

# Elections American Style First Memo

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## R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
load(url("https://www.dropbox.com/scl/fi/kp1lty1chtgzye8gnufl4/clea_lc_20240419.RData?rlkey=phvtoh91a48"))
```

— Germany ENP Analysis

```
# --- Handle missing codes (same as professor did for Italy) ---
missing_codes_num <- c(-990, -992, -994)
missing_codes_char <- as.character(missing_codes_num)

clea_lc_20240419 <- clea_lc_20240419 %>%
  mutate(across(where(is.numeric),
    ~ ifelse(. %in% missing_codes_num, NA, .))) %>%
  mutate(across(where(is.character),
    ~ ifelse(. %in% missing_codes_char, NA, .))) %>%
  mutate(across(where(is.factor),
    ~ {
      x <- as.character(.)
      x[x %in% missing_codes_char] <- NA_character_
      factor(x)
    })))

# --- Scope: Germany, post-1920 elections ---
germany_years <- c(1924, 1928, 1930, 1932)

germany <- clea_lc_20240419 %>%
  dplyr::filter(ctr_n == "Germany", yr %in% germany_years)
```

## Calculating the ENP for 1 constituency

```
de_cst1 <- germany %>%
  dplyr::filter(yr == germany_years[1], cst == 1) %>%
  dplyr::group_by(cst, cst_n) %>%
```

```

dplyr::summarize(
  enp_v = 1/sum(pvs1^2, na.rm = TRUE),
  enp_s = 1/sum((seat/mag)^2, na.rm = TRUE),
  yr     = dplyr::first(yr),
  mag    = dplyr::first(mag),
  cst_n  = dplyr::first(cst_n),
  .groups = "drop"
)

knitr::kable(de_cst1,
  caption = paste0("ENP for Germany, ", germany_years[1], ", Constituency 1"))

```

Table 1: ENP for Germany, 1924, Constituency 1

cst	cst_n	enp_v	enp_s	yr	mag
1	baden	2.671366	Inf	1924	NA

— This Bar graph show the mean ENP\_votes across all constituencies for each year:

```

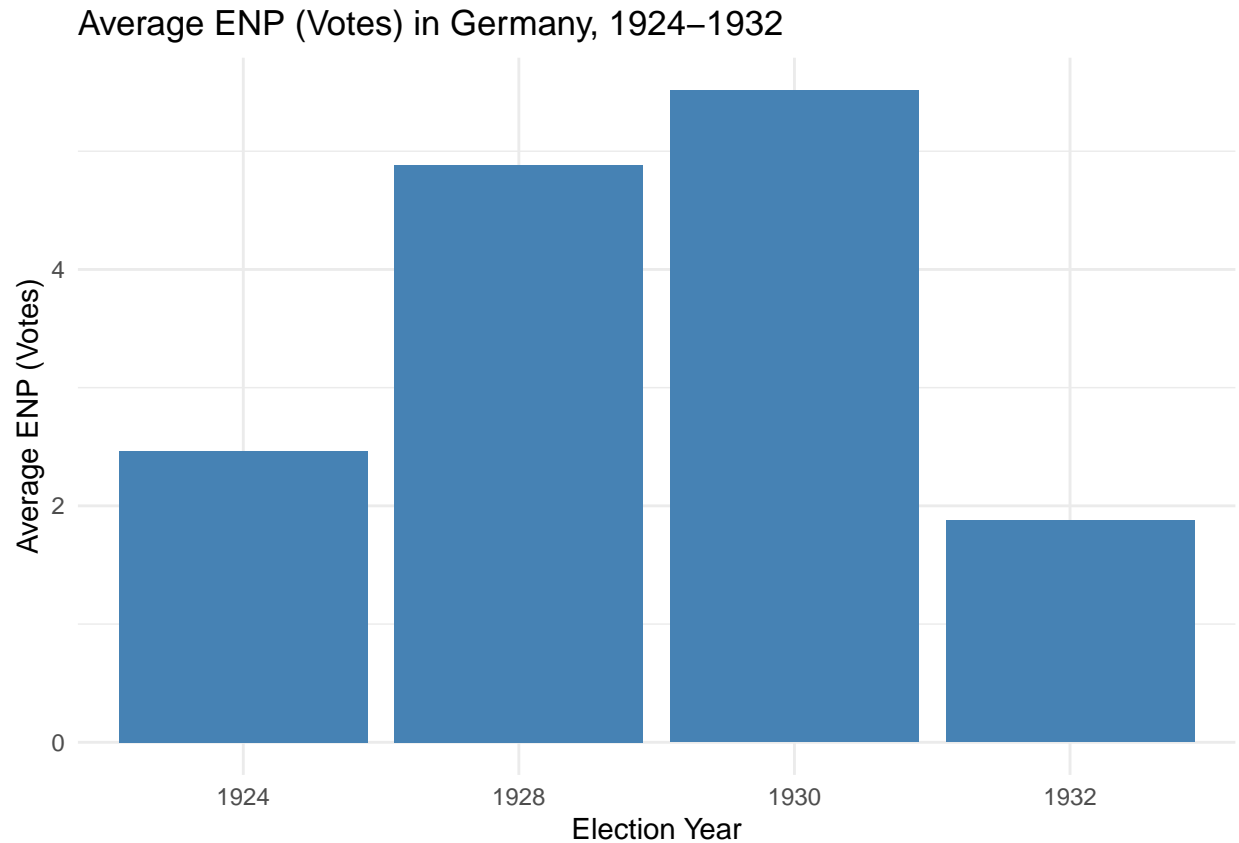
## Calculating the ENP for contituencies.

de_all <- germany %>%
  dplyr::group_by(yr, cst, cst_n) %>%
  dplyr::summarize(
    enp_v = 1/sum(pvs1^2, na.rm = TRUE),
    enp_s = 1/sum((seat/mag)^2, na.rm = TRUE),
    .groups = "drop"
  )

# Calculate mean ENP (Votes) by year
de_avg <- de_all %>%
  dplyr::group_by(yr) %>%
  dplyr::summarize(mean_enp_v = mean(enp_v, na.rm = TRUE))

# Bar chart of average ENP
ggplot2::ggplot(de_avg, ggplot2::aes(x = factor(yr), y = mean_enp_v)) +
  ggplot2::geom_col(fill = "steelblue") +
  ggplot2::labs(title = "Average ENP (Votes) in Germany, 1924-1932",
    x = "Election Year",
    y = "Average ENP (Votes)") +
  ggplot2::theme_minimal()

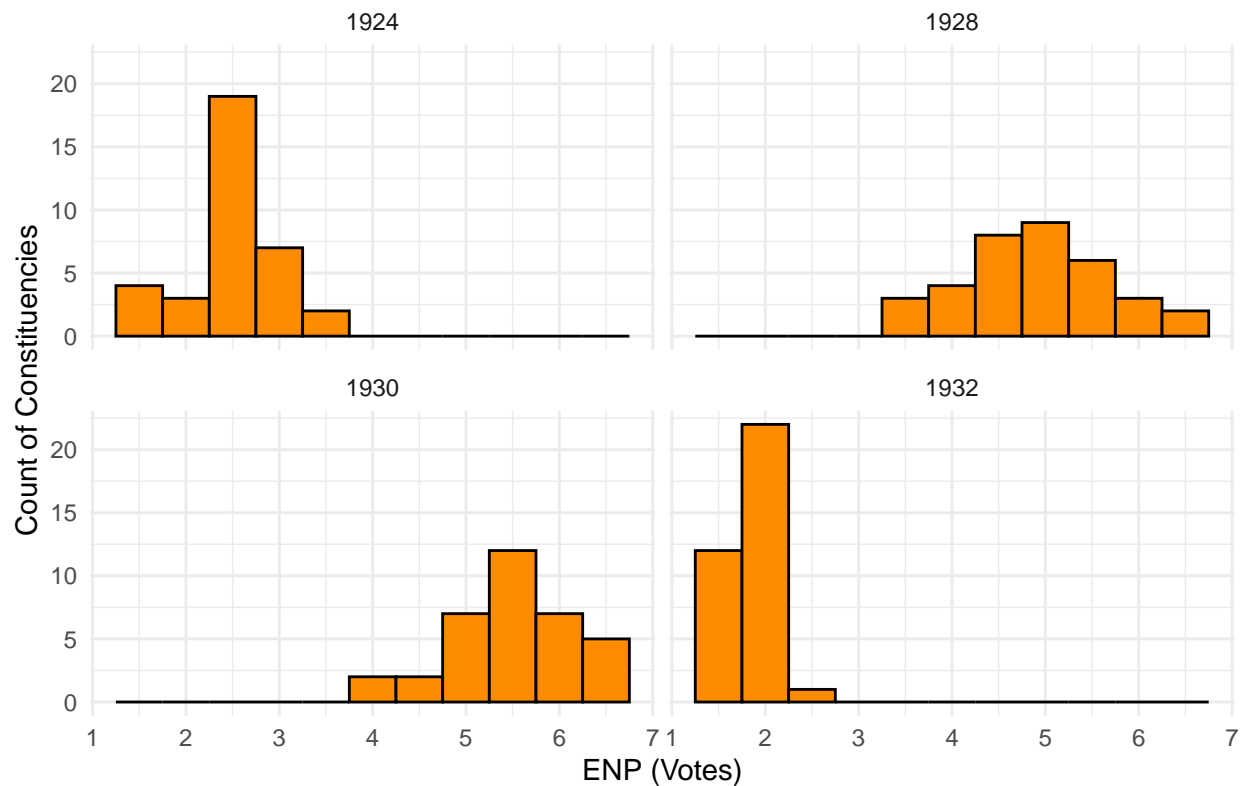
```



— This Histogram shows the distribution of district-level ENP\_votes for each election.

