



San Francisco International Airport

Marin County Overflight Study

**Prepared by the
SFO Aircraft Noise Abatement Office**

January 2, 2001

Marin County Overflight Study

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Marin County Overflight Study

Executive Summary

Pursuant to the direction of Director John L. Martin, the SFO Airport Noise Abatement Office staff and consultants conducted a technical evaluation of aircraft operations and airspace overlying Marin County, CA. This comprehensive seven month analysis included studying the composition, patterns and frequency of overflights regardless of origin or destination; the noise impacts as sampled with portable monitoring equipment at three separate locations; and, air traffic procedures, including airspace study and the review of improvements with the potential to mitigate aircraft overflight noise. The Overflight Study contains explanations of each of these components in a level of detail which the layperson should find thorough yet understandable.

The Study found that most of Marin County's air traffic was comprised of SFO arrivals, OAK arrivals and general aviation overflights. Variations in airport weather causes some impact upon flight patterns, especially when aircraft are held over the Point Reyes area in West Marin. Potential changes in the holding pattern location and other standard flight routes were studied, especially with consideration of moving some air traffic offshore over the Pacific Ocean. With the possible exception of a relocated holding pattern, however, the proximity of offshore military airspace appears to preclude substantial changes to the arrival traffic flows. Certain flight patterns were identified that have the strong potential for reducing late night overflight noise over Marin County. Additionally, two recommendations were included that provide the basis for future dialogue regarding long term equipment and airspace improvements.

Marin County Overflight Study

Background:

In May 2000, SFO Airport Director John L. Martin directed the Aircraft Noise Abatement Office and its consultants to conduct an analysis of aircraft overflight noise and air traffic procedures affecting Marin County. There were three methods of study used to develop this report: 1) research of actual flight tracks and patterns using data collected using TAMIS technology; 2) review of actual noise/acoustical data collected by the consulting firm Harris, Miller, Miller and Hanson (HMMH); and 3) review of air traffic control (ATC) airspace design, procedures and usage relative to Marin County overflights.

Marin County is comprised of approximately 521 square miles, with a total population of approximately 246,000 (1998 census). The most densely populated areas are located along the central and eastern portion of the County. Uneven higher terrain up to 2,600 feet exists lengthwise through the central and western portion of the County. Land use is a mixture of residential, commercial, light industrial and open space. The western portion of Marin County contains the Point Reyes National Park, sparsely populated ranch land and several small communities such as Inverness and Bolinas (*Figure 1*).

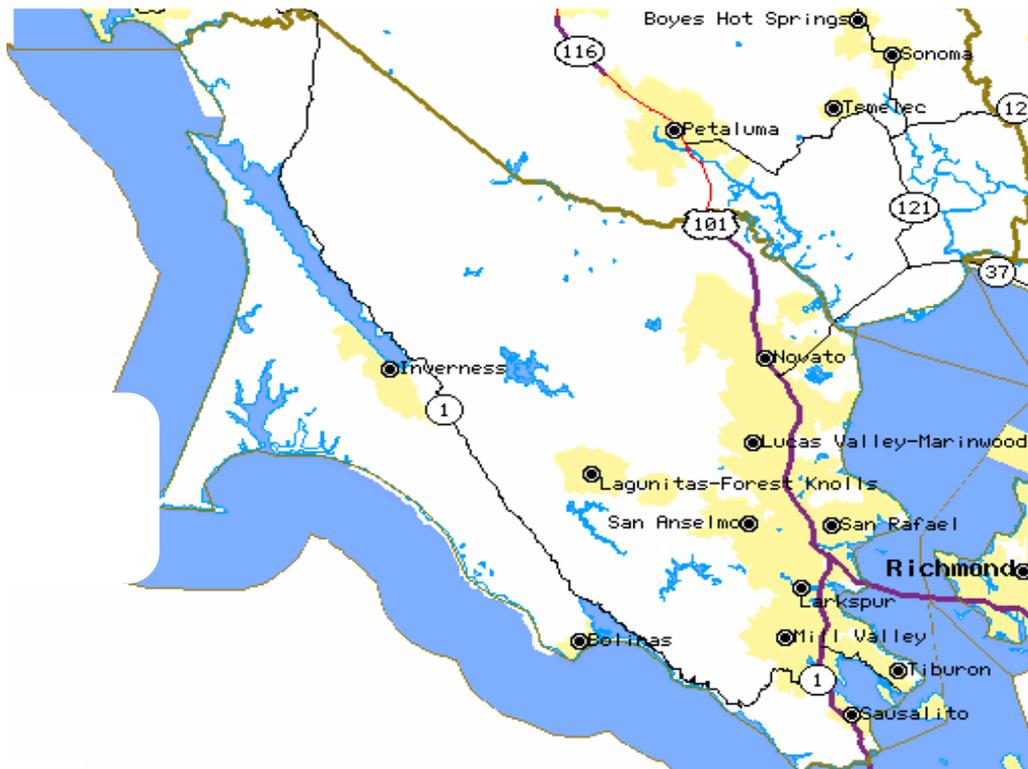


Figure 1: Marin County, CA

Marin County does not contain its own commercial airport. Gness Field is a general aviation airport located near Novato in the northeastern portion of the County. There is a small private airport located near San Rafael, as well as a helicopter and seaplane base located near the northwest edge of Sausalito. Hamilton Air Force Base is a decommissioned military installation located near Novato, now being developed for residential use. The City of San Rafael is the Marin County seat and is near the center of the County. San Rafael is located approximately 22 air miles from the Oakland International Airport (OAK) and 24 air miles from the San Francisco International Airport (SFO). San Rafael is also located approximately 40 air miles from the Santa Rosa/Sonoma County Airport, a mid sized regional airport that accommodates general aviation traffic along with some smaller commercial traffic, helicopters, firefighting air tankers and private jet aircraft.

The SFO Aircraft Noise Abatement Office and the Federal Aviation Administration have previously assisted Marin County residents in the analysis of aircraft overflight and noise data. Several detailed acoustical noise studies have been conducted in Marin County, particularly within the Tiburon and the Point Reyes areas. In May 2000, Marin County published a report containing a set of internal policies¹ with the objective of reviewing County airspace issues. In addition, Congresswomen Lynn Woolsey (D-Petaluma) has discussed constituents' concerns with FAA Administrator Jane Garvey. As a result, the FAA Regional Office recently undertook its own airspace study of the Marin County area. Nationwide, there has been legislation to reduce aircraft overflights and maximize the tranquility of National Parks, though most of these efforts have focused upon low altitude, high frequency sightseeing operations in the Grand Canyon and at Yellowstone.

Analysis:

1. *Overflight Composition.* Marin County's Gness Field typically generates few aircraft operations. Most of the aircraft overflights operate between airports outside the County. There are several flight patterns commonly utilized over Marin County. These include:
 - a) *San Francisco and San Jose Airport arrivals.* These are known as "Point Reyes Arrivals" (Figure 2) and constitute the heaviest overflight pattern in Marin County. Most of these aircraft are routed near the western half of the County, often over or near the Point Reyes VOR navigation aid, located atop Mt. Vision within the Point Reyes National Park area. A thirty-day traffic count was conducted for the period of June 7 to July 6, 2000 and is summarized within *Attachment 1*. This pattern consisted primarily of jet aircraft (approximately 64%). Lower altitude aircraft were almost entirely propeller and turboprop aircraft segregated from higher altitude jet traffic flows. Jet aircraft were consistently restricted to higher altitudes of 11,000 feet MSL² and above due to departing traffic passing beneath them at 10,000 feet or below near

¹ The "County of Marin Aircraft Overflight and Airspace Issues Report" of 5/16/00 is available via The Internet at: <http://www.co.marin.ca.us/BOS/AGDOCS/airover-000516.pdf>.

