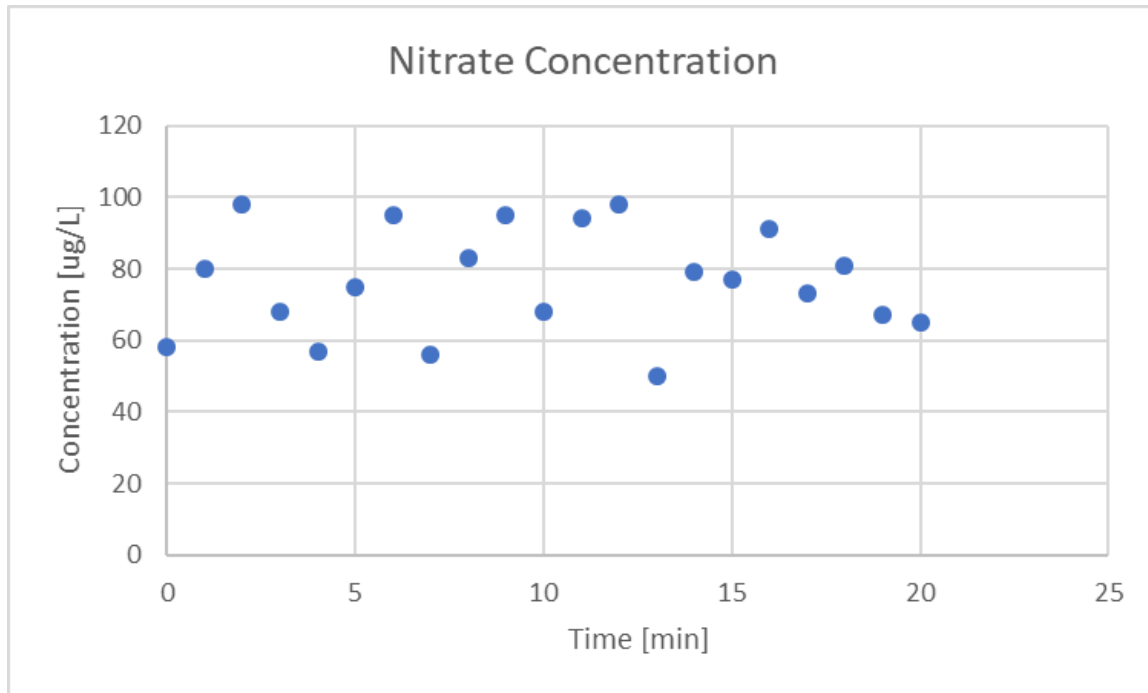# Making Excel Plots presentation quality
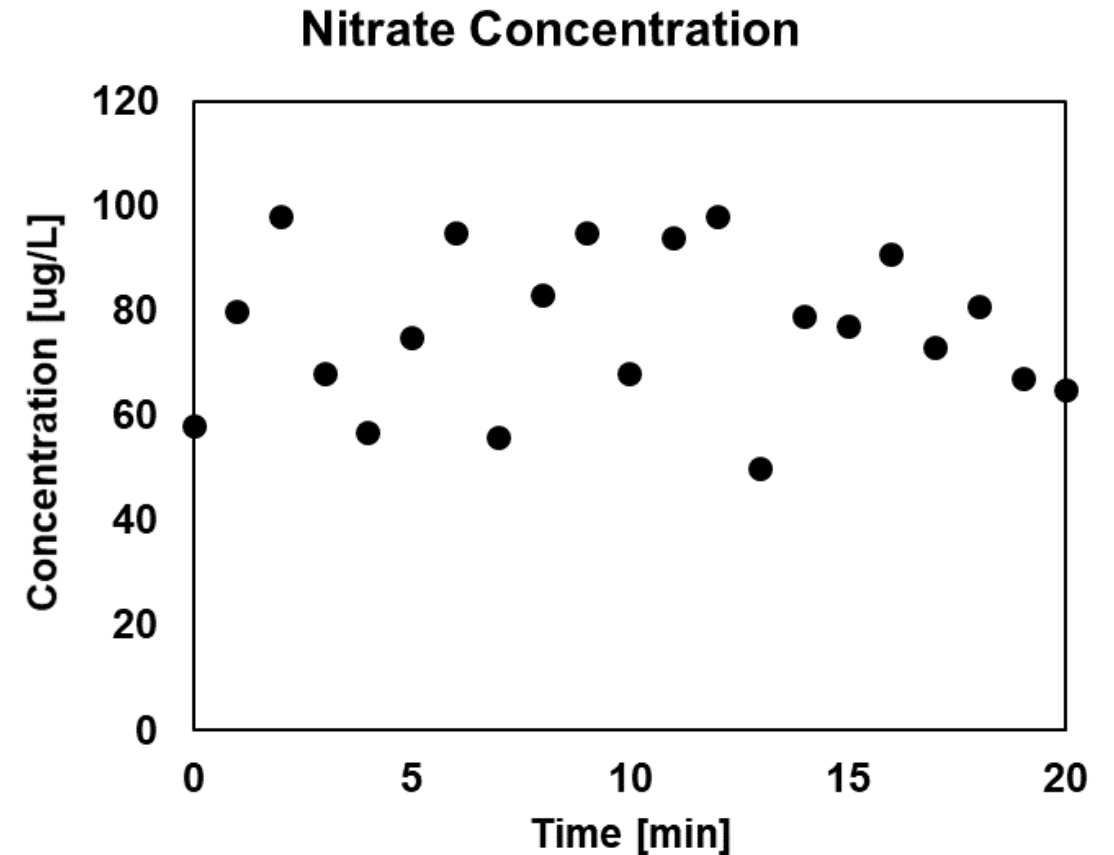
J. Wolfand, Colorado School of Mines

Adapted from E. Marron (UC Berkeley)

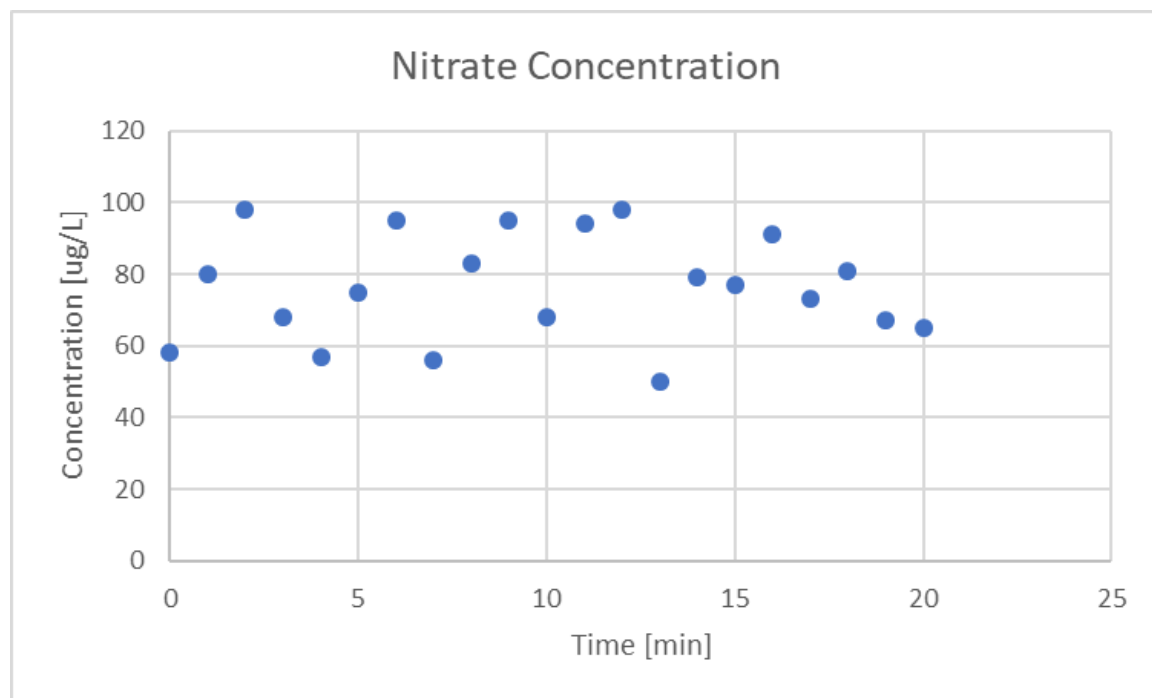# You can do much better than default!

