State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME

A Summary of Preliminary California Spiny Lobster Report Card Data from the First Half of the 2008/2009 Recreational Lobster Season

by

Travis Buck
Douglas J. Neilson
Pete Kalvass
Kristine Barsky
Deborah A. Aseltine-Neilson

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SUMMARY

The recreational lobster fishery numbers approximately 27,500 participants from all over California and more than 10 other states, and relies on two types of fishing gear: hoop nets and diving. Both types of gear were used throughout southern California. However, at least in the subsample, a few locations (e.g. San Miguel Island) were only fished by diving. Since we cannot determine relative return rates of the report cards by divers versus hoop netters, we cannot determine the absolute contribution of each to the total recreational lobster fishing effort or catch.

Certain locations, particularly Catalina Island, were heavily fished by both groups. Within hoop nets, there are two types to be considered: the traditional net, which lays flat on the bottom during deployment, and the rigid net, which is conical in shape and retains that shape during deployment. While both nets are found across southern California, traditional nets were more prevalent in the south, giving way moving north along the coast to more rigid nets.

Diving was well represented by both skin divers and scuba divers. More lobsters were taken by scuba divers than by skin divers everywhere except off Point Loma in San Diego, near the San Luis Obispo County line, and at Tanner Banks. At the offshore islands, with the exception of Catalina Island, more lobsters were taken by diving than with hoop nets although, again, comparisons between diving and hoop nets based on our subsample must be treated with care.

Thirteen percent of the report cards in the subsample reported no fishing effort. Most trips resulted in zero lobsters kept, regardless of gear type. If lobsters were kept, bag frequencies showed more instances of lower numbers of lobsters being kept. However, there is a jump in the number of trips involved that kept bag limits of seven lobsters. Rigid hoop nets recorded more bag limits per trip than any other bag size except zero lobsters kept. The other gear types recorded higher frequencies of one lobster kept following the most common result of zero lobsters kept.

About 20 percent of the fishermen returned their lobster report cards. The Department of Fish and Game (Department) has the receipts of everyone that purchased a lobster report card and is working out the details of how to address, and in what timeframe, the 80 percent who did not return their report card. Once computerization of the license renewal process is completed, these unreturned cards will be revisited. The compliance rate for report card returns was similar to other fisheries, and large enough to provide statistical significance to the results.

It is estimated that over 103,000 lobster fishing trips occurred in the first half of the 2008/2009 recreational lobster season resulting in a harvest of at least 216,000 lobsters for a total combined weight of at least 281,000 pounds. The commercial catch for the same period of time totaled approximately 576,258

pounds of lobster. Therefore, the recreational catch was equal to at least 49 percent of the commercial lobster catch in the first half of the 2008/2009 season. Commercial harvest rates of lobsters tend to decline as the season progresses. If this trend is the same in the recreational fishery, we would expect lower numbers, and weights, to be harvested in the second half of the season. As this is the first half of the first season the lobster report card was initiated, it is impossible to evaluate how these data compare to past lobster seasons. However, the Department will be able to evaluate that in future years.

The Department thanks everyone that returned their report cards! Please continue to record your fishing results and return your cards in a timely fashion. Enjoy the fishing and good luck.

BACKGROUND

The Department is responsible for managing the California spiny lobster, *Panulirus interruptus*, in U.S. waters. The fishery consists of both a commercial and recreational fishery in southern California. The Department has monitored the commercial fishery through catch logs for the last 36 years, and landings records go back approximately 100 years. The recreational fishery, however, has not been directly monitored with the exception of creel surveys in 1992 and 2007.

The Department plans to perform a stock assessment of the California spiny lobster during 2010, and information from the California Spiny Lobster Report Card provides important information regarding the size of the recreational take.

The California Spiny Lobster Report Card was introduced at the beginning of the 2008 recreational lobster season and its format was patterned after the California Abalone Report Card. By law, a California sport fishing license and a lobster report card must be carried by everyone that fishes for spiny lobster in California. Even individuals not required to possess a sport fishing license, including children under 16 and people fishing from public piers or on free fishing days, must have a report card when fishing for lobsters. Divers hunting lobster do not need to carry the card while diving, but must have the card within 500 yards of their point of entry into the water.

The recreational spiny lobster fishing season generally runs from October to mid-March of two consecutive years. However, like a sport fishing license, the lobster report card is valid from January to December of a given year. Therefore, recreational lobster fishermen will buy a report card at the beginning of the year and that card will be valid for the end of one lobster season and the beginning of the next. California Spiny Lobster Report Cards are required to be returned to the Department by January 31 of the following year.

INFORMATION FOUND ON THE REPORT CARD

The report card has room to record 56 separate trips by the fisherman. A trip is defined as a single block of time spent fishing using a single gear type at a single location, and is recorded on a single line of the report card. If the fisherman changes location or gear while fishing, it is recorded as a new trip on a new line of the card. If the fisherman uses multiple gear types at a single location, a separate line on the card would be filled out for each gear type used and the catch for each.

The data on the card include the fisherman's name and contact information, date of birth, driver's license number, and sport fishing license number if applicable. Each trip is documented with the date, fishing location, type of gear used, and the number of lobsters retained. The fishing location is selected from a list of approximately 90 sites listed on the back of the card. The gear type can be one of four varieties: traditional hoop nets that lay flat on the bottom when deployed; rigid hoop nets with a conical shape that is retained while deployed; hand caught while scuba diving; and hand caught while skin diving. The report card does not record the number of nets used, the number of short lobsters released, or the number of hours spent fishing during each trip.

If all 56 lines on a report card are filled and the fisherman intends to continue fishing for lobster during that year, another report card must be purchased. There is no limit to the number of cards a fisherman may purchase over the course of a year.