² MSL is altitude expressed in feet measured from "mean sea level." AGL is altitude expressed in feet measured above ground level. Below 18,000', Air Traffic Control consistently utilizes MSL altitude, as does this report. Aircraft AGL altitude over a point can be derived by subtracting the location's ground elevation from the aircraft's MSL altitude.

the City of San Francisco. The typical origination of the jet arrivals included the Pacific Northwest, the Far East and Europe. On average, there were 158 jet arrivals a day. About 24% of these were heavy jets such as the Boeing 747/767/777 and Airbus 340.

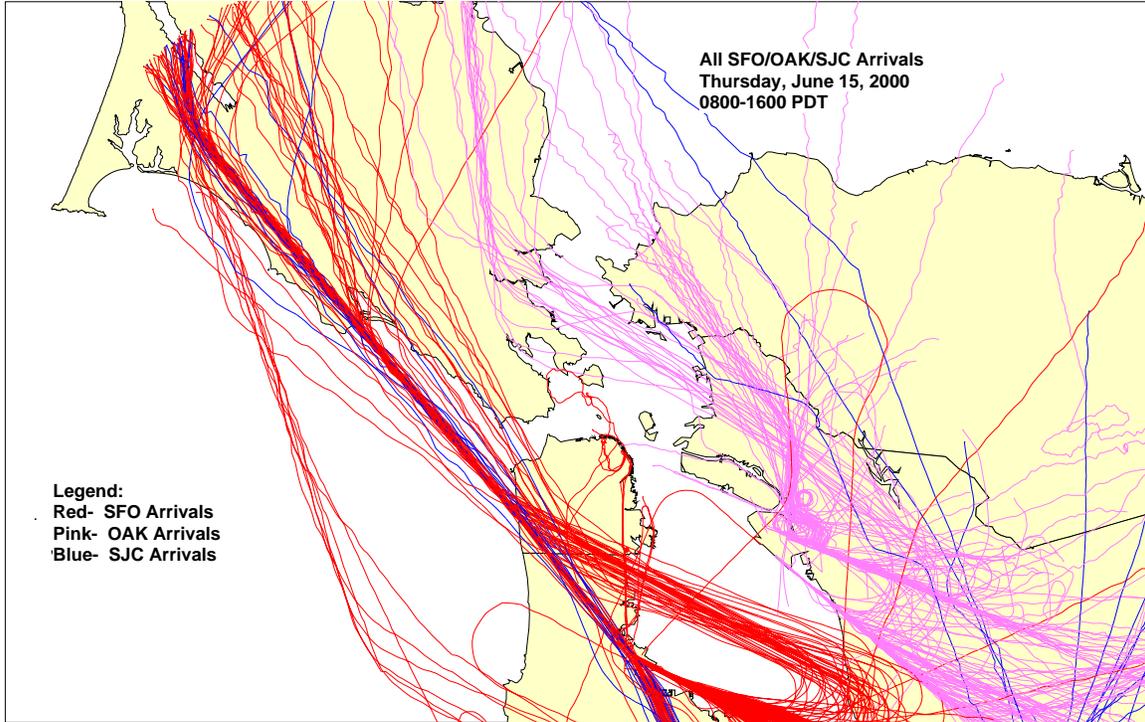


Figure 2: SFO, OAK and SJC Arrivals (West Flow)

This arrival pattern is fairly consistent regardless of wind and weather conditions, though conditions at SFO commonly require the use of an ATC holding pattern near the Point Reyes VOR, described on page 10 of this report. SJC arrivals over this area number about eight per day. During southerly wind conditions, common during storm conditions, SFO arrivals use an opposite direction (“southeast”) flow to Runways 19 after passing Point Reyes. When this occurs, some SFO and OAK arrivals pass at lower altitudes over Southern Marin County near Sausalito (*Figure 3*).

- b) *Oakland Airport arrivals.* The communities of Sausalito, Tiburon, Belvedere, and Corte Madera lie between 14 and 19 nautical miles from the runway at OAK. Specific runway use varies based upon the winds and weather. During light or westerly wind conditions, approximately 18 aircraft per day approaching OAK pass over or east of these areas at altitudes of approximately 5,900 feet as they enter the “downwind” leg of their approach to Runway 29 (*Figure 2*). During the southeast (opposite direction) traffic flow, the Runway 11 final approach course of OAK arrivals passes over or near these towns at lower altitudes (i.e., 4000 feet, *Figure 3*). During southeast flow, OAK arrivals currently average 55 overflights per day. The typical origination of these flights in both traffic flows is domestic, including the Pacific Northwest. Less than 5% of these aircraft are heavy jets.

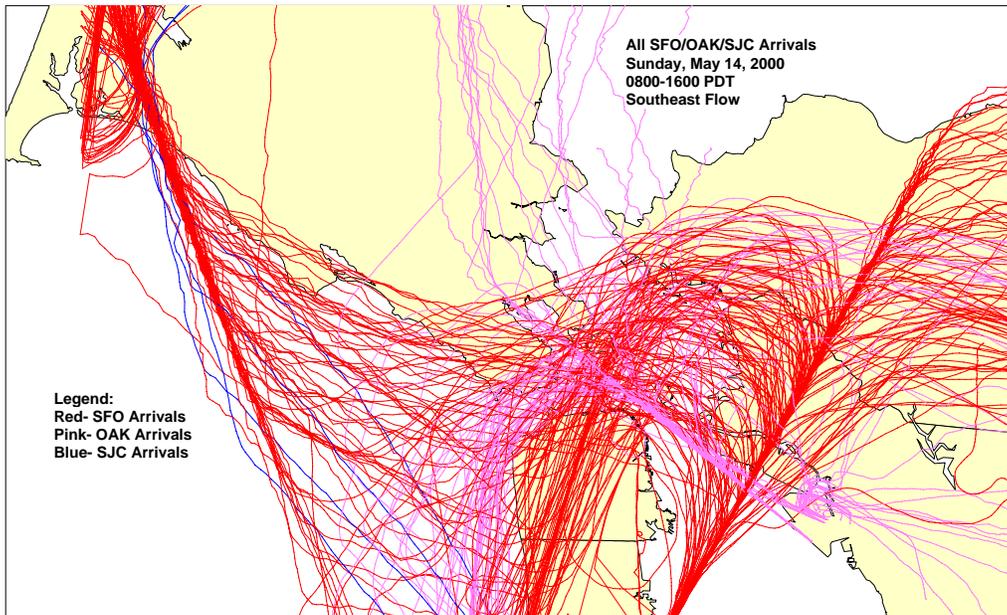


Figure 3: SFO, OAK, SJC Arrivals (South East Flow)

c) *SFO and Oakland Departures.* Eastbound jet departures from Oakland Airport sometimes proceed straight-out over Southern Marin County at an altitude of about 7,800 feet. These aircraft number between three and five per day, tending to occur during busier air traffic periods. Turboprop aircraft departing from SFO destined for Northern California commonly overfly the western edge of San Francisco Bay adjacent to Tiburon. These aircraft are typically at an altitude of about 10,000 feet and number between 10 and 15 per day. Occasionally, jets depart SFO Runway 28, sometimes overflying Southern Marin County enroute to the East Coast or Europe. During early mornings between 1 AM to 6 AM, SFO Runway 10 departures enroute to Anchorage or the Far East are routed via the Bay. These pass near the Town of Tiburon at an average altitude of ~9,000 feet, over San Rafael at about 11,000 feet, and over Novato above 13,000 feet. These aircraft average three to four a day (Fig 4).

