

Competitiveness

Article 4 Part 2 Section 1 (14)(F)

“To the extent practicable, competitive districts should be favored where to do so would create no significant detriment to the other goals.”

IRC 1.0 Measures

1. Party Registration
2. Arizona Quick & Dirty (AQD)
3. JudgeIt
4. Statewide Election Averages

IRC 1.0 Measures in detail

1. Party Registration

- ▣ Democratic / Republic difference within 7%
- ▣ 3rd-party registration greater than the Dem / Rep difference

2. Arizona Quick & Dirty (AQD)

- ▣ Average of the 2018 and 2020 votes for Corporation Commission

3. JudgeIt

- ▣ Statistical analysis of partisan registration, the vote in the immediately preceding election, and incumbency
- ▣ Closely related to PlanScore's "King/Grofman Partisan Bias" measure

4. Statewide Election Averages

- ▣ 3-election and 4-election averages using 1998 statewide offices

IRC 1.0 Competitive Range

- Competitive range / definition
 - ▣ JudgeIt: Statistical Standard Error of +/- 3.5% considered “competitive”
 - ▣ That 7% range was used as “competitive” definition for all measures
 - ▣ IRC 1.0 discussed, but did not formally count, “bulletproof” districts

IRC 1.0 Discussion

“[Corporation Commission results] were used because they are less likely to be the kinds of races where you have a lot of other variables that come into play, so it would tend to give you an idea of how people would usually vote with respect to Republican and Democratic candidates.”

IRC 1.0 Methodology

- AQD and Voter Registration counts calculated “live” within the mapping software

- Later, 1998 election result averages were also “live”

- Maps sent off for JudgeIt analysis
 - ▣ Took 4 hours when planned, about a day when unplanned

IRC 2.0 Measures

- Eight averages of 2004 – 2010 statewide election results

IRC 2.0 Measures in detail

- Eight averages of statewide election results:
 2. Average results from 2008 + 2010, each year weighted equally
 3. Average result from 2008 + 2010 plus major party registration
 4. Average result from 2004 + 2006 + 2008 + 2010
 5. Average result from 2004 + 2006+ 2008+ 2010 plus major party registration
 6. Average result from 2004 + 2006+ 2008+2010 plus major party registration; but races where one candidate received more than 60% of the 2-way vote removed
 7. Average result from 2004 + 2006+ 2008+2010 plus major party registration; but races where one candidate received more than 60% of the total vote removed
 8. Weighted average result from 2010 (1/3 weight) + 2008 (1/3 weight) + 2004 (1/6 weight) + 2006 (1/6 weight); races where one candidate received more than 60% of the 2-way vote removed
 9. Weighted average result from 2010 (1/4 weight) + 2008 (1/4 weight) + 2006 (1/8 weight) + major party registration (1/4 weight); races where one candidate received more than 60% of the 2-way vote removed.

IRC 2.0 Range

- We are not aware of any adopted “competitive range” or other “competitive” definition adopted by IRC 2.0

IRC 2.0 Methodology

- Results calculated “live” within the mapping system for all eight measures.

2021: Simple Options

- A. Voter Registration
- B. Average of a selection of Statewide Election Results
- C. Count/Mix of Democratic and Republican election victories in Selected Elections

More Complicated Options

- A. Statistical Calculations based on past election data
 - A. Seats-Votes Bias / Partisan Swing
 - B. Responsiveness / Swing analysis
 - C. JudgeIt a.k.a. King/Grofman
 - D. Declination
 - E. Efficiency Gap
 - F. Mean-Median Difference

