

Reproducible Research: Peer Assessment 2

Jim Callahan

September 21, 2015

Synopsis:

Get this to work and then see what to do next.

Data Processing

Load the NOAA storm data file.

```
filename <- "~/GitHub/RepData_PeerAssessment2/data/repdata%2Fdata%2FStormData.csv.bz2"
NOAA <- read.csv(filename,
                  stringsAsFactors = FALSE )
str(NOAA)
```

```
## 'data.frame':    902297 obs. of  37 variables:
## $ STATE__      : num  1 1 1 1 1 1 1 1 1 1 ...
## $ BGN_DATE     : chr   "4/18/1950 0:00:00" "4/18/1950 0:00:00" "2/20/1951 0:00:00" "6/8/1951 0:00:00" .
## $ BGN_TIME     : chr   "0130" "0145" "1600" "0900" ...
## $ TIME_ZONE    : chr   "CST" "CST" "CST" "CST" ...
## $ COUNTY       : num   97 3 57 89 43 77 9 123 125 57 ...
## $ COUNTYNAME   : chr   "MOBILE" "BALDWIN" "FAYETTE" "MADISON" ...
## $ STATE        : chr   "AL" "AL" "AL" "AL" ...
## $ EVTYPE       : chr   "TORNADO" "TORNADO" "TORNADO" "TORNADO" ...
## $ BGN_RANGE    : num   0 0 0 0 0 0 0 0 0 0 ...
## $ BGN_AZI      : chr   "" "" "" "" ...
## $ BGN_LOCATI   : chr   "" "" "" "" ...
## $ END_DATE     : chr   "" "" "" "" ...
## $ END_TIME     : chr   "" "" "" "" ...
## $ COUNTY_END   : num   0 0 0 0 0 0 0 0 0 0 ...
## $ COUNTYENDN   : logi  NA NA NA NA NA NA ...
## $ END_RANGE    : num   0 0 0 0 0 0 0 0 0 0 ...
## $ END_AZI      : chr   "" "" "" "" ...
## $ END_LOCATI   : chr   "" "" "" "" ...
## $ LENGTH       : num   14 2 0.1 0 0 1.5 1.5 0 3.3 2.3 ...
## $ WIDTH        : num  100 150 123 100 150 177 33 33 100 100 ...
## $ F            : int    3 2 2 2 2 2 2 1 3 3 ...
## $ MAG          : num    0 0 0 0 0 0 0 0 0 0 ...
## $ FATALITIES   : num    0 0 0 0 0 0 0 0 1 0 ...
## $ INJURIES     : num   15 0 2 2 2 6 1 0 14 0 ...
## $ PROPDMG      : num   25 2.5 25 2.5 2.5 2.5 2.5 2.5 25 25 ...
## $ PROPDMGEXP   : chr   "K" "K" "K" "K" ...
## $ CROPDMG      : num    0 0 0 0 0 0 0 0 0 0 ...
## $ CROPDMGEXP   : chr   "" "" "" "" ...
## $ WFO          : chr   "" "" "" "" ...
## $ STATEOFFIC   : chr   "" "" "" "" ...
## $ ZONENAMES    : chr   "" "" "" "" ...
## $ LATITUDE     : num  3040 3042 3340 3458 3412 ...
```

```

## $ LONGITUDE : num 8812 8755 8742 8626 8642 ...
## $ LATITUDE_E: num 3051 0 0 0 0 ...
## $ LONGITUDE_: num 8806 0 0 0 0 ...
## $ REMARKS : chr "" "" "" "" ...
## $ REFNUM : num 1 2 3 4 5 6 7 8 9 10 ...

#### Select Columns of interest:
#### Primary key: REFNUM
#### Date and Time: BGN_DATE, BGN_TIME,
#### Location: STATE, COUNTY, COUNTY_END, LATITUDE, LONGITUDE,
#### Type of Storm: EVTYPE,
#### Damage: PROPDMG, PROPDMGEXP, CROPDMG, CROPDMGEXP,
#### Casualties: FATALITIES, INJURIES

# storms <- subset(NOAA, select())
columnsubset <- c("REFNUM", "BGN_DATE", "BGN_TIME", "TIME_ZONE",
                  "STATE", "COUNTY", "COUNTY_END", "LATITUDE", "LONGITUDE",
                  "EVTYPE", "PROPDMG", "PROPDMGEXP", "CROPDMG", "CROPDMGEXP",
                  "FATALITIES", "INJURIES")

#### Select Rows of interest (exclude freakish events without impact):
#### Select only observations with at least one injury (or fatality)
#### or non-zero property damage (or crop damage).
# rowsubset <- "NOAA$INJURIES > 0 || NOAA$FATALITIES > 0 || NOAA$PROPDMG > 0 || NOAA$CROPDMG > 0"

storms <- NOAA[, columnsubset]
str(storms)

## 'data.frame': 902297 obs. of 16 variables:
## $ REFNUM : num 1 2 3 4 5 6 7 8 9 10 ...
## $ BGN_DATE : chr "4/18/1950 0:00:00" "4/18/1950 0:00:00" "2/20/1951 0:00:00" "6/8/1951 0:00:00" .
## $ BGN_TIME : chr "0130" "0145" "1600" "0900" ...
## $ TIME_ZONE : chr "CST" "CST" "CST" "CST" ...
## $ STATE : chr "AL" "AL" "AL" "AL" ...
## $ COUNTY : num 97 3 57 89 43 77 9 123 125 57 ...
## $ COUNTY_END: num 0 0 0 0 0 0 0 0 0 0 ...
## $ LATITUDE : num 3040 3042 3340 3458 3412 ...
## $ LONGITUDE : num 8812 8755 8742 8626 8642 ...
## $ EVTYPE : chr "TORNADO" "TORNADO" "TORNADO" "TORNADO" ...
## $ PROPDMG : num 25 2.5 25 2.5 2.5 2.5 2.5 2.5 25 25 ...
## $ PROPDMGEXP: chr "K" "K" "K" "K" ...
## $ CROPDMG : num 0 0 0 0 0 0 0 0 0 0 ...
## $ CROPDMGEXP: chr "" "" "" "" ...
## $ FATALITIES: num 0 0 0 0 0 0 0 0 1 0 ...
## $ INJURIES : num 15 0 2 2 2 6 1 0 14 0 ...

#### Select years of interest (Since 2001 "21st Century Storms" or last 25 years)

#### Step 1: Create a year variable from date
# datetime = as.POSIXct(storms$BGN_DATE, "%m/%d/%Y %H:%M:%S", tz = storms$TIME_ZONE)
datetime = as.POSIXct(storms$BGN_DATE, "%m/%d/%Y %H:%M:%S", tz = "EST")
storms$year <- format(datetime, "%Y")

