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A guide to NFL FPI
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Anthony Davis fills up stat sheet against Suns

A guide to NFL FPI

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ESPN Sports Analytics Group

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In the NFL -- unlike college football or college basketball -- there are no committees, no "style points" and no subjectivity. If a team wins enough games to earn a divisional title or a wild-card spot, it will make the playoffs and possibly have a chance to compete for the Super Bowl.

For this reason, the ultimate goal when rating teams in the NFL is to measure team strength and project performance going forward.

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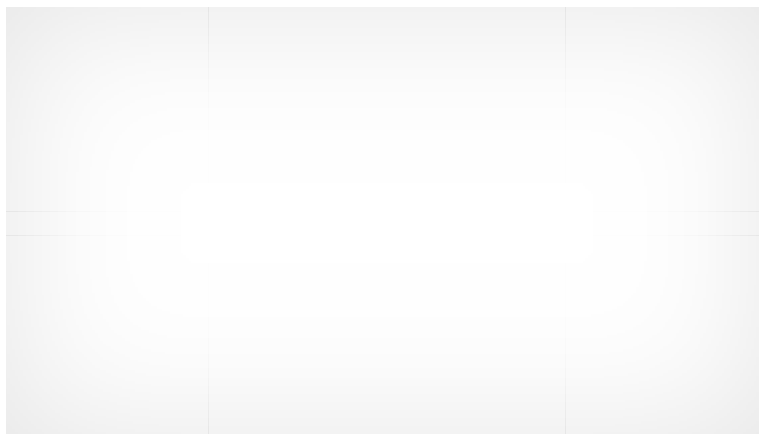
With this objective in mind, ESPN's Stats & Information Group has created an NFL version of its Football Power Index, or FPI for short. There are a number of other NFL power ratings out there -- FiveThirtyEight (Elo Ratings), Pro Football Reference (SRS), Jeff Sagarin and others have created systems to rate NFL teams -- but FPI has a few additional features (like incorporating quarterback injuries) that sets it apart.

What is NFL FPI?

At its core, NFL FPI is a prediction system for the NFL. Each team's FPI rating is composed of a predicted offensive, defensive and special teams efficiency, as measured by expected points added per play, and that rating is the basis for FPI's game-level and season-level projections.

In the preseason, FPI uses a number of predictive factors to project future team strength. The main component of preseason FPI is Vegas expectations; the expected win totals and money lines for each team are an accurate representation of predicted team strength and provide a strong baseline for teams entering the season.

But relying solely on Vegas has its flaws, and more information is needed to determine what percentage of a team's projected win total can be attributed to its offense, defense and special teams units -- the components that make up FPI.

Therefore, other information included in the preseason ratings include: previous years' efficiencies for each unit, number of returning starters (on offense and defense), coaching/ coordinator/quarterback changes and quarterback injuries.

After combining all of these factors, a preseason FPI rating is determined for each team, which represents the points above or below average a team is expected to be in the coming season. Preseason FPI will serve as the basis of the early-season predictions but will diminish in effect as the season progresses and we learn more about the actual strength of each team.

Although team ratings provide fodder for debate, the ultimate goal of these projections is not to rate teams -- it is to predict performance going forward. The next piece of the puzzle for FPI is its game predictions.

What is accounted for in game predictions?

Like most game predictions, FPI accounts for team strength, opponent strength and home-field advantage. There are a number of unique inputs into each game prediction, however, that are worth highlighting:

On-field performance in previous games: Team performance is measured by expected points added per play, which helps control for the extremely fast- or slow-paced teams. EPA per play is a measure of efficiency that serves as the basis for how FPI evaluates individual units and quarterbacks.

Rest: An extra week of rest makes a difference, particularly when facing a team coming off short rest. With all else equal, an extra week of rest is worth about 1 point per game, on average.

Altitude: There are only a few teams that experience an altitude advantage, but stadium

altitude was found to be predictive. The biggest beneficiary of the altitude impact is Denver, which receives a small, but notable (about 0.3 points per game) increase in its chance of winning at home, compared to a team without an altitude advantage.

Distance traveled: Like with altitude, long travel distances only impact a handful of teams, but in the most extreme cases (say, Seattle to Miami), hosting a team with a significant travel distance is worth about half a point per game, all else equal.

Seasonal effects: Over the last five seasons, offenses have contributed about 1.8 points per game to their net scoring margins in the first six weeks, but as the temperature (and offenses) cooled, the league-wide offensive EPA per game dropped to 1.0 points per game in the final six weeks of the season. Whether it is the warm weather or the unfamiliarity with opposing offensive schemes, defenses have historically been at a disadvantage early in the season and have held the advantage later in the year. This trend is accounted for in the game-level projections.