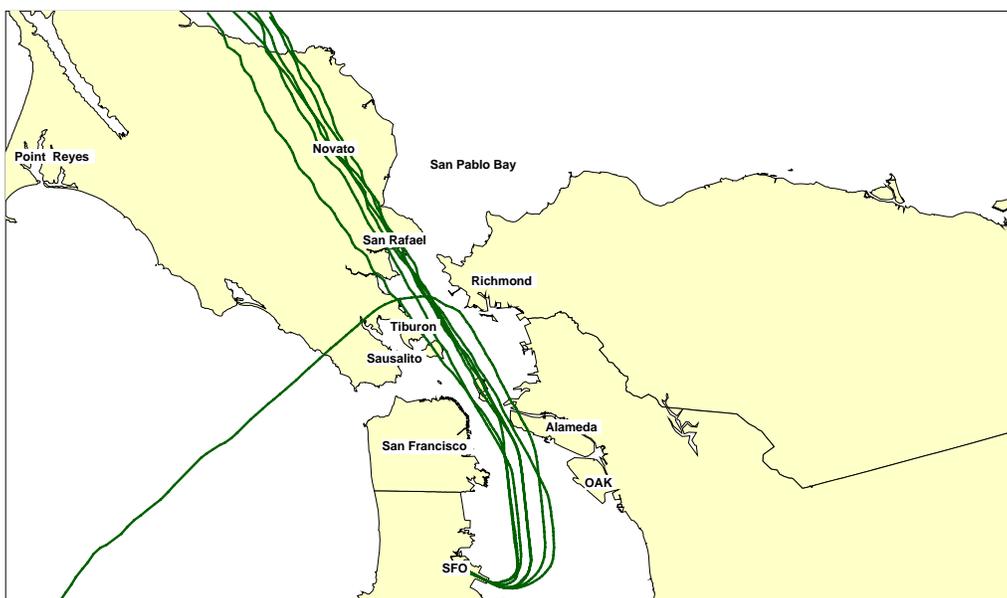


Figure 4, SFO Runway 10 Departures 6/16/00 1 AM to 6 AM

- d) San Francisco Far East Departures. Aircraft departing SFO for the Far East frequently navigate via Mendocino VOR enroute to a great circle route. Many of these aircraft navigate via an offshore airway known as Victor 199 (V199). When departing on Runway 28 between midnight and 6 AM, these aircraft are commonly issued direct routings by ATC to climb over Marin County between 7,000 and 12,000 feet. These number approximately 70 each month and are exclusively heavy jet aircraft using climb power during the early morning hours (*Figure 5*).

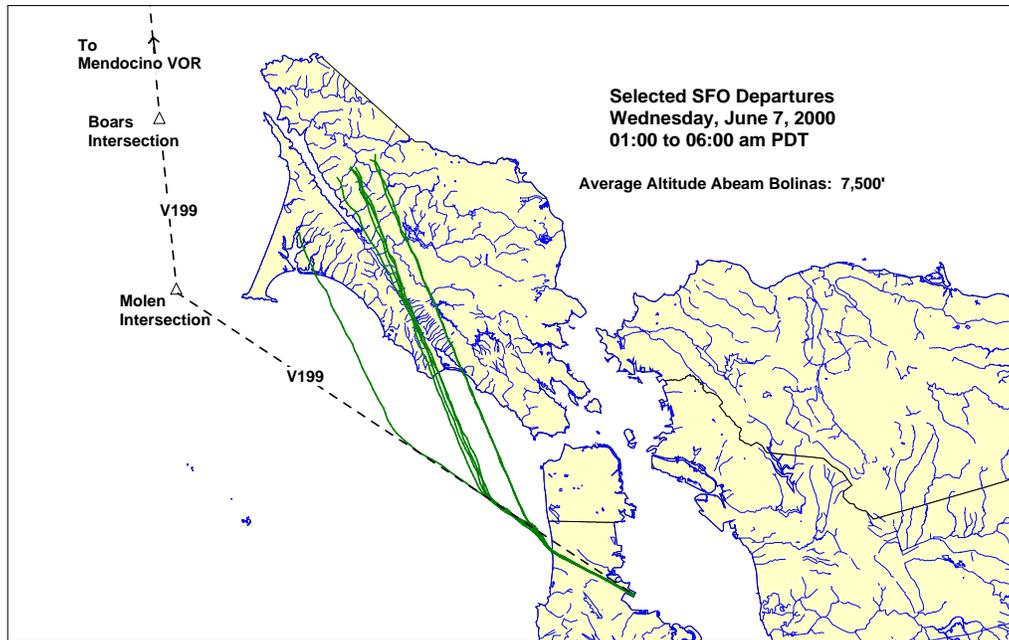


Figure 5: SFO Runway 28 Far East Departures (1 AM to 6 AM)

- e) Santa Rosa Departures. Some aircraft departing the Santa Rosa/Sonoma County Airport under positive ATC control, such as jets and turboprops, are typically directed to climb toward Point Reyes VOR before being turned on course. Because SFO's radar monitoring system does not cover this geographic area, we could not quantify the current activity levels of traffic affecting Marin County from the Santa Rosa Airport. Some of these are older business jet aircraft weighing less than 75,000 pounds that are not required to comply with the strict, nationwide Stage 3, or even Stage 2, noise requirements.
- f) High Altitude Overflights. Aircraft navigating between airports outside of the Bay Area, such as between Los Angeles and the Far East, commonly overfly Marin County at altitudes of 30,000 feet or more.
- g) General Aviation Traffic. Light aircraft flying under visual flight rules (VFR) are common. These may include propeller driven and helicopter traffic watch flights, training flights, sightseeing flights, aerial surveys, and light aircraft transitioning between outlying airports. Sightseeing flights of the Point Reyes National Park do not appear to be frequent. Our equipment does not track all VFR aircraft, but it

appears that these aircraft generate as many as 400 daily overflights of Marin County, varying with weather, typically at altitudes between 1,000 and 10,000 feet.

2. Noise Impact. To supplement our evaluation, portable noise monitors were temporarily installed at Point Reyes (6/6/00-6/23/00) and Bolinas (6/15/00-6/23/00). Previously, extensive noise monitoring was conducted within the Town of Tiburon (9/19/99-11/16/99 and 12/17/99-1/6/00). Acoustical consultants Harris, Miller, Miller and Hanson (HMMH) conducted this monitoring³. The FAA did not appear to have any knowledge of the placement of these noise monitors during the testing periods and our random reviews of flight tracks both before and after the testing periods were quite similar. However, early morning departures from SFO did use Runways 10, the preferred noise abatement runways, more commonly between 6/6/00 and 6/23/00.