```

```
#### Step 2: Filter by year
storms <- storms[as.numeric(storms$year) > 2001, ]

#### Remove the original NOAA database
rm(NOAA)

#### Scale Property Damage and Crop Damage by thousands and millions
storms$PropertyDamage <- storms$PROPDMG
storms$CropDamage <- storms$CROPDMG

with(storms,
{
  PropertyDamage <- ifelse(PROPDMGEXP == "K", PROPDMG * 1000, PROPDMG)
  PropertyDamage <- ifelse(PROPDMGEXP == "M", PROPDMG * 1000 * 1000, PROPDMG)

  CropDamage <- ifelse(CROPDMGEXP == "K", CROPDMG * 1000, CROPDMG)
  CropDamage <- ifelse(CROPDMGEXP == "M", CROPDMG * 1000 * 1000, CROPDMG)
}
)

#### Rename and put variables in logical order.
```

Results

```
# Tabulate Fatalities and Damage by Storm Type
# R commands include table(), xtabs() and ftable() -- or "aggregate()"
#### Severe Storm Events -- type and frequency
#### Jared Lander's "R for Everyone" page 123
stormtab <- aggregate(cbind(FATALITIES, INJURIES, PropertyDamage, CropDamage)
~ EVTYPE + year, storms, sum)
stormtab
```

Tabulate Fatalities and Damage by Storm Type

##		EVTYPE	year	FATALITIES	INJURIES	PropertyDamage
## 1		ABNORMALLY WET	2002	0	0	0.00
## 2		ASTRONOMICAL HIGH TIDE	2002	0	0	0.00
## 3		AVALANCHE	2002	18	11	31.50
## 4		BLACK ICE	2002	0	0	0.00
## 5		BLIZZARD	2002	4	7	185.00
## 6		COASTAL FLOOD	2002	0	0	0.00
## 7		COASTAL FLOODING	2002	0	0	100.00
## 8		COLD	2002	0	0	0.00
## 9		COLD WEATHER	2002	2	0	0.00
## 10		DENSE FOG	2002	0	0	0.00
## 11		DROUGHT	2002	0	0	0.00
## 12		DROWNING	2002	1	0	0.00
## 13		DRY	2002	0	0	0.00
## 14		DRY MICROBURST	2002	1	6	83.00
## 15		DUST DEVIL	2002	0	1	13.30