“Thousands of Maps” Comparisons

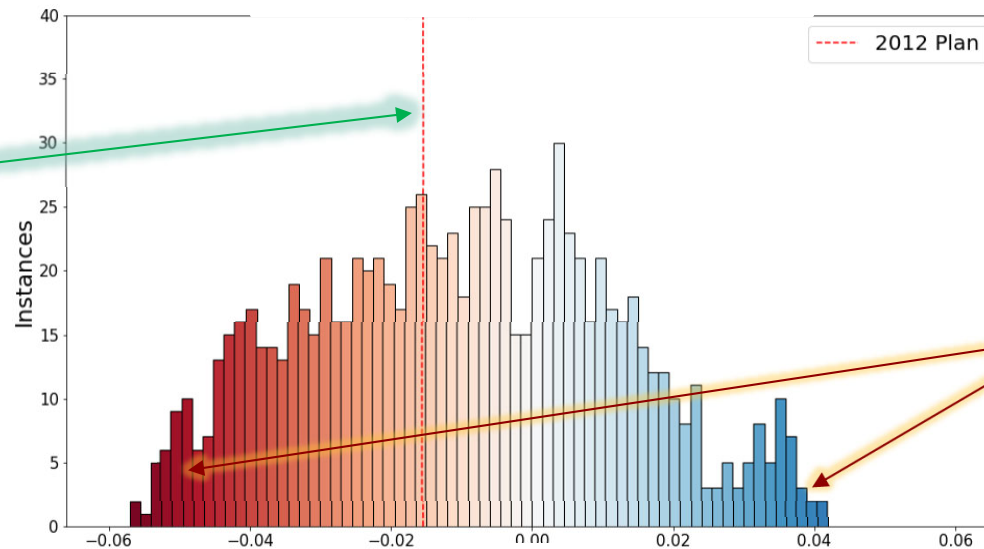
- Markov-Chain based programming approach
 1. Algorithm attempting to capture other criteria written
 2. Thousands of maps generated
 3. A competitiveness score based on one measure calculated
 4. Resulting number of competitive districts calculated
 5. Graph developed showing the range of results
 6. Maps under consideration by the Commission compared to that range of results

“Thousands of Maps” Comparisons

- Appealing, but not a complete solution
 - ▣ Focusing on the “best” map is letting the algorithm decide
 - ▣ Any/all map(s) in a central range are generally considered equally good

Generate this value for each map and compare to some version of the pre-generated chart.

A map in the middle is considered relatively competitive.



A map at either extreme is considered an outlier (in a negative way).

Chart from “Assessing Congressional Districting In Maine And New Hampshire,” by Sara Asgari, Quinn Basewitz, Ethan Bergmann, Jackson Brogsol, Nathaniel Cox, Diana Davis, Martina Kampel, Becca Keating, Katie Knox, Angus Lam, Jorge Lopez-Nava, Jennifer Paige, Nathan Pitock, Victoria Song, Dylan Torrance, available online at <https://arxiv.org/pdf/2011.06555.pdf>

Table of Partisan Statewide Elections

	2020	2018	2016	2014	2012
President	X		X		X
Senate1		X			X
Senate2	X		X		
Governor		X		X	
Secretary of State		X		X	
Attorney General		X		X	
State Treasurer		X		Uncontested	
Superintendent of Public Education		X		X	
State Mine Inspector		X		Uncontested	
Corporation Commissioner	3 seats	2 seats	3 seats	2 seats	3 seats

Partisan Statewide Election Results

	2020Dem	2020Rep	2018Dem	2018Rep	2016Dem	2016Rep	2014Dem	2014Rep	2012Dem	2012Rep
President	1,672,143	1,661,686			1,161,167	1,252,401			1,025,232	1,233,654
Senate1			1,191,100	1,135,200					1,036,542	1,104,457
Senate2	1,716,467	1,637,661			1,031,245	1,359,267				
Governor			994,341	1,330,863			626,921	805,062		
Secretary of State			1,176,384	1,156,532			712,918	779,226		
Attorney General			1,120,726	1,201,398			696,054	782,361		
State Treasurer			1,052,197	1,249,120			Uncontested			
Superintendent of Public Education			1,185,457	1,113,781			724,239	740,273		
State Mine Inspector			1,090,346	1,168,798			Uncontested			
Corporation Commissioner	1,450,194	1,449,963	1,076,800	1,053,862	1,024,501	1,208,002	576,482	766,864	868,726	979,034
		1,434,236	1,006,654	1,049,394	988,666	1,122,849	557,963	761,915	776,472	943,157
		1,379,804				1,061,094			862,876	935,573

	2020Dem	2020Rep	2018Dem	2018Rep	2016Dem	2016Rep	2014Dem	2014Rep	2012Dem	2012Rep
President	50.2%	49.8%			48.1%	51.9%			45.4%	54.6%
Senate1			51.2%	48.8%					48.4%	51.6%
Senate2	51.2%	48.8%			43.1%	56.9%				
Governor			42.8%	57.2%			43.8%	56.2%		
Secretary of State			50.4%	49.6%			47.8%	52.2%		
Attorney General			48.3%	51.7%			47.1%	52.9%		
State Treasurer			45.7%	54.3%						
Superintendent of Public Education			51.6%	48.4%			49.5%	50.5%		
State Mine Inspector			48.3%	51.7%						
Corporation Commissioner	50.0%	50.0%	50.5%	49.5%	45.9%	54.1%	42.9%	57.1%	47.0%	53.0%
<i>(top R & top D Corp. Com. candidates only)</i>										

Data hand-entered for this presentation as the official database is being compiled.
Some numbers may have been misread or transposed.