PRELIMINARY RESULTS FROM THE FIRST HALF OF THE 2008/2009 RECREATIONAL SPINY LOBSTER SEASON

Since the 2009 report cards are not due back to the Department until January 2010, this summary is based entirely on the 2008 report cards covering the first half of the 2008/2009 season. The 2008/2009 lobster season opened at one minute past midnight on the morning of September 27, 2008.

Report Card Summary. There were 27,537 report cards sold in 2008 (Table 1). As of September 1, 2009, 5,764 report cards had been returned to the Department (a 21 percent return rate). Of those, a subsample of 3,609 report cards was taken for analysis. The subsample had 460 (13 percent) cards that recorded no fishing effort. The remaining 3,149 report cards, 11 percent of the total sold, recorded 13,631 trips.

Table 1. Summary of basic Fall 2008 lobster report card totals.

Number of Report Cards Sold	Number of Report Cards Returned	Number of 2008 Report Cards in Subsample Analyzed	Number of Report Cards With No Fishing Recorded	Total Number of Trips Documented
27,537	**5,764**	**3,609**	**460**	**13,631**

Returned report cards documented trips at every location listed on the back of the report cards plus a few trips from Pismo Beach, north of the San Luis Obispo County line and not included on the report card's location list (Figure 1).

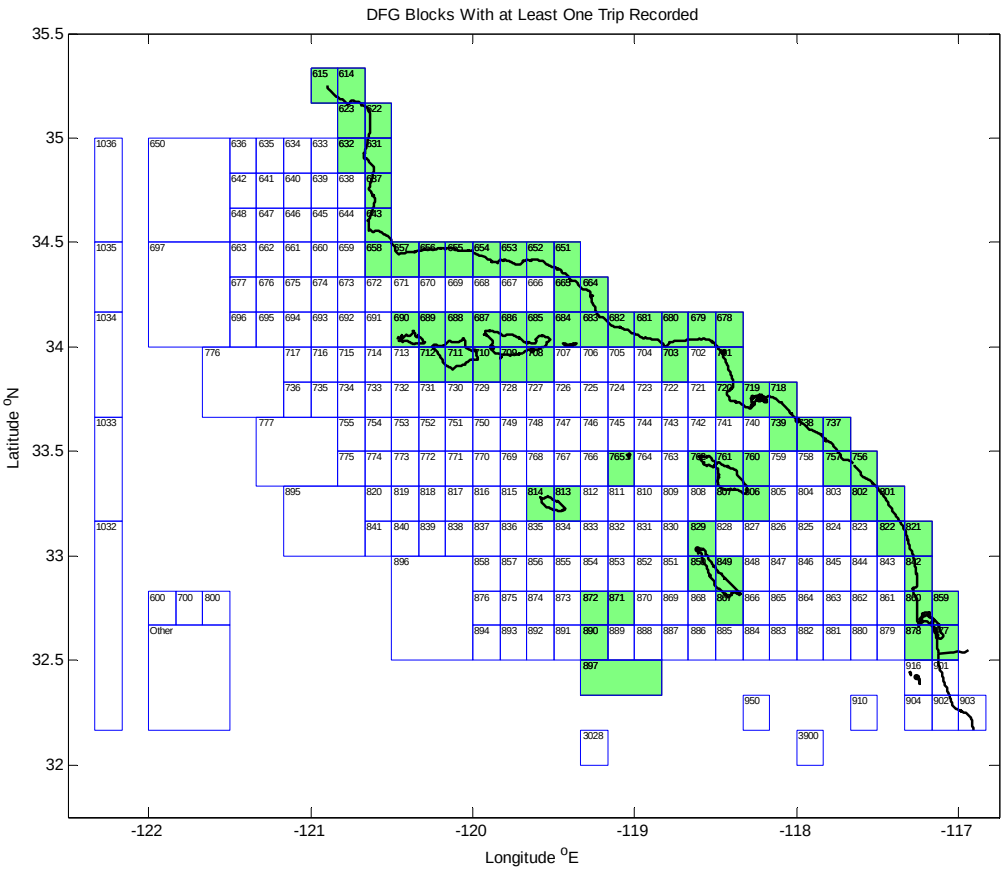

Figure 1. CDFG 10 nautical mile fishing blocks, used for summarizing both commercial and recreational catch data, that reported at least one lobster fishing trip (shaded boxes) in the first half of the 2008/2009 season. The shaded blocks in the lower center portion of the map, unassociated with islands, contain Cortes and Tanner banks.

The recreational lobster fishery is composed of two different groups of fishermen, hoop netters and divers. The analyzed report cards in the subsample are almost

evenly split between hoop netters and divers. A higher level of compliance in returning the report cards is needed to tell if differences in catch and effort between the two groups are real, or caused by one group being more conscientious in returning their cards. For this reason, we did not make direct comparisons between diving and hoop netting (e.g., divers caught more than hoop netters). Readers of this report should refrain from making these types of comparisons from the data presented.

Summary of Trips by Gear Type. Because some fishermen recorded invalid or no gear types at all, or recorded multiple gears for a single trip, a breakdown of the number of trips by gear type is not straightforward. Hoop netters sometimes specified both types of nets being used on a single trip. Some divers also recorded both scuba and skin diving on a single trip, while still other fishermen recorded a mix of hoop nets and diving on a single trip. It is possible that these fishermen were unaware of the requirement to use separate lines for each gear type and its corresponding catch.

Trips with invalid or missing gear codes (Table 2) were not included in this summarization.

Table 2. Summary of trips for 3,609 report cards.