I think this looks bad

I think this looks better
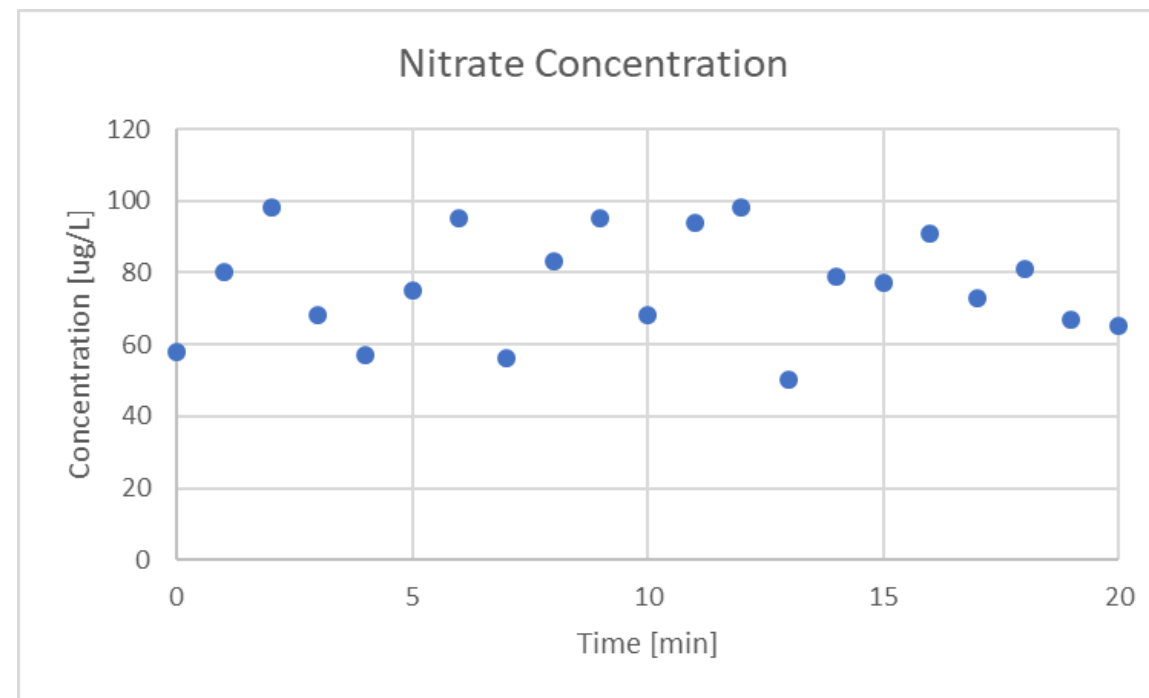
Adjust axes

Bad

Better

Remove gridlines

Bad
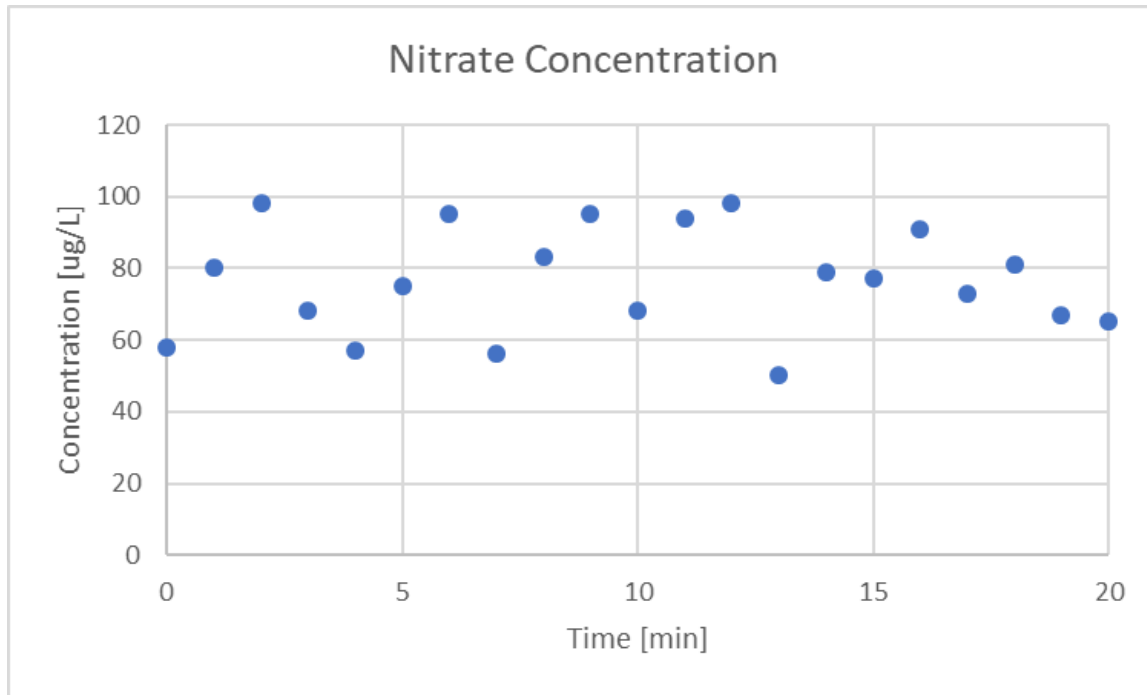
Better
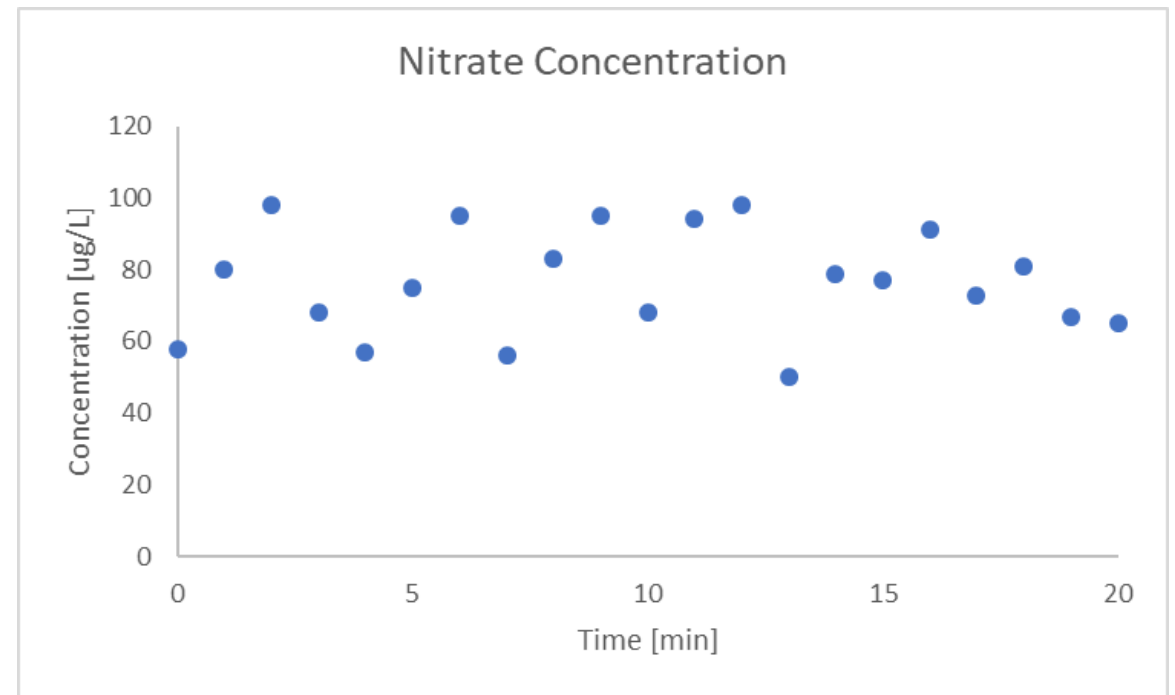
Change color: grey to black
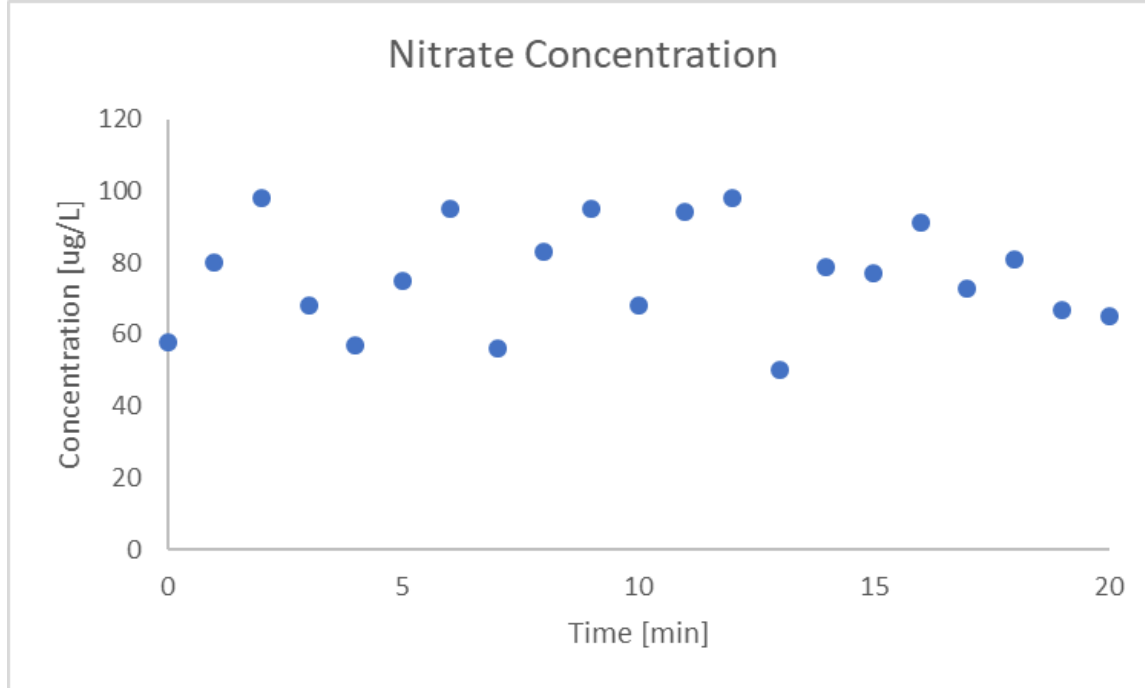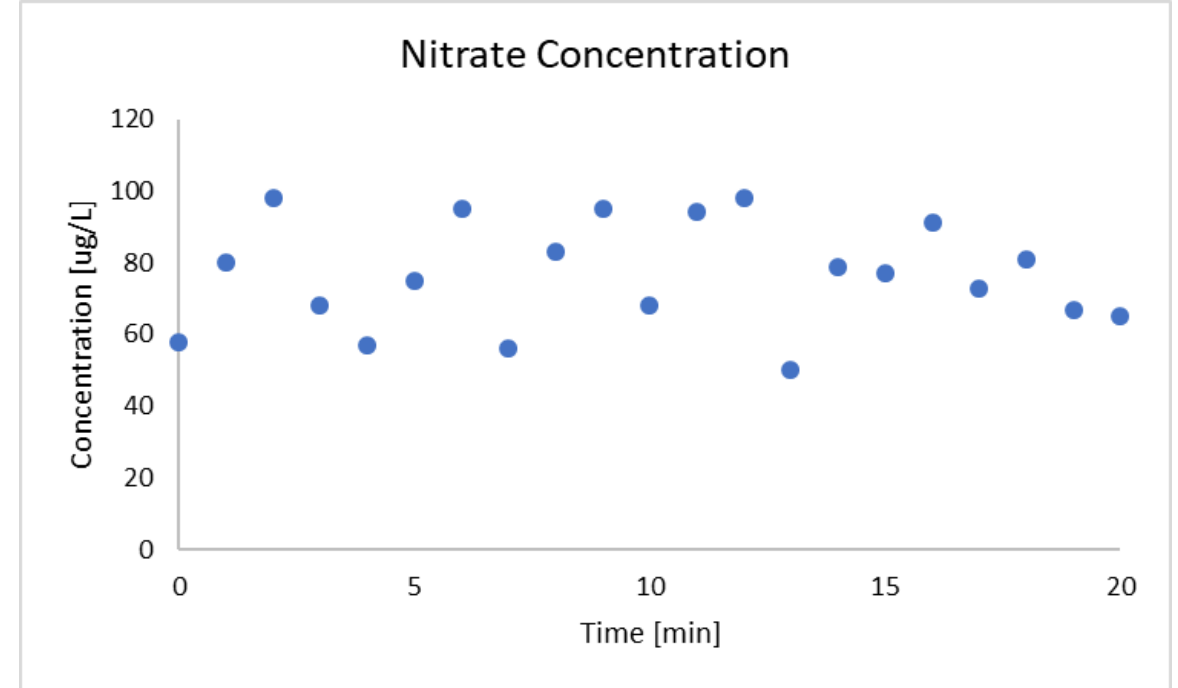
Change font: Calibri to Arial or Helvetica