Disclaimer

The following slides covering the information provided by Drs. McGhee, Duchin and Wang are NDC summaries. For their exact comments, please see the videos of their presentations and the letters and presentations they provided.

General Summary: Dr. McGhee

- Agrees with the importance of explainability.
- Overall, the Presidential vote in a district is "far and away" the best predictor of Congressional District results.
- In these days of partisan extremes, using just about any statewide election is likely to generate similar results.

General Summary: Dr. McGhee

- ❑ Worst measure: party registration
- ❑ Better: averages of past election results
- ❑ Best: statistical regression analyzing the accuracy of past statewide election result predictions by-district results

Measures Summary: Dr. McGhee I

□ PlanScore

- Generates three Statistical Calculations:
 1. Efficiency Gap
 2. Partisan Bias (King/Grofman measure)
 3. Mean-Median Gap
- Heavily, but not entirely, based on the previous Presidential election results.
- As do all statistical analysis based on previous congressional or legislative election results, relies on some “fill” data or other adjustments for uncontested elections and other mathematical challenges.

Measures Summary: Dr. McGhee II

Proposed an alternative approach:

- A. Generate a Competitive Range of “reasonable swing”
1. Calculate the actual average U.S. house, state senate, and state house vote share in each of the last five election years (3 averages for each year).
 2. Calculate the overall average **across** the last 5 elections for U.S. house, state senate, and state house (3 averages total).
 3. Calculate the differences between #1 and #2 for each chamber.
 4. Identify the largest absolute difference (i.e., either positive or negative) across all chambers and years.
 - The Legislative or Congressional body with the largest “swing” (difference between single-year and average-over-five-year vote share) is the largest “reasonably expected swing,” a.k.a. competitive margin.

See also the August 5th letter from Dr. McGhee for more details.

Measures Summary: Dr. McGhee II

- B. Calculate the # of competitive districts in each map:
1. Run the map through PlanScore; this will give you a prediction for each seat in the plan in an average election from the last decade.
 2. For each district in the map, subtract 50% from PlanScore's predicted vote share.
 3. Any seat where the absolute result of this calculation is smaller than the "reasonably expected swing" is a competitive seat.

NDC Comment: This "averages over 5 election cycles" method does not capture the Democratic and Turnout swing in the state from 2012 to 2020.

Add'l General Comments: Dr. McGhee

- “I would caution against using any statewide office with larger partisan swings that you get from A.1 – A.4 above. That’s a sign that the office doesn’t have strong down-ballot coattails. (Gubernatorial races are especially notable for this).”
- ▣ *The next slide shows **possible** examples circled by NDC on the table of past election results. NDC has not yet calculated the “partisan swings” Dr. McGhee references to determine if the circled elections are actually outside of that swing range.*

Partisan Statewide Election Results

	2020Dem	2020Rep	2018Dem	2018Rep	2016Dem	2016Rep	2014Dem	2014Rep	2012Dem	2012Rep
President	1,672,143	1,661,686			1,161,167	1,252,401			1,025,232	1,233,654
Senate1			1,191,100	1,135,200					1,036,542	1,104,457
Senate2	1,716,467	1,637,661			1,031,245	1,359,267				
Governor			994,341	1,330,863			626,921	805,062		
Secretary of State			1,176,384	1,156,532			712,918	779,226		
Attorney General			1,120,726	1,201,398			696,054	782,361		
State Treasurer			1,052,197	1,249,120			Uncontested			
Superintendent of Public Education			1,185,457	1,113,781			724,239	740,273		
State Mine Inspector			1,090,346	1,168,798			Uncontested			
Corporation Commissioner	1,450,194	1,449,963	1,076,800	1,053,862	1,024,501	1,208,002	576,482	766,864	868,726	979,034
		1,434,236	1,006,654	1,049,394	988,666	1,122,849	557,963	761,915	776,472	943,157
		1,379,804				1,061,094			862,876	935,573