Total Number of Trips Documented	Number of Trips with Invalid or Missing Gear Codes	Number of Trips Analyzed (with valid Gear Codes)
13,631	**57**	**13,574**

Calculating 'Number of Trips' for 'Any Hoop Nets' in Table 3 was achieved by summing trips where either traditional or rigid hoops nets were specified for a single trip with trips that recorded both traditional and rigid hoop nets for a single trip. Calculating 'Number of Trips' for 'Any Diving' in Table 3 was achieved by summing trips where either scuba or skin diving were specified for a single trip with trips that recorded both scuba and skin diving for a single trip. Trips that recorded both a hoop net gear type and a diving gear type for a single trip were not included in Table 3.

Table 3. Number of trips with specified gear type combinations not including trips specifying both a dive and a hoop net gear type for the same trip.

	Number of Trips	Number of Cards with associated Gear Type	Trips per Card
Any Hoop Nets	**6,719**	**1,821**	**3.7**
Any Diving	**6,833**	**1,484**	**4.6**

Of the 13,574 trips with identifiable gear codes, 13,552 trips involved either hoop nets or diving but not both, and 13,127 trips recorded a single gear type.

Considering southern California as a whole, there is a general preference for traditional hoop nets (vs. rigid hoop nets), and more scuba trips than skin diving (Figure 2). However, the preference varies from county to county (Figure 3). Traditional hoop nets dominate the southern counties of San Diego and Orange. Moving north, rigid hoop nets increasingly dominate. Even in the north, however, traditional nets make up a substantial proportion of the hoop net gear used. The Department does not have historical data related to the use of hoop nets in the recreational lobster fishery and cannot report on trends in types of hoop nets used. Given this snapshot, however, it appears that traditional hoop nets are still dominant over the newly introduced rigid designs.

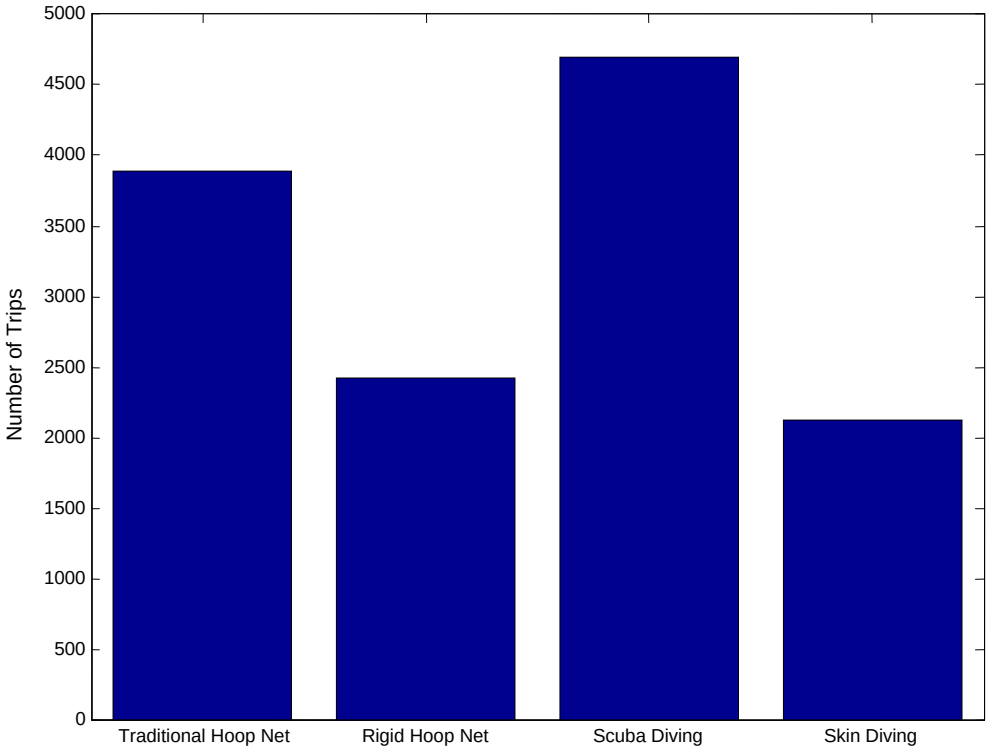

Figure 2. Comparison of the number of trips across southern California by gear type for 3,609 report cards. Only trips specifying a single gear type were used. Mixed gear trips are not included.