- a) Point Reyes Noise Analysis. The conclusions of the HMMH August, 2000 Technical Report "Aircraft Overflight and Noise Analysis at Mt. Vision Road, Point Reyes National Seashore, California" were as follows:

"Based on observations and collected data, we conclude the following:

- 1) *Aircraft noise exposure measured 27 dB to 39 dB CNEL.*
- 2) *Aircraft noise was primarily due to arrivals at SFO and SJC at altitudes above 10,000 feet MSL.*
- 3) *Aircraft arrivals to SFO dominated the aircraft contribution to the noise exposure level.*
- 4) *Aircraft increased the total daily CNEL by 0 to 2 dB.*
- 5) *Community, or non-aircraft noise exposure of 41 dB – 60 dB exceeds aircraft exposure and is most likely affected by the prevailing windy conditions at the site."*

- b) Bolinas Noise Analysis. The Conclusions of the HMMH August, 2000 Technical Report "Aircraft Overflight and Noise Analysis at Terrace Avenue, Bolinas, California" were quite similar to the Point Reyes analysis, as follows:

"Based on observations and collected data, we conclude the following:

- 1) *Aircraft noise exposure measured 32 dB to 38 dB CNEL.*
- 2) *Aircraft noise was primarily due to arrivals at SFO and SJC at altitudes above 10,000 feet MSL.*
- 3) *Aircraft arrivals to SFO dominated the aircraft contribution to the noise exposure level.*
- 4) *Aircraft increased the total daily CNEL by 0 to 1 dB.*
- 5) *Community, or non-aircraft, noise exposure of 45 dB – 50 dB exceeds aircraft noise exposure."*

- c) Tiburon Noise Analysis. The March, 2000 HMMH Technical Report "Aircraft Overflight and Noise Analysis at Tiburon, California" found:

³ Copies of the complete HMMH Noise Monitoring Reports may be obtained through the SFO Aircraft Noise Abatement Noise Office at (650) 821-5100.

“Based on observations and collected data, we conclude the following:

- 1) Aircraft noise exposure measured 19 dB – 44 dB CNEL.*
- 2) During the west flow plan, OAK Runway 29 arrivals and SFO Runways 01, 10 and 28 departures dominated the aircraft contribution to the noise exposure level.*
- 3) During the southeast flow plan, OAK Runway 11 arrivals and SFO Runway 19 arrivals dominated the aircraft contribution to the noise exposure level.*
- 4) Aircraft increased the total daily CNEL by 0 to 1 dB.*
- 5) Non-aircraft noise exposure exceeds aircraft noise exposure.*
- 6) Both the west plan and the southeast plan operations produced comparable aircraft sound exposure levels.”*

- d) Our Summary of the Noise Analyses.* Each of the areas monitored is well outside of both the SFO and the OAK 65 CNEL contour boundaries⁴. The HMMH studies measured “Total CNEL” at the three sites. The Total CNEL values consisted of two components. One component measured the “community-only” types of ambient noise, such as vehicles, people, animals, wind, and power tools. The “aircraft-only” component was measured and combined with the community-only CNEL to provide the Total CNEL values for that site.⁵

Without exception, aircraft noise contributed between 0 dB and 2 dB to the daily total CNEL measurements recorded during the survey period. Occasionally, single overflight noise events will be more perceptible or even annoying, particularly during periods of low ambient noise, such as late nights and early mornings. Also, use of an ATC holding pattern over Point Reyes intermittently causes substantial increases in aircraft overflights. Therefore, we have principally focused our analysis upon potential improvements in these areas.

3. Air Traffic Procedures.

a. Description of airspace.

- 1) Controlling Authorities.* Two authorities control the airspace over Marin County: the FAA (Oakland, CA ⁶) Bay TRACON and the FAA (Fremont, CA) Oakland Center. Bay TRACON controls Instrument Flight Rule (IFR) traffic below 12,000 feet roughly from the Mill Valley area southward. Oakland Center handles all IFR traffic from Mill Valley north and easterly, in addition to traffic at higher altitudes throughout Northern California and the Pacific. The United States Military controls much of the airspace over the Pacific Ocean west of Marin County, through the jurisdiction of several “Warning Areas.”

⁴ CNEL contour is an accepted metric utilized to evaluate the impact of aircraft noise upon communities. Residential land use within the 65 CNEL contour is considered to be incompatible.

⁵ Total CNEL values are summed logarithmically; for example, measurements of 49.3 CNEL (dB) community and 36.3 CNEL (dB) aircraft equal a Total 49.5 CNEL (dB).

⁶ The Bay TRACON will be relocated to Mather Field, Sacramento, CA in July 2002. The new facility may assume additional airspace from the Oakland Center and will be renamed the “Northern California TRACON.”

- 2) Victor Airways. Within the United States, a fixed route system is established for air navigation purposes. At altitudes below 18,000 feet, this is known as the VOR or Victor Airway system. Victor Airways -- sometimes called “highways in the sky” -- are controlled airspace segments eight nautical miles in width. Much, but not all IFR aircraft navigation is conducted between VORs on Victor Airways⁷. Three Victor Airways bisect Marin County, only one of which (V27) is commonly used by jets. Another Airway (V199) lies just offshore to the west (*see Attachment 3*).
- 3) Vectoring of Aircraft. ATC commonly removes aircraft from non-standard routes via issuance of a heading and navigational guidance by radar. This is done for traffic separation, terrain avoidance, to obtain an operational advantage, or for noise abatement. As a result, there are common but not “required” flight routes over Marin.
- 4) Holding Patterns. A holding pattern is a predetermined “racetrack” type maneuver assigned by ATC that keeps aircraft within certain airspace while awaiting further clearance⁸. Oakland Center frequently assigns holding at the Point Reyes VOR above 12,000 feet altitude to SFO arrivals when weather conditions suddenly deteriorate, or when weather does not improve as rapidly as forecast. Aircraft may circle for a few minutes or for more than an hour, depending upon the ability of Bay TRACON and SFO to accommodate the aircraft⁹.
- 5) Military/Special Use Airspace.
 - a) Warning Areas. A warning area is special use airspace that contains activity that may be hazardous to nonparticipating (i.e., “nonmilitary”) aircraft. It is airspace that otherwise would be a restricted area¹⁰, but the FAA has no strict authority over since it is usually above international waters. Military operations typically conducted in such areas are aerial refueling, air combat training, practice and testing. There are two such areas over the Pacific Ocean adjacent to Marin County: W-260 and W-513 (*Attachment 3*). It is believed that until April 1997, these areas were used mostly by aircraft based at Alameda NAS, now decommissioned. According to the Navy FACSFAC (Fleet Area Control and Surveillance Facility, San Diego, CA), Warning Areas W-260 and W-513 are currently used by Naval Air Station (NAS) Fallon, NV; NAS Lemoore, CA; NAS Whidbey Island, WA; the Fresno Air National Guard; and Boeing Aircraft Corporation.

⁷ Seven VOR navigation aids are located within fifty miles of Marin County. The FAA may eventually decommission VORs through use of Global Positioning System (GPS) technology. However, this is not expected to significantly alter the typical air traffic routes near busy airports.

⁸ The FAA implements “ground delay” and “ground hold/stop” programs at domestic departure airports, especially those on the West Coast, to minimize the impact of single stream operations at SFO. Nonetheless, the highest level of efficiency is achieved by having some aircraft in holding patterns prepared to enter the final approach area when the clouds dissipate or the weather improves.

⁹ It is expected that airborne holding will significantly decrease should SFO’s runways be reconfigured as proposed.

¹⁰ “Restricted Areas” are those in which unauthorized penetration during advertised hours is not only illegal, but also extremely dangerous. These generally contain such operations as artillery firing, guided missiles or aerial gunnery.

- b) *Air Defense Identification Zone.* An Air Defense Identification Zone (ADIZ) is airspace established at U.S. borders in which the ready identification of inbound civil aircraft is required in the interest of national security.¹¹ The Coastal ADIZ generally parallels the Marin County shoreline approximately 20 nautical miles offshore (*Attachment 3*). Even though national defensive strategies based on coastal defense appear to be outmoded¹², it is impractical to consider any airspace modifications that infringe upon the ADIZ.
- c) *Procurement of Military Airspace.* Previous efforts to obtain the civil use of other military airspace has, unfortunately, proven to be a protracted process taking years to accomplish. Such efforts are not commonly successful. Also, the FAA has identified other military areas it desires use of for significant operational reasons.

b. Potential Modifications studied.