Bad
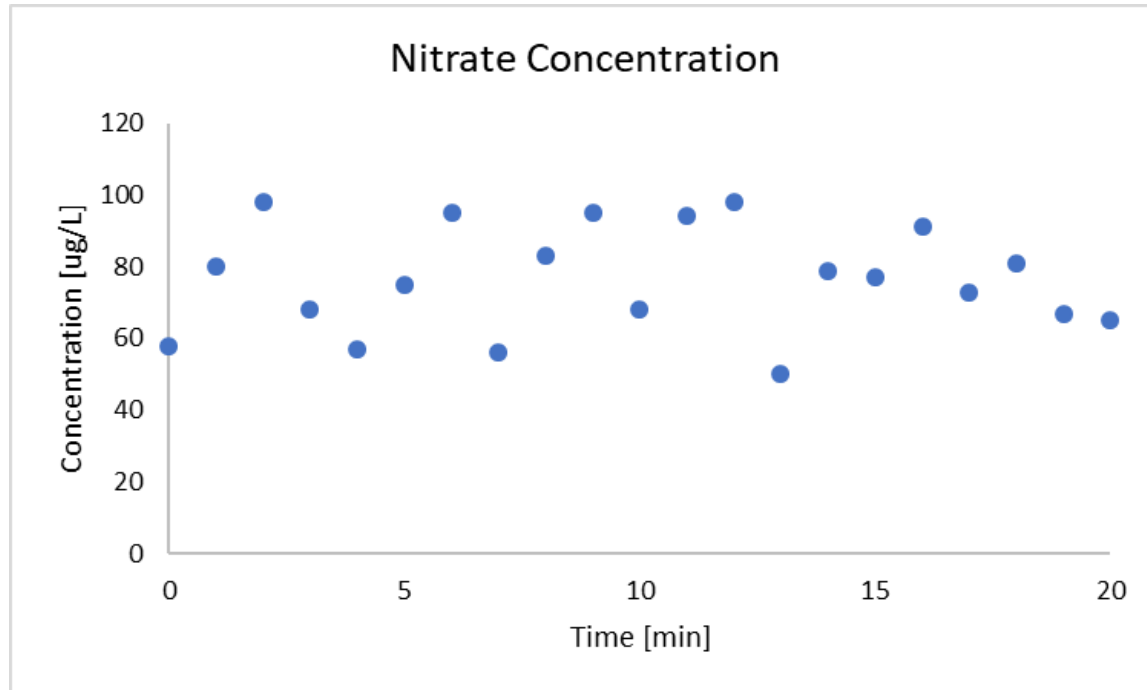
Better
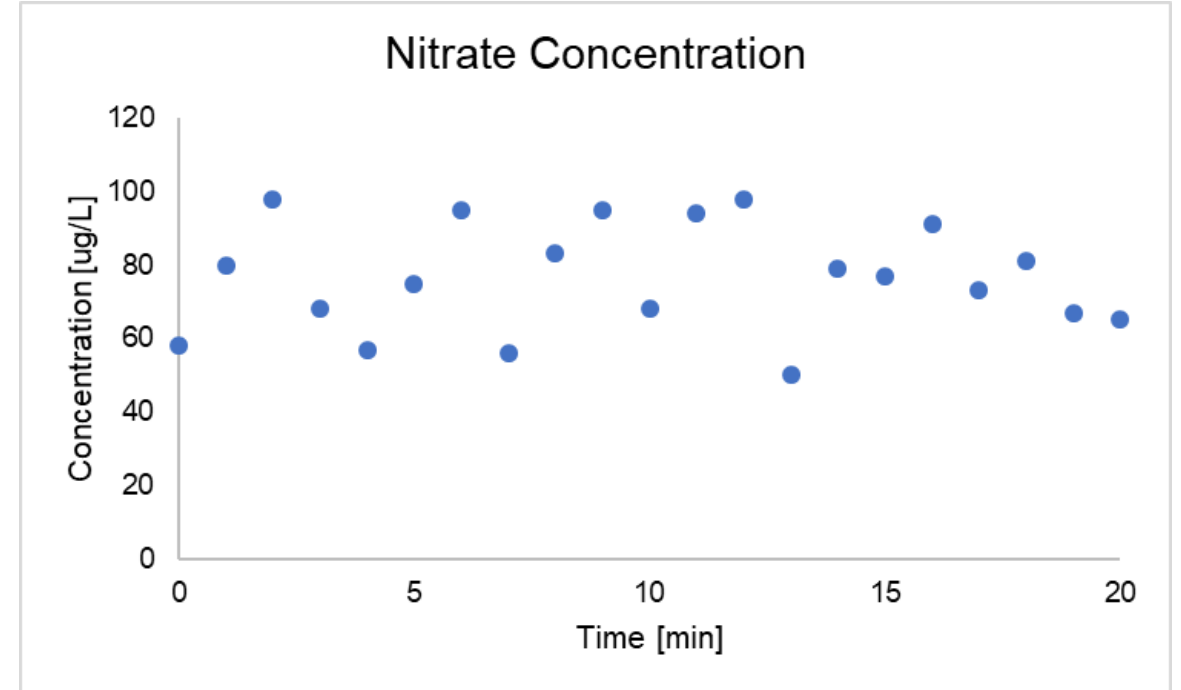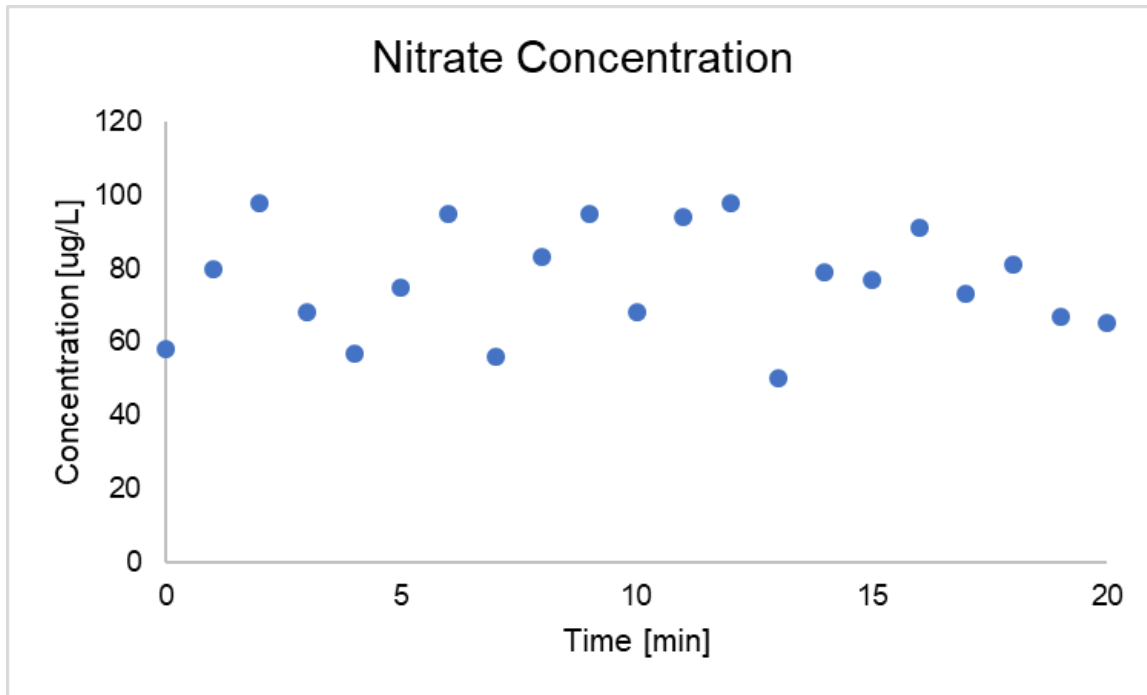
Add full border
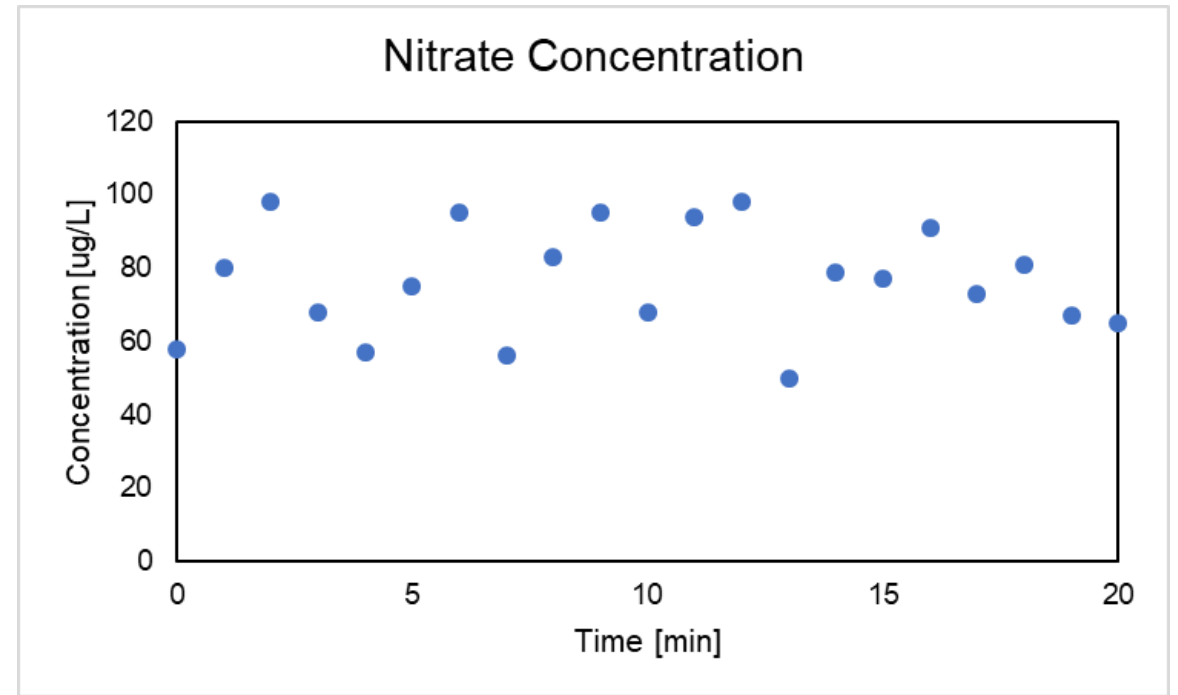
Make font bigger and bold, border thicker

