Rockies 2017 - Week #7

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Greg Holland: Relief pitcher, having a very positive impact for the Colorado Rockies. Greg has been credited with nineteen saves so far this season.

"Never allow the fear of striking out keep you from playing the game!" – Babe Ruth

Table 1: NL West Standings

Tm	W	L	W-L%	GB
Colorado Rockies	28	17	.622	–
Arizona Diamondbacks	26	19	.578	2.0
Los Angeles Dodgers	26	19	.578	2.0
San Francisco Giants	19	26	.422	9.0
San Diego Padres	16	30	.348	12.5

Table 2: Current Rockies Results as of 2017-05-22

Wins	Losses	Win.Pct	Runs	Runs.Ag	Predicted Season Wins
28	17	62.222	225	208	87

Week #7

The Rockies are still on top of the National League this week, edging out the Nationals with a higher winning percentage. Trevor Story was put on the disabled list on Monday (May 15) with a strained left shoulder. He **may** be activated before the end of May.

Here is a synopsis of what is included this week.

- Solution to Logarithm Quiz
- **Featured Graphics**
  - Carlos Gonzalez OPS Performance, historical perspective.
- Colorado Rockies Dashboards
  - Rockies Win/Loss Graphs for 2017 and 2007
  - National and American League Standings
  - Game-by-Game Results
  - **Pythagorean Theorem** prediction of the number of wins.
  - Batting Statistics (for non-pitchers)
  - Pitching Statistics
- Topics for Future Articles
- Glossary
  - Batting Statistics
  - Pitching Statistics
  - Fielding Statistics

Most of the source data for this article can be found at URL http://baseball-reference.com.

Let me know what other special interest statistics you might like to see. Remember to refer to the Glossaries at the end of the document if unfamiliar with one or more of the statistic abbreviations in the tables.

Solution to Logarithm Quiz

To review the context of the question, we presented a graph of points, one per season Cargo has played in MLB. The values plotted are the log_{10} of the **real** statistic.

Solve for x in the following equation to get the real value of a statistic for Cargo's **2017 season.**

$$log_{10}(x) = 7.301030$$

Simplifying this equation (x by itself on the left-hand side), we get:

$$x_{2017} = 10^{7.301030}$$

Solve for x in this equation to get the value of this unknown statistic for Cargo's **2009 season.**

$$log_{10}(x) = 5.605305$$

Again, simplifying, as above, we get:

$$x_{2009} = 10^{5.605305}$$

One **does not** require a scientific calculator to compute these values. Google will do it for you! Simply paste this string into the search bar for Google.com to get the value for x_{2009}:

```
10^5.605305
```

And for x_{2017}, paste this string into Google.com:

```
10^7.301030
```

The rounded values returned by Google are **403,000** and **20,000,000.** These represent the **salary** Cargo received or will receive for **2009** and **2017**, respectively.

Featured Graphics

Carlos Gonzalez OPS Performance, historical perspective.

If you have been following the sports press this season, you know there is some concern regarding Cargo's offensive production. He has performed well on the field and has been a leader both in the dugout and on the field. In the past, his biggest value to the team has been his performance at the plate. Some have posited that he is just having a slow start; that he starts slow and finishes strong.