- 1) *Use of V199 for SFO/SJC Arrivals.* It was suggested at the May, 2000 Regional Airport Planning Committee (RAPC) meeting that the FAA consider rerouting SFO and SJC arrivals via V199 to use the offshore oceanic airspace to the west of Point Reyes. We have discussed this proposal with both the Bay TRACON and Oakland Center, who apparently are preparing a detailed response to Congresswoman Woolsey through Administrator Garvey. In our view, moving the Point Reyes Arrivals flow westerly to V199 is impractical due to the following reasons:
 - a) *Shift of upstream traffic.* A shift would occur of some higher altitude arrival traffic above 15,000 feet toward the Northern Sonoma County, Jenner and Sea Ranch, CA areas if flights are routed offshore to intercept V199.
 - b) *Air Traffic Control conflicts between Point Reyes Arrivals and SFO/SJC departures on V199.* SFO and SJC departures for the Far East, although not high in number, commonly use V199, climbing through altitudes that would conflict with opposite direction arrivals if using the same routing. Even if portions of Military Warning Areas W260 and W513 became available, this conflict would exist, as the Coastal ADIZ would prevent the establishment of dual offshore airways. Dual airways, each eight miles wide, would infringe three to four miles into the ADIZ.
 - c) *Effect upon SFO and OAK departure traffic.* Aircraft departing OAK and Runway 01L at SFO for southwestern U.S. destinations tend to climb over or near the City of San Francisco toward the Pacific Ocean. Most of these aircraft pass beneath jets proceeding directly toward SFO from Point Reyes. If the Point Reyes Arrivals were farther west than their current pattern, altitude conflicts would commonly occur between the arrivals and departures. Also,

¹¹ Federal Aviation Regulations Part 99, Subpart 99.3a.

¹² See <http://versaware.kidsreference.lycos.com/getpage.asp?book=FWENCOline&abspage=/articles/006000a/006000367.asp>.

use of a noise abating right downwind arrival procedure to SFO known as “Down the Bay” could be impaired. It is possible that these conflicts could be reduced by use of a narrow route from V199 south of Marin County to existing flight patterns high over the City of San Francisco. However, the overriding impracticalities of routing the traffic past the V199 departure traffic, Military Warning Areas, and Coastal ADIZ cause these additional concerns to be abstract.

- 2) *Relocation of Point Reyes Holding Pattern.* There appears to be some flexibility regarding where Point Reyes Arrivals are circled during holding operations, even without the military airspace. Oakland Center and Bay TRACON conduct these operations near their facility boundaries, which might be modified within the next several years. At that time, it seems that use of an alternative holding area, such as over BOARS intersection (eight miles west of Dillon Beach) could be considered (*Attachment 3*). This is possible because it appears to be the first point at which aircraft departing SFO and SJC via V199 could routinely be crossed above (versus below) the holding aircraft. Aside from slightly increased ATC complexity, a BOARS holding pattern would have the following effects:
 - a) *Holding Pattern Direction.* Due to the military airspace, aircraft would need to be held in left turns instead of the current right turns over and northeast of BOARS at altitudes of about 12,000 to 18,000 feet. Although most of the holding pattern would be offshore, aircraft would still fly over land areas, particularly near the Bodega Bay area of Sonoma County. If portions of Military Warning Areas W260 and W513 east of the Coastal ADIZ became available, then the aircraft could be held in right turns, completely over water.
 - b) *Pattern exiting.* For reasons previously described (*section 3-b-1*), aircraft exiting a BOARS holding pattern would likely proceed via V107 (*Attachment 3*) and Point Reyes VOR enroute to SFO. This area already underlies the general flight pattern for holding aircraft.
 - c) *ATC Efficiency.* A holding pattern located further from the airport could decrease the efficiency of the traffic flow due to the slightly increased time required to fill gaps in arrival spacing. This concern could be eliminated by CTAS technology, described on page 11.
- 3) *Revised altitude within the SFO Molen IDP.* Aircraft departing SFO for the Far East and Alaska (~15/day) use the Molen Instrument Departure Procedure (Molen 3 IDP, *Figure 6*). The Molen IDP contains a low, 5,000-foot restriction adjacent to Stinson Beach that appears to be obsolete. However, the noise mitigation benefit from raising this restriction could be minor, as most aircraft departing Runways 10 and 19 are already assigned altitudes of 6,000 feet or more prior to STINS.