Bad
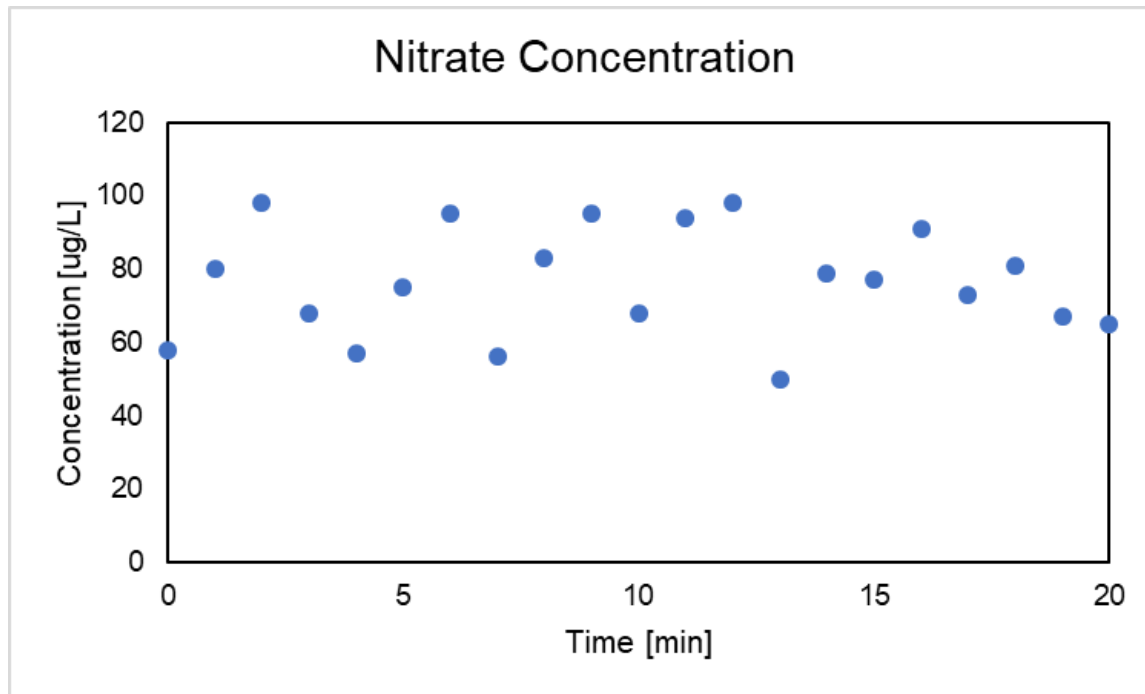
Better
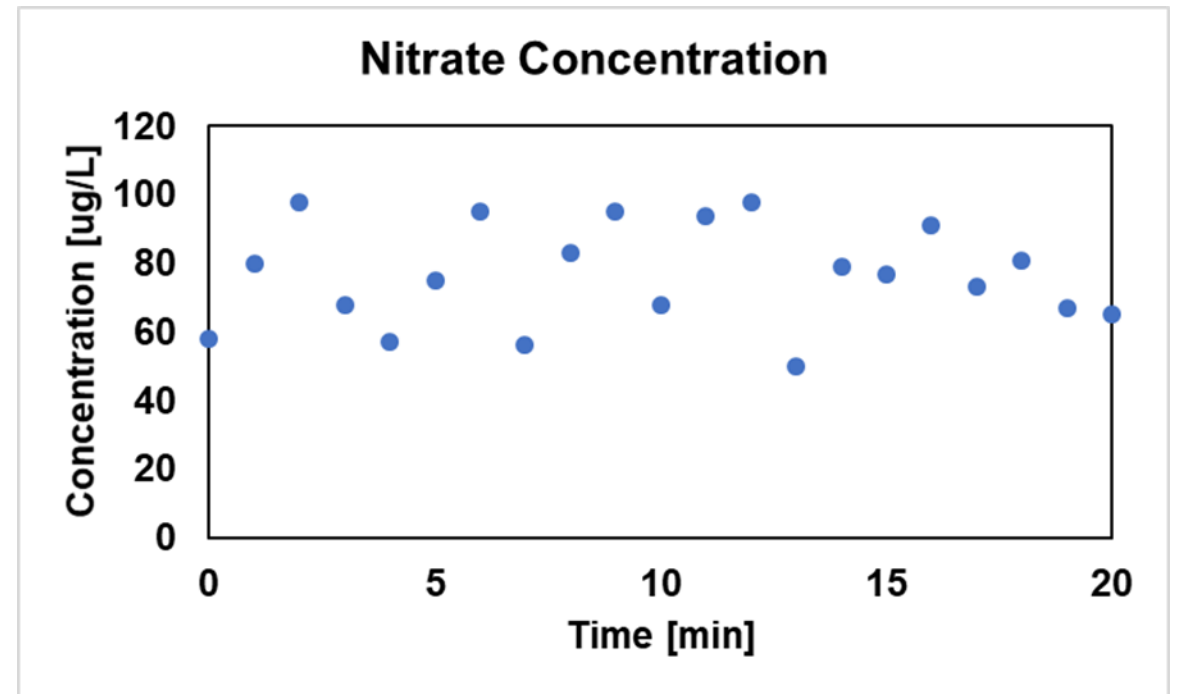
Change marker color and size
This goes for lines too!

