accident categories for investigation and reporting purposes that may reduce the amount of time spent on these activities. Currently, the Bureau allows for discretion in the types of accident reports prepared. As a result, some officers complete more forms than necessary. New accident categories and standards for writing reports are being developed by a panel of DPS sergeants and officers and will be submitted to DPS management for approval. The categories being considered include:

- accidents with no or only minor injuries and involving vehicles that can be driven away,
- accidents with injuries that do not require hospitalization, whether or not the vehicles can be driven away, and
- accidents involving hospitalized injuries or fatalities, and other offenses likely to be prosecuted.

DPS should accrue time savings with these new categories because more limited investigation and reporting standards would be required for the "accidents with no or only minor injuries and vehicles that can be driven away" category. Rather than the current procedure of filling out supplemental pages, officers would complete only a standard, one-page form. The Lieutenant heading the panel estimates that from 50 to 70 percent of all accidents would fall into this new category, and both the investigation and the report would require approximately one hour to complete (as opposed to the two to three hours currently required). New DPS accident investigation categories, investigation requirements, and reporting standards appear to have the potential for considerable time savings.

New Technologies Could Assist Highway Patrol

New technologies such as photo radar and the automated citation device may also help the Highway Patrol Bureau improve its efficiency and effectiveness.

Photo radar - Photo radar is one new technology used to enforce the speed limit. Specialized radar equipment, a computer, and a camera or video recorder are mounted inside a marked police vehicle so that the equipment can then be moved from one location to another. An officer enters into the computer the posted speed limit and the amount over the speed limit for which citations should be issued. Proponents of photo radar believe this technology's greatest benefit is that it reduces speeding and therefore the number of accidents involving injury. At the same time, it reduces the number of officers needed for speed enforcement so more officers are available for other types of law enforcement. It is also safer for both officers and motorists because it eliminates the need for an officer to pursue a speeding vehicle or create a hazard by pulling the speeding vehicle to the side of the road.

Photo radar is in use in many other countries including Europe, Canada and Australia. In the United States, local police departments currently use this technology; however, state law enforcement agencies are just now beginning to study the impact of photo radar.

We contacted the Paradise Valley and Peoria Police Departments to learn about their experiences with the use of photo radar. Peoria has used photo radar only since April 1990 and, therefore has limited data. A Paradise Valley law enforcement official noted that the number of injury accidents in fiscal year 1990 decreased 21 percent over the number of injury accidents in 1989. He considers this decrease to be a direct result of the use of photo radar.

Both jurisdictions noted that there have been concerns expressed by citizens regarding the manner in which these systems are leased and used. Citizen concerns about invasion of privacy and entrapment have not been supported by the courts. A law suit was brought against the Paradise Valley Police Department on this issue, but the Arizona Supreme Court refused to accept jurisdiction of the case.

In February 1991, Senate Bill 1164 -- a bill that would prohibit the use of photo radar devices -- was introduced. However, this bill was defeated by the Transportation Committee. On March 19, 1991, voters in

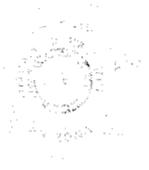
the City of Peoria, by a 5 to 2 margin, voted to discontinue the use of photo radar in their city and to terminate the city's three-year contract with Traffic Monitoring Technologies.

The assistant director for the Highway Patrol Bureau has indicated that photo radar is a valuable law enforcement tool; however, the manner in which it would be used by the Bureau would differ from the manner in which it has been used by local police departments. He noted that the greatest public concern about these systems is that they will be used to increase revenues in the same way law enforcement used speed traps. However, photo radar equipment has been shown to deter speeding. He also noted rather than eliminate the use of photo radar, safeguards can be adopted to ensure proper use of this equipment. The assistant director also thinks that initially warnings should be issued rather than citations. Thus, photo radar would be used more as an informative rather than a punitive tool of enforcement.

Automated citations - Another type of technology that the California Highway Patrol is testing is the use of automated citation computers by officers in the field. An officer enters the driver's license and vehicle registration information into an automated citation device and a citation is then printed by a portable printer connected to the device. At the end of a shift, the officer uploads the information in the citation device to a personal computer located in the area office. Use of the automated citation computer may reduce the amount of data that needs to be input at the courts as well as reduce the number of illegible citations that cannot be entered into the court system and adjudicated.