	2020Dem	2020Rep	2018Dem	2018Rep	2016Dem	2016Rep	2014Dem	2014Rep	2012Dem	2012Rep
President	50.2%	49.8%			48.1%	51.9%			45.4%	54.6%
Senate1			51.2%	48.8%					48.4%	51.6%
Senate2	51.2%	48.8%			43.1%	56.9%				
Governor			42.8%	57.2%			43.8%	56.2%		
Secretary of State			50.4%	49.6%			47.8%	52.2%		
Attorney General			48.3%	51.7%			47.1%	52.9%		
State Treasurer			45.7%	54.3%						
Superintendent of Public Education			51.6%	48.4%			49.5%	50.5%		
State Mine Inspector			48.3%	51.7%						
Corporation Commissioner	50.0%	50.0%	50.5%	49.5%	45.9%	54.1%	42.9%	57.1%	47.0%	53.0%
<i>(top R & top D Corp. Com. candidates only)</i>										

Data hand-entered for this presentation as the official database is being compiled.
Some numbers may have been misread or transposed.

General Summary: Dr. Duchin

- Much harder to predict future election results than to analyze current or past election results.
- Using a selection of real-world election results is clearer than uniform partisan swing and related analysis.
- Easy to understand a count of the # of districts that changed party preference.

General Summary: Dr. Duchin

- ❑ An algorithmic analysis of thousands of plans could flag outliers and give a sense of what is possible, but should not pick the specific plan.
- ❑ Many statistical measures lack clarity for AZ's goal or have other issues.
- ❑ The geography of where voters live can lead to districts are naturally “safe.” A "swing" or "competitive" district is won by each party in different elections.

General Summary: Dr. Duchin

- In many states, Senate and/or Presidential elections are a decent predictor of future election results, but other statewide elections reflect a district's responsiveness to shifts in voter opinion.
 - ▣ NDC's rephrasing: Are you looking to correctly predict the right winner as often as possible, or to correctly predict seats where both parties have a chance to win?
- Don't worry too much about personality and other campaign-specific factors; if you are taking a large enough selection of elections, these will wash out overall.

Measures Summary: Dr. Duchin

- Party registration is not a good measure.

- One Possibility: “Swing Districts” metric:
 - Look at the actual vote counts in each individual statewide single-seat election of the last 10 years. Count the number of districts that include a party winner “flip.”
 - Districts where each party won at least 1 statewide election are “swing districts,” and a map with more “swing districts” is a “more competitive” map.

- Second, More Traditional, Possibility: “Vote Band” metric:
 - Use an individual election or select a "vote index" (combination of elections), then calculate an average of a set of statewide single-seat elections over the last 6 or 10 years.
 - Count a district as “competitive” if the vote is 53 – 47% or closer.
 - Could alternatively use 55 – 45% range, or any range you choose.

General Summary: Dr. Wang

- Voter behavior is easier to predict now than historically.
- There is a solid consensus on how to look at how competitive maps were in the past. It is much harder to predict how competitive the districts will be in the future.
- Last decade of Arizona elections gives lots of swing elections for useful analysis.

See also the August 5th letter from Dr. Wang for more details.

General Summary: Dr. Wang

- More intensive statistical analysis may be more appropriate for academic and retroactive analysis than during mapping.
- Be cautious about assumptions of statistical models and wary of the difficulty of explaining their complexity.
- FiveThirtyEight.com model gives a sense of competitive possibilities.
 - *NDC Note: [MGGG](#), [Dave's Redistricting](#), and other sites have similar 'test / demo / evaluate' capabilities.*

Measures Summary: Dr. Wang

- Use a “market basket” of statewide partisan elections from the past ten years (not by-district elections).

Use either or both of the following:

1. “Average Performance” metric
 - Identical to Dr. Duchin’s “Vote Band” metric
 - But Dr. Wang typically uses a 46.5% to 53.5% “competitive” band
2. “Responsive Districts” metric
 - Essentially identical to Dr. Duchin’s “Swing Districts” metric

Goals for Today's Meeting

- A. Select the method(s) you wish to use.
- B. Select the election(s) to be include in those calculation.
- C. Select whether to establish ranges / rankings and/or competitiveness “points.”

Some particulars of each selection may be left for future mathematical calculation.