Bad
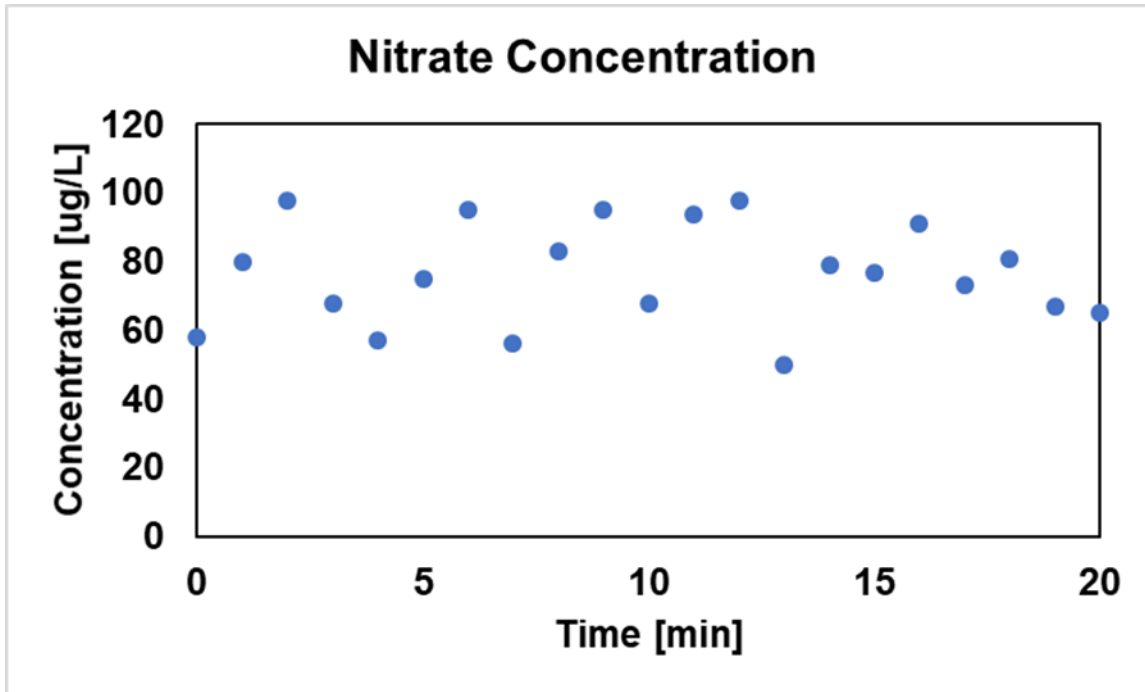
Better

Remove gray border

Make more square

Bad

Nitrate Concentration

Better

Nitrate Concentration
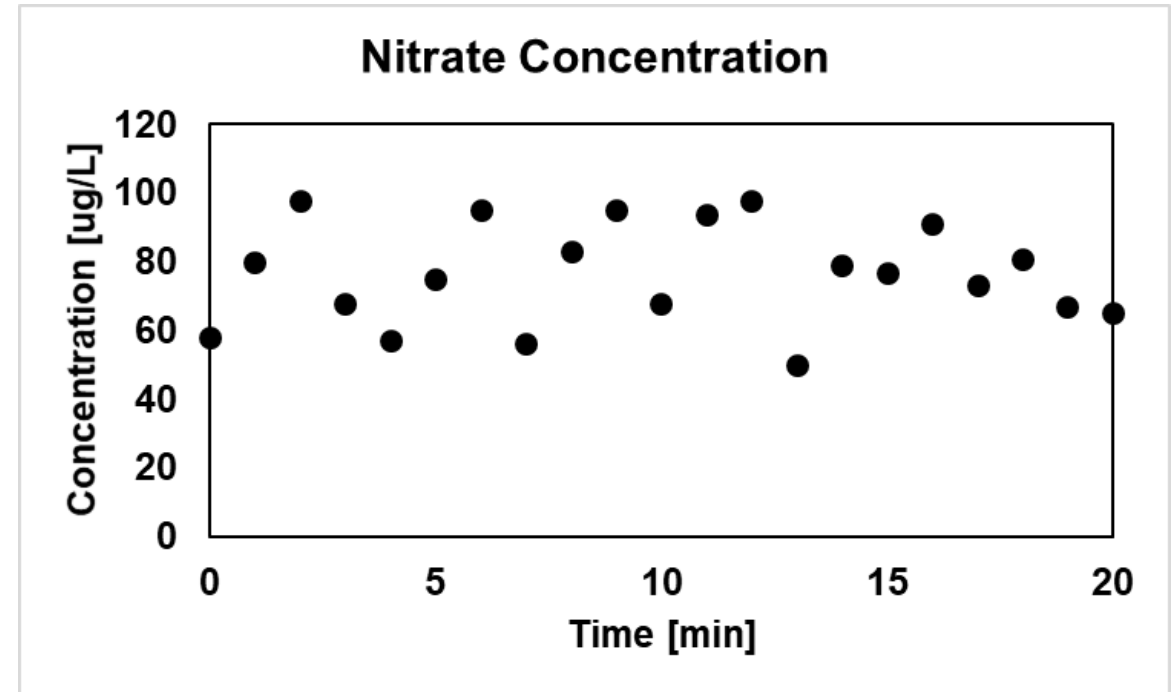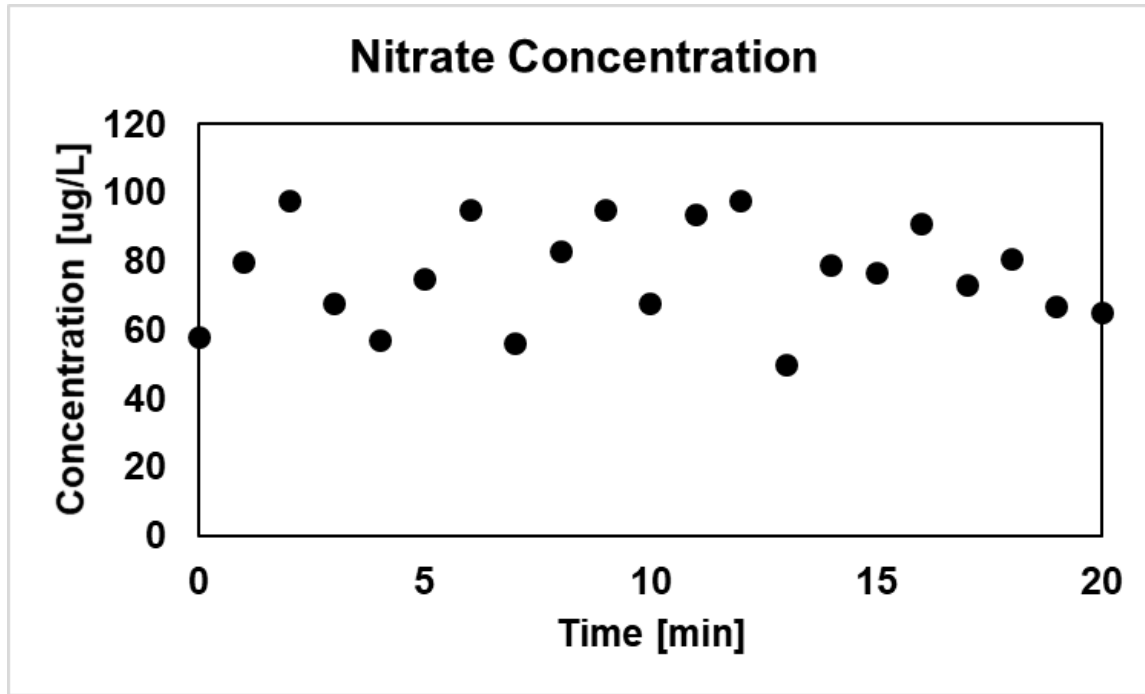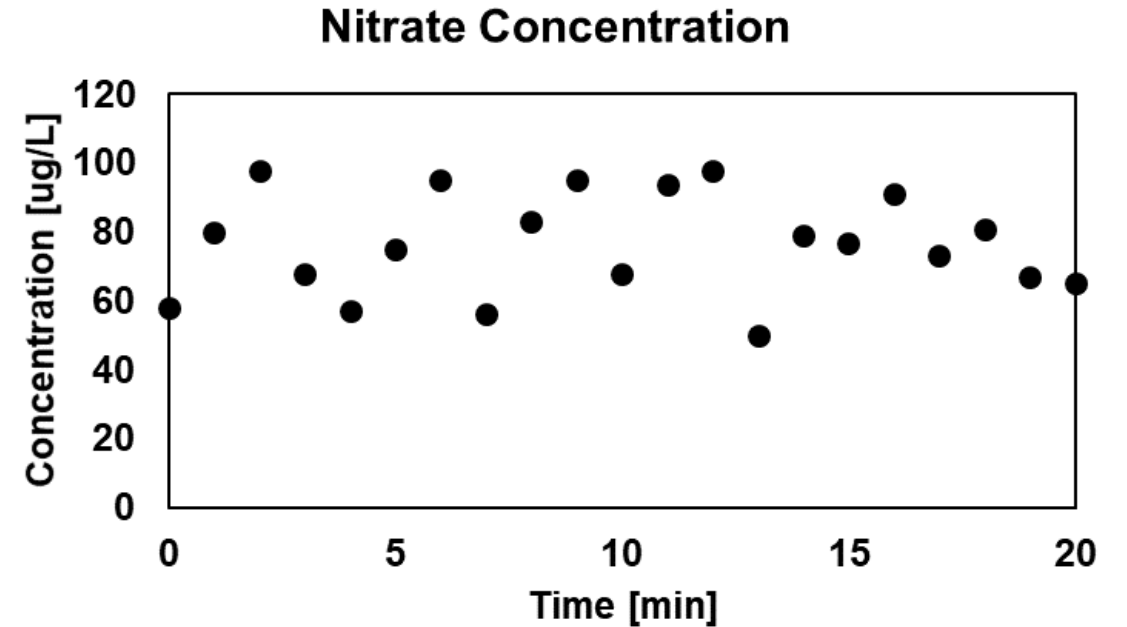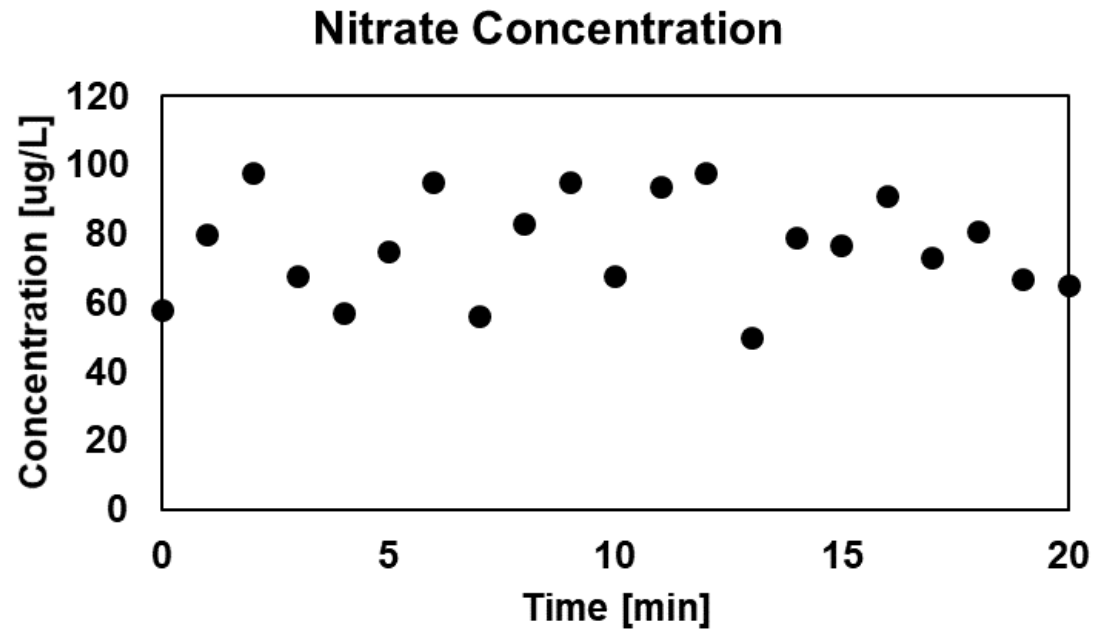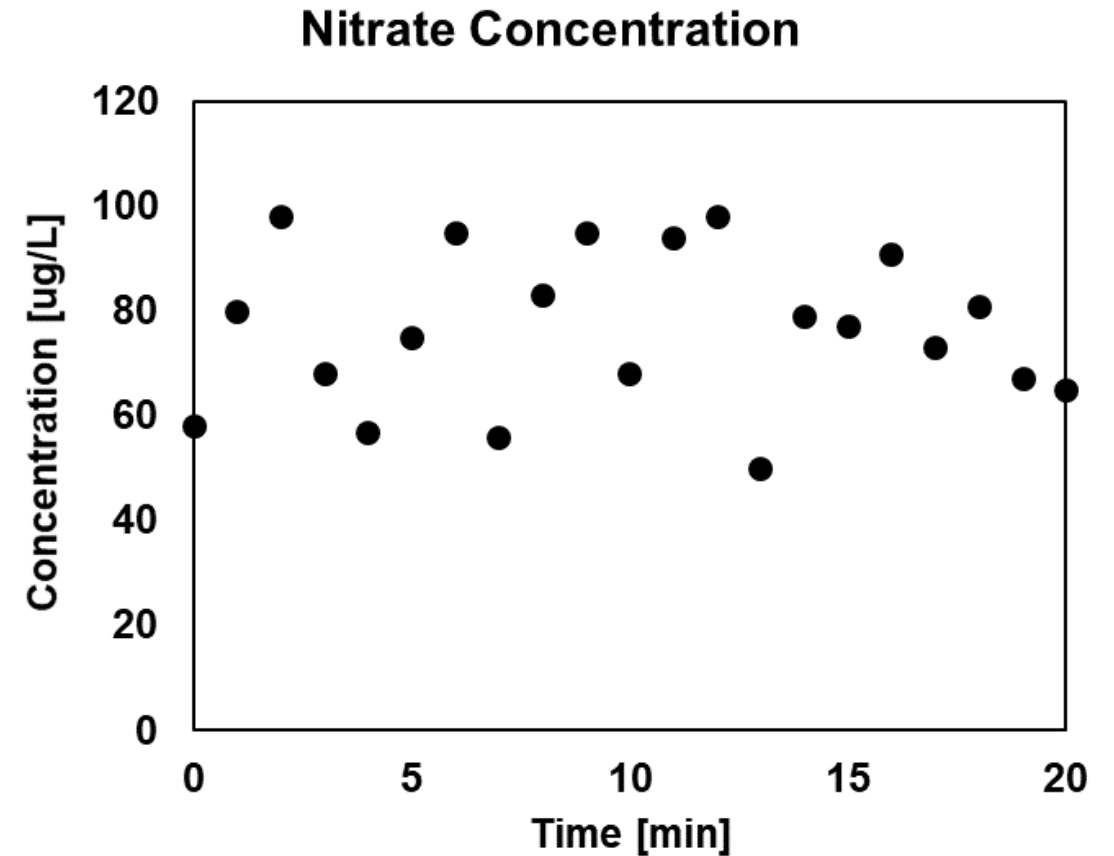
Should also change default colors
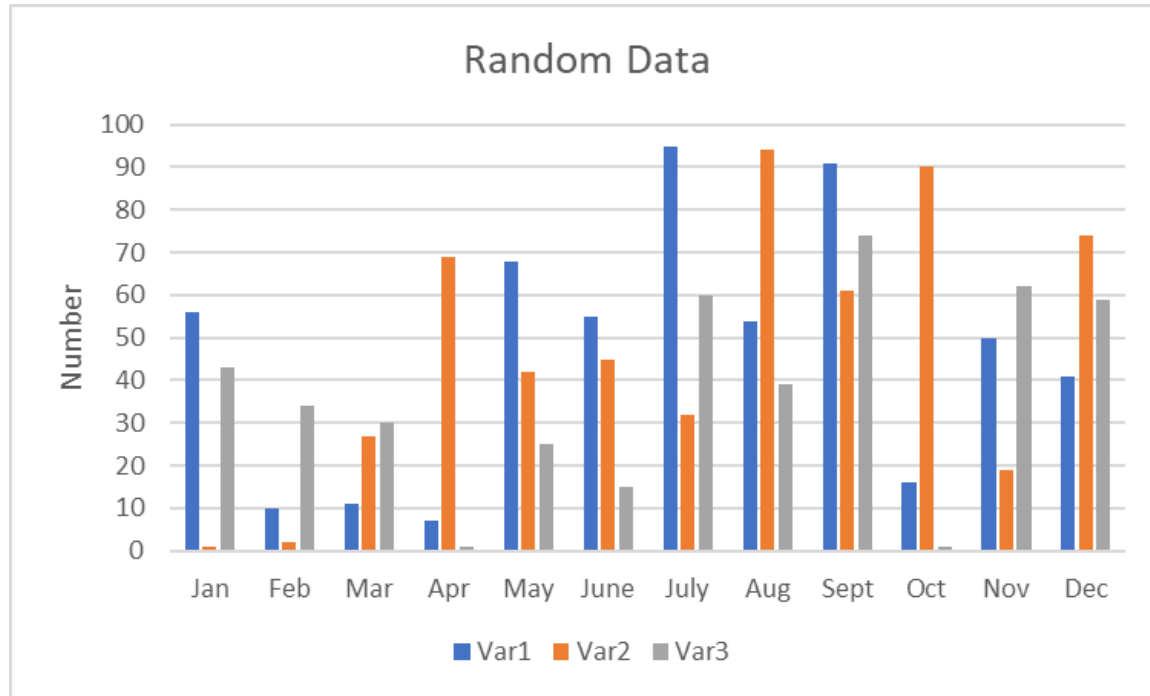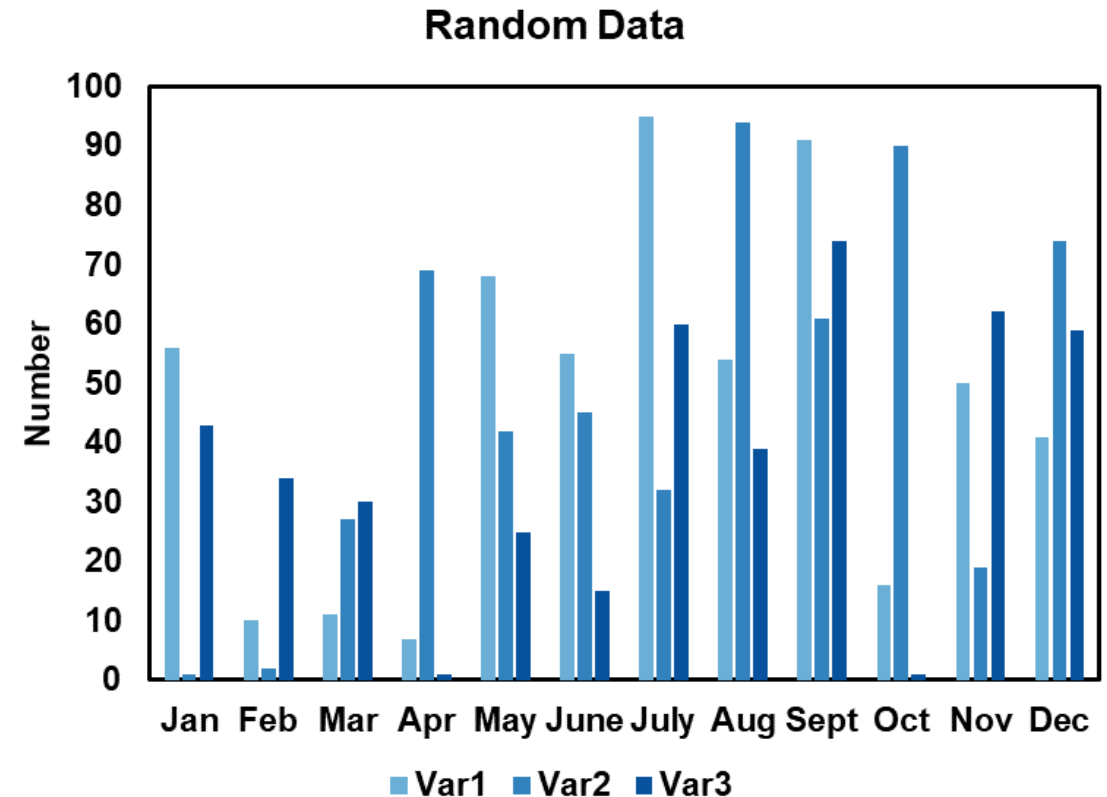