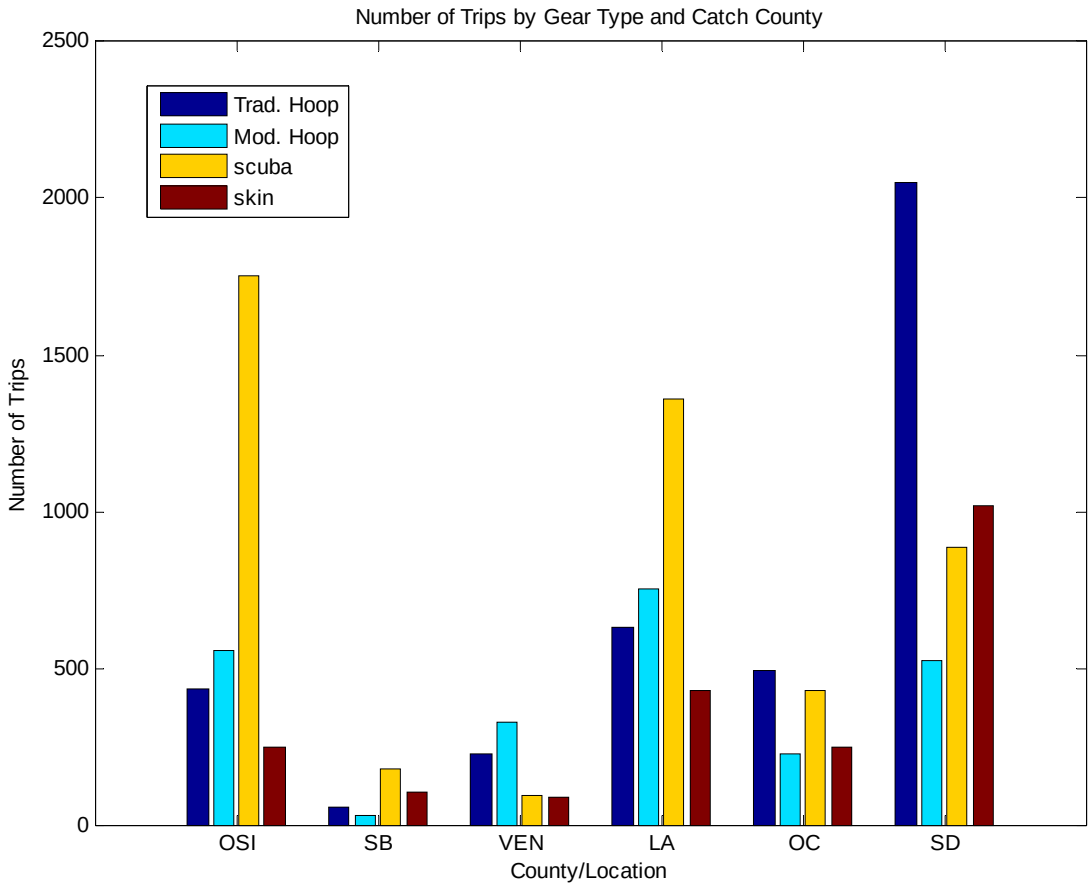

Figure 3. The number of trips broken down by gear type and county. The plot considers only trips that specified a single gear type. Mixed gear trips are not included. OSI is short for 'offshore islands' and refers to all eight Channel Islands, Cortes Bank, and Tanner Bank. San Luis Obispo County had less than ten trips total and is also excluded.

Summary of Catch by Gear Type. As with trips, a breakdown of the catch by gear type is also not straightforward. Besides the problem of invalid or missing gear types, some fishermen did not record the number of lobsters kept in the 'Lobster Retained' column of the report card. Also, in those cases where multiple gear types were specified for a single trip, most fishermen wrote a single 'Lobster Retained' value without splitting the catch between the multiple gear types. It is for these reasons that in Table 4 the catch totals for hoop net and diving subtypes do not add up to the totals for ‘All Hoop Nets’ and ‘All Diving.’ It is also for these reasons that the ‘Number of Trips Involved’ for ‘All Hoop Nets’ and ‘All Diving’ in Table 4 do not add up to the ‘Number of Trips’ for ‘Any Hoop Nets’ and ‘Any Diving’ in Table 3.

In the subsample, fishermen using hoop nets caught 13,548 lobsters during the first half of the 2008/2009 season (Table 4). Traditional hoop nets caught more lobsters total (6,812) than rigid hoop nets (5,784). This fact, combined with a

lower catch per trip for traditional hoop nets (1.8 vs. 2.4), is another indication of the higher effort devoted to traditional hoop nets. Despite the higher effort devoted to traditional hoop nets, not included in Table 4 are the number of lobsters caught per report card, and individual fishermen using rigid hoop nets caught on average more lobsters total per card (7.8) than traditional hoop net users (5.8) during the first three months of the season.

Dive trips reported 15,147 lobsters caught during the first half of the season with the overwhelming majority taken by scuba divers. Scuba divers were also more successful than skin divers on each trip (2.4 lobster retained vs. 1.8 lobster retained on average). Individual scuba divers also caught more lobsters total per report card than individual skin divers (10.3 vs. 8.0). One might expect this result given the increased amount of time to search afforded by scuba.

Table 4. Number of lobster caught, number of trips involved, and catch per trip by gear type for 3,609 report cards.

	Number of Lobster Caught	Number of Trips Involved	Lobster per Trip
All Hoop Nets	13,548	6,640[1]	2.0
Traditional	6,812	3,851	1.8
Rigid	5,784	2,387	2.4
All Diving	15,147	6,788[2]	2.2
Scuba	11,250	4,664	2.4
Skin	3,865	2,114	1.8

1. Includes trips where traditional or rigid hoop nets, or both, were specified for a single trip.
2. Includes trips where scuba or skin diving, or both, were specified for a single trip.

Broken down by county, the total catch for each gear type (Figure 4) generally follows the number of trips by gear type (Figure 3), although scuba divers in San Diego County caught more lobsters than skin divers in fewer trips. Essentially, the more trips a fisherman makes, the more lobsters he will probably catch.