```
ggplot2::ggplot(de_all, ggplot2::aes(x = enp_v)) +  
  ggplot2::geom_histogram(binwidth = 0.5, fill = "darkorange", color = "black") +  
  ggplot2::facet_wrap(~ yr) +  
  ggplot2::labs(title = "Distribution of ENP (Votes) Across German Constituencies",  
    x = "ENP (Votes)",  
    y = "Count of Constituencies") +  
  ggplot2::theme_minimal()
```

## Distribution of ENP (Votes) Across German Constituencies



```
# --- Nationwide ENP for Germany (Votes & Seats) ---
de_party_totals <- germany %>%
  dplyr::group_by(ctr_n, yr, pty) %>%
  dplyr::summarize(
    votes = sum(pv1, na.rm = TRUE),
    seats = sum(seat, na.rm = TRUE),
    .groups = "drop"
  )

de_totals <- de_party_totals %>%
  dplyr::group_by(ctr_n, yr) %>%
  dplyr::summarize(
    totalvotes = sum(votes, na.rm = TRUE),
    totalseats = sum(seats, na.rm = TRUE),
    .groups = "drop"
  )

de_party_shares <- de_party_totals %>%
  dplyr::left_join(de_totals, by = c("ctr_n", "yr")) %>%
  dplyr::mutate(
    vote_share = votes / totalvotes,
    # protect against years with no seat totals
    seat_share = dplyr::if_else(totalseats > 0, seats / totalseats, NA_real_)
  )

de_enp_nat <- de_party_shares %>%
```

```

dplyr::group_by(ctr_n, yr) %>%
dplyr::summarize(
  ENP_votes = 1 / sum(vote_share^2, na.rm = TRUE),
  ENP_seats = dplyr::if_else(all(is.na(seat_share)),
                             NA_real_,
                             1 / sum(seat_share^2, na.rm = TRUE)),
  .groups = "drop"
)

knitr::kable(de_ennp_nat, caption = "Nationwide Effective Number of Parties (Germany)")

```

Table 2: Nationwide Effective Number of Parties (Germany)

ctr_n	yr	ENP_votes	ENP_seats
Germany	1924	7.116740	NA
Germany	1928	6.413647	NA
Germany	1930	6.877439	NA
Germany	1932	4.690880	NA

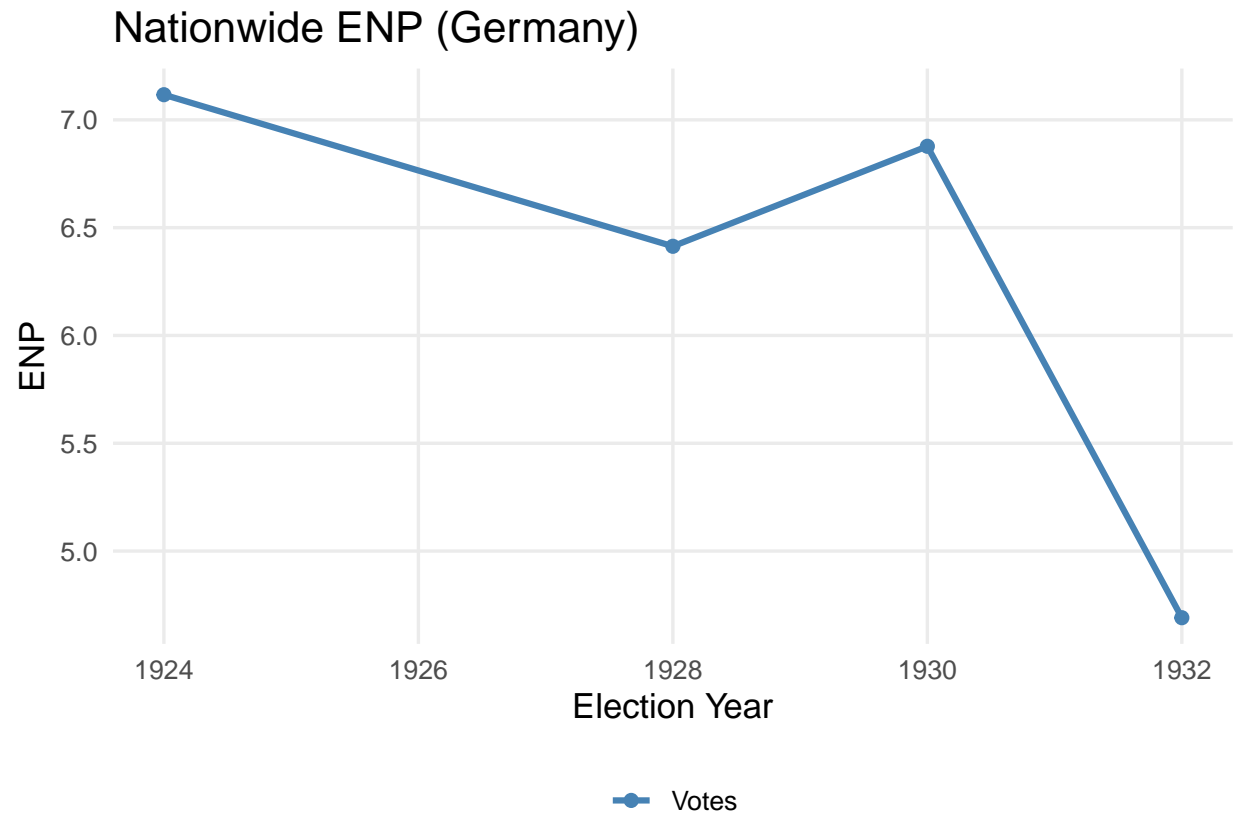
```

# Line plot, like the Italy example. Seats line drawn only if available.
p_de <- ggplot2::ggplot(de_ennp_nat, ggplot2::aes(x = yr)) +
  ggplot2::geom_line(ggplot2::aes(y = ENP_votes, color = "Votes"), linewidth = 1.1) +
  ggplot2::geom_point(ggplot2::aes(y = ENP_votes, color = "Votes"), size = 2)

if (!all(is.na(de_ennp_nat$ENP_seats))) {
  p_de <- p_de +
    ggplot2::geom_line(ggplot2::aes(y = ENP_seats, color = "Seats"), linewidth = 1.1) +
    ggplot2::geom_point(ggplot2::aes(y = ENP_seats, color = "Seats"), size = 2)
}

p_de +
  ggplot2::scale_color_manual(values = c("Votes" = "steelblue")) +
  ggplot2::labs(
    title = "Nationwide ENP (Germany)",
    x = "Election Year",
    y = "ENP",
    color = NULL
  ) +
  ggplot2::theme_minimal(base_size = 13) +
  ggplot2::theme(panel.grid.minor = ggplot2::element_blank(),
                  legend.position = "bottom")

```



— Canada ENP Analysis

```
# --- Make sure missing codes are cleaned ---
missing_codes_num <- c(-990, -992, -994)
missing_codes_char <- as.character(missing_codes_num)

clea_lc_20240419 <- clea_lc_20240419 %>%
  mutate(across(where(is.numeric),
    ~ ifelse(. %in% missing_codes_num, NA, .))) %>%
  mutate(across(where(is.character),
    ~ ifelse(. %in% missing_codes_char, NA, .))) %>%
  mutate(across(where(is.factor),
    ~ {
      x <- as.character(.)
      x[x %in% missing_codes_char] <- NA_character_
      factor(x)
    })))

# --- Scope: Canada, pick four elections (example: 1968-1984) ---
canada_years <- c(1968, 1972, 1980, 1984)

canada <- clea_lc_20240419 %>%
  dplyr::filter(ctr_n == "Canada", yr %in% canada_years)
```

– ENP for canada, Constituency 1

```

ca_cst1 <- canada %>%
  dplyr::filter(yr == canada_years[1], cst == 1) %>%
  dplyr::group_by(cst, cst_n) %>%
  dplyr::summarize(
    enp_v = 1/sum(pvs1^2, na.rm = TRUE),
    enp_s = 1/sum((seat/mag)^2, na.rm = TRUE),
    yr     = dplyr::first(yr),
    mag    = dplyr::first(mag),
    cst_n  = dplyr::first(cst_n),
    .groups = "drop"
  )

knitr::kable(ca_cst1,
  caption = paste0("ENP for Canada, ", canada_years[1], ", Constituency 1"))

```

Table 3: ENP for Canada, 1968, Constituency 1

cst	cst_n	enp_v	enp_s	yr	mag
1	abitibi	2.367751	1	1968	1

— ENP for All Selected Years and Constituencies

```

ca_all <- canada %>%
  dplyr::group_by(yr, cst, cst_n) %>%
  dplyr::summarize(
    enp_v = 1/sum(pvs1^2, na.rm = TRUE),
    enp_s = 1/sum((seat/mag)^2, na.rm = TRUE),
    .groups = "drop"
  )