## 16	DUST STORM 2002	2	45	427.00
## 17	EARLY SNOWFALL 2002	0	0	0.00
## 18	EXCESSIVE HEAT 2002	167	378	0.00
## 19	EXTREME COLD 2002	8	0	303.00
## 20	EXTREME COLD/WIND CHILL 2002	1	0	0.00
## 21	EXTREME WINDCHILL 2002	0	0	0.00
## 22	FIRST SNOW 2002	0	0	0.00
## 23	FLASH FLOOD 2002	32	71	51974.98
## 24	FLOOD 2002	10	5	18276.54
## 25	FOG 2002	22	146	2576.40
## 26	FREEZE 2002	0	0	0.00
## 27	FREEZING DRIZZLE 2002	0	0	0.00
## 28	FREEZING RAIN 2002	0	0	0.00
## 29	FROST 2002	0	0	0.00
## 30	FROST/FREEZE 2002	0	0	0.00
## 31	FUNNEL CLOUD 2002	0	0	0.00
## 32	GUSTY THUNDERSTORM WIND 2002	0	0	0.00
## 33	GUSTY WIND 2002	0	0	0.00
## 34	GUSTY WINDS 2002	0	0	5.00
## 35	HAIL 2002	0	125	34659.74
## 36	HARD FREEZE 2002	0	0	0.00
## 37	HAZARDOUS SURF 2002	0	1	0.00
## 38	HEAVY RAIN 2002	1	1	829.00
## 39	HEAVY SNOW 2002	2	39	6806.60
## 40	HEAVY SURF 2002	1	3	42.00
## 41	HIGH SEAS 2002	2	1	0.00
## 42	HIGH SURF 2002	4	3	0.00
## 43	HIGH SURF ADVISORIES 2002	0	0	0.00
## 44	HIGH SURF ADVISORY 2002	0	0	0.00
## 45	HIGH WIND 2002	19	105	20408.08
## 46	HURRICANE 2002	1	3	1243.59
## 47	HURRICANE/TYPHOON 2002	1	316	175.00
## 48	ICE ON ROAD 2002	1	0	0.00
## 49	ICE STORM 2002	4	45	4347.21
## 50	ICE/SNOW 2002	0	0	0.00
## 51	ICY ROADS 2002	0	0	0.00
## 52	LIGHT SNOW 2002	0	0	210.00
## 53	LIGHTNING 2002	51	256	30350.80
## 54	MARINE HAIL 2002	0	0	0.00
## 55	MARINE TSTM WIND 2002	0	0	158.00
## 56	MIXED PRECIPITATION 2002	0	0	120.00
## 57	MODERATE SNOWFALL 2002	0	0	0.00
## 58	MONTHLY PRECIPITATION 2002	0	0	0.00
## 59	MUDSLIDE 2002	0	0	0.00
## 60	RECORD WARMTH 2002	0	0	0.00
## 61	RIP CURRENT 2002	0	3	0.00
## 62	RIP CURRENTS 2002	43	57	100.00
## 63	ROUGH SEAS 2002	4	0	0.00
## 64	SEICHE 2002	0	0	35.00
## 65	SMALL HAIL 2002	0	0	0.00
## 66	SMOKE 2002	0	0	0.00
## 67	SNOW 2002	0	0	110.00
## 68	SNOW DROUGHT 2002	0	0	0.00
## 69	SNOW SHOWERS 2002	0	0	0.00