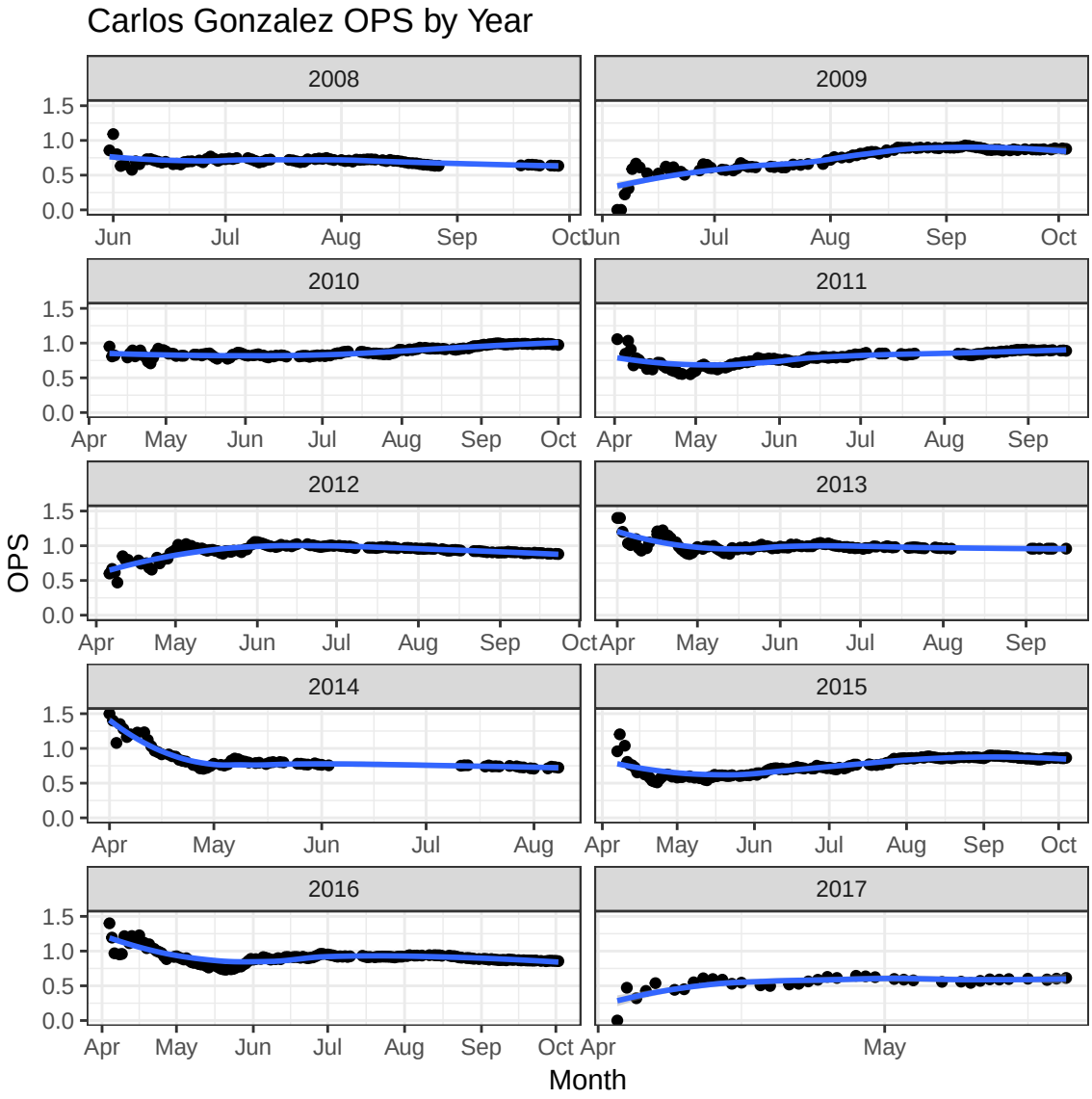
For this analysis we will use OPS (Onbase Plus Slugging) as a measure of Cargo's season-to-season performance.

The following table shows Cargo's OPS. Note, the OPS value for 2017 is for Cargo's to-date performance this season. To date, Cargo has played in