knitr::kable(ca_all,
  caption = "ENP for Canada, Selected Years, All Constituencies")

```

Table 4: ENP for Canada, Selected Years, All Constituencies

yr	cst	cst_n	enp_v	enp_s
1968	1	abitibi	2.367751	1
1968	2	ahuntsic	2.164371	1
1968	3	algoma	2.631831	1
1968	4	annapolis valley	2.072200	1
1968	5	argenteuil	2.372494	1
1968	6	assiniboia	2.999312	1
1968	7	athabasca	2.489387	1
1968	8	battle river	2.168921	1
1968	9	battleford-kindersley	2.955855	1
1968	10	beauce	2.863552	1
1968	11	beauharnois	2.199500	1
1968	12	bellechasse	2.496941	1
1968	13	berthier	2.732301	1
1968	14	bonaventure	2.681325	1

yr	cst	cst_n	enp_v	enp_s
1968	15	bonavista-trinity-conception	2.011624	1
1968	16	bourassa	2.455985	1
1968	17	brandon-souris	2.465967	1
1968	18	brant	2.943909	1
1968	19	broadview	2.786733	1
1968	20	bruce	2.430762	1
1968	21	burin-burgeo	2.098320	1
1968	22	burnaby-richmond	2.893243	1
1968	23	burnaby-seymour	2.421506	1
1968	24	calgary centre	2.273533	1
1968	25	calgary north	2.325475	1
1968	26	calgary south	2.265422	1
1968	27	cape breton highlands-canso	2.064740	1
1968	28	cape breton-east richmond	2.901577	1
1968	29	cape breton-the sydneys	2.413452	1
1968	30	capilano	2.032743	1
1968	31	cardigan	2.070776	1
1968	32	carleton-charlotte	1.963408	1
1968	33	central nova	2.172190	1
1968	34	chambly	2.041433	1
1968	35	champlain	3.025421	1
1968	36	charlevoix	2.946567	1
1968	37	chicoutimi	2.555673	1
1968	38	churchill	2.838200	1
1968	39	coast chilcotin	2.782990	1
1968	40	cochrane	2.634704	1
1968	41	comox-alberni	2.943723	1
1968	42	compton	2.761266	1
1968	43	crowfoot	1.702084	1
1968	44	cumberland-colchester north	2.056237	1
1968	45	dartmouth-halifax east	2.128803	1
1968	46	dauphin	3.253006	1
1968	47	davenport	2.640578	1
1968	48	dollard	1.746251	1
1968	49	don valley	2.272772	1
1968	50	drummond	3.083016	1
1968	51	duvernay	2.225543	1
1968	52	edmonton centre	3.400656	1
1968	53	edmonton east	2.665355	1
1968	54	edmonton west	2.279083	1
1968	55	edmonton-strathcona	2.365425	1
1968	56	eglinton	2.241711	1
1968	57	egmont	2.069541	1
1968	58	elgin	2.587691	1
1968	59	esquimalt-saanich	3.024745	1
1968	60	essex	2.615982	1
1968	61	etobicoke	2.344514	1
1968	62	fort william	2.901529	1
1968	63	fraser valley east	3.617395	1
1968	64	fraser valley west	3.063439	1
1968	65	frontenac	2.758543	1
1968	66	frontenac-lennox and addington	2.550755	1



yr	cst	cst_n	enp_v	enp_s
1968	67	fundy-royal	2.027494	1
1968	68	gamelin	2.566852	1
1968	69	gander-twillingate	2.057661	1
1968	70	gaspé	2.817682	1
1968	71	gatineau	2.579900	1
1968	72	glengarry-prescott	2.052665	1
1968	73	gloucester	2.135293	1
1968	74	grand falls-white bay-labrador	2.110020	1
1968	75	greenwood	2.923294	1
1968	76	grenville-carleton	2.353864	1
1968	77	grey-simcoe	2.512220	1
1968	78	halifax	2.030574	1
1968	79	halifax-east hants	2.061531	1
1968	80	halton	2.636193	1
1968	81	halton-wentworth	2.815752	1
1968	82	hamilton east	2.643414	1
1968	83	hamilton mountain	2.878480	1
1968	84	hamilton west	2.784999	1
1968	85	hamilton-wentworth	2.925557	1
1968	86	hastings	2.444305	1
1968	87	high park	3.219182	1
1968	88	hillsborough	2.206455	1
1968	89	hochelaga	2.556264	1
1968	90	hull	1.957856	1
1968	91	humber-st. george's-st. barbe	2.588248	1
1968	92	huron	2.139719	1
1968	93	joliette	2.628899	1
1968	94	kamloops-cariboo	3.184573	1
1968	95	kamouraska	2.954367	1
1968	96	kenora-rainy river	2.676205	1
1968	97	kent-essex	2.323465	1
1968	98	kingston and the islands	2.515638	1
1968	99	kitchener	2.922288	1
1968	100	kootenay west	3.113845	1
1968	101	labelle	2.474257	1
1968	102	lac-saint-jean	2.516335	1
1968	103	lachine	2.094590	1
1968	104	lafontaine	2.391147	1
1968	105	lakeshore	2.769085	1
1968	106	lambton-kent	2.304691	1
1968	107	lanark and renfrew	2.273736	1
1968	108	langelier	2.372119	1
1968	109	lapointe	2.815262	1
1968	110	laprairie	1.666865	1
1968	111	lasalle	1.935074	1
1968	112	laurier	2.870387	1
1968	113	laval	2.190086	1
1968	114	leeds	2.282220	1
1968	115	lethbridge	3.044602	1
1968	116	lincoln	2.795410	1
1968	117	lisgar	2.563507	1
1968	118	london east	2.993838	1

yr	cst	cst_n	enp_v	enp_s
1968	119	london west	2.345921	1
1968	120	longueuil	2.375451	1
1968	121	lotbinière	3.094502	1
1968	122	louis-hébert	2.146840	1
1968	123	lévis	3.175291	1
1968	124	mackenzie	2.788085	1
1968	125	madawaska-victoria	2.076264	1
1968	126	maisonneuve	2.435080	1
1968	127	malpeque	2.083430	1
1968	128	manicouagan	2.376394	1
1968	129	marquette	2.632222	1
1968	130	matane	2.362684	1
1968	131	meadow lake	3.110200	1
1968	132	medicine hat	3.277308	1
1968	133	mercier	2.705608	1
1968	134	middlesex	2.436408	1
1968	135	missisquoi	2.829793	1
1968	136	moncton	2.322017	1
1968	137	montmorency	2.841009	1
1968	138	moose jaw	2.870347	1
1968	139	mount royal	1.208574	1
1968	140	nanaimo-cowichan-the islands	3.039600	1
1968	141	new westminster	2.695025	1
1968	142	niagara falls	2.567461	1
1968	143	nickel belt	2.669676	1
1968	144	nipissing	2.402991	1
1968	145	norfolk-haldimand	2.437785	1
1968	146	northumberland-durham	2.725819	1
1968	147	northumberland-miramichi	2.231605	1
1968	148	northwest territories	2.090677	1
1968	149	notre-dame-de-grâce	1.729412	1
1968	150	okanagan boundary	3.611642	1
1968	151	okanagan-kootenay	2.226445	1
1968	152	ontario	2.852681	1
1968	153	oshawa-whitby	2.999705	1
1968	154	ottawa centre	2.188667	1
1968	155	ottawa east	1.557634	1
1968	156	ottawa west	2.375955	1
1968	157	ottawa-carleton	1.942706	1
1968	158	outremont	1.558522	1
1968	159	oxford	2.317188	1
1968	160	palliser	2.106438	1
1968	161	papineau	2.228680	1
1968	162	parkdale	2.561392	1
1968	163	parry sound-muskoka	2.543197	1
1968	164	peace river	2.453203	1
1968	165	peel south	2.622185	1
1968	166	peel-dufferin-simcoe	2.641242	1
1968	167	pembina	2.204714	1
1968	168	perth	2.386624	1
1968	169	peterborough	2.842899	1
1968	170	pontiac	2.624751	1

yr	cst	cst_n	enp_v	enp_s
1968	171	port arthur	2.683860	1
1968	172	portage	2.649463	1
1968	173	portneuf	2.604459	1
1968	174	prince albert	2.390313	1
1968	175	prince edward-hastings	2.314287	1
1968	176	prince george-peace river	3.657766	1
1968	177	provencher	3.033604	1
1968	178	qu'appelle-moose mountain	2.897731	1
1968	179	québec-est	2.699524	1
1968	180	red deer	2.076733	1
1968	181	regina east	3.025364	1
1968	182	regina-lake centre	2.955792	1
1968	183	renfrew north	2.191863	1
1968	184	restigouche	2.496624	1
1968	185	richelieu	2.497397	1
1968	186	richmond	2.663680	1
1968	187	rimouski	2.455125	1
1968	188	roberval	2.484427	1
1968	189	rocky mountain	1.622990	1
1968	190	rosedale	2.322798	1
1968	191	saint john-lancaster	2.212539	1
1968	192	saint-denis	1.830525	1
1968	193	saint-henri	2.261581	1
1968	194	saint-hyacinthe	2.315214	1
1968	195	saint-jacques	2.319485	1
1968	196	saint-jean	2.589476	1
1968	197	saint-maurice	2.683521	1
1968	198	saint-michel	2.078701	1
1968	199	sainte-marie	2.938605	1
1968	200	sarnia	2.585512	1
1968	201	saskatoon-biggarr	2.806384	1
1968	202	saskatoon-humboldt	2.998565	1
1968	203	sault ste. marie	2.883755	1
1968	204	scarborough east	2.736382	1
1968	205	scarborough west	2.793168	1
1968	206	selkirk	2.888198	1
1968	207	shefford	2.837998	1
1968	208	sherbrooke	2.873887	1
1968	209	simcoe north	2.523926	1
1968	210	skeena	2.481362	1
1968	211	south shore	2.021353	1
1968	212	south western nova	2.125788	1
1968	213	spadina	2.423027	1
1968	214	st. boniface	2.649234	1
1968	215	st. catharines	2.685259	1
1968	216	st. john's east	2.008503	1
1968	217	st. john's west	2.037196	1
1968	218	st. paul's	2.202239	1
1968	219	stormont- Dundas	1.577465	1
1968	220	sudbury	2.485111	1
1968	221	surrey	2.990355	1
1968	222	swift current-maple creek	2.891015	1

yr	cst	cst_n	enp_v	enp_s
1968	223	terrebonne	2.269300	1
1968	224	thunder bay	2.770832	1
1968	225	timiskaming	2.894758	1
1968	226	timmins	2.361672	1
1968	227	trinity	2.350961	1
1968	228	trois-rivières	3.038490	1
1968	229	témiscamingue	2.257378	1
1968	230	témiscouata	2.608164	1
1968	231	vancouver centre	2.444500	1
1968	232	vancouver east	2.545617	1
1968	233	vancouver kingsway	2.645190	1
1968	234	vancouver quadra	2.445588	1
1968	235	vancouver south	2.841452	1
1968	236	vaudreuil	1.704832	1
1968	237	vegreville	2.121300	1
1968	238	verdun	1.679432	1
1968	239	victoria	2.871908	1
1968	240	victoria–haliburton	2.546818	1
1968	241	villeneuve	2.613504	1
1968	242	waterloo	3.021352	1
1968	243	welland	2.596233	1
1968	244	wellington	2.650749	1
1968	245	wellington–grey	2.479302	1
1968	246	westmorland–kent	2.284605	1
1968	247	westmount	1.535109	1
1968	248	wetaskiwin	2.064863	1
1968	249	windsor west	2.461402	1
1968	250	windsor–walkerville	2.599293	1
1968	251	winnipeg north	2.511966	1
1968	252	winnipeg north centre	2.508583	1
1968	253	winnipeg south/winnipeg-sud	2.402792	1
1968	254	winnipeg south centre	2.604026	1
1968	255	york centre	2.313257	1
1968	256	york east	2.839942	1
1968	257	york north	2.500709	1
1968	258	york south	2.632043	1
1968	259	york west	2.770605	1
1968	260	york–scarborough	2.307194	1
1968	261	york–simcoe	2.668227	1
1968	262	york–sunbury	2.088828	1
1968	263	yorkton–melville	2.957483	1
1968	264	yukon	2.204176	1
1972	1	abitibi	2.223819	1
1972	2	ahuntsic	2.771802	1
1972	3	algoma	2.885795	1
1972	4	annapolis valley	2.118851	1
1972	5	argenteuil–deux-montagnes	2.947479	1
1972	6	assiniboia	3.152395	1
1972	7	athabasca	2.314577	1
1972	8	battle river	2.226817	1
1972	9	battleford–kindersley	3.073059	1
1972	10	beauce	2.807733	1

yr	cst	cst_n	enp_v	enp_s
1972	11	beauharnois-salaberry	2.970609	1
1972	12	bellechasse	2.638082	1
1972	13	berthier	2.665674	1
1972	14	bonaventure-Îles-de-la-madeleine	2.577389	1
1972	15	bonavista-trinity-conception	2.222996	1
