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Air Operations Program
Workload Assessment and Staffing Study

June 28, 2024

Agreement Number 23C002000

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Executive Summary

The Department of California Highway Patrol's (CHP) mission is to provide the highest level of safety, service, and security to the people of California. The Air Operations Program (AOP) meets CHP's mission by supporting field-related operations and allied agencies across California for emergency response, homeland security missions (e.g., patrolling the state's electrical and water infrastructure), patrol of rural roadways, speed enforcement, enforcement other than speed, special events, transportation, and other missions. Over the past two decades, the AOP has operated in an evolving landscape, including new allied agency resources, increases in operational costs, changing demographic trends, and the emergence of technological advancements in air operations capabilities and unmanned aerial systems. These factors coupled with departmental organizational and policy changes and statewide directives have put additional pressure on the AOP.

CHP contracted with Crowe LLP (Crowe) to perform a Workload Assessment and Staffing Study (Study) of the department's AOP. The CHP's objective for this study is to determine appropriate staffing levels for the AOP to achieve the department's mission and its air operations objective. Since December 2023, Crowe evaluated program data, interviewed subject matter experts (SMEs) within the Office of Air Operations (OAO) and the eight Air Operations Units (AOUs), interviewed five benchmark agencies, assessed the program's current and emerging needs, and examined staffing model options.

This report provides Crowe's recommendations based on a comprehensive examination of the AOP's current and emerging workload and operational needs. Crowe's recommendations reflect analysis and consultation with program SMEs and benchmark agencies. Crowe's goal was to maintain a forward-looking focus to identify staffing model options that can effectively and efficiently support the CHP's mission and its air operations objective.

Proposed Staffing Model Options

Based on our comprehensive review of the AOP, we recommend that CHP consider the proposed options for the OAO identified in **Exhibit ES-1,** and the proposed options for AOUs in **Exhibit ES-2.** OAO options propose up to two positions for an Unmanned Aircraft System (UAS) program (program manager and specialist), one budget manager, and two assistant chief pilots (one officer to the assist chief helicopter and one officer to assist the chief airplane pilot). AOU staffing options propose the following:

- **Option 1** maintains at least one airplane and helicopter crew (i.e., one pilot and one flight officer) per shift to cover two shifts per day. This option would require an increase of 26.0 filled positions.
- **Option 2** maintains at least one crew per shift to cover two shifts per day, increases airplane staffing, maintains helicopter staffing levels, and decreases the number of sergeants from two to one for lower volume units (Border, Coastal, and Northern). This option would require a net increase of 7.0 positions.
- **Option 3** retains only airplane crews in the Inland, Northern, and Southern units and both helicopters and airplane crews in the Border, Central, Coastal, Golden Gate, and Valley units based on allied agency capabilities and volumes in each coverage area. This option would maintain two shifts per day and result in a decrease of 13.0 positions.
- **Option 4** retains only helicopter crews and eliminates airplane crews from the program. This option would maintain two shifts per day and result in a decrease of 50.0 positions.
- **Option 5** maintains one shift per day with at least one helicopter crew and one airplane crew per day. This option would result in a decrease of 53.0 positions.
- **Option 6** retains only airplane crews and eliminates helicopter crews from the program. This option would maintain two shifts per day and result in a decrease of 50.0 positions.

We provide detailed analysis and rationale for the staffing model options in *Section 5* of this report.

Exhibit ES-1
Proposed Staffing Options – Office of Air Operations

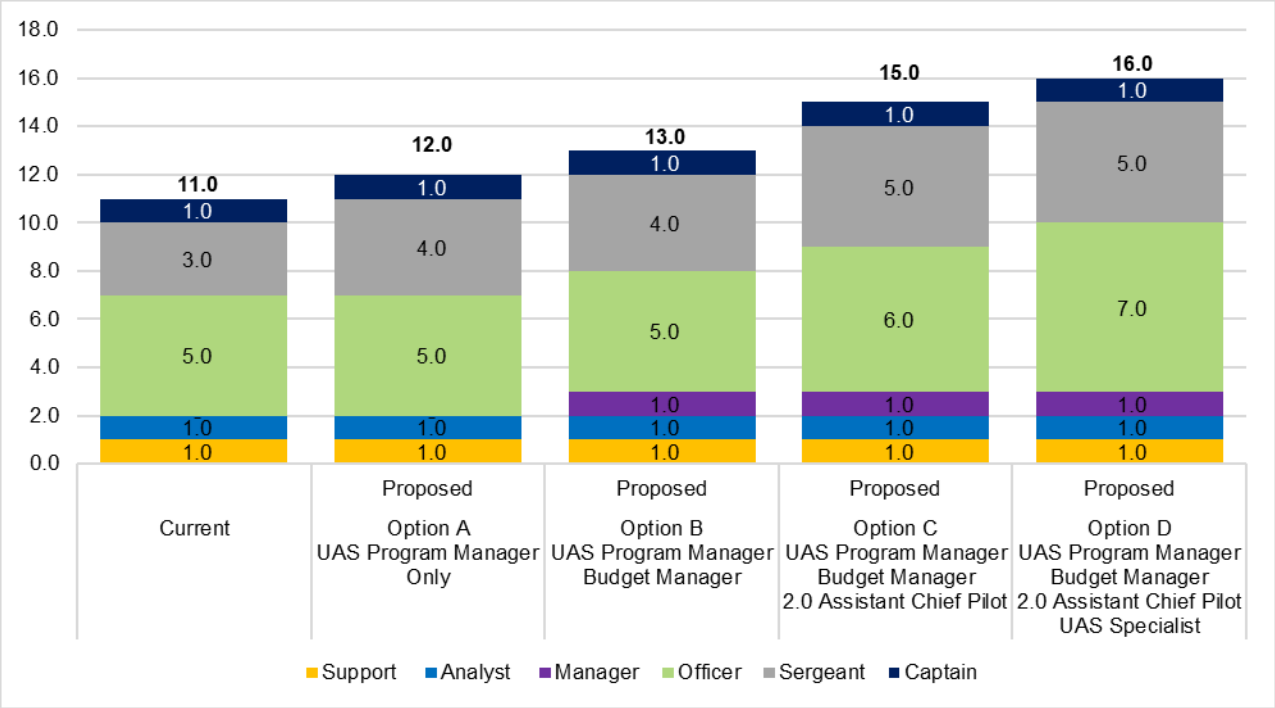
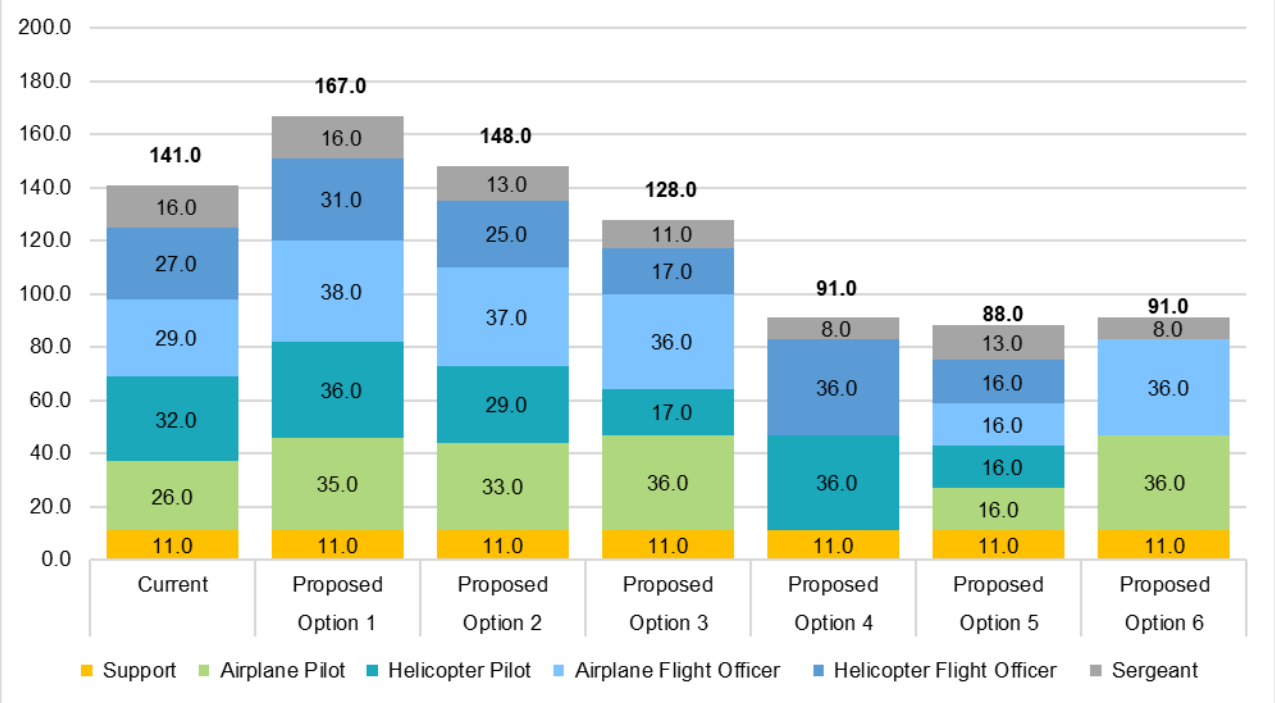


Exhibit ES-2
Proposed Staffing Options – Air Operation Units

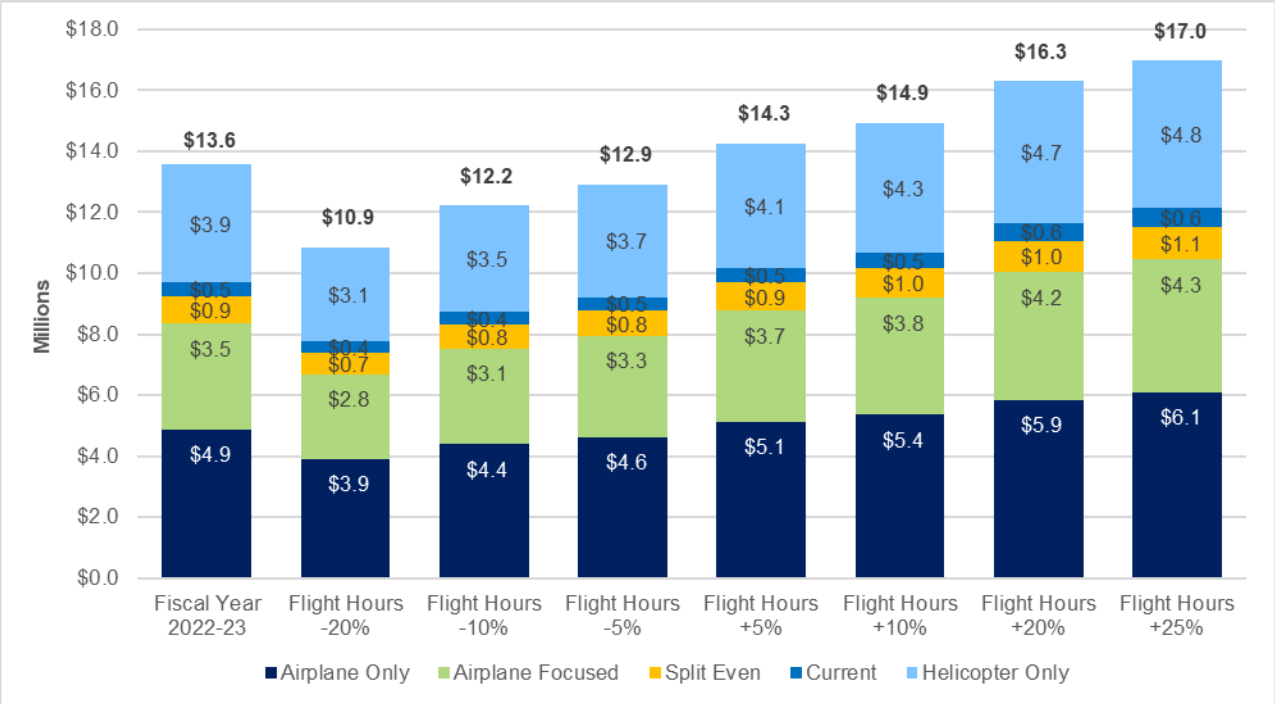


Estimated Operating Requirements

In **Exhibit ES-3,** we provide estimated operating requirements for fuel, maintenance, and other operational needs to support the following flight models under seven different scenarios where status quo flight levels[1] are decreased by 20 percent and increased up to 25 percent.

- **Airplane only** scenario indicates requirements to support 100 percent of status quo flight hours or roughly 11,200 flight hours. This flight model would require up to $6.1 million should status quo flight hours increase by 25%.
- **Airplane focused** scenario indicates requirements to support 60 percent flight hours with airplanes and 40 percent flight hours with helicopters. This flight model would require up to $10.4 million should status quo flight hours increase by 25%.
- **Split even** scenario indicates requirements to support 50 percent flight hours with airplanes and 50 percent flight hours with helicopters. This flight model would require up to $11.5 million should status quo flight hours increase by 25%.
- **Current** scenario represents the "status quo" and indicates requirements to support 55 percent flight hours with helicopters and 45 percent flight hours with airplanes up to $12.1 million should status quo flight hours increase by 25%.
- **Helicopter only** scenario indicates the requirement to support 100 percent flight time in helicopters or roughly 11,200 flight hours. This flight model would require up to roughly $17.0 million should status quo flight time increase by 25%.

Exhibit ES-3
Estimated Operating Requirements Under Various Flight Scenarios



[1] To account for "status quo" flight levels, Crowe used the AOP's Fiscal Year 2022-23 direct operating costs totaling approximately $9.7 million, which supported roughly 11,200 flight hours with 55 percent helicopter flight hours and 45 percent airplane flight hours. It is important to note that this exhibit is for discussion purposes and does not account for inflation.

Recommendations

The recommendations, outlined in **Exhibit ES-4,** provide the CHP with specific, realistic, and actionable strategies to continue to achieve the department's mission and its air operations objective to support allied agencies, field operations, and the public. We categorize the recommendations as follows:

- **Design recommendations** address how to define the AOP's authority, how to clarify its roles and responsibilities, and how to structure its organization for mission alignment.
- **Resource recommendations** address how to meet the AOP's personnel, air fleet, and operating requirements for operational efficiencies and effectiveness.
- **Deployment recommendations** address how deployment practices, service areas, coordination with allied agencies, and crew sizes are managed for optimal coverage and response times.
- **Implementation recommendations** address how the program implements workload, performance, and funding practices for continuous improvement.

Exhibit ES-4
Design, Resource, Deployment, and Implementation Recommendations

Focus Area	Description
Design	
Mission	**Seek Codification of Program Authority and Roles** CHP should codify the AOP's roles and responsibilities through legislation and/or regulation to provide clear guidance on its jurisdiction, decision-making authority, and funding. For example, the Maryland State Police Aviation Command operates under authority codified in the state law, which has enabled consistent and reliable funding and operational support. CHP should consider following Maryland's strategy by codifying the program's deployment priorities and its roles and responsibilities for "emergency response" as defined in program policy and outlined in state plans, such as the Law Enforcement Mutual Aid Plan.
Structure	**Transition to a Centralized Operating Structure Under New Division** CHP should centralize the OAO and AOUs under a new division, as opposed to the current dual management system where the program is managed by both Field Divisions and Headquarters. Creating a new division would likely require reorganization of commands, as detailed in General Order 21.1. In addition, CHP should add a Lieutenant-level position to support the Captain's management and administration of the proposed new division. Other state models, such as those used by Texas and Maryland, have centralized operating structures under divisions that allow for more streamlined decision-making and strategic deployment of resources (both personnel and aircraft) under one command. Both Texas and Maryland have at least a Lieutenant-level position to support the division commander. Creating a new division would also allow for changes to the program's rank and command structure, which could potentially incentivize both program and other CHP staff with institutional knowledge and skills to seek leadership roles within the program.
Resource	
Personnel	**Implement OAO Staffing Option D** CHP should add two positions for a UAS program[2] (1 sergeant and 1 officer), a budget manager (non-uniformed, staff services manager or financial accountant), and two assistant chief pilots – one to support the chief helicopter pilot and one to support the chief airplane pilot. Other agencies, such as the California Department of Forestry and Fire Protection (CalFIRE), Texas Department of Public Safety (DPS) Aircraft Operations Division, and Florida Highway Patrol have at least one drone program manager. A budget manager would enhance oversight and control of the program's budget. Adding two assistant chief pilot positions would alleviate workload pressure on the chief pilots by reallocating travel, administration, and management responsibilities.

[2] The Law Enforcement Drone Association (LEDA) recommends the following positions for a drone program: 1) Chief Pilot to act as a SME, 2) a program manager to implement policies and procedures in alignment with FAA regulations, and 3) a logistics lead to maintain equipment, software, and funding.

Focus Area	Description
	Implement AOU Staffing Option 2 CHP should implement AOU Staffing Option 2, which aligns with the program's priority to deploy airplanes rather than helicopters. This option maintains statewide air operations coverage with a focus on fully staffing airplane crews, recognizing that airplanes can respond to many search incidents that account for a large portion of the AOUs' workload. This option maintains current helicopter crew levels. On a statewide level, the CHP provides a unique and critical capability by maintaining both helicopters and airplanes as most allied agencies throughout the state generally maintain helicopters only. Lastly, this option assumes that it may not be necessary to maintain two sergeants at each location. As a result, CHP should explore the feasibility of reducing the number of sergeants, especially for lower volume units, such as the Border, Coastal, and Northern units. We provide additional rationale, assumptions, and implications for the proposed staffing model options in *Section 5.*
Distribution of Aircraft	**Maintain Current Distribution of Aircraft With Some Exceptions** CHP should maintain the current geographic distribution of aircraft until the new staffing model is approved. It may not be necessary to maintain two helicopters at each location if the department prioritizes airplane crew staffing. For instance, the Northern Unit, which currently has two helicopters, could rely on CalFIRE to fill operational needs, provided CHP assures year-round coverage for hoist rescues. Similarly, the Southern Unit, which has extensive helicopter capabilities, might be considered for fleet reduction. This approach will assure a seamless transition while maintaining operational readiness.
Number of Units	**Maintain Current Distribution of Air Units** CHP should maintain the current number of air units and not consolidate them. Consolidation would likely reallocate resources rather than minimize costs effectively or achieve operational efficiencies. Crowe recognizes there are costs required to maintain operations at each location, but these units contribute to providing a statewide force and effectively act as an insurance policy for the state. Maintaining the current units distributes workload, prevents undue pressure on other units, and assures the state retains its broad emergency response capabilities.
Training Programs	**Enhance Training Resources and Programs** CHP should allocate up to $2.0 million for training related flight hours. This would cover at least 12.0 hours of training related flight hours for all personnel to maintain proficiencies. The training budget should be separate from the AOP's operating budget for fuel and maintenance. In addition, CHP should develop comprehensive training programs that are regularly updated to reflect best practices and new technologies. For example, CHP should consider the feasibility of implementing a Pilot Trainee Program to train new pilots in-house to alleviate the costs associated with becoming a pilot and incentivize internal recruitment; and offer training to qualified flight officers to build time towards the minimum pilots in command (PIC) requirements. Crowe recognizes that implementing a Pilot Trainee Program may have implications, such as additional funding requirements to support related flight hours or the decrease in paramedic flight officer filled positions, but believes providing an additional means of developing proficiencies and staffing resources internally would ultimately provide long-term benefits to the AOP.

Focus Area	Description
Deployment	
Beat Structures and Timing	**Maintain Two Shifts Per Day and Coverage of At Least from 0800 to 0000** CHP should maintain two shifts per unit to assure full operational coverage, aligning with benchmark agencies where most maintain multiple shifts per day. For example, Maryland State Police Aviation Command maintains availability 24/7, with the lowest staffed unit having five helicopter pilots. Crowe's analysis found that nearly 90 percent of incidents occur between 0800 and 0000, and all units should maintain coverage during this period. CHP should not stage or move units, with the exception for Coastal and Northern AOUs, as all maintained sufficient response times where they flew the most frequently. Coastal AOU could benefit from staging in the Monterey area to enhance response time to incidents in that area. Northern AOU could benefit from staging helicopters during fire season to support CalFIRE. Maintaining this beat structure assures optimal response capabilities and operational readiness.
Coordination with Field Offices	**Continue to Coordinate with Field Offices to Respond to Demographic Trends** CHP should use unit-specific deployment strategies based on demographic, arrest trend, and traffic collision data as helpful indicators for understanding the landscape, though these should not be the primary drivers for planning purposes. Crowe's analysis indicates that licensed drivers are expected to grow in all units except Northern, with Central and Valley seeing the biggest immediate increases at almost 4 percent in five years. Arrest trends have been trending downward across all units, with the highest arrests occurring in the Southern and Border units. Traffic collisions remain high, with Southern having the highest fatalities, followed by Inland and Central. Understanding these trends, along with the fact that many units' biggest workload involve searches (suspects, vehicles, and persons) and pursuits, can help inform strategic decisions. For example, increasing patrol availability in high-collision areas and ensuring sufficient staffing for search and pursuit operations could enhance coverage and operational efficiency to support field offices in need.
Coordination with Allied Agencies	**Continue to Coordinate with Allied Agencies for Maximum Impact** CHP air units should continue to coordinate closely with allied agencies, particularly those that benefit significantly from support. Units should strive to direct calls routed through CHP dispatch for workflow consistency, as currently, 60 percent of calls come through dispatch while 40 percent go directly to the units. Units should document calls they do not respond to and track this data for planning purposes. Crowe's analysis identified that the program spent nearly $16.6 million on direct operating costs to support allied agencies over the last three fiscal years, averaging $5.5 million per year. Additionally, CHP should continue to provide the Helicopter Rescue Team (HRT) program to feasible air units throughout the state where feasible, as staff have provided positive feedback on this program.
Implementation	
Estimated Minimum Operating Requirements	**Implement Airplane Focused or Split Even Flight Time to Maximize Operating Budget** Seek augmentation to the program’s fuel and maintenance budget up to $15.0 million to provide a buffer for unplanned expenses, and adequately support incident and training flight hours. CHP should decrease helicopter flight hours by 5 to 10 percent to optimize the program’s available operating expense budget. An airplane focused flight model to support 60 percent flight hours with airplanes and 40 percent flight hours with helicopters would require up to $11.0 million in operating expenses should current flight hours increase by 25%. A split even flight model to support 50 percent flight hours with airplanes and 50 percent flight hours with helicopters would require up to $11.6 million in operating expenses should current flight hours increase by 25%. For reference, Texas DPS Aircraft Operations Division’s maintenance budget includes a minimum of $10.0 million and performs approximately 12,000 flight hours per year.

Focus Area	Description
Alternative Funding Sources	**Secure Federal Funding for Homeland Security Workload** CHP should pursue federal funding opportunities to support the program's homeland security missions, which accounted for nearly 10 percent of flight hours over the last four fiscal years. CHP should enhance collaboration with federal agencies such as the Department of Homeland Security (DHS) to align AOP operations with national security priorities and increase funding prospects. For reference, Texas DPS Aircraft Operations Division receives roughly $2.0 million per year in federal funds for the Operation Stonegarden Program (OPSG) to improve border security.
Performance Metrics	**Implement ROI-based or Other Performance Related Measures** CHP should implement ROI-type performance measures to evaluate the efficiency of CHP's air units and enhance the ability to demonstrate the program's benefits to stakeholders and decision-makers. For example, we found that the Border, Golden Gate, Inland, and Valley units had a higher percentage of total incident flight time compared to their share of total direct operating costs, indicating efficient output (responses to incidents) relative to inputs (fuel and maintenance costs). Conversely, the ROI observed in Central, Coastal, and Northern units could improve if the demand for incident responses increased, warranting an associated increase in flight hours. In FY2020 to FY2023, the estimated direct operating cost per incident for AOUs across both airplanes and helicopters ranged from roughly $430 per incident up to nearly $1,600 per incident. CHP should track DOC per incident for potential reimbursement opportunities. These ROI indicators can be calculated and measured by the OAO's proposed budget manager to supplement detailed financial analysis and report to leadership, providing enhanced direction on overall program performance and resource allocation.
Fuel Management Practices	**Transition to Bulk Fuel Tanks for All Units** CHP should consider purchasing bulk fuel tanks for all air units. Golden Gate AOU has a bulk tank and can purchase fuel in larger quantities and at significantly lower costs per gallon. Fuel represents roughly 20 percent of the program's direct operating costs, totaling nearly $2.0 million in FY22/23, or approximately $180 per flight hour. Implementing bulk fuel tanks across all units could result in substantial cost savings. The estimated cost savings from this transition could result in a 30 to 50 percent fuel expense reduction (excluding one-time costs to purchase bulk fuel tanks).
Maintenance Management Practices	**Explore Feasibility of Sharing In-House Aviation Mechanics with CalFIRE** CHP should explore sharing state helicopter mechanics with the CalFIRE to maximize cost sharing and efficiencies. One aviation mechanic position averages a salary range of $90,000 to $130,000 per year, potentially exceeding $200,000 when including retirement, healthcare, and other indirect costs. Bringing in a mechanic for each unit would likely cost the program over $2.0 million per year. In FY22/23, the program paid $2.0 million for helicopter mechanics. These specialized positions are hard to recruit, making cost-sharing agreements with CalFIRE a viable solution. Notably, Texas DPS Aircraft Operations Division has 4.0 in-house maintenance staff that mainly perform minor maintenance inspections, minor unscheduled maintenance, daily inspections, and maintain mission equipment.
Procurement Approval Practices	**Streamline Procurement Approval Processes** CHP should authorize AOU sergeants to approve initial maintenance procurement requests, with final payment and approval by OAO maintenance leads in coordination with a new budget manager. CHP should establish a reasonable threshold (e.g., $100,000 and under) that does not require approval above the OAO Captain. This may reduce procurement delays and allow AOUs quicker access to essential equipment, resulting in responsive decision-making and alignment with strategic objectives while retaining necessary controls for larger purchases.

1. Introduction

The Department of California Highway Patrol (CHP) initiated the Air Operations Program Workload Assessment and Staffing Study (Study) to identify appropriate staffing levels at each level of the department's air operations. CHP contracted[3] with Crowe LLP (Crowe) to evaluate the Air Operation Program's (AOP) staffing and operational needs, including the sufficiency of equipment and aircraft, adequacy of geographical service boundaries, and the suitability of its current resources and technology to effectively accomplish the department's mission. Crowe prepared this report on behalf of the CHP to evaluate the AOP's current and emerging workload, and to propose staffing model options to continue to meet the department's air operations objective.

A. Background

Established in the late 1960s, the AOP supports CHP field-related operations and allied agencies across California for emergency response, homeland security missions (e.g., patrolling the state's electrical and water infrastructure), patrol of rural roadways, speed enforcement, enforcement other than speed, special events, transportation, and other missions. Allied agencies include, but are not limited to local police departments, county sheriffs, state departments (e.g., Department of Water Resources and Department of Fish and Wildlife), and federal departments (e.g., Department of Homeland Security).

This study is the sixth formal evaluation since the program's inception. Below is a summary of the prior five studies:

- **Air Operations Evaluation (1983):** Conducted by the Flight Safety Institute. This evaluation focused on the program's organization, mission, and guidance contained in departmental publications to strengthen the program's overall effectiveness and safety. This study was prompted by events occurring in 1960 to 1982, including four fatal crashes, seven CHP officers killed, two civilians killed, one CHP officer injured, and five aircraft damaged.
- **Air Operations Program Evaluation Report (1985):** Conducted by the Enforcement Services Division. This evaluation focused on safety, training, selection of aircrew members, selection and maintenance of aircraft, and departmental organizational structure to improve the department's aviation safety record and to administer the air operations program more effectively. This study was prompted by four major accidents and one fatality in 1984.
- **Air Operations Centralization Proposal (1991):** Conducted by the Enforcement Services Division, Air Operations Section (AOS). This evaluation was prompted by key recommendations resulting from the 1983 and 1985 studies, as other concerns in preceding years. Key areas evaluated included accident prevention and investigation, safety program, budget and fiscal control, and selection of personnel.
- **Air Operations Program Safety Evaluation (1995):** Conducted by the Program Management and Professional Standards Division (PMPSD) to evaluate issues effecting program safety, including the program's organization, management, supervision, selection and training, resources, and operations. This evaluation also included a review of the program's emergency medical services (EMS) operations and distribution of aircraft.
- **Air Operations Program Analysis (2004):** Conducted by CHP personnel at the direction of the Office of the Commissioner. This evaluation identified a series of recommendations related to air unit consolidation, reduction in flight hours, air fleet reduction, and various other cost reduction strategies.

For discussion purposes, the remainder of this section outlines the program's current organization, staffing levels, budget, air fleet, flight hours, and incidents.

[3] Agreement Number 23C002000.

1. Organization

CHP is organized into commands and functions. According to General Order 21.1,[4] "CHP is a department within the California State Transportation Agency (Section 2100 California Vehicle Code [CVC]). The department is under the control of a civil executive officer known as the Commissioner of the CHP. The Commissioner is appointed by the Governor, with advice and consent of the Senate, to serve under the direction of the Governor (Section 2107 CVC). The powers and duties of the Commissioner are detailed within Section 2108 CVC. The Commissioner is assisted by a Deputy Commissioner, who provides oversight of the daily operations of the Department. The Deputy Commissioner is considered to be an "assistant commissioner," in the context of Sections 2110 and 2111 CVC. Reporting to the Deputy Commissioner are two Assistant Commissioners who are appointed by the Commissioner with the approval of the Governor (Section 2110 CVC). The Assistant Commissioners carry out and execute such duties, with respect to traffic law enforcement, as may be specified by the Commissioner (Section 2111 CVC)".

The AOP's current organization and staffing structure, shown in **Exhibit 1,** includes over 180 uniformed and non-uniformed staff within the OAO located at CHP Headquarters and within the eight Air Operations Units (AOU) located throughout California. The AOP is currently managed by both headquarters and AOU, as follows:

Headquarters Management

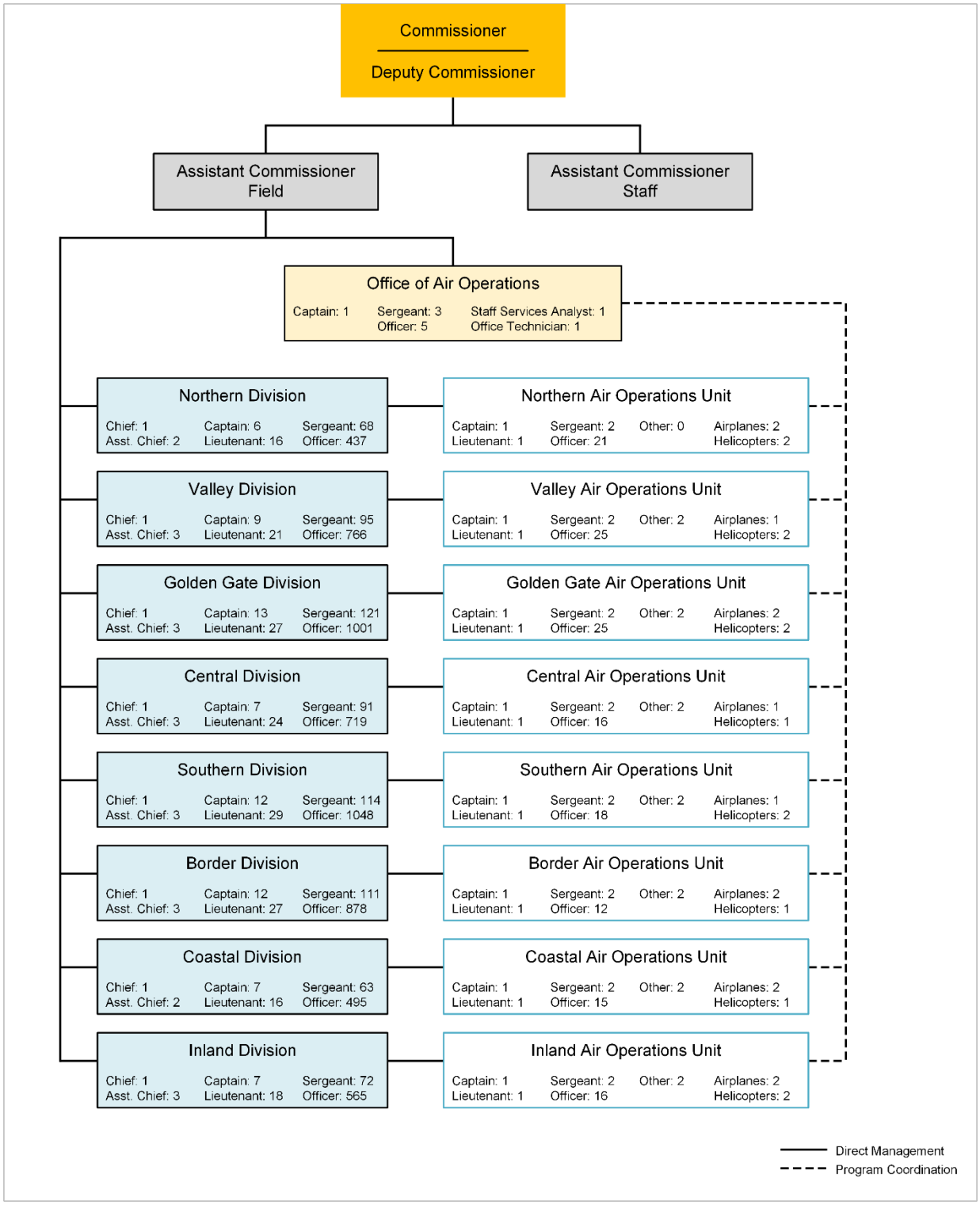
- **Assistant Commissioner, Field (ACF):** Under the direction of the Commissioner, the ACF exercises overall operational control of the AOP with oversight by OAO. This includes assignment of appropriate resources, aircraft, equipment, and personnel.
- **Office of Air Operations (OAO):** The OAO is commanded by a uniformed manager at the rank of captain. The OAO advises the ACF on matters related to the AOP, and obtains approval from the ACF regarding program changes, revisions, or modifications. The OAO provides advice and assistance to Special Services Commanders (SSC) and aerial supervisors. With approval and oversight from the ACF, the OAO develops and manages the AOP's budget, develops specifications for, and procures aircraft and related equipment, and reviews and approves proposed modifications to departmental aircraft. The OAO also manages the Emergency Medical Program to ensure flight officers meet paramedic training requirements and have necessary equipment. The OAO will be responsible for the department's unmanned aircraft systems (UASs) once its drone program is implemented and operationalized.

Air Operations Unit (AOU) Management

- **Division Commanders:** Under the direction of the ACF and oversight by OAO, Division commanders are directly responsible for AOUs.
- **Special Services Commanders:** The SSCs, under the direction of field Division Commander, are responsible for effective management and operation of AOUs. The SSCs provide direct supervision to aerial supervisors. SSCs also maintain communications between the AOU, field Division, and OAO.
- **Air Operations Units:** Under the direction of the SSC, and with the support of OAO, AOUs conduct departmental aviation missions and meet the departmental air operations objective.

[4] General Order 21.1, "Organization of the Department of California Highway Patrol".

Exhibit 1
Current Air Operations Program
Authorized Organization and Staffing Structure



2. Staffing Levels

The AOP's statewide authorized positions have remained relatively static from FY2016 to FY2023[5]. Primary staffing changes include minimal increases in support staff and officers within the AOUs.

AOU Staffing

Exhibit 2 depicts total authorized AOU positions over the last eight fiscal years. Positions include Support Staff, Officers, and Sergeants. This graph omits Division SSCs and Commanders.

- Support staff positions include office technicians and custodians. Authorized positions have increased from eight positions in FY2016 to 14 authorized positions in FY2023.
- The number of officers increased from 143 positions in FY2016 to 148 positions in FY2023. Officer positions include both pilot and flight officer (including EMT) classifications – levels for these classifications tend to vary.
- The number of sergeants has remained at 16 positions since FY2016.

OAO Staffing

Exhibit 3 depicts total authorized OAO positions over the last eight fiscal years. Positions include Support Staff, Officers, Sergeants, and Lieutenant / Captain. OAO staffing levels have remained at 11 positions since FY2016. Prior to FY2016, the OAO had three professional staff positions, but currently only has two professional staff positions. OAO includes the following authorized positions:

- **Captain:** manages OAO with the mission of providing responsible management and administration of the office, which consists of the following disciplines: Flight Operations, Aircraft Maintenance, Aviation Safety, and Emergency Medical Services; manages the AOP's budget.
- **Chief Airplane Pilot:** manages the department's pilot eligibility list and oversees initial and recurrent pilot training and annual pilot evaluations; assesses and develops aircraft modifications and requirements.
- **General Support Officer:** responsible for the accreditation of the AOP.
- **Airplane Maintenance Officer:** oversees airplane maintenance for the OAO.
- **Chief Helicopter Pilot:** manages the department's pilot eligibility list and oversees initial and recurrent pilot training and annual pilot evaluations; assesses and develops aircraft modifications and requirements.
- **Helicopter Maintenance Officer:** oversees helicopter maintenance for the OAO.
- **Emergency Medical Services Coordinator:** directs the department's Paramedic Training Program.
- **Chief Flight Officer:** manages the department's Flight Officer Program, Aviation Life Support Program (ALSE), and Waterborne Response and Asset Protection Program (WRAPP).
- **Program Analyst:** assists with program policy updates, program budget preparation activities, and other program support workload.
- **Staff Support:** performs clerical support workload on behalf of OAO staff.
- **Safety Coordinator:** manages the Department's Aviation Safety Program.

These are highlighted responsibilities and do not encompass each positions overall workload.

[5] For discussion purposes, Crowe refers to "Fiscal Year 2022-23" as "FY2023". Crowe uses this convention throughout the report.

Exhibit 2
Air Operations Units
Total Authorized Positions, FY2016 to FY2023

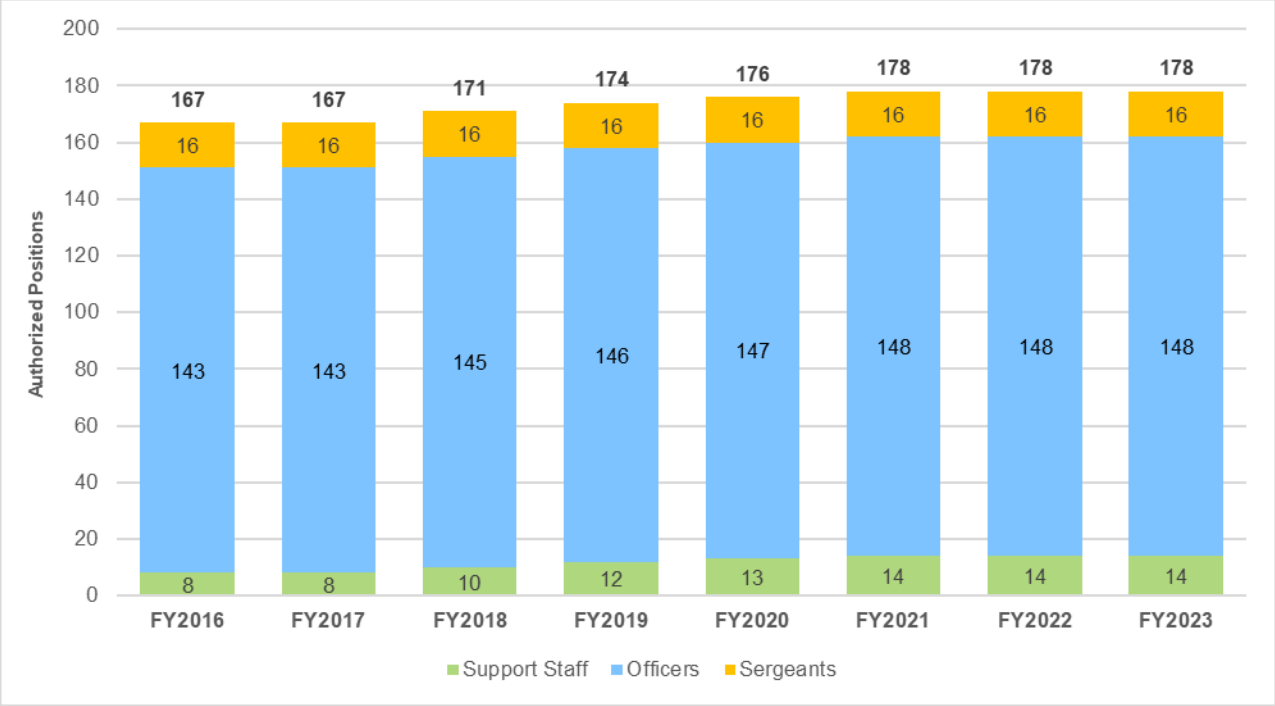
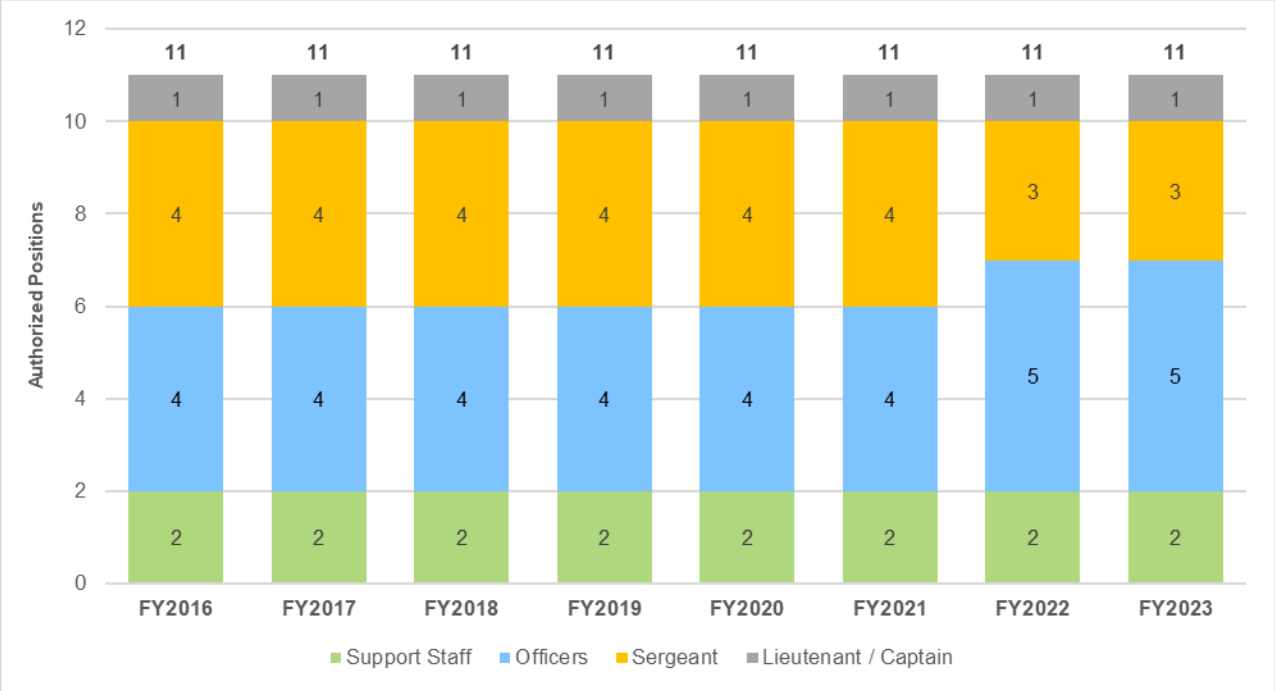


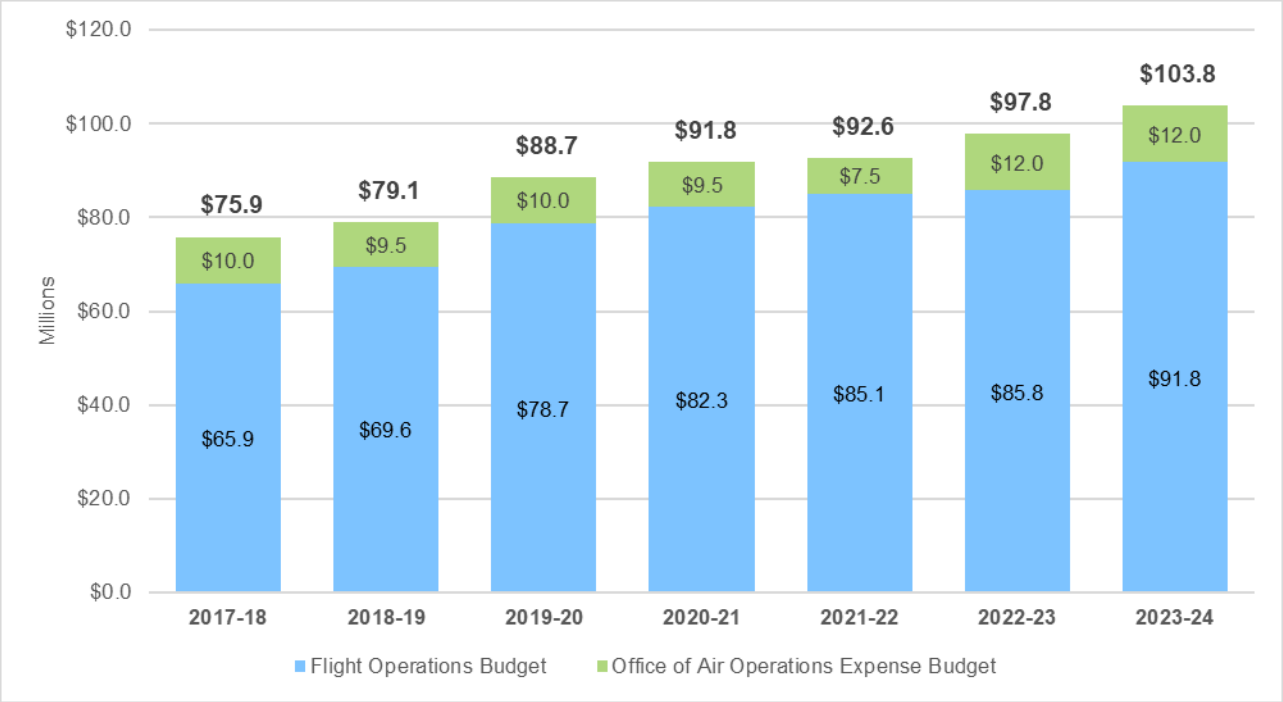
Exhibit 3
Office of Air Operations
Total Authorized Positions, FY2016 to FY2023



3. Budget

CHP's Flight Operations Budget has increased nearly 40 percent over the last seven fiscal years – from roughly $76.0 million to $104.0 million, as shown in **Exhibit 4.** For discussion purposes, Crowe categorized CHP's Flight Operations budget into two categories – "Flight Operations Budget" and "Office of Air Operations Expense Budget". "Flight Operations Budget" primarily supports program salaries, benefits, overhead, and other indirect expenses. "Office of Air Operations Expense Budget" is managed by the OAO and primarily supports the AOP's aircraft maintenance, fuel, and other operating expenses.