most of the 45 games in the current season. This represents 28 percent of the season's 162 games.

Table 3: Carlos Gonzalez OPS by Year

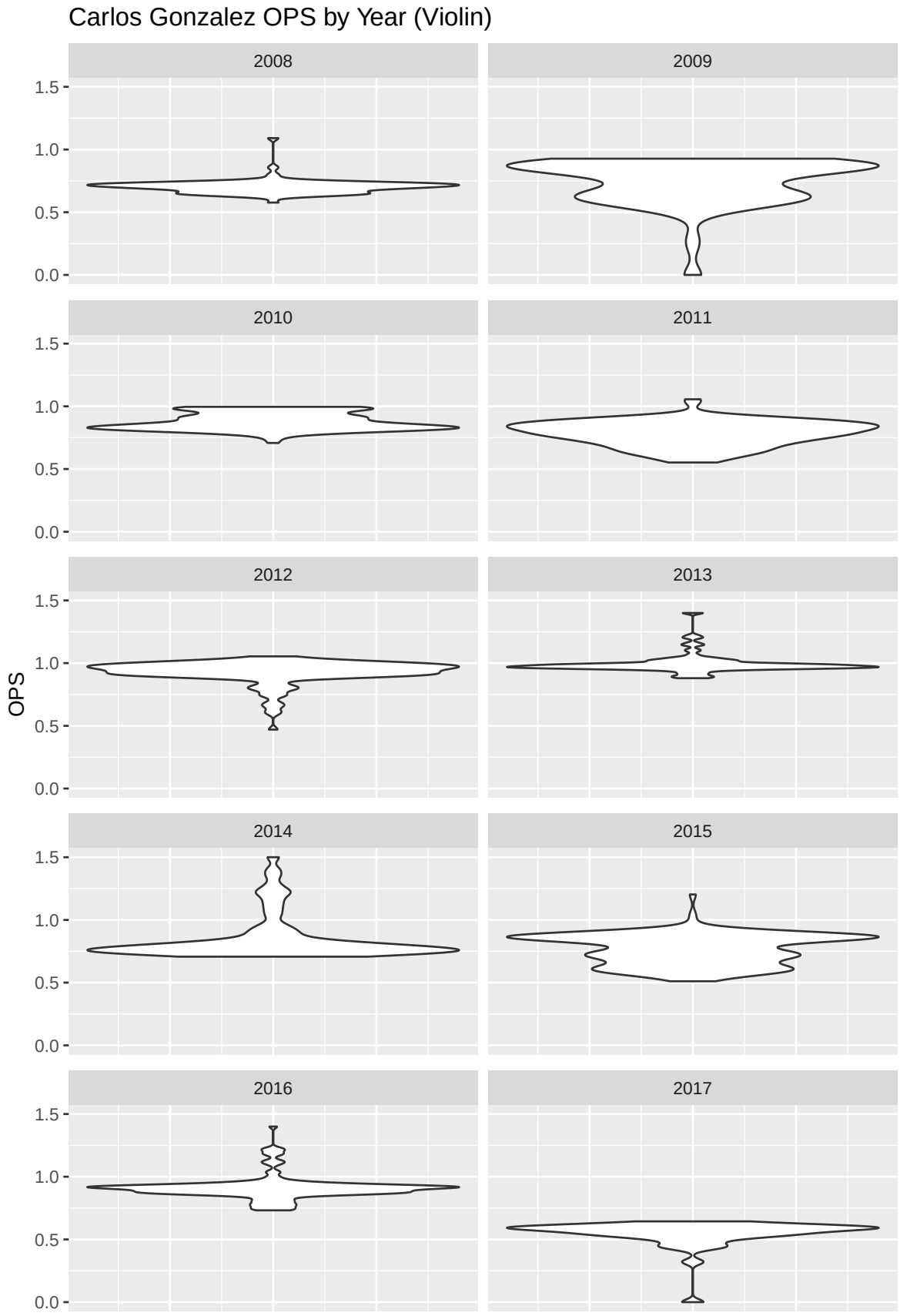
Year	OPS
2008	0.634
2009	0.878
2010	0.974
2011	0.889
2012	0.881
2013	0.958
2014	0.723
2015	0.865
2016	0.855
2017	0.613