## 70	SNOW SQUALLS	2002	0	0	15.00
## 71	STORM SURGE	2002	0	0	1417.15
## 72	STRONG WIND	2002	1	1	161.50
## 73	STRONG WINDS	2002	1	2	10.50
## 74	THUNDERSTORM	2002	0	0	0.00
## 75	TORNADO	2002	55	968	52653.55
## 76	TORNADO DEBRIS	2002	0	0	0.00
## 77	TROPICAL STORM	2002	1	4	1559.93
## 78	TSTM WIND	2002	16	262	110877.25
## 79	TSTM WIND/HAIL	2002	1	19	677.95
## 80	UNSEASONABLY COLD	2002	0	0	0.00
## 81	UNSEASONABLY COOL	2002	0	0	0.00
## 82	UNSEASONABLY DRY	2002	0	0	0.00
## 83	UNSEASONABLY WARM	2002	0	0	0.00
## 84	UNUSUALLY COLD	2002	0	0	0.00
## 85	URBAN/SML STREAM FLD	2002	4	9	2617.20
## 86	VERY WARM	2002	0	0	0.00
## 87	VOLCANIC ASH	2002	0	0	0.00
## 88	WATERSPOUT	2002	0	1	0.00
## 89	WHIRLWIND	2002	0	0	7.00
## 90	WILD/FOREST FIRE	2002	1	138	7168.83
## 91	WILDFIRE	2002	0	0	22.00
## 92	WIND	2002	7	21	305.00
## 93	WIND ADVISORY	2002	0	0	0.00
## 94	WIND CHILL	2002	0	0	0.00
## 95	WINTER STORM	2002	9	99	4617.74
## 96	WINTER WEATHER	2002	0	0	0.00
## 97	WINTER WEATHER MIX	2002	0	3	60.00
## 98	WINTER WEATHER/MIX	2002	0	0	0.00
## 99	WINTRY MIX	2002	0	0	0.00
## 100	ABNORMALLY DRY	2003	0	0	0.00
## 101	ASTRONOMICAL HIGH TIDE	2003	0	0	96.00
## 102	AVALANCHE	2003	10	7	15.00
## 103	BLIZZARD	2003	0	4	197.00
## 104	COASTAL FLOODING	2003	0	0	0.00
## 105	COLD WIND CHILL TEMPERATURES	2003	0	0	0.00
## 106	DENSE FOG	2003	5	43	1675.00
## 107	DROUGHT	2003	0	0	645.15
## 108	DUST DEVIL	2003	1	3	130.00
## 109	DUST STORM	2003	2	91	284.00
## 110	EXCESSIVE HEAT	2003	36	174	0.00
## 111	EXTREME COLD	2003	5	0	0.00
## 112	EXTREME COLD/WIND CHILL	2003	14	14	860.00
## 113	EXTREME WINDCHILL	2003	1	0	0.00
## 114	FLASH FLOOD	2003	69	61	96386.18
## 115	FLOOD	2003	18	5	23534.44
## 116	FOG	2003	0	0	0.00
## 117	FREEZING RAIN	2003	0	0	0.00
## 118	FROST/FREEZE	2003	0	0	0.00
## 119	FUNNEL CLOUD	2003	0	0	0.00
## 120	HAIL	2003	0	121	43465.42
## 121	HEAVY RAIN	2003	5	34	7375.00
## 122	HEAVY SNOW	2003	2	13	6266.33
## 123	HEAVY SURF/HIGH SURF	2003	13	8	687.50