1972	16	brandon-souris	2.260362	1
1972	17	brant	2.859919	1
1972	18	broadview	2.942686	1
1972	19	brome-missisquoi	2.984675	1
1972	20	bruce	2.465469	1
1972	21	burin-burgeo	1.669976	1
1972	22	burnaby-richmond-delta	3.080262	1
1972	23	burnaby-seymour	2.992511	1
1972	24	calgary centre	2.520734	1
1972	25	calgary north	2.343853	1
1972	26	calgary south	2.270710	1
1972	27	cape breton highlands-canso	2.222843	1
1972	28	cape breton-east richmond	2.957307	1
1972	29	cape breton-the sydneys	2.725679	1
1972	30	capilano	2.675222	1
1972	31	cardigan	2.574631	1
1972	32	carleton-charlotte	2.120391	1
1972	33	central nova	2.353455	1
1972	34	chambly	2.831901	1
1972	35	champlain	2.431052	1
1972	36	charlevoix	2.836081	1
1972	37	chicoutimi	2.855184	1
1972	38	churchill	3.066191	1
1972	39	coast chilcotin	3.161136	1
1972	40	cochrane	3.036365	1
1972	41	comox-alberni	2.818409	1
1972	42	compton	3.655190	1
1972	43	crowfoot	1.690993	1
1972	44	cumberland-colchester north	2.266641	1
1972	45	dartmouth-halifax east	2.265639	1
1972	46	dauphin	2.478174	1
1972	47	davenport	2.923693	1
1972	48	dollard	1.982317	1
1972	49	don valley	2.318130	1
1972	50	drummond	2.664787	1
1972	51	duvernay	2.981203	1
1972	52	edmonton centre	2.568642	1
1972	53	edmonton east	2.648368	1
1972	54	edmonton west	2.525770	1
1972	55	edmonton-strathcona	2.699690	1
1972	56	eglinton	2.515310	1
1972	57	egmont	2.106791	1
1972	58	elgin	2.364682	1
1972	59	esquimalt-saanich	3.061510	1
1972	60	essex-windsor	2.468744	1
1972	61	etobicoke	2.594817	1
1972	62	fort william	2.912894	1

yr	cst	cst_n	enp_v	enp_s
1972	63	fraser valley east	3.610842	1
1972	64	fraser valley west	2.733101	1
1972	65	frontenac	2.747328	1
1972	66	frontenac-lennox and addington	2.281986	1
1972	67	fundy-royal	2.176416	1
1972	68	gamelin	2.871734	1
1972	69	gander-grand falls	2.083376	1
1972	70	gaspé	2.499569	1
1972	71	gatineau	2.740102	1
1972	72	glengarry-prescott-russell	2.860924	1
1972	73	gloucester	2.897952	1
1972	74	grand falls-white bay-labrador	2.140744	1
1972	75	greenwood	2.868035	1
1972	76	grenville-carleton	2.342486	1
1972	77	grey-simcoe	2.660345	1
1972	78	halifax	2.341273	1
1972	79	halifax-east hants	2.268463	1
1972	80	halton	2.666568	1
1972	81	halton-wentworth	2.590369	1
1972	82	hamilton east	2.923192	1
1972	83	hamilton mountain	2.917418	1
1972	84	hamilton west	2.482578	1
1972	85	hamilton-wentworth	3.012983	1
1972	86	hastings	2.361637	1
1972	87	high park-humber valley	2.783119	1
1972	88	hillsborough	2.229431	1
1972	89	hochelaga	3.367445	1
1972	90	hull	2.171399	1
1972	91	humber-st. george's-st. barbe	2.126954	1
1972	92	huron	1.991342	1
1972	93	joliette	2.842683	1
1972	94	kamloops-cariboo	3.249232	1
1972	95	kamouraska	2.422270	1
1972	96	kenora-rainy river	2.925663	1
1972	97	kent-essex	2.410680	1
1972	98	kingston and the islands	2.422906	1
1972	99	kitchener	2.877649	1
1972	100	kootenay west	2.447015	1
1972	101	labelle	3.060868	1
1972	102	lac-saint-jean	2.806477	1
1972	103	lachine	2.412000	1
1972	104	lafontaine	3.114014	1
1972	105	lambton-kent	2.320824	1
1972	106	lanark-renfrew-carleton	2.177748	1
1972	107	langelier	2.480282	1
1972	108	lapointe	2.419510	1
1972	109	laprairie	2.330642	1
1972	110	lasalle	2.325011	1
1972	111	laurier	2.830196	1
1972	112	laval	2.504417	1
1972	113	leeds	2.428856	1
1972	114	lethbridge	2.453248	1

yr	cst	cst_n	enp_v	enp_s
1972	115	lincoln	2.774848	1
1972	116	lisgar	1.837324	1
1972	117	london east	2.954737	1
1972	118	london west	2.535258	1
1972	119	longueuil	3.452435	1
1972	120	lotbinière	2.200644	1
1972	121	louis-hébert	2.603364	1
1972	122	lévis	3.080531	1
1972	123	mackenzie	2.826632	1
1972	124	madawaska-victoria	2.221125	1
1972	125	maisonneuve-rosemont	3.273755	1
1972	126	malpeque	2.152649	1
1972	127	manicouagan	2.554357	1
1972	128	marquette	2.148618	1
1972	129	matane	2.484583	1
1972	130	meadow lake	3.102750	1
1972	131	medicine hat	2.441757	1
1972	132	mercier	3.104299	1
1972	133	middlesex	2.583853	1
1972	134	moncton	2.282562	1
1972	135	montmorency	3.112701	1
1972	136	montreal-bourassa	2.838959	1
1972	137	moose jaw	2.862275	1
1972	138	mount royal	1.503777	1
1972	139	nanaimo-cowichan-the islands	2.482791	1
1972	140	new westminster	3.007585	1
1972	141	niagara falls	2.817512	1
1972	142	nickel belt	2.594358	1
1972	143	nipissing	2.888255	1
1972	144	norfolk-haldimand	2.282051	1
1972	145	northumberland-durham	2.656277	1
1972	146	northumberland-miramichi	2.582563	1
1972	147	northwest territories	2.943269	1
1972	148	notre-dame-de-grâce	1.944753	1
1972	149	okanagan boundary	2.889909	1
1972	150	okanagan-kootenay	3.285871	1
1972	151	ontario	2.850401	1
1972	152	oshawa-whitby	2.710581	1
1972	153	ottawa centre	2.979205	1
1972	154	ottawa east	2.222239	1
1972	155	ottawa west	2.914038	1
1972	156	ottawa-carleton	2.690581	1
1972	157	outremont	2.146311	1
1972	158	oxford	2.038988	1
1972	159	palliser	2.158707	1
1972	160	papineau	2.781559	1
1972	161	parkdale	2.858244	1
1972	162	parry sound-muskoka	2.737818	1
1972	163	peace river	2.583431	1
1972	164	peel south	2.891879	1
1972	165	peel-dufferin-simcoe	2.692264	1
1972	166	pembina	2.403872	1

yr	cst	cst_n	enp_v	enp_s
1972	167	perth-wilmot	2.316575	1
1972	168	peterborough	2.573778	1
1972	169	pontiac	2.718960	1
1972	170	port arthur	2.608377	1
1972	171	portage	2.751262	1
1972	172	portneuf	2.587362	1
1972	173	prince albert	2.249293	1
1972	174	prince edward-hastings	2.178574	1
1972	175	prince george-peace river	3.253877	1
1972	176	provencher	2.947879	1
1972	177	qu'appelle-moose mountain	2.623023	1
1972	178	québec-est	2.494587	1
1972	179	red deer	2.338425	1
1972	180	regina east	2.874630	1
1972	181	regina-lake centre	3.019938	1
1972	182	renfrew north-nipissing east	2.390578	1
1972	183	restigouche	1.482690	1
1972	184	richelieu	2.867170	1
1972	185	richmond	2.568529	1
1972	186	rimouski	2.852370	1
1972	187	rivière-du-loup-témiscouata	2.810377	1
1972	188	roberval	2.386140	1
1972	189	rocky mountain	2.602724	1
1972	190	rosedale	2.661284	1
1972	191	saint john-lancaster	2.129759	1
1972	192	saint-denis	2.185594	1
1972	193	saint-henri	3.715316	1
1972	194	saint-hyacinthe	3.005489	1
1972	195	saint-jacques	2.697696	1
1972	196	saint-jean	3.233816	1
1972	197	saint-maurice	2.317225	1
1972	198	saint-michel	3.244634	1
1972	199	sainte-marie	3.585778	1
1972	200	sarnia-lambton	2.718279	1
1972	201	saskatoon-biggarr	2.888090	1
1972	202	saskatoon-humboldt	2.843053	1
1972	203	sault ste. marie	2.951782	1
1972	204	scarborough east	2.851341	1
1972	205	scarborough west	2.998470	1
1972	206	selkirk	2.817048	1
1972	207	shefford	2.680230	1
1972	208	sherbrooke	3.100826	1
1972	209	simcoe north	2.675188	1
1972	210	skeena	2.720094	1
1972	211	south shore	2.172193	1
1972	212	south western nova	2.325886	1
1972	213	spadina	3.031821	1
1972	214	saint boniface/saint-boniface	2.920298	1
1972	215	st. catharines	2.882235	1
1972	216	st. john's east	2.073565	1
1972	217	st. john's west	2.196801	1
1972	218	st. paul's	2.835325	1



yr	cst	cst_n	enp_v	enp_s
1972	219	stormont- Dundas	2.343569	1
1972	220	sudbury	2.379864	1
1972	221	surrey-white rock	2.741866	1
1972	222	swift current-maple creek	3.042935	1
1972	223	terrebonne	3.021611	1
1972	224	thunder bay	2.683900	1
1972	225	timiskaming	2.672836	1
1972	226	timmins	2.671012	1
1972	227	toronto-lakeshore	2.922521	1
1972	228	trinity	2.837711	1
1972	229	trois-rivières métropolitain	2.754823	1
1972	230	témiscamingue	2.098246	1
1972	231	vancouver centre	2.995829	1
1972	232	vancouver east	2.743379	1
1972	233	vancouver kingsway	2.478182	1
1972	234	vancouver quadra	2.848153	1
1972	235	vancouver south	3.019201	1
1972	236	vaudreuil	2.743852	1
1972	237	vegreville	1.779428	1
1972	238	verdun	2.334776	1
1972	239	victoria	2.896576	1
1972	240	victoria-haliburton	2.277025	1
1972	241	villeneuve	2.425032	1
1972	242	waterloo	2.927840	1
1972	243	welland	2.636686	1
1972	244	wellington	2.536557	1
1972	245	wellington-grey-dufferin-waterloo	2.499838	1
1972	246	westmorland-kent	2.396088	1
1972	247	westmount	2.240219	1
1972	248	wetaskiwin	2.290325	1
1972	249	windsor west	2.543599	1
1972	250	windsor-walkerville	2.753312	1
1972	251	winnipeg north	2.963252	1
1972	252	winnipeg north centre	2.866363	1
1972	253	winnipeg south/winnipeg-sud	2.525694	1
1972	254	winnipeg south centre	2.700645	1
1972	255	york centre	2.927935	1
1972	256	york east	2.883195	1
1972	257	york north	2.674569	1
1972	258	york south	2.752934	1
1972	259	york west	2.976772	1
1972	260	york-scarborough	2.704709	1
1972	261	york-simcoe	2.624264	1
1972	262	york-sunbury	2.330048	1
1972	263	yorkton-melville	2.779778	1
1972	264	yukon	2.501844	1
1980	1	abitibi	2.593062	1
1980	2	algoma	2.572133	1
1980	3	annapolis valley-hants	2.955444	1
1980	4	argenteuil	1.981053	1
1980	5	assiniboia	3.022388	1
1980	6	athabasca	2.690906	1

yr	cst	cst_n	enp_v	enp_s
1980	7	beaches	3.089857	1
1980	8	beauce	2.204797	1
1980	9	beauharnois-salaberry	1.774089	1
1980	10	bellechasse	2.451943	1
1980	11	berthier-maskinongé	2.141012	1
1980	12	blainville-deux-montagnes	1.761158	1
1980	13	bonaventure-Îles-de-la-madeleine	1.911903	1
1980	14	bonavista-trinity-conception	2.562471	1
1980	15	bourassa	1.644885	1
1980	16	bow river	1.629815	1
1980	17	brampton-georgetown	2.782344	1
1980	18	brandon-souris	2.776041	1
1980	19	brant	2.929121	1
1980	20	broadview-greenwood	3.034841	1
1980	21	bruce-grey	2.491097	1
1980	22	burin-st. george's	1.871765	1
1980	23	burlington	2.565344	1
1980	24	burnaby	2.798659	1
1980	25	calgary centre	2.336518	1
1980	26	calgary east	2.724973	1
1980	27	calgary north	2.102514	1
1980	28	calgary south	1.922194	1
1980	29	calgary west	2.025981	1
1980	30	cambridge	2.976579	1