QB injuries/suspensions/absence: A key differentiating factor for FPI's game-level predictions is its ability to account for quarterbacks missing games. On game day, knowing a QB's status is straightforward -- either a player is starting or he is not -- but the model also accounts for the chance that quarterback will miss games throughout the season. For example, looking out from Week 1, there is a higher chance that a quarterback will not play in Week 17 than in Week 5. But with each week that a quarterback remains healthy, the chances that he is available for subsequent weeks rise.

If a starting quarterback is out (or there is a chance he will be out), FPI accounts for how much better he is than his backup, and the difference between the two is accounted for in the game-level projection. Each quarterback's efficiency is determined based on past performance (using similar components as what we use to build up Total QBR), adjusted for an aging curve, and the players without any prior experience are set at replacement level.

All of these factors are combined to make up each single-game projection. Then each team's season is simulated 10,000 times to produce its chance to win its division, make the playoffs, win the Super Bowl and pick first in the NFL draft, among other interesting

projections.

Ultimately the Football Power Index gives us a tool to project that future. In its first publicly available season, the FPI favorite won 63 percent of NFL games, which is comparable with the Vegas closing line, and proved to be well calibrated in a small sample.

Because of the level of detail in each simulation and the exhaustive process in building the model (see details on process here) we are confident that it will be remain of the most accurate systems out there for the upcoming season.

March 12, 2018

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Jokic shoots 80% in triple-double

Nikola Jokic scored 20 points on 8-for-10 shooting, grabbed 11 rebounds, and handed out 10 assists in the Nuggets' 130–104 win over the visiting Kings. It was the second time this season that Jokic notched a triple-double while shooting better than 75% from the floor, having also done so at Milwaukee on Feb. 15. The only other NBA players to have more than one such game in a season are Wilt Chamberlain (two in 1965–66, eight in 1966–67, and four in 1967–68) and Draymond Green (two in 2015–16).

Durant scores 39 despite low field-goal percentage

Kevin Durant scored 39 points but made just 34.4% of his shots from the field (11-for-32) in the Warriors' 109–103 loss at Minnesota. The only other NBA player in the last 57 seasons to score as many points in a non-overtime game while shooting less than 35% from the floor was Durant's former teammate, Russell Westbrook, on March 2, 2017 at Portland (45 points, 33.3%.) Before Westbrook, the last players to have games like this were the Lakers' Elgin Baylor and the Knicks' Richie Guerin, both in the 1960–61 campaign.

Mitchell scores 18 straight points for Utah

Donovan Mitchell scored 18 straight points for the Jazz during the second half of Utah's 116–99 win at New Orleans. Mitchell is the second NBA rookie in the last three days to

score 18 consecutive points for his team. The Hawks' Tyler Dorsey did that in a loss at Indiana on March 9. Before Friday, no other rookie in the last 20 years had fashioned such a streak.

Mitchell is the second player this season to score at least 18 consecutive points for Utah. Rodney Hood put 19 in a row on the scoreboard at Orlando on Nov. 18. The last team to have two different players account for 18+ straight points in a game in one season was the 2008–09 Nuggets. Carmelo Anthony scored 26 consecutive team points on Dec. 10, and then J.R. Smith scored 18 straight on April 4.

Before 2017–18, no Jazz player had scored at least 18 straight team points since Karl Malone, at Golden State on April 7, 1998. The Mailman delivered 19 consecutive Utah points in that game.

Davis sets New Orleans record with 10 blocks

Anthony Davis set a single-game team record with 10 blocks in the Pelicans' home loss to the Jazz. The only current franchises that have not had a player block at least 10 shots in a game since the NBA started recording that statistic in 1973 are the Celtics, Grizzlies, Timberwolves, Trail Blazers, and Kings.

Sixers post first 20-point road win in nearly six years

Joel Embiid's 21 points led the 76ers in their 120–97 win at Brooklyn. Philadelphia hadn't won a road game by 20-or-more points since a 105–80 victory at Charlotte on March 19, 2012. The Sixers' run of 251 consecutive away games without a 20-point win more than doubled the both longest such streak in franchise history and the second-longest active streak in the NBA. The team's previous record was 125 straight road games, from 1981 to 1984, during which it won an NBA Championship in 1983. The longest active such streak by any NBA team is now 125, by the Mavericks.

Oladipo scores 100 over three games against Celtics

Victor Oladipo led all players with 27 points in the Pacers' 99–97 win at Boston, the final regular-season meeting between the two teams this season. Oladipo scored 100 points in three games against the Celtics in 2017–18 (he missed the first meeting) for an average of 33.3 points per game. That's the highest scoring average ever by an Indiana player in one season against Boston. The only other Pacers player to put up 30-or-more points per game against the Celtics over a full season was Billy Knight, who averaged 32.3 in three games in 1976–77, Indiana's first year in the NBA.