## 124	HIGH WIND 2003	15	127	17390.88
## 125	HURRICANE/TYPHOON 2003	6	2	987.77
## 126	ICE STORM 2003	6	31	1324.56
## 127	LANDSLIDE 2003	15	16	596.00
## 128	LIGHTNING 2003	44	238	22232.25
## 129	MARINE HAIL 2003	0	0	0.00
## 130	MARINE TSTM WIND 2003	2	2	218.00
## 131	PROLONG COLD 2003	0	0	0.00
## 132	RIP CURRENT 2003	40	22	0.00
## 133	RIP CURRENTS 2003	1	25	0.00
## 134	SLEET STORM 2003	0	0	0.00
## 135	SNOW 2003	0	0	0.00
## 136	STORM SURGE 2003	0	1	757.10
## 137	STRONG WIND 2003	9	29	6845.91
## 138	TORNADO 2003	54	1087	59887.74
## 139	TROPICAL DEPRESSION 2003	0	0	50.00
## 140	TROPICAL STORM 2003	8	230	3152.77
## 141	TSTM WIND 2003	17	224	126016.42
## 142	TSTM WIND/HAIL 2003	0	0	0.00
## 143	UNSEASONABLY COLD 2003	0	0	0.00
## 144	URBAN/SML STREAM FLD 2003	1	4	510.00
## 145	VOLCANIC ASH 2003	0	0	0.00
## 146	WATERSPOUT 2003	0	0	0.00
## 147	WILD/FOREST FIRE 2003	0	2	75.00
## 148	WILDFIRE 2003	24	249	10750.44
## 149	WINTER STORM 2003	16	52	4812.00
## 150	WINTER WEATHER/MIX 2003	4	12	531.00
## 151	ASTRONOMICAL HIGH TIDE 2004	0	0	2.50
## 152	AVALANCHE 2004	12	6	90.00
## 153	BLIZZARD 2004	1	4	242.00
## 154	DENSE FOG 2004	1	45	141.45
## 155	DROUGHT 2004	0	0	0.00
## 156	DUST DEVIL 2004	0	5	8.80
## 157	DUST STORM 2004	0	11	80.00
## 158	EXCESSIVE HEAT 2004	6	74	0.00
## 159	EXTREME COLD/WIND CHILL 2004	27	2	650.00
## 160	FLASH FLOOD 2004	58	29	90429.25
## 161	FLOOD 2004	24	99	36134.61
## 162	FROST/FREEZE 2004	0	0	0.00
## 163	FUNNEL CLOUD 2004	0	0	0.00
## 164	HAIL 2004	0	4	29653.18
## 165	HEAVY RAIN 2004	4	9	2620.00
## 166	HEAVY SNOW 2004	3	139	7530.50
## 167	HEAVY SURF/HIGH SURF 2004	24	29	305.00
## 168	HIGH WIND 2004	13	49	20053.75
## 169	HURRICANE/TYPHOON 2004	23	839	2277.53
## 170	ICE STORM 2004	0	10	2515.75
## 171	LANDSLIDE 2004	4	11	1310.01
## 172	LIGHTNING 2004	33	279	21760.25
## 173	MARINE HAIL 2004	0	0	0.00
## 174	MARINE TSTM WIND 2004	6	0	243.00
## 175	RIP CURRENT 2004	32	23	0.00
## 176	SEICHE 2004	0	0	0.00
## 177	SLEET STORM 2004	0	0	0.00

## 178	STORM SURGE 2004	0	0	352.92
## 179	STRONG WIND 2004	13	19	6724.54
## 180	TORNADO 2004	35	396	73341.16
## 181	TROPICAL DEPRESSION 2004	0	0	335.00
## 182	TROPICAL STORM 2004	11	1	1918.18
## 183	TSTM WIND 2004	16	243	106313.80
## 184	VOLCANIC ASH 2004	0	0	0.00
## 185	WATERSPOUT 2004	0	0	2.00
## 186	WILDFIRE 2004	0	63	2746.90
## 187	WINTER STORM 2004	9	16	4549.01
## 188	WINTER WEATHER/MIX 2004	15	21	506.50
## 189	ASTRONOMICAL HIGH TIDE 2005	0	0	835.00
## 190	AVALANCHE 2005	11	16	200.00
## 191	BLIZZARD 2005	1	2	1114.74
## 192	COASTAL FLOOD 2005	0	1	450.00
## 193	COLD/WIND CHILL 2005	0	0	0.00
## 194	DENSE FOG 2005	0	12	642.00
## 195	DROUGHT 2005	0	0	491.00
## 196	DUST DEVIL 2005	0	0	30.80
## 197	DUST STORM 2005	0	32	70.00
## 198	EXCESSIVE HEAT 2005	158	298	3.00
## 199	EXTREME COLD/WIND CHILL 2005	24	1	100.00
## 200	FLASH FLOOD 2005	28	22	69711.90
## 201	FLOOD 2005	15	16	45423.35
## 202	FREEZING FOG 2005	0	0	0.00
## 203	FROST/FREEZE 2005	0	0	0.00
## 204	FUNNEL CLOUD 2005	0	0	15.00
## 205	HAIL 2005	1	8	34126.02
## 206	HEAVY RAIN 2005	8	39	5456.50
## 207	HEAVY SNOW 2005	7	11	6190.90
## 208	HEAVY SURF/HIGH SURF 2005	5	11	386.00
## 209	HIGH SURF 2005	0	0	15.00
## 210	HIGH WIND 2005	2	14	17378.40
## 211	HURRICANE/TYPHOON 2005	34	118	2399.07
## 212	ICE STORM 2005	2	4	6289.40
## 213	LAKE-EFFECT SNOW 2005	0	0	80.00
## 214	LANDSLIDE 2005	11	11	2204.40
## 215	LIGHTNING 2005	38	309	38577.97
## 216	MARINE HAIL 2005	0	0	0.00
## 217	MARINE HIGH WIND 2005	0	0	21.00
## 218	MARINE TSTM WIND 2005	1	0	305.00
## 219	RIP CURRENT 2005	35	9	0.00
## 220	SEICHE 2005	0	0	25.00
## 221	SLEET STORM 2005	0	0	0.00
## 222	STORM SURGE 2005	0	1	3942.72
## 223	STORM SURGE/TIDE 2005	0	0	0.00
## 224	STRONG WIND 2005	5	29	5566.35
## 225	TORNADO 2005	38	537	59885.81
## 226	TROPICAL DEPRESSION 2005	0	0	50.00
## 227	TROPICAL STORM 2005	0	11	7849.49
## 228	TSTM WIND 2005	15	185	99653.47
## 229	VOLCANIC ASH 2005	0	0	0.00
## 230	WATERSPOUT 2005	0	0	0.00
## 231	WILDFIRE 2005	6	82	6438.75