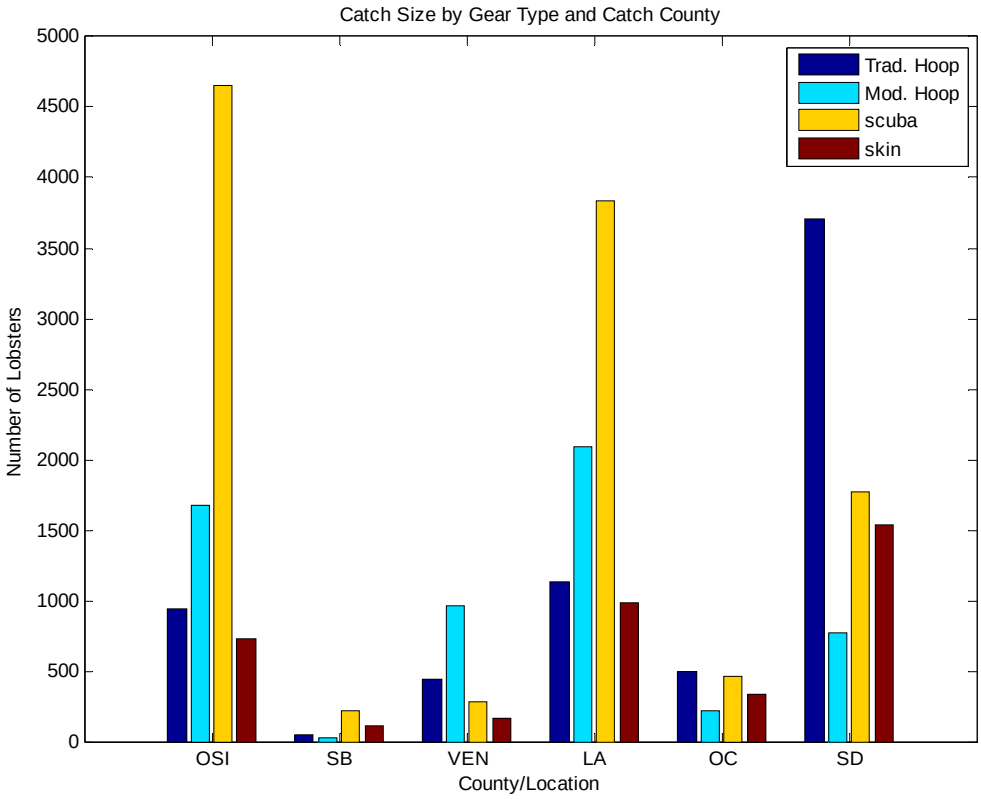

Figure 4. Catch size broken down by gear type and county. OSI is short for 'offshore islands' and refers to all eight Channel Islands, Cortes Bank, and Tanner Bank. San Luis Obispo County had catch information from less than 10 trips total and is excluded.

During the first two months of the 2007/2008 season, the Department performed a creel survey of recreational lobster fishermen in the five coastal counties of southern California. As part of that study, the carapace lengths and weights of retained lobsters were measured. The Department used those measurements to calculate a regression for predicting weights from lengths. Based on those results, a just-legal lobster, with a carapace length of 3.25 inches, would weigh approximately 1.3 pounds. If this is considered to be the minimum possible weight for any retained lobster, a minimum total weight for all lobsters retained by the recreational fishery can then be calculated. Some retained lobsters might not quite weigh as much as 1.3 pounds, but 3.25 inches would be the minimum length of any retained lobsters, and there would be many retained lobsters with longer carapace lengths and heavier corresponding weights. This estimated minimum 'landing weight' will provide a reasonable lower threshold of the possible total landing weight for the recreational fishery in a season.
Because some report cards include both hoop net and dive trips, it is impractical to calculate an estimate of the total number of lobster trips for each gear type for the October through December 2008 time period. Instead, an estimate can be calculated if one assumes that the total number of report cards sold in 2008

contains 1) the same proportion of report cards with net, dive, and net plus dive trips as the analyzed subsample of cards, 2) a similar proportion of report cards with no trips, and 3) a similar number of trips per card for all gears combined. Using the 27,537 report cards sold for 2008 and an estimate of 4.3 trips per card (total number of trips with identifiable gear codes/associated number of report cards), then an estimated 103,015 lobster trips were taken by recreational fishermen within this 3-month period.

The number of lobsters caught per trip was probably somewhere between the 2.0 'lobster per trip' for 'All Hoop Nets" and the 2.2 'lobster per trip' for 'All Diving' (Table 4). Splitting the difference, 2.1 lobsters was used as the catch per trip for all recreational fishermen. Now, using the number of trips and catch per trip, the number of lobsters caught overall would be approximately 216,332 lobsters. Given the minimum weight discussed above, this works out to at least 281,232 pounds 'landed' in the first half of the recreational season. The commercial lobster catch, based on landing receipts for the same period of time, totaled approximately 576,258 pounds.

Geographical Distribution of the Catch. Across southern California the highest take of lobsters, by all methods, occurred in the vicinity of Point Loma, San Diego Bay, Catalina Island, and Palos Verdes Peninsula. While the catch reported for both diving and hoop netting was comparable, there were geographical differences in gear type usage (Figure 5, Figure 6). Hoop netting dominated at the Point Loma and San Diego Bay hotspots, for instance, while the offshore islands tended to be dominated by diving. Catalina Island shows significant fishing effort by both hoop nets and diving, with more lobsters taken by hoop nets.

Rigid hoop nets took about twice as many lobsters as traditional hoop nets at Catalina Island and 1.5 times as many as all dive-related lobster fishing at the island. Rigid hoop nets also caught more than traditional nets in the vicinity of Ventura. Traditional nets recorded a significantly higher total catch along Point Loma/San Diego Bay than rigid hoop nets. Otherwise the two types of nets had similar catches.

Scuba diving trips took more lobster than skin diving trips everywhere except the Point Loma coastline, near the San Luis Obispo County line, and at Tanner Banks, where skin diving accounted for at least as many lobsters as scuba diving. In the subsample, no hoop net trips were reported at Tanner Banks or San Miguel Island.