1980	31	cape breton highlands-canso	2.518083	1
1980	32	cape breton-east richmond	2.846260	1
1980	33	cape breton-the sydneys	2.866913	1
1980	34	capilano	2.305281	1
1980	35	cardigan	2.286663	1
1980	36	cariboo-chilcotin	2.908503	1
1980	37	carleton-charlotte	2.645816	1
1980	38	central nova	2.635534	1
1980	39	chambly	1.938273	1
1980	40	champlain	2.055791	1
1980	41	charlesbourg	1.890248	1
1980	42	charlevoix	1.861573	1
1980	43	chicoutimi	2.002676	1
1980	44	churchill	2.932589	1
1980	45	châteauguay	1.746702	1
1980	46	cochrane	2.354675	1
1980	47	comox-powell river	2.649498	1
1980	48	cowichan-malahat-the islands	2.497398	1
1980	49	crowfoot	1.625452	1
1980	50	cumberland-colchester	2.735432	1
1980	51	dartmouth-halifax east	2.783818	1
1980	52	dauphin	2.655714	1
1980	53	davenport	2.185844	1
1980	54	dollard	1.640609	1
1980	55	don valley east	2.520758	1
1980	56	don valley west	2.381399	1
1980	57	drummond	1.791958	1
1980	58	durham-northumberland	2.855823	1

yr	cst	cst_n	enp_v	enp_s
1980	59	duvernay	1.833138	1
1980	60	edmonton east	2.520830	1
1980	61	edmonton north	2.279547	1
1980	62	edmonton south	2.194593	1
1980	63	edmonton west	2.379071	1
1980	64	edmonton-strathcona	2.268431	1
1980	65	eglinton-lawrence	2.558717	1
1980	66	egmont	2.180880	1
1980	67	elgin	2.496887	1
1980	68	erie	2.835849	1
1980	69	esquimalt-saanich	2.819601	1
1980	70	essex-kent	2.483783	1
1980	71	essex-windsor	2.331126	1
1980	72	etobicoke centre	2.468926	1
1980	73	etobicoke north	2.754442	1
1980	74	etobicoke-lakeshore	2.963255	1
1980	75	fraser valley east	2.826363	1
1980	76	fraser valley west	2.564141	1
1980	77	frontenac	2.938967	1
1980	78	fundy-royal	2.876746	1
1980	79	gamelin	1.833050	1
1980	80	gander-twillingate	2.051119	1
1980	81	gaspé	2.107665	1
1980	82	gatineau	1.575849	1
1980	83	glengarry-prescott-russell	1.919171	1
1980	84	gloucester	2.162904	1
1980	85	grand falls-white bay-labrador	2.565647	1
1980	86	grey-simcoe	2.731702	1
1980	87	guelph	2.907761	1
1980	88	haldimand-norfolk	2.667990	1
1980	89	halifax	2.771213	1
1980	90	halifax west	2.838957	1
1980	91	halton	2.642249	1
1980	92	hamilton east	2.890345	1
1980	93	hamilton mountain	3.007806	1
1980	94	hamilton west	2.937021	1
1980	95	hamilton-wentworth	2.790720	1
1980	96	hastings-frontenac	2.755190	1
1980	97	hillsborough	2.346465	1
1980	98	hochelaga-maisonneuve	1.800640	1
1980	99	hull	1.896126	1
1980	100	humber-port au port-st. barbe	2.806213	1
1980	101	humboldt-lake centre	2.823709	1
1980	102	huron-bruce	2.443359	1
1980	103	joliette	2.292723	1
1980	104	jonquière	1.697837	1
1980	105	kamloops-shuswap	2.941554	1
1980	106	kamouraska-rivière-du-loup	2.247758	1
1980	107	kenora-rainy river	2.664615	1
1980	108	kent	2.653743	1
1980	109	kindersley-lloydminster	2.792844	1
1980	110	kingston and the islands	2.764130	1

yr	cst	cst_n	enp_v	enp_s
1980	111	kitchener	2.947304	1
1980	112	kootenay east-revelstoke	2.838576	1
1980	113	kootenay west	2.667816	1
1980	114	labelle	1.999797	1
1980	115	lac-saint-jean	2.277434	1
1980	116	lachine	2.200207	1
1980	117	lambton-kent-middlesex	2.494934	1
1980	118	lanark-renfrew-carleton	2.408237	1
1980	119	langelier	1.882357	1
1980	120	laprairie	1.838613	1
1980	121	lasalle	1.579237	1
1980	122	laurier	2.111673	1
1980	123	laval	1.703789	1
1980	124	laval-des-rapides	1.722242	1
1980	125	leeds-grenville	2.550907	1
1980	126	lethbridge-foothills	1.956054	1
1980	127	lincoln	2.981813	1
1980	128	lisgar	2.148314	1
1980	129	london east	2.733234	1
1980	130	london west	2.617112	1
1980	131	london-middlesex	2.872081	1
1980	132	longueuil	1.992698	1
1980	133	lotbinière	2.437533	1
1980	134	louis-hébert	2.195433	1
1980	135	lévis	2.109483	1
1980	136	mackenzie	2.734485	1
1980	137	madawaska-victoria	2.005957	1
1980	138	malpeque	2.279547	1
1980	139	manicouagan	1.976037	1
1980	140	matapédia-matane	1.605633	1
1980	141	medicine hat	1.870039	1
1980	142	mercier	1.919785	1
1980	143	mission-port moody	2.650605	1
1980	144	missisquoi	2.218862	1
1980	145	mississauga north	2.699111	1
1980	146	mississauga south	2.743828	1
1980	147	moncton	2.632847	1
1980	148	montmorency	1.948570	1
1980	149	moose jaw	2.713492	1
1980	150	mount royal	1.482577	1
1980	151	mégantic-compton-stanstead	2.428422	1
1980	152	nanaimo-alberni	2.605473	1
1980	153	nepean-carleton	2.430455	1
1980	154	new westminster-coquitlam	2.714992	1
1980	155	niagara falls	2.851506	1
1980	156	nickel belt	2.420152	1
1980	157	nipissing	2.495264	1
1980	158	north vancouver-burnaby	2.957580	1
1980	159	northumberland	2.525328	1
1980	160	northumberland-miramichi	2.451829	1
1980	161	notre-dame-de-grâce	1.845676	1
1980	162	nunatsiaq	2.468243	1

yr	cst	cst_n	enp_v	enp_s
1980	163	okanagan north	2.693933	1
1980	164	okanagan-similkameen	2.888783	1
1980	165	ontario	2.970389	1
1980	166	oshawa	2.599168	1
1980	167	ottawa centre	2.711534	1
1980	168	ottawa west	2.521810	1
1980	169	ottawa-carleton	2.395155	1
1980	170	ottawa-vanier	2.027735	1
1980	171	outremont	1.865403	1
1980	172	oxford	2.681607	1
1980	173	papineau	1.743412	1
1980	174	parkdale-high park	2.806719	1
1980	175	parry sound-muskoka	2.827843	1
1980	176	peace river	2.380482	1
1980	177	pembina	2.058901	1
1980	178	perth	2.566256	1
1980	179	peterborough	2.948526	1
1980	180	pontiac-gatineau-labelle	1.877635	1
1980	181	portage-marquette	2.571279	1
1980	182	portneuf	1.776442	1
1980	183	prince albert	2.997070	1
1980	184	prince edward-hastings	2.725508	1
1980	185	prince george-bulkley valley	2.944850	1
1980	186	prince george-peace river	2.645773	1
1980	187	provencher	2.882106	1
1980	188	qu'appelle-moose mountain	2.666161	1
1980	189	québec-est	1.815530	1
1980	190	red deer	1.703853	1
1980	191	regina east	3.038327	1
1980	192	regina west	2.896453	1
1980	193	renfrew-nipissing-pembroke	2.509077	1
1980	194	restigouche	2.278167	1
1980	195	richelieu	1.958609	1
1980	196	richmond	2.112350	1
1980	197	richmond-south delta	2.607210	1
1980	198	rimouski	2.463681	1
1980	199	roberval	2.178094	1
1980	200	rosedale	2.716226	1
1980	201	rosemont	1.692139	1
1980	202	saint john	2.779504	1
1980	203	saint-denis	1.628827	1
1980	204	saint-henri-westmount	2.001790	1
1980	205	saint-hyacinthe	1.964863	1
1980	206	saint-jacques	1.876667	1
1980	207	saint-jean	1.825716	1
1980	208	saint-léonard-anjou	1.497089	1
1980	209	saint-maurice	1.661447	1
1980	210	saint-michel	1.709546	1
1980	211	sainte-marie	2.011039	1
1980	212	sarnia	2.891622	1
1980	213	saskatoon east	3.118662	1
1980	214	saskatoon west	2.772554	1

yr	cst	cst_n	enp_v	enp_s
1980	215	sault ste. marie	2.510457	1
1980	216	scarborough centre	2.893130	1
1980	217	scarborough east	2.798298	1
1980	218	scarborough west	3.075396	1
1980	219	selkirk–interlake	2.698046	1
1980	220	shefford	1.927667	1
1980	221	sherbrooke	1.857429	1
1980	222	simcoe north	2.951441	1
1980	223	simcoe south	2.779320	1
1980	224	skeena	2.706398	1
1980	225	south shore	2.703343	1
1980	226	south west nova	2.499024	1
1980	227	spadina	2.880978	1
1980	228	st. boniface	2.818478	1
1980	229	st. catharines	2.978069	1
1980	230	st. john’s east	2.197797	1
1980	231	st. john’s west	2.340655	1
1980	232	st. paul’s	2.637399	1
1980	233	stormont–dundas	2.366793	1
1980	234	sudbury	2.373499	1
1980	235	surrey–white rock–north delta	2.647592	1
1980	236	swift current–maple creek	2.700079	1
1980	237	terrebonne	2.017604	1
1980	238	the battlefords–meadow lake	3.019425	1
1980	239	thunder bay–atikokan	2.842527	1
1980	240	thunder bay–nipigon	2.652615	1
1980	241	timiskaming	2.742746	1
1980	242	timmins–chapleau	2.427134	1
1980	243	trinity	2.430163	1
1980	244	trois-rivières	1.995433	1
1980	245	témiscamingue	2.294674	1
1980	246	vancouver centre	3.084836	1
1980	247	vancouver east	2.671045	1
1980	248	vancouver kingsway	2.781244	1
1980	249	vancouver quadra	2.823492	1
1980	250	vancouver south	2.568573	1
1980	251	vaudreuil	1.790555	1
1980	252	vegreville	1.710029	1
1980	253	verchères	2.021492	1
1980	254	verdun	1.702849	1
1980	255	victoria	2.551768	1
1980	256	victoria–haliburton	2.728250	1
1980	257	waterloo	2.825564	1
1980	258	welland	2.876539	1
1980	259	wellington–dufferin–simcoe	2.461745	1
1980	260	western arctic	2.999185	1
1980	261	westmorland–kent	1.981944	1
1980	262	wetaskiwin	1.682136	1
1980	263	willowdale	2.586935	1
1980	264	windsor west	2.267489	1
1980	265	windsor–walkerville	2.418109	1
1980	266	winnipeg north	2.676172	1

yr	cst	cst_n	enp_v	enp_s
1980	267	winnipeg north centre	2.416240	1
1980	268	winnipeg-assiniboine	2.603773	1
1980	269	winnipeg-birds hill	2.468214	1
1980	270	winnipeg-fort garry	2.735550	1
1980	271	winnipeg-st. james	2.985597	1
1980	272	yellowhead	1.892182	1
1980	273	york centre	2.249899	1
1980	274	york east	2.750188	1
1980	275	york north	2.657548	1
1980	276	york south-weston	2.814539	1
1980	277	york west	2.419633	1
1980	278	york-peel	2.725567	1
1980	279	york-scarborough	2.562670	1
1980	280	york-sunbury	2.594945	1
1980	281	yorkton-melville	2.652947	1
1980	282	yukon	2.772293	1
1984	1	abitibi	2.777537	1
1984	2	algoma	2.998401	1
1984	3	annapolis valley-hants	2.520881	1
1984	4	argenteuil-papineau	2.372276	1
1984	5	assiniboia	2.764304	1
1984	6	athabasca	1.958488	1
1984	7	beaches	3.034621	1
1984	8	beauce	2.133916	1
1984	9	beauharnois-salaberry	2.121593	1
1984	10	bellechasse	2.195532	1
1984	11	berthier-maskinongé-lanaudière	1.804483	1
1984	12	blainville-deux-montagnes	2.620716	1
1984	13	bonaventure-Îles-de-la-madeleine	2.232734	1
1984	14	bonavista-trinity-conception	2.122079	1
1984	15	bourassa	2.726140	1
1984	16	bow river	1.675361	1
1984	17	brampton-georgetown	2.408659	1
1984	18	brandon-souris	2.865002	1
1984	19	brant	2.585664	1
1984	20	broadview-greenwood	2.764093	1