Cargo's OPS average through 2016 is 0.851. His OPS measure this season is 27.9 percent below this average. Over twenty-five percent of the season has been played.



The faceted graphs above illustrate the trajectory of Cargo's OPS for each of his MLB seasons. In most seasons, Cargo has started strong and leveled out as the season has progressed. The exceptions to this are seasons 2009, 2012 and this season. This season has been unique for Cargo in that he has not shown anything close to his performance in previous seasons. Let us hope he finds the combination to get back to his usual stellar form.

The plot below is another facet-type graphic showing each of Cargo's MLB career seasons. This time we use a **violin** visualization. The "violin" shows the distribution of his OPS performance over the season. The bumps above or below the bulge indicate his streaks and slumps, respectively. Study these carefully and see if you can discern how his performance varies from season to season. How is his performance in 2017 different from all the other years?

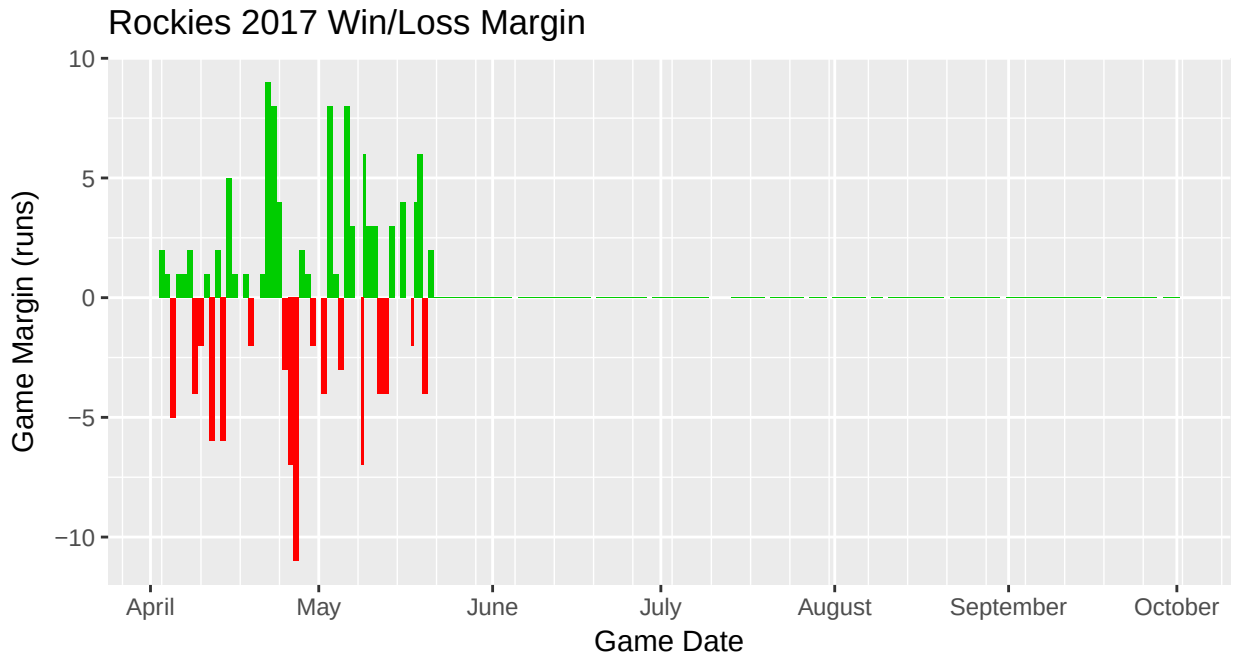

Carlos Gonzalez OPS by Year (Violin)
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
OPS
1.5
1.0
0.5
0.0

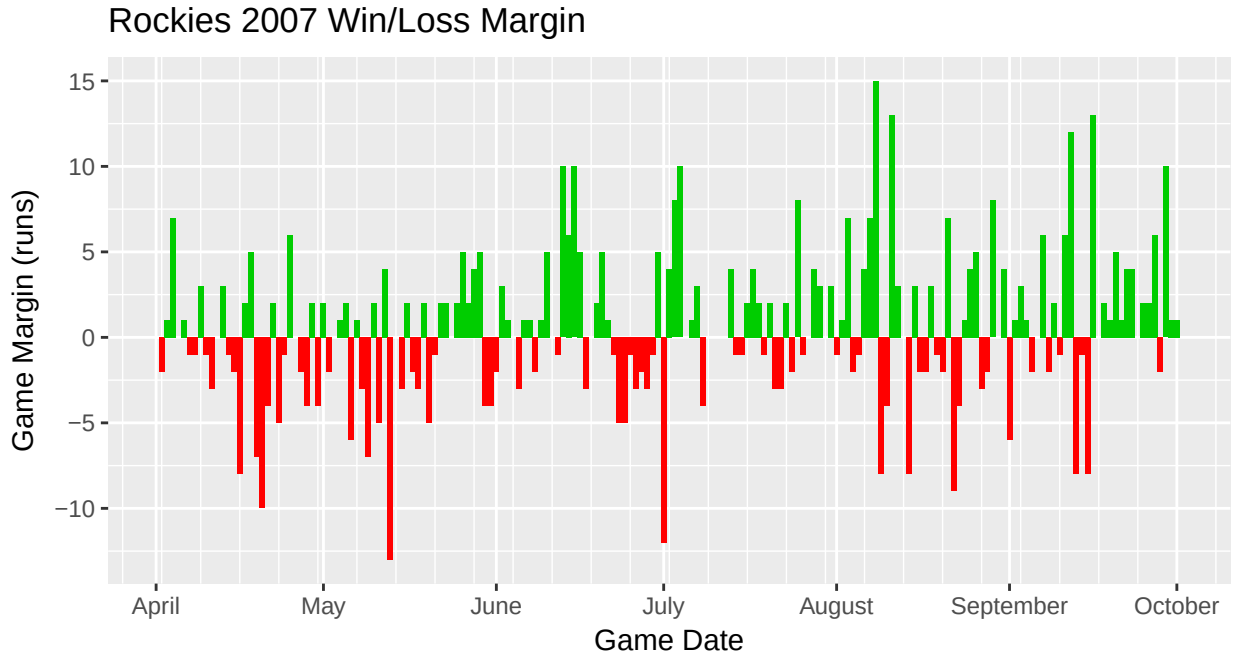
Rockies Dashboard

Win Loss Margin

One of the many ways to visualize a teams performance is to show wins and losses as the margin of the win (positive) or loss (negative). In the graphs below, we show the current season performance. For emphasis, wins are displayed as green (above the zero) and losses as red (below).

Following the current season's graph, I have included the Win/Loss margin chart for our benchmark season of 2007 when the Rockies won the National League pennant.





National League Standings

Table 4: NL East Standings

Tm	W	L	W-L%	GB
Washington Nationals	26	17	.605	–
Atlanta Braves	18	23	.439	7.0
New York Mets	18	24	.429	7.5
Philadelphia Phillies	15	26	.366	10.0
Miami Marlins	15	28	.349	11.0

Table 5: NL Central Standings

Tm	W	L	W-L%	GB
Milwaukee Brewers	25	19	.568	–
St. Louis Cardinals	22	19	.537	1.5
Chicago Cubs	22	20	.524	2.0
Cincinnati Reds	20	23	.465	4.5
Pittsburgh Pirates	20	24	.455	5.0

Table 6: NL West Standings

Tm	W	L	W-L%	GB
Colorado Rockies	28	17	.622	–
Arizona Diamondbacks	26	19	.578	2.0
Los Angeles Dodgers	26	19	.578	2.0
San Francisco Giants	19	26	.422	9.0
San Diego Padres	16	30	.348	12.5