Colorbrewer2.org
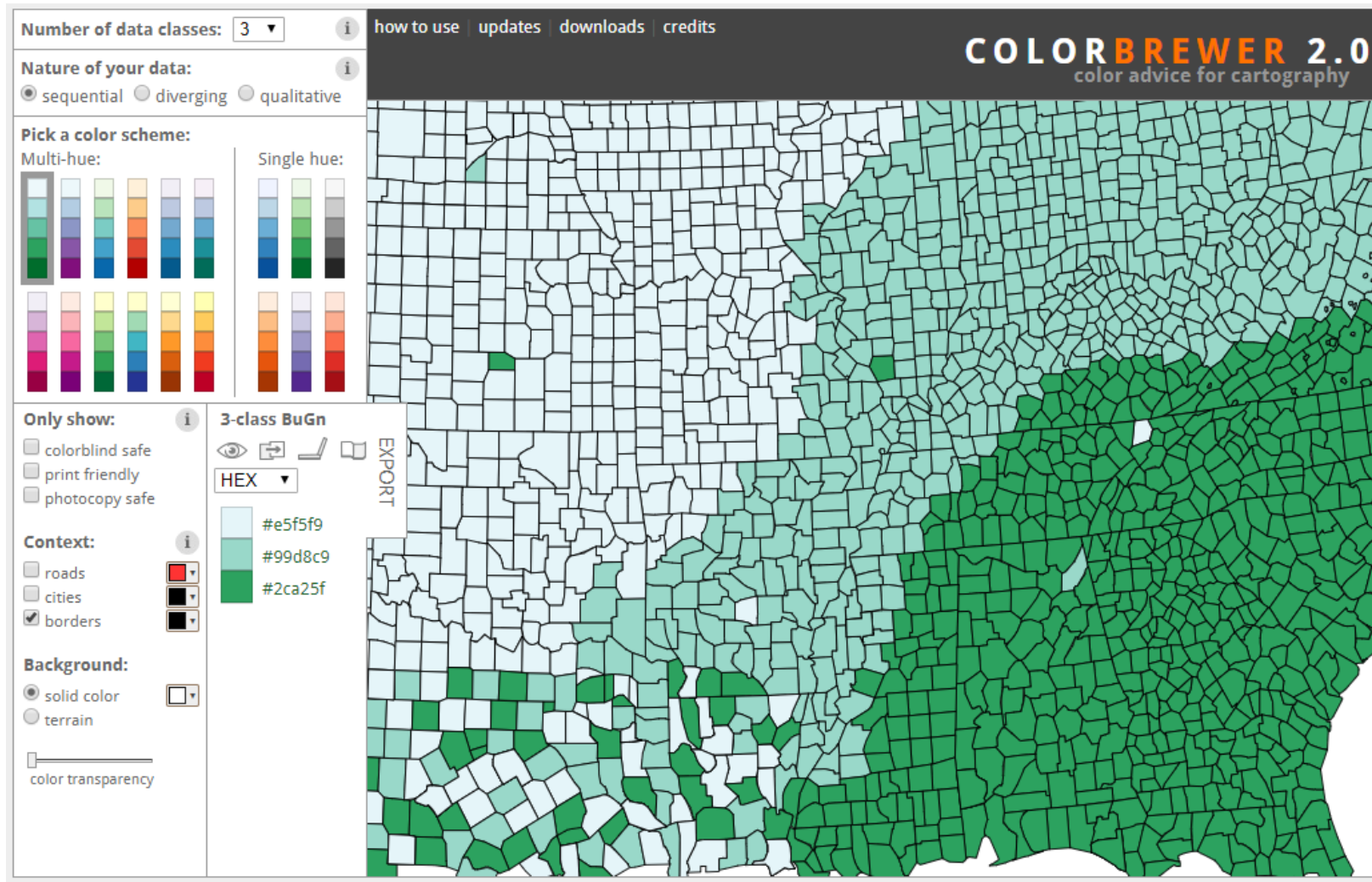
Publication quality!
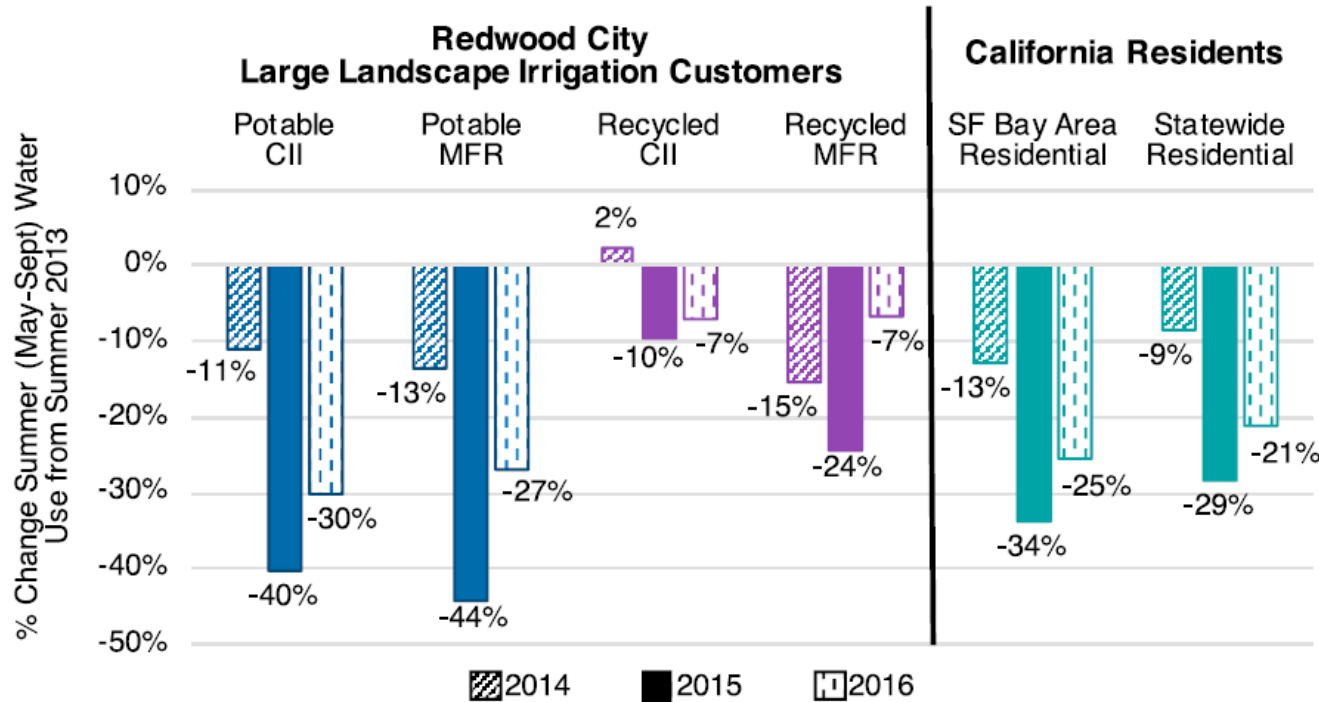
Figure 2. Average percent change in summer water use from summer 2013 for each large landscape customer class compared to residents in the San Francisco (SF) Bay Area (where Redwood City is located) and across California. Conservation rates for California residents are based on residential gallons per capita per day. The 2014 statewide rates do not include May since conservation reporting started in June 2014, but relative conservation amounts have been adjusted accordingly and the two statewide 2014 rates are only compared to June–September 2013. CII = commercial, industrial, institutional; MFR = multifamily residential. Data source for California residents conservation: California State Water Resources Control Board (2018).

