

A Geographical Look at Home Runs

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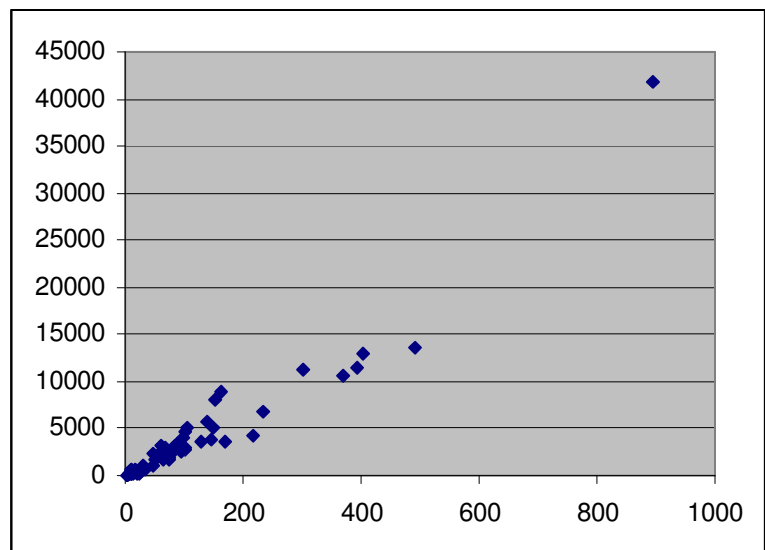
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Abstract - In this paper, we will look at career home runs for major league baseball players based on the state in which they were born.

Major league baseball is known for its interesting statistics. There are multitudes of numbers and multitudes of ways of looking at the numbers. For some now-forgotten reason, I once started looking at home runs by the state of birth of the home run hitter. This chart gives home runs by state (including the District of Columbia). Consider the chart below, where “n” denotes the number of players born in that state who have hit at least one major league home run. [Note: All data comes from Lee Sinin's Sabermetric Baseball Encyclopedia.]

	HRs	n		HRs	n		HRs	n
Alabama	7985	153	Kentucky	2851	100	North Dakota	284	7
Alaska	71	5	Louisiana	4057	97	Ohio	10682	369
Arizona	876	32	Maine	262	23	Oklahoma	5090	105
Arkansas	3252	61	Maryland	4729	101	Oregon	2293	46
California	41790	894	Massachusetts	4314	217	Pennsylvania	13666	493
Colorado	414	27	Michigan	5057	149	Rhode Island	1093	30
Connecticut	1999	76	Minnesota	2505	62	South Carolina	3496	88
D.C.	600	35	Mississippi	3256	84	South Dakota	122	10
Delaware	563	18	Missouri	6882	234	Tennessee	3045	102
Florida	8984	163	Montana	198	9	Texas	11238	303
Georgia	5672	139	Nebraska	1137	46	Utah	170	11
Hawaii	202	15	Nevada	200	8	Vermont	540	17
Idaho	712	11	New Hampshire	301	20	Virginia	2624	95
Illinois	11504	393	New Jersey	3830	146	Washington	2952	68
Indiana	3601	129	New Mexico	664	9	West Virginia	1803	50
Iowa	1611	75	New York	13008	404	Wisconsin	2534	83
Kansas	1756	66	North Carolina	3507	168	Wyoming	244	6

Not surprisingly, California has both the most home runs and the most home run hitters. Also not surprisingly, there is a strong correlation between the number of players who have hit home runs and the number of home runs from an individual state. The chart to the right shows the scatter plot of the data. The correlation coefficient is



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0.96. California, as is often the case, is an unusual data point. Removing California from the data produces a correlation coefficient of 0.95 for the remaining data. In either case, more players hitting home runs generally means more home runs.

There are, however, some interesting variations if we look at the mean and median home runs per state. This chart presents that data, in descending order according to the mean.

state	mean	median	state	mean	median
New Mexico	73.78	8	Tennessee	29.85	6
Idaho	64.73	3	Missouri	29.41	7
Florida	55.12	12	Illinois	29.27	6
Arkansas	53.31	15	Ohio	28.95	7
Alabama	52.19	13	Kentucky	28.51	5
Oregon	49.85	9	Indiana	27.91	7
Oklahoma	48.48	7	Pennsylvania	27.72	6
Maryland	46.82	6	Virginia	27.62	6
California	46.74	13	Arizona	27.38	14
Washington	43.41	8	Kansas	26.61	6
Louisiana	41.82	5	Connecticut	26.30	6
Georgia	40.80	9	New Jersey	26.23	6
Wyoming	40.67	22	Nevada	25.00	3
North Dakota	40.57	7	Nebraska	24.72	7.5
Minnesota	40.40	6	Montana	22.00	3
South Carolina	39.73	9	Iowa	21.48	6
Mississippi	38.76	10.5	North Carolina	20.88	6
Texas	37.09	6	Massachusetts	19.88	5
Rhode Island	36.43	6.5	D.C.	17.14	7
West Virginia	36.06	11	Utah	15.45	3
United States	34.74	7	Colorado	15.33	4
Michigan	33.94	7	New Hampshire	15.05	4
New York	32.20	7	Alaska	14.20	2
Vermont	31.76	3	Hawaii	13.47	2
Delaware	31.28	3	South Dakota	12.20	6.5
Wisconsin	30.53	9	Maine	11.39	3

The apparent tendency here is for states significantly above or below the national mean to be states with comparatively few home run hitters. This makes sense since a small n will result in a high mean if there is a single home run hitter with a large number of home runs.

