# example

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## Example of doing bycatch estimation and expansion in STAN

### Load data

```r
# replace this with your own data frame
d = data.frame("Year"= 2002:2014,
  "Takes" = c(0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0),
  "expansionRate" = c(24, 22, 14, 38, 22, 28, 30,  7, 26, 21, 22, 23, 27),
  "Sets" = c(391, 349, 320, 663, 469, 517, 539, 287, 756, 673, 532, 351, 486))
```

### Fit model

```r
fit = bycatch_expansion(time = d[,"Year"], events = d[,"Takes"],
  effort = d[,"Sets"], coverage = d[,"expansionRate"])
```

### Make plots

```r
plot_expanded(fit, xlab="Year", ylab = "Fleet-level bycatch")
```

### Make table of expanded bycatch estimates

```r
df = data.frame("time" = d[,"Year"],
  "mean" = apply(fit$expanded_estimates, 2, mean),
  "median" = apply(fit$expanded_estimates, 2, quantile, 0.5),
  "lower95" = apply(fit$expanded_estimates, 2, quantile, 0.025),
  "upper95" = apply(fit$expanded_estimates, 2, quantile, 0.975))

write.table(df, "estimated_bycatch.csv", row.names=F, col.names=T, sep=",")
```
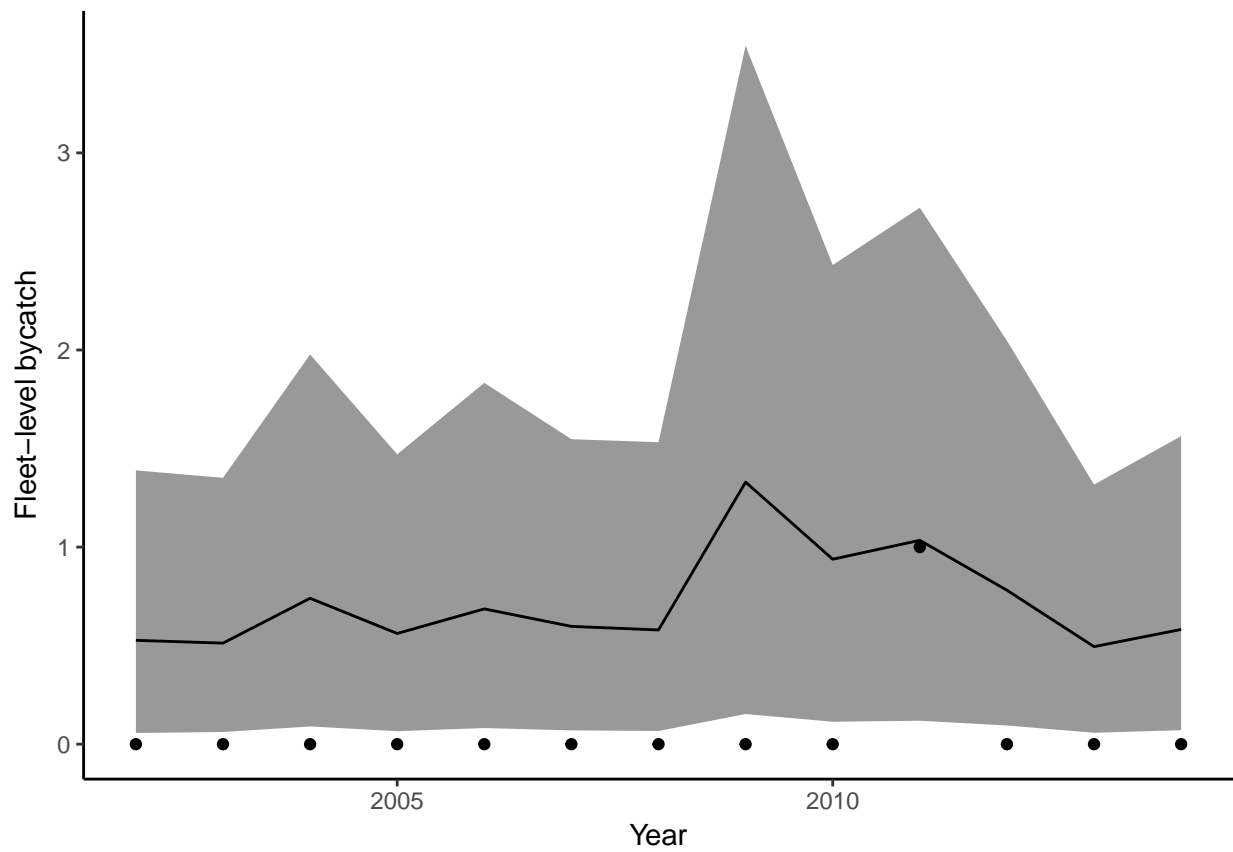
Figure 1: Estimated fleet-level expanded bycatch, incorporating data on takes, effort, and observer coverage. Dots represent observed bycatch events.