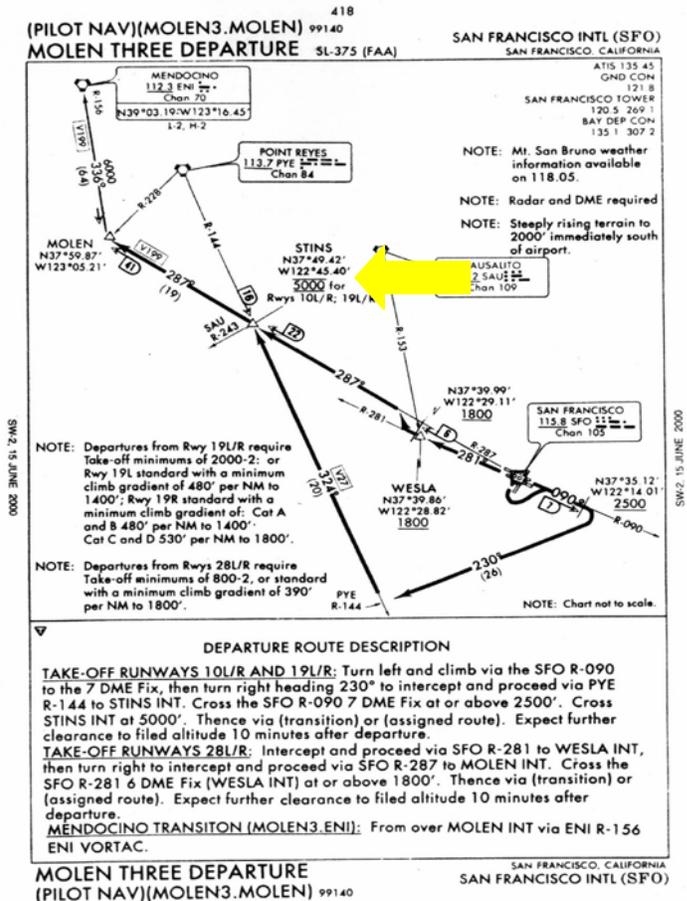


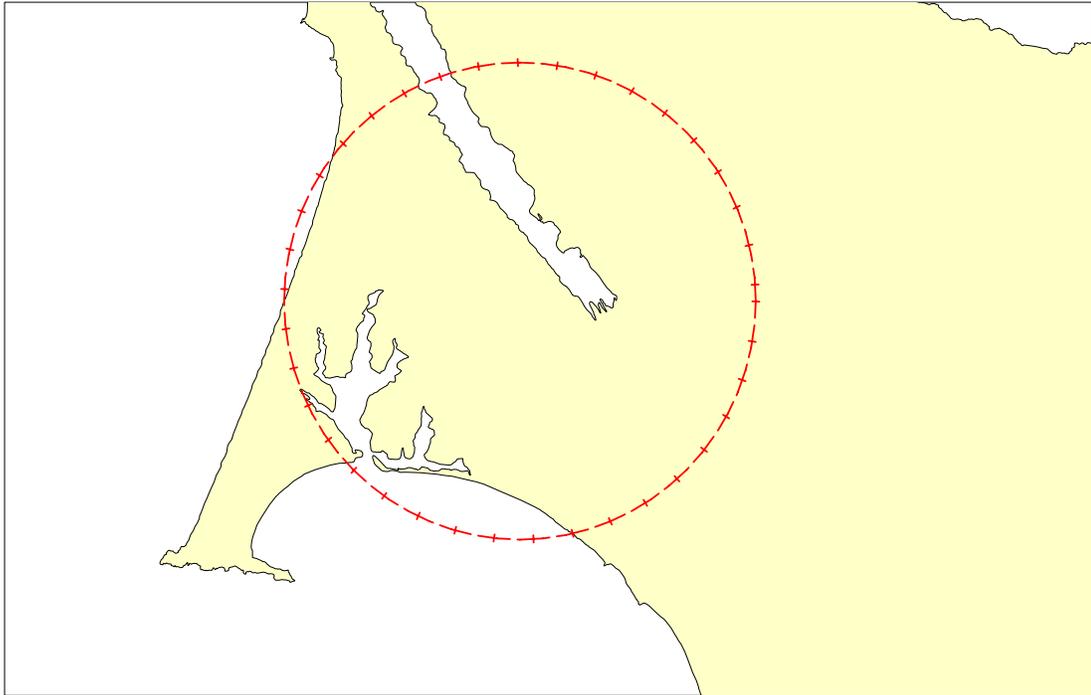
Figure 6, Molen Instrument Departure Procedure

- 4) Late night use of V199 for SFO departures. As previously discussed (see *Description of Airspace* on pages 4 and 5), aircraft departing SFO between midnight to 6 AM to the Far East are commonly routed directly over Marin County toward the Mendocino VOR Navigation Aid. These aircraft could be routed by ATC via V199 and Molen Intersection, as they commonly are during daytime hours. This change would add approximately eight nautical miles to this route which equals one or one and a half minutes flying time.
- 5) CTAS. The Center-TRACON Automation System, or CTAS, is a computer and radar software technology designed to assist Air Traffic Controllers to maximize the efficient usage of airspace. This equipment has the potential to reduce airborne holding and maximize the use of noise mitigating routes. The initial installation of CTAS in this area is scheduled for July 2002, with further design enhancements to follow.

Recommendations:

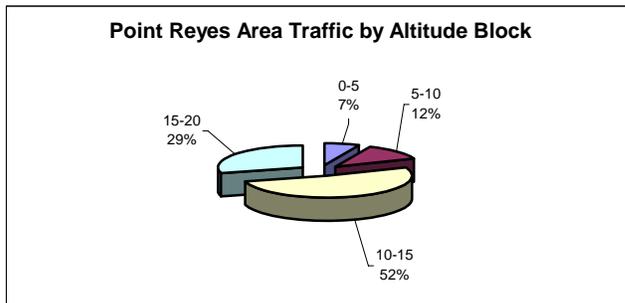
1. Point Reyes Holding Pattern. We recommend that the FAA Bay TRACON and the FAA Oakland Center evaluate the feasibility of utilizing BOARS Intersection as a supplementary or alternative holding point, if it could be determined that there would be no adverse noise impact on other communities.
2. Molen IDP. The 5,000 feet STINS Intersection Runways 10/19 crossing restriction should be revised upward to 6,000 feet.
3. Early Morning SFO Departure Overflights. It appears that Bay TRACON and Oakland Center could enhance noise relief by internally stipulating that SFO Oceanic Departures routed via Mendocino be directed to use over-water routings to V199 as much as practical, especially during late evening and early morning hours. This would eliminate up to 15 low climbing overflights of Marin County each morning.
4. CTAS. San Francisco International Airport, the Airport/Community Roundtable and other interested parties should continue to lobby the FAA Administrator to install CTAS, especially AFAST and PFAST enhancements, at the earliest possible date.
5. Offshore Airspace. The Airport should open a dialogue with the United States Department of Defense regarding the release of portions of Warning Areas W260 and W513 to full time civilian use. Discontinued military usage of limited portions of those warning areas east of the ADIZ boundary could enable other changes to aircraft holding patterns and thus provide additional noise relief to Marin County.

Point Reyes Area Overflight Statistics
June 7 through July 6, 2000
24 hours



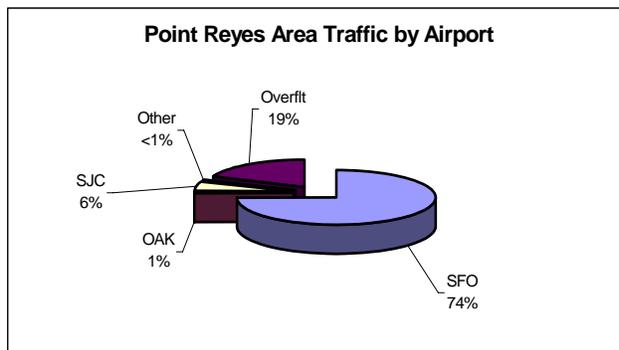
Traffic Count by Altitude (MSL)

Altitude	Count	%
0-4,999	318	6.7
5,000-9,999	577	12.1
10,000-14,999	2,470	52.0
15,000-19,999	1,382	29.1



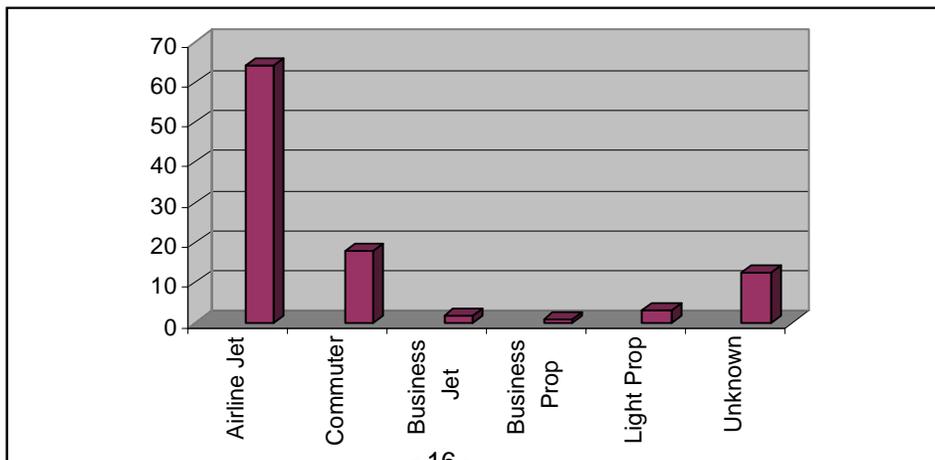
Traffic by Airport and Operation

Airport	Count	%	Arrivals	Departures
<i>SFO</i>	<i>3,541</i>	<i>74.6</i>	<i>3,470</i>	<i>71</i>
<i>OAK</i>	<i>27</i>	<i>.6</i>	<i>24</i>	<i>3</i>
<i>SJC</i>	<i>274</i>	<i>5.8</i>	<i>267</i>	<i>7</i>
<i>Other</i>	<i>905</i>	<i>19.0</i>		