1984	21	brome-missisquoi	2.310147	1
1984	22	bruce-grey	2.050855	1
1984	23	burin-st. george's	2.259259	1
1984	24	burlington	2.192660	1
1984	25	burnaby	2.630740	1
1984	26	calgary centre	2.062595	1
1984	27	calgary east	2.375027	1
1984	28	calgary north	1.775244	1
1984	29	calgary south	1.595770	1
1984	30	calgary west	1.715256	1
1984	31	cambridge	2.264111	1
1984	32	cape breton highlands-canso	2.417910	1
1984	33	cape breton-east richmond	2.329106	1
1984	34	cape breton-the sydneys	2.708487	1
1984	35	capilano	2.460733	1
1984	36	cardigan	2.153614	1

yr	cst	cst_n	enp_v	enp_s
1984	37	cariboo-chilcotin	2.452081	1
1984	38	carleton-charlotte	2.176330	1
1984	39	central nova	2.189948	1
1984	40	chambly	2.690385	1
1984	41	champlain	2.151580	1
1984	42	charlesbourg	2.589484	1
1984	43	charlevoix	1.968338	1
1984	44	chicoutimi	2.174527	1
1984	45	churchill	2.826262	1
1984	46	châteauguay	2.674094	1
1984	47	cochrane-superior	2.890260	1
1984	48	comox-powell river	2.520730	1
1984	49	cowichan-malahat-the islands	2.548481	1
1984	50	crowfoot	1.607528	1
1984	51	cumberland-colchester	2.308757	1
1984	52	dartmouth-halifax east	2.463256	1
1984	53	dauphin-swan river	2.939569	1
1984	54	davenport	2.608022	1
1984	55	dollard	2.724300	1
1984	56	don valley east	2.366302	1
1984	57	don valley west	2.258004	1
1984	58	drummond	2.307726	1
1984	59	durham-northumberland	2.326890	1
1984	60	duvernay	2.764105	1
1984	61	edmonton east	3.045801	1
1984	62	edmonton north	2.415528	1
1984	63	edmonton south	2.230294	1
1984	64	edmonton west	2.363074	1
1984	65	edmonton-strathcona	2.259700	1
1984	66	eglinton-lawrence	2.707617	1
1984	67	egmont	2.223493	1
1984	68	elgin	1.976553	1
1984	69	erie	2.413604	1
1984	70	esquimalt-saanich	2.649746	1
1984	71	essex-kent	2.288344	1
1984	72	essex-windsor	2.949717	1
1984	73	etobicoke centre	2.335146	1
1984	74	etobicoke north	2.818032	1
1984	75	etobicoke-lakeshore	2.868070	1
1984	76	fraser valley east	2.282067	1
1984	77	fraser valley west	2.456653	1
1984	78	frontenac	1.782761	1
1984	79	fundy-royal	2.400887	1
1984	80	gamelin	2.858278	1
1984	81	gander-twillingate	2.129703	1
1984	82	gaspé	2.092061	1
1984	83	gatineau	2.534666	1
1984	84	glengarry-prescott-russell	2.438602	1
1984	85	gloucester	2.202697	1
1984	86	grand falls-white bay-labrador	2.511654	1
1984	87	grey-simcoe	2.280102	1
1984	88	guelph	2.684213	1



yr	cst	cst_n	enp_v	enp_s
1984	89	haldimand-norfolk	2.297531	1
1984	90	halifax	2.774803	1
1984	91	halifax west	2.519617	1
1984	92	halton	2.276713	1
1984	93	hamilton east	3.007832	1
1984	94	hamilton mountain	2.632183	1
1984	95	hamilton west	3.006876	1
1984	96	hamilton-wentworth	2.591351	1
1984	97	hastings-frontenac-lennox and addington	2.411599	1
1984	98	hillsborough	2.270614	1
1984	99	hochelaga-maisonneuve	3.021897	1
1984	100	hull-aylmer	2.934459	1
1984	101	humber-port au port-st. barbe	2.196867	1
1984	102	humboldt-lake centre	2.751998	1
1984	103	huron-bruce	2.047947	1
1984	104	joliette	1.728843	1
1984	105	jonquière	2.506909	1
1984	106	kamloops-shuswap	2.318223	1
1984	107	kamouraska-rivière-du-loup	2.435731	1
1984	108	kenora-rainy river	2.955259	1
1984	109	kent (ont)	2.589204	1
1984	110	kindersley-lloydminster	2.284007	1
1984	111	kingston and the islands	2.515771	1
1984	112	kitchener	2.787937	1
1984	113	kootenay east-revelstoke	2.525679	1
1984	114	kootenay west	2.300952	1
1984	115	la prairie	2.862928	1
1984	116	labelle	2.499825	1
1984	117	lac-saint-jean	2.078757	1
1984	118	lachine	2.594493	1
1984	119	lambton-kent-middlesex	2.351233	1
1984	120	lanark-renfrew-carleton	2.381419	1
1984	121	langelier	3.009807	1
1984	122	lasalle	2.624255	1
1984	123	laurier	4.036843	1
1984	124	laval	2.694318	1
1984	125	laval-des-rapides	2.780369	1
1984	126	leeds-grenville	2.211855	1
1984	127	lethbridge-foothills	2.037199	1
1984	128	lincoln	2.740610	1
1984	129	lisgar	2.853205	1
1984	130	london east	2.759325	1
1984	131	london west	2.529632	1
1984	132	london-middlesex	2.762130	1
1984	133	longueuil	2.871669	1
1984	134	lotbinière	2.345005	1
1984	135	louis-hébert	2.845955	1
1984	136	lévis	2.841475	1
1984	137	mackenzie	2.961228	1
1984	138	madawaska-victoria	2.229211	1
1984	139	malpeque	2.285075	1
1984	140	manicouagan	1.746743	1

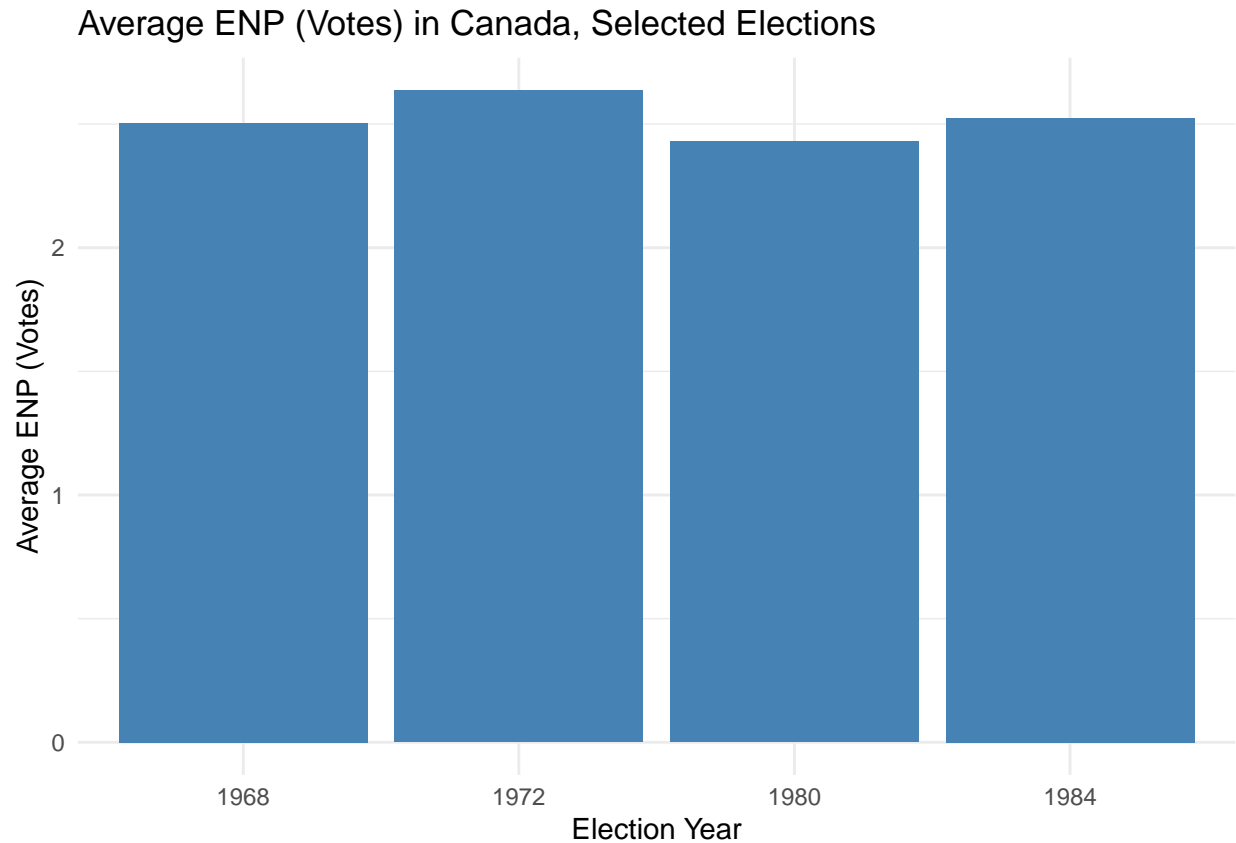
yr	cst	cst_n	enp_v	enp_s
1984	141	matapédia-matane	2.506389	1
1984	142	medicine hat	1.683613	1
1984	143	mission-port moody	2.503867	1
1984	144	mississauga north	2.578251	1
1984	145	mississauga south	2.362443	1
1984	146	moncton	2.351042	1
1984	147	montmorency-orléans	2.584436	1
1984	148	montreal-mercier	2.819294	1
1984	149	montreal-sainte marie	3.055616	1
1984	150	moose jaw	2.618914	1
1984	151	mount royal	2.575131	1
1984	152	mégantic-compton-stanstead	2.184639	1
1984	153	nanaimo-alberni	2.477407	1
1984	154	nepean-carleton	2.419968	1
1984	155	new westminster-coquitlam	2.569658	1
1984	156	niagara falls	2.501718	1
1984	157	nickel belt	2.996642	1
1984	158	nipissing	2.510596	1
1984	159	north vancouver-burnaby	2.949919	1
1984	160	northumberland	2.158214	1
1984	161	northumberland-miramichi	2.272790	1
1984	162	notre-dame-de-grâce-lachine east	2.803913	1
1984	163	nunatsiaq	3.557806	1
1984	164	okanagan north	2.435327	1
1984	165	okanagan-similkameen	2.610535	1
1984	166	ontario	2.430782	1
1984	167	oshawa	2.760072	1
1984	168	ottawa centre	3.092397	1
1984	169	ottawa west	2.584169	1
1984	170	ottawa-carleton	2.653991	1
1984	171	ottawa-vanier	2.701166	1
1984	172	outremont	3.421554	1
1984	173	oxford	2.345327	1
1984	174	papineau	3.226745	1
1984	175	parkdale-high park	2.949977	1
1984	176	parry sound-muskoka	2.394212	1
1984	177	peace river	2.307221	1
1984	178	pembina	1.864192	1
1984	179	perth	2.429095	1
1984	180	peterborough	2.678524	1
1984	181	pontiac-gatineau-labelle	2.121301	1
1984	182	portage-marquette	3.012712	1
1984	183	portneuf	2.439932	1
1984	184	prince albert	3.018117	1
1984	185	prince edward-hastings	2.496769	1
1984	186	prince george-bulkley valley	2.625075	1
1984	187	prince george-peace river	2.182332	1
1984	188	provencher	2.471124	1
1984	189	qu'appelle-moose mountain	2.765178	1
1984	190	québec-est	2.735679	1
1984	191	red deer	1.698211	1
1984	192	regina east	2.807927	1

yr	cst	cst_n	enp_v	enp_s
1984	193	regina west	2.775440	1
1984	194	renfrew-nipissing-pembroke	2.403152	1
1984	195	restigouche	2.581373	1
1984	196	richelieu	2.228672	1
1984	197	richmond-south delta	2.493606	1
1984	198	richmond-wolfe	2.365417	1
1984	199	rimouski-témiscouata	2.124357	1
1984	200	roberval	1.984098	1
1984	201	rosedale	2.636989	1
1984	202	rosemont	2.918494	1
1984	203	saint john	2.613779	1
1984	204	saint-denis	2.864313	1
1984	205	saint-henri-westmount	2.844870	1
1984	206	saint-hyacinthe-bagot	2.374017	1
1984	207	saint-jacques	3.101328	1
1984	208	saint-jean	2.242645	1
1984	209	saint-léonard-anjou	2.907655	1
1984	210	saint-maurice	2.110048	1
1984	211	saint-michel-ahuntsic	2.927671	1
1984	212	sarnia-lambton	2.488393	1
1984	213	saskatoon east	3.010347	1
1984	214	saskatoon west	2.551098	1
1984	215	sault ste. marie	2.992102	1
1984	216	scarborough centre	2.735047	1
1984	217	scarborough east	2.458031	1
1984	218	scarborough west	3.035341	1
1984	219	selkirk-interlake	2.980310	1
1984	220	shefford	2.407388	1
1984	221	sherbrooke	2.563053	1
1984	222	simcoe north	2.485476	1
1984	223	simcoe south	2.322317	1
1984	224	skeena	2.714218	1
1984	225	south shore	2.347324	1
1984	226	south west nova	2.289137	1
1984	227	spadina	3.015885	1
1984	228	st. boniface	3.057129	1
1984	229	st. catharines	2.664286	1
1984	230	st. john's east	1.567420	1
1984	231	st. john's west	1.617013	1
1984	232	st. paul's	2.592517	1
1984	233	stormont-dundas	2.515394	1
1984	234	sudbury	2.933473	1
1984	235	surrey-white rock-north delta	2.488679	1
1984	236	swift current-maple creek	2.723353	1
1984	237	terrebonne	2.262492	1
1984	238	the battlefords-meadow lake	2.606526	1
1984	239	thunder bay-atikokan	2.875549	1
1984	240	thunder bay-nipigon	2.992595	1
1984	241	timiskaming	2.535632	1
1984	242	timmins-chapleau	2.996890	1
1984	243	trinity	3.019839	1
1984	244	trois-rivières	2.115364	1

yr	cst	cst_n	enp_v	enp_s
1984	245	témiscamingue	2.666969	1
1984	246	vancouver centre	2.964691	1
1984	247	vancouver east	2.675531	1
1984	248	vancouver kingsway	2.625479	1
1984	249	vancouver quadra	2.764489	1
1984	250	vancouver south	2.509800	1
1984	251	vaudreuil	2.508931	1
1984	252	vegreville	1.521950	1
1984	253	verchères	2.479121	1
1984	254	verdun-saint-paul	2.703641	1
1984	255	victoria (fed-bc)	2.632686	1
1984	256	victoria-haliburton	2.257510	1
1984	257	waterloo	2.433519	1
1984	258	welland	2.913972	1
1984	259	wellington-grey-dufferin-simcoe	1.925679	1
1984	260	western arctic	2.792610	1
1984	261	westmorland-kent	2.781090	1
1984	262	wetaskiwin	1.881088	1
1984	263	willowdale	2.565838	1
1984	264	windsor west	2.935999	1
1984	265	windsor-walkerville	2.973265	1
1984	266	winnipeg north	2.937159	1
1984	267	winnipeg north centre	2.909432	1
1984	268	winnipeg-assiniboine	2.580183	1
1984	269	winnipeg-birds hill	2.646207	1
1984	270	winnipeg-fort garry	2.561426	1
1984	271	winnipeg-st. james	2.985980	1
1984	272	yellowhead	1.743747	1
1984	273	york centre	2.658288	1
1984	274	york east	2.657144	1
1984	275	york north	3.470184	1
1984	276	york south-weston	3.115956	1
1984	277	york west	2.918541	1
1984	278	york-peel	2.202661	1
1984	279	york-scarborough	2.619090	1
1984	280	york-sunbury	2.330017	1
1984	281	yorkton-melville	2.531598	1
1984	282	yukon	2.515834	1

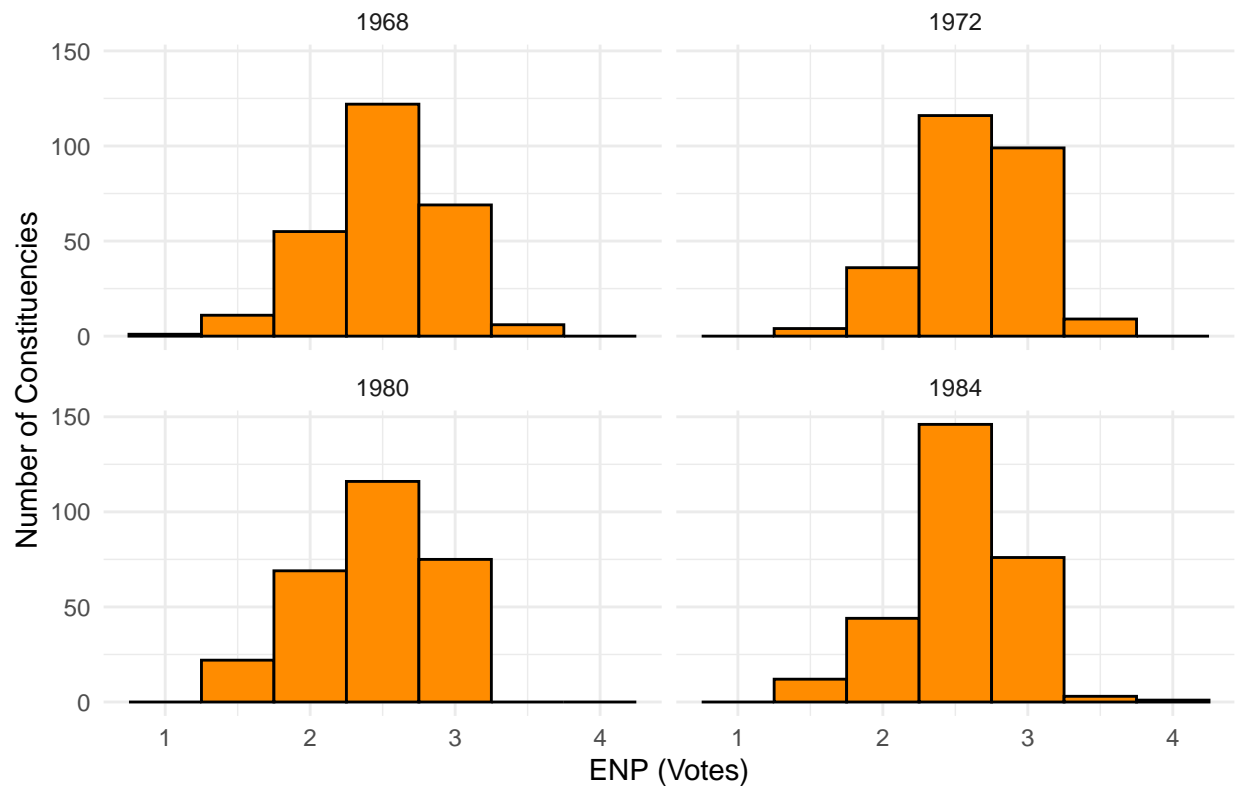
```
# --- Bar Plot: Average ENP (Votes) by Year ---
ca_avg <- ca_all %>%
  dplyr::group_by(yr) %>%
  dplyr::summarize(mean_enp_v = mean(enp_v, na.rm = TRUE))