Analysis of this data is not the purpose of this paper. Instead, I wanted to look at something that was interesting to me shortly after I first looked at the data. Harmon Killebrew was one of the most feared sluggers in the game in the 1960s, hitting more home runs (393) in that decade than any other player. Killebrew was born in Idaho, which has a home run total of 712.

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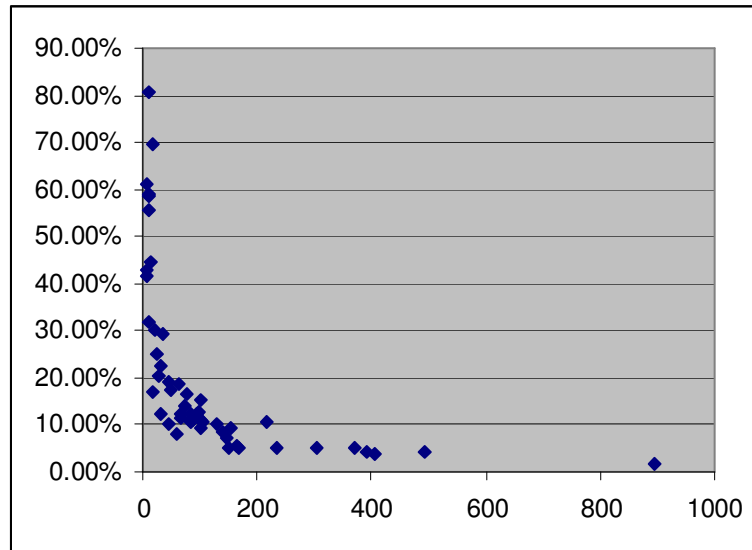
Killebrew hit 573 of those home runs, accounting for 80.478% of Idaho's home runs. As a result of that observation, I decided to look at all states and see what percentage of that states home runs were hit by its all time leader. The following chart presents that data. The data is in descending order by percentages by the leader. The next item in our list of "things that are not surprising" is that almost all of the states near the top are the ones near the bottom of the "total HR" list. Rhode Island is the only one in the top 16 of players with high percentages that is not in the bottom 16 of total HR.

State	Leader(s)	HR	%
Idaho	Harmon Killebrew	573	80.478%
Alaska	Josh Phelps	57	80.282%
Vermont	Carlton Fisk	376	69.630%
Nevada	Marty Cordova	122	61.000%
Utah	Duke Sims	100	58.824%
Montana	John Lowenstein	116	58.586%
New Mexico	Ralph Kiner	369	55.572%
Hawaii	Mike Lum	90	44.554%
Wyoming	Mike Devereaux	105	43.033%
North Dakota	Travis Hafner	118	41.549%
South Dakota	Mark Ellis	39	31.967%
New Hampshire	Phil Plantier	91	30.233%
D.C.	Don Money	176	29.333%
Maine	Del Bissonette	66	25.191%
Rhode Island	Paul Konerko	245	22.415%
Colorado	Johnny Frederick	85	20.531%
Oregon	Dave Kingman	442	19.276%
Minnesota	Dave Winfield	465	18.563%
West Virginia	George Brett	317	17.582%
Delaware	Dave May and Randy Bush	96	17.052%
Connecticut	Mo Vaughn	328	16.408%
Maryland	Babe Ruth	714	15.098%
Iowa	Hal Trosky	228	14.153%
Louisiana	Mel Ott	511	12.596%
Kansas	Bob Horner	218	12.415%
Virginia	Willie Horton	325	12.386%
Arizona	Jack Howell	108	12.329%
Wisconsin	Al Simmons	307	12.115%
Washington	Ron Santo	342	11.585%
South Carolina	Jim Rice	382	10.927%
Kentucky	Jay Buhner	310	10.873%
Mississippi	Ellis Burks	352	10.811%
Oklahoma	Mickey Mantle	536	10.530%
Massachusetts	Jeff Bagwell	449	10.408%

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Nebraska	Wade Boggs	118	10.378%
Indiana	Gil Hodges	370	10.275%
Alabama	Hank Aaron	755	9.455%
Tennessee	Todd Helton	286	9.392%
Georgia	Frank Thomas	487	8.586%
Arkansas	Brooks Robinson	268	8.241%
New Jersey	Eric Karros	284	7.415%
Florida	Fred McGriff	493	5.488%
Texas	Frank Robinson	586	5.214%
Missouri	Yogi Berra	358	5.202%
Ohio	Mike Schmidt	548	5.130%
Michigan	John Mayberry and Kirk Gibson	255	5.043%
North Carolina	Ray Durham	175	4.990%
Pennsylvania	Reggie Jackson and Ken Griffey Jr.	563	4.120%
Illinois	Jim Thome	472	4.103%
New York	Lou Gehrig	493	3.790%
California	Barry Bonds	734	1.756%

The following chart plots n against the percentage of home runs by the state's leader.