## 232	WINTER STORM 2005	15	19	9104.07
## 233	WINTER WEATHER 2005	0	0	85.00
## 234	WINTER WEATHER/MIX 2005	9	36	3192.00
## 235	AVALANCHE 2006	13	6	0.00
## 236	BLIZZARD 2006	1	0	689.00
## 237	COASTAL FLOOD 2006	0	0	2593.28
## 238	COLD/WIND CHILL 2006	2	0	0.00
## 239	DENSE FOG 2006	3	40	650.00
## 240	DENSE SMOKE 2006	0	0	0.00
## 241	DROUGHT 2006	0	4	926.50
## 242	DUST DEVIL 2006	0	1	37.00
## 243	DUST STORM 2006	2	22	690.00
## 244	EXCESSIVE HEAT 2006	205	993	170.00
## 245	EXTREME COLD/WIND CHILL 2006	8	5	0.00
## 246	FLASH FLOOD 2006	59	18	60523.28
## 247	FLOOD 2006	19	5	29059.09
## 248	FREEZING FOG 2006	0	0	0.00
## 249	FROST/FREEZE 2006	0	0	0.00
## 250	FUNNEL CLOUD 2006	0	0	0.00
## 251	HAIL 2006	0	18	50441.38
## 252	HEAT 2006	47	520	10.00
## 253	HEAVY RAIN 2006	1	4	7028.41
## 254	HEAVY SNOW 2006	0	2	2642.25
## 255	HEAVY SURF/HIGH SURF 2006	0	0	0.00
## 256	HIGH SURF 2006	13	9	360.00
## 257	HIGH WIND 2006	19	57	24023.32
## 258	ICE STORM 2006	6	0	1732.29
## 259	LAKE-EFFECT SNOW 2006	0	0	1350.00
## 260	LAKESHORE FLOOD 2006	0	0	10.00
## 261	LANDSLIDE 2006	3	2	448.00
## 262	LIGHTNING 2006	45	245	35986.08
## 263	MARINE HAIL 2006	0	0	0.00
## 264	MARINE HIGH WIND 2006	0	0	136.00
## 265	MARINE STRONG WIND 2006	2	0	16.00
## 266	MARINE THUNDERSTORM WIND 2006	1	0	1.00
## 267	MARINE TSTM WIND 2006	0	6	1500.00
## 268	RIP CURRENT 2006	26	24	0.00
## 269	SEICHE 2006	0	0	10.00
## 270	SLEET 2006	0	0	0.00
## 271	STORM SURGE 2006	0	0	160.00
## 272	STORM SURGE/TIDE 2006	0	0	545.00
## 273	STRONG WIND 2006	17	25	9956.25
## 274	THUNDERSTORM WIND 2006	0	9	6198.75
## 275	TORNADO 2006	67	992	66879.08
## 276	TROPICAL STORM 2006	0	1	496.36
## 277	TSTM WIND 2006	13	232	124294.64
## 278	TSUNAMI 2006	0	0	12.20
## 279	VOLCANIC ASH 2006	0	0	0.00
## 280	WATERSPOUT 2006	0	0	25.00
## 281	WILDFIRE 2006	15	92	10435.84
## 282	WINTER STORM 2006	9	14	7320.15
## 283	WINTER WEATHER 2006	3	19	1583.50
## 284	WINTER WEATHER/MIX 2006	0	3	644.00
## 285	ASTRONOMICAL LOW TIDE 2007	0	0	120.00