ggplot2::ggplot(ca_avg, ggplot2::aes(x = factor(yr), y = mean_enp_v)) +
  ggplot2::geom_col(fill = "steelblue") +
  ggplot2::labs(title = "Average ENP (Votes) in Canada, Selected Elections",
    x = "Election Year", y = "Average ENP (Votes)") +
  ggplot2::theme_minimal()
```



```
# --- Histogram: Distribution of ENP (Votes) Across Constituencies ---
ggplot2::ggplot(ca_all, ggplot2::aes(x = enp_v)) +
  ggplot2::geom_histogram(binwidth = 0.5, fill = "darkorange", color = "black") +
  ggplot2::facet_wrap(~ yr) +
  ggplot2::labs(title = "Distribution of ENP (Votes) Across Canadian Constituencies",
                x = "ENP (Votes)", y = "Number of Constituencies") +
  ggplot2::theme_minimal()
```

## Distribution of ENP (Votes) Across Canadian Constituencies



— Nationwide ENP of Canada

```
ca_party_totals <- canada %>%
  dplyr::group_by(ctr_n, yr, pty) %>%
  dplyr::summarize(
    votes = sum(pv1, na.rm = TRUE),
    seats = sum(seat, na.rm = TRUE),
    .groups = "drop"
  )

ca_totals <- ca_party_totals %>%
  dplyr::group_by(ctr_n, yr) %>%
  dplyr::summarize(
    totalvotes = sum(votes, na.rm = TRUE),
    totalseats = sum(seats, na.rm = TRUE),
    .groups = "drop"
  )