The last items I will mention that I would consider "not surprising" come from this chart. First, is the fact seen here that the large percentages are all in states with small n. Second, all of the states with large n have fairly small percentages. There are, however, some states with fairly small n with a small percentage coming from the leader. This is simply because some of those states, such as Delaware, have never had a player who hit many home runs.

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Another item I found of interest was how many players with higher home run totals were born in particular states. This last table includes the names of any hitters from the state with 400 or more home runs, and the numbers of hitters with 300 or more, 200 or more and 100 or more.

	at least 400	at least 300	at least 200	at least 100
Alabama	Hank Aaron 755 Willie Mays 660 Willie McCovey 521 Billy Williams 426	6	10	20
Alaska	0	0	0	0
Arizona	0	0	0	3
Arkansas	0	0	3	14
California	Barry Bonds 734 Mark McGwire 583 Ted Williams 521 Eddie Murray 504 Darrell Evans 414 Duke Snider 407	19	53	131
Colorado	0	0	0	0
Connecticut	0	1	1	6
Delaware	0	0	0	0
Florida	Fred McGriff 493 Gary Sheffield 455 Andre Dawson 438	7	14	30
Georgia	Frank Thomas 487	3	6	20
Hawaii	0	0	0	0
Idaho	Harmon Killebrew 573	1	1	1
Illinois	Jim Thome 472	5	14	24
Indiana	0	2	5	10
Iowa	0	0	1	4
Kansas	0	0	1	7
Kentucky	0	2	4	7
Louisiana	Mel Ott 511	4	7	10
Maine	0	0	0	0
Maryland	Babe Ruth 714 Jimmie Foxx 534 Cal Ripken 431	5	7	11
Massachusetts	Jeff Bagwell 449	1	2	10
Michigan	0	0	5	18
Minnesota	Dave Winfield 465	1	4	8
Mississippi	0	2	4	10
Missouri	0	2	4	17
Montana	0	0	0	1

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Nebraska	0	0	0	4
Nevada	0	0	0	1
New Hampshire	0	0	0	0
New Jersey	0	0	3	11
New Mexico	0	1	2	2
New York	Lou Gehrig 493 Alex Rodriguez 464 Carl Yastrzemski 452	6	15	36
North Carolina	0	0	0	12
North Dakota	0	0	0	2
Ohio	Mike Schmidt 548	3	8	28
Oklahoma	Mickey Mantle 536 Willie Stargell 475	4	8	14
Oregon	Dave Kingman 442	2	3	7
Pennsylvania	Reggie Jackson & Ken Griffey Jr. 563 Stan Musial 475 Mike Piazza 419	7	15	32
Rhode Island	0	0	2	4
South Carolina	0	2	4	10
South Dakota	0	0	0	0
Tennessee	0	0	3	10
Texas	Frank Robinson 586 Ernie Banks & Eddie Mathews 512	7	11	27
Utah	0	0	0	1
Vermont	0	1	1	1
Virginia	0	1	2	7
Washington	0	2	6	9
West Virginia	0	1	1	7
Wisconsin	0	1	2	6
Wyoming	0	0	0	1
D.C.	0	0	0	1

The last thing I will consider is players who, in 2006, became their state's all time native son home run champion or those who likely will in 2007.

Mark Ellis hit 11 home runs in 2006 bringing his total to 39, taking the record from Dave Collins who had 32.

Gabby Hartnett's Rhode Island standard of 236 fell when Paul Konerko hit 35 home runs giving him a career total of 245.

Pennsylvania now has a tie for the top spot. Reggie Jackson's record of 563 was equaled by Ken Griffey Jr. who hit 27 home runs in 2006.

North Dakota's new leader is Travis Hafner. His 42 home runs in 2006 left him with 118, four ahead of former leader Darin Erstad.

Mark Grace's total of 173 is now second to Ray Durham whose 26 home runs left him with 175.

The following chart shows players who will probably become their state's all-time leader in 2007.

State	Current Leader	Likely New Leader
Arizona	Jack Howell 108	Shea Hillenbrand 104
Delaware	Dave May and Randy Bush 96	John Mabry 95
New York	Lou Gehrig 493	Alex Rodriguez 464

Obviously a lot of other information or observations could be gleaned from this data. This serves to confirm baseball's place as the most perfect sport ever invented.

Biography

Fred Worth received his B.S. in Mathematics from Evangel College in Springfield, Missouri in 1982. He received his M.S. in Applied Mathematics in 1987 and his Ph.D. in Mathematics in 1991 from the University of Missouri-Rolla where his son is currently attending school. He has been teaching at Henderson State University since August 1991. He is a member of the Society for American Baseball Research, the Mathematical Association of America and the Association of Christians in the Mathematical Sciences.