## 286	AVALANCHE 2007	18	12	2.00
## 287	BLIZZARD 2007	0	0	279.00
## 288	COASTAL FLOOD 2007	0	0	1246.36
## 289	COLD/WIND CHILL 2007	4	10	91.00
## 290	DENSE FOG 2007	0	3	440.00
## 291	DENSE SMOKE 2007	0	0	100.00
## 292	DROUGHT 2007	0	0	825.00
## 293	DUST DEVIL 2007	0	0	0.00
## 294	DUST STORM 2007	0	4	280.50
## 295	EXCESSIVE HEAT 2007	22	536	0.00
## 296	EXTREME COLD/WIND CHILL 2007	23	1	3.00
## 297	FLASH FLOOD 2007	70	51	97196.40
## 298	FLOOD 2007	17	8	55708.57
## 299	FREEZING FOG 2007	0	0	0.00
## 300	FROST/FREEZE 2007	0	0	640.00
## 301	FUNNEL CLOUD 2007	0	0	0.00
## 302	HAIL 2007	0	25	20581.75
## 303	HEAT 2007	22	30	0.00
## 304	HEAVY RAIN 2007	2	8	1647.03
## 305	HEAVY SNOW 2007	0	0	1168.00
## 306	HIGH SURF 2007	10	0	362.00
## 307	HIGH WIND 2007	3	28	15278.10
## 308	HURRICANE 2007	1	12	237.50
## 309	ICE STORM 2007	2	8	9435.20
## 310	LAKE-EFFECT SNOW 2007	0	0	1874.00
## 311	LAKESHORE FLOOD 2007	0	0	30.00
## 312	LANDSLIDE 2007	3	3	1502.00
## 313	LIGHTNING 2007	45	139	42386.45
## 314	MARINE HAIL 2007	0	0	0.00
## 315	MARINE HIGH WIND 2007	0	0	0.00
## 316	MARINE STRONG WIND 2007	3	15	3.00
## 317	MARINE THUNDERSTORM WIND 2007	2	2	102.00
## 318	RIP CURRENT 2007	46	14	0.00
## 319	SLEET 2007	0	0	0.00
## 320	STORM SURGE/TIDE 2007	0	5	4.00
## 321	STRONG WIND 2007	7	21	3538.82
## 322	THUNDERSTORM WIND 2007	16	254	109823.80
## 323	TORNADO 2007	81	659	60048.70
## 324	TROPICAL DEPRESSION 2007	0	0	0.00
## 325	TROPICAL STORM 2007	0	0	345.00
## 326	VOLCANIC ASHFALL 2007	0	0	0.00
## 327	WATERSPOUT 2007	0	0	70.00
## 328	WILDFIRE 2007	17	185	5194.00
## 329	WINTER STORM 2007	3	2	6129.90
## 330	WINTER WEATHER 2007	4	156	1477.20
## 331	ASTRONOMICAL LOW TIDE 2008	0	0	200.00
## 332	AVALANCHE 2008	25	14	27.10
## 333	BLIZZARD 2008	2	0	521.00
## 334	COASTAL FLOOD 2008	2	0	978.00
## 335	COLD/WIND CHILL 2008	31	0	0.00
## 336	DENSE FOG 2008	0	0	430.00
## 337	DENSE SMOKE 2008	0	0	0.00
## 338	DROUGHT 2008	0	0	100.00
## 339	DUST DEVIL 2008	1	14	60.53

