Supporting Information. Grace, J. B., and K. M. Irvine. 2020. Scientist's guide to developing explanatory statistical models using causal analysis principles. Ecology.

Appendix S1
Wildfire Regression Study
All subsets regression - see Fisher et al. (2018) for a basic introduction. R code and data are provided in "Data S1". Analyses were run using R version 3.5.3 (R Core Team 2019).

Box S1. Illustration of all-subsets regression for wildfire example (results in Tables 2 and 3).

```
##### Appendix S1: All subsets regression and model decomposition
fire.dat <- read.csv("AppendixS1_data.csv")

#########################################################
##### Multimodel Comparisons For Wildfire Study ######
#########################################################
# library for model comparisons
library(AICcmodavg)

### All Subsets Regression
## predictor set {firesev, age, elev, coastdist}
# null model
m1 <- lm(vegcover ~ 1, data=fire.dat)

## one-predictor models
m2 <- lm(vegcover ~ firesev, data=fire.dat)
m3 <- lm(vegcover ~ age, data=fire.dat)
m4 <- lm(vegcover ~ elev, data=fire.dat)
m5 <- lm(vegcover ~ coastdist, data=fire.dat)

## two-predictor models
m6 <- lm(vegcover ~ firesev + age, data=fire.dat)
m7 <- lm(vegcover ~ firesev + elev, data=fire.dat)
m8 <- lm(vegcover ~ firesev + coastdist, data=fire.dat)
#
m9 <- lm(vegcover ~ age + elev, data=fire.dat)
m10 <- lm(vegcover ~ age + coastdist, data=fire.dat)
#
m11 <- lm(vegcover ~ elev + coastdist, data=fire.dat)

## three-predictor models
m12 <- lm(vegcover ~ firesev + age + elev, data=fire.dat)
m13 <- lm(vegcover ~ firesev + age + coastdist, data=fire.dat)
m14 <- lm(vegcover ~ firesev + elev + coastdist, data=fire.dat)
m15 <- lm(vegcover ~ age + elev + coastdist, data=fire.dat)

## four-predictor model
m16 <- lm(vegcover ~ firesev + age + elev + coastdist, data=fire.dat)

aictab(list(m1,m2,m3,m4,m5,m6,m7,m8,m9,m10,m11,m12,m13,m14,m15,m16),

c("m1","m2","m3","m4","m5","m6","m7","m8","m9","m10","m11","m12","m13","
m14","m15","m16"))
```

Literature Cited

R Core Team (2019). R: A language and environment for statistical computing. R Foundation for