Other programs that plot better

- Matlab
- R
- GraphPad Prism
- SigmaPlot
- IGOR
- Others…?

Making Presentation-Quality Tables

Which one looks better?

signal processing concept	algebraic concept (coordinate free)	in coordinates
filter	$h \in \mathcal{A}$ (algebra)	$\phi(h) \in \mathbb{C}^{I \times I}$
signal	$s = \sum s_i b_i \in \mathcal{M}$ ($\mathcal{A}$-module)	$\mathbf{s} = (s_i)_{i \in I} \in \mathbb{C}^I$
filtering	$h \cdot s$	$\phi(h) \cdot \mathbf{s}$
impulse	base vector $b_i \in \mathcal{M}$	$\mathbf{b}_i = (\dots, 0, 1, 0 \dots)^T \in \mathbb{C}^I$
impulse response of $h \in \mathcal{A}$	$h \cdot b_i \in \mathcal{M}$	$\phi(h) \cdot \mathbf{b}_i = (\dots, h_{-1}, h_0, h_1, \dots)^T \in \mathbb{C}^I$
Fourier transform	$\Delta : \mathcal{M} \to \bigoplus_{\omega \in W} \mathcal{M}_\omega$	$\mathcal{F} : \mathbb{C}^I \to \bigoplus_{\omega \in W} \mathbb{C}^{d_\omega}$ $\Leftrightarrow \phi \to \bigoplus_{\omega \in W} \phi_\omega$
spectrum of signal	$\Delta(s) = (s_\omega)_{\omega \in W} = \omega \mapsto s_\omega$	$\mathcal{F}(\mathbf{s}) = (\mathbf{s}_\omega)_{\omega \in W} = \omega \mapsto \mathbf{s}_\omega$
frequency response of $h \in \mathcal{A}$		$(\phi_\omega(h))_{\omega \in W} = \omega \mapsto \phi_\omega(h)$

signal processing concept	algebraic concept (coordinate free)	in coordinates
filter	$h \in \mathcal{A}$ (algebra)	$\phi(h) \in \mathbb{C}^{I \times I}$
signal	$s = \sum s_i b_i \in \mathcal{M}$ ($\mathcal{A}$-module)	$\mathbf{s} = (s_i)_{i \in I} \in \mathbb{C}^I$
filtering	$h \cdot s$	$\phi(h) \cdot \mathbf{s}$
impulse	base vector $b_i \in \mathcal{M}$	$\mathbf{b}_i = (\dots, 0, 1, 0, \dots)^T \in \mathbb{C}^I$
impulse response of $h \in \mathcal{A}$	$h \cdot b_i \in \mathcal{M}$	$\phi(h) \cdot \mathbf{b}_i = (\dots, h_{-1}, h_0, h_1, \dots)^T \in \mathbb{C}^I$
Fourier transform	$\Delta : \mathcal{M} \to \bigoplus_{\omega \in W} \mathcal{M}_\omega$	$\mathcal{F} : \mathbb{C}^I \to \bigoplus_{\omega \in W} \mathbb{C}^{d_\omega} \Leftrightarrow \phi \to \bigoplus_{\omega \in W} \phi_\omega$
spectrum of signal	$\Delta(s) = (s_\omega)_{\omega \in W} = \omega \mapsto s_\omega$	$\mathcal{F}(\mathbf{s}) = (\mathbf{s}_\omega)_{\omega \in W} = \omega \mapsto \mathbf{s}_\omega$
frequency response of $h \in \mathcal{A}$	n.a.	$(\phi_\omega(h))_{\omega \in W} = \omega \mapsto \phi_\omega(h)$

Which one looks best?

Title 1	Title	Title	Title	Title
Label	text	text	text	text
Label	text	text	text	text
Label	text	text	text	text
Label	text	text	text	text
Label	text	text	text	text
Label	text	text	text	text

STUDENTS MARK SHEET					
Name	Maths	Science	English	Physics	General Knowledge
David	85	87	88	92	88
Richard	91	81	78	71	74
John	81	86	88	84	92
Tony	84	86	87	82	81
Scott	71	79	82	88	89

Codingfusion.com

Table 1: Noise Filtering Results
Total Dots = 171 (manual count)
Total Noise specks = 73

Filter Size	Dots Erased	Noise Erased.
0x0	0	0
1x1	0	30
2x2	34	40
3x3	154	55
4x4	171	67
5x5	171	73

Table 1
Number of unrepresented and underrepresented Member States, 1994–2004

Member States	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Unrepresented	28	25	23	25	24	24	21	18	16	17	15
Underrepresented	25	25	22	20	9	13	8	10	11	10	10
Number of Member States	184	185	185	185	185	185	188	189	189	191	191

	Title	Title
Label	Ab Cd Ef	12 345
Label	Xyz 99	3 56
Label	pq–rst	99–a
Label	pq–uv5	199.6

Chicago Manual of Style

TABLE 1. Table title

Stub column head	Spanner head[a]		Spanner head	
	Column head	Column head	Column head	Column head
Stub entry				
Stub subentry	0.00	0.00	0.00[b]	0.00
Stub subentry	0.00	0.00	0.00	0.00
Stub entry[c]				
Stub subentry	0.00	0.00	0.00	0.00
Stub subentry	0.00	0.00	0.00	0.00
Stub entry	0.00	0.00	0.00[b]	0.00

Note: General note to table. A general note might be used to explain how to interpret the data.

Source: A source note acknowledges the source of the data, if not the author's own.

[a] Note to the first spanner head.

[b] Note that applies to the data in two different data cells.

[c] Note to the second stub entry.

No need for color

Company	Status	Value	Code	Cost
Google	Red	59	googl	$2394
Apple	Green	504	aapl	$359
Microsoft	orange	300	msft	$45

Company	Status	Value	Code	Cost
Google	Red	59	googl	$2394
Apple	Green	504	aapl	$359
Microsoft	orange	300	msft	$45

Remove vertical lines

Company	Status	Value	Code	Cost
Google	Red	59	googl	$2394
Apple	Green	504	aapl	$359
Microsoft	orange	300	msft	$45

Company	Status	Value	Code	Cost
Google	Red	59	googl	$2394
Apple	Green	504	aapl	$359
Microsoft	orange	300	msft	$45

Remove horizontal lines between data

Company	Status	Value	Code	Cost
Google	Red	59	googl	$2394
Apple	Green	504	aapl	$359
Microsoft	orange	300	msft	$45

Company	Status	Value	Code	Cost
Google	Red	59	googl	$2394
Apple	Green	504	aapl	$359
Microsoft	orange	300	msft	$45

Enough space between rows

Company	Status	Value	Code	Cost
Google	Red	59	googl	$2394
Apple	Green	504	aapl	$359
Microsoft	orange	300	msft	$45

Company	Status	Value	Code	Cost
Google	Red	59	googl	$2394
Apple	Green	504	aapl	$359
Microsoft	orange	300	msft	$45

Left align dimensions, right or center align data

Company	Status	Value	Code	Cost
Google	Red	59	googl	$2394
Apple	Green	504	aapl	$359
Microsoft	orange	300	msft	$45

Company	Status	Value	Code	Cost
Google	red	59	googl	$2394
Apple	green	504	aapl	$359
Microsoft	orange	300	msft	$45

Left align dimensions, right or center align data

Company	Status	Value	Code	Cost
Google	Red	59	googl	$2394
Apple	Green	504	aapl	$359
Microsoft	orange	300	msft	$45

Company	Status	Value	Code	Cost
Google	red	59	googl	$2394
Apple	green	504	aapl	$359
Microsoft	orange	300	msft	$45

Simple guidelines

- No need for color
- Avoid vertical lines
- Avoid "boxing up" cells, usually 3 horizontal lines are enough
- Avoid double horizontal lines
- Enough space between rows
- Left align dimensions, right or center align data
- Pay attention to significant digits

Generally publications will use their own style

Table 1. SFR water demand model outputs. *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

	Pooled model	Cluster A model (highest income, high WU)	Cluster B model (medium income, medium WU)	Cluster C model (lowest income, medium WU)
Model information				
Number of observations	1200	180	660	360
F statistic	301.2*** (df = 7; 1192)	101.9*** (df = 7; 172)	204.5*** (df = 7; 652)	108.4** (df = 7; 35...)
Coefficients				
Intercept	1.417***	2.057***	1.749***	2.462***
Temperature (°C)	0.082***	0.132***	0.073***	0.054***
Precipitation (mm)	-3.5×10^{-6}	-4.2×10^{-4}	-1.3×10^{-4}	-9.3×10^{-5}
PDSI	-0.012**	-0.007	-0.006	-0.003
Average price [2015$/hundred cubic feet (CCF) water]	-0.058***	-0.005	-0.035***	-0.077***
Unemployment rate (%)	-0.031***	-0.041**	-0.036***	-0.018***
Median household income (2015$/$1000)	0.009***	0.001*	0.005***	0.002**
Number of newspaper articles about the California drought from nine sources	-0.0018***	-0.0015***	-0.0016***	-0.0011***
Model performance metrics				
Adjusted R^2	0.64	0.80	0.68	0.68
RMSE	12.9	11.7	4.0	3.1
PBIAS	-7.0%	-2.1%	-1.9%	-1.3%
AIC	583.2	18.2	-265.2	-323.8

Table 2. Summary of Case Study Design Scenario Parameters

recipient spreading basin	scenario name	production parameters[a] winter maximum potential capacity, MGD (1000 m³/d)	summer maximum potential capacity, MGD (1000 m³/d)	conveyance parameters[b] pipeline distance, miles (km)	net elevation change, feet (m)
Hansen Spreading Grounds	Hyperion system	160 (606)	160 (606)	27 (43)	910 (277)
	LA-Glendale system	40 (151)	20 (76)	11 (18)	520 (158)
	Tillman system	27 (102)	27 (102)	11 (18)	250 (76)
	Tillman+LA-Glendale sys.	67 (254)	47 (178)	25 (40)	520 (158)
Rio Hondo Spreading Grounds	Hyperion system	160 (606)	160 (606)	23 (37)	130 (40)
	New Metro Satellite system	45 (170)	45 (170)	11 (18)	-26 (-7.9)

[a]Production parameters, representing the potential to produce recycled water for MAR, were provided in the LA RWMPD. [b]Conveyance parameters were computed using ArcGIS.

In LaTeX

Style: \usepackage{booktabs}

	Item	
Animal	Description	Price ($)
Gnat	per gram	13.65
	each	0.01
Gnu	stuffed	92.50
Emu	stuffed	33.33
Armadillo	frozen	8.99