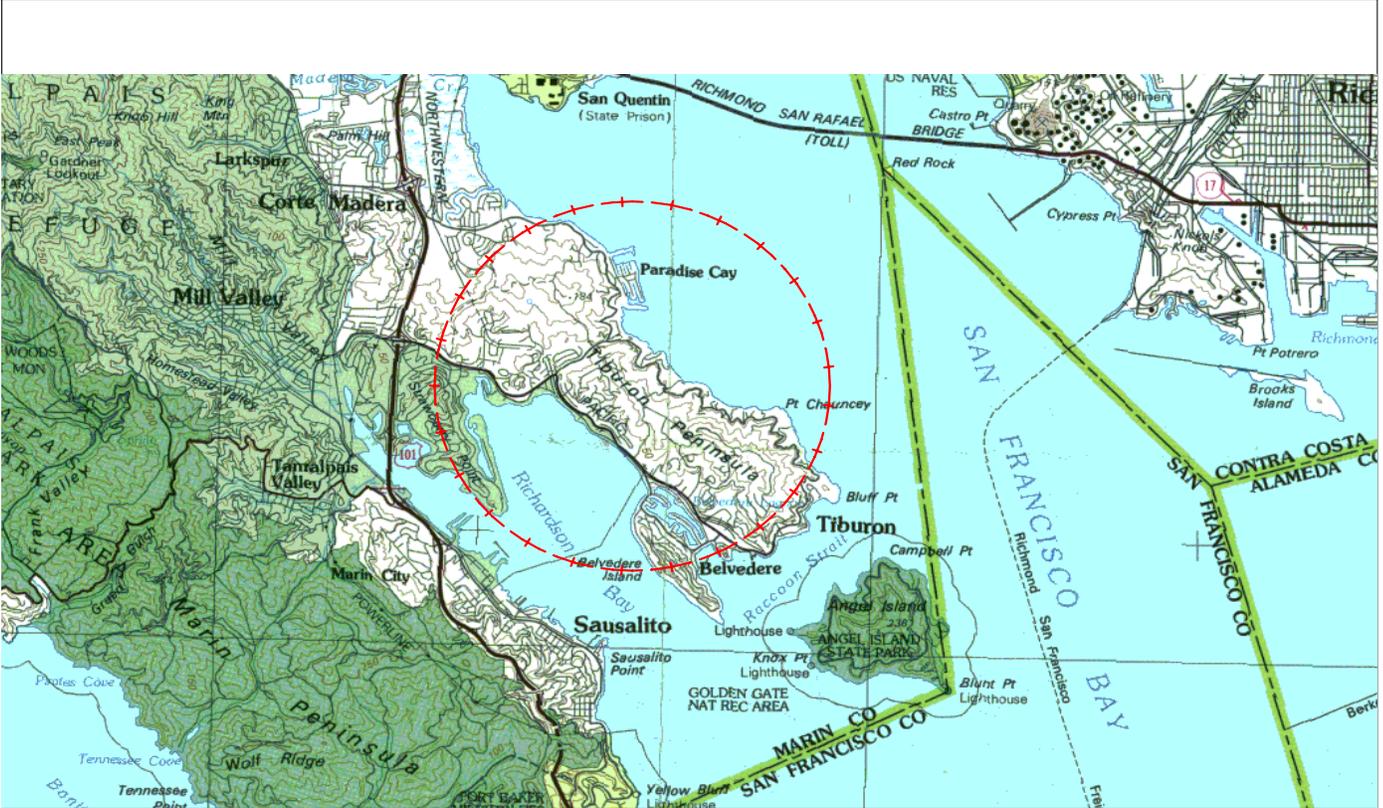


Traffic by Aircraft Type

Type	Count	%
Air Carrier Jet	3,040	64.1
Commuter Turboprop	850	17.9
Business Jet	77	1.6
Business Turboprop	46	1.0
Light Propeller	141	3.0
Unknown	594	12.5



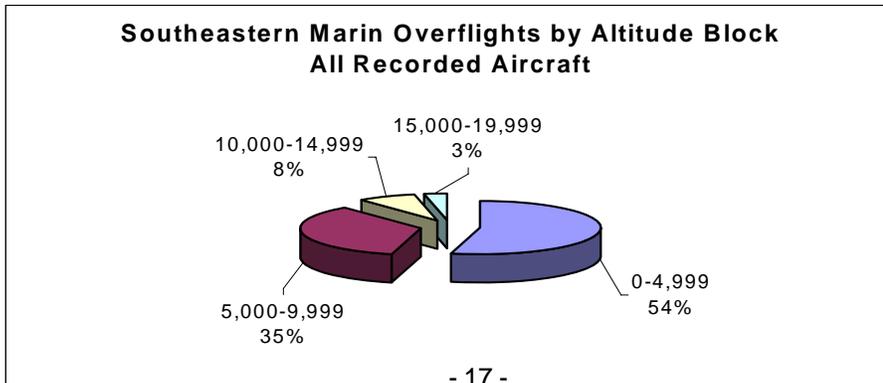
Southeastern Marin County/Tiburon Area Overflight Statistics
June 7 through July 6, 2000, 24 hours
Surface to 20,000' MSL



Traffic Count by Altitude

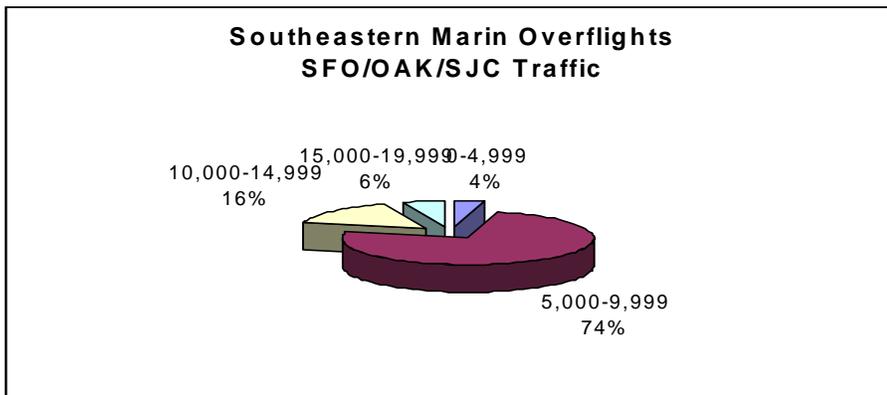
(MSL, All Aircraft Including Unknown, VFR & Helicopter)

Altitude	Count	%	Altitude	Count	%
0-4,999	1,632	53.9	10,000-14,999	230	7.6
5,000-9,999	1,069	35.3	5,000-19,999	94	3.1



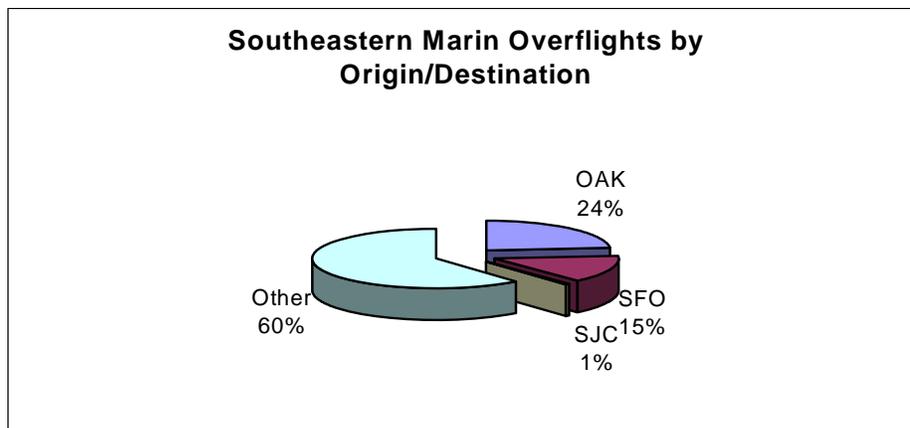
Traffic Count by Altitude (MSL)
(Known SFO/OAK/SJC Aircraft Only)