Exhibit 4
CHP Flight Operations Budget, FY2017 to FY2024



4. Air Fleet

The CHP operates an air fleet of 14 fixed wing aircraft and two King Airs (KAs), detailed in **Exhibit 5,** and 15 helicopter aircraft, detailed in **Exhibit 6.** In general, each AOU maintains two fixed wing aircraft and two helicopter aircraft with some exceptions.

In Fiscal Year (FY) 2014/15 (FY2015), the CHP requested multi-year funding from the Motor Vehicle Account (MVA) to establish an on-going replacement program for the CHP air fleet. Funding for the program began in FY2014 with a one-time $17 million augmentation to replace four of the oldest aircraft in the department's air fleet. In FY2015, the state approved the CHP's request for a one-time augmentation of $16 million in FY2015, a one-time augmentation of $14 million in FY2016, and a one-time augmentation of $6 million and a permanent augmentation of $8 million in FY2017. The permanent augmentation would fund the timely replacement of CHP air fleet in future years.

In its review of the FY2015 Transportation Proposals, the Legislative Analyst's Office (LAO) raised questions on the following:

- Unclear what size of air fleet is needed.
- Future ongoing replacement funding "locks in" air fleet size.
- Appropriateness of using MVA funds to support replacement costs.

The LAO recommended that the Legislature withhold action on the Governor's proposal pending additional information from CHP and legislative deliberations regarding (1) the need for the size of the air fleet proposed and (2) the appropriateness of using the MVA as the sole funding source to purchase aircraft (including whether allied agencies should reimburse CHP for some of the costs).

Six of the CHP's fixed wing aircraft and three of its helicopter aircraft are over 20 years old. According to the OAO, these aircraft may potentially need replacement. The OAO is currently in the process of procuring new fixed wing aircraft ("short caravan" Cessnas). The OAO plans to trade in two older fixed wing aircraft for a new fixed wing aircraft. It is likely the CHP may need to seek an increase to the $8 million permanent augmentation established in FY2017 for fleet replacement to account for inflation.

Exhibit 5
Current In-Service Fixed Wing Fleet

Location/AOU	Aircraft Tail #	Make	Model	Date In-Service
OAO	N911CA	Beechcraft (2005)	B300	8/1/2017
OAO	N918CA	Beechcraft (1978)	A200	2/22/2023
Northern	N511HP	Cessna (2000)	T206	5/1/2001
Northern	N202HP	Cessna (2022)	208B	12/1/2022
Valley	N159HP	GippsAero (2018)	GA8TC 320	12/1/2018
Golden Gate	N137HP	GippsAero (2015)	GA8TC 320	2/1/2016
Golden Gate	N153HP	GippsAero (2016)	GA8TC 320	8/1/2017
Central	N139HP	GippsAero (2015)	GA8TC 320	6/1/2016
Central	N156HP	GippsAero (2016)	GA8TC 320	2/1/2018
Southern	N140HP	GippsAero (2013)	GA8TC 320	3/1/2015
Border (Thermal)	N661HP	Cessna (2000)	T206	1/1/2001
Border (Thermal)	N551HP	Cessna (2000)	T206	9/1/2001
Coastal	N443HP	Cessna (2000)	T206	4/1/2001
Coastal	N553HP	Cessna (2006)	T206	10/1/2006
Inland	N441HP	Cessna (2000)	T206	4/1/2001
Inland	N513HP	Cessna (2001)	T206	9/1/2001

Exhibit 6
Current In-Service Helicopter Fleet

Location/AOU	Aircraft Tail #	Make	Model	Date In-Service
OAO	N314HP	Eurocopter (2000)	Eurocopter AS350B3	1/1/2002
Northern	N976HP	Airbus (2014)	Airbus H-125	6/1/2015
Northern	N979HP	Airbus (2015)	Airbus H-125	1/1/2016
Valley	N974HP	Airbus (2014)	Airbus H-125	3/1/2015
Valley	N978HP	Airbus (2015)	Airbus H-125	12/1/2015
Golden Gate	N981HP	Airbus (2016)	Airbus H-125	12/1/2016
Golden Gate	N982HP	Airbus (2016)	Airbus H-125	12/1/2016
Central	N975HP	Airbus (2014)	Airbus H-125	5/1/2015
Central	N986HP	Airbus (2023)	Airbus H-125	3/1/2024
Southern	N341HP	Eurocopter (2001)	Eurocopter AS350B3	12/1/2002
Southern	N617HP	Eurocopter (2001)	Eurocopter AS350B3	12/1/2002
Border (Thermal)	N988HP	Airbus (2021)	Airbus H-125	10/1/2021
Coastal	N983HP	Airbus (2016)	Airbus H-125	3/1/2017
Inland	N984HP	Airbus (2019)	Airbus H-125	11/1/2019
Inland	N985HP	Airbus (2019)	Airbus H-125	12/1/2019

5. Flight Hours

The AOP's total statewide flight hours averaged roughly 16,000 flight hours per year over the last eight fiscal years, as shown in **Exhibit 7.** Between FY2016 and FY2019, the AOP averaged roughly 21,000 flight hours per year and peaked at approximately 23,000 flight hours in FY2018. Between FY2019 and FY2020, the AOP experienced a significant decrease in flight hours due to updated deployment priorities[6]. Between FY2020 and FY2023, the AOP averaged roughly 11,700 flight hours per year, as shown in **Exhibit 8.**

Exhibit 7
Estimated Annual Flight Hours by Unit, FY2016 to FY2023

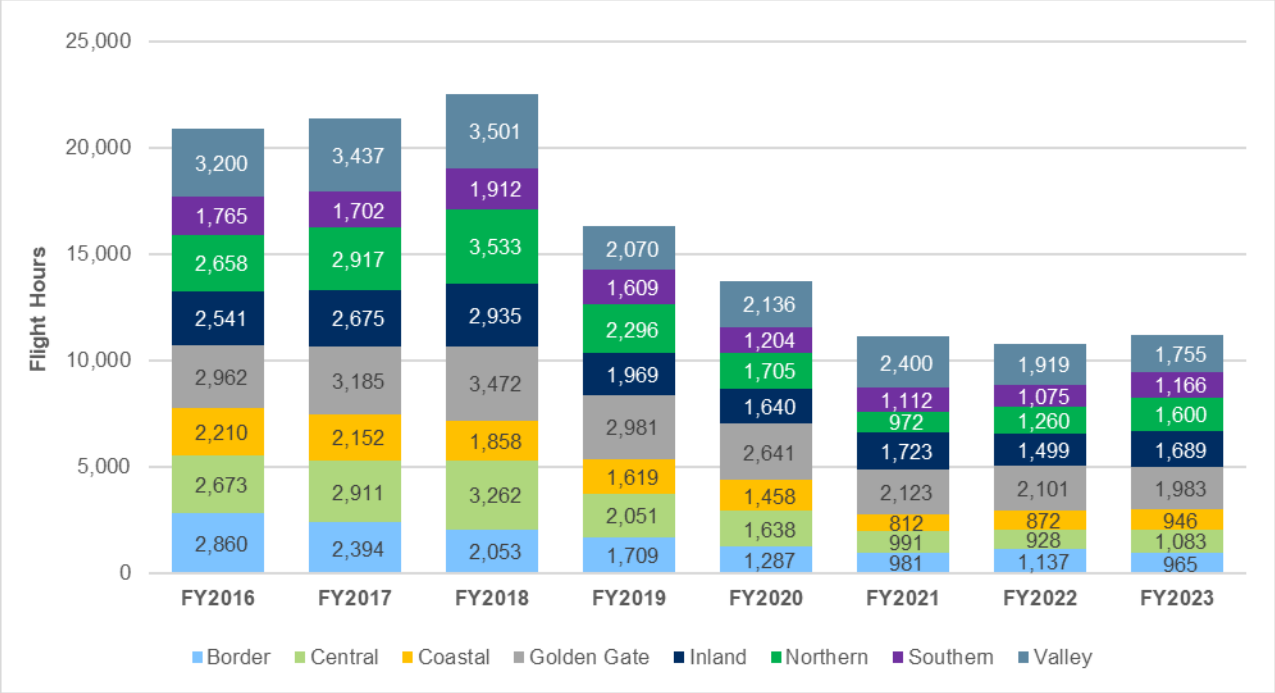


Exhibit 8
Estimated Change in Average Annual Flight Hours, FY2016 to FY2019 and FY2020 to FY2023

Unit	FY2016 to FY2019	FY2020 to FY2023	% Change
Border	2,254	1,093	-51.5%
Central	2,724	1,160	-57.4%
Coastal	1,960	1,022	-47.9%
Golden Gate	3,150	2,212	-29.8%
Inland	2,530	1,638	-35.3%
Northern	2,851	1,384	-51.4%
Southern	1,747	1,139	-34.8%
Valley	3,052	2,052	-32.8%
Statewide	**20,269**	**11,700**	**-42.3%**

[6] Per HPM 100.7, Chapter 2, Annex G, Air Operations Aircraft Deployment Priorities, incidents related to Emergency Responses are the top priority.

Flight Hours by Aircraft Type

Exhibit 9 and **Exhibit 10** illustrate the AOP's estimated annual flight hours by airplane and helicopter. AOUs averaged nearly 1,300 annual airplane flight hours and nearly 1,300 annual helicopter flight hours from FY2016 to FY2019. From FY2020 to FY2023, AOUs averaged roughly 700 annual airplane flight hours and nearly 800 annual helicopter flight hours. Statewide, airplane and helicopter flight hours have been evenly split from FY2016 to FY2021.

In FY2022, helicopter flight hours, as a percentage of total flight hours, started to slightly increase. In FY2022 and FY2023, statewide helicopter flight hours represented 55 percent of total flight hours, while airplane flight hours represented 45 percent. This slight increase in helicopter flight hours is likely due to a lack of availability of operational airplanes for some units (e.g., Inland, Valley, and other units over the past two years).

Exhibit 9
Estimated Annual Airplane Flight Hours by Unit, FY2016 to FY2023

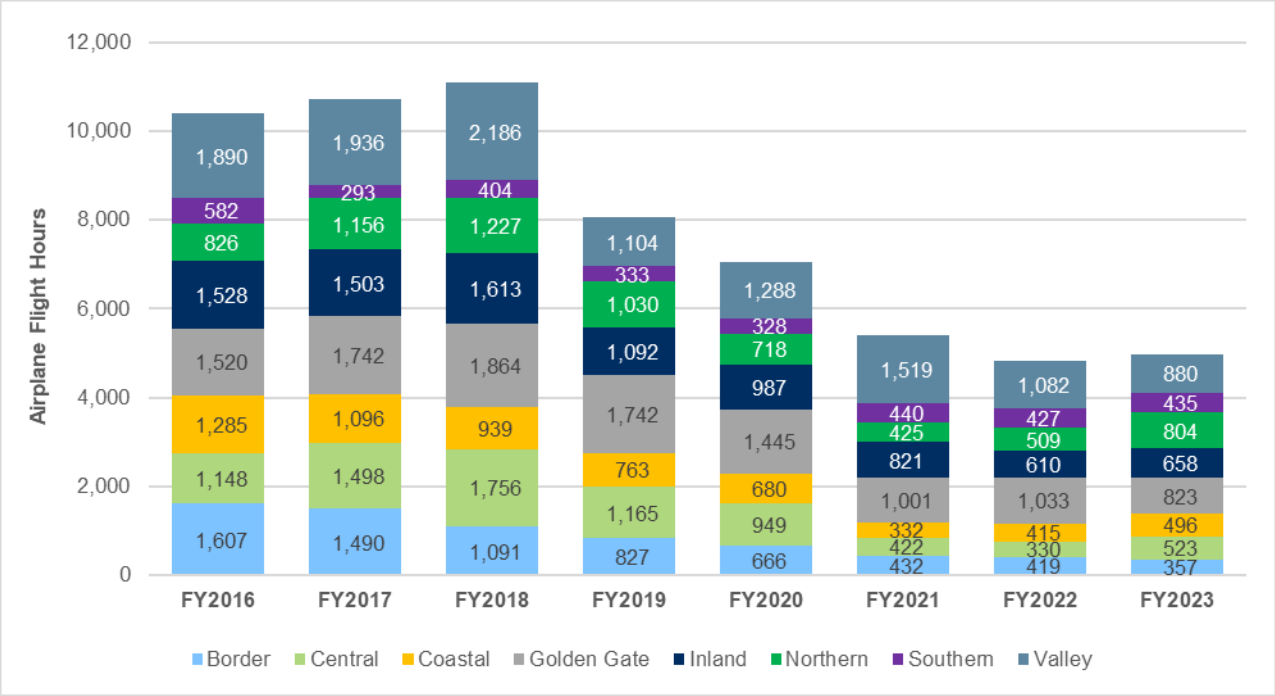
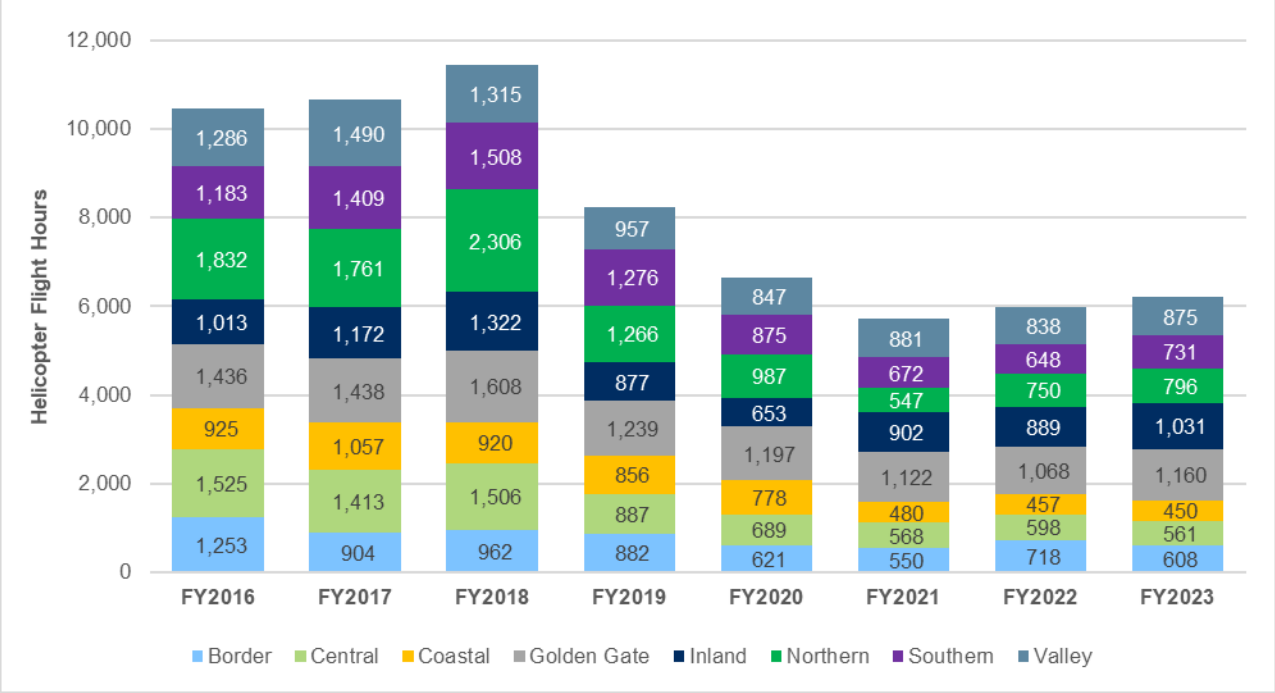


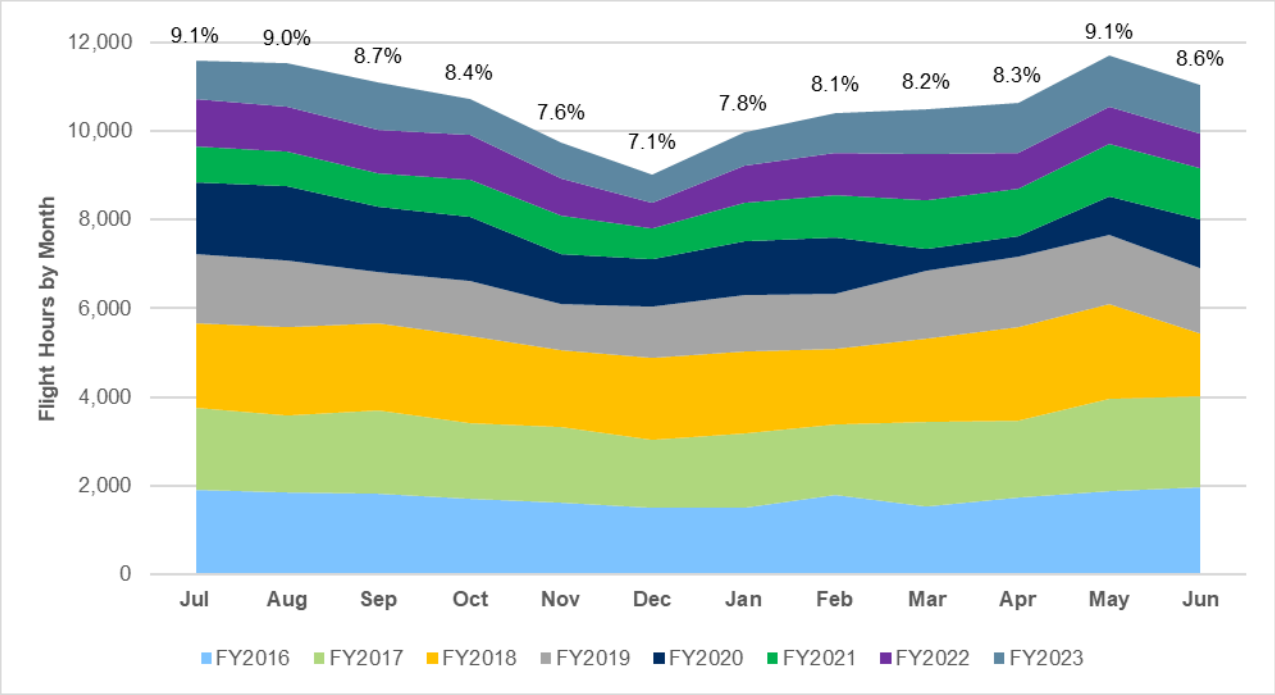
Exhibit 10
Estimated Annual Helicopter Flight Hours by Unit, FY2016 to FY2023



Seasonality

Exhibit 11 illustrates seasonality of flight hours and the estimated percentage of total flight hours that typically occur in each month. The AOP's highest proportion of flight hours occur between May and September, while the lowest occurs between November and January.

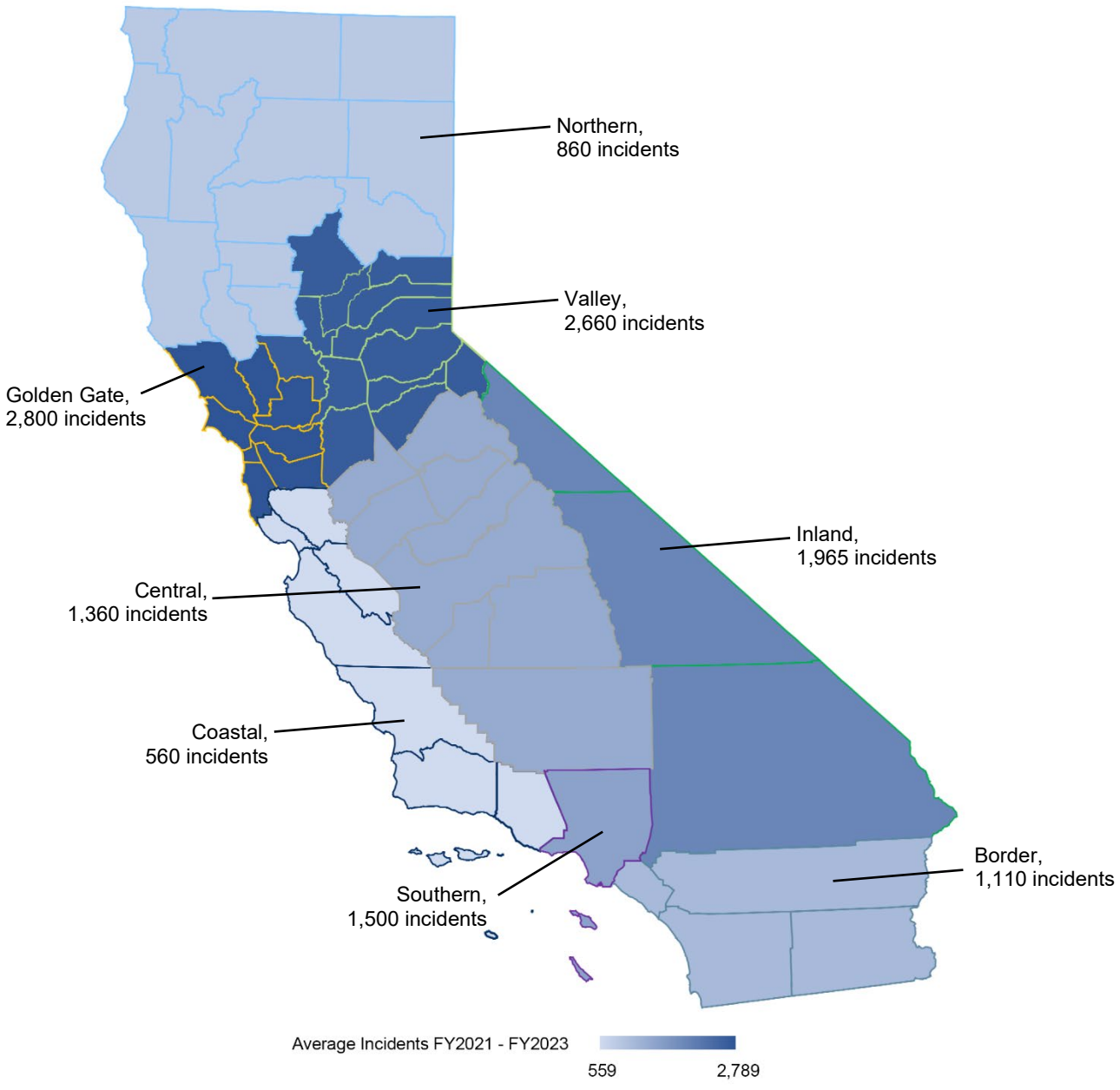
Exhibit 11
Monthly Seasonality of Incident Flight Hours, FY2016 to FY2023



6. Incidents

The AOP responded to over 38,000 incidents, based logged flights in Flight 93, during the past three fiscal years. For illustrative purposes, we include a heat map, shown in **Exhibit 12,** that identifies the average annual statewide incidents per AOU from FY2021 to FY2023. The darker shades indicate a higher number of incidents (on average). In FY2022 and FY2023, roughly 60 percent of incidents were prompted by calls from a CHP dispatcher and 40 percent of incidents prompted by calls from called agencies or self-launches deemed appropriate after an aircrew exercised professional judgment.

Exhibit 12
Average Annual Statewide Incidents by Air Operations Unit, FY2021 to FY2023



B. Objective and Scope

CHP initiated this study to identify proper staffing levels at each level of the AOP to meet the department's mission and to provide the highest level of service to the public and assistance to allied agencies. The scope of this study includes uniformed and non-uniformed personnel at the OAO and each AOU location. As part of this study, Crowe performed the following activities[7] including but not limited to:

- Compared flight operator time usage with industry standards (i.e., standards practiced by benchmark agencies) to develop a roadmap for the department to use to meet those standards.
- Evaluated the program's organizational structure, workload, responsibilities, and developed different performance standards to correspond to the varying circumstances and conditions around the air operation's boundaries; and determined the average time spent on various aspects of the job.
- Assessed the proportional distribution of personnel, equipment, and aircraft for the OAO and each AOU, based on current workload, and projected future workload needs based on population growth, increases in licensed drivers, and other factors, for continued efficiency and effectiveness of departmental operations.
- Assessed emergency response times and reach times.
- Evaluated the number of personnel required during a specific period (e.g., peaks of emergency incidents); the required number of staff for each location to accommodate various work hours and shifts; and the minimum number of personnel required to staff an office to provide desired coverage while maintaining an acceptable level of service and employee safety.
- Assessed the structure of beats, service areas, and deployment strategies, and made recommendations for the most efficient approaches.
- Assessed the program's rank structure and the authority, at each level of the chain of command, and management ratios.
- Reviewed and evaluated the impact of existing resources and recommended resources best suited for the needs of the department.
- Identified potential current and future critical issues that may impact the air operations' functions.
- Reviewed and assessed alternative solutions for overtime usage.
- Prepared draft and final report containing observations and findings concerning current and future workloads, and a detailed workplan.

C. Report Organization

Section 2 describes Crowe's methodology to conduct this study. In *Section 3*, we assess the AOP's current and emerging workload, and in *Section 4* we provide staffing model approaches to support our analysis and recommendations on the appropriate staffing levels at each level of the department's air operations. The last section of the report highlights implications and other potential programmatic needs based on the findings detailed in *Sections 3* and *Section 4*.

Appendix A provides a listing of the key program data that Crowe reviewed and assessed as part of the study. **Appendix B** provides a summary of insights resulting from the program-wide survey and Crowe's interviews with selected AOP staff. **Appendix C** provides a profile of the benchmark programs that Crowe interviewed as part of this study. Benchmark agencies include: Texas Department of Public Safety Aircraft Operations Division, Federal Bureau of Investigation Aviation Program, Maryland State Police Aviation Command, Los Angeles County Sheriff Air Bureau, and Los Angeles Police Department Air Support Division. **Appendix D** summarizes allied agency air resources and capabilities based on information reported by AOUs.

[7] Activities refer to the "detailed descriptions of work to be performed" as described in Agreement 23C002000, Scope of Work.

2. Methodology

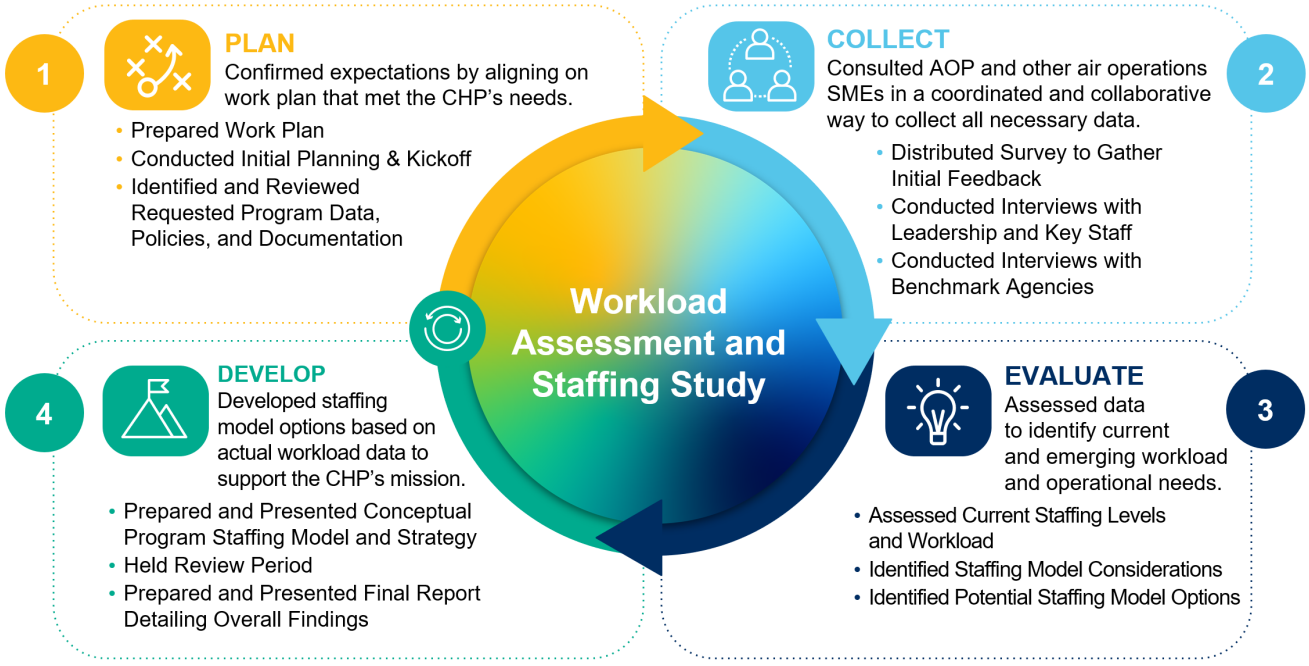
This section describes Crowe's methodology to perform this study. Our approach was to first develop a detailed understanding of the AOP's operational needs based on its current and emerging workload; and second, to use this understanding as a baseline for identifying staffing model options to support the AOP's operational needs and, ultimately, the department's air operations objective. Within this section, we describe the following:

A. Approach
B. Staffing Model Considerations
C. Staffing Model Options.

A. Approach

Crowe's overall approach to conduct this study included four phases, summarized in **Exhibit 13.** The development of this report reflects nearly six months of data analysis, interviews, and research that we conducted throughout each of the four phases detailed within this subsection.

Exhibit 13
Air Operations Program
Workload Assessment and Staffing Study – Overall Approach



Phase 1 – Plan

In November 2023, Crowe formally initiated the project and met with CHP Commissioners to discuss the study's goals and objectives. Crowe received their input on historical, current, and future workload and staffing considerations for CHP's air operations. After meeting with CHP Commissioners, Crowe then met with CHP's project manager to confirm the study's scope, objectives, overall approach, work plan, and milestones. In January 2024, Crowe conducted a program-wide webinar attended by both OAO and AOU staff to communicate the study's scope, objectives, overall approach, work plan, and milestones. Below is a summary of activities Crowe performed during this initial phase:

- Requested and reviewed key documents and relevant information before collecting program data.
- Identified internal stakeholders within OAO and AOUs to identify current and emerging staffing and operational needs.
- Identified external agencies to engage and collect data and input as part of the next phase of our work plan.

Phase 2 – Collect

Between January and March 2024, Crowe collected and reviewed programmatic data to understand and identify the Program's current and emerging workload and operational needs. In particular, Crowe collected and reviewed historical data from 2015 to 2023 within the department's web-based aircraft / flight duty report (CHP 93). Below is a summary of additional activities Crowe performed during this phase:

- Coordinated with AOP staff to collect requested programmatic data.
- Developed and distributed a program-wide survey to AOP staff.
- Facilitated initial one-on-one interviews with selected OAO staff.
- Facilitated interviews with selected AOU staff within each of the eight field Divisions.
- Facilitated interviews with benchmark programs from the City of Los Angeles Police Department Los Angeles County Sherriff Department, Maryland State Police Aviation Command, the Federal Bureau of Investigation (FBI), and the Texas Department of Public Safety.
- Researched staffing model best practices within the areas of law enforcement and air operations.

Phase 3 – Evaluate

In April and May 2024, Crowe evaluated the programmatic data collected as part of Phase 2. Our aim was to identify the AOP's current and emerging operational needs based on a comprehensive review of the data, and then to evaluate potential staffing models to meet the program's current and emerging operational needs. As part of our evaluation, we first identified staffing model considerations based on our review of program data, interviews, and research to systematically assess the AOP's operational and staffing needs. Crowe then developed staffing model options to meet the AOP's operational and staffing needs based on staffing model considerations focused on program design, resources, deployment strategies, and implementation practices.

Phase 4 – Develop

In this last phase, Crowe prepared this draft report based on outcomes from the prior phases. Crowe will review the content of this draft report with the CHP to obtain necessary input. Crowe will then prepare a final report and present overall findings and study conclusions by June 30, 2024.

In the remainder of this section, we provide additional details on the overall program considerations and the development of staffing model options for discussion purposes.

B. Overall Program Considerations

Crowe identified overall program considerations based on our evaluation of program data, interviews with program SMEs and benchmark programs, and research on best practices. The considerations, summarized in **Exhibit 14,** provide a framework for our analysis of the AOP's current and emerging workload and operational needs in Section 3. These considerations account for how the AOP is *designed, resourced, deployed, and implemented*, to continue to meet the department's mission and provide the highest level of service to the public and assistance to allied agencies. These considerations served as a basis for staffing model options, detailed in Section 5.

Exhibit 14
Design, Resource, Deployment, and Implementation Considerations

Design	**Mission**	**Structure**
	• Emergency Medical Services • Search and Rescue • Enforcement / Patrol / Surveillance • AOU Specific Priorities • Multiple Priorities	• Centralized • Decentralized • Hybrid • Dual Management
Resources	**Workload**	**Operating Equipment**
	• Workload Allocation • Training • Minimum Proficiencies • Non-CHP Resources	• CHP Fleet • Non-CHP Fleet • Maintenance • Direct Operating Costs • Fuel
Deployment	**Operational Coverage**	**Staffing Levels**
	• Shift Structure • Beat Structure • Service Areas • Deployment Strategies	• Pilots • Flight Officers • Operations
Implementation	**Performance Standards**	**Funding**
	• Programmatic Authorities • Operational Performance Metrics • Transparency	• Alternative Funding Sources • Direct Funding Allocation for Operating Equipment • Reimbursements • Federal Funding

C. Staffing Model Approaches

Crowe evaluated staffing model approaches based on our evaluation of the AOP's current and emerging workload and operational needs. **Exhibit 15** provides a summary-level description of each approach and how we used these approaches to develop proposed staffing model options. In *Section 4*, we provide examples of each approach, including key assumptions and implications for the AOP.

Exhibit 15
Selected Staffing Model Approaches

Approach	Description	Rationale
Workload-Based Approach	Accounts for service demand based on workload to determine staffing levels within each AOU. Crowe calculated the estimated full-time equivalents (FTEs) to staff varying shifts to meet service demand. The calculations account for the frequency of calls at varying hours of the day and the required response time.	These indicators offer a workload-driven approach that considers demands placed on the AOUs. Workload is a viable means of quantifying necessary staffing because demand for service is measurable and can be substantiated. Workload model approaches may be complex to implement given fluctuations in demand (as measured in demand for services) but can likely provide a pathway for the program to set clear performance objectives based on actual workload.
Weighted Per Capita Indicators	Accounts for the number of field operations officers, population, incidents, flight hours, and geographic area (measured in square miles) to determine staffing levels within each AOU.	This approach is relatively simple and easy to apply. It allows for quick comparisons between different AOUs. It does not account for variations in workload demand (e.g., service calls). This model serves as a starting point to determine potential staffing needs.
Minimum Staffing Indicators	This approach uses the minimum number of resources on duty to determine staffing levels within each AOU based on the HPM. This approach sets the base level of pilots and flight officers, as required by HPM Annex A, for a specific shift within any given AOU.	This approach provides a mechanism to maintain baseline staffing levels as set in policy. This approach can, however, result in staffing levels that do not align with actual workload and may lead to unintended consequences, such as excessive overtime or insufficient staffing levels during peak activity periods.
Authorized Positions Indicators	This approach uses authorized positions, as set in the CHP's budget, as a basis to determine staffing levels in each AOU. This approach is driven by fiscal constraints and assumes staffing levels at full staffing levels (i.e., vacancies are filled).	This approach assures that staffing levels are aligned with budgetary allocations. This approach provides a clear limit on the number of personnel for each AOU. However, this approach may not reflect the AOP's operational needs given fluctuations in support for field operations and allied agencies in any given division.

3. Current and Emerging Workload and Operational Needs

This section provides a comprehensive analysis of the AOP's current and emerging workload and operational needs based on the overall program considerations described in *Section 2*. This section is organized as follows:

A. Select Key Findings
B. Evaluation of Programmatic Design
C. Evaluation of Program Resources
D. Evaluation of Deployment Practices
E. Evaluation of Program Implementation.

A. Key Findings

Our evaluation considers various aspects of the AOP, including its design, available resources, deployment strategies, and implementation practices. The insights gained from our evaluation serve as a critical input for the staffing model options detailed in *Section 5*. Here are select key findings:

- **Regional Differences in Support for Field Operations and Allied Agencies:** AOUs dedicate a significant portion of flight time to support allied agencies with notable regional differences where some units support CHP field operations more heavily. For example, Border AOU spends nearly 40 percent of its incident flight time supporting Riverside County Sherriff and Inland AOU spends roughly 30 percent of its incident flight time supporting San Bernardino County Sherriff. Southern AOU spends nearly 70 percent of its incident flight time to support CHP field operations. Other units follow this trend in varying levels of support for field operations and allied agencies.
- **Significant Decrease in Overall Incident Flight Hours:** Since FY2020, AOUs have significantly decreased incident-related flight hours (i.e., flight time utilized to respond to an incident on behalf of an allied agency or field office) due to changes to the AOP's deployment priorities. AOUs averaged roughly 11,200 incident flight hours in total over the last three fiscal years. Overall, AOUs averaged roughly 70 percent over their total flight time responding to incidents, and 30 percent on training, patrol, travel, or other flight activities.
- **Helicopters Are Used More Frequently for Incidents Despite Policy Changes:** The AOP aims to prioritize airplane over helicopter deployment to maximize operational efficiencies and maintain program effectiveness. Over the last three fiscal years, all AOUs with the exception of Valley AOU spent more time deploying helicopters than airplanes. On average, the AOUs performed 55 percent of incident-related flight time in helicopters and 45 percent of incident-related flight time in airplanes. This is a slight change from historical norms where AOUs flew helicopters and airplanes proportionally at 50 percent each. This trend is likely due to the need for staffing and airplane engine replacement, rendering aircraft inoperative, and not due to a concerted deviation from AOP policy.
- **Searches Account for the Highest Portion of Incidents:** AOUs spend over 40 percent of their incident-related flight time responding to searches for suspects, vehicles, and people. Homeland security missions account for substantially less of the AOUs' incident workload at 10 percent of total workload. Notably, in FY2016 to FY2019, homeland security missions accounted for over 40 percent of AOUs' incident-related flight.
- **Positive Incident Response Times in High Incident Areas:** AOUs averaged 12.1 minutes to respond to incidents over the last three fiscal years. Crowe found five CHP areas that account for more than 10 percent of an AOUs total incidents, and it took the unit greater than 12.1 minutes to respond to an incident (on average). The CHP areas include Monterey (17 percent, 29.5 minutes), Templeton (28 percent, 12.7 minutes), and San Luis Obispo (22 percent, 17.5 minutes) in Coastal AOU, Barstow (18 percent, 23.6 minutes) in Inland AOU, and Red Bluff (14.9 percent, 16.1 minutes) in Northern AOU.

- **HPM 100.7 Annex A Staffing Levels Provide Minimal Shift Coverage:** HPM 100.7, Chapter 2, Annex A recommends that AOUs staff one 10-hour shift twice per day for seven days per week. This equates to an absolute (fractional) crew member per aircraft at 4.2 members. Crowe's analyses in *Section 4* and *Section 5* find the HPM 100.7's fractional crew member per aircraft recommendation is appropriate to provide *minimal* shift coverage for CHP's desired coverage (two shifts per day, seven days a week). In general, AOUs could benefit from an additional airplane pilot and airplane flight officer to alleviate staffing pressures and to align with the program's deployment priorities.
- **OAO Could Benefit From Additional Professional Staff:** Crowe found that the OAO could benefit from a UAS Manager (sergeant level) and UAS Specialist (officer level) to implement a UAS Program following best practices observed in other state highway law enforcement programs, such as Texas and Florida. Adding these two positions would provide resources to support the implementation of modern aerial capabilities that could enhance program's service delivery. The OAO could benefit from a non-uniformed budget manager that is dedicated to managing the program's operating expense budget (fuel, maintenance, and other program needs) and fiscal performance. Adding a budget manager is likely essential to alleviate the existing workload burden currently placed on other professional staff in OAO who have other primary operational duties. The OAO could also benefit from two assistant chief pilot positions (officer level) to alleviate the chief airplane pilot and chief helicopter pilot's travel and administrative workload, and to assure continuous leadership and operational oversight at headquarters.
- **Potential Candidates for Fixed Wing or Helicopter Replacements:** Airframe hours average approximately 10,000 hours across the AOP's fixed wing fleet. Northern, Border, Coastal, and Inland AOUs have airplanes above the 10,000-hour mark. Airframe hours average approximately 7,000 hours across the AOP's helicopter fleet. OAO, Central AOU, and Southern AOU have helicopters above the 7,000-hour mark. These units may likely be candidates for airplane and/or helicopter replacements should the AOP use airframe hours as an indicator for replacement.
- **Some Units May Not Require Full Coverage Helicopter Crew Staffing Levels:** Allied agencies in Northern, Southern, and Inland Divisions have robust helicopter capabilities, including lifesaving, search, and rescue capabilities. These AOUs may be candidates to reduce helicopter crews at full coverage levels. CHP may consider staging helicopter crews in these Divisions on an as-needed basis, especially during fire season in the Northern Division since CalFIRE will likely prioritize fire-related workload. In *Section 5,* we offer a model that accounts for a decrease in helicopter crew staffing levels for these units.
- **Most Units Could Benefit From Additional Airplane Crew Staffing Levels:** Crowe found airplane crew staffing shortages in all AOUs, with the exception of Northern AOU. Additionally, Crowe identified that AOP's overtime hours increased nearly 60 percent from FY2022 to FY2023. This increase likely indicates AOUs are facing staffing shortages to cover planned shifts, especially for airplane coverage. In *Section 5,* we offer a model that supports the CHP's alignment with its deployment priorities, policy, and addresses airplane crew staffing shortages.
- **CHP Needs an Agile Operating Model for Comprehensive and Expansive Air Operations:** The program's current and emerging workload indicates a need for an agile operating model to maintain current service levels – or even increased service levels – into the future. In **Exhibit 16,** we summarize selected indicators that supported our understanding of the AOP's current and emerging workload, including total incident flight hours, response times, incident types (frequency), agencies supported, field offices supported, and CHP areas where most incidents occur within each AOU. Percentages reflect the portion of time spent conducting a specific activity. For example, 55 percent of Border AOU's incidents involved searches.