No Harden, no problem for Houston

Even without James Harden, the Rockets' starting backcourt, consisting of Eric Gordon (26 points) and Chris Paul (24), outscored its Mavericks' counterpart (Dennis Smith 4, Yogi Ferrell 2), 50–6 in Houston's 105–82 road win Sunday. It was the sixth time this

season that the Rockets' starting guards outscored those of their opponent by a margin of 40-or-more points. That's twice as many such games as any other NBA team. The Warriors have the second-most, with three.

A second-half scoring surge by Bulls and Hawks

The Bulls and Hawks each scored at least 35 points in both the third and fourth quarters of Chicago's 129–122 road win Sunday. That hadn't happened in an NBA game since a Warriors' 143–141 win at Dallas on Jan. 18, 1992.

Chicago made 48 of 98 shots from the floor (49.0%) in its 129–122 victory. The Bulls hadn't scored as many points in a non-overtime game in which they made fewer than half of their field-goal attempts since Dec. 22, 1982, when they shot 47.0% in a 140–131 loss at Boston.

Thomas off to a fast start as a Lakers' sub

Isaiah Thomas came off the bench to score 20 points and hand out nine assists in the Lakers' 127–113 home win over the Cavaliers. In 12 games since coming to Los Angeles in a trade with Cleveland, Thomas has registered 191 points and 68 assists, all as a substitute. Over the last 40 years, the only other player to average at least 15 points and five assists per game over his first 12 contests with a particular team, while not starting any of them, was Thomas himself, for the Celtics in February-March 2015 (236 points, 60 assists).

Raptors' bench lights up Knicks

The Raptors' bench scored 69 points on 28-for-42 shooting (66.7%), including 11-for-16 (68.8%) from three-point range in Toronto's 132–106 win at New York. No team's substitutes had combined for as many points and as high field-goal and three-point percentages since Feb. 28, 2012, when the Timberwolves' bench produced 72 points, shooting 71.1% overall and 72.7% from three-point range in a 109–97 road win over the Clippers.

For the third time in team history, the Raptors scored at least 30 points in all four quarters Sunday. The previous two games were at home, in wins over the Knicks on Jan. 15, 2006 and the Cavaliers on Jan. 11, 2018.

Hornqvist reaches 20-goal mark for eighth time

Patric Hornqvist scored his 20th goal of the season for the Penguins in their 3–1 win against the Stars. Hornqvist has reached the 20-goal mark eight times in his NHL career: four times for Nashville and in all four seasons he's played with Pittsburgh. Three other skaters who've played in the NHL this season have recorded at least four 20-goal seasons for two different teams: Jeff Carter (Flyers, Kings), Rick Nash (Blue Jackets, Rangers) and Joe Thornton (Bruins, Sharks).

Kane clinches eighth 25-goal season

Patrick Kane's 25th goal of the season snapped a 1–1 tie with just over three minutes remaining in the third period and the Blackhawks went on to beat the Bruins, 3–1. This is the fifth consecutive season in which Kane has scored at least 25 goals and it's the eighth time he's reached the 25-goal mark in his 11 seasons in the NHL, all with Chicago. The only other players who scored 25 goals or more for the Hawks in at least eight different seasons are Bobby Hull (13), Stan Mikita (13), Steve Larmer (11) and Denis Savard (9). Kane is the first player to produce five straight 25-goal seasons for Chicago since Patrick Sharp did so from 2007–08 through 2011–12.

Gibson stops 50 in Islanders' win

Rookie Christopher Gibson stopped 50 of the Flames' 52 shots on goal in his 4–2 win for the Islanders at Calgary. He's the first rookie goaltender in Islanders history to win a game while facing 50 or more shots on goal. Gibson's win on Sunday marked the third time this season that an Islanders goaltender made at least 50 saves in a victory, following wins by Thomas Greiss (Jan. 15 at Montreal, 52 saves) and Jaroslav Halak (Feb. 15 vs. the Rangers, 50 saves). That matches the number of 50-save wins by Islanders goaltenders over the team's entire history before this season: one each by Glenn Healy (in 1990), Felix Potvin (in 1999) and Dwayne Roloson (in 2009).

Veteran Boychuk notches three points

Defenseman Johnny Boychuk tied his career high for points in one game when he scored one goal and assisted on two for the Islanders in their 5–2 win at Calgary. The 34-year-old Boychuk's only other three-point game in his 11 seasons in the NHL came in his first game with the Islanders, on Oct. 10, 2014 at Carolina. Only three other defensemen produced a three-point game for the Islanders at age 34 or older: Denis Potvin (twice in 1988, age 34), Mark Streit (in 2012, age 34) and Lubomir Visnovsky (in 2014, age 37).