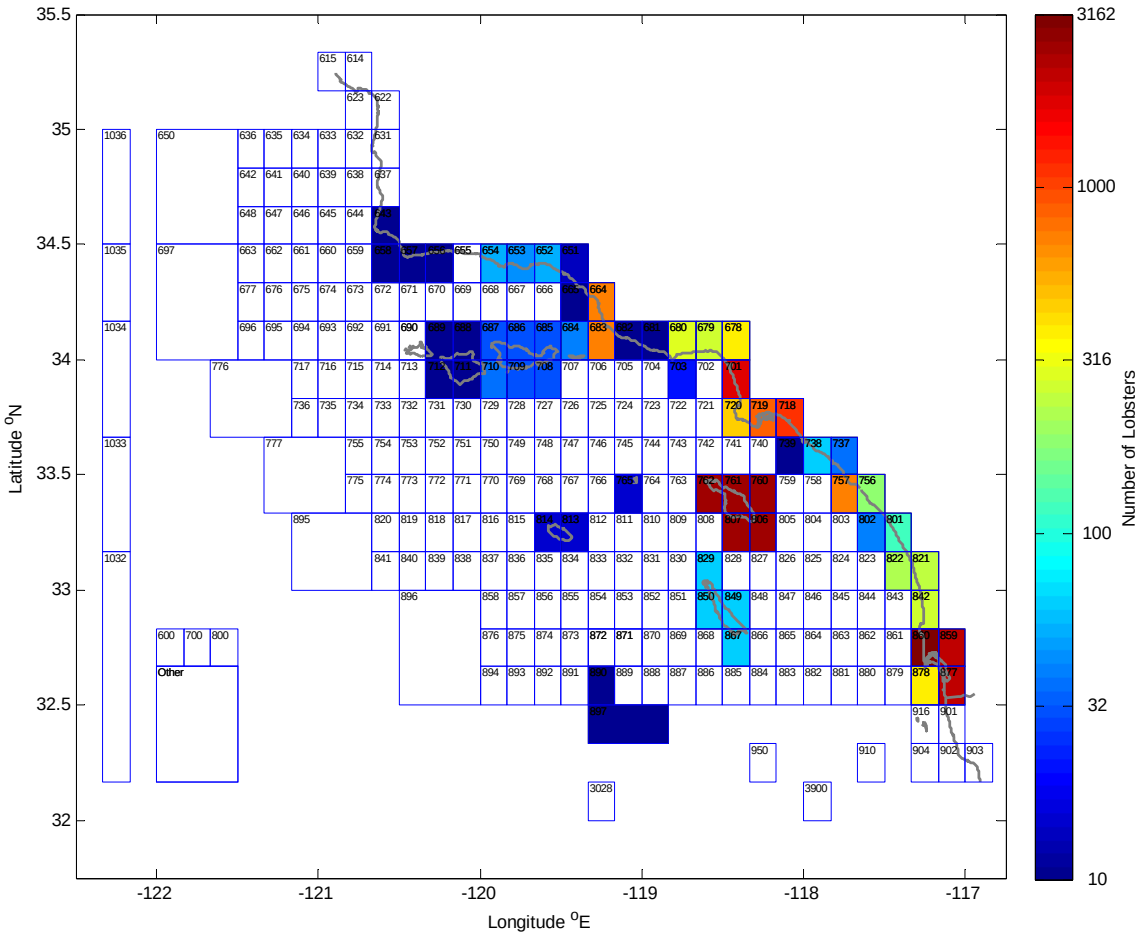

Figure 5. Geographical distribution and quantity of all lobsters caught while hoop netting. Report card location codes have been mapped to CDFG 10 nautical mile blocks.