American League Standings

Table 7: AL East Standings

Tm	W	L	W-L%	GB
New York Yankees	25	16	.610	–
Baltimore Orioles	25	17	.595	0.5
Boston Red Sox	22	21	.512	4.0
Tampa Bay Rays	23	23	.500	4.5
Toronto Blue Jays	19	26	.422	8.0

Table 8: AL Central Standings

Tm	W	L	W-L%	GB
Minnesota Twins	22	18	.550	–
Cleveland Indians	23	19	.548	–
Detroit Tigers	21	21	.500	2.0
Chicago White Sox	20	22	.476	3.0
Kansas City Royals	18	25	.419	5.5

Table 9: AL West Standings

Tm	W	L	W-L%	GB
Houston Astros	29	15	.659	–
Texas Rangers	24	21	.533	5.5
Los Angeles Angels of Anaheim	23	23	.500	7.0
Oakland Athletics	20	24	.455	9.0
Seattle Mariners	20	25	.444	9.5

Rockies Game-by-Game Schedule/Results

Gm#	Day	Date	H/A	Opp	W/L	R	RA	Win	Loss	Save	D/N	Streak
1	Mon	Apr 3	A	MIL	W	7	5	Estevez	Marinez	Holland	D	+
2	Tue	Apr 4	A	MIL	W	6	5	Anderson	Davies	Holland	N	++
3	Wed	Apr 5	A	MIL	L	1	6	Peralta	Chatwood	Feliz	N	-
4	Thu	Apr 6	A	MIL	W	2	1	Dunn	Feliz	Holland	D	+
5	Fri	Apr 7	H	LAD	W	2	1	Freeland	Ryu	McGee	D	++
6	Sat	Apr 8	H	LAD	W	4	2	Dunn	Kershaw	Holland	N	+++
7	Sun	Apr 9	H	LAD	L	6	10	Maeda	Anderson		D	-
8	Mon	Apr 10	H	SDP	L	3	5	Diaz	Chatwood		N	–
9	Tue	Apr 11	H	SDP	W	3	2	Senzatela	Diaz	Holland	N	+
10	Wed	Apr 12	H	SDP	L	0	6	Lee	Freeland		D	-
11	Thu	Apr 13	A	SFG	W	3	1	Rusin	Bumgarner	Holland	N	+
12	Fri	Apr 14	A	SFG	L	2	8	Cueto	Anderson		N	-
13	Sat	Apr 15	A	SFG	W	5	0	Chatwood	Moore		D	+
14	Sun	Apr 16	A	SFG	W	4	3	Senzatela	Samardzija	Holland	D	++
15	Tue	Apr 18	A	LAD	W	4	3	Rusin	Ryu	Holland	N	+++
16	Wed	Apr 19	A	LAD	L	2	4	Kershaw	Anderson	Jansen	N	-
17	Fri	Apr 21	H	SFG	W	6	5	Chatwood	Cueto	Holland	N	+
18	Sat	Apr 22	H	SFG	W	12	3	Senzatela	Moore		N	++
19	Sun	Apr 23	H	SFG	W	8	0	Freeland	Samardzija		D	+++
20	Mon	Apr 24	H	WSN	W	8	4	Estevez	Romero		N	++++
21	Tue	Apr 25	H	WSN	L	12	15	Romero	Marquez		N	-
22	Wed	Apr 26	H	WSN	L	4	11	Roark	Chatwood		N	–
23	Thu	Apr 27	H	WSN	L	5	16	Gonzalez	Senzatela		D	—
24	Fri	Apr 28	A	ARI	W	3	1	Freeland	Ray	Holland	N	+
25	Sat	Apr 29	A	ARI	W	7	6	Estevez	Rodney	Holland	N	++
26	Sun	Apr 30	A	ARI	L-wo	0	2	Delgado	Lyles		D	-
27	Tue	May 2	A	SDP	L	2	6	Cahill	Chatwood		N	–
28	Wed	May 3	A	SDP	W	11	3	Senzatela	Weaver		N	+
29	Thu	May 4	A	SDP	W	3	2	Qualls	Hand	Holland	D	++
30	Fri	May 5	H	ARI	L	3	6	Greinke	Marquez	Rodney	N	-
31	Sat	May 6	H	ARI	W	9	1	Anderson	Corbin	Rusin	N	+
32	Sun	May 7	H	ARI	W	5	2	Chatwood	Walker	Holland	D	++
33	Tue	May 9 (1)	H	CHC	W	10	4	Senzatela	Arrieta		D	+++
34	Tue	May 9 (2)	H	CHC	L	1	8	Lackey	Freeland		N	-
35	Wed	May 10	H	CHC	W	3	0	Marquez	Hendricks	Holland	D	+
36	Thu	May 11	H	LAD	W	10	7	Hoffman	Ryu	Holland	N	++
37	Fri	May 12	H	LAD	L	2	6	Kershaw	Chatwood		N	-
38	Sat	May 13	H	LAD	L	0	4	Wood	Anderson		N	–
39	Sun	May 14	H	LAD	W	9	6	Senzatela	Urias	Holland	D	+
40	Tue	May 16	A	MIN	W	7	3	Freeland	Hughes	Holland	N	++
41	Thu	May 18 (1)	A	MIN	W	5	1	Marquez	Santana	Holland	D	+++
42	Thu	May 18 (2)	A	MIN	L	0	2	Berrios	Chatwood	Kintzler	N	-
43	Fri	May 19	A	CIN	W	12	6	Anderson	Bonilla		N	+
44	Sat	May 20	A	CIN	L	8	12	Wojciechowski	Dunn		D	-
45	Sun	May 21	A	CIN	W	6	4	Freeland	Arroyo	Holland	D	+