In the remainder of this section, we describe detailed observations on the program's design, resources, deployment practices, and implementation. The observations in this section serve as a basis to support these key findings and the staffing model options outlined in *Section 5.*

Exhibit 16
Selected Workload Drivers, FY2021 to FY2023

Measures	Incident Types Based on Frequency	Agencies Supported Based on Flight Hours	Field Offices Supported Based on Flight Hours	CHP Area Where Incidents Occur
Border Air Unit				

Average Annual Flight Hours: 1,028
Average Annual Incident Flight Hours: 650
Average Annual Incidents: 1,113
Average Response Time: 10.4 minutes
	• Search, 55%
	  ○ Suspect, 21%
	  ○ Vehicle, 18%
	  ○ Person, 15%
	  ○ Other, 1%
	• Felony Arrests, 11%
	• Pursuit, 8%
		• Riverside Co. Sherriff, 38%
		• Indio PD, 6%
		• Palm Springs PD, 5%
		• Desert Hot Springs PD, 5%
			• Indio, 12%
			• San Gorgonio Pass, 4%
			• El Centro, 2%
			• Blythe, 1%
				• Indio, 84%
				• San Gorgonio Pass, 6%

Central Air Unit				

Average Annual Total Flight Hours: 1,000
Average Annual Incident Flight Hours: 740
Average Annual Incidents: 1,360
Average Response Time: 12.2 minutes
	• Search, 43%
	  ○ Suspect, 20%
	  ○ Vehicle, 13%
	  ○ Person, 10%
	  ○ Other, 1%
	• Felony Arrests, 12%
	• Traffic Collision, 10%
		• Fresno PD, 12%
		• Fresno Co. Sherriff, 10%
		• Tulare Co. Sherriff, 7%
		• Madera Co. Sherriff, 5%
			• Fresno, 19%
			• Visalia, 4%
			• Coalinga, 3%
			• Bakersfield, 2%
			• Madera, 2%
				• Fresno, 67%
				• Visalia, 6%
				• Madera, 6%

Coastal Air Unit				

Average Annual Total Flight Hours: 876
Average Annual Incident Flight Hours: 464
Average Annual Incidents: 560
Average Response Time: 22.3 minutes
	• Search, 42%
	  ○ Suspect, 11%
	  ○ Vehicle, 13%
	  ○ Person, 16%
	  ○ Other, 1%
	• Felony Arrests, 10%
	• Pursuit, 9%
		• San Luis Obispo Co. Sherriff, 16%
		• Monterey Co. Sherriff, 7%
		• Department of Forestry and Fire Protection, 4%
		• Paso Robles PD, 3%
			• Templeton, 6%
			• San Luis Obispo, 5%
			• Monterey, 4%
			• Santa Maria, 4%
			• King City, 4%
				• Templeton, 35%
				• San Luis Obispo, 20%
				• Monterey, 13%
				• Santa Maria, 8%
				• King City, 7%

Golden Gate Air Unit				

Average Annual Total Flight Hours: 2,069
Average Annual Incident Flight Hours: 1,638
Average Annual Incidents: 2,789
Average Response Time: 11.2 minutes
	• Search, 35%
	  ○ Suspect, 14%
	  ○ Vehicle, 13%
	  ○ Person, 7%
	  ○ Other, 1%
	• Pursuit, 13%
	• Felony Arrests, 12%
		• Vallejo PD, 6%
		• Marin Co. Fire, 4%
		• Contra Costa Co. Sheriff, 4%
		• Napa Co. Fire, 3%
			• Solano, 9%
			• Contra Costa, 6%
			• Oakland, 6%
			• Napa, 2%
				• Solano, 27%
				• Contra Costa, 17%
				• Oakland, 15%
				• Napa, 9%
				• Marin, 9%
				• Santa Rosa, 6%

Measures	Incident Types Based on Frequency	Agencies Supported Based on Flight Hours	Field Offices Supported Based on Flight Hours	CHP Area Where Incidents Occur
Inland Air Unit				

Average Annual Total Flight Hours: 1,638
Average Annual Incident Flight Hours: 1,130
Average Annual Incidents: 1,965
Average Response Time: 15.2 minutes
	• Search, 43%
	  ○ Suspect, 12%
	  ○ Vehicle, 21%
	  ○ Person, 9%
	  ○ Other, 1%
	• Homeland Security, 12%
	• Traffic Collision, 10%
		• San Bernardino Co. Sherriff, 33%
		• Inyo County Sherriff, 7%
		• San Bernardino Co. Fire, 3%
		• Riverside Co. Sherriff, 1%
			• Barstow, 10%
			• Victorville, 9%
			• San Bernardino, 7%
			• Riverside, 3%
			• Bishop, 2%
				• Victorville, 61%
				• Barstow, 13%
				• San Bernardino, 10%

Northern Air Unit				

Average Annual Total Flight Hours: 1,277
Average Annual Incident Flight Hours: 759
Average Annual Incidents: 861
Average Response Time: 15.0 minutes
	• Search, 49%
	  ○ Suspect, 17%
	  ○ Vehicle, 15%
	  ○ Person, 16%
	  ○ Other, 1%
	• Felony Arrests, 14%
	• Pursuit, 8%
		• Redding PD, 14%
		• Shasta Co. Sherriff, 10%
		• Siskiyou Co. Sherriff, 7%
		• Tehama Co. Sherriff, 5%
			• Redding, 11%
			• Red Bluff, 6%
			• Trinity River, 4%
			• Yreka, 2%
			• Humboldt, 2%
				• Redding, 60%
				• Redd Bluff, 14%
				• Trinity River, 6%

Southern Air Unit				

Average Annual Total Flight Hours: 1,118
Average Annual Incident Flight Hours: 708
Average Annual Incidents: 1,500
Average Response Time: 9.4minutes
	• Search, 31%
	  ○ Suspect, 10%
	  ○ Vehicle, 14%
	  ○ Person, 7%
	  ○ Other, 1%
	• Pursuit, 25%
	• Felony Arrests, 14%
		• U.S. Secret Service, 5%
		• Los Angeles County Sherriff, 2%
		• Los Angeles PD, 2%
		• Whittier PD, 1%
			• South Los Angeles, 5%
			• Baldwin Park, 5%
			• Santa Fe Springs, 4%
			• East Los Angeles, 3%
				• South Los Angeles, 20%
				• Baldwin Park, 12%
				• Sante Fe Springs, 12%
				• East Los Angeles, 10%
				• Central Los Angeles, 6%

Valley Air Unit				

Average Annual Total Flight Hours: 2,025
Average Annual Incident Flight Hours: 1,519
Average Annual Incidents: 2,660
Average Response Time: 13.6 minutes
	• Search, 60%
	  ○ Suspect, 27%
	  ○ Vehicle, 22%
	  ○ Person, 9%
	  ○ Other, 1%
	• Felony Arrests, 10%
	• Pursuit, 8%
		• Sacramento PD, 13%
		• Sacramento Co. Sherriff, 7%
		• El Dorado Co. Sherriff, 5%
		• Placer Co. Sherriff, 4%
			• North Sacramento, 13%
			• South Sacramento, 7%
			• Auburn 3%
			• Stockton, 3%
				• North Sacramento, 32%
				• South Sacramento, 26%
				• Auburn, 10%

B. Evaluation of Program Design

The AOP's design (i.e., how CHP defines the program's objective and organizes its structure) is crucial in shaping the program's capacity to support the department's mission and the diverse needs of field operations, allied agencies, and the public. As the program's operational landscape evolves, there are opportunities to enhance the program's objective and structure so that CHP's air operations are more responsive, efficient, and aligned with both current and future demands. In this subsection, we highlight detailed findings related to the AOP's objective and its structure.

1. Objective

The AOP's objective is to support CHP field-related operations and allied agencies across the state. Crowe analyzed the following programmatic trends to highlight the AOP's current and emerging workload and operational needs within the context of the program's mission:

- Comparative support for field operations and allied agencies by each AOU
- Total flight activities performed by each AOU
- Incident and patrol related activities performed by each AOU
- Service-related activities performed by each AOU
- Service-related activities performed by each AOU per 10 incident fight hours.

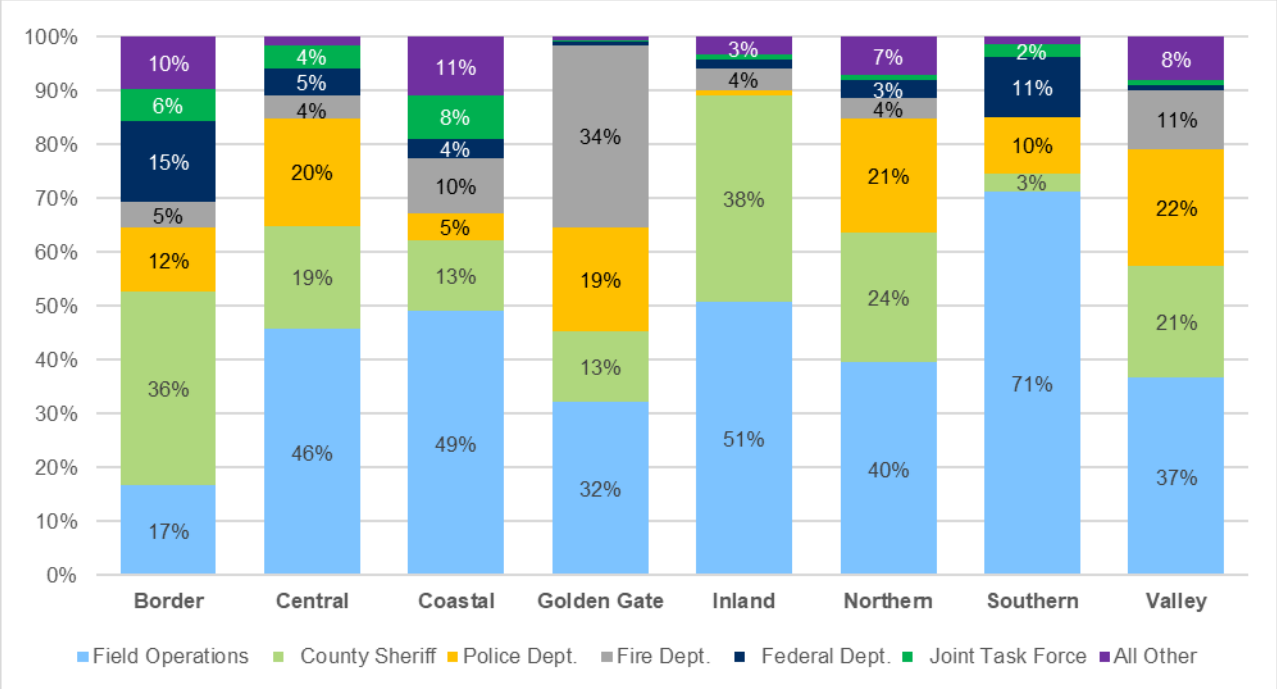
a. Support for Field Operations and Allied Agencies

Exhibit 17 illustrates the AOUs' flight time in FY2023 to support field operations and allied agencies (e.g., county sheriffs, local police departments, fire departments, federal departments, and other). On average, AOUs' flight time to support field operations (i.e., CHP area offices) accounted for 43 percent of total flight time and assistance to allied agencies accounted for 57 percent of total flight time. Of the 57 percent, AOUs spent the majority of flight time, 21 percent, to support county sheriffs, followed by local police departments at 14 percent and fire departments at 11 percent.

Here are some exceptions to this statewide trend:

- Southern AOU performed the highest percentage of flight time to support field operations at 71 percent of its total flight time. 31 percent of incident occurrences were searches, 25 percent were pursuits, and 14 percent were felony arrests.
- Border AOU performed the highest percentage of flight time to support allied agencies at 83 percent of its total flight time. 55 percent of incidents occurrences were searches,11 percent were felony arrests, and 8 percent were pursuits.
- Inland AOU performed the highest percentage of flight time to support county sheriffs at 38 percent of its total flight time. 43 percent of incident occurrences were searches, 12 percent were homeland security checks, and 10 percent involved traffic collisions.
- Golden Gate AOU performed the highest percentage of flight time to support fire departments at 34 percent of its total flight time. 35 percent of incident occurrences were searches, 13 percent were pursuits, and 12 percent were felony arrests.

Exhibit 17
Support for Field Operations and Allied Agencies, FY2023



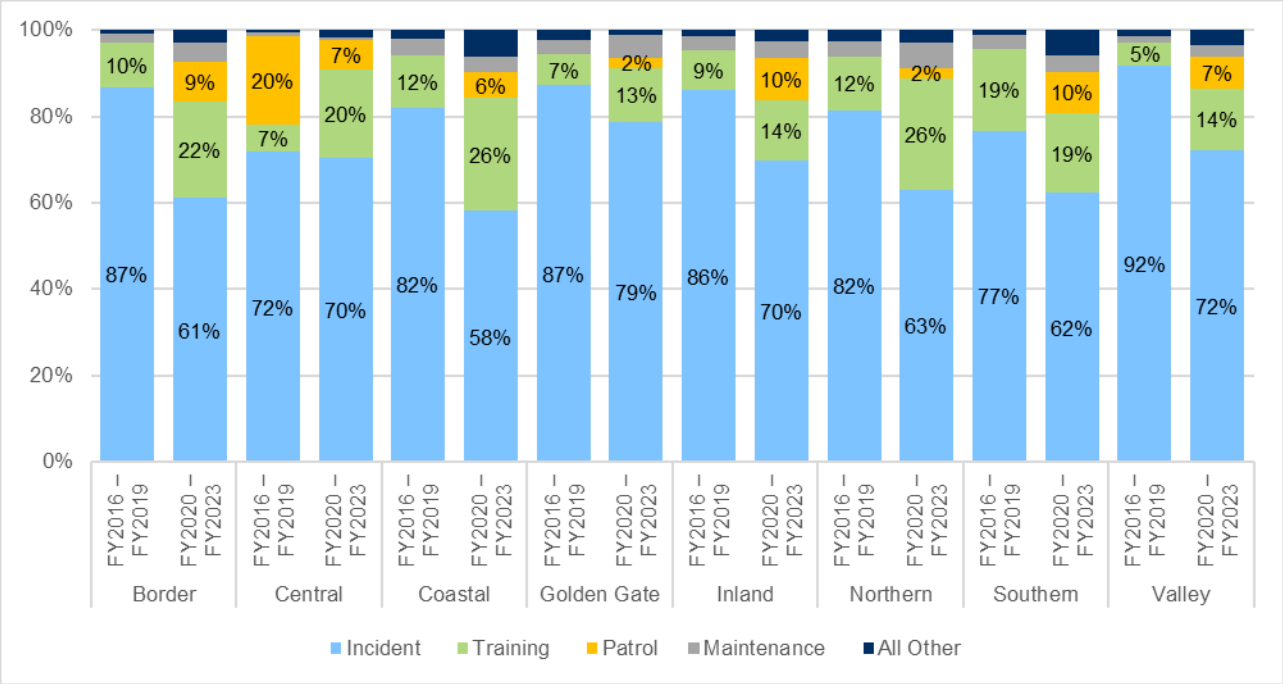
b. Flight Activities

The AOP records flight activities into five categories: incident, training, patrol, maintenance, and other. According to Web CHP 93 Manual (CHP 93), the AOP's user guide for completing flight logs and duty reports, these activities are defined as follows:

- **Incident:** An incident occurs when an aircraft is requested to participate in, or the crew self-generates a service for an allied agency.
- **Training:** This includes the time spent in flight and/or ground training for air operations related training, check rides, evaluations, and certifications.
- **Patrol:** The patrol code is used to document the time a crew is flying but is not actively involved in an incident.
- **Maintenance:** Includes maintenance (scheduled and unscheduled) and includes time that the crew spends flying to a maintenance facility.
- **Additional Activities:** Includes weather and other activities; weather includes time that an aircraft is unable to complete a current mission due to weather conditions; activities other than those already defined, such as the crew returning to an airport due to low fuel, are categorized as "other". Other does not include patrol or incident time.

Exhibit 18 illustrates a comparison of AOUs' historical flight time by activity type from FY2016 to FY2019 and from FY2020 to FY2023. Between FY2016 and FY2019, the breakdown of AOUs' flight activities included: 83 percent for incidents, 10 percent for training, 4 percent for maintenance and other activities, and 2 percent for patrol. Between FY2020 and FY2023, the breakdown of AOUs' flight activities included: 67 percent for incidents, 20 percent for training, 7 percent for maintenance and other activities, and 7 percent for patrol. This resulted in a period-over-period decrease in flight time for incidents by 16 percent, and a period-over-period increase in flight time for training by 10 percent, maintenance and other activities by 3 percent, and patrol by 5 percent.

Exhibit 18
Comparison of Flight Activities, FY2016 to FY2019 and FY2020 to FY2023



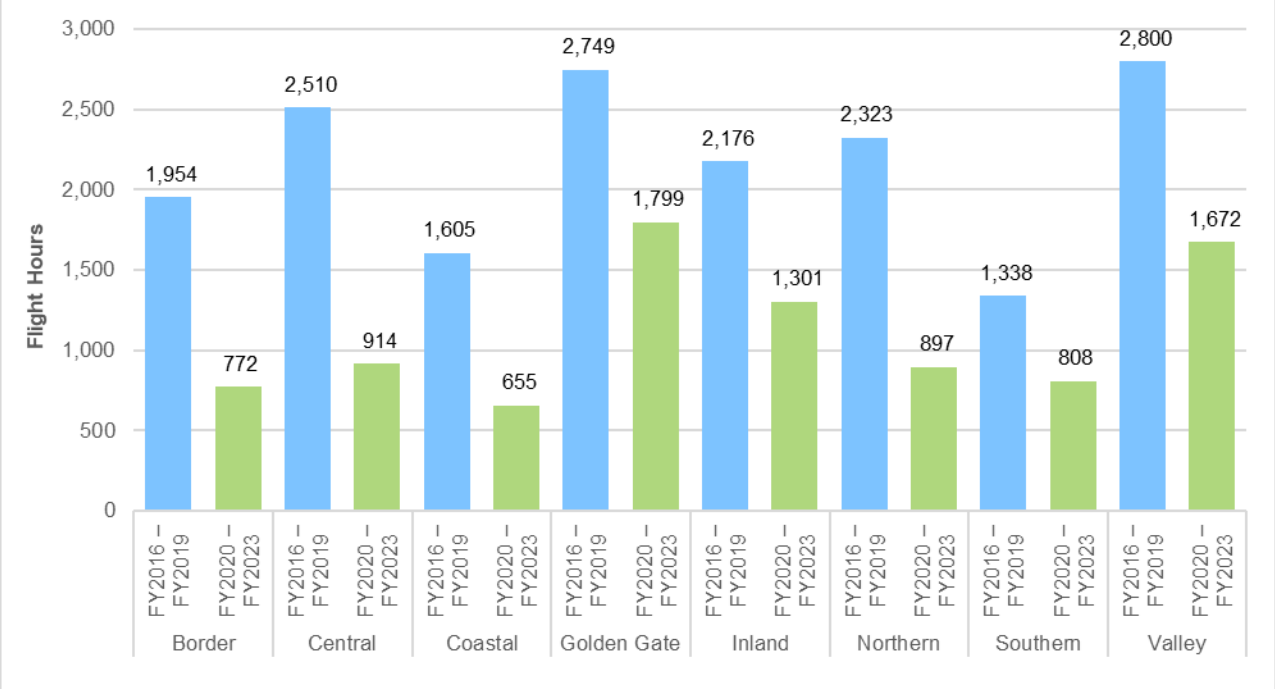
c. Incident and Patrol Activities

Exhibit 19 illustrates a comparison of AOUs' flight time for incident and patrol activities prior to and after FY2019. From FY2016 to FY2019, AOUs averaged nearly 2,200 annual flight hours for incident and patrol activities per year. From FY2020 to FY2023, AOUs averaged roughly 1,100 annual flight hours – roughly a 50 percent decrease in flight time for incident and patrol activities.

Here are some exceptions to this statewide trend:

- From FY2016 to FY2019, Valley AOU performed the highest flight hours to respond to incidents and patrols, averaging roughly 2,800 flight hours per year; Southern AOU performed the least flight hours to respond to incidents and patrols, averaging roughly 1,400 flight hours per year.
- From FY2020 to FY2023, Golden Gate AOU performed the highest flight hours to respond to incidents and patrols, averaging roughly 1,800 hours per year; Coastal AOU performed the least flight hours to respond to incidents and patrols, averaging roughly 700 flight hours.
- Central AOU performed 64 percent less flights hours between these periods, while Golden Gate performed 35 percent less flights hours.

Exhibit 19
Comparison of AOU Incidents and Patrol Activities, FY2016 to FY2019 and FY2020 to FY2023



d. Service Activities

The AOP performs a collection of activities that provide services to CHP field officers and allied agencies. Service activities may occur when the AOP responds to calls for incidents and are engaged in patrol missions. The AOP records services provided within the following activity categories:

- Search[8]
- Homeland Security
- Camera
- Night Vision Goggles (NVG)
- Assist to Motorists
- Traffic Collision (TC)
- Felony Arrests
- Pursuit
- Transport
- Emergency Medical Services (EMS)
- Rescue[9]
- Enforcement
- Misdemeanor Arrest
- Vehicle Recovery
- Surveillance
- DUI Arrest
- Community Engagement
- LoJack Recovery.

Exhibit 20 and **Exhibit 21** illustrate the services that the AOUs performed from FY2016 to FY2019 and FY2020 to FY2023.

Between FY2016 and FY2019, homeland security checks represented 43 percent of AOP services, while search missions and assists to motorists represented 27 percent and 11 percent each. In aggregate, homeland security checks, search missions, and assists to motorists represented roughly 80 percent of services provided statewide. Responses to traffic collisions, felony arrests, transports, pursuits, enforcements, EMS, and rescues collectively represented roughly 20 percent of AOP services.

Between FY2020 and FY2023, search missions comprised the largest portion of AOP services at 42 percent of total – a 15 percent increase from the prior period. Homeland security checks decreased by 33 percent. Felony arrests and pursuits together represented roughly 20 percent of AOP total services. Traffic collisions, EMS, rescues, assist to motorists, transport, and enforcement represented a combined 24 percent of AOP total services.

Exhibit 22 and **Exhibit 23** display the objects of searches, as a percentage of total searches, from FY2016 to FY2019 and FY2020 to FY2023. The primary object of a search may include Aircraft, Evidence, Person (including Missing, Lost, 10-31s, and Non-Suspects), Property (including animals), Suspect, and Vehicle.

Between FY2016 and FY2019, suspects were the object of 51 percent of searches, vehicles were the object of 34 percent, and people were the object of 12 percent. Property, evidence, and aircraft, in aggregate, were the object of 3 percent of searches.

Between FY2020 and FY2023, suspects were the object of 41 percent of searches, vehicles were the object of 36 percent, and people were the object of 20 percent. Property, evidence, and aircraft, in aggregate, were the object of 3 percent of searches.

[8] According to Flight 93 User's Guide (v1.4.2), the primary object of a search may include: Aircraft, Evidence, Person (including Missing, Lost, 10-31s, Non-Suspects), Property (including animals), Suspect, and Vehicle.

[9] According to Flight 93 User's Guide (v1.4.2), the following option may be used to complete a mission: Hoist, Off-Site Landing, Hover, Water, Long Line, Rescue Assist, Toe-In, One Skid, Cancelled, and Short Haul.

Exhibit 20
Services as a Percentage of Total Flight Time, FY2016 – FY2019

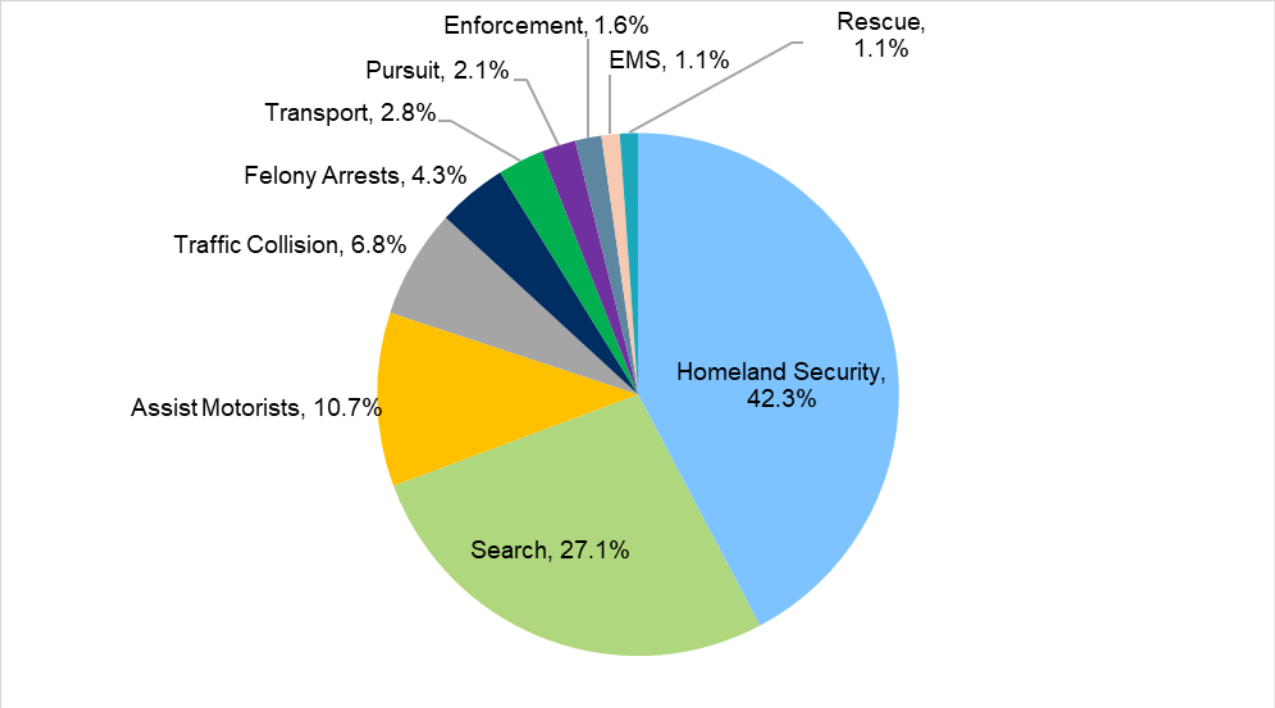


Exhibit 21
Services as a Percentage of Total Flight Time, FY2020 – FY2023

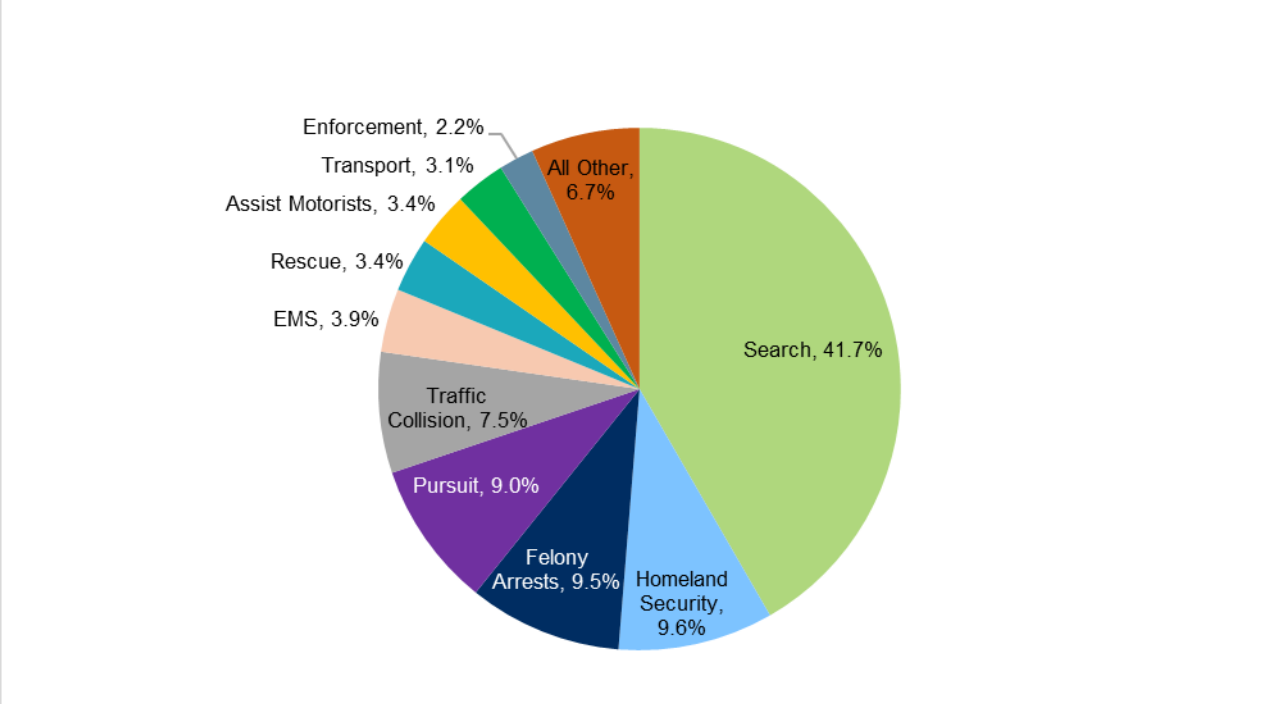


Exhibit 22
Search Objects as a Percentage of Total Searches, FY2016 – FY2019

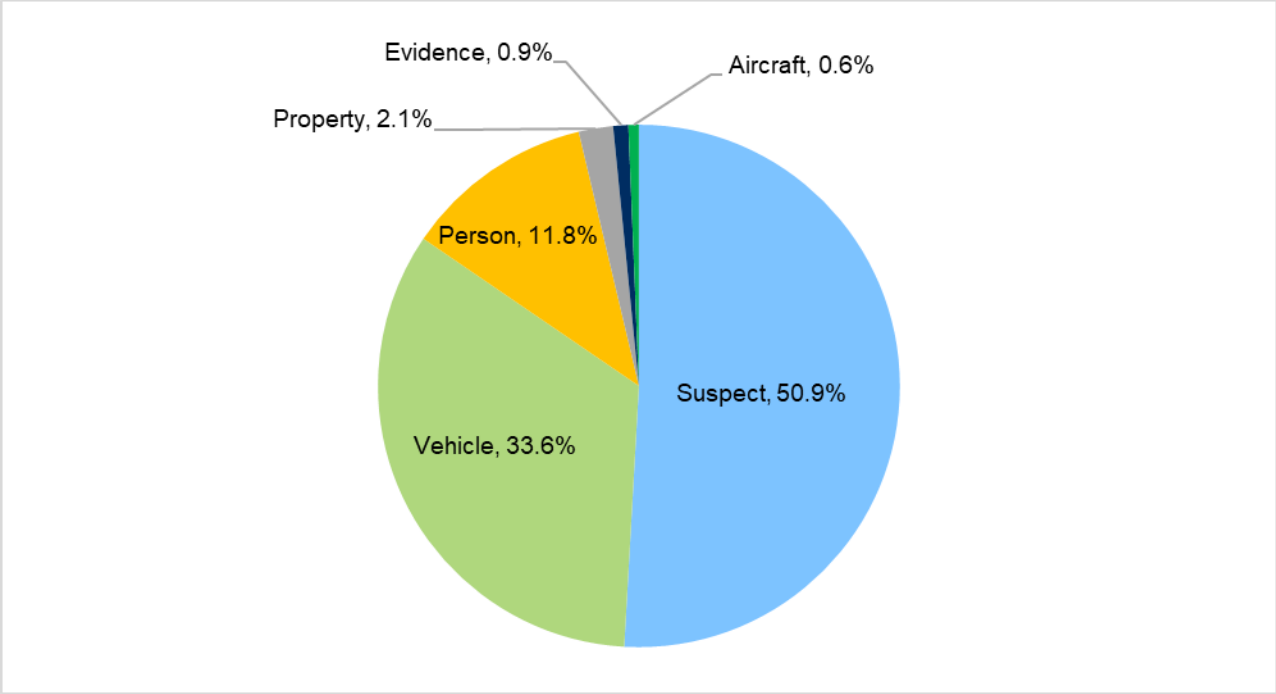
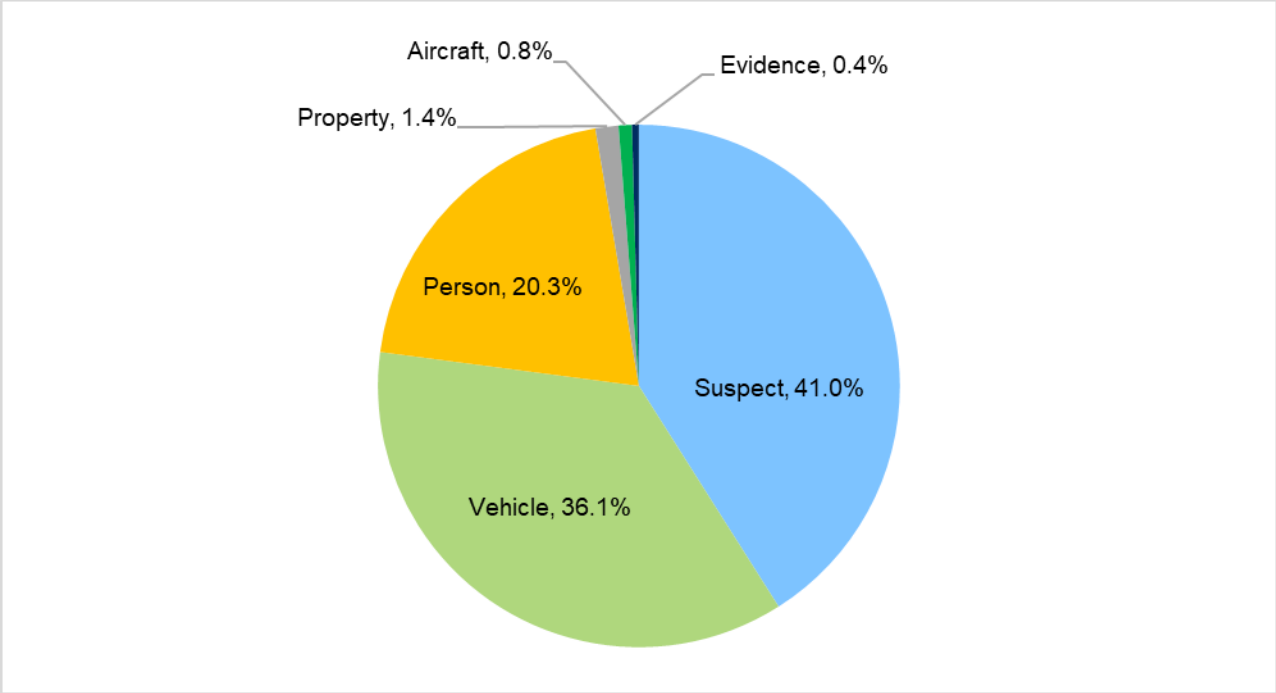


Exhibit 23
Search Objects as a Percentage of Total Searches, FY2020 – FY2023



e. Services Performed per 10 Incident Flight Hours

Exhibit 24 illustrates the number of services performed by AOUs for every 10 incident flight hours (e.g., flight hours utilized to respond to calls). From FY2016 to FY2019, AOUs performed 18 services per 10 incident flight hours. From FY2020 to FY2023, this figure decreased by 5.9 percent, to 17 services per 10 incident flight hours.

Here are some exceptions to this statewide trend:

- From FY2016 to FY2019, Inland AOU performed the highest number of services per 10 flight hours, averaging 30 services; the Border AOU performed the least number of services per 10 flight hours, averaging 11 services.
- From FY2020 to FY2023, Golden Gate AOU performed the highest number of services per 10 flight hours, averaging 21 services; the Border AOU performed the least number of services per 10 flight hours, averaging 10 services.
- Border, Central, Golden Gate, Northern, and Valley AOUs performed more services per 10 flight hours from FY2020 to FY2023 than from FY2016 to FY2019 – and increased by roughly 48 percent, 18 percent, 16 percent, 9 percent, and 16 percent, respectively.

Exhibit 25 illustrates the breakdown of services performed by AOUs for every 10 incident flight hours from FY2016 to FY2019 and FY2020 to FY2023. Between FY2016 and FY2019, homeland security checks accounted for the highest levels at eight incidents per 10 flight hours. Between FY2020 and FY2023, searches[10] accounted for the highest levels at seven incidents per 10 flight hours.

Between the two periods, AOUs performed less motorist assists and homeland security check services for every 10 incident hours – decreasing by roughly 70 percent and 78 percent, respectively. AOUs performed more EMS, felony arrests, pursuits, searches, and traffic collisions services for every 10 incident hours – increasing roughly 230 percent, 112 percent, 300 percent, 50 percent, and 7 percent, respectively.

[10] According to Flight 93 User's Guide (v1.4.2), the primary object of the search may include: Aircraft, Evidence, Person (including Missing, Lost, 10-31s, Non-Suspects), Property (including animals), Suspect, and Vehicle. A search mission may include a rescue component.

Exhibit 24
Total Services per 10 Flight Hours, FY2023

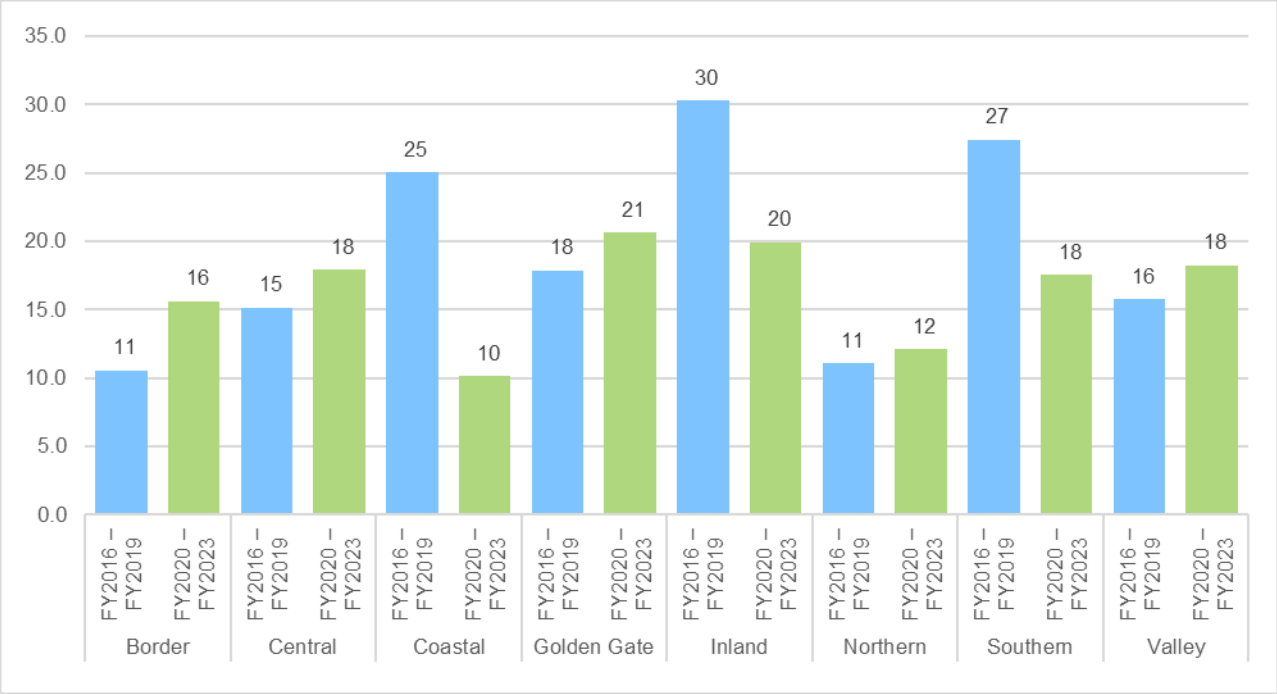
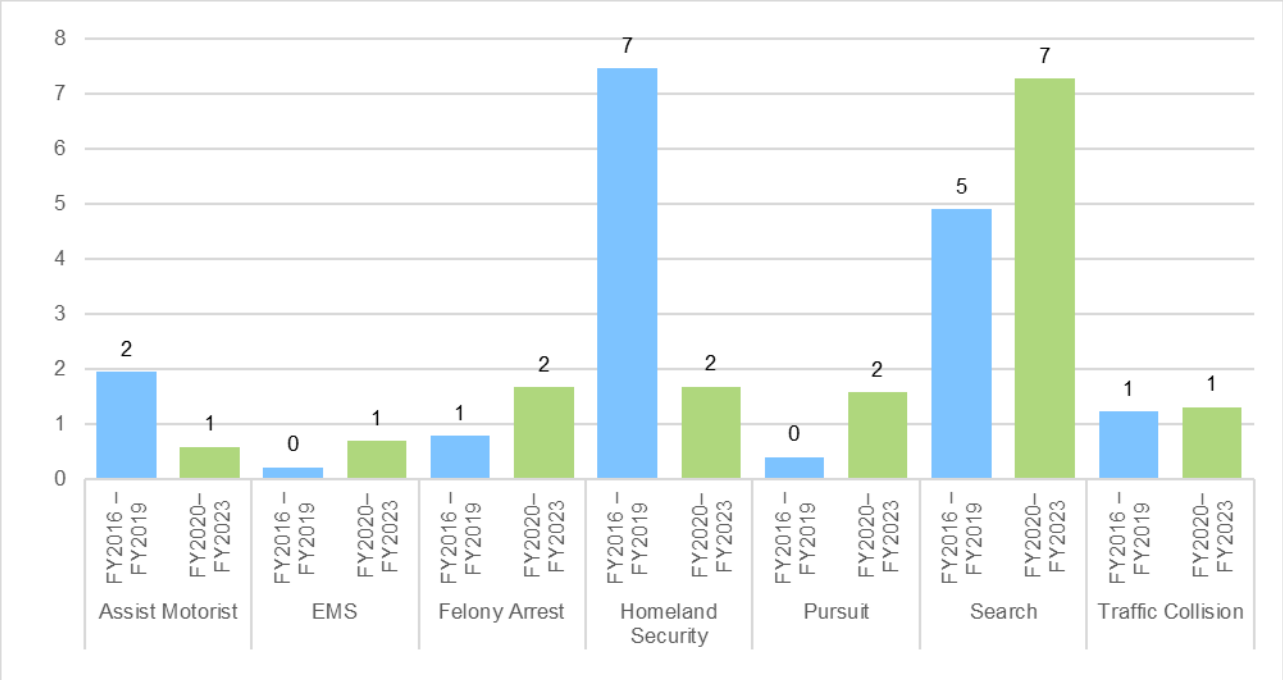


Exhibit 25
Key Services per 10 Flight Hours, FY2023



2. Structure

CHP operationalizes the AOP through a dual management organizational structure (i.e., a decentralized operational model), as shown in **Exhibit 26.** The field Divisions manage AOUs, in alignment with the HPM, to support field operations and allied agencies. The OAO manages the AOP's practices and policies for aviation safety, emergency medical services, training, maintenance, procurement, and its operating budget.