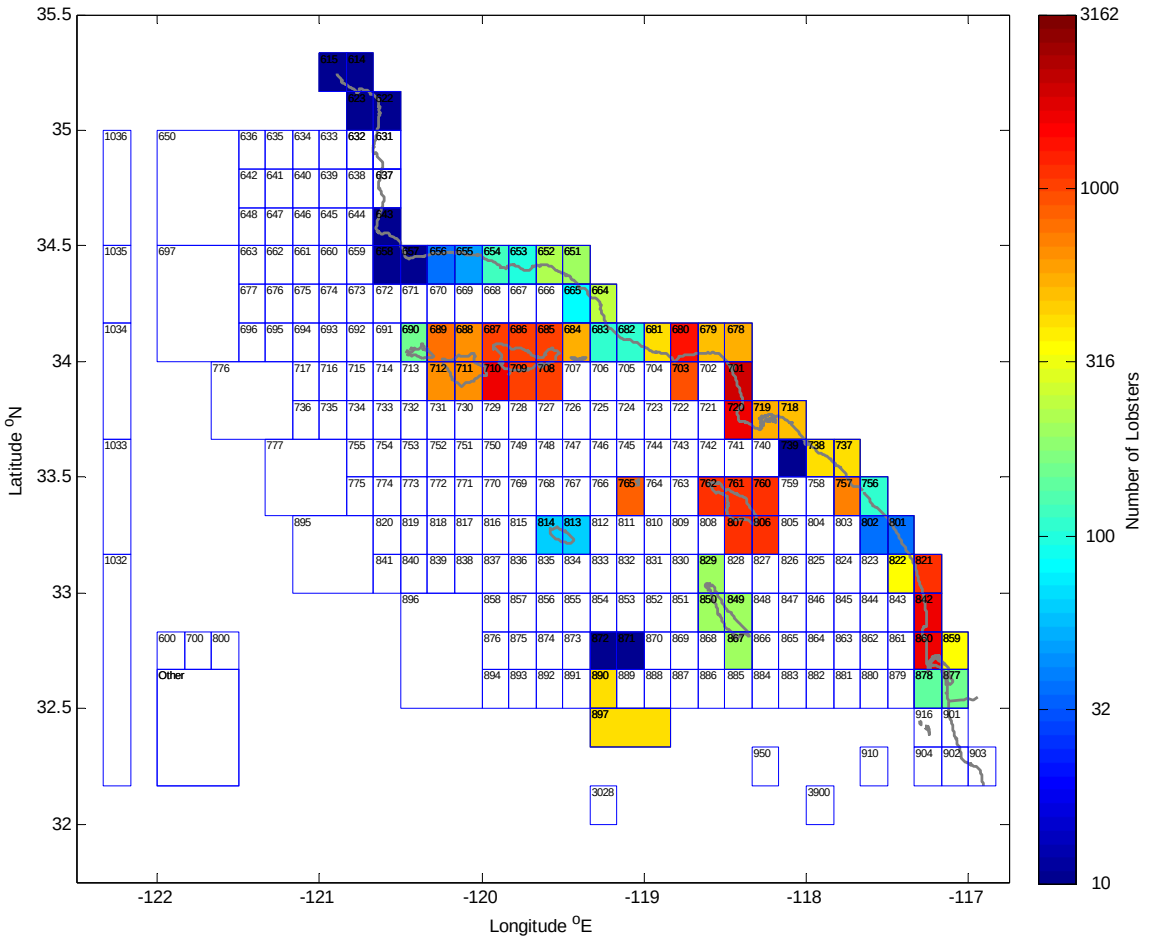

Figure 6. Geographical distribution and quantity of all lobsters caught while diving. Report card location codes have been mapped to CDFG 10 nautical mile blocks.

Success of gear types. Looking at bag frequencies (Figure 7) - the number of trips resulting in 0, 1, 2, or more lobsters retained - a higher percentage of trips resulted in zero lobsters kept than any other number of lobsters kept, regardless of gear type. All gear types exhibited a drop in the number of trips of a given catch size as the bag size increased to six lobsters, and then exhibited a jump in frequency for trips achieving a bag limit of 7 lobsters. This last point suggests that a certain proportion of fisherman continue fishing until a bag limit is achieved.

The results for rigid hoop nets are interesting given that after zero lobsters retained the next most common result is a bag limit. For all other gear types, one lobster retained was the next most common result.

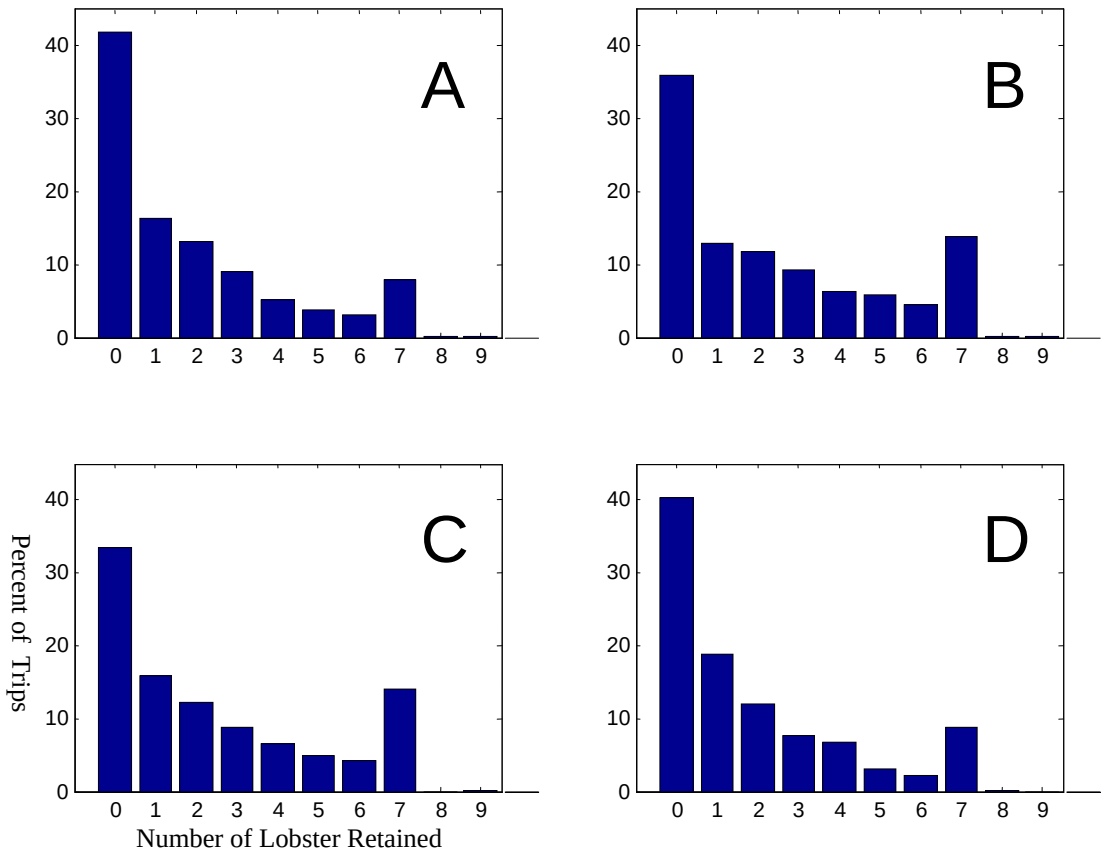

Figure 7. Bag Frequencies for specified gear types: A. Traditional Hoop Nets, B. Rigid Hoop Nets, C. Scuba Diving, D. Skin Diving. Includes trips with mixed gear types in which case the number of retained lobsters was added to each gear type specified. This did not alter the curves relative to data that included only the single specified gear type in question.

Demographics. Of the 3,609 report cards examined, all but a handful were from residents of California. No foreign countries were represented and the list of states outside California were, in alphabetical order: Arizona, Connecticut, Florida, Hawaii, Louisiana, Missouri, Nebraska, Nevada, North Carolina, Oregon, Pennsylvania, Tennessee, Texas, Utah, Virginia, and Washington,. As would be expected, the majority of fishermen resided in coastal areas in southern California (Figure 8). The number of California trips per zip code varied from 0 to 271, with total number of retained lobsters as high as 704 lobsters per zip code.