The Rockies current record is 28 Wins and 17 Losses. So far, the Rockies have scored 225 runs and have had 208 runs scored against them.

Pythagorean Win-Loss Theorem

$$predictedW\% = \frac{R^k}{R^k + RA^k}$$

Using the commonly used values of k, the Rockies predicted wins for the 2017 are shown in the table below. Remember this statistic will vary widely over the course of the season.

Table 11: Predicted Wins for Entire 2017 Season

Wins (k=1.81)	Wins (k=1.83)	Wins (k=2.00)
87	87	87

Batting Statistics (non-pitchers)

Table 12: Rockies Batting Statistics (1 of 2).

Rk	Pos	Name	Age	G	AB	R	H	2B	3B	HR	RBI	SB	CS	BB
1	C	Garneau	29	22	68	5	14	7	0	1	6	0	0	4
2	1B	Reynolds	33	43	155	28	50	5	0	12	39	1	1	20
3	2B	LeMahieu	28	45	174	22	52	9	1	2	16	3	3	17
4	SS	Story	24	33	111	18	20	6	0	6	15	1	0	17
5	3B	Arenado	26	44	170	30	50	14	1	11	30	1	0	14
6	LF	Parra*	30	35	111	14	29	2	0	4	14	0	2	4
7	CF	Blackmon*	30	44	182	31	58	10	6	9	33	3	2	10
8	RF	Gonzalez*	31	40	149	19	33	9	0	3	13	0	0	18
9	LF	Desmond	31	20	80	12	22	3	0	2	10	2	1	2
10	C	Wolters*	25	22	64	16	20	4	1	0	4	0	0	8
11	UT	Valaika	24	25	53	10	13	4	0	4	10	0	0	2
12	UT	Amarista*	28	23	50	9	17	6	0	2	12	0	0	1
13	OF	Cardullo	29	15	28	2	4	0	0	0	3	0	0	3
14	C	Hanigan	36	8	29	3	8	0	0	1	6	0	0	1
15	IF	Adames#	25	12	13	1	0	0	0	0	0	0	0	1
16	LF	Tapia*	23	6	12	0	0	0	0	0	0	0	0	1

Table 13: Rockies Batting Statistics (2 of 2).

Rk	Pos	Name	Age	SO	BA	OBP	SLG	OPS	OPS+	TB	GDP	HBP	SH	SF	IBB
1	C	Garneau	29	24	.206	.260	.353	.613	50	24	1	1	1	0	0
2	1B	Reynolds	33	40	.323	.401	.587	.988	141	91	5	1	0	1	0
3	2B	LeMahieu	28	26	.299	.371	.397	.768	91	69	3	3	1	0	0
4	SS	Story	24	48	.180	.289	.396	.685	68	44	1	0	0	0	0
5	3B	Arenado	26	32	.294	.353	.582	.935	126	99	7	3	0	3	1
6	LF	Parra*	30	23	.261	.293	.387	.680	67	43	1	1	0	0	0
7	CF	Blackmon*	30	37	.319	.357	.588	.945	129	107	0	2	2	2	0
8	RF	Gonzalez*	31	37	.221	.300	.342	.642	59	51	1	0	0	3	2
9	LF	Desmond	31	23	.275	.306	.388	.693	71	31	3	2	0	1	1
10	C	Wolters*	25	14	.313	.397	.406	.804	101	26	2	1	0	0	3
11	UT	Valaika	24	14	.245	.273	.547	.820	96	29	0	0	1	0	0
12	UT	Amarista*	28	10	.340	.353	.580	.933	126	29	1	0	0	0	0
13	OF	Cardullo	29	7	.143	.250	.143	.393	2	4	0	1	0	0	0
14	C	Hanigan	36	7	.276	.300	.379	.679	67	11	0	0	0	0	0
15	IF	Adames#	25	6	.000	.071	.000	.071	-80	0	0	0	0	0	0
16	LF	Tapia*	23	5	.000	.077	.000	.077	-78	0	0	0	0	0	0

- * - bats left-handed, # - bats both, else - bats right, ? - unknown; OPS_lg for OPS+ does not include pitchers.