The AOP's dual management structure offers both benefits and challenges. While it allows for localized operational control and centralized budget management, the existing structure may lead to communication gaps, resource misalignment, and operational inefficiencies. The insights from survey responses and interviews with program SMEs, detailed in **Appendix B,** highlight the potential need for a more centralized approach to program management, with improved communication, better alignment of policies with operational needs, and enhanced resource allocation to address the ongoing needs effectively and efficiently in consideration of the key benefits and challenges detailed below.

Benefits of Dual Management Structure

- **Localized Control Over Staffing:** Divisions maintain direct control over staffing levels, allowing for tailored responses to unique regional demands. This benefit is crucial, especially in addressing high-demand periods effectively, as it highlights the opportunity for gains in operational efficiency with requisite staffing.
- **Centralized Budget and Maintenance Management:** The OAO's management of the maintenance budget is intended to provide a uniform policy for aircraft and equipment maintenance across divisions. This centralized approach attempts to standardize maintenance practices to some degree, although feedback indicates this is an area with room for improvement (e.g., streamlining the procurement process to minimize approvals and touchpoints required to purchase necessary equipment, parts, and technology).
- **Strategic Long-Term Planning:** Having the headquarters manage the broader policy and budgeting responsibilities allows for a more strategic approach to long-term challenges and opportunities within the AOP. This setup may support a more integrated management approach that can optimize resource allocation and planning across the entire AOP.

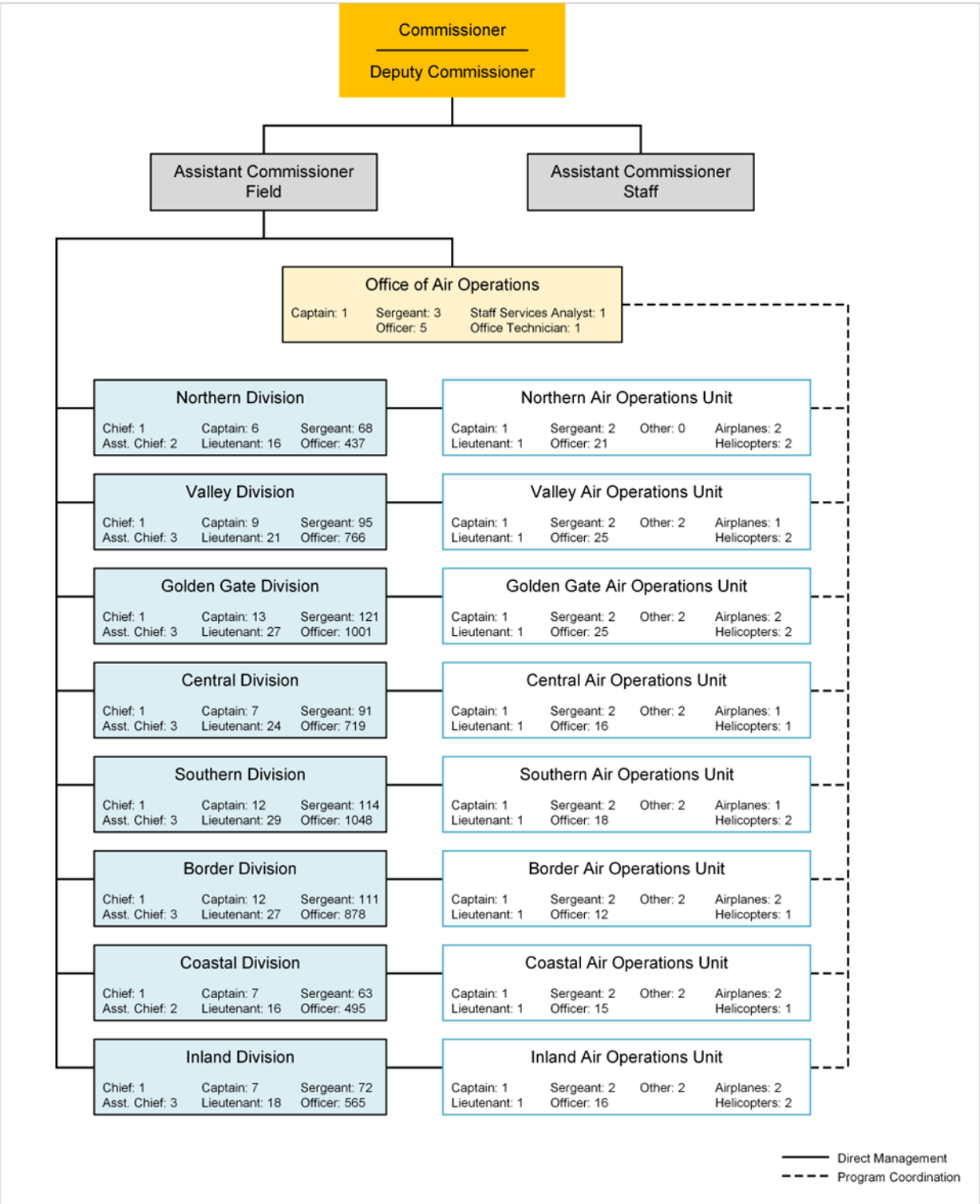
Challenges of Dual Management Structure

- **Resource Constraints Impacting Operational Capacity:** Divisions face significant resource constraints, including understaffing, aircraft reliability issues, and restricted fuel usage due to budget limitations. These constraints may have the potential to impact the timeliness of operational processes, emergency responses, and service deliveries.
- **Communication and Coordination Inefficiencies:** Despite centralized budget control, there is a clear disconnect in communication between the divisions and headquarters, leading to delays and inefficiencies in implementing policy changes and responding to division-specific needs. The lack of standardization and transparency, as reported in the survey, exacerbates these issues.
- **Mismatch Between Operational Needs and Budgetary Constraints:** The dual management structure creates a scenario where operational needs at the Division level may not always align with the financial and policy directives from OAO. This misalignment is evident in the restrictions on helicopter usage and maintenance delays due to budget cuts, which may directly affect the AOUs' ability to achieve their desired levels of operational effectiveness.
- **Inadequate Understanding of Operational Realities by Headquarters:** There is a perceived gap in understanding between headquarters policymakers and the operational staff at the division level. Decisions made without adequate on-ground input may lead to policies that are not always aligned with operational realities, particularly in terms of aviation-specific challenges and needs (e.g., flight proficiency requirements, training cycles and timelines, and equipment and technology needs).

In benchmarking the AOP against other programs, Crowe noted that most do not employ a dual management structure. Typically, these programs (such as Texas and Maryland's air operations programs) either have a fully centralized system where major decisions including staffing, budgeting, and operations are controlled at the headquarters, or they are fully decentralized with local units having complete autonomy over operational and budgetary decisions (e.g., FBI's organizational model). The AOP's dual management system is unique in its split of responsibilities, which can offer a balance between centralized control and localized autonomy but also presents unique challenges as highlighted.

In **Appendix C,** we include an organizational chart of the Texas Department of Public Safety Aircraft Operations Division and Maryland State Police Aviation Command. Both entities offer potential organizational options that the AOP may want to adopt. For example, Texas maintains a centralized model under one division with regional units staffed by both airplane and helicopter crews for law enforcement, patrol, and other incidents. Similarly, Maryland maintains a centralized model under one division with regional units staffed by helicopter crews for emergency medical services. In addition, both entities staff internal mechanics that perform aircraft maintenance workload.

Exhibit 26
Current Air Operations Program Organization and Staffing Structure



C. Evaluation of Program Resources

The AOP's resources are fundamental to its ability to support the CHP's mission and assist field operations and allied agencies effectively. The program must have adequate personnel and equipment to maintain operational readiness and efficiency. There are opportunities to optimize the allocation and utilization of resources within the AOP to enhance its performance and meet evolving demands. In this subsection, we highlight detailed findings related to the AOP's personnel and operating equipment.

1. Personnel

Crowe analyzed the following trends to highlight the AOP's current and emerging workload and operational needs within the context of the program's personnel:

- Current AOUs Staffing Levels
- Air operations as a statewide force multiplier for the CHP
- Regular versus overtime hours
- Distribution of key workload (i.e., flight hours versus all other workload)
- Flight hours distribution for pilots and flight officers in each AOU.

a. Current AOU Staffing Levels

Exhibit 27 outlines current active officer positions by pilot, flight officer (including paramedic), and aircraft type. HPM 100.7, Chapter 2, Annex A recommends that AOUs staff one 10-hour shift twice per day for seven days per week. This equates to an absolute (fractional) crew member per aircraft at 4.2 members. Crowe's analysis in Section 4 and Section 5 finds the HPM 100.7's fractional crew member per aircraft recommendation is appropriate to provide minimal shift coverage for the CHP's desired coverage (two shifts per day, seven days a week).

Border, Central, Coastal units fall under the HPM 100.7's air unit staffing recommendation. All units could potentially benefit from an additional airplane pilot and airplane flight officer, with the exception of Northern AOU, to enhance staffing levels and align with the program's deployment priority for airplanes. We spend more time in *Section 4* analyzing staffing permutations based on workload, per capita metrics, minimum and budgetary levels.

Exhibit 27
Current Active AOU Officer Positions

Unit	Pilots	Flight Officers	Paramedics
Border	• Airplane: 2 • Helicopter: 4	• Airplane: 1 • Helicopter: 3	• Helicopter FO: 2
Central	• Airplane: 3 • Helicopter: 4	• Airplane: 4 • Helicopter: 4	• Helicopter FO: 4
Coastal	• Airplane: 2 • Helicopter: 3	• Airplane: 2 • Helicopter: 4	• Helicopter FO: 4
Golden Gate	• Airplane: 3 • Helicopter: 4	• Airplane: 4 • Helicopter: 4	• Helicopter FO: 4
Inland	• Airplane: 4 • Helicopter: 4	• Airplane: 2 • Helicopter: 4	• Helicopter FO: 4
Northern	• Airplane: 4 • Helicopter: 5	• Airplane: 4 • Helicopter: 5	• Helicopter FO: 5
Southern	• Airplane: 4 • Helicopter: 4	• Helicopter: 8[11]	• Helicopter FO: 0
Valley	• Airplane: 4 • Helicopter: 4	• Airplane: 4 • Helicopter: 3	• Helicopter FO: 4

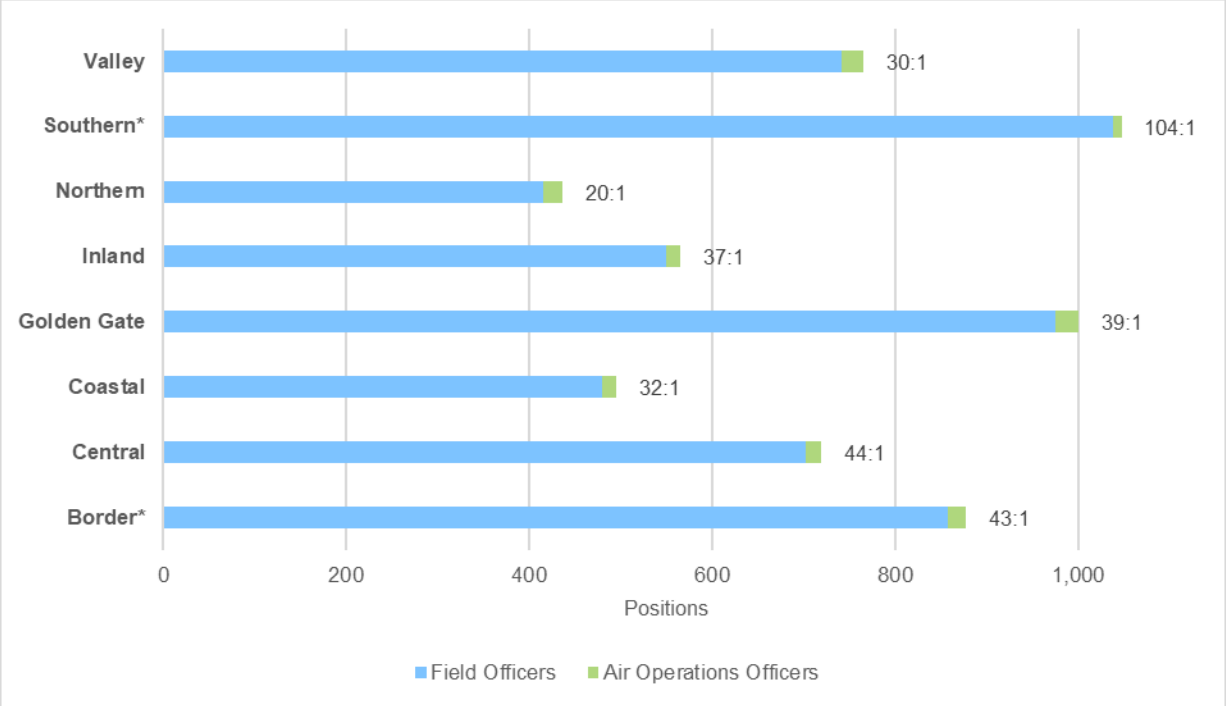
[11] All flight officers in the Southern AOU are assigned to "Helicopter" to align with the aircraft in which the majority of their flight hours are incurred. However, each flight officer is capable of staffing an airplane, if needed.

b. Air Operations as a Force Multiplier

Exhibit 28 and **Exhibit 29** provide the approximate ratios of field officers and sergeants to air operations officers and sergeants based on FY2023 authorized positions. These ratios tend to vary by AOU. Each air unit has roughly fifteen to twenty-five officers and two sergeants.[12] Field officers and sergeants differ dramatically by division as shown by the total position counts.

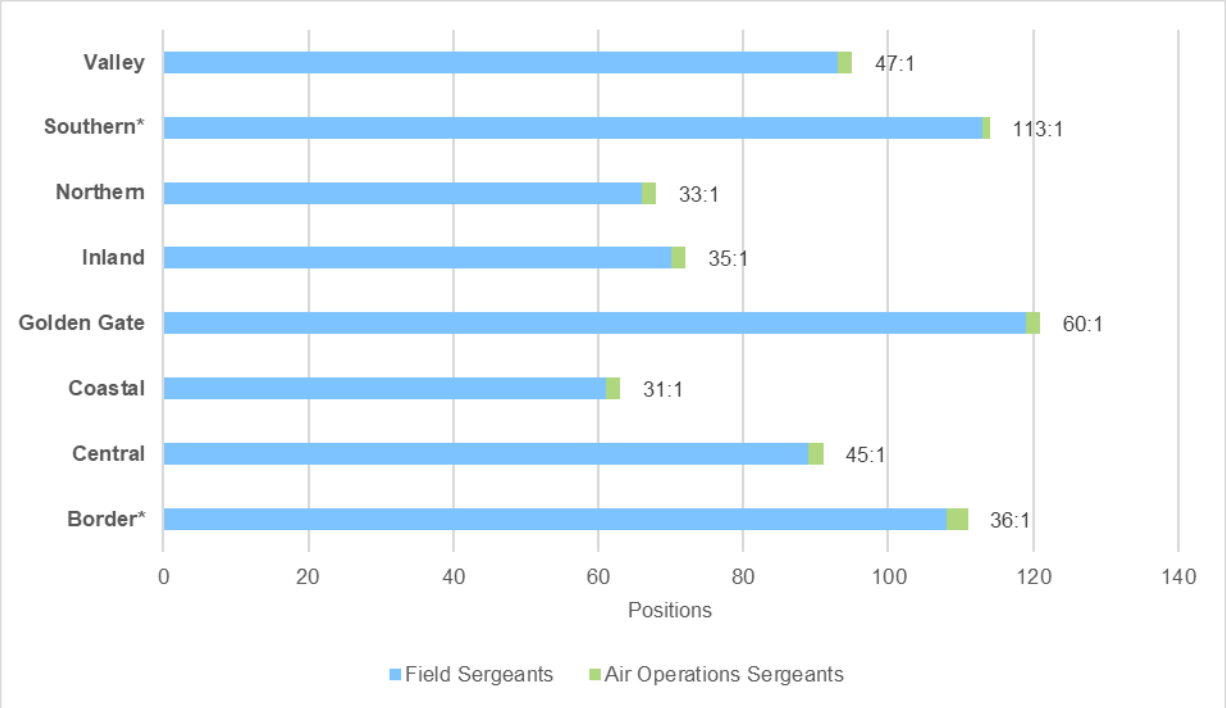
While the staffing ratio inconsistency could develop from differences in regional needs and allied agencies, it could also signal that certain divisions may need to increase the size of their AOUs to provide a consistent force multiplier. In *Section 4* under the per capita staffing approach, we analyze the number of AOU officers relative to the number of field officers in each Division to identify potential staffing needs in each Division.

Exhibit 28
Comparison of the Estimated Number of Field to Air Operations Officers, FY2023



[12] Five of the Border Unit's officers and one sergeant support the Southern Unit's coverage.

Exhibit 29
Comparison of the Estimated Number of Field to Air Operations Sergeants, FY2023



c. Regular versus Overtime Hours

Crowe reviewed the AOP's regular and overtime hours reported in the Activity Tracking System (ATS). As shown in **Exhibit 30,** the AOP's FY2022 regular and overtime hours totaled roughly 223,000 hours and, in FY2023, totaled roughly 214,000 hours – a four percent decrease. Overtime hours accounted for 7,860 hours or roughly 3.5 percent of FY2022 total hours and 12,400 hours or 5.8 percent of FY2023 total hours. Overtime hours increased nearly 60 percent from FY2022 to FY2023. This increase likely indicates AOUs are facing staffing shortages to cover planned shifts. AOP's overtime accounted for roughly $2.5 million in FY2023 and $1.4 million in FY2022.

Exhibit 31 illustrates total hours (including regular and overtime hours) by unit in FY2022 and FY2023. Border, Coastal, Golden Gate, Inland, and Valley units decreased regular hours between these fiscal years. Nearly every unit increased overtime hours between these fiscal years with the exception of the Northern AOU, which decreased its overtime by nearly 40 percent.

Exhibit 30
Estimated Regular and Overtime Hours, FY2022 and FY2023

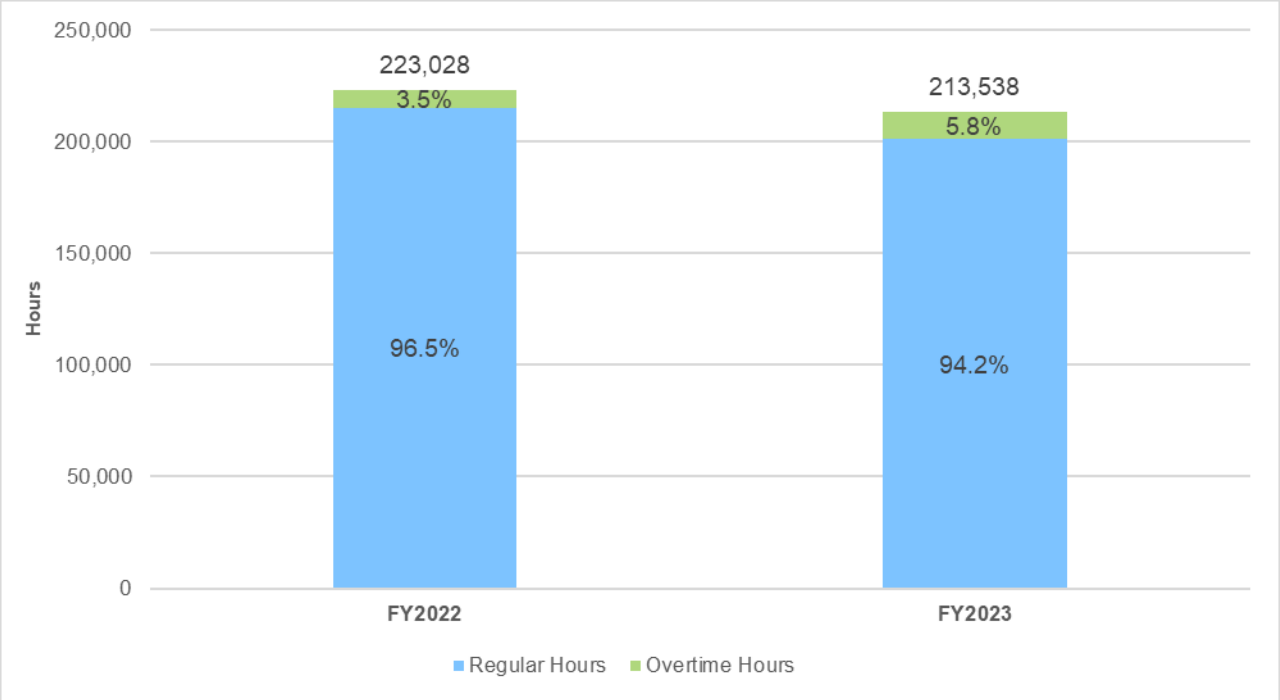
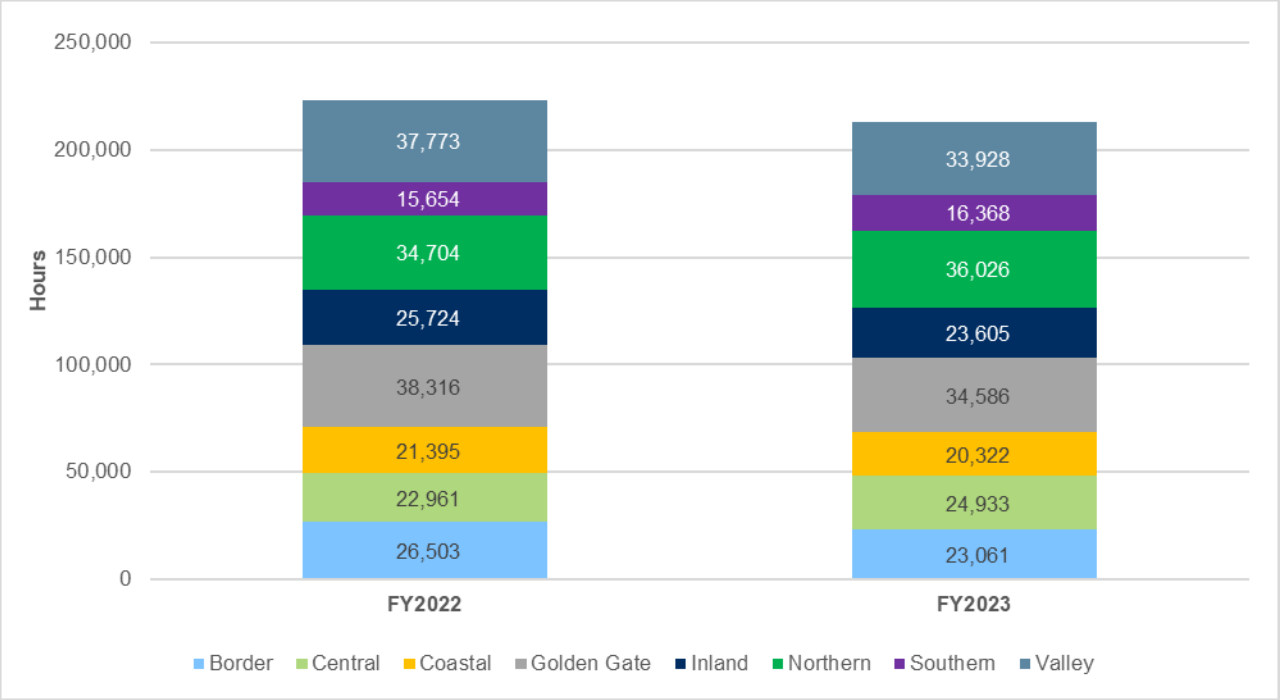


Exhibit 31
Estimated Total Hours by AOU, FY2022 and FY2023



d. Distribution of Key Workload

Exhibit 32 provides the estimated distribution of time in FY2022 and FY2023 spent performing ancillary duties[13] and standby workload, and flight workload. This exhibit provides a general indication of time spent performing workload activities in any given shift. Nearly 90 percent of AOUs' time is spent performing ancillary duties and standby workload and roughly 11 percent conducting flights. Crowe calculated distributions of time based on AOU's regular and overtime hours recorded in ATS and flight hours recorded in CHP 93. Examples of ancillary duties and standby workload include activities related to Division Air Unit Job Descriptions, as defined in HPM 100.7 Chapter 1, Annex C, as well as other duties such as planning and reporting, resource and equipment management, training, and general time spent on other non-flight duties.

Exhibit 32
AOP Estimated Distribution of Ancillary Duties, Standby, and Flight Workload, FY2022 and FY2023

e. Flight Time Distribution for Pilots and Flight Officers

Exhibit 33 illustrates the average flight time per pilot from FY2016 to FY2019 and FY2020 to FY2023 and **Exhibit 34** illustrates the average flight time per flight officer from FY2016 to FY2019 and FY2020 to FY2023. On average, pilots performed 38 percent less flight hours and flight officers performed 34 percent less flight hours between periods. Here are some exceptions to this statewide trend:

- From FY2016 to FY2019 and FY2020 to FY2023, Border AOU pilots and flight officers' flight time per pilot and flight officer decreased by nearly 60 percent and 45 percent, respectively.
- From FY2016 to FY2019 and FY2020 to FY2023, Central AOU pilots and flight officers' flight time decreased by 54 percent and 49 percent, respectively.
- Flight time per pilot decreased the least in Golden Gate AOU at roughly 9 percent between periods.
- Flight time per flight officer decreased the least in Inland AOU at roughly 16 percent between periods.

[13] As defined in Division Air Unit job descriptions in HPM, Chapter 1, Annex C.

Exhibit 33
Estimated Flight Time Per Pilot, FY2016 to FY2019 and FY2020 to FY2023

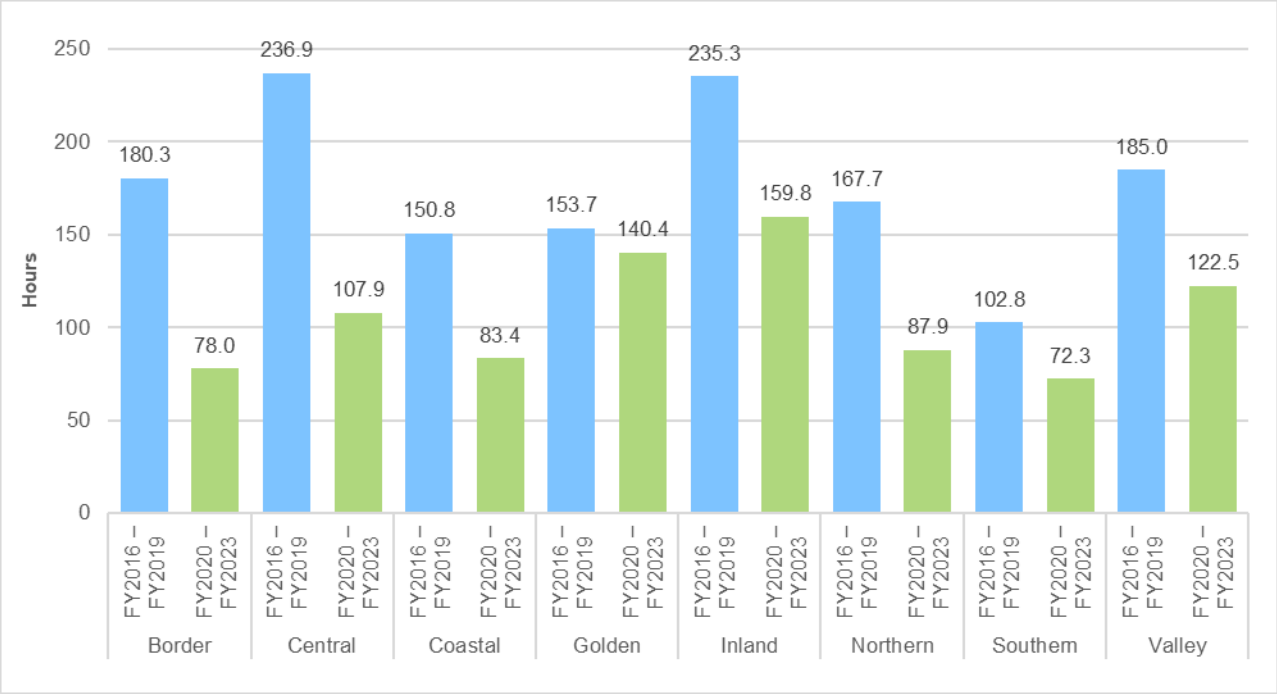
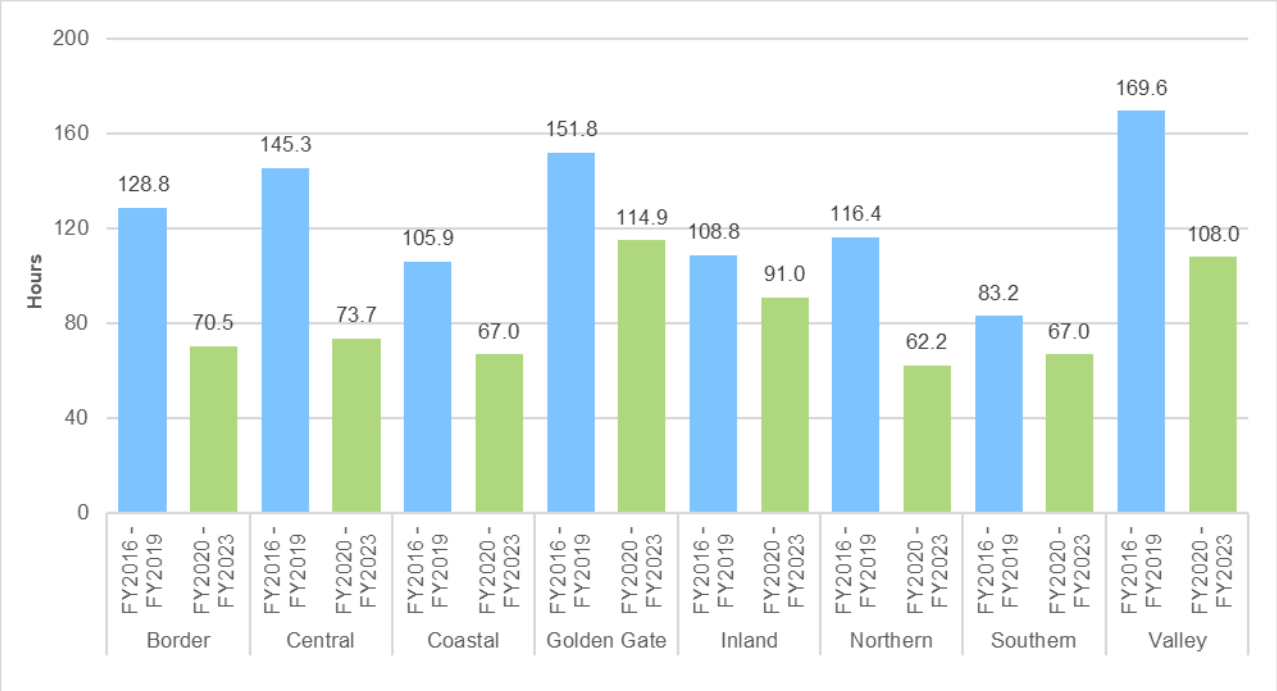


Exhibit 34
Estimated Flight Time Per Flight Officer, FY2016 to FY2019 and FY2020 to FY2023



2. Operating Equipment

Crowe analyzed the following components to highlight the AOP's current and emerging workload and operational needs within the context of the program's operating equipment:

- Distribution of aircraft
- Distribution of flight time between aircraft.

a. Distribution of Aircraft

The AOP maintains a total of 31 aircraft. This includes 16 fixed wing aircraft, summarized in **Exhibit 35,** and 15 helicopters summarized in **Exhibit 36.** Southern and Valley AOUs have one airplane. The six other AOUs each have two airplanes. Border and Coastal AOUs have one helicopter each. The six other AOUs have two helicopters each.

The exhibits indicate airframe and engine hours for each aircraft. The AOP's fixed wing fleet's airframe hours average approximately 10,000 hours. Northern, Border, Coastal, and Inland AOUs have airplanes above the 10,000-hour mark. The AOP's helicopter's airframe hours average roughly 7,000 hours. OAO, Central, and Southern AOUs have helicopters above the 7,000-hour mark.

Border and Inland AOUs' two airplanes have been in service for approximately twenty-two years. Coastal and Northern AOUs each have one airplane exceeding twenty years of being in service. The airplane fleet from Valley, Central, Southern and Golden Gate AOUs are at the midpoint of their useful lives.

Southern AOU's two helicopters are approximately twenty-two years in service, and the OAO's assigned helicopter has approximately twenty-four years in service. Valley, Northern and Central AOUs each have one helicopter reaching the midpoint of its useful life.

In *Section 5*, we identify the potential distribution of aircraft needed to support each detailed staffing model option presented in this report. In **Appendix C,** we detail the number of aircraft maintained by each benchmark agency. Of the two state programs benchmarked, Texas maintains 15 helicopters and nine airplanes across seven regional hubs and Maryland maintains 10 helicopters and one airplane across four regional hubs.

Exhibit 35
Recorded Airframe and Engine Hours for In-Service Fixed Wing Aircraft

Location/AOU	Aircraft Tail #	Make	Model	Date In-Service	Airframe Hours	Engine Hours
OAO	N911CA	Beechcraft (2005)	B300	8/1/2017	21,700	11,474 #2: 8,304
OAO	N918CA	Beechcraft (1978)	A200	2/22/2023	13,859	68 #2: 68
Northern	N511HP	Cessna (2000)	T206	5/1/2001	15,180	151
Northern	N202HP	Cessna (2022)	208B	12/1/2022	1,083	1,083
Valley	N159HP	GippsAero (2018)	GA8TC 320	12/1/2018	2,916	697
Golden Gate	N137HP	GippsAero (2015)	GA8TC 320	2/1/2016	6,013	1,830
Golden Gate	N153HP	GippsAero (2016)	GA8TC 320	8/1/2017	4,193	2,044
Central	N139HP	GippsAero (2015)	GA8TC 320	6/1/2016	4,275	2,048
Central	N156HP	GippsAero (2016)	GA8TC 320	2/1/2018	2,198	2,200
Southern	N140HP	GippsAero (2013)	GA8TC 320	3/1/2015	6,493	25
Border (Thermal)	N661HP	Cessna (2000)	T206	1/1/2001	16,860	1,313
Border (Thermal)	N551HP	Cessna (2000)	T206	9/1/2001	13,981	240
Coastal	N443HP	Cessna (2000)	T206	4/1/2001	16,018	312
Coastal	N553HP	Cessna (2006)	T206	10/1/2006	7,245	1,120
Inland	N441HP	Cessna (2000)	T206	4/1/2001	14,923	177
Inland	N513HP	Cessna (2001)	T206	9/1/2001	14,519	982

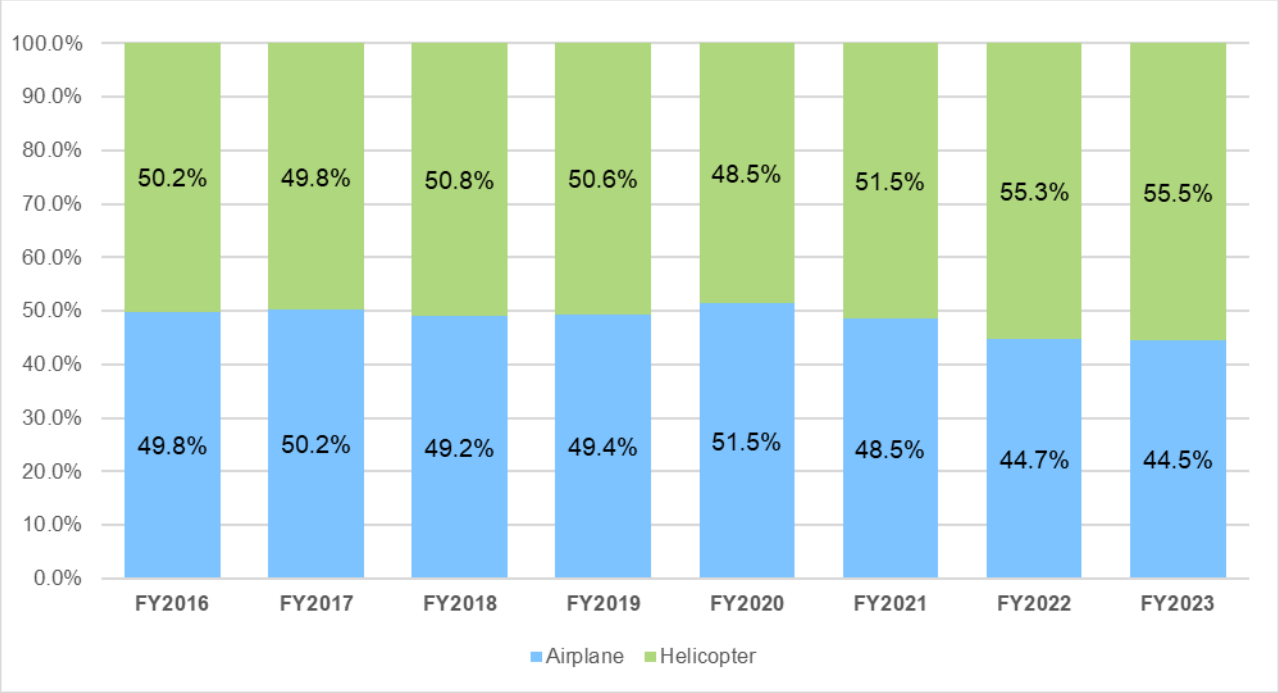
Exhibit 36
Recorded Airframe and Engine Hours for In-Service Helicopter Aircraft

Location/AOU	Aircraft Tail #	Make	Model	Date In-Service	Airframe Hours	Engine Hours
OAO	N314HP	Eurocopter (2000)	AS350B3	1/1/2002	17,614	11,514
Northern	N976HP	Airbus (2014)	Airbus H-125	6/1/2015	4,810	4,810
Northern	N979HP	Airbus (2015)	Airbus H-125	1/1/2016	5,248	5,188
Valley	N974HP	Airbus (2014)	Airbus H-125	3/1/2015	5,904	1,497
Valley	N978HP	Airbus (2015)	Airbus H-125	12/1/2015	5,022	5,022
Golden Gate	N981HP	Airbus (2016)	Airbus H-125	12/1/2016	5,437	5,148
Golden Gate	N982HP	Airbus (2016)	Airbus H-125	12/1/2016	4,676	4,676
Central	N975HP	Airbus (2014)	Airbus H-125	5/1/2015	7,513	3,217
Central	N986HP	Airbus (2023)	Airbus H-125	3/1/2024	–	–
Southern	N341HP	Eurocopter (2001)	AS350B3	12/1/2002	14,149	10,144
Southern	N617HP	Eurocopter (2001)	AS350B3	12/1/2002	16,748	14,441
Border (Thermal)	N988HP	Airbus (2021)	Airbus H-125	10/1/2021	1,608	1,608
Coastal	N983HP	Airbus (2016)	Airbus H-125	3/1/2017	4,520	4,520
Inland	N984HP	Airbus (2019)	Airbus H-125	11/1/2019	2,189	2,189
Inland	N985HP	Airbus (2019)	Airbus H-125	12/1/2019	2,454	2,454

b. Distribution of Flight Hours Between Aircraft

Exhibit 37 illustrates the distribution of the AOP's airplane and helicopter flight hours between FY2016 and FY2023. In general, the AOP's airplane and helicopter flight hours have been evenly split from FY2016 to FY2021. In FY2022 and FY2023, the AOP averaged roughly 55 percent helicopter hours versus 45 percent airplane hours. This is a slight change from historical norms where AOUs flew helicopters and airplanes proportionally at 50 percent each. This trend is likely due to airplane engine replacement and staffing needs and not due to a concerted deviation from AOP policy.

Exhibit 37
Flight Time Between Airplanes and Helicopters, FY2016 to FY2023



D. Evaluation of Deployment Practices

The AOP's deployment practices are vital in meeting timely and efficient responses to incidents while maintaining high operational effectiveness. Strategic placement of personnel and resources is crucial to optimizing response times and overall mission success. In this subsection, we highlight detailed findings related to the AOP's deployment strategies and operational coverage.

1. Deployment Strategies

Crowe analyzed the following programmatic trends to highlight the AOP's current and emerging workload and operational needs within the context of the program's deployment priorities:

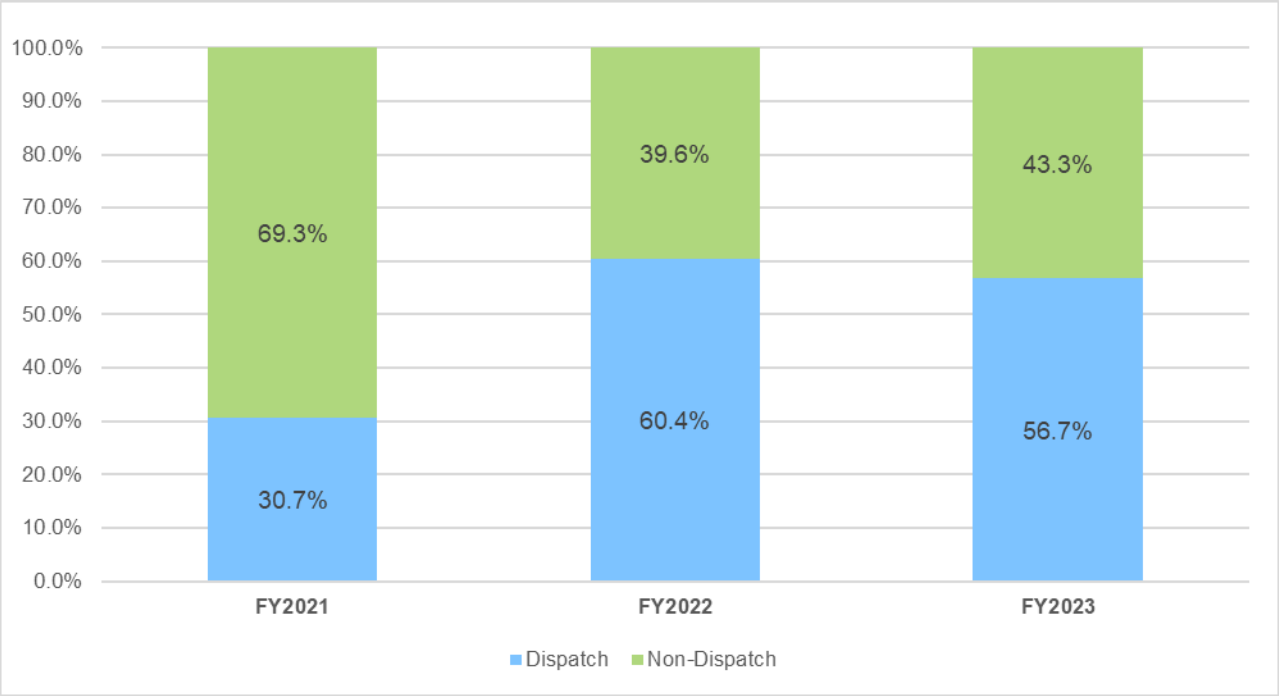
- Source of calls prompting incident response (e.g., calls coming in through dispatch versus calls coming in directly to each AOU)
- Emergency response times to respond to deployment priorities (as defined in policy)
- Service areas and demographic trends (e.g., increase in licensed drivers, crime trends, and traffic collision trends)
- Allied agencies aircraft and capabilities in each Division.

a. Source of Calls Prompting Incident Response

AOUs are prompted to respond to incidents for field or allied agency support either through calls into a CHP dispatch center or direct contact (i.e., calls not going through CHP's dispatch center). It is important to note that AOUs generally do not document the calls coming in through direct contact that they do not respond to.

Exhibit 38 provides a breakdown of the source of calls to AOUs. In FY2021, roughly 31 percent of the AOUs' incident responses were prompted by a CHP dispatcher and 69 percent by direct calls from allied agencies or self-launches deemed appropriate after an aircrew exercised professional judgment. After FY2021, the majority of AOUs' incident responses were prompted by a request from a CHP dispatcher. For example, in FY2022 and FY2023, roughly 60 percent of incident responses, respectively, were prompted by calls from a CHP dispatcher.