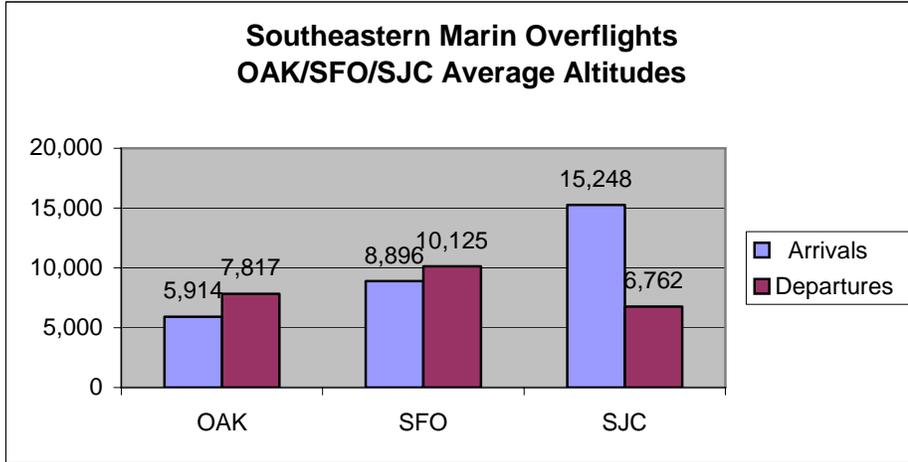
Altitude	Count	%
0-4,999	46	3.9
5,000-9,999	880	74.6
10,000-14,999	188	15.9
15,000-19,999	65	5.5



Traffic by Airport, Operation and Average Altitude

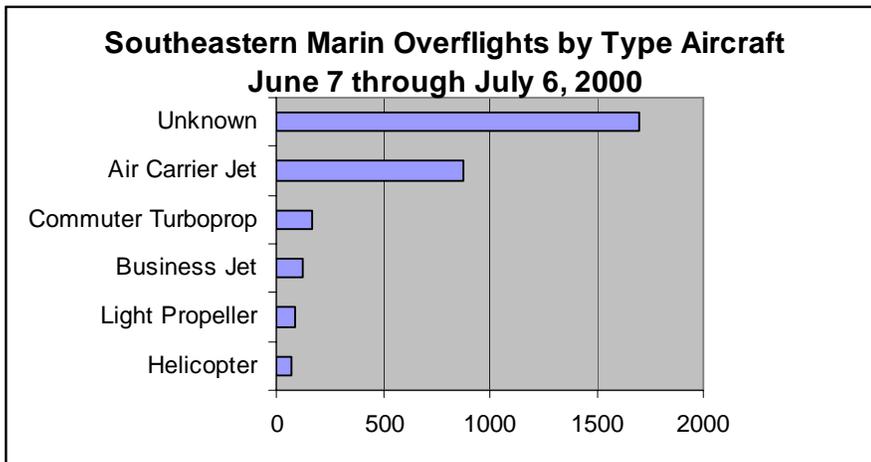
Airport	Count	%	Arrivals	Departures
<i>OAK</i>	713	23.6	573 (5,914')	140 (7,817')
<i>SFO</i>	450	14.9	23 (8,896')	427 (10,125')
<i>SJC</i>	16	<1	14 (15,248')	2 (6,762')
<i>Other</i>	1846	61.0	- (2,980')	-
Total	3025		610	569

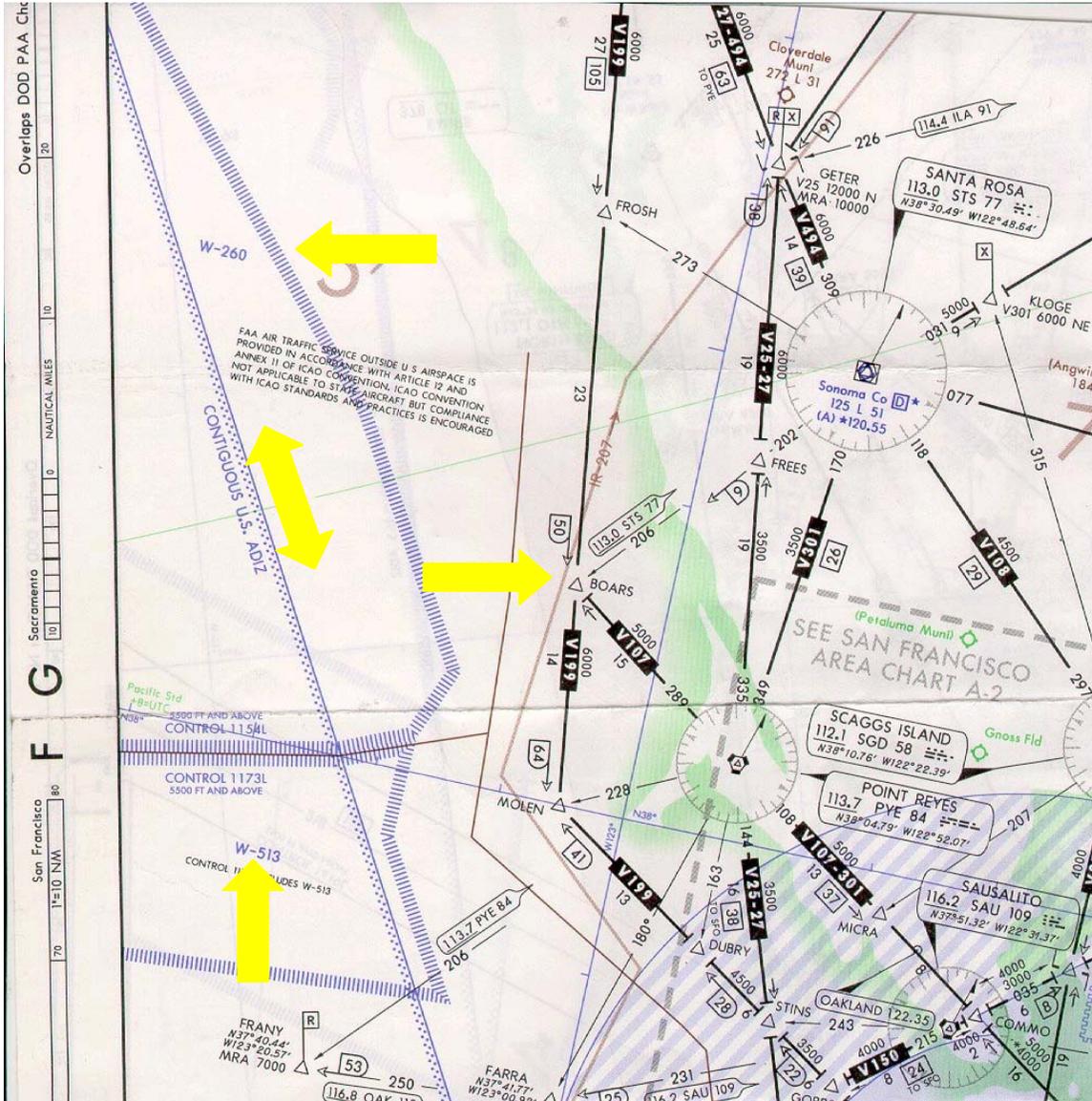




Traffic by Aircraft Type

Type	Count	%
Air Carrier Jet	878	29.0
Business Jet	120	4.0
Commuter Turboprop	168	5.5
Light Propeller	86	2.8
Helicopter	74	2.4
Unknown	<u>1,699</u>	56.2
Total	3,025	





**Attachment 3: Marin County Area
Low Altitude Airways & Intersections
Offshore Military Warning Areas and ADIZ**