Pitching Statistics

Table 14: Rockies pitching statistics (1 of 2).

Rk	Pos	Name	Age	W	L	W-L%	ERA	G	GS	GF	CG	SHO	SV	IP	H	R
1	SP	Senzatela	22	6	1	.857	3.67	9	9	0	0	0	0	54.0	48	23
2	SP	Chatwood	27	3	6	.333	5.09	9	9	0	1	1	0	53.0	48	30
3	SP	Freeland*	24	5	2	.714	3.31	9	9	0	0	0	0	51.2	45	22
4	SP	Anderson*	27	3	4	.429	6.00	9	9	0	0	0	0	48.0	52	34
5	SP	Marquez	22	2	2	.500	4.34	5	5	0	0	0	0	29.0	27	14
6	SP	Gray	25	0	0		4.38	3	3	0	0	0	0	12.1	11	6
7	CL	Holland	31	0	0		0.96	20	0	20	0	0	19	18.2	9	2
8	RP	Oberg	27	0	0		5.50	20	0	4	0	0	0	18.0	18	13
9	RP	Ottavino	31	0	0		3.00	19	0	0	0	0	0	18.0	14	6
10	RP	McGee*	30	0	0		2.25	17	0	4	0	0	1	16.0	13	4
11	RP	Dunn*	32	2	1	.667	4.85	17	0	0	0	0	0	13.0	13	7
12		Rusin*	30	2	0	1.000	2.19	15	0	3	0	0	1	24.2	18	7
13		Lyles	26	0	1	.000	8.53	12	0	4	0	0	0	19.0	29	19
14		Estevez	24	3	0	1.000	7.30	14	0	3	0	0	0	12.1	15	11
15		Qualls	38	1	0	1.000	5.19	9	0	4	0	0	0	8.2	8	6
16		Hoffman	24	1	0	1.000	5.40	2	1	1	0	0	0	6.2	7	4
17		Carle	25	0	0		0.00	1	0	1	0	0	0	1.0	0	0

Table 15: Rockies pitching statistics (2 of 2).

Rk	Pos	Name	ER	HR	BB	IBB	SO	HBP	BK	WP	BF	ERA+	FIP	WHIP
1	SP	Senzatela	22	7	18	0	34	4	1	0	226	138	4.69	1.222
2	SP	Chatwood	30	9	27	0	41	0	2	3	221	99	5.23	1.415
3	SP	Freeland*	19	4	24	1	32	3	1	0	221	153	4.37	1.335
4	SP	Anderson*	32	11	16	0	49	2	2	2	209	84	5.10	1.417
5	SP	Marquez	14	2	10	1	24	0	0	0	124	117	3.31	1.276
6	SP	Gray	6	1	7	0	9	0	0	1	53	117	4.34	1.459
7	CL	Holland	2	0	6	0	26	0	0	2	68	529	1.22	0.804
8	RP	Oberg	11	1	10	1	17	1	0	3	81	93	3.70	1.556
9	RP	Ottavino	6	1	11	0	20	0	0	2	76	170	3.37	1.389
10	RP	McGee*	4	1	5	0	22	0	0	1	67	227	2.04	1.125
11	RP	Dunn*	7	2	6	0	15	0	0	0	56	106	4.11	1.462
12		Rusin*	6	1	4	0	21	1	0	0	96	232	2.47	0.892
13		Lyles	18	5	5	0	17	2	0	1	90	60	5.77	1.789
14		Estevez	10	0	5	1	13	0	1	1	58	70	2.15	1.622
15		Qualls	5	1	3	0	3	0	0	0	37	100	4.88	1.269
16		Hoffman	4	2	2	0	10	0	0	0	29	97	4.84	1.350
17		Carle	0	0	0	0	1	0	0	1	4		1.04	0.000

* - throws left-handed

Topics for Future Articles

Here are a few suggestions, but I would prefer to hear from you, dear reader, on what interests you.

- Player Value - I am personally just getting familiar with this concept. Work In Progress (WIP)
- What is the OPS+ statistic and how is it calculated.
- Survey MLB ticket prices.
- A suggestion from a work colleague that we investigate what budding talent we have in the Rockies farm system. I will look into this and see what I can find.

Let me know what you would like to see in future articles. Send me email at jdreed@q.com.