Exhibit 38
Source of Calls to AOUs Prompting Incident Responses, FY2021 to FY2023

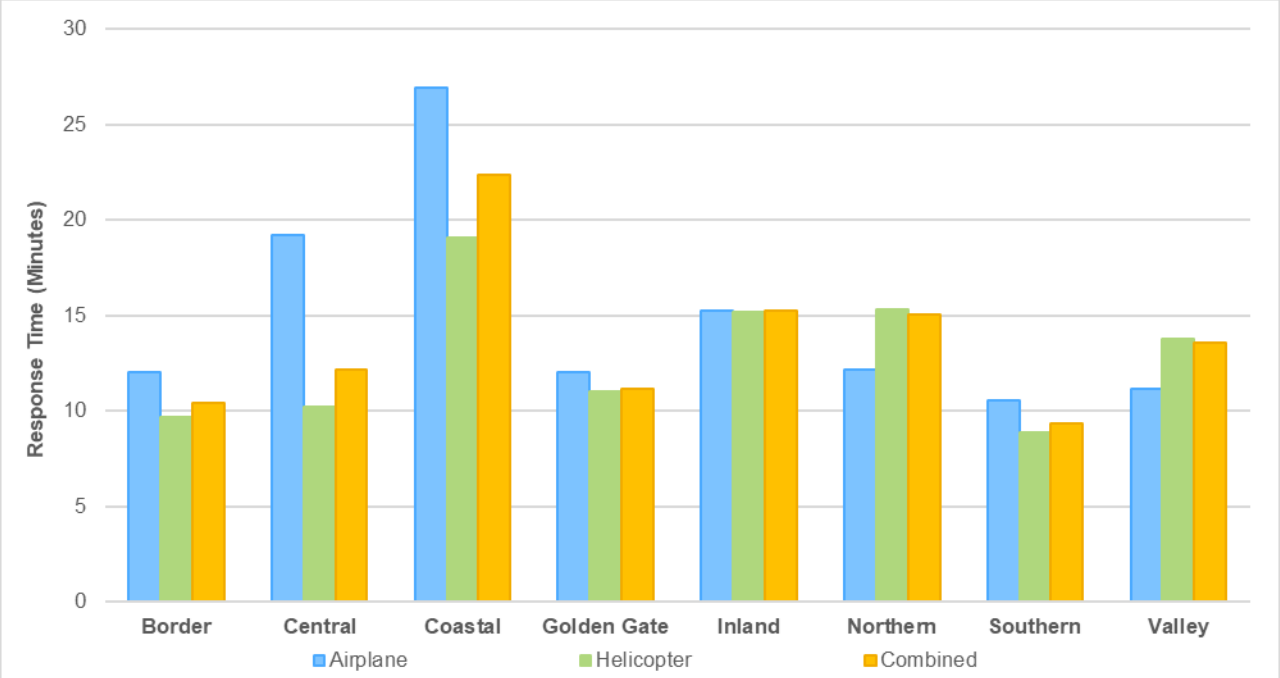


b. Response Times

The AOP prioritizes timely responses to missions in order to meet and complement departmental needs while aiding allied agencies and the public. **Exhibit 39** displays the average annual response time by aircraft from FY2021 to FY2023. Statewide, average annual response times by airplane were 14.9 minutes and 12.9 minutes for helicopters. Key exceptions to these statewide trends include:

- Coastal AOU's response times were the highest at 26.9 minutes for response by airplane, 19.1 minutes for response by helicopter, and 22.3 minutes on average.
- Southern AOU's response times were the lowest at 10.5 minutes for response by airplane, 8.9 minutes for response by helicopter, and 9.4 minutes on average.
- Central AOU's airplane response time, at 19.2 minutes, was 29 percent higher than the statewide average. However, at 10.2 minutes, its helicopter response time was 31 percent lower than the statewide average.

Exhibit 39
AOU Response Times by Aircraft, FY2021 to FY2023



c. Service Areas and Demographic Trends

Exhibit 40 provides a breakdown of each unit's service area (in square miles), population, and estimated *emergency* response time for airplanes and helicopters based on FY2023 data. **Exhibit 41** highlights key demographic trends for licensed drivers, arrests, and traffic collisions within each AOU. Here are key findings:

- With the exception of Coastal AOU, there is not a strong correlation between the size of service areas and emergency response times. Emergency response times, consisting mostly of the incident flight time, are within 10 to 15 minutes for most AOUs, despite the variance in geographical size. Central and Coastal AOUs have a relatively smaller area than Northern AOU yet have a much higher airplane response time.
- Although not a strong correlation, helicopter emergency response times are more strongly correlated to area size compared to airplane response times. Coastal AOU has the highest helicopter response time and the highest airplane response time. Southern AOU, with its smaller service area, demonstrates the fastest response time for both aircraft types. Northern AOU has the largest area and the second slowest helicopter response time. Inland AOU has the second largest area and the third slowest response time for both aircraft, while Central AOU, with the third largest area, exhibits the second slowest airplane response time.
- Over the next 20 years, licensed drivers are projected to increase in all units, with the exception of Northern AOU. Licensed drivers are projected to increase the most in Golden Gate, Valley, and Central AOUs. AOP should anticipate more drivers on the state highways based on this data.
- Statewide arrests for misdemeanors and felonies are down roughly 6 to 10 percent in each AOU over the last three calendar years (2020, 2021, and 2022). Arrests decreased only 4 percent during this time period in Inland AOU. This trend is consistent with FBI crime data showing overall crime generally decreasing throughout the state.
- Traffic collisions and fatalities remain high throughout the state. AOUs should continue to coordinate with field offices and allied agencies to patrol specific areas where collisions are likely to occur or where there are minimal resources for incident response (especially in rural areas).

Exhibit 40
Geographical Size, Population and Average Response Time by Location (FY2023)

Unit	Size of Service Area (in square miles)	Population of Service Area[14]	Estimated Response Time for Airplane (in minutes)	Estimated Response Time for Helicopter (in minutes)
Northern	41,250	727,426	10.9	15.1
Golden Gate	7,437	5,654,592	11.7	10.6
Valley	13,623	3,759,572	–[15]	–
Central	27,078	3,621,334	20.3	10.0
Coastal	14,422	4,195,068	25.0	16.7
Inland	37,272	2,221,360	15.5	15.2
Southern	4,164	9,750,065	10.2	7.9
Border	16,639	9,061,070	13.2	8.9
Total	**161,985**	**38,990,487**	**14.3 (average)**	**10.9 (average)**

[14] California Department of Finance. Demographic Research Unit. Report P-2B: Population Projections by Individual Year of Age, California Counties, 2020-2060. Sacramento: California. March 2024.

[15] Valley AOU did not report response times in Flight 93 in FY2023.

Exhibit 41
Demographic Indicators by Unit

Unit	Projected Increases to Licensed Drivers [16]	Arrest Trends [17]	Traffic Collisions [18]
Border	• 2030: 3.4% • 2035: 6.2% • 2040: 7.4% • 2045: 8.0%	• 123,000/year • 9.6% decrease	• 52,600 crashes/year • 500 fatal crashes/year
Central	• 2030: 3.8% • 2035: 6.6% • 2040: 8.0% • 2045: 9.1%	• 110,000/year • 9.9% decrease	• 43,000/year • 660 fatal crashes/year
Coastal	• 2030: 1.8% • 2035: 3.1% • 2040: 3.3% • 2045: 2.7%	• 65,000/year • 9.8% decrease	• 24,000/year • 180 fatal crashes/year
Golden Gate	• 2030: 3.0% • 2035: 6.8% • 2040: 9.4% • 2045: 11.2%	• 121,000/year • 7.2% decrease	• 63,000/year • 430 fatal crashes/year
Inland	• 2030: 3.7% • 2035: 6.7% • 2040: 8.3% • 2045: 9.9%	• 96,000/year • 4.3% decrease	• 55,000/year • 670 fatal crashes/year
Northern	• 2030: -0.2% • 2035: -1.3% • 2040: -3.3% • 2045: -4.7%	• 25,000/year • 6.2% decrease	• 6,700/year • 128 fatal crashes/year
Southern	• 2030: 1.2% • 2035: 1.5% • 2040: 0.1% • 2045: -1.6%	• 180,000/year • 11.8% decrease	• 104,000/year • 760 fatal crashes/year
Valley	• 2030: 3.7% • 2035: 7.2% • 2040: 9.9% • 2045: 12.2%	• 89,000/year • 8.2% decrease	• 49,000/year • 552 fatal crashes/year

[16] Based on 2025 through 2045 population projections prepared by the California Department of Finance.
[17] Based on 2022 to 2020 Uniform Crime Report (UCR) felony and misdemeanor arrest data.
[18] Based on 2021 to 2023 Statewide Integrated Traffic Records System (SWITRS) incident data.

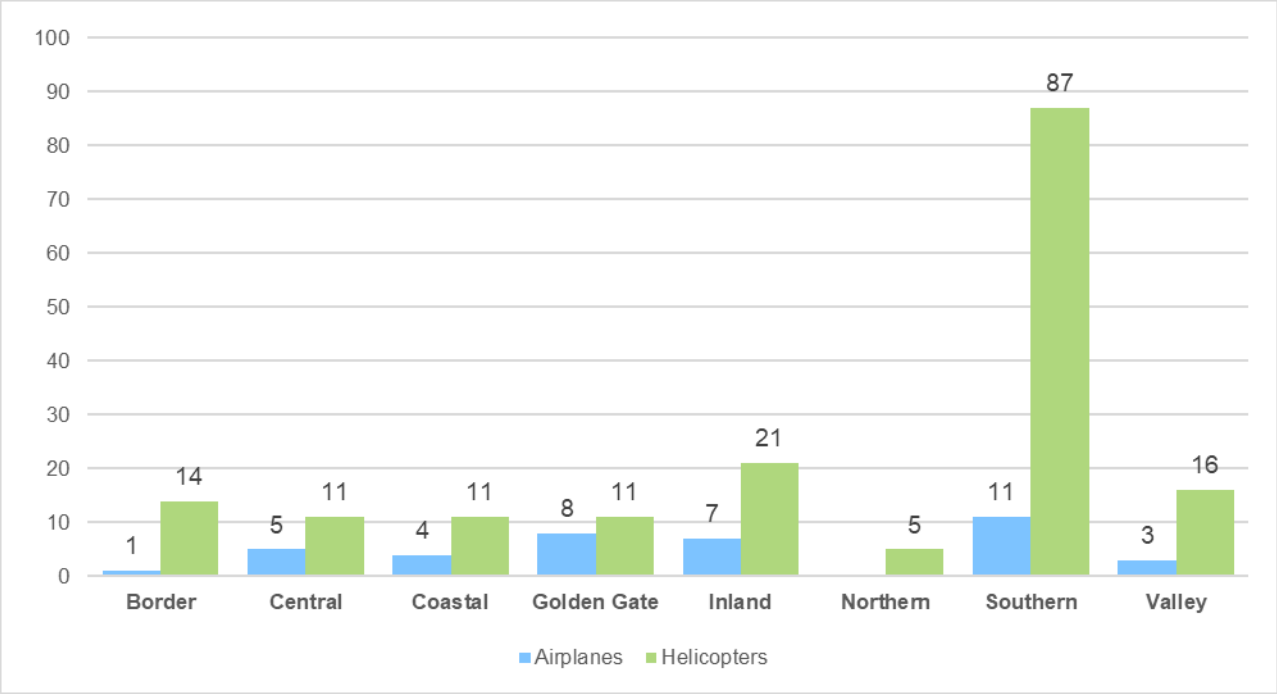
d. Coordination with Allied Agencies

Exhibit 42 provides an overview of the distribution of airplanes and helicopters owned by allied agencies within each unit's coverage areas. In **Appendix D,** we outline allied agencies' aircraft and capabilities based on input from each of the AOUs. Observations include:

- **Dominance of Helicopters in Southern Area:** The Southern region notably has a significantly higher count of helicopters (87), indicating a major resource there. This large fleet suggests that helicopters are crucial for the operational needs of allied agencies in this region, possibly due to its geographic or logistical challenges.
- **Limited Use of Airplanes:** Airplanes are less commonly used across the regions, with the Northern region having no airplanes. This suggests that the operational preferences or requirements of the allied agencies lean more towards helicopters.
- **Operational Considerations:** The heavy reliance on helicopters, especially in the Southern region, highlights the need for specific strategies concerning their maintenance, staffing, and operational readiness. The regional variations in fleet composition may reflect different operational needs or environmental conditions that influence the choice between helicopters and airplanes.

This analysis helps in understanding how resources are distributed across the State, which is critical in considering planning, resource allocation, and the operational efficiency of the AOP's support provided to allied agencies. Overall, the AOP is uniquely positioned to provide both helicopter and airplane capabilities across the state. In *Section 5*, we detail a potential staffing model option that considers adjusted staffing levels in targeted units (e.g., Northern, Southern, and Inland units) where allied agencies have robust helicopter capabilities.

Exhibit 42
Allied Agencies Fleet Summary



2. Operational Coverage

We examined the AOP's current operational coverage to identify deployment opportunities for the AOP. In this subsection, we examine the following:

- Shift schedules
- Shift coverage
- Daily incident frequency and workload accommodations
- Staffing level requirements per HPM
- Sample of Actual and Planned Shift Coverage (March 2024).

a. Shift Schedules

Exhibit 43 provides a summary of general shift schedules for each AOU based on current beat structures. Each AOUs' actual schedule is likely subject to change depending on staffing and aircraft availability. While exact shift schedules vary by AOU, the general planned daily schedule includes two 10.5 hour shifts per aircraft type, per day. The AOUs often stagger their helicopter and airplane shifts such that periods without any aircraft coverage are limited to 1.5 to five hours per day. This shift schedule is consistent with industry best practices to adequately meet coverage needs, as informed by our discussions with benchmark agencies.

Exhibit 43
General Shift Schedule by AOU Location

Unit	Helicopter Shifts	Airplane Shifts	Helicopter Coverage	Airplane Coverage	Hours without Coverage
Border	S1: 0730 – 1700 S2: 1630 – 0200	S1: 0600 – 1530 S2: 1000 – 1930	18.5 hours/day	13.5 hours/day	4.0 hours/day
Central	S1: 0700 – 1730 S2: 1700 – 0330	S1: 0800 – 1830 S2: 1800 – 0430	20.5 hours/day	20.5 hours/day	2.5 hours/day
Coastal	S1: 0530 – 1600 S2: 1500 – 0130	S1: 0530 – 1600 S2: 1500 – 0130	20.0 hours/day	20.0 hours/day	4.0 hour/day
Golden Gate	S1: 0900 – 1930 S2: 1700 – 0330	S1: 0500 – 1530 S2: 1700 – 0330	18.5 hours/day	21.0 hours/day	1.5 hours/day
Inland	S1: 0600 – 1630 S2: 1330 – 0000	S1: 0530 – 1600 S2: 1330 – 0000	18.0 hours/day	18.5 hours/day	5.5 hours/day
Northern	S1: 0600 – 1630 S2: 1600 – 0230	S1: 0600 – 1530 S2: 1400 – 0030	20.5 hours/day	18.5 hours/day	3.5 hours/day
Southern	S1: 0600 – 1630 S2: 1500 – 0130	S1: 0600 – 1630 S2: 1500 – 0130	19.5 hours/day	19.5 hours/day	4.5 hours/day
Valley	S1: 0600 – 1630 S2: 1600 – 0230	S1: 0700 – 1730 S2: 1630 – 0300	20.5 hours/day	20.0 hours/day	3.0 hours/day

b. Shift Coverage

Exhibit 44 illustrates each AOUs' current beat structures. A 24-hour day is split into half hour periods reflecting each AOU's general planned coverage, represented by the following icons:

- **Single coverage** (●): also illustrated by the light blue shaded areas, represents the periods where there is one of the attributed aircraft type ready to respond to incidents.
- **Double coverage/Transition** (○): also illustrated by the dark blue shaded areas, represents the periods where there is two of the attributed aircraft type ready to respond to incidents or the period a new crew is transitioning to take over coverage.
- **No coverage** (▲): also illustrated by the red shaded areas, represents the periods where there is no aircraft actively ready to respond to incidents.
- **Other aircraft coverage** (□): also illustrated by the yellow shaded areas, represents the periods where there is no aircraft coverage of the attributed aircraft type, but the other aircraft type is providing coverage.

Exhibit 44
General AOU Shift Coverage

	Border		Central		Coastal		Golden Gate		Inland		Northern		Southern		Valley	
	Heli	Air	Heli	Air	Heli	Air	Heli	Air	Heli	Air	Heli	Air	Heli	Air	Heli	Air
0000	●	□	●	●	●	●	●	●	▲	▲	●	●	●	●	●	●
0030	●	□	●	●	●	●	●	●	▲	▲	●	□	●	●	●	●
0100	●	□	●	●	●	●	●	●	▲	▲	●	□	●	●	●	●
0130	●	□	●	●	▲	▲	●	●	▲	▲	●	□	▲	▲	●	●
0200	▲	▲	●	●	▲	▲	●	●	▲	▲	●	□	▲	▲	●	●
0230	▲	▲	●	●	▲	▲	●	●	▲	▲	▲	▲	▲	▲	□	●
0300	▲	▲	●	●	▲	▲	●	●	▲	▲	▲	▲	▲	▲	▲	▲
0330	▲	▲	□	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
0400	▲	▲	□	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
0430	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
0500	▲	▲	▲	▲	▲	▲	□	●	▲	▲	▲	▲	▲	▲	▲	▲
0530	▲	▲	▲	▲	●	●	□	●	□	●	▲	▲	▲	▲	▲	▲
0600	□	●	▲	▲	●	●	□	●	●	●	●	●	●	●	●	□
0630	□	●	▲	▲	●	●	□	●	●	●	●	●	●	●	●	□
0700	□	●	●	□	●	●	□	●	●	●	●	●	●	●	●	●
0730	●	●	●	□	●	●	□	●	●	●	●	●	●	●	●	●
0800	●	●	●	●	●	●	□	●	●	●	●	●	●	●	●	●
0830	●	●	●	●	●	●	□	●	●	●	●	●	●	●	●	●
0900	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
0930	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1000	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1030	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1100	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1130	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1200	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1230	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1300	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1330	●	○	●	●	●	●	●	●	○	○	●	●	●	●	●	●
1400	●	○	●	●	●	●	●	●	○	○	●	○	●	●	●	●
1430	●	○	●	●	●	●	●	●	○	○	●	○	●	●	●	●
1500	●	○	●	●	○	○	●	●	○	○	●	○	○	○	●	●
1530	●	●	●	●	○	○	●	□	○	○	●	●	○	○	●	●
1600	●	●	●	●	●	●	●	□	○	●	○	●	○	○	○	●
1630	○	●	●	●	●	●	●	□	●	●	●	●	●	●	●	○
1700	●	●	○	●	●	●	○	●	●	●	●	●	●	●	●	○
1730	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●
1800	●	●	●	○	●	●	○	●	●	●	●	●	●	●	●	●
1830	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●
1900	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●
1930	●	□	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2000	●	□	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2030	●	□	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2100	●	□	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2130	●	□	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2200	●	□	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2230	●	□	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2300	●	□	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2330	●	□	●	●	●	●	●	●	●	●	●	●	●	●	●	●

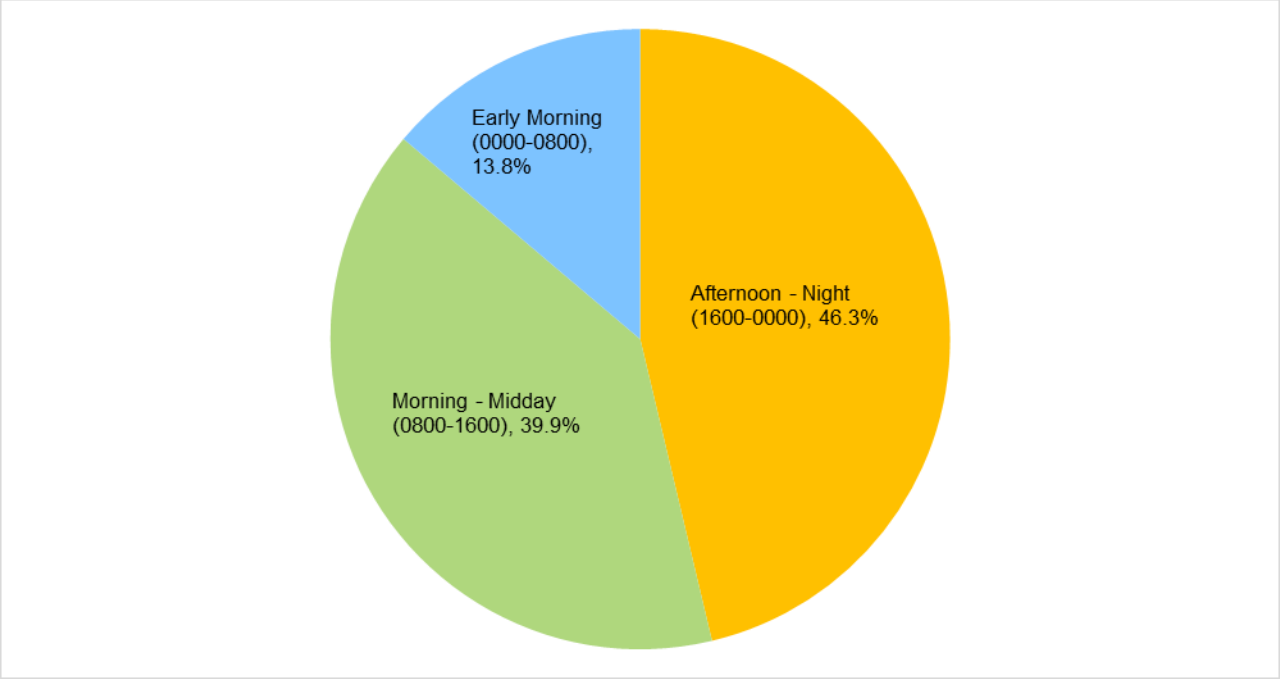
Legend: ● Single coverage ○ Double coverage/Transition ▲ No coverage □ Other aircraft coverage

c. Daily Incident Frequency and Workload Accommodations

In **Exhibit 45,** we provide a breakdown of incident frequency during FY2023 in three-time blocks. An estimated 86 percent of incidents occurred between 0800 and 0000. Incident frequency decreased in the early morning; an estimated 14 percent of incidents occur between 0000 and 0800. This trend is consistent with the Department of Justice (DOJ)'s crime data, which indicates nearly 75 percent of crime occurs during 0800 and 0000 hours and 25 percent of crime occurs between 0000 and 0800.

The planned coverage schedule for each AOU, illustrated in Exhibit 43, is adequate to cover the majority of incidents. However, during early mornings (e.g., 0200 – 0600) when incident occurrences are the lowest, units have reduced shift coverage. Decreased staffing in the early morning period is also consistent with observations from benchmark agencies. These incident frequency trends have been consistent from FY2016 to now.

Exhibit 45
Frequency of AOU Incidents by Time Period, FY2022/23



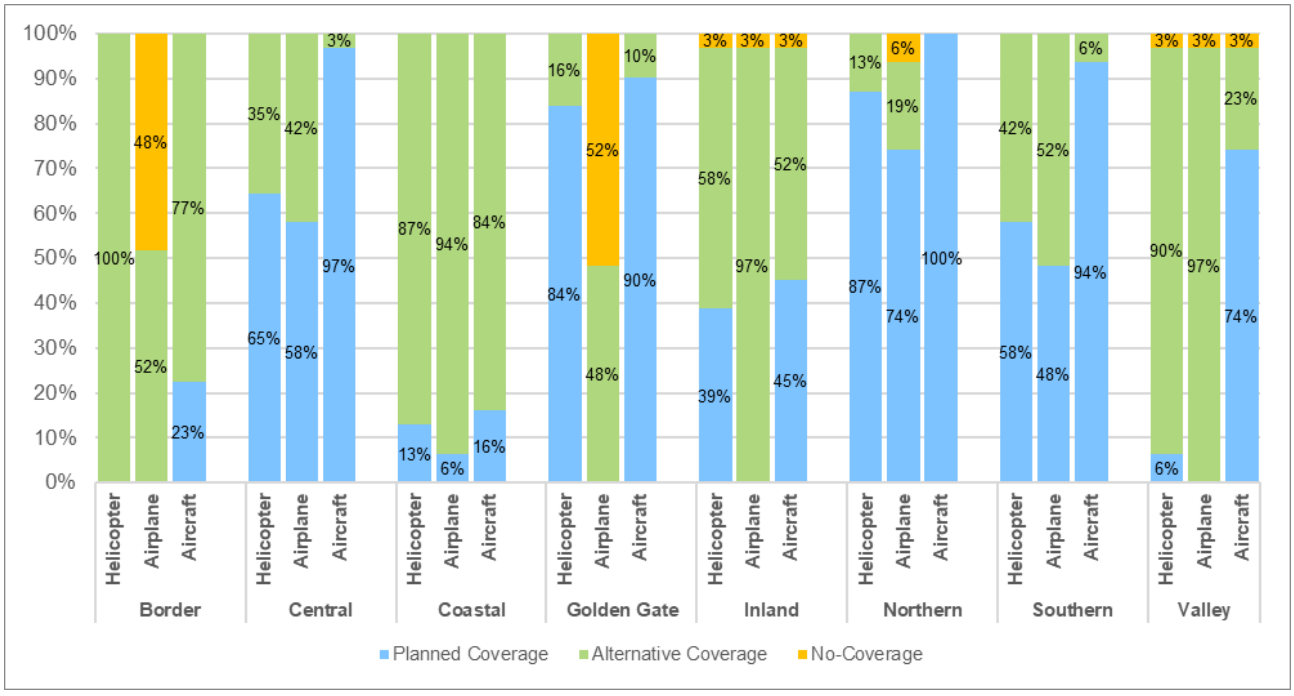
e. Sample of Actual and Planned Shift Coverage: March 2024

Each AOU has a general planned shift coverage schedule that provides adaptable coverage. Yet, this schedule is often not completely met due to staffing constraints. Crowe analyzed the month of March 2024 to illustrate the challenges that current crew sizes experience in achieving the desired coverage. Crowe understands that this sample month may not be reflective of the year as a whole. **Exhibit 46** displays frequency in which each AOU met their general planned coverage schedule. Below are definitions used in this exhibit:

- **Planned Coverage:** Indicates the percentage of days in March 2024 that an AOU fully met their general planned coverage schedule with two fully staffed shifts per the indicated aircraft type.
- **Alternative Coverage:** Indicates the percentage of days in March 2024 that an AOU used an alternative shift(s) schedule to the shift schedule laid out in the general planned coverage schedule. This typically includes one fully staffed shift per indicated aircraft type or training accommodations. This includes a few exceptions, particularly the Valley AOU.
- **No-Coverage:** Indicates the percentage of days in March 2024 that an AOU did not have any fully staffed shifts per aircraft during any period of the day. This includes AOU training days where crews are scheduled for training, but no crews are designated for a coverage shift.
- **Aircraft Type:** The Helicopter and Airplane columns correspond to the "Heli" and "Air" general planned coverage in Exhibit 39. The Aircraft column is used to indicate the percentage of days general planned coverage is met using the above coverage designations with at least one fully staffed crew per shift, irrespective of aircraft type.

Most AOUs were not able to consistently meet their general planned coverage due to staffing shortages, particularly with pilots. Border, Coastal, and Golden Gate (airplane crew only) AOUs particularly struggled with vacancies during March 2024. Resulting finding of the current crew size model is further discussed in *Section 4*.

Exhibit 46
Actual AOU Shift Coverage, March 2024



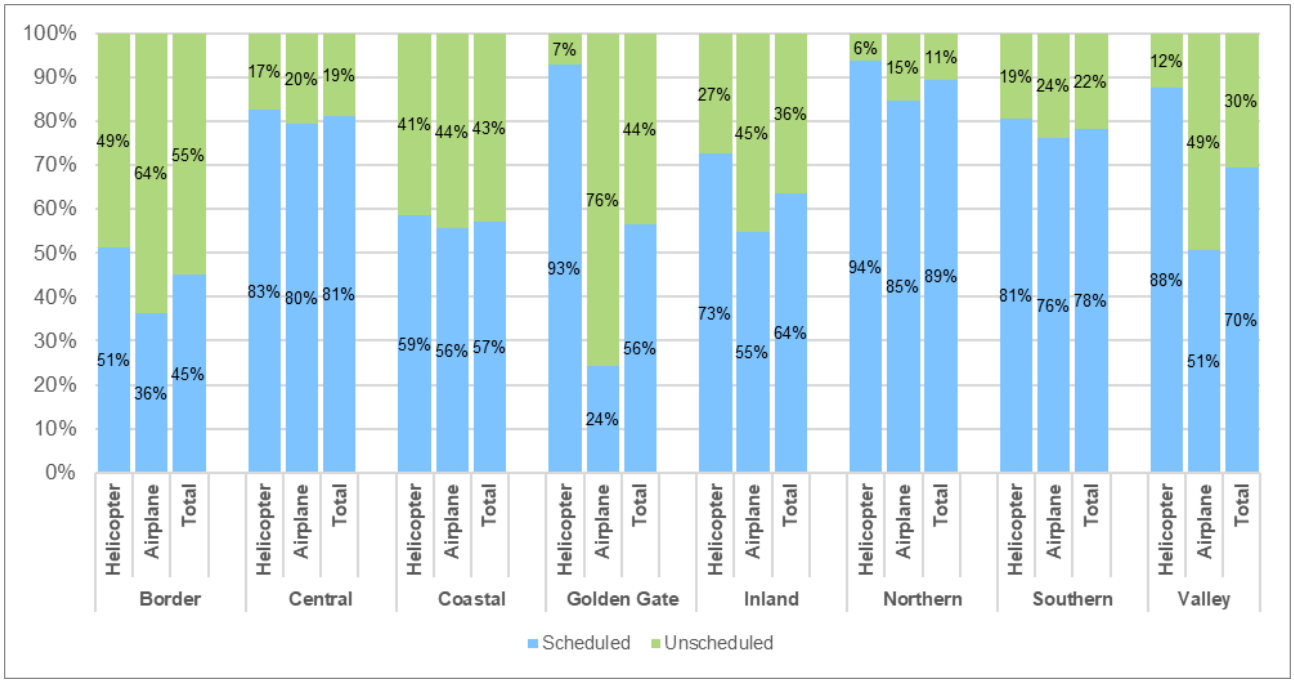
f. Sample of Planned Coverage Hours

For discussion purposes, in **Exhibit 47,** we provide a breakdown of AOUs' scheduled hours as a percentage of total general planned hours for March 2024. Below is a description of scheduled versus unscheduled hours:

- **Scheduled Hours:** The proportion of fully staffed coverage hours scheduled out of the total general planned hours for the month of March 2024 per aircraft type.
- **Unscheduled Hours:** The proportion of unstaffed coverage hours out of the total general planned hours for the month of March 2024 per aircraft type.

AOUs that were fully staffed according to the four pilot and four flight officer per shift model, such as Central (helicopter only), Golden Gate (helicopter only), Northern (helicopter, five active pilots/FO), Southern, and Valley (helicopter only), still did not schedule adequate coverage hours to achieve general planned shift coverage fully during March 2024 due to unplanned obligations and priorities. In many cases, one person could be out for the day due to illness, family priorities, and other reasons, which would impact coverage.

Exhibit 47
Planned AOU Coverage Hours Scheduled, March 2024



E. Implementation Opportunities

Effective implementation of the AOP is essential to achieving the CHP's mission and the program's impact and effectiveness in supporting field operations and allied agencies. In this subsection, we highlight detailed findings related to the AOP's performance (i.e., estimated return on investment), fuel and maintenance costs, direct operating costs, and escalated direct operating costs (e.g., fuel and maintenance needs to support additional flight hours).

1. Return on Investment

Crowe analyzed air unit's performance in FY2021 to FY2023 by comparing the following indicators: 1) percent of total direct operating costs as a percentage of the program's total direct operating costs, 2) percent of total incidents as a percentage of the program's total incidents, and 3) percent of total incident flight hours as a percentage of the program's total incident flight hours. We then divided the first indicator by the second and third indicator, which resulted in indicators for "return on investment" (ROI) for the number of incidents and ROI on incident flight time. These indicators serve as a metric to compare outputs (i.e., incidents and incident hours) and inputs (i.e., direct operating costs, excluding air fleet replacement costs).

As shown in **Exhibit 48,** we found that Border, Golden Gate, Inland, and Valley air units achieved greater than 100% ROI for both indicators. Central, Coastal, and Northern air units resulted in ROIs below 100%. Southern air unit resulted close to a 100% ROI for number of incidents, but roughly 80% ROI for incident flight time. These results indicate that if a higher demand for incidents were present in Central, Coastal, and Northern AOUs, the associated increase in flight hours may result in an increased ROI.

Exhibit 48
Return on Investment Analysis, FY2021 to FY2023

Unit	Total DOC	% of Total DOC	Average Incidents per Year	% of Incidents	ROI Incidents	Average Incident Flight Hours	% of Incident Flight Hours	ROI Incident Flight Time
Border	$1.9 million	7%	1,113	9%	**119%**	645	8%	**116%**
Central	$2.6 million	12%	1,361	11%	90%	741	10%	83%
Coastal	$2.6 million	9%	559	4%	49%	464	6%	68%
Golden Gate	$3.6 million	18%	2,789	22%	**124%**	1,638	22%	**123%**
Inland	$2.8 million	13%	1,965	15%	**120%**	1,131	15%	**117%**
Northern	$3.2 million	12%	861	7%	55%	759	10%	81%
Southern	$3.0 million	12%	1,500	12%	99%	708	9%	79%
Valley	$4.0 million	17%	2,660	21%	**119%**	1,519	20%	**114%**
Statewide	**$23.7 million**	**100%**	**12,809**	**100%**	**97%**	**7,605**	**100%**	**98%**

2. Cost per Incident, Cost Per Day, and Cost Per Shift

Crowe analyzed air unit's performance in FY2021 to FY2023 by comparing the following indicators: 1) cost per incident, 2) cost per day, and 3) cost per shift. Similar to the ROI analysis, these indicators serve as a metric to compare air units' outputs (i.e., incidents and incident hours) and inputs (i.e., direct operating costs, excluding air fleet replacement costs).

As shown in **Exhibit 49,** we found that Coastal and Northern air units resulted in the highest cost per incident. Golden Gate, Inland, and Valley air units achieved less than $500 cost per incident. Golden Gate and Valley units responded to over 7 incidents per day, which resulted in the highest daily operating costs. On average, we found the program costs total nearly $210 per shift hour in FY2021 to FY2023 – both Golden Gate and Valley had the highest cost per shift hour.

These metrics provide CHP with a general understanding of the program's costs at a granular level (i.e., cost per incident, cost per day, cost per shift hour). CHP should consider incorporating these metrics for reporting performances and to use these as baseline indicators to seek reimbursement for services when feasible.

Exhibit 49
Cost per Incident, Day, Shift Hour, FY2021 to FY2023

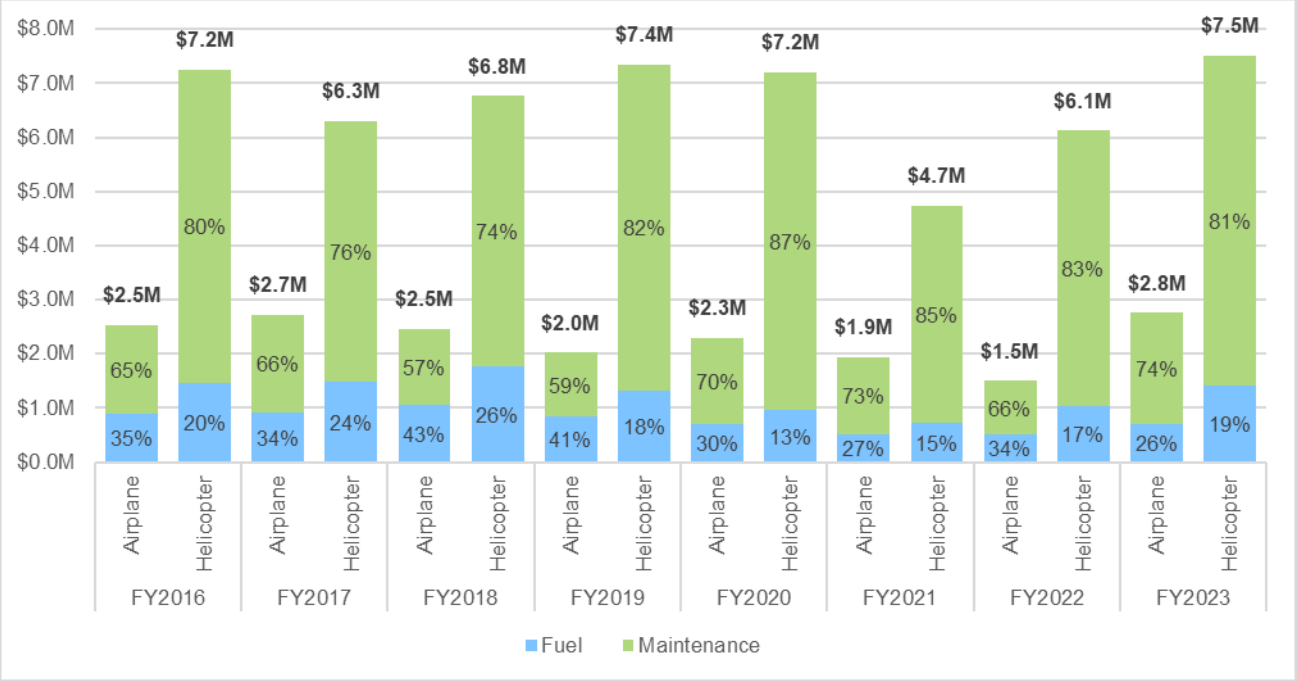
Unit	Total DOC	Average Incidents per Year	Cost per Incident	Incidents per Day	Cost per Day	Incidents per Shift Hour	Cost per Shift Hour
Border	$1.9 million	1,113	**$578**	3.0	**$1,761**	0.19	**$110**
Central	$2.6 million	1,361	**$630**	3.7	**$2,349**	0.23	**$147**
Coastal	$2.6 million	559	**$1,580**	1.5	**$2,418**	0.10	**$151**
Golden Gate	$3.6 million	2,789	**$428**	7.6	**$3,270**	0.48	**$204**
Inland	$2.8 million	1,965	**$468**	5.4	**$2,519**	0.34	**$157**
Northern	$3.2 million	861	**$1,226**	2.4	**$2,893**	0.15	**$181**
Southern	$3.0 million	1,500	**$668**	4.1	**$2,747**	0.26	**$172**
Valley	$4.0 million	2,660	**$499**	7.3	**$3,635**	0.46	**$227**
Statewide	**$23.7 million**	**12,809**	**$759**	**4.4**	**$2,699**	**0.27**	**$208**

2. Fuel and Maintenance Costs

The AOP's annual fuel and maintenance budget is currently $12.0M. **Exhibit 50** highlights the AOP's direct fuel and maintenance costs over the last eight fiscal years. Selected highlights include:

- From FY2016 to FY2023, the AOP's fuel costs accounted for roughly 25 percent of its operation costs and its maintenance costs accounted for roughly 75 percent of its operation costs. Historically, the AOP's annual fuel costs averaged $2.0M and its annual maintenance costs averaged nearly $7.0M, resulting in total annual operating costs of approximately $9.0M (not escalated by inflation).
- From FY2016 to FY2023, the AOP's annual operating costs for its airplanes averaged $2.3M or nearly 26 percent of its direct operating costs. The AOP's annual operating costs for its helicopters averaged $6.7M or approximately 74 percent of its direct operating costs.
- On average, roughly 34 percent of annual airplane direct operating costs were for fuel and 66 percent was for maintenance. Roughly 19 percent of annual helicopter direct operating costs were for fuel and 81 percent of annual helicopter direct operating costs was for maintenance.

Exhibit 50
Fuel and Maintenance Costs by Aircraft, FY2016 to FY2023

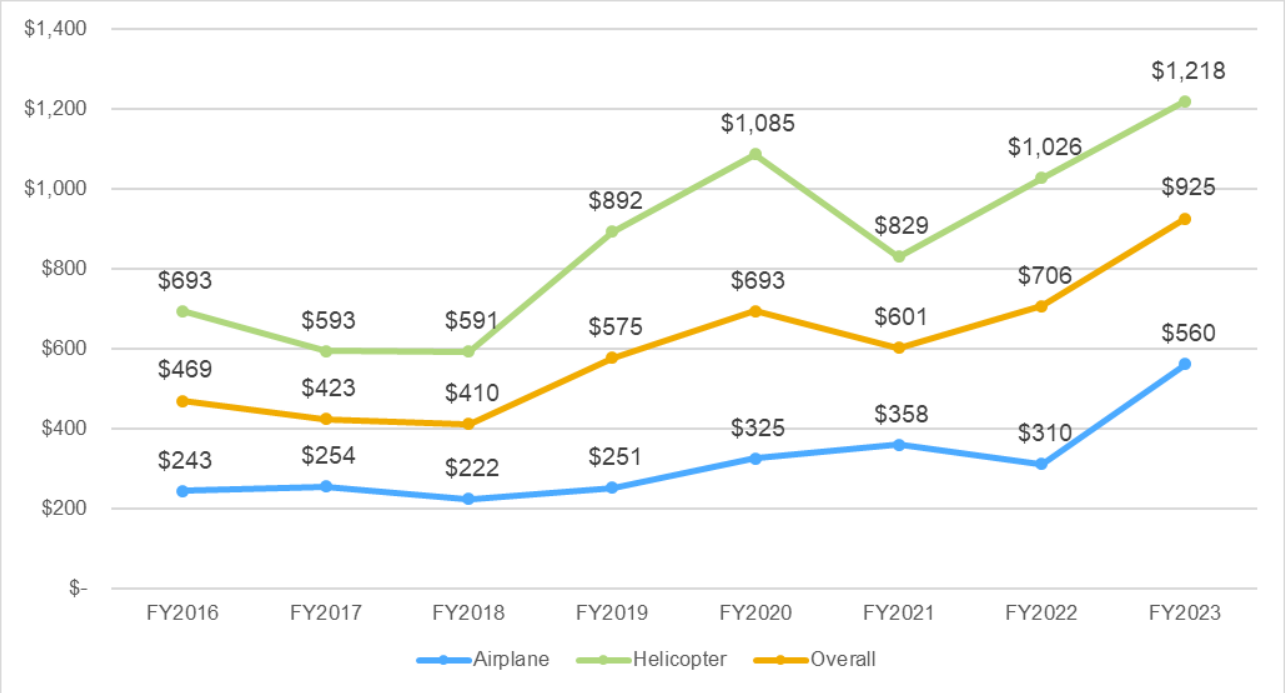


3. Direct Operating Costs per Flight Hour

Direct Operating Cost (DOC) per flight hour is calculated as the sum of fuel costs and maintenance costs divided by flight hours. This metric may signal cost efficiencies. For example, a lower DOC may indicate operational efficiencies. **Exhibit 51** highlights the AOP's DOC over the last eight fiscal years. Highlights include:

- DOC is reduced (or improved) when flight hours decrease at a slower rate than costs decrease, or flight hours increase at a faster rate than costs increase. Conversely, DOC is increased when flight hours decrease at a faster rate than costs decrease, or flight hours increase at a slower rate than costs increase.
- From FY2016 to FY2023, the average annual DOC was $560 per flight hour. The average annual DOC for airplanes was $292 per flight hour, and the annual average DOC for helicopters was $816 per flight hour.
- In FY2023, the overall DOC increased to $925 due to higher annual helicopter flight hours in comparison to average annual airplane flight hours.
- From FY2016 to FY2023, the average, annual helicopter fuel costs and maintenance costs per flight hour were $157 and $659, respectively. Annual airplane fuel costs and maintenance costs per flight hour were $99 and $193, respectively, from FY2016 to FY2023. Helicopter fuel costs per flight hour were 37.1 percent higher than airplane fuel costs per flight hour. Helicopter maintenance costs per flight hour were 70.7 percent higher than airplane maintenance costs per flight hour.