Catch per trip (Figure 9) varied although few zip codes reported zero lobsters kept. Regions distant from the ocean, where it is assumed lobster fishing trips would be special trips given the distance involved, fared about as well as the coastal regions. It is assumed that close proximity to the ocean would result in more trips for lobster and the associated high failure rate of many fishermen

would lower the overall catch per trip for the associated zip code. There are exceptions to this, as in south San Diego for instance.

One special case not evident in these plots is Catalina Island. The number of trips by fishermen from this zip code (90704) was one of the highest in the state at 237. Their harvest, as well, was the highest in the state at 704 lobsters. Catalina's catch per trip is approximately three lobsters, less than half the allowable bag limit of seven lobsters. This may not seem like a high number of lobsters per trip, and the circle on the plot does not appear to be relatively large, but coupled with the high effort it translated into the highest total catch for any zip code in the state.

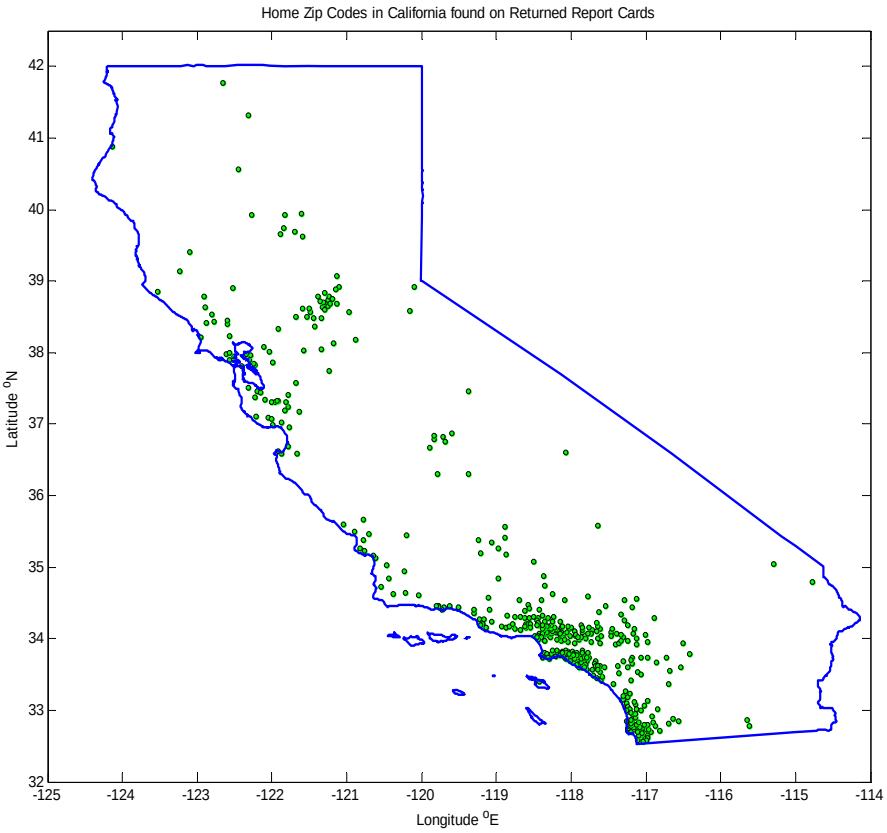

Figure 8. California zip codes of fishermen involved in at least one recorded lobster fishing trip.

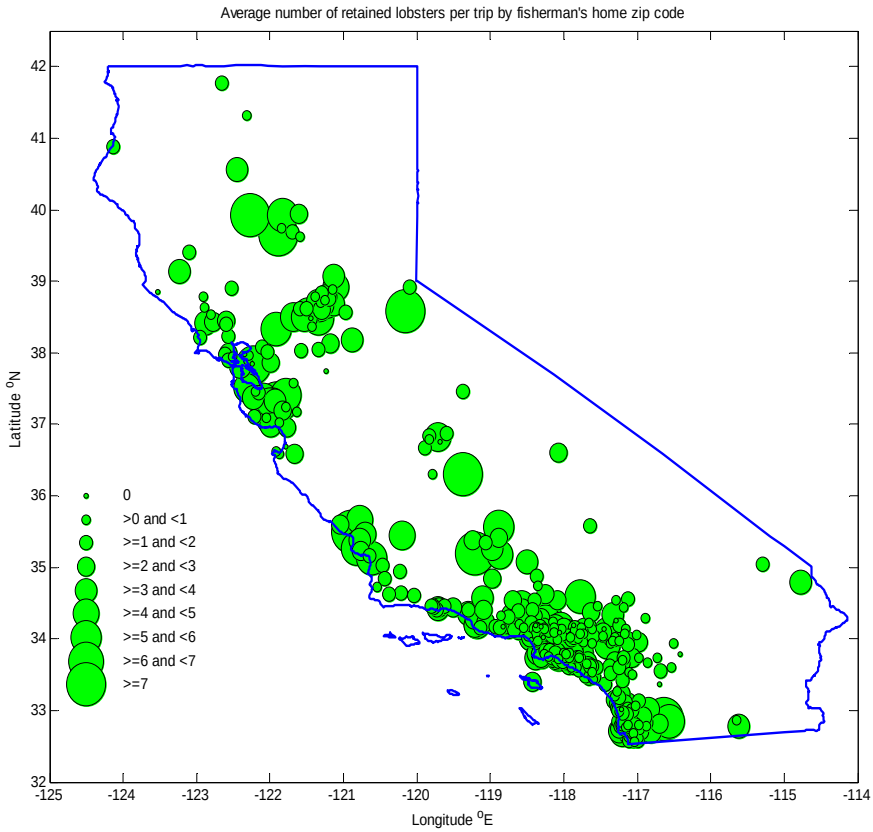

Figure 9. Average number of lobsters retained per trip for each California zip code with at least one lobster fishing trip reported. Catch per trip can be a fraction of a lobster.