ARIZONA DEPARTMENT OF PUBLIC SAFETY

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FIFE SYMINGTON
GOVERNOR

F. J. "RICK" AYARS
DIRECTOR

June 21, 1991

Mr. Arthur Heikkila
Auditor General's Office
2700 North Central Avenue
Phoenix, Arizona 85004

Dear Mr. Heikkila:

This letter is forwarding our reply to the review draft of the Audit Report on the Highway Patrol Bureau.

I have reviewed the revisions drafted in your report on the patrol and a reply to the findings is attached.

On behalf of the Patrol Bureau and it's staff, I wish to thank you and your team for it's cooperation and patience. If you have any questions or need further assistance, please contact me again.

Sincerely,

A handwritten signature in cursive script, appearing to read "L. N. Thompson", is written over the typed name.

L. N. Thompson, Lt. Colonel
Assistant Director, DPS
Highway Patrol Bureau

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REVIEW OF DRAFT AUDITOR'S REPORT
OF HIGHWAY PATROL BUREAU

FINDING #1 - NUTI POLICE ALLOCATION MODEL

A review of the report shows that it accurately details the current state of the deployment of Highway Patrol Bureau field personnel. However, we disagree with the references to the methods used by California and Washington. California was rushed into using this formula due to a mandate from the California Legislature to develop a formula to use in establishing manpower needs. Washington chose to go directly to strict "top down" management involvement without first establishing the validity of their decision-making process.

The Highway Patrol Bureau has established a committee of line and staff personnel to coordinate the implementation of the Police Allocation Model (PAM) developed by Northwestern University's Traffic Institute (NUTI).

The PAM committee's primary objective is to determine the public's demand for service in each demographic patrol area and establish the manpower needs for each area. This is being accomplished by the collection of statistical data (PDEP system) and evaluating input from all autonomous patrol areas consisting of small geographic areas - to districts - to divisions, within the Bureau. Upon review of this information, the command staff of the Bureau will establish policy decisions to standardize (1) patrol intervals that will meet the needs of the motoring public in each demographic patrol area and (2) establish an average known response time for calls for service within these defined areas.

The Bureau has recognized that the current Personnel Deployment System (PDEP) does not capture all the required data to work the PAM in an accurate manner. An improvement has already been implemented, allowing for the tracking of self-initiated time. The PAM committee is continuing to work with technical support personnel from Data Processing in the development of a new deployment system which will meet all the needs of the Bureau in the accurate deployment of its officers and field support staff by the utilization of the PAM.

These actions will enhance the Bureau's ability to better calculate and deploy its manpower.

FINDING #2 - PERSONNEL DEPLOYMENT SYSTEM (PDEP)

The Bureau agrees with the statements regarding PDEP. However, the reports suggest self-initiated activity produced by patrol officers should be a direct link to the Bureau's accident reduction goal. This is but one way to address this need. Others include DUI checkpoints, visibility, Violator Directed Patrol, and education of the motoring public through the media and the Department's Public Affairs & Community Education Program (PACE).

PDEP, as currently used, falls short of the Bureau's need to collect correct statistical information for funding and staffing requirements. To correct this shortcoming, a minor correction which tracks additional items and hours dealing with self-initiated activity and the recording of supervisor time separate from officer time was implemented June 1, 1991. Training is currently scheduled for

all bureau supervisors in the proper use of PDEP and should be completed by October 1991. This instruction will define the use of the improved PDEP Activity Code Manual and the revised Highway Patrol Bureau Time and Activity Report (Weekly).

As designed, PDEP has several limitations which limit the Bureau's ability to identify staffing requirements. To correct these issues, the Bureau PDEP committee has been coupled with the PAM committee. They continue to work with Data Processing in the redesign of Phase I and II of PDEP to enhance the system's ability to track the needed information in a simplified "user-friendly" manner and the implementation of Phase III. The application of PDEP Phase III would greatly enhance the Bureau's ability to use the PAM by showing location of enforcement data.

OTHER PERTINENT INFORMATION - ACCIDENT INVESTIGATION SECTION

The report accurately details the current state of accident investigation in the Highway Patrol Bureau.

The committee mentioned in the report is currently finishing its second draft of a comprehensive Accident Investigation Policy Manual. The manual will address all areas detailed in the Auditor General's report, setting parameters on investigative detail, report format and reducing time spent on minor accident reporting/investigation. Although some discretion will be retained by investigators and commanders, it will be limited by the setting of standards for each reporting level.