Exhibit 51
Direct Operating Costs per Flight Hour



4. Escalated Direct Operating Costs

Crowe understands that any approach to determining staffing levels for the AOP should consider the associated operational costs (e.g., fuel and maintenance costs). For discussion purposes, we include two fiscal estimates to illustrate the fiscal impact of *hypothetical* shifts based on FY2023 DOC (not escalated for inflation).

Exhibit 52 indicates that three 8-hour shifts per day, using the FY2021 to FY2023 average annual incident flight hours as the baseline, would result in annual total DOC of approximately $890,000 per AOU or roughly $7.1 million per year. **Exhibit 53** indicates that two 10-hour shifts per day would result in annual total DOC of approximately $840,000 per AOU or roughly $6.7 million per year. In both examples we estimate fiscal ranges should the AOP's flight hours decrease or increase by 20 percent.

Exhibit 52
8-Hour Shift Estimated Financial Impact Based on FY2023 DOC

	Estimated Financial Impact Based on FY2023 DOC					
	Per AOU			Program-Wide		
8-Hour Shift	- 20% Flight Hours	Baseline Incident Flight Hours	+ 20% Flight Hours	- 20% Flight Hours	Baseline Incident Flight Hours	+ 20% Flight Hours
0700–1459	$64,000	$80,000	$96,000	$512,000	$640,000	$768,000
1500–2259	$91,000	$113,000	$136,000	$728,000	$904,000	$1,088,000
2300–0659	$30,000	$37,000	$45,000	$240,000	$296,000	$360,000
Airplane	**$185,000**	**$230,000**	**$277,000**	**$1,480,000**	**$1,840,000**	**$2,216,000**
0700–1459	$193,000	$241,000	$289,000	$1,544,000	$1,928,000	$2,312,000
1500–2259	$260,000	$325,000	$390,000	$2,080,000	$2,600,000	$3,120,000
2300–0659	$74,000	$92,000	$110,000	$592,000	$736,000	$880,000
Helicopter	**$527,000**	**$658,000**	**$789,000**	**$4,216,000**	**$5,264,000**	**$6,312,000**
Grand Total	**$712,000**	**$888,000**	**$1,066,000**	**$5,696,000**	**$7,104,000**	**$8,528,000**

Exhibit 53
10-Hour Shift Estimated Financial Impact Based on FY2023 DOC

	Estimated Financial Impact Based on FY2023 DOC					
	Per AOU			Program-Wide		
10-Hour Shift	- 20% Flight Hours	Baseline Incident Flight Hours	+ 20% Flight Hours	- 20% Flight Hours	Baseline Incident Flight Hours	+ 20% Flight Hours
0600–1559	$84,000	$105,000	$126,000	$672,000	$840,000	$1,008,000
1600–0159	$91,000	$113,000	$136,000	$728,000	$904,000	$1,088,000
Airplane	**$175,000**	**$218,000**	**$262,000**	**$1,400,000**	**$1,744,000**	**$2,096,000**
0600–1559	$258,000	$323,000	$387,000	$2,064,000	$2,584,000	$3,096,000
1600–0159	$240,000	$299,000	$359,000	$1,920,000	$2,392,000	$2,872,000
Helicopter	**$498,000**	**$622,000**	**$746,000**	**$3,984,000**	**$4,976,000**	**$5,968,000**
Grand Total	**$673,000**	**$840,000**	**$1,008,000**	**$5,384,000**	**$6,720,000**	**$8,064,000**

4. Staffing Model Approaches

This section outlines four approaches to determining estimated staffing needs. We evaluate different staffing configurations to address the AOP's current and emerging workload and operational needs in consideration of the programmatic trends presented in *Section 3*. It is important to note that this information presented in this section is for discussion purposes only. This section is organized as follows:

A. Summary Results
B. Workload-Based Approach
C. Weighted Per Capita Approach
D. Minimum Staffing Approach
E. Authorized Positions Approach

A. Summary Results

Each staffing approach offers unique advantages and challenges. For example, the workload-based approach provides flexibility and responsiveness to operational demands, while the weighted per capita approach accounts for resource distribution based on potential workload indicators, such as historical incidents, number of field officers that may need air support, and other factors. The minimum staffing approach provides a baseline level of readiness (e.g., as defined by HMP 100.7), and the authorized positions approach offers stability and consistency with budgeted resource allocations.

Based on the summary results presented in **Exhibit 54,** Crowe recommends that the CHP consider elements from each approach when making staffing decisions to allow for flexibility and stability in AOP staffing levels. Evaluating the implications of each approach will allow the AOP to strategically combine elements from each to optimize resource allocation, enhance operational efficiency, and provide a high level of service.

Exhibit 54
Summary Staffing Configuration Results

Approach	Key Features	Results
Workload-Based Approach: The workload-approach bases staffing requirements on the actual workload, such as the number of incidents, flight hours, and seasonality. It aims to align staffing levels directly with operational demands for adequate coverage and response capability.	• **Incident-Driven Staffing:** Staffing levels are adjusted based on the number and complexity of incidents each AOU handles. Higher incident rates require more staff. • **Flight Hour Allocation:** Units with higher flight hours receive more personnel to manage the workload efficiently. • **Aircraft-Specific Demand Seasonality:** Staffing requirements fluctuate based on the aircraft-specific demand during periods of the coverage day (e.g., shift A requires greater FTE because there is higher demand during the hours in which shift A provides coverage).	• **8-Hour Shift Structure:** One pilot and one flight officer per aircraft and per shift are sufficient to meet the workload-based demand. • **10-Hour Shift Structure:** One pilot and one flight officer per aircraft and per shift are sufficient to meet the workload-based demand. • Additional pilots and/or flight officers may be necessary to meet shift coverage during trainee ramp-up periods or vacancies.

Approach	Key Features	Results
Weighted Per Capita Approach: The weighted per capita approach considers population density, coverage area, and other indicator factors to determine staffing needs. This approach aims for an equitable resource distribution across regions based on five major workload indicators.	• **Modular Modeling Focus:** weights can be customized to account for new information or differ assumptions. • **Force Multiplication:** Larger field officer forces are allocated additional resources to align with comprehensive air support. • **Population and Geographic Considerations:** Areas with higher population and more coverage responsibility receive more staff to manage increased demands.	• Scenarios indicate additional staffing needs primarily for Inland and Border. • Emphasizes a need for a regional approach to staffing, even while approach does not fully account for regional differences in service activities, allied support, or population characteristics.
Minimum Staffing Approach: The minimum staffing approach establishes a baseline number of staff required to maintain essential operations and meet basic safety standards. It captures a minimum level of personnel to perform core functions.	• **Baseline Staffing Levels:** Sets a minimum number of pilots and flight officers per shift, typically around 4 FTE per shift. • **Safety and Compliance:** Targets meeting minimum safety and operational standards, even during low-demand periods. • **Scalability:** Additional staff can be added based on specific needs or during peak periods.	• Four trained pilots and flight officers per aircraft is an adequate level to meet the industry standard of two 10-hour shifts per day. • An additional pilot per aircraft is necessary to reach two 10.5-hour shifts per day. • Additional pilots and flight officers may be necessary to account for officer turn-over and new pilot training.
Authorized Positions Approach: The authorized positions approach is based on the officially sanctioned number of positions allocated to each AOU by the CHP. This approach assures that staffing levels are maintained according to established organizational standards and policies.	• **Fixed Staffing Levels:** Staffing is based on the number of authorized positions, regardless of actual workload or demographic factors. • **Consistency:** Targets meeting uniform staffing levels across units based on organizational guidelines. • **Budget Alignment:** Staffing aligns with budgetary allocations and approved positions.	• Significant variations of authorized positions between AOUs. • All AOUs are experiencing positional vacancies, many significantly below authorized levels. • AOUs filled positions tend to hover around four pilots and four flight officers.

B. Workload-Based Approach

The workload-based approach estimates staffing levels based on the estimated demand for service. The workload-based approach uses AOP's historical incident flight hours (i.e., flight time spent responding to incidents) as a basis to account for the estimated demand for service.

In **Exhibit 55,** we provide an example of a workload-based staffing level calculation. This example demonstrates how to calculate estimated staffing levels required to meet the demand for service during a 10-hour shift. We assume the AOP desires to provide staffing for at least one airplane and one helicopter each shift, and flight officers will be required at a ratio of one-to-one to pilots, as required by HPM 100.7, Chapter 2. Below are key components of the calculation:

- **Incident Hours (A):** accounts for the average flight hours, based on FY2021 to FY2023 actual data, to reach and provide services during each shift. This factor serves as the baseline of estimated demand for service.
- **Annual Hours (B):** accounts for the maximum possible shift hours per year, per pilot.
- **Pilots Required (C)**: calculates the number of pilots required to meet demand, given maximum pilot availability.
- **% of Time Available (D):** accounts for the percent of a pilot's shift time that is available to respond to incidents (i.e., time not obligated to training, ancillary duties, or other non-flight activities). We assume 50 percent of a pilot's shift is available to respond to incidents.
- **Pilots Required to Meet Performance Objective (E):** calculates the number of pilot FTEs required to meet demand, given the percent of pilot's shift time available to respond to incidents.
- **Shift-Relief Factor (F):** serves as a factor to account for time-off. We assume that one pilot FTE is available to perform 1,771.1 labor hours per year, based on HPM 100.7, Annex A.
- **Estimated Staffing Level (G):** indicates the number of estimated FTEs required to meet demand per shift.

Exhibit 55
Workload-based Approach Calculation Example (10-Hour Shift)

	FY21 to FY23 Actual ↓	10 Hours × 365 Days ↓	A ÷ B ↓	Assumption ↓	(100% ÷ D) × C ↓	B ÷ Annual Labor Hours ↓	E × F ↓
	A	B	C	D	E	F	G
10-Hour Shift	Incident Hours	Annual Hours	Pilots Required	% of Time Available	Pilots Required to Meet Performance Objective	Shift-Relief Factor	Estimated Staffing Level
0600–1559	187	3,650	0.05	50.00%	0.10	2.06	0.21
1600–0159	203	3,650	0.06	50.00%	0.11	2.06	0.23
Airplane							**0.44**
0600–1559	265	3,650	0.07	50.00%	0.15	2.06	0.30
1600–0159	246	3,650	0.07	50.00%	0.13	2.06	0.28
Helicopter							**0.58**
Grand Total							**1.02**

In the remainder of this subsection, we calculate estimated staffing levels based on the methodology and assumptions described above. We model estimated staffing level requirements under the following scenarios: 1) 8-hour shift, 2) 10-hour shift, and 3) maximum demand. In each of these scenarios, we also model the impact on staffing when incident hours (i.e., demand for services) increase and/or decrease at 20 percent of the baseline (i.e., FY2021 to FY2023 average incident related flight hours).

1. 8-Hour Shift Baseline Estimate

The results in **Exhibit 56** indicate each AOU would need 0.46 airplane pilot FTEs and 0.61 helicopter pilot FTEs, a total of 1.07 FTEs, to respond to incidents during a three 8-hour shifts per day structure. As shown in **Exhibit 57,** if a pilot's call availability increases by 20 percent, then the total daily requirement for airplane and helicopter pilot FTEs decreases by 0.14 and 0.18, respectively. If call availability decreases by 20 percent, then the total daily requirement for airplane and helicopter pilot FTEs increases by 0.31 and 0.41, respectively.

Exhibit 56
8-Hour Shift Estimate, Baseline Incident Flight Hours

	A	B	C	D	E	F	G
8-Hour Shift	Incident Hours	Annual Hours	Pilots Required	% of Time Available	Pilots Required to Meet Performance Objective	Shift-Relief Factor	Estimated Staffing Need
0700–1459	142	2,920	0.05	50.00%	0.10	1.65	0.16
1500–2259	202	2,920	0.07	50.00%	0.14	1.65	0.23
2300–0659	66	2,920	0.02	50.00%	0.05	1.65	0.07
Airplane							**0.46**
0700–1459	198	2,920	0.07	50.00%	0.14	1.65	0.22
1500–2259	267	2,920	0.09	50.00%	0.18	1.65	0.30
2300–0659	76	2,920	0.03	50.00%	0.05	1.65	0.09
Helicopter							**0.61**
Grand Total							**1.07**

Exhibit 57
8-Hour Shift Estimate, Baseline Incident Flight Hours, +/- 20% Time Availability

	Time Availability		
8-Hour Shift	+20% Time Availability	50% Time Availability	-20% Time Availability
0700–1459	0.11	0.16	0.27
1500–2259	0.16	0.23	0.38
2300–0659	0.05	0.07	0.12
Airplane	**0.32**	**0.46**	**0.77**
0700–1459	0.16	0.22	0.37
1500–2259	0.21	0.30	0.50
2300–0659	0.06	0.09	0.14
Helicopter	**0.43**	**0.61**	**1.01**
Grand Total	**0.75**	**1.07**	**1.78**

2. 8-Hour Shift Escalated Estimate

Exhibit 58 demonstrates the impact on estimated staffing needs if flight hours increased or decreased by 20 percent for three 8-hour shifts per day structure. If incident flight hours increase by 20 percent, then each AOU would need 0.55 airplane pilot FTEs and 0.73 helicopter pilot FTEs, or a total of 1.28 FTEs. If flight hours decrease by 20 percent, then each AOU would need 0.37 airplane pilot FTEs and 0.49 helicopter pilot FTEs, a total of 0.86 FTEs per day.

As shown in **Exhibit 59,** if a pilot's call availability and incident flight hours increase by 20 percent, then the requirement for airplane and helicopter pilot FTEs decreases by 0.15 and 0.21, respectively. The total requirement for airplane and helicopter pilot FTEs decreases by 0.10 and 0.14, respectively, when flight hours are decreased by 20 percent. If call availability decreases by 20 percent while flight hours increase by 20 percent, then the total requirement for airplane and helicopter pilot FTEs increases by 0.38 and 0.49, respectively. If call availability and incident flight hours decrease by 20 percent, the total requirement for airplane and helicopter pilot FTEs increases by 0.25 and 0.32, respectively.

Exhibit 58
8-Hour Shift Escalated Estimate, +/- 20% Incident Flight Hours

	A	B	C	D	E	F	G
8-Hour Shift	Incident Hours	Annual Hours	Pilots Required	% of Time Available	Pilots Required to Meet Performance Objective	Shift-Relief Factor	Estimated Staffing Need
0700–1459	171/114	2,920	0.06/0.04	50.00%	0.12/0.08	1.65	0.19/0.13
1500–2259	243/162	2,920	0.08/0.06	50.00%	0.17/0.11	1.65	0.27/0.18
2300–0659	80/53	2,920	0.03/0.02	50.00%	0.05/0.04	1.65	0.09/0.06
Airplane							**0.55/0.37**
0700–1459	237/158	2,920	0.08/0.05	50.00%	0.16/0.11	1.65	0.27/0.18
1500–2259	320/213	2,920	0.11/0.07	50.00%	0.22/0.15	1.65	0.36/0.24
2300–0659	91/60	2,920	0.03/0.02	50.00%	0.06/0.04	1.65	0.10/0.07
Helicopter							**0.73/0.49**
Grand Total							**1.28/0.86**

Exhibit 59
8-Hour Shift Escalated Estimate (+/- 20% Incident Flight Hours), +/- 20% Time Availability

	Time Availability		
8-Hour Shift	+20% Time Availability	50% Time Availability	-20% Time Availability
0700–1459	0.14/0.09	0.19/0.13	0.32/0.21
1500–2259	0.20/0.13	0.27/0.18	0.46/0.30
2300–0659	0.06/0.04	0.09/0.06	0.15/0.10
Airplane	**0.40/0.27**	**0.55/0.37**	**0.93/0.62**
0700–1459	0.19/0.13	0.27/0.18	0.45/0.30
1500–2259	0.26/0.17	0.36/0.24	0.60/0.40
2300–0659	0.07/0.05	0.10/0.07	0.17/0.11
Helicopter	**0.52/0.35**	**0.73/0.49**	**1.22/0.81**
Grand Total	**0.92/0.61**	**1.28/0.86**	**2.15/1.43**

3. 10-Hour Shift Baseline Estimate

The results in **Exhibit 60** indicate each AOU would need 0.44 airplane pilot FTEs and 0.58 helicopter pilot FTEs, a total of 1.02 FTEs, to respond to incidents during a shift structure comprised of two 10-hours shifts per day. As shown in **Exhibit 61,** if a pilot's call availability increases by 20 percent, then the total daily requirement for airplane and helicopter pilot FTEs decreases by 0.13 and 0.17, respectively. If call availability decreases by 20 percent, then the total daily requirement for airplane and helicopter pilot FTEs increases by 0.29 and 0.38, respectively.

Exhibit 60
10-Hour Shift, Baseline Incident Flight Hours

	A	B	C	D	E	F	G
10-Hour Shift	Incident Hours	Annual Hours	Pilots Required	% of Time Available	Pilots Required to Meet Performance Objective	Shift-Relief Factor	Estimated Staffing Need
0600–1559	187	3,650	0.05	50.00%	0.10	2.06	0.21
1600–0159	203	3,650	0.06	50.00%	0.11	2.06	0.23
Airplane							**0.44**
0600–1559	265	3,650	0.07	50.00%	0.15	2.06	0.30
1600–0159	246	3,650	0.07	50.00%	0.14	2.06	0.28
Helicopter							**0.58**
Grand Total							**1.02**

Exhibit 61
10-Hour Shift Estimate, Baseline Incident Flight Hours, +/- 20% Time Availability

	Time Availability		
10-Hour Shift	+20% Time Availability	50% Time Availability	-20% Time Availability
0600–1559	0.15	0.21	0.35
1600–0159	0.16	0.23	0.38
Airplane	**0.31**	**0.44**	**0.73**
0600–1559	0.21	0.30	0.50
1600–0159	0.20	0.28	0.46
Helicopter	**0.41**	**0.58**	**0.96**
Grand Total	**0.72**	**1.02**	**1.63**

4. 10-Hour Shift Escalated Estimate

Exhibit 62 demonstrates the impact on estimated staffing needs if flight hours increased or decreased by 20 percent during a two 10-hour shift per day structure. If incident flight hours increased by 20 percent, each AOU would need 0.52 airplane pilot FTEs and 0.69 helicopter pilot FTEs, a total of 1.21 FTEs. If flight hours decreased by 20 percent, each AOU would need 0.35 airplane pilot FTEs and 0.26 helicopter pilot FTEs, a total of 0.61 FTEs per day.

As shown in **Exhibit 63,** if a pilot's call availability and incident flight hours increase by 20 percent, then the requirement for airplane and helicopter pilot FTEs decreases by 0.14 and 0.20, respectively. The total requirement for airplane and helicopter pilot FTEs decreases by 0.20 and 0.13, respectively, when flight hours are decreased by 20 percent. If call availability decreases by 20 percent while flight hours increase by 20 percent, then the total requirement for airplane and helicopter pilot FTEs increases by 0.38 and 0.46, respectively. If call availability and incident flight hours decrease by 20 percent, the total requirement for airplane and helicopter pilot FTEs increases by 0.25 and 0.31, respectively.

Exhibit 62
10-Hour Shift, +/- 20% Incident Flight Hours

	A	B	C	D	E	F	G
10-Hour Shift	**Incident Hours**	**Annual Hours**	**Pilots Required**	**% of Time Available**	**Pilots Required to Meet Performance Objective**	**Shift-Relief Factor**	**Estimated Staffing Need**
0600–1559	225/150	3,650	0.06/0.04	50.00%	0.12/0.08	2.06	0.25/0.17
1600–0159	243/162	3,650	0.07/0.04	50.00%	0.13/0.09	2.06	0.27/0.18
Airplane							**0.52/0.35**
0600–1559	318/212	3,650	0.09/0.06	50.00%	0.17/0.12	2.06	0.36/0.24
1600–0159	295/197	3,650	0.08/0.05	50.00%	0.16/0.11	2.06	0.33/0.22
Helicopter							**0.69/0.26**
Grand Total							**1.21/0.61**

Exhibit 63
10-Hour Shift Escalated Estimate, +/- 20% Time Availability

	Time Availability		
10-Hour Shift	**+20% Time Availability**	**50% Time Availability**	**-20% Time Availability**
0600–1559	0.18/0.12	0.25/0.17	0.42/0.28
1600–0159	0.20/0.13	0.27/0.18	0.46/0.30
Airplane	**0.38/0.15**	**0.52/0.35**	**0.88/0.58**
0600–1559	0.26/0.17	0.36/0.24	0.60/0.40
1600–0159	0.24/0.16	0.33/0.22	0.56/0.37
Helicopter	**0.49/0.33**	**0.69/0.46**	**1.15/0.77**
Grand Total	**0.87/0.48**	**1.21/0.81**	**2.03/1.35**

5. Maximum Demand Example

Exhibit 64 illustrates the estimated required FTEs to meet the highest single period of annual demand for any AOU during the period from FY2016 to FY2023 — Valley AOU in FY2018. The results indicate each AOU would need 2.18 airplane pilot FTEs and 1.32 helicopter pilot FTEs, a total of 3.50 FTEs, to respond to incidents during a shift structure comprised of two 10-hours shifts per day at this level of demand.

Exhibit 64
10-Hour Shift, Valley AOU, FY2018 – Maximum Demand

	A	B	C	D	E	F	G
10-Hour Shift	**Incident Hours**	**Annual Hours**	**Pilots Required**	**% of Time Available**	**Pilots Required to Meet Performance Objective**	**Shift-Relief Factor**	**Estimated Staffing Need**
0600–1559	716	3,650	0.20	50.00%	0.40	2.06	0.82
1600–0159	1,195	3,650	0.33	50.00%	0.66	2.06	1.36
Airplane							**2.18**
0600–1559	710	3,650	0.20	50.00%	0.39	2.06	0.80
1600–0159	447	3,650	0.12	50.00%	0.25	2.06	0.52
Helicopter							**1.32**
Grand Total							**3.50**

C. Weighted Per Capita Approach

The weighted per capita approach estimates staffing levels based on select workload indicators (i.e., key factors that may account for service demand). For discussion purposes, Crowe selected five workload indicators that may account for the AOP's service demand throughout the State. As shown in **Exhibit 65,** these indicators include: population, coverage area (in square miles), number of field officers in each division, FY2023 incidents, and FY2023 actual flight hours. Each of these indicators can be weighted equally or differently to determine different staffing level variations to meet the AOP's estimated workload demand.

Exhibit 65
Per Capita Workload Indicators by Unit (FY 2023)

Unit	Population (A)	Area (sq mi) (B)	Field Officers (C)	Incidents (D)	Flight Hours (E)
Border	9,061,070	16,639	866	1,278	965
Central	3,621,334	27,078	703	1,950	1,083
Coastal	4,195,068	14,422	480	956	946
Golden Gate	5,654,592	7,437	976	3,168	1,983
Inland	2,221,360	37,372	550	2,758	1,689
Northern	727,426	41,250	415	1,577	1,600
Southern	9,750,065	4,164	1,030	2,447	1,166
Valley	3,759,572	13,623	742	2,646	1,755

In **Exhibit 66,** we provide the estimated per capita ratios for each AOU. These ratios indicate the number of air unit officers per unit of the workload indicator category (e.g., population, area, field officers, incidents, and flight hours). We adjusted outliers to the acceptable minimum bound using the Winsorized estimators' method. We then took an average of the per capita ratios to calculate a baseline per capita workload indicator.

Exhibit 66
Estimated Per Capita Ratios by Unit

Unit	Population (A)	Area (sq mi) (B)	Field Officers (C)	Incidents (D)	Flight Hours (E)
Border	0.00000	0.00072	0.01367	0.00939	0.01243
Central	0.00000	0.00059	0.02225	0.00821	0.01477
Coastal	0.00000	0.00104	0.03030	0.01569	0.01586
Golden Gate	0.00000	0.00336	0.02498	0.00789	0.01261
Inland	0.00001	0.00040	0.02655	0.00544	0.00888
Northern	0.00001	0.00053	0.05002	0.01395	0.01375
Southern	0.00000	0.00432	0.01718	0.00736	0.01544
Valley	0.00001	0.00176	0.03133	0.00907	0.01368
Average	**0.00001**	**0.00159**	**0.02703**	**0.00962**	**0.01343**

We calculate estimated staffing levels under different scenarios by weighting the average per capita ratio using different weights. In particular, we calculate three scenarios using the following weights:

1. Population (A) = 5%, Coverage Area (B) = 5%, Field Officer (C) = 30%, Incidents (D) = 30%, Flight Hours (E) = 30%
2. Population (A) = 1%, Coverage Area (B) = 1%, Field Officer (C) = 39%, Incidents (D) = 39%, Flight Hours (E) = 20%
3. Population (A) = 0%, Coverage Area (B) = 0%, Field Officer (C) = 30%, Incidents (D) = 20%, Flight Hours (E) = 50%.

We first calculate each AOUs estimated officers per indicator by using the following formula:

- Indicator Level × AOP Indicator Baseline Ratio × Indicator Weight = Estimated Officers per Indicator
  - e.g., Border Population: 9,061,070 × 0.00001 × 0.05 = 2.3 Officers

We then calculate the total estimated officers for each AOU by adding the results from each calculation:

- Indicator A + Indicator B + Indicator C + Indicator D + Indicator E = Total Estimated Officers
  - e.g., Border AOU (Scenario #1): 2.38 + 1.32 + 7.02 + 3.69 + 3.89 = 18 Officers

Scenario #1

In the first scenario, shown in **Exhibit 67,** we weight population and coverage area equally (e.g., 5 percent each) and field officers, incidents, and flight hours equally (e.g., 30 percent each). The results in this example indicate an overall need of approximately 16 additional authorized officer positions. Most AOUs would require at least one additional officer, except for: Coastal AOU decreasing staffing by two officers, Northern AOU decreasing staffing by three officers, and Valley AOU decreasing staffing by two officers. Under this weighting, the results indicate most new officers would be allocated to Border and Inland AOUs.

Exhibit 67
Weighted Per Capita Approach – Scenario #1

	Each 5% Weight		Each 30% Weight				
Unit	**Population (A)**	**Area (sq mi) (B)**	**Field Officers (C)**	**Incidents (D)**	**Flight Hours (E)**	**Estimated Staffing Need**	**Authorized Officers**
Border	2.38	1.32	7.02	3.69	3.89	18.00	12.00
Central	0.95	2.15	5.70	5.63	4.36	19.00	16.00
Coastal	1.10	1.15	3.89	2.76	3.81	13.00	15.00
Golden	1.48	0.59	7.92	9.15	7.99	27.00	25.00
Inland	0.58	2.97	4.46	7.96	6.80	23.00	16.00
Northern	0.19	3.28	3.37	4.55	6.45	18.00	21.00
Southern	2.56	0.33	8.35	7.06	4.70	23.00	18.00
Valley	0.99	1.08	6.02	7.64	7.07	23.00	25.00
Total						**164.00**	**148.00**

Scenario #2

In Scenario #2, shown in **Exhibit 68,** we weight population and coverage area at 1 percent, field officers and incidents at 39 percent each, and flight hours at 20 percent. The results in this example indicate an overall need of approximately 10 additional authorized officer positions. Most AOUs would require at least one additional officer with the exceptions of Coastal AOU decreasing staffing by three officers, Northern AOU decreasing staffing by six officers, and Valley AOU decreasing staffing by two officers.

Exhibit 68
Weighted Per Capita Approach – Scenario #2

	Each 1% Weight		Each 39% Weight		20% Weight		
Unit	**Population (A)**	**Area (sq mi) (B)**	**Field Officers (C)**	**Incidents (D)**	**Flight Hours (E)**	**Estimated Staffing Need**	**Authorized Officers**
Border	0.48	0.26	9.13	4.80	2.59	17.00	12.00
Central	0.19	0.43	7.41	7.32	2.91	18.00	16.00
Coastal	0.22	0.23	5.06	3.59	2.54	12.00	15.00
Golden	0.30	0.12	10.29	11.89	5.33	28.00	25.00
Inland	0.12	0.59	5.80	10.35	4.54	21.00	16.00
Northern	0.04	0.66	4.38	5.92	4.30	15.00	21.00
Southern	0.51	0.07	10.86	9.18	3.13	24.00	18.00
Valley	0.20	0.22	7.82	9.93	4.71	23.00	25.00
Total						**158.00**	**148.00**

Scenario #3

In Scenario #3, shown in **Exhibit 69,** we remove population and coverage area from the calculation. We weight field officers at 30 percent, incidents at 20 percent, and flight hours at 50 percent. Flight hours have been the key measurement of workload throughout the study. Accordingly, we have increased the weight of flight hours in this scenario so that flight hours impact this model's results proportionally.

The results in this example indicate an overall need of approximately six additional authorized officer positions. Most AOUs would require at least one additional officer with the exceptions of Coastal AOU decreasing staffing by three officers, Northern AOU decreasing staffing by six officers, and Valley AOU decreasing staffing by two officers. These results indicate most new officers would be allocated to Border and Inland.

Exhibit 69
Weighted Per Capita Model – Scenario #3

	Each 0% Weight		30% Weight	20% Weight	50% Weight		
Unit	Population (A)	Area (sq mi) (B)	Field Officers (C)	Incidents (D)	Flight Hours (E)	Estimated Staffing Need	Authorized Officers
Border	–	–	7.02	2.46	6.48	16.00	12.00
Central	–	–	5.70	3.75	7.27	17.00	16.00
Coastal	–	–	3.89	1.84	6.35	12.00	15.00
Golden	–	–	7.92	6.10	13.31	27.00	25.00
Inland	–	–	4.46	5.31	11.34	21.00	16.00
Northern	–	–	3.37	3.04	10.74	17.00	21.00
Southern	–	–	8.35	4.71	7.83	21.00	18.00
Valley	–	–	6.02	5.09	11.78	23.00	25.00
Total						**154.00**	**148.00**

D. Minimum Staffing Approach

This approach estimates the minimum staffing levels by building on the staffing requirements detailed in HPM 100.7, Chapter 2, Annex A. Specifically, this approach estimates the minimum number of pilots and flight offers per aircraft to meet desired shift coverage. In comparison to the workload-based and per capita based approach, this approach is not based on actual workload demand.

1. Air Unit Recommended Staffing Levels

According to HPM 100.7, Chapter 2, Annex A, "Air unit staffing levels are determined by the affected field Division commander with the concurrence of Assistant Commissioner, Field." **Exhibit 70** depicts the HPM's recommended staffing levels for an 8-hour shift and **Exhibit 71** depicts recommended staffing levels for a 10-hour shift. The HPM reaches these recommendations using the assumption that one FTE, accounting for vacation, sick leave, and regular days off (RDO) (not military leave), is 1,771.1 hours/year or 147.6 hours/month.

Exhibit 70
HPM Recommended Staffing Levels for 8 Hour Shift

Desired Coverage	Absolute (fractional) crew member FTE per aircraft	Required crew members per aircraft – 1 aircraft	Required crew members per aircraft – 2 aircraft
2 shifts / day for 7 days	3.3	4	7
2 shifts / day for 5 days	2.4	3	5

Exhibit 71
HPM Recommended Staffing Levels for 10 Hour Shift

Desired Coverage	Absolute (fractional) crew member FTE per aircraft	Required crew members per aircraft – 1 aircraft	Required crew members per aircraft – 2 aircraft
2 shifts / day for 7 days	4.2	5	8
2 shifts / day for 5 days	2.9	3	5

2. Minimum Staffing Approach Options

In **Exhibit 72** and **Exhibit 73,** we provide an example calculation for recommended minimum staffing (minimum required hours) for airplanes and helicopters. The calculation identifies the estimated FTEs that are potentially required to meet the demand for service during an 8-hour, 10-hour, and 10.5-hour shift. The presented options assume that the AOP attempts 24-hour coverage seven days a week with two aircraft (i.e., one airplane and one helicopter) available for peak workload hours. Below are key factors in the calculation:

- **Estimated FTE (monthly) (A):** Total number of hours worked per month, per FTE, accounting for vacation, sick leave, and regular days off, and not accounting for military leave based on the HPM 100.7.
- **Number of Shifts (B):** Number of shifts required to provide desired coverage.
- **Shift Length (hours) (C):** Proposed number of hours in each shift.
- **Staff Per Shift (D):** Recommended number of staff in each flight crew requirements as defined in HPM Chapter 2 Section 20 “Flight Crew Staffing”.
- **Monthly Hours (E):** Total hours required at minimum to be worked in a month, accounting for proposed number of shifts, length of shifts, and hours per shift, in order to provide desired coverage.
- **Absolute (fractional) Officers (F):** The actual number of FTEs required to meet demand.
- **Estimated Staffing Need (G):** The total number of officers estimated to meet demand. An officer can be substituted with a sergeant to cover the fractional amount of FTE.

Exhibit 72
Minimum Staffing Approach and Calculations – Fixed Wing

Per HPM ↓			Per HPM ↓	B × C × D × 30.43 (7-day coverage) ↓	E ÷ A ↓	Rounded up ↓
A	B	C	D	E	F	G
Estimated FTE (Monthly)	Number of Shifts	Shift Length (Hours)	Staff Per Shift	Monthly (Hours)	Absolute (fractional) Officers	Estimated Staffing Need
147.6	2	8	2	973.82	6.60	7
147.6	3	8	2	1,460.74	9.90	10
147.6	2	10	2	1,217.28	8.25	9 (8)
147.6	2	10.5	2	1,278.14	8.66	9

() = Officer count assuming Sergeant flies for 1/3 FTE.

Exhibit 73
Minimum Staffing Approach and Calculations – Helicopter

A	B	C	D	E	F	G
Estimated FTE (Monthly)	Number of Shifts	Shift Length (Hours)	Staff Per Shift	Monthly (Hours)	Absolute (fractional) Officers	Estimated Staffing Need
147.6	2	8	2	973.82	6.60	7
147.6	3	8	2	1,460.74	9.90	10
147.6	2	10	2	1,217.28	8.25	9 (8)
147.6	2	10.5	2	1,278.14	8.66	9

() = Officer count assuming Sergeant flies for 1/3 FTE.

3. Staffing Breakdown by Coverage Type

Exhibit 74 compares the recommended number of officers required to meet each scheduling option based on HPM 100.7's recommendations and average current filled/authorized officer personnel. Most AOUs currently operate two 10.5-hour shifts per aircraft. The recommended staffing levels for the proposed shift structures, except for shift structure comprised of three 8-hour shifts, can be met with current authorized staffing levels. The three 8-hour shift structure would require an additional two authorized officers to meet the estimated staffing need.

Exhibit 74
Minimum Staffing Options Comparison

	Two 8-Hour Shifts		Three 8-Hour Shifts		Two 10-Hour Shifts		Two 10.5-Hour Shifts	
	Airplane	Helicopter	Airplane	Helicopter	Airplane	Helicopter	Airplane	Helicopter
Number of Pilots	4	4	5	5	5 (4)	5 (4)	5	5
Number of FOs	3	3	5	5	4	4	4	4
Estimated Staffing Need	**14**		**20**		**18 (16)**		**18**	
Recommended by HPM	**14***		**N/A**		**16***		**N/A**	
Current Filled (Avg)	**14**		**14**		**14**		**14**	
Current Authorized (Avg)	**18**		**18**		**18**		**18**	

() = Officer count assuming Sergeant flies for 1/3 FTE.

** = Assuming HPM CH2.20 recommendation is followed.*

4. March 2024 Case Study

For discussion purposes, Crowe analyzed the month of March 2024 to demonstrate how different levels of staffing can affect AOUs ability to meet specific shift schedules. Crowe understands that this sample month may not be reflective of the year as a whole.

Exhibit 75 illustrates the number of officer hours scheduled by aircraft in March 2024. "Officer Hours by Aircraft" are compared with column E, "Monthly Hours," of Exhibits 64 and Exhibit 65 to evaluate March 2024 staffing's ability to meet monthly hour minimums. Five AOUs (e.g., Central, Golden Gate (helicopter only), Northern, Southern, and Valley) met minimum staffing requirements for two 10-hour shifts and only one AOU (Northern) met minimum staffing requirements for two 10.5-hour shifts.

AOUs' ability to meet minimum staffing level hours is directly related to the officer count. The five AOUs that met the minimum staffing levels in March 2024 also met the recommended staffing levels from the previous three exhibits or are one officer short. The three AOUs (Border, Coastal, and Inland) that did not meet the minimum staffing levels per aircraft are staffed at levels below HPM recommendations.

While many AOUs met the minimum staffing for specific shift lengths, the model assumes staffing in an optimal state with fully trained officers and optimal pilot to flight officer ratios. Many of the units that met the minimum staffing did not meet their general planned schedule. This occurred due to a multitude of reasons (e.g., multiple new pilots in training, inflexible officer scheduling due to RDOs, or suboptimal pilot to flight officer ratios preventing full flight crew deployment).

Exhibit 75
Estimated Officer Shift Hours – March 2024

Unit	Aircraft	Shift Length	Officer Count	Officer Hours by Aircraft		Percent of minimum monthly hours scheduled (10-hour shift | 10.5-hour shift)
Border	Airplane	9.5	3	523	43%	41%
	Helicopter	9.5	4	684	56%	54%
Central	Airplane	10.5	7	1,229*	101%*	96%
	Helicopter	10.5	8*	1,323**	109%*	104%**
Coastal	Airplane	10.5	4	630	52%	49%
	Helicopter	10.5	7	977	80%	76%
Golden Gate	Airplane	10.5	5	882	72%	69%
	Helicopter	10.5	8*	1,428**	117%*	112%**
Inland	Airplane	10.5	4	683	56%	53%
	Helicopter	10.5	7	1,113	91%	87%
Northern	Airplane	10.5	9**	1,365**	112%*	107%**
	Helicopter	10.0	10**	1,510**	124%*	118%**
Southern	Airplane	10.5	8*	1,260*	104%*	99%
	Helicopter	10.5	7	1,260*	104%*	99%
Valley	Airplane	10.5	8*	1,323**	109%*	104%**
	Helicopter	10.5	8*	1,229*	101%*	96%

* = *meets minimum staffing/hour requirement for 10.0-hour shift.*
** = *meets minimum staffing/hour requirement for 10.5-hour shift.*

E. Authorized Positions Approach

The authorized positions approach is based on authorized positions specified in the CHP's budget, assuming vacancies are filled. While this approach aligns with budgetary allocations and provides a clear limit on personnel numbers, it may not fully consider the operational needs of the AOP, especially in relation to varying levels of support for field operations and allied agencies within different divisions. As a result, this approach may not always accurately reflect the AOP's operational requirements.

Exhibit 76 illustrates this approach, showing number of pilots and field officers for each aircraft type, for each AOU. **Exhibit 77** illustrates the number of active and vacant pilots and field officers for each aircraft type, for each AOU.

Exhibit 76
Authorized Positions Approach

	Airplane		Helicopter			
Division	Authorized Pilots	Authorized Flight Officers	Authorized Pilots	Authorized Flight Officers	Total Authorized Pilots	Total Authorized Flight Officers
Border	3.0	1.0	4.0	4.0	**7.0**	**5.0**
Central	4.0	4.0	4.0	4.0	**8.0**	**8.0**
Coastal	4.0	3.0	4.0	4.0	**8.0**	**7.0**
Golden	6.0	6.0	7.0	6.0	**13.0**	**12.0**
Inland	4.0	3.0	4.0	4.0	**8.0**	**7.0**
Northern	4.0	4.0	7.0	7.0	**11.0**	**11.0**
Southern	4.0	4.0	6.0	4.0	**10.0**	**8.0**
Valley	6.0	6.0	6.0	6.0	**12.0**	**12.0**
Total	**35.0**	**31.0**	**42.0**	**39.0**	**77.0**	**70.0**

Exhibit 77
Active and Vacant Positions

	Active Positions				Vacant Positions					
	Airplane		Helicopter		Airplane		Helicopter			
Division	Active Pilots	Active FOs	Active Pilots	Active FOs	Vacant Pilots	Vacant FOs	Vacant Pilots	Vacant FOs	Total Pilot Vacancies	Total FO Vacancies
Border	2.0	1.0	2.0	3.0	1.0	0.0	2.0	1.0	**3.0**	**1.0**
Central	3.0	4.0	4.0	4.0	1.0	0.0	0.0	0.0	**1.0**	**0.0**
Coastal	2.0	2.0	3.0	4.0	2.0	1.0	1.0	0.0	**3.0**	**1.0**
Golden	4.0	4.0	4.0	4.0	2.0	2.0	3.0	2.0	**5.0**	**4.0**
Inland	4.0	2.0	4.0	4.0	0.0	1.0	0.0	0.0	**0.0**	**1.0**
Northern	4.0	4.0	5.0	5.0	0.0	0.0	2.0	2.0	**2.0**	**2.0**
Southern	4.0	3.0	4.0	4.0	0.0	1.0	2.0	0.0	**2.0**	**1.0**
Valley	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	**4.0**	**4.0**
Total	**27.0**	**24.0**	**30.0**	**32.0**	**8.0**	**7.0**	**12.0**	**7.0**	**20.0**	**14.0**

5. Proposed Staffing Model Options

This section provides an overview of Crowe's proposed staffing model options, including rationale, detailed results, and implications. These proposed staffing models provide specific, measurable, and relevant options for CHP's consideration. This section is organized as follows:

A. Overview of Results
B. Rationale for Proposed Staffing Model Options
C. Detailed Results by Option
D. Implications.

A. Overview of Results

Based on our comprehensive review of the AOP, we recommend that CHP consider the proposed options for OAO in **Exhibit 78** and the proposed options for AOUs in **Exhibit 79.** Below is an overview of the proposed options:

- **OAO Staffing Options** propose up to two positions for an Unmanned Aircraft System (UAS) program (program manager and specialist), one budget manager, and two assistant chief pilots (two officers – one to assist the chief helicopter pilot and one to assist the chief airplane pilot).
- **AOU Option 1 Full-Coverage Model** maintains at least one airplane and helicopter crew (one pilot and one flight officer) per shift to cover two shifts per day. This option would require an increase in 26.0 total AOU positions. This model provides comprehensive coverage with both airplane and helicopter crews per shift. This model would likely result in increased staffing costs and resource allocation, which may require significant budget adjustments.
- **AOU Option 2 Enhanced Airplane Focus Model** maintains at least one crew per shift to cover two shifts per day, increases airplane staffing, maintains helicopter staffing levels, and decreases the number of sergeants from two to one for all lower volume units (Border, Coastal, and Northern). This option would require an increase 7.0 total AOU positions. This model aligns with the program's deployment priorities and policy by increasing airplane crew staffing. This model also provides a pathway to transition to one helicopter unit, especially in Divisions where there are existing allied agency resource helicopter capabilities.
- **AOU Option 3 Airplane-Centric Model** retains only airplane crews in Inland, Northern, and Southern units and both helicopters and airplane crews in Border, Central, Coastal, Golden Gate, and Valley units based on allied agency capabilities and volumes in each coverage area. This option would maintain two shifts per day and result in a decrease of 13.0 total AOU positions. This model reduces the need for six helicopters and may likely provide overall significant cost savings.
- **AOU Option 4 Helicopter Only Model** retains only helicopter crews and eliminates airplane crews from the program. This option would maintain two shifts per day and result in a decrease of 50.0 total AOU positions. This model reduces the program's operational scope and versatility, potentially affecting its ability to execute surveillance and some patrol missions.
- **AOU Option 5 Single-Shift Model** maintains one shift per day with at least one helicopter crew and one airplane crew per day. This option would result in a decrease of 53.0 total positions. This option may lead to limited coverage and could lead to response delays, particularly during high-demand periods affecting the overall effectiveness of the program.
- **AOU Option 6 Airplane Only Model** retains only airplane crews and eliminates helicopter crews from the program. This option would maintain two shifts per day and result in a decrease of 50.0 total positions. This model would lead to substantial cost savings, but may disrupt and cause unintended consequences, such as the program's inability to respond to certain incident types, such as lifesaving and emergency type events that require a hoist or other helicopter capabilities.