Decision A: Methods I

Described By	Description	Type	Competitive Range	Understanding	Implementation
McGhee	PlanScore + “Reasonable Swing”	Statistical	Defined by “Reasonable Swing”	Complicated	Short Delay or Send for Quick Review
Duchin	“Swing Districts”	Actual Past Election Results	# of Districts that “swing”	Simple	Live
Wang	“Responsive Districts”				
Duchin	“Vote Band”	Actual Past Election Results	53 – 47%	Simple	Live
Wang	“Average Performance”		53.5 – 46.5%		
IRC 2.0	Simple Average		Undefined?		
IRC 1.0	Down-Ballot Election Average (i.e. AQD)	Averaged Past Election Results	IRC 1.0 used 53.5 – 46.5%	Simple	Live

Decision A: Methods II

Source	Description	Type	Competitive Range	Understanding	Implementation
Literature	Presidential Election Result	2020 or a weighted or unweighted average of '20, '16 & '12	To be determined	Simple	Live
Literature	Partisan Swing / Symmetry *	Statistical	Standard Error	Complicated	Send for Quick Review
Literature	Mean-Median Difference *	Statistical	Standard Error	Complicated	Live
Literature	Proportionality *	Averaged Election Results	Standard Error	Medium	Generate Report
Literature	Declination	Actual Past Election Results	Unclear	Complicated	Send for review
Literature	Efficiency Gap *	Statistical	Complicated	Complicated	Send for Quick Review
Duchin	Extreme Outlier analysis	Thousands of Plans	Complicated	Complicated	Initial Setup, then Generate Report

* NDC Note: the focus of this tool is measuring fairness / partisan gerrymandering, not district competitiveness.

Decision B: Elections

- Which past statewide elections should be included in the analysis?
 - ▣ All 22? Just down-ballot? Just top-of-ballot? Include Corp. Commission?
 - ▣ By Year: just those from 2018 – 2020? From 2016 – 2020?
 - ▣ Exclude: 56%+ “outliers”? Governor? Corporation Commission?
 - ▣ Some other selection?

	2020Dem	2020Rep	2018Dem	2018Rep	2016Dem	2016Rep	2014Dem	2014Rep	2012Dem	2012Rep
President	50.2%	49.8%			48.1%	51.9%			45.4%	54.6%
Senate1			51.2%	48.8%					48.4%	51.6%
Senate2	51.2%	48.8%			43.1%	56.9%				
Governor			42.8%	57.2%			43.8%	56.2%		
Secretary of State			50.4%	49.6%			47.8%	52.2%		
Attorney General			48.3%	51.7%			47.1%	52.9%		
State Treasurer			45.7%	54.3%						
Superintendent of Public Education			51.6%	48.4%			49.5%	50.5%		
State Mine Inspector			48.3%	51.7%						
Corporation Commissioner	50.0%	50.0%	50.5%	49.5%	45.9%	54.1%	42.9%	57.1%	47.0%	53.0%
<i>(top R & top D Corp. Com. candidates only)</i>										

Decision C: Range/Rankings

- Are districts either “competitive” or “not competitive”
 - ▣ 53 – 47%? 53.5 – 46.5%? 55 – 45%? Other?

- Or is there a range such as “highly competitive,” “somewhat competitive” and “bulletproof” districts?

- Define the range(s)

- Should “points” be awarded by category, or decisions evaluated plan by plan?

Recommendation

1. Select the method(s) you wish to use.
2. Select the election(s) to be include in those calculation.
3. Select whether to establish ranges / rankings and/or “points.”

Samples

1. Select the method(s) you wish to use.
 - ▣ i.e. Plan Score, Swing Districts and Simple Average?
2. Select the election(s) to be include in those calculation.
 - ▣ i.e. all 10 years; 2016-2020 elections; some other limitation?
3. Select whether to establish ranges.
 - ▣ i.e. Standard Deviation for Plan Score or past elections average;
 - ▣ Some count of district “swings”;
 - ▣ A 53 – 47% or some other range for averages.
4. Select whether to establish rankings or “points.”
 - ▣ i.e. no “points,” or something like 4 points for “highly” competitive, 2 points for “somewhat” and -1 for “bulletproof.”

Final Thoughts

- Direction needed for proper setup of the redistricting software.
 - ▣ “API” connection to PlanScore or similar systems are complicated.
 - ▣ “Send-off for analysis” options require setting up such systems.

- There is some flexibility going forward: this decision is guidance and direction, but somewhat open to future revision.