Going Low — part 1

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The huge influx of new poker players has changed not only the age demographic, but the game demographic as well. No-limit hold'em was hard to find a few years ago, whereas, precisely the opposite is now true. Games such as Omaha and 7-card stud have been somewhat lost in the shuffle. I hope that many of the new players will slowly discover some of the fascinating aspects of other games eventually leading to a wider variety of games being more readily available.

My favorite game is 7-card high-low, while Omaha, both high only and high-low, has a dedicated set of fans. What I want to do now is to take a look at some basic information on low variants. The first game I consider is 7-card stud. A basic question is the probability of making an 8-low or better with seven cards. However, let's do a lot more than that. The following table contains considerable information about the numbers of various low hands in 7-card stud.

high hand	8-low	7-low	6-low	5-low
straight flush	4,996	5,020	5,020	5,020
flush	519,304	301,340	128,540	28,824
straight	747,980	747,980	747,980	747,980
3-of-a-kind	172,040	70,840	20,240	-
two-pair	771,120	317,520	90,720	-
one pair	5,951,880	2,922,480	962,280	-
high card	5,003,880	3,061,380	1,196,580	-
totals	13,171,200	7,426,560	3,151,360	781,824

Reading the table is straightforward, but just to make certain you're keyed in, here is an example. If we want to know how many 7-card hands there are that are 6-low and have 3-of-a-kind for a high hand, we look across the row corresponding to 3-of-a-kind until we come to the column headed "6-low." We find that there are 20,240 such hands. If we want to know how many 7-low hands there are, we go to the row corresponding to totals and go until we reach the appropriate column. We find that there are 7,426,560 7-low hands.

Let's now discuss how to use the information in the table. Suppose we want the probability of achieving a 7-low. We've just seen that there are 7,426,560 7-low hands. In order to determine the probability of being dealt a 7-low, we need the total number of 7-card hands. This number is simply $C(52,7) = 133,784,560$. We divide 7,426,560 by 133,784,560 and obtain .0555. This is essentially 1/18. Thus, the odds against being dealt a 7-low in 7-card stud are about 17-to-1. The sum of the four numbers in the totals row is 24,530,944. This gives us the number of 7-card hands that qualify for 8-low or better. Dividing this number by the total number of 7-card hands above gives us a probability of .18336 that a player makes a qualifying 8-low in 7-card stud. This is roughly 1/5.5 so that the odds against making a qualifying low are about 4.5-to-1.

Hands that scoop pots are especially powerful in high-low games. An example of a hand that will do well in 7-card high-low is a hand that is 7-low and contains a straight. Going to the table we find that there are 747,980 such hands. Dividing by the total number of 7-card hands gives a probability of about .00559 or about 1/179. This means the odds against being dealt such a hand are about 178-to-1. These are indeed thin odds.

If you start looking at the entries in the table with regard to the chances of being dealt particular hands, you might begin to feel that the odds are stacked against you in 7-card stud high-low with an 8-low as a qualifier. However, the story isn't as bleak as it may now appear. We shall look at the brighter side of the story in Part 2. The details for arriving at the numbers in the table may be found at my website under the Poker Computations directory.