Exhibit 78
Proposed Options – Office of Air Operations

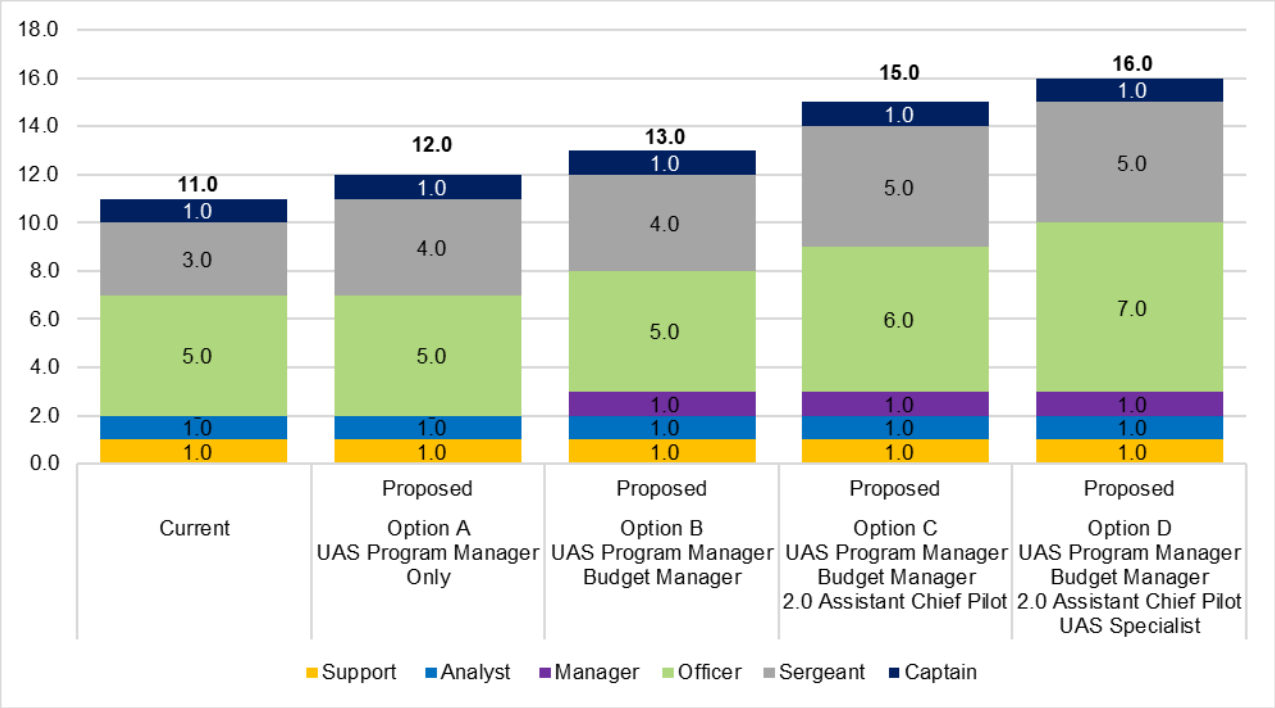
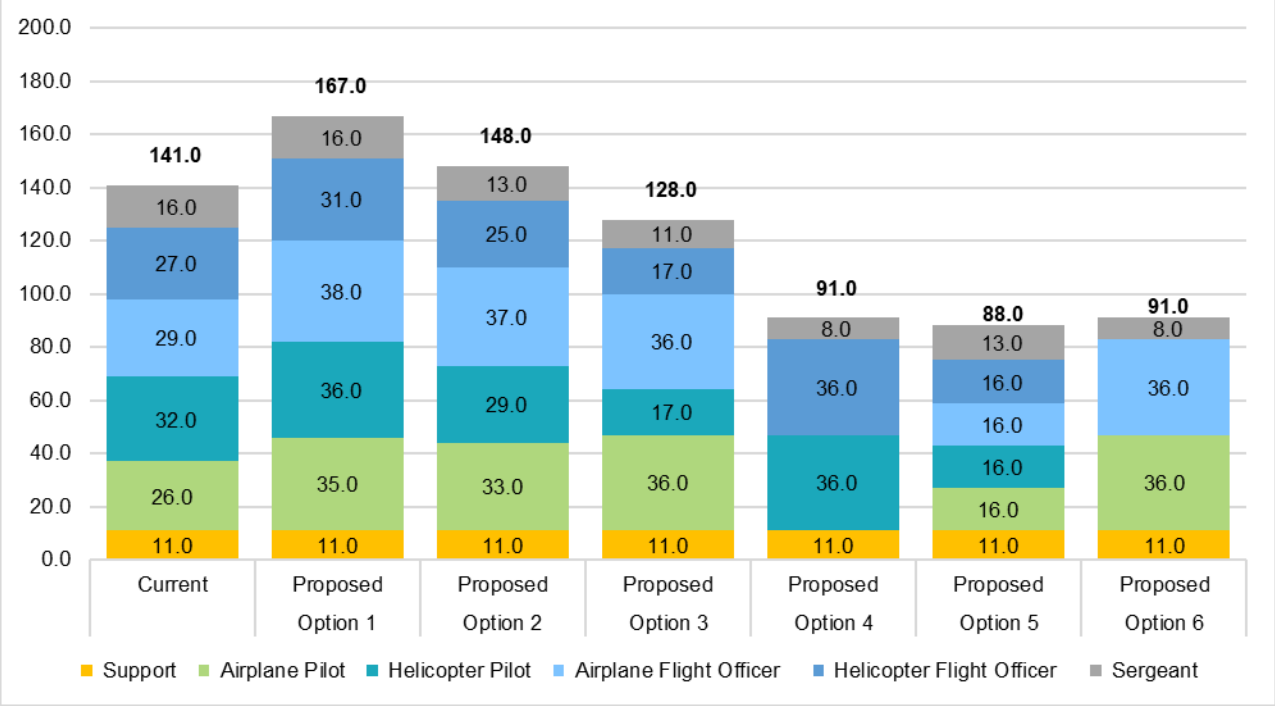


Exhibit 79
Proposed Options – Air Operations Units

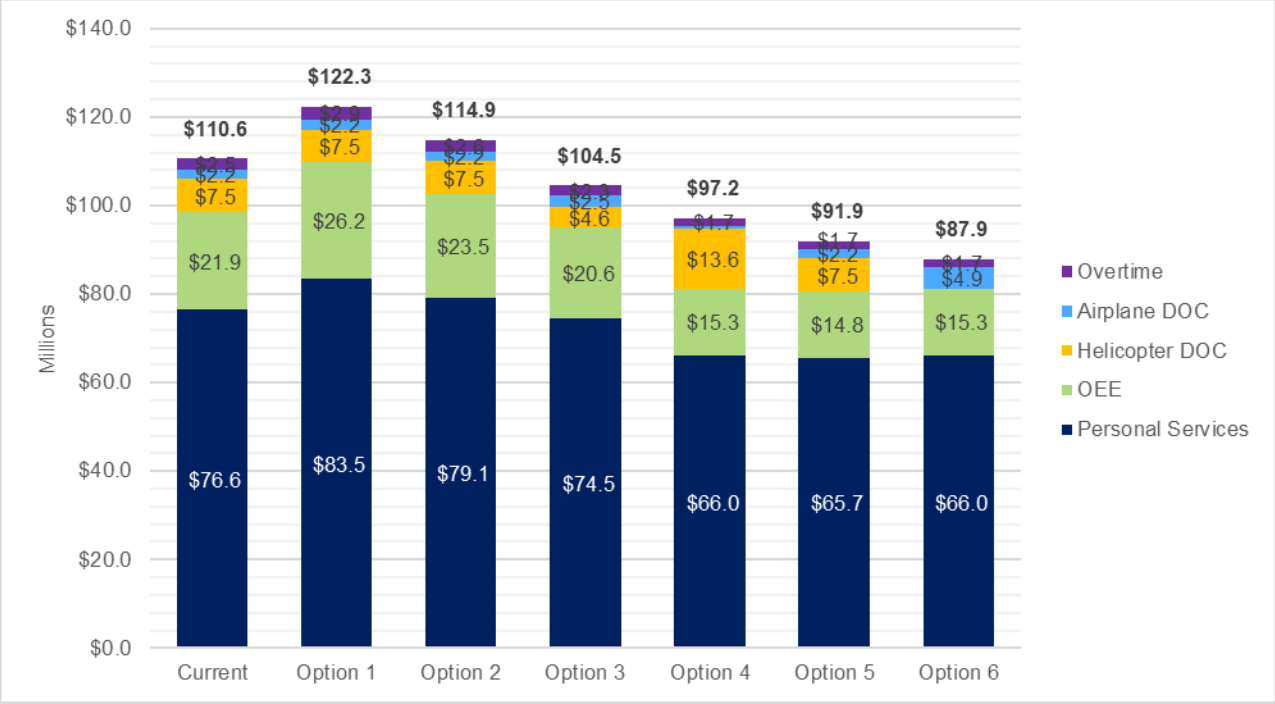


Estimated Programmatic Needs

Crowe calculated the AOP's estimated programmatic needs to identify potential budgetary requirements for each proposed option, as shown in **Exhibit 80.** Crowe's calculations built on FY2023 actual expenditures of $110.6 million[19] for CHP's Flight Operations. Crowe assumed baseline staffing levels of 152.0 positions based on current AOP staffing levels. Crowe's calculations account for the following:

- **Personal Services:** Crowe estimated costs for each position based on average salaries for sergeant, officer (pilot), and officer (flight officer) classifications. Crowe used pay ranges published by California Department of Human Resources (CalHR), and alternative range criteria for air operations personnel provided by the OAO. Crowe also accounted for estimated retirement, health, and workers' compensation expenditures for each position.
- **Airplane DOC:** Crowe used FY2023 airplane DOC actuals totaling $2.2 million. Option 4 includes $600,000 in airplane-related DOC to maintain OAO's two King Air aircraft. Option 4 assumes 11,200 helicopter flight hours.
- **Helicopter DOC:** Crowe used FY2023 helicopter DOC actuals of $7.5 million. Option 6 omits helicopter-related DOC since this option is a helicopter-only staffing model. Option 6 assumes 11,200 airplane flight hours.
- **Operating Equipment and Other Expenses:** Crowe used FY2023 Operating Expenses and Equipment (OEE) actuals totaling $21.9 million, or roughly $144,000 per position. Crowe excluded airplane and helicopter DOC from OEE.
- **Overtime:** Crowe used FY2023 overtime actuals totaling $2.5 million, or roughly $16,000 per position.

Exhibit 80
Estimated Programmatic Needs by Option



[19] Includes approximately $77.0 million for personal services expenditures (salaries, retirement and health benefits, and workers compensation) and $33.6 million for operating expenses and equipment, and overtime expenditures. This amount does not include expenditures for fleet replacement. CHP's Flight Operations FY2023 (FY 2022-23) budget was $97.8 million.

B. Rationale for Staffing Model Options

In **Exhibit 81,** we provide rationale for each proposed staffing model option. We also outline proposed total staffing requirements (full time equivalents in OAO and AOUs), fleet requirements (airplanes and helicopters), and estimated programmatic needs to support each option. For discussion purposes, we combined OAO and AOU staffing requirements under each option. Each option assumes OAO Staffing Option D, which includes two positions for an Unmanned Aircraft System (UAS) program (program manager and specialist), one budget manager, and two assistant chief pilots (officers to assist chief helicopter and airplane pilots). Each staffing model option is presented below in order of estimated programmatic needs.

Exhibit 81
Rationale for Staffing Model Options

Rationale	Staffing	Air Fleet	Estimated Programmatic Needs
Current The AOP's current model aims to provide staffing coverage for at least two shifts per day in each AOU. Higher volume units generally operate with 4.0 pilots and 4.0 flight officers for each aircraft. Lower volume units generally operate with less staff at 3.0 to 2.0 pilots and 3.0 to 2.0 flight officers for each aircraft. Crowe's analysis of current staffing levels identified that some AOUs could benefit from additional airplane crew staff to support and align with the AOP's deployment policies and priorities. Crowe's analysis also found that the AOP could benefit from additional professional level staff for a UAS program, enhanced budget management, and assistance to the chief airplane and chief helicopter pilots.	• OAO: 11.0 • AOUs: 141.0 • Total: 152.0	• Airplanes: 16 • Helicopters: 15	**$110.6 million**
Option 1 – Full Coverage Model This model accounts for having a helicopter and an airplane crew always available, with two shifts per day fully staffed to meet regional needs. It would provide staffing levels of at least 4.0 airplane pilots and 4.0 flight officers, 4.0 helicopter pilots and 4.0 flight officers; higher call volume units would have 5.0 airplane pilots and 5.0 flight officers, 5.0 helicopter pilots and 5.0 flight officers for comprehensive coverage and readiness. This model would require approximately $122.5 million.	• OAO: 16.0 • AOUs: 167.0 • Total: 183.0	• Airplanes: 16 • Helicopters: 15	**$122.5 million**
Option 2 – Enhanced Airplane Focus Model This model adds 1.0 airplane pilot and 1.0 airplane flight officer in each unit. This model provides additional staffing to align with CHP's policy to prioritize deployment of airplanes versus helicopters and assures optimal shift coverage. This model maintains only 1.0 sergeant in Border, Coastal, and Northern units due to lower staffing levels, call volumes, and potential lack of need for more active operational roles. This model would require approximately $115.0 million.	• OAO: 16.0 • AOUs: 148.0 • Total: 164.0	• Airplanes: 16 • Helicopters: 15	**$115.0 million**

Rationale	Staffing	Air Fleet	Estimated Programmatic Needs
Option 3 – Airplane Centric Model This model reduces the AOP's overall costs associated with helicopters while maintaining helicopter and airplane capabilities in specific areas with service gaps, assuring continued coverage where allied agencies lack helicopter capabilities for search and rescue and emergency medical services. This model would eliminate full time use of helicopter crews in Inland, Northern, and Southern units based on existing helicopter capabilities of allied agencies in each service area. CHP could consider staging helicopter crews in these units on an as needed basis (e.g., during fire season in Northern AOU). This model provides a pathway to assure critical areas retain necessary capabilities while reducing overall helicopter related costs. CHP may need to consider adding two airplanes to assure all units maintain two aircraft. This model would require approximately $104.7 million.	• OAO: 16.0 • AOUs: 128.0 • Total: 144.0	• Airplanes: 18 • Helicopters: 9	**$104.7 million**
Option 4 – Helicopter Only Model Retaining only helicopters reduces overall staffing levels and eliminates the lower-cost airplanes, which totaled roughly $2.2 million in FY2022-23 for fuel and maintenance. This model assumes each unit would only require 1.0 sergeant. This option would also result in cost savings from not needing to cover airplane-related expenses such as equipment, training, technology, insurance, and other overhead. This option focuses resources on the more versatile and responsive helicopters, despite their higher operational costs. However, air units would likely not be able to conduct surveillance and other patrol related activities that require airplane capabilities. This model assumes the OAO would maintain the two King Airs for transportation and other purposes. This model would require approximately $97.2 million.	• OAO: 16.0 • AOUs: 91.0 • Total: 107.0	• Airplanes: 2 • Helicopters: 15	**$97.2 million**

Rationale	Staffing	Air Fleet	Estimated Programmatic Needs
Option 5 – Single Shift Model Maintaining one shift per day with one helicopter and one airplane available within each unit would decrease staffing levels significantly, with cost savings primarily attributed to the reduction in staff. Operating expenses for fuel and maintenance could also materially decrease by reducing the program's air fleet and by maintaining at least one airplane and one helicopter per unit. Additional savings would be realized from the reduced need for equipment, training, technology, insurance, and other overhead associated with operating fewer shifts. This model aims for minimal operational capacity at the lowest cost but could result in unintended consequences such as service gaps and lack of air support resources throughout the state. This model would require approximately $92.0 million.	• OAO: 16.0 • AOUs: 88.0 • Total: 104.0	• Airplanes: 10 • Helicopters: 9	**$92.0 million**
Option 6 – Airplane Only Model By retaining only airplanes, this model reduces overall staffing levels and eliminates the higher costs associated with helicopters, which equated roughly $7.5 million in FY2022-23 for maintenance and fuel. This model assumes each unit would only require 1.0 sergeant. Similar to Option 3, additional cost savings would come from not needing to cover helicopter-related expenses such as equipment, training, technology, insurance, and other overhead. As a result, the minimum operating budget for this model may likely be significantly lower. Overall, this option streamlines the program by focusing on more cost-effective aircraft. This model would require approximately $88.0 million.	• OAO: 16.0 • AOUs: 91.0 • Total: 107.0	• Airplanes: 16 • Helicopters: 0	**$88.0 million**

C. Detailed Results by Option

In this subsection, we describe how each staffing model option would impact each air unit, including overall staffing level impacts and aircraft distribution needs. Below are key assumptions for the proposed options:

- **Crew Sizes:** Each crew consists of one pilot and one flight officer. This aligns with HPM 100.7 and is consistent with practices of benchmark agencies.
- **Shift Duration:** Shifts are roughly 10 to 10.5 hours, which is considered best practice and aligns with benchmark agencies. Each model assures at least 18 to 20 hours of coverage in each service area.
- **Flexibility:** Each model allows for flexibility to respond to regional dynamics and needs, including field support and allied agency support. This assures that the air operations can adapt to varying demands and maintain effective service delivery across different regions.
- **Airplane Distribution:** The current distribution of airplanes is assumed to be adequate. However, CHP could make policy decisions to increase or decrease the need for helicopters, especially since many allied agencies have these resources, but may lack capabilities and consistent resources for deployment. We highlight these capabilities in **Appendix D.**
- **Full Coverage:** Based on our analysis, full coverage would require at least 4.0 pilots and 4.0 flight officers for each aircraft. This aligns with HPM 100.7.
- **Leadership Structure:** Each unit should be staffed with two sergeants, with some exceptions. Staffing each air unit with two leadership positions is unique to CHP. For example, models in Maryland and Texas have one leader managing regional units.

1. Full Coverage Option

This proposed option maintains at least an airplane and helicopter crew per shift, representing a "full coverage" model. This option, illustrated in **Exhibit 82,** would require an increase in current staffing levels by 26.0 positions. Border AOU would require 6.0 positions, Coastal, Golden Gate, and Valley AOUs would require 5.0 positions, Inland and Southern AOUs would require 2.0 positions, Central AOU would require 1.0 position, and Northern AOU would not require additional positions. The airplane distribution would not change, maintaining the current allocation of aircraft outlined in **Exhibit 83.**

Exhibit 82
Full Coverage Model – Distribution of Personnel

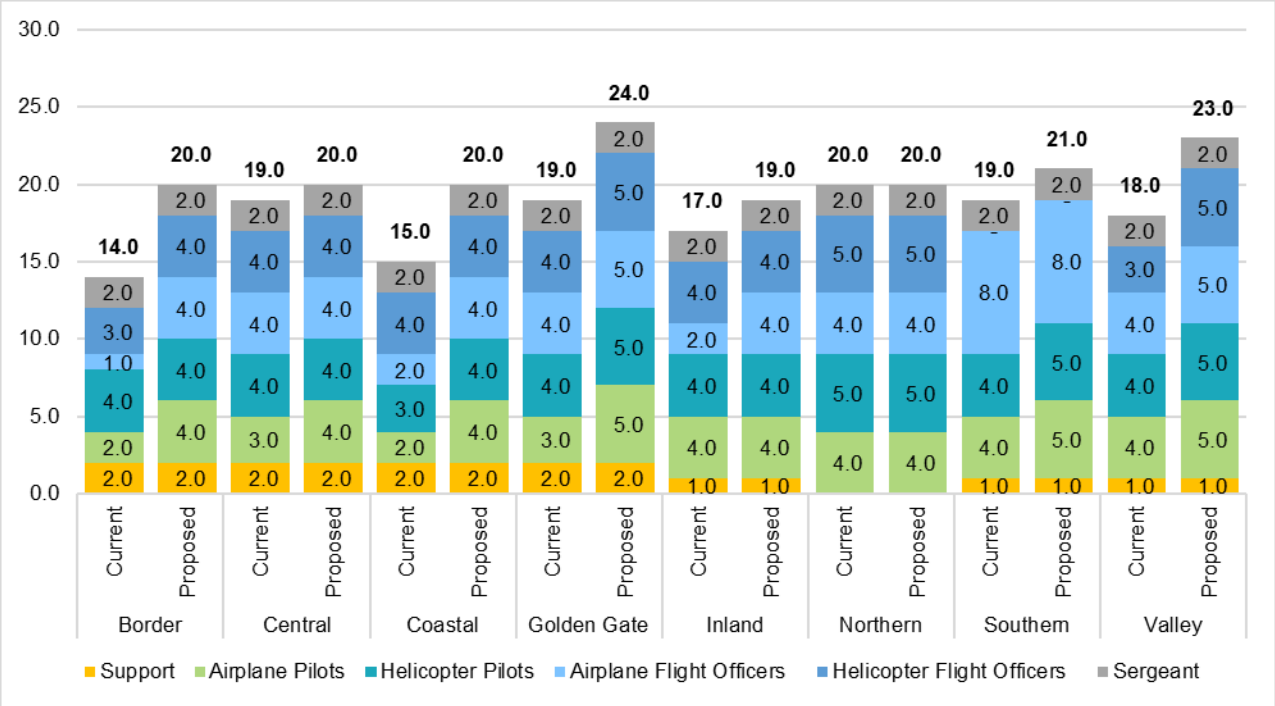


Exhibit 83
Full Coverage Option – Distribution of Aircraft

Unit	Current Airplanes	Proposed Airplanes	Current Helicopters	Proposed Helicopters
OAO	2	2	1	1
Border	2	2	1	1
Central	2	2	2	2
Coastal	2	2	1	1
Golden Gate	2	2	2	2
Inland	2	2	2	2
Northern	2	2	2	2
Southern	1	1	2	2
Valley	1	1	2	2
Total	**16**	**16**	**15**	**15**

2. Enhanced Airplane Focus Option

This proposed option increases airplane crew staffing levels for specific AOUs to align with policies and deployment priorities. This option also decreases the number of sergeants from 2.0 to 1.0 positions for Border, Coastal, and Northern units. This option, illustrated in **Exhibit 84,** would require an increase in current staffing levels by 7.0 positions. Notably, Northern AOU would not require 3.0 current positions – 1.0 helicopter pilot, 1.0 helicopter flight officer, and 1.0 sergeant. We propose the distribution of aircraft outlined in **Exhibit 85** to support this option. The CHP could consider transitioning to one helicopter for Northern and Inland units while maintaining the current airplane distribution under this option.

Exhibit 84
Enhanced Airplane Focus Model – Distribution of Personnel

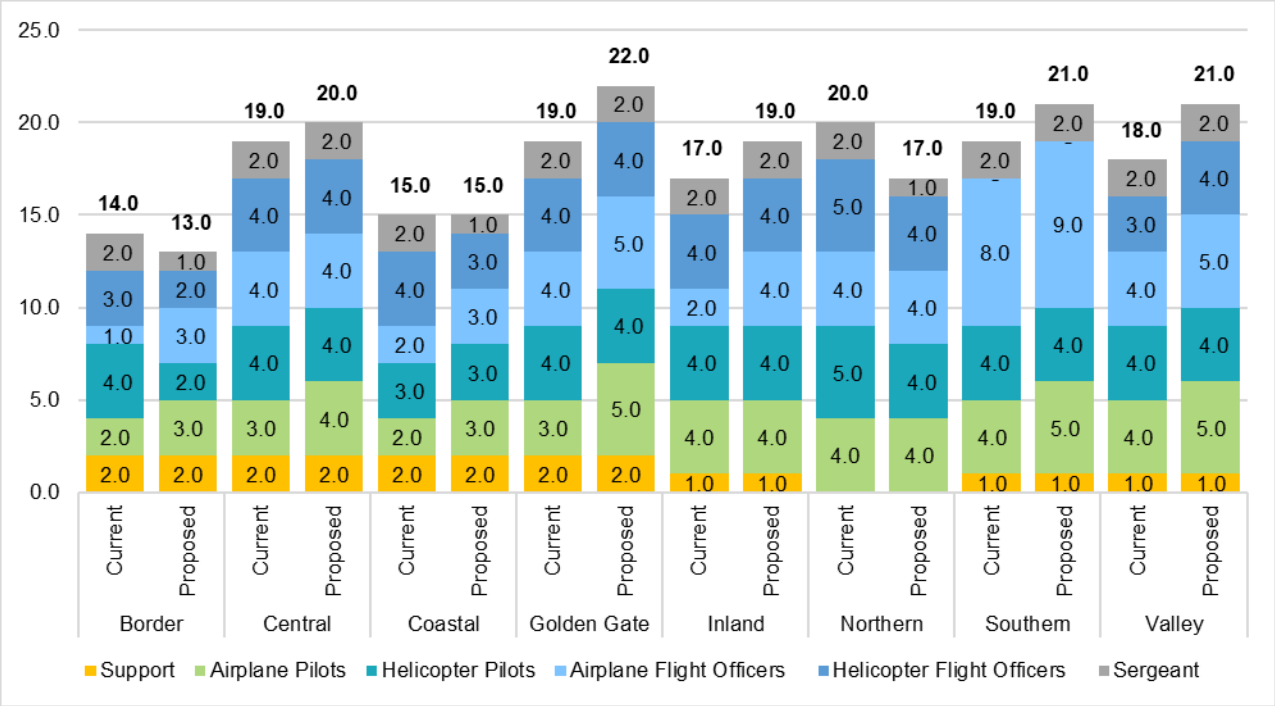


Exhibit 85
Enhanced Airplane Focus Model – Distribution of Aircraft

Unit	Current Airplanes	Proposed Airplanes	Current Helicopters	Proposed Helicopters
OAO	2	2	1	1
Border	2	2	1	1
Central	2	2	2	2
Coastal	2	2	1	1
Golden Gate	2	2	2	2
Inland	2	2	2	2
Northern	2	2	2	2
Southern	1	1	2	2
Valley	1	1	2	2
Total	**16**	**16**	**15**	**15**

3. Airplane-Centric Option

This proposed option maintains airplane crews while eliminating helicopter crews in units where there are existing helicopter capabilities for life saving, search, and rescue needs. This option also decreases the number of sergeants from 2.0 to 1.0 positions in Border, Coastal, and Northern units. This option, illustrated in **Exhibit 86,** would result in a decrease of 13.0 AOU positions and require staffing increases for Central, Golden Gate, and Valley units, while decreasing staffing for Border, Inland, Northern, and Southern units. We propose the aircraft distribution outlined in **Exhibit 87** to support this option, resulting in an increase of two airplanes and a decrease of six helicopters.

Exhibit 86
Airplane Centric Option – Distribution of Personnel

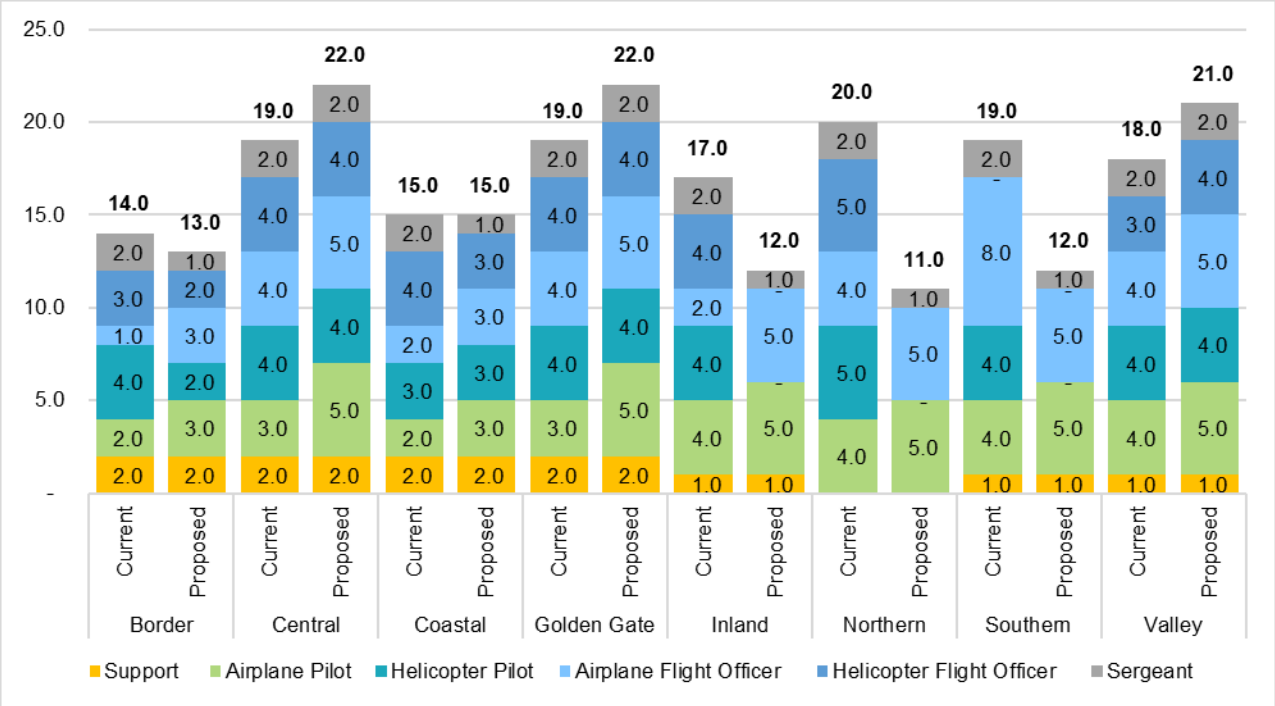


Exhibit 87
Airplane Centric Option – Distribution of Aircraft

Unit	Current Airplanes	Proposed Airplanes	Current Helicopters	Proposed Helicopters
OAO	2	2	1	**1**
Border	2	2	1	**1**
Central	2	2	2	**1**
Coastal	2	2	1	**1**
Golden Gate	2	2	2	**1**
Inland	2	2	2	**1**
Northern	2	2	2	**1**
Southern	1	**2**	2	**1**
Valley	1	**2**	2	**1**
Total	**16**	**18**	**15**	**9**

4. Helicopter Only Option

This proposed option retains helicopter crews for two shifts per day and eliminates airplane crews. This option, illustrated in **Exhibit 88,** would result in a decrease of 50.0 AOU positions. We propose the distribution of aircraft outlined in **Exhibit 89** to support this option. We assume the OAO may want to maintain the two King Airs at headquarters for general transportation and other purposes.

Exhibit 88
Helicopter Only Option – Distribution of Personnel

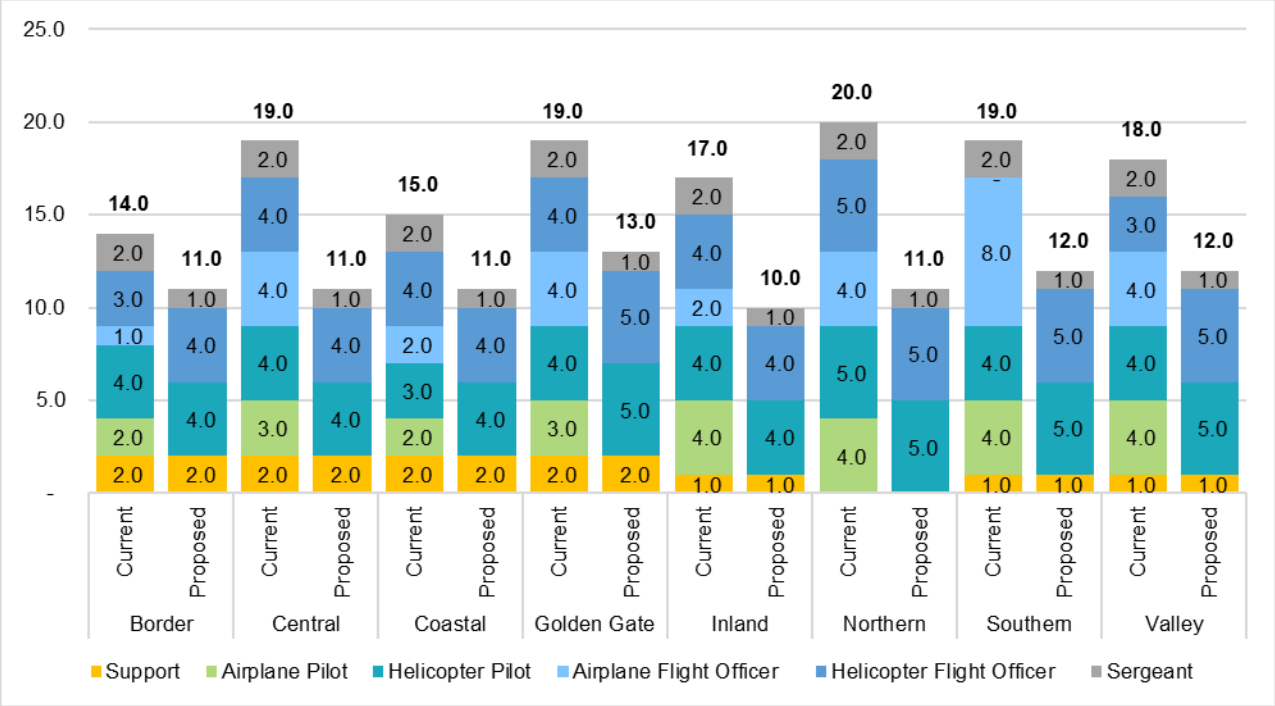


Exhibit 89
Helicopter Only Option – Distribution of Aircraft

Unit	Current Airplanes	Proposed Airplanes	Current Helicopters	Proposed Helicopters
OAO	2	2	1	1
Border	2	**0**	1	1
Central	2	**0**	2	2
Coastal	2	**0**	1	1
Golden Gate	2	**0**	2	2
Inland	2	**0**	2	2
Northern	2	**0**	2	2
Southern	1	**0**	2	2
Valley	1	**0**	2	2
Total	**16**	**2**	**15**	**15**

5. Single-Shift Option

This proposed option maintains one shift per day for both helicopter and airplane crews. This option, illustrated in **Exhibit 90,** would result in a decrease of 53.0 AOU positions. We propose the distribution of aircraft outlined in **Exhibit 91** to support this option. We assume the OAO may want to maintain the two King Airs at headquarters for general transportation and other purposes.

Exhibit 90
Single-Shift Option – Distribution of Personnel

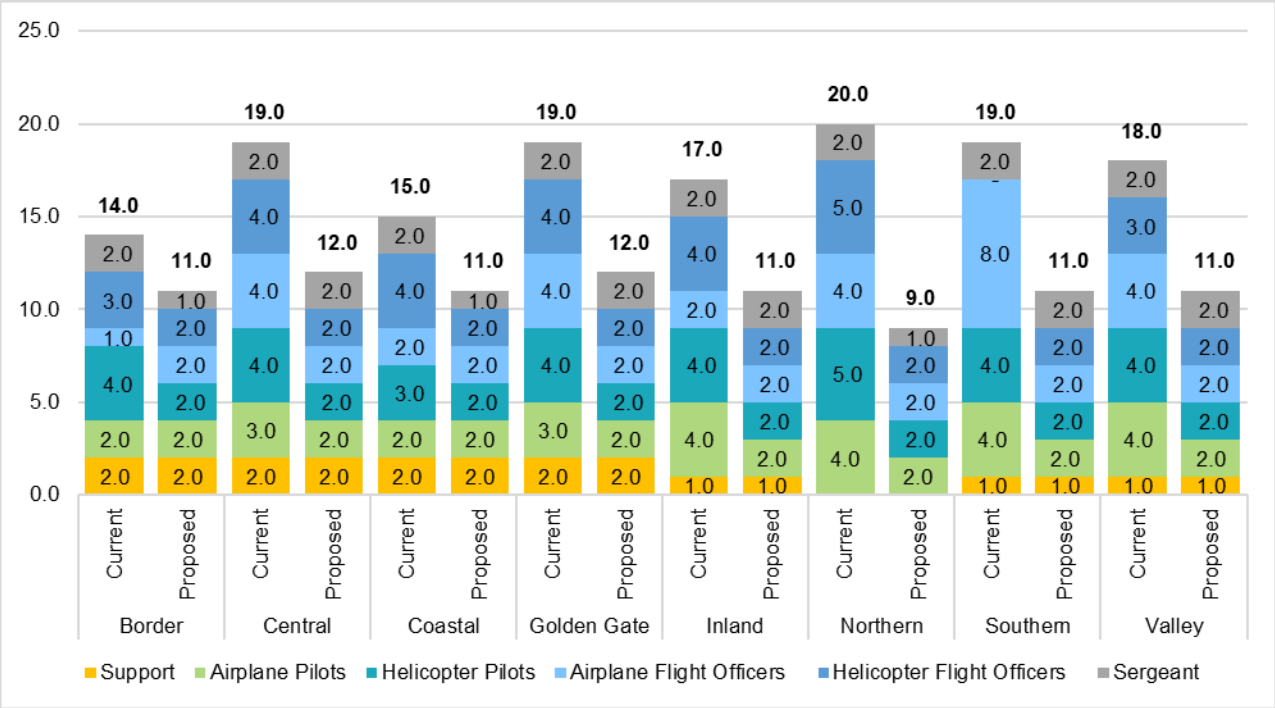


Exhibit 91
Single Shift Option – Distribution of Aircraft

Unit	Current Airplanes	Proposed Airplanes	Current Helicopters	Proposed Helicopters
OAO	2	2	1	1
Border	2	**1**	1	1
Central	2	**1**	2	**1**
Coastal	2	**1**	1	1
Golden Gate	2	**1**	2	**1**
Inland	2	**1**	2	**1**
Northern	2	**1**	2	**1**
Southern	1	1	2	1
Valley	1	1	2	**1**
Total	**16**	**10**	**15**	**9**

6. Airplane Only Option

This proposed option supports only airplane crews and eliminates helicopter crews across all programs. This option, illustrated in **Exhibit 92,** would result in a decrease of 50.0 AOU positions. This option would eliminate the need for all helicopters in the program and would likely require the airplane distribution outlined in **Exhibit 93.**

Exhibit 92
Airplane Only Option – Distribution of Personnel

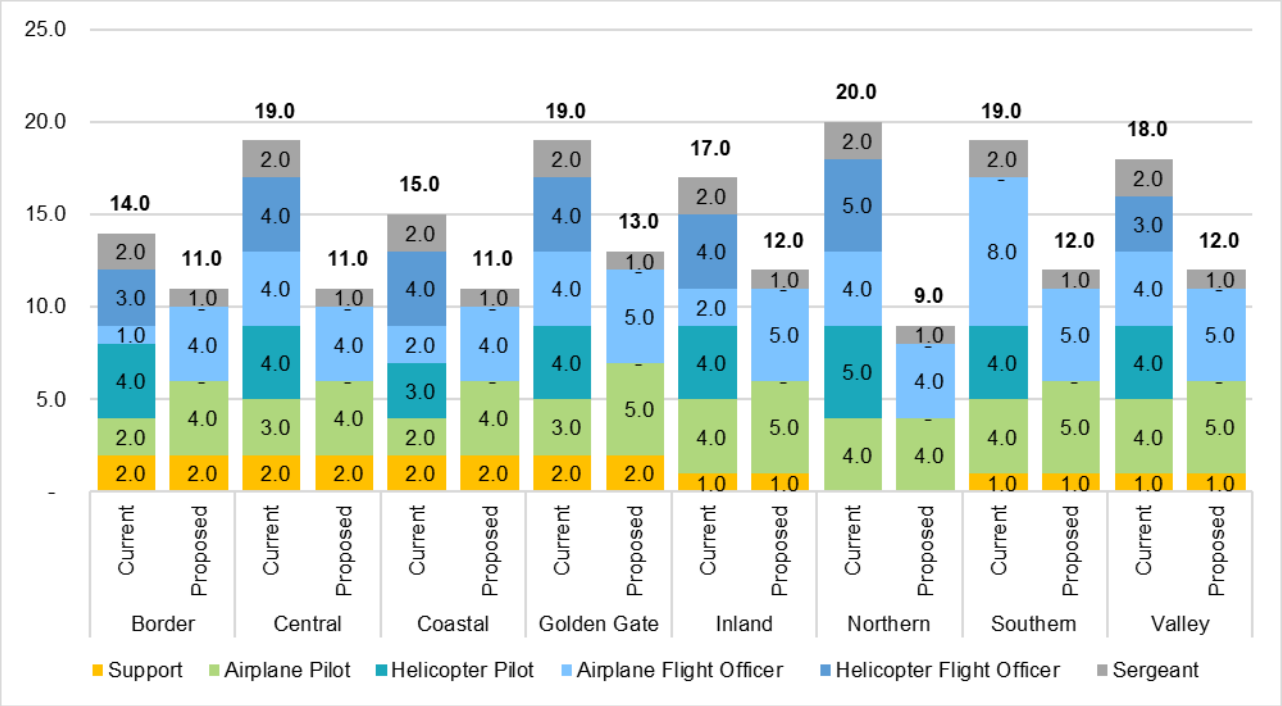


Exhibit 93
Airplane Only Option – Distribution of Aircraft

Unit	Current Airplanes	Proposed Airplanes	Current Helicopters	Proposed Helicopters
OAO	2	2	1	**0**
Border	2	2	1	**0**
Central	2	2	2	**0**
Coastal	2	2	1	**0**
Golden Gate	2	2	2	**0**
Inland	2	2	2	**0**
Northern	2	2	2	**0**
Southern	1	**2**	2	**0**
Valley	1	**2**	2	**0**
Total	**16**	**18**	**15**	**0**

Estimated Fuel and Maintenance Budgetary Needs

Crowe calculated estimated fuel and maintenance budgetary needs to supplement the staffing model options detailed in this report. Crowe used the AOP's FY2023 actual airplane and helicopter DOCs totaling $9.7 million, which supported roughly 6,200 helicopter flight hours and 5,000 airplane flight hours. For illustrative purposes, Crowe then modeled the following three scenarios:

- Estimated budgetary needs under "Status Quo" flight hours, shown in **Exhibit 94**
- Estimated budgetary needs for 60 percent airplane and 40 percent helicopter flight hours, shown in **Exhibit 95**
- Estimated budgetary needs for 50 percent airplane and 50 percent helicopter flight hours, shown in **Exhibit 96.**

Each scenario resulted at or near the program's current $12.0 million fuel and maintenance budget if the AOP conducted 25 percent more flight hours. It is important to note that this analysis does not account for inflation. This analysis indicates CHP would likely need to augment the AOP's fuel and maintenance budget to support 25 percent more flight hours under these scenarios.