Yours truly,

Jim Reed

Appendix

Glossary

Batting Statistics

Statistic Abbreviation	Definition
G	number of games (participated)
PA	plate appearances
AB	at bats
R	runs scored by player or team
RA	runs allowed
H	hits
2B	doubles
3B	triples
HR	home runs
RBI	runs batted in
BA	batting average
OBP	on-base percentage
SLG	slugging percentage
OPS	on-base percentage plus slugging percentage
OPS+	This statistic normalizes a player's OPS. It adjusts for small variables that might affect OPS scores (e.g., park effects).

Pitching Statistics

Pitching Statistic	Definition
Rk	Rank This is a count of the rows from top to bottom. It is recalculated following the sorting of a column.
Pos	Position
Name	Player Name
Age	Player's age at midnight of June 30th of that year
W	Wins
L	Losses
W-L%	Win-Loss Percentage W / (W + L) For players, leaders need one decision for every ten team games. For managers, minimum to qualify for leading is 320 games.
ERA	9 * ER / IP
G	Games Played or Pitched
GS	Games Started
GF	Games Finished
CG	Complete Game
SHO	Shutouts No runs allowed and a complete game.
SV	Saves
IP	Innings Pitched
H	Hits/Hits Allowed
R	Runs Scored/Allowed
ER	Earned Runs Allowed
HR	Home Runs Hit/Allowed
BB	Bases on Balls/Walks
IBB	Intentional Bases on Balls First tracked in 1955.
SO	Strikeouts
HBP	Times Hit by a Pitch.
BK	Balks
WP	Wild Pitches
BF	Batters Faced
ERA+	ERA+ 100*[lgERA/ERA] Adjusted to the player's ballpark(s).
FIP	Fielding Independent Pitching
WHIP	(BB + H)/IP For recent years, leaders need 1 IP per team game played
H9	9 x H / IP For recent years, leaders need 1 IP per team game played
HR9	9 x HR / IP For recent years, leaders need 1 IP per team game played
BB9	9 x BB / IP For recent years, leaders need 1 IP per team game played
SO9	9 x SO / IP For recent years, leaders need 1 IP per team game played
SO/W	SO/W or SO/BB For recent years, pitching leaders need 1 IP per team game played.

Fielding Statistics

Fielding Statistic	Definition
Name	Player Name Bold can mean player is active for this team or player has appeared in MLB * means LHP or LHB, \# means switch hitter, + can mean HOFer.
Age	Player's age at midnight of June 30th of that year
G	Games Played or Pitched
GS	– Games Started
CG	– Complete Game
Inn	– Innings Played in Field
Ch	– Defensive Chances Putouts + Assists + Errors
PO	– Putouts
A	– Assists
E	– Errors Committed
DP	– Double Plays Turned
Fld%	– Fielding Percentage (Putouts + Assists) / (Putouts + Assists + Errors)
Rtot	– Total Zone Total Fielding Runs Above Avg The number of runs above or below average the player was worth based on the number of plays made. This number combines the Rtz, Rdp,Rof, Rcatch numbers into a total defensive contribution. See the glossary section for a more complete explanation. Provided by BaseballProjection.com
Rtot/yr	– Total Zone Total Fielding Runs Above Avg per 1,200 Inn The number of runs above or below average the fielder was worth per 1,200 Innings (approx 135 games). This number combines the Rtz, Rdp, Rof, Rcatch numbers into a total defensive contribution. See the glossary section for a more complete explanation. Provided by BaseballProjection.com
Rdrs	– BIS Defensive Runs Saved Above Avg The number of runs above or below average the player was worth based on the number of plays made. This number combines the Rpm, Rbdp, Rbof, Rbcatch numbers into a total defensive contribution. Provided by Baseball Info Solutions
Rdrs/yr	– BIS Defensive Runs Saved Above Avg per 1,200 Inn The number of runs above or below average the fielder was worth per 1,200 Innings (approx 135 games). This number combines the Rpm, Rbdp, Rbof, Rbcatch numbers into a total defensive contribution. For pitchers, this is set to 200 Innings. Provided by Baseball Info Solutions
RF/9	– Range Factor per 9 Inn 9 * (Putouts + Assists) / Innings Played
RF/G	– Range Factor per Game (Putouts + Assists) / Games Played
PB	– Passed Balls
WP	– Wild Pitches
SB	– Stolen Bases
CS	– Caught Stealing

Fielding Statistic	Definition
CS%	– Caught Stealing Percentage CS / (SB + CS)
lgCS%	– League Caught Stealing Percentage League Expected CS / Players SB + Players CS
PO	– Pickoffs Runner picked off a base. May include cases they were safe on an error. Also includes Pickoff Caught Stealing plays.
Pos	Summary – Positions Played The positions either followed by the games played at that position or in order of games or innings played. For a single season, * indicates they played at least 2/3rds of the team games there Positions after / indicate less than ten games played at those positions. For career, a + sign means more than 300 games at that position and a - sign means less than 30 games.

Run date time: 2017-05-22 08:11:40