ca_party_shares <- ca_party_totals %>%
  dplyr::left_join(ca_totals, by = c("ctr_n", "yr")) %>%
  dplyr::mutate(
    vote_share = votes / totalvotes,
    seat_share = seats / totalseats
  )

ca_enp_nat <- ca_party_shares %>%
```

```

dplyr::group_by(ctr_n, yr) %>%
dplyr::summarize(
  enp_v = 1/sum(vote_share^2, na.rm = TRUE),
  enp_s = 1/sum(seat_share^2, na.rm = TRUE),
  .groups = "drop"
)

ggplot2::ggplot(ca_enp_nat, ggplot2::aes(x = yr)) +
  ggplot2::geom_line(ggplot2::aes(y = enp_v, color = "Votes"), linewidth = 1.1) +
  ggplot2::geom_point(ggplot2::aes(y = enp_v, color = "Votes"), size = 2) +
  ggplot2::geom_line(ggplot2::aes(y = enp_s, color = "Seats"), linewidth = 1.1) +
  ggplot2::geom_point(ggplot2::aes(y = enp_s, color = "Seats"), size = 2) +
  ggplot2::scale_color_manual(values = c("Votes" = "darkgreen", "Seats" = "darkred")) +
  ggplot2::labs(title = "Nationwide ENP (Canada)",
    x = "Election Year", y = "ENP") +
  ggplot2::theme_minimal(base_size = 13) +
  ggplot2::theme(panel.grid.minor = ggplot2::element_blank(),
    legend.position = "bottom")

```