Exhibit 94
Fuel and Maintenance Budgetary Needs – "Status Quo"

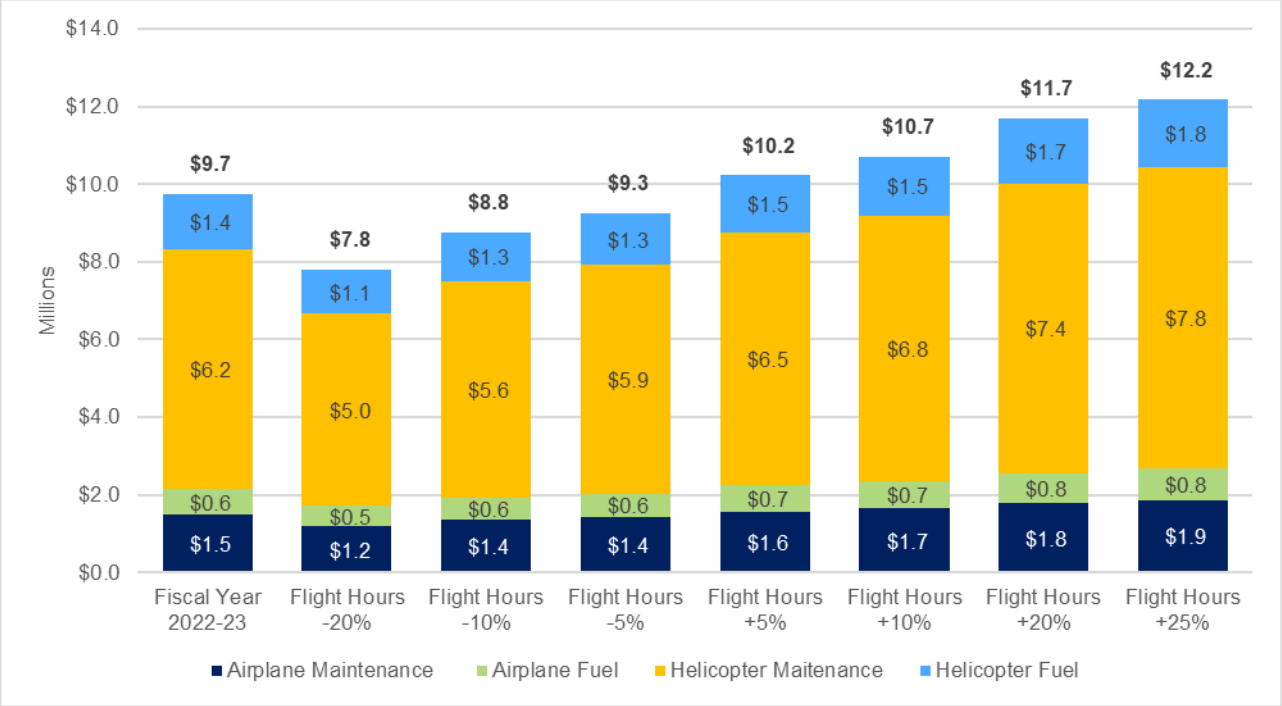


Exhibit 95
Fuel and Maintenance Budgetary Needs – 60% Airplane Flight Time & 40% Helicopter Flight Time

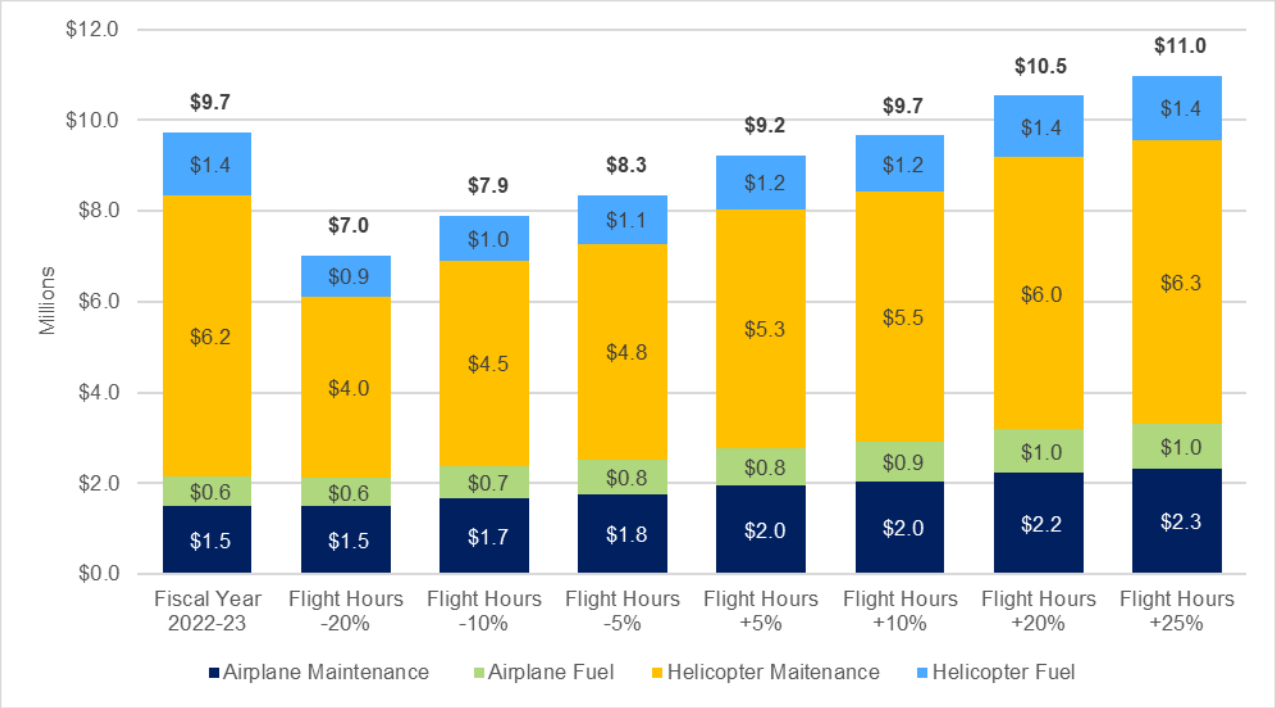
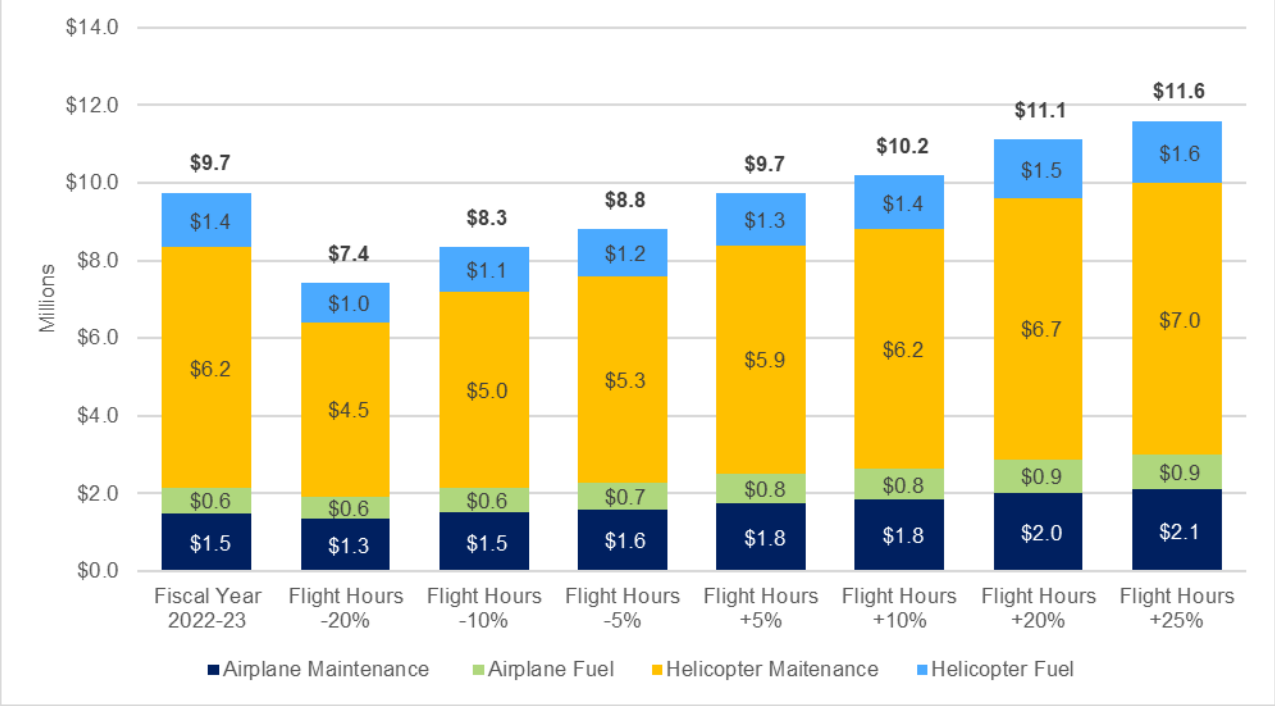


Exhibit 96
Fuel and Maintenance Budgetary Needs – 50% Airplane Flight Time & 50% Helicopter Flight Time



D. Summary and Implications

Based on Crowe's analysis, CHP should implement the recommendations detailed in the Executive Summary by following the strategic actions detailed in this last section. These actions provide a structured approach for CHP to align the AOP's staffing levels, optimize resources, and codify deployment priorities. We provide estimated fiscal needs for each staffing adjustment to assure clear financial planning and allocation.

Phase 1: Engagement

- Stakeholder Engagement
  - Engage key stakeholders (e.g., Division, AOU, other CHP staff) on study outcomes
  - Schedule meetings to gather input and feedback on study outcomes
- Resource Allocation
  - Assign project teams and responsibilities for strategic actions
  - Review available resources and programmatic needs for each staffing model option.

Phase 2: Staffing Adjustments

- AOU Staffing Adjustments
  - Implement AOU Staffing Option 2: "Enhanced Airplane Focus Model"
  - Increase airplane crew staffing levels in selected AOUs
  - Adjust sergeant positions at low call volume sites (this may occur over time)
  - Secure funding of $1.3 million for AOU staffing adjustments (excludes OEE)
- OAO Staffing Enhancements
  - Develop Budget Change Proposal (BCP) for new positions
  - Recruit for UAS program manager, budget manager, and assistant chief pilots
  - Secure funding of $1.2 million for OAO staffing enhancements (excludes OEE).

Phase 3: Infrastructure and Resource Optimization

- Fleet Replacement
  - Prioritize the replacement of aged fleet
  - Seek additional augmentation to existing funding (if needed) for fleet replacement
  - Assess the feasibility of decreasing the number of helicopters in divisions with allied agencies that have existing lifesaving and rescue capabilities.
- Bulk Fuel Tank Implementation
  - Assess current fuel procurement processes
  - Secure funding for bulk fuel tanks
  - Install bulk fuel tanks at all AOUs that do not have bulk fuel tanks
  - Continue to evaluate cost savings and adjust fuel budget accordingly
- Partnership with CalFIRE for Mechanic Workload
  - Initiate discussions with CalFIRE for sharing aircraft mechanics
  - Determine feasibility of partnership
  - Draft and finalize partnership agreements.

- Augment Fuel and Maintenance Budget
  - Seek augmentation to the program's fuel and maintenance budget up to $15.0 million to provide a buffer for unplanned expenses, and adequately support incident and training flight hours
  - Continue to assess fuel and maintenance needs, including the potential fiscal impact of inflation, cost savings from bulk fuel tanks, and maintenance workload.

Phase 4: Policy and Procedure Codification

- Deployment Priorities Codification
  - Review and refine current air operations objectives to include "emergency response"
  - Prioritize codification of "emergency response" priorities, as define in HPM 100.7, Annex G
  - Clarify and define "emergency incidents" and "other emergencies" deployment priorities
  - Seek legislative approval for codification; coordinate with CHP legislative affairs
- Separate Air Operations Division Establishment
  - Outline structure for the new Air Operations Division
  - Consider the addition of a Lieutenant-level position to support management and administration
  - Secure approvals and "buy-in" from leadership
  - Transition to the new division structure.

Phase 5: Training and Development

- Training Programs
  - Review and determine feasibility of new training programs for new and existing staff
  - Establish separate and additional training budget of up to $2.0 million for pilots and flight officers
  - Assure each personnel receives at least 10-12 hours of training flight hours per month
- Professional Development
  - Create opportunities for ongoing professional development
  - Establish mentorship programs for new staff.

Monitoring and Evaluation (Ongoing)

- Performance Metrics
  - Develop ROI-based performance measures (e.g., incidents performed / hours)
  - Track and report key metrics regularly in alignment with potential codification of priorities
- Continuous Improvement
  - Manage program data, regularly review, and adjust Flight 93 record keeping practices
  - Solicit feedback from program staff and stakeholders, and make necessary improvements.

These are strategic actions to implement Crowe's recommendations. These actions aim to assure the AOP remains agile, efficient, and effective in meeting the evolving demands of statewide air support.

Appendix A
Air Operations Program Data and Information

Appendix A:
Air Operations Program Data and Information

Exhibit 97 provides examples of the program data and information the Crowe reviewed to conduct this study. Crowe's review included, but was not limited to: historical incident data, time reporting and flight logs, policies, historical funding and budget information, organizational charts, staffing matrices, duty statements, fleet and asset listings, and previous evaluation reports. This review provided a foundation for Crowe's assessment of the AOP's current and emerging workload and operational needs presented in *Section 3*, and the proposed staffing model options presented in *Section 4*.

Exhibit 97
Examples of Program Data and Information

Description
HPM 100.7 Chapter 1 through 13
FY2023-24 staffing matrix and organizational chart; historical organizational charts
FY2023-24 staffing by position classification, pay scale range, and associated funding source
FY2023-24 funding and budget coding detail in Excel format (e.g., funding and budget detail submitted to Department of Finance for the Governor's budget)
Historical funding and budget coding detail from FY2014-15 to FY2022-23
Current documentation of workload functions and key responsibilities for program staff
Current documentation of time schedule and shift by position (i.e., unit beat schedules)
Historical Flight 93 log data from 2015 to 2023; Web 93 Manual
Current fleet listing and asset information, including detail on number of airplanes, number of helicopters, useful life, replacement costs, maintenance, and operation cost estimates
Relevant maintenance management policies and plans
List of information systems used by CHP to track, monitor, and report on Air Operation Program's workload and performance
Internal estimates for airplane and helicopter alternatives (i.e., alternative models)
1983, 1985, 1991, 1995, and 2004 program studies
FY2014-15 Budget Change Proposal (BCP) that provided ongoing $8 million for CHP's fleet replacement
CHP Dispatch call volumes for the last three years
CHP 2020-2024 Strategic Plan
General Order 21.1, Organization of the Department of California Highway Patrol (2020)
Various other programmatic data and information

Appendix B
Insights from Survey and Interviews

Appendix B:
Insights from Survey and Interviews

This appendix summarizes key insights resulting from Crowe's program-wide survey and interviews with selected program subject matter experts (SMEs). The insights detailed in this appendix contributed to Crowe's assessment of the AOP's current and emerging workload and operational needs, presented in *Section 3*, and provided supporting rationale for the proposed staffing model options presented in *Section 4*.

Program-wide Survey

Crowe distributed a program-wide surveys to gather initial input and insights from staff on the program's current and emerging workload and operational needs. The ten-question survey, listed in **Exhibit 98,** covered a range of topics, including staffing levels and allocations, resource availability and utilization, training and professional development, operational challenges and bottlenecks, communication and coordination across the program, innovations and best practices, future needs and aspirations, and open feedback and suggestions.

Interviews

Following the survey, Crowe conducted interviews with selected staff within the OAO and AOUs listed in **Exhibit 99.** Crowe aimed to gain a clear, detailed understanding of the operational and workload drivers based on direct input and experiences shared by staff. The topics covered in the interviews included clarification of survey responses, detailed discussions on experiences and needs, and open-ended feedback and information sharing. The interviews provided an opportunity for more in-depth conversations and allowed for a richer understanding of the program's history and its future**. Exhibit 100** presents selected highlights from the survey and interviews.

Exhibit 98
Survey Questions

Number	Survey Question
1	Are there any resource constraints that currently affect your Air Operations Unit Division's (AOU) operational capacity? Resource constraints may include, but are not limited to, the following: staffing levels during high-demand periods, overtime usage, aircrafts, equipment and/or technology needs.
2	What are the most significant operational challenges or bottlenecks your AOU faces?
3	What are some of the key changes in your AOU's service area over the past five years? Please describe the changes and relative impact.
4	What criteria must be met in order to pursue a mission and/or incident? Describe your AOU's deployment strategy.
5	How does your AOU communicate and coordinate with the OAO and other AOUs to implement and respond to policy directives and other mandates? Are there any challenges or areas for improvement?
6	How does your AOU communicate and coordinate with external agencies to provide the necessary level of service in your service area? Are there any challenges or areas for improvement?
7	Has your AOU implemented any innovative practices or technologies that have significantly improved operational effectiveness and efficiencies?
8	How does your AOU evaluate and determine its long-term workload and staffing needs and goals?
9	Do you have any suggestions for how the OAO can better support your AOU?
10	Are there any other comments or insights you would like to share that have not been covered in this survey?

Exhibit 99
Program Interviews

Date	Unit	Attendees
February 26, 2024	Coastal	Eric Zivic, Jim Parish, Jayson Doumas, Shannon Slover
February 28, 2024	Golden Gate	Lannis Pope, Timothy Hinkson
March 1, 2024	Southern	Spencer Ammons, Chad New
March 4, 2024	Valley	Brian Souza, JM Watkins
March 7, 2024	Northern	Donovan Geyer, J Edgerton, Andrew Lockwood, B Henderson, Scott Frederick
March 12, 2024	Inland	Derek Crouse, William Osegueda
March 14, 2024	Border	Nicholas Haltom
March 19, 2024	Central	Jeff Andriese, Chris Barrett, Craig Kunzler

Exhibit 100
Selected Key Highlights

Area	Challenge	Opportunity
Staffing Levels	• **Understaffing:** Leading to scheduling gaps, increased workload, and operational delays. • **Vacancies:** Unfilled pilot and flight officer positions impacting emergency services. • **Limited Training:** Due to insufficient staffing.	• **Recruitment Initiatives:** Develop targeted recruitment campaigns to attract qualified candidates (especially internal candidates) • **Professional Development:** Invest in training and career progression programs to retain staff.
Budget Constraints	• **Resource Limitations:** Restrictions on aircraft usage, fuel costs, and maintenance due to budget constraints. • **Impact on Service Delivery:** Limited budget affecting staffing, equipment, and fuel usage.	• **Efficient Budgeting:** Implement better budget management practices resulting in optimal use of funds. • **Invest in New Technology:** Explore the purchase of next-generation aircraft to enhance reliability and reduce maintenance downtime.
Equipment and Technology	• **Aging Fleet:** Older aircraft and outdated technology reducing operational efficiency and safety. • **Maintenance Delays:** Frequent downtime due to delayed repairs. • **Training Equipment:** Lack of advanced equipment for training and proficiency.	• **Fleet Modernization:** Invest in newer, more reliable aircraft and advanced technology to improve operational capabilities. • **Enhanced Maintenance:** Develop a robust maintenance schedule and quick response for repairs.
Operational Capacity	• **Restricted Operations:** Limited flight operations and fuel usage impacting response capabilities. • **Reduced Patrols:** Fewer flight hours affecting proactive service. • **Increased Workload:** Resource constraints leading to higher workloads and decreased efficiency.	• **Expand Flight Operations:** Increase flight hours and patrol flights to enhance proactive service. • **Standardized Practices:** Implement standardized procedures and training for improved efficiency. • **Agency Coordination:** Enhance collaboration with allied agencies to optimize resource allocation and response capabilities.
Communication and Coordination	• **Inefficiencies:** Communication and management issues leading to confusion and delays. • **Dual Chain of Command:** Inefficient communication due to multiple command layers. • **External Communication:** Challenges with external agencies due to aging equipment and lack of official strategy.	• **Active Engagement:** Foster a culture of active listening and engagement with frontline personnel. • **Transparent Decision-Making:** Involve division-level input in decision-making for optimal transparency. • **Strengthen External Ties:** Build stronger relationships with external agencies through regular training and communication updates.
Training and Proficiency	• **Safety Concerns:** Maintenance delays & equipment issues compromising safety. • **Reduced Coverage:** Fewer hours of coverage impacting pilot and flight officer skills.	• **Enhanced Training Programs:** Fund and expand pilot training programs to develop competencies. • **Regular Patrol Flights:** Require regular patrol flying to maintain proficiency.
Innovative Practices and Technologies	• **Limited Implementation:** Few new technologies and innovative practices adopted. • **Communication and Tracking:** Need for real-time radio communication monitoring and smartphone-based tracking.	• **Expand Programs:** Build on the Helicopter Rescue Technician (HRT) Program and collaborate with local fire agencies for specialized rescue missions. • **Advanced Technology:** Utilize Night Vision Goggles (NVG), FLIR systems, and other advanced technologies for enhanced capabilities.

Appendix C
Profile of Benchmark Agencies

Appendix C:
Profile of Benchmark Programs

This appendix provides a profile of the selected benchmark agencies, as shown in **Exhibit 101,** that Crowe interviewed for this study. The five benchmark agencies were selected with guidance from the AOP. Crowe used this information to identify leading practices that may address the AOP's workload and operational needs. The selected benchmark agencies include:

- Texas Department of Public Safety Aircraft Operations Division (organizational chart, shown in **Exhibit 102**)
- Federal Bureau of Investigation Aviation Program
- Maryland State Police Aviation Command (organizational chart, shown in **Exhibit 103**)
- Los Angeles County Sheriff Air Bureau
- Los Angeles Police Department Air Support Division.

Exhibit 101
Benchmark Results

Program	CHP Air Operations Program	Texas DPS Aircraft Operations Division	FBI	Maryland State Police Aviation Command	LA County Sheriff Air Bureau	LAPD Air Support Division
Population	38.0 million	30.0 million	N/A	6.2 million	9.7 million	3.8 million
Coverage Area (in square miles)	162,000	268,000	N/A	12,400	4,000	500
Structure	Hybrid	Hybrid	Hybrid	Centralized	De-centralized	Centralized
Annual Budget	~$100+ million funded by Motor Vehicle Account	~$25 million funded by General Fund for Air Operations	N/A	~ $60 million[20]	N/A	~ $50 million
Annual Flight Hours	~11,000 hours	~12,000 hours	N/A	~3,000 hours	N/A	~16,000 hours
Mission	Mix	Patrol / Law Enforcement	Homeland Security	Medical Evacuation & Emergency Medical Services	Patrol / Law Enforcement	Patrol / Law Enforcement
Units	8 stations / 1 headquarters	7 Regions, 11 stations / 1 headquarters	13 hubs	4 Regions, 7 hubs	2	3
Helicopters (Count)	Airbus H-125 (11) Eurocopter AS350B3 (4)	Airbus AS350 (non-hoist equipped) (11) Airbus AS350 (hoist equipped) (3) Airbus EC145 twin engine (1)	Blackhawk (6) Other (5)	AW139 (10)	Airbus A-Star (15) Airbus Super Puma (2) Cessna Centurion 2-10 (2)	17 9 Airbus AS350 B3e 8 AS350 B2
Airplanes (Count)	Beechcraft B300 (1) Beechcraft B200 (1) GippsAero GA8TC 320 (6) Cessna T206 (7) Cessna 208B (1)	Cessna 206 single engine (4) Cessna 208 Caravan single engine turboprop airplanes (2) Pilatus PC12 single engine turboprop airplanes (2) King Air 350 airplane (1)	Boeing 757 (2) Gulfstream (1) Q400 (1)	Piper Saratoga (1)	Beechcraft King Air B-200 (1)	1
Beat Schedule	Two 10-hour shifts per day, 7 days per week	Two 10-to-12-hour shifts (based on location) 6 days per week. Skeleton crew on Sundays	Overlapping 16-hour shifts for 24-hours per day, 7 days per week coverage	24-hours per day, 7 days per week coverage	24-hours per day, 7 days per week coverage	Two 10-hour shifts per day, 7 days per week

[20] 80 percent funding derived from the state's Emergency Medical System Operations Fund and 20 percent from General Fund.

Program	CHP Air Operations Program	Texas DPS Aircraft Operations Division	FBI	Maryland State Police Aviation Command	LA County Sheriff Air Bureau	LAPD Air Support Division
Flight Crew	Pilot (1), flight officer (1) per aircraft	Pilot (1), flight officer (1) per aircraft	Pilot (2) per aircraft	Pilot (2), paramedic flight officer (2) per shift	Pilot (2), tactical paramedic flight officers (3) per aircraft	Pilot (1), tactical flight officer (1) per aircraft
Direct Staffing[21]	77 pilots 70 flight officers (authorized)	50 pilots 50 tactical flight officers 112 personnel	72 pilots, N/A flight officers	Flight Operations Division: 5 regional supervisors 7 section supervisors 45 sworn aircrew 46 civilian pilots 6 section instruction pilots	26 pilots, 12 flight officers. Tactical paramedics provided by partner division	37 pilots 25 tactical flight officers
Internal Maintenance Teams	No	Yes, minor maintenance only; outsources major maintenance	N/A	Yes	Yes	Yes

[21] Staffing for direct service delivery by flight crews; does not account for operational, planning, and maintenance related positions.

Exhibit 102
Texas DPS Aircraft Operations Division

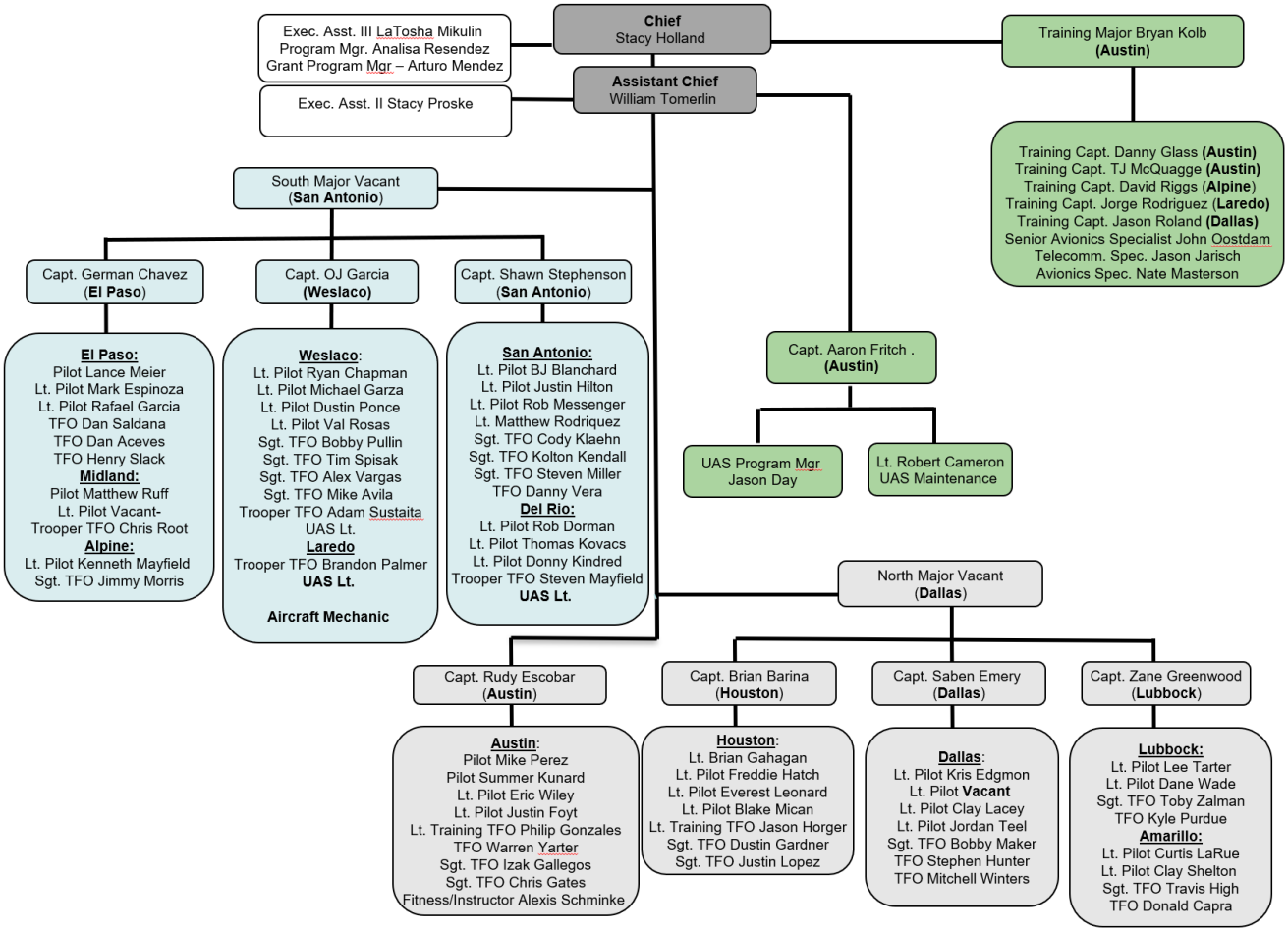
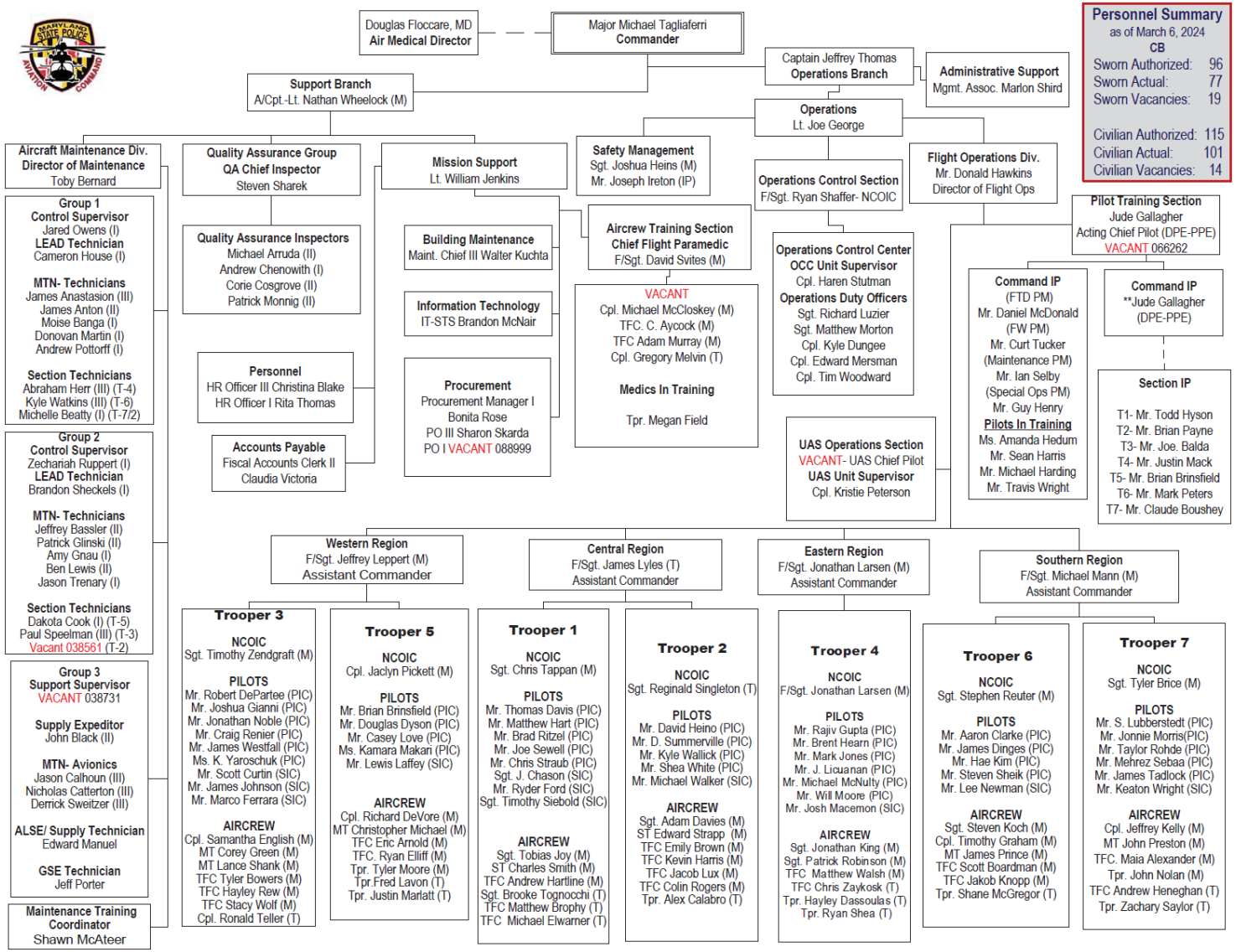


Exhibit 103
Maryland State Police Aviation Command



Appendix D:
Allied Agency Air Resources & Capabilities

This appendix outlines allied agency air resources and relevant capabilities within each Division, shown in **Exhibit 104.** Crowe identified allied agency air resources and relevant capabilities by requesting this information from each AOU. This information supported the development of the proposed staffing model options detailed in this report. Here is a summary:

- **Border Division:** This division includes five primary allied agencies with air resources. Notably, San Diego County Sheriff and Riverside County Sheriff have versatile helicopter capabilities, enhancing regional air support. However, there is no air program in Imperial County, creating a coverage gap in this area.
- **Central Division:** Many sheriff offices in the Central Division have limited air capabilities, ranging from 2 to no aircraft, primarily helicopters. These resources are mostly used for patrol functions, limiting their availability for other specialized air operations.
- **Coastal Division:** Allied agencies in the Coastal Division have limited air capabilities. The Santa Barbara County Sheriff's Office, however, operates five helicopters in the southern portion of the unit's coverage area, providing critical air support in that region.
- **Golden Gate Division:** Allied agencies in the Golden Gate Division have varying air resources, primarily used for patrol and law enforcement. The diversity in resources ensures some level of air support but highlights the need for coordinated operations with CHP air units.
- **Inland Division:** The primary allied agency in the Inland Division is the San Bernardino County Sheriff, which operates 15 aircraft, including 10 helicopters and 5 airplanes. Riverside County Sheriff also contributes with 5 helicopters. These substantial resources enhance air support capabilities within the division.
- **Northern Division:** The Northern Division benefits from a CalFIRE presence, which supplements air support with their fleet, particularly for emergency and fire response operations.
- **Southern Division:** The Southern Air Unit has the most extensive air resources out of all service areas, dominated by helicopter coverage primarily for general law enforcement services. This extensive helicopter presence supports a wide range of operations and enhances the overall air capability in the region.

These allied agency capabilities highlight the strengths and gaps within each air division, emphasizing the need for CHP's strategic coordination and resource allocation to optimize statewide air operations.

Exhibit 104
Selected Key Allied Agencies per Division

			Helicopters		Fixed Wing		
Division	Entity	County	Estimated Fleet Size	Make and Model	Estimated Fleet Size	Make and Model	Capabilities
Border	Riverside County SO	Riverside	5	(2) H-125 (3) AS350	0	N/A	SAR, NVG, Hoist, Downlink, Patrol
	Riverside PD	Riverside	1	H-145	1	Cessna 182	Patrol, Surveillance
	San Diego Co. Sherriff	San Diego	8	(4) Bell 407gxi (3) Bell 205 (1) Bell 412	0	N/A	Patrol, SAR, Hoist
	San Diego PD	San Diego	4	(3) AS350 B3 (1) H-125 B3e	0	N/A	Patrol, NVG, Downlink
	Imperial County	Imperial	0	N/A	0	N/A	No Air Operations Program
Central	Fresno PD	Fresno	2	Airbus EC-120	0	N/A	Patrol Function Only
	Fresno County SO	Fresno	2	MD-500	1	Cessna 206	Limited Rescue ability, Non-EMS
	Stanislaus County SO	Stanislaus	1	Bell 206-L4	0	N/A	Patrol Function Only (Limited)
	Modesto PD	Stanislaus	0	N/A	1	GippsAero GA-8	Patrol Function Only (Limited)
	Tulare County SO	Tulare	0	N/A	1	Cessna 182	Patrol Function Only (Limited)
	Kings County SO	Kings	0	N/A	1	Cessna 206	Patrol Function Only (Limited)
	Kern County SO	Kern	2	Airbus H-125	0	N/A	Limited Rescue ability, Non-EMS
	CalFire	Tuolumne	1	Sikorski UH-60	0	N/A	Primarily Firefighting; BLS Only
	Merced County SO	Merced	1	Bell 205	1	Cessna 206	Primarily SWAT Support
	Kern County Fire Department	Kern	2	Bell 205	0	N/A	Primarily Firefighting/BLS Only

			Helicopters		Fixed Wing		
Division	Entity	County	Estimated Fleet Size	Make and Model	Estimated Fleet Size	Make and Model	Capabilities
Coastal	Santa Cruz County SO	Santa Cruz	0	N/A	1	Cessna 172	Not staffed regularly; has not flown in the past 2 years; based at Watsonville airport.
	Monterey County SO	Monterey	0	N/A	1	Cessna 206	Not staffed regularly; equipped with a fuselage mounted camera; only flies scheduled missions; does not respond for other calls; based at Salinas airport.
	San Benito County SO	San Benito	0	N/A	0	N/A	No Air Operations Program
	San Luis County Obispo SO	San Luis Obispo	0	N/A	1	Cessna 182	Not staffed regularly; when it does fly, a civilian aero squadron pilot flies and a deputy is the flight officer; has been operational for four years now; some years they have not flown a single hour; so far this year it has flown under three hours for training only; equipped with a fuselage mounted camera; has not flown a mission yet, just training missions; based at San Luis Obispo airport.
	Santa Barbara CountySheriff	Santa Barbara	5	2 - Bell 206 2 - Hueys 1 - Blackhawk/ Firehawk	1	Cessna 206	Staffed regularly; unit formed as a combination of sheriff deputies and fire personnel; they respond to both law enforcement and fire related calls; they do hoist operations during the day and night; they do have staffing shortages where they do not fly; based at Santa Ynez airport.
	Ventura County SO	Ventura	4	3 - Hueys 1 - Blackhawk/ Firehawk	0	N/A	Staffed regularly; unit formed as a combination of sheriff deputies and fire personnel; they respond to both law enforcement and fire related calls; they do hoist operations during the day and night; they prioritize fire related calls over law enforcement calls; based at Camarillo airport.

			Helicopters		Fixed Wing		
Division	Entity	County	Estimated Fleet Size	Make and Model	Estimated Fleet Size	Make and Model	Capabilities
Golden Gate	Contra Costa SO	Contra Costa	2	Bell 407	0	N/A	Primarily Law Enforcement; limited Search and Rescue (SAR)
	Alameda SO	Alameda	1	Bell 505	2	Cessna 206	Primarily Law Enforcement
	East Bay Regional Parks		1	H-125	0	N/A	Primarily Law Enforcement
	Oakland PD	Alameda	3	MD500	1	Cessna 182	Primarily Law Enforcement
	San Jose PD	Santa Clara	1	H-125	1	Cessna 182	Primarily Law Enforcement
	Santa Clara SO	Santa Clara	1	EC120	0	N/A	Primarily Law Enforcement
	Sonoma SO	Sonoma	1	Bell 407	0	N/A	Law Enforcement and Search and Rescue; outside of the CHP Golden Gate Division, this is the most reliable resource; this is the only other resource the provides ALS patient care and transport to the hospital with a paramedic.
	San Mateo SO	San Mateo	0	N/A	1	Cessna 206	Law Enforcement on a volunteer basis.
	FBI	N/A	0	N/A	1	Cessna 182	Transient Availability; not available for emergency calls.
	Coast Guard	N/A	1	HH65 Dolphin	0	N/A	Search and Rescue in the ocean and beach areas.
	DEA	N/A	0	N/A	1	Cessna 206	Limited; not a resource for emergencies.
	Marin SO	Marin	0	N/A	1	Cessna 182	Primarily Law Enforcement

			Helicopters		Fixed Wing		
Division	**Entity**	**County**	**Estimated Fleet Size**	**Make and Model**	**Estimated Fleet Size**	**Make and Model**	**Capabilities**
Inland	San Bernardino County SO	San Bernardino	10	(6) H125, (1) B3, (1) Bell 412, (1) Bell 212, (1) Bell Huey	5	(2) Airvans, (2) Beech C12's, (1) Rockwell	
	Ontario PD	San Bernardino	3	H125	0	N/A	
	Riverside County SO	Riverside	5	(2) H-125 (3) AS350	0	N/A	SAR, NVG, Hoist, Downlink, Patrol
	Riverside PD	Riverside	1	H-145	1	Cessna 182	Patrol, Surveillance
	Fontana PD	San Bernardino	1	(1) H125, (1) R-66	0	N/A	General Patrol
Northern	CalFire	Tehama	1	S-70 Firehawk	0		Hoist Rescue; Basic Life Support (BLS); year-round
	CalFire	Modoc	1	UH-1H Super Huey	0		Hoist Rescue; BLS; seasonal
	CalFire	Humboldt	1	UH-1H Super Huey	0		Hoist Rescue; BLS; seasonal
	CalFire	Mendocino	1	S-70 Firehawk	0		Hoist Rescue; BLS; seasonal
	Coast Guard	Humboldt	1	MH-65 Dolphin	0		Coastal Responses; Hoist Rescue; BLS

			Helicopters		Fixed Wing		
Division	Entity	County	Estimated Fleet Size	Make and Model	Estimated Fleet Size	Make and Model	Capabilities
Southern (Metro)	Los Angeles PD	LA	17	Airbus H125	1	King Air 200	Operates 3 helicopters 22 hours per day, General Law Enforcement Support (GLES), SWAT, Surveillance
	Los Angeles County SO	LA	17	AS350 / (2) Super Puma	3	Cessna 210 / KA200	Operates 3 helicopters 22 hours per day, GLES, SWAT, SAR
	Burbank PD	LA	1	MD 500	0	N/A	GLES
	Glendale PD	LA	1	MD 500	0	N/A	GLES
	Pasadena PD	LA	4	Bell O/H-58	0	N/A	GLES
	Pomona PD	LA	1	MD 500	0	N/A	GLES
	Bellflower/Skynight	LA	1	R-66	0	N/A	GLES
	Long Beach PD	LA	3	AS350	0	N/A	GLES
	Hawthorne PD	LA	1	MD 500	0	N/A	GLES
	Corona PD	Riverside	1	Bell 407	0	N/A	GLES
	Riverside SD	Riverside	5	Airbus H125/H145	0	N/A	GLES, SAR, SWAT
	San Bernardino SD	San Bernardino	11	Airbus/Bell	5	Airvan/Beechcraft	GLES, SAR, SWAT
	Anaheim PD	Orange	3	AS350	1	Cessna Caravan	GLES
	Huntington Beach PD	Orange	3	MD 500	0	N/A	GLES
	Orange SD	Orange	5	Airbus H125 / UH-1	1	Airvan	GLES, SAR, Surveillance
	San Diego PD	San Diego	4	Airbus H125	0	N/A	GLES
	San Diego SD	San Diego	7	Bell 407/412/205	0	N/A	GLES, SAR
	Ontario PD	San Bernardino	2	Airbus H125	0	N/A	GLES

			Helicopters		Fixed Wing		
Division	Entity	County	Estimated Fleet Size	Make and Model	Estimated Fleet Size	Make and Model	Capabilities
Valley	Butte County SO	Butte	1	H-125	0	N/A	On call helicopter operations. Part time hours vary
	Placer County SO	Placer	1	H-125	1	Piper Navajo	Hours of helicopter operation vary. Part time operation. Airplane is for transport only.
	Sacramento Metro Fire	Sacramento	1	UH-1 Huey	0	N/A	Seasonal. Rescue only in Sacramento County. Hours vary.
	CalStar 3	Placer	1	H-135	0	N/A	Medevac callout only. Private.
	Reach 2	San Joaquin	1	H-135	0	N/A	Medevac callout only. Private.
	Reach 7	Yuba	1	H-125	0	N/A	Medevac callout only. Private.
	Calstar 6	El Dorado	1	H-125	0	N/A	Medevac callout only. Private.
	Enloe Flight Care	Butte	1	H-125	0	N/A	Medevac callout only. Private.
	Careflight 3	Nevada	1	H-125	0	N/A	Medevac callout only. Private.
	PHI Med 41&42	Stanislaus	1	H-135	0	N/A	Medevac callout only. Private.
	Sacramento PD	Sacramento	2	Bell 505 Bell 206	0	N/A	Only service City of Sacramento. Operational one shift into the evening. Law Enforcement only.
	Sacramento SO	Sacramento	3	EC-120/ UH-1 Huey	1	Cessna 206	Only service City of Sacramento. Operational one shift into the evening. Law Enforcement only.
	Stockton PD	San Joaquin	1	Bell 505	0	N/A	Only service City of Stockton. Operational one shift into the evening. Law Enforcement only.
	San Joaquin SO	San Joaquin	0	N/A	1	Cessna 206	Only service County of San Joaquin. Part time operation. Hours vary.