## 340	DUST STORM 2008	0	0	0.00
## 341	EXCESSIVE HEAT 2008	15	131	0.00
## 342	EXTREME COLD/WIND CHILL 2008	8	0	0.00
## 343	FLASH FLOOD 2008	55	30	114156.07
## 344	FLOOD 2008	22	16	105659.42
## 345	FREEZING FOG 2008	0	0	0.00
## 346	FROST/FREEZE 2008	0	0	40.00
## 347	FUNNEL CLOUD 2008	0	0	25.00
## 348	HAIL 2008	2	12	44065.45
## 349	HEAT 2008	27	8	0.00
## 350	HEAVY RAIN 2008	2	16	4206.20
## 351	HEAVY SNOW 2008	4	18	5538.00
## 352	HIGH SURF 2008	6	58	333.50
## 353	HIGH WIND 2008	11	56	33139.81
## 354	HURRICANE 2008	1	0	2169.63
## 355	ICE STORM 2008	0	0	1624.93
## 356	LAKE-EFFECT SNOW 2008	0	0	2911.00
## 357	LANDSLIDE 2008	0	0	83.34
## 358	LIGHTNING 2008	25	207	33748.81
## 359	MARINE HAIL 2008	0	0	4.00
## 360	MARINE HIGH WIND 2008	1	1	110.00
## 361	MARINE STRONG WIND 2008	4	0	26.10
## 362	MARINE THUNDERSTORM WIND 2008	2	6	162.00
## 363	RIP CURRENT 2008	44	21	0.00
## 364	SEICHE 2008	0	0	75.00
## 365	SLEET 2008	0	0	0.00
## 366	STORM SURGE/TIDE 2008	11	0	4580.05
## 367	STRONG WIND 2008	17	26	7714.54
## 368	THUNDERSTORM WIND 2008	25	253	186007.68
## 369	TORNADO 2008	129	1690	106413.26
## 370	TROPICAL DEPRESSION 2008	0	0	301.00
## 371	TROPICAL STORM 2008	2	13	12476.94
## 372	VOLCANIC ASHFALL 2008	0	0	0.00
## 373	WATERSPOUT 2008	0	0	10.20
## 374	WILDFIRE 2008	3	32	4433.80
## 375	WINTER STORM 2008	0	4	15387.10
## 376	WINTER WEATHER 2008	11	77	2526.65
## 377	ASTRONOMICAL LOW TIDE 2009	0	0	0.00
## 378	AVALANCHE 2009	7	3	2.00
## 379	BLIZZARD 2009	3	1	5779.30
## 380	COASTAL FLOOD 2009	0	0	1421.30
## 381	COLD/WIND CHILL 2009	11	0	0.00
## 382	DENSE FOG 2009	0	0	755.00
## 383	DENSE SMOKE 2009	0	0	0.00
## 384	DROUGHT 2009	0	0	50.00
## 385	DUST DEVIL 2009	0	3	226.50
## 386	DUST STORM 2009	3	0	660.00
## 387	EXCESSIVE HEAT 2009	7	12	0.00
## 388	EXTREME COLD/WIND CHILL 2009	17	0	0.00
## 389	FLASH FLOOD 2009	33	17	95187.62
## 390	FLOOD 2009	23	10	66484.50
## 391	FREEZING FOG 2009	0	0	2.00
## 392	FROST/FREEZE 2009	0	0	85.00
## 393	FUNNEL CLOUD 2009	0	0	0.00

## 394	HAIL 2009	0	70	43828.12
## 395	HEAT 2009	26	14	11.50
## 396	HEAVY RAIN 2009	6	9	1655.00
## 397	HEAVY SNOW 2009	2	0	3767.20
## 398	HIGH SURF 2009	15	29	271.20
## 399	HIGH WIND 2009	4	22	31142.15
## 400	HURRICANE 2009	0	1	20.00
## 401	ICE STORM 2009	3	3	3156.20
## 402	LAKE-EFFECT SNOW 2009	0	0	1657.00
## 403	LANDSLIDE 2009	0	9	6422.50
## 404	LIGHTNING 2009	34	201	34067.15
## 405	MARINE HAIL 2009	0	0	0.00
## 406	MARINE HIGH WIND 2009	0	0	0.00
## 407	MARINE STRONG WIND 2009	1	2	20.00
## 408	MARINE THUNDERSTORM WIND 2009	2	2	51.50
## 409	RIP CURRENT 2009	39	20	1.00
## 410	SEICHE 2009	0	0	15.00
## 411	SLEET 2009	0	0	0.00
## 412	STORM SURGE/TIDE 2009	0	0	118.00
## 413	STRONG WIND 2009	10	24	5970.00
## 414	THUNDERSTORM WIND 2009	20	188	162214.24
## 415	TORNADO 2009	21	397	71409.00
## 416	TROPICAL DEPRESSION 2009	0	0	2.00
## 417	TROPICAL STORM 2009	1	0	221.00
## 418	TSUNAMI 2009	32	129	81.00
## 419	WATERSPOUT 2009	0	0	10.00
## 420	WILDFIRE 2009	2	68	5861.60
## 421	WINTER STORM 2009	1	34	8874.00
## 422	WINTER WEATHER 2009	10	86	1933.00
## 423	ASTRONOMICAL LOW TIDE 2010	0	0	0.00
## 424	AVALANCHE 2010	22	20	201.80
## 425	BLIZZARD 2010	0	0	1138.00
## 426	COASTAL FLOOD 2010	0	0	460.20
## 427	COLD/WIND CHILL 2010	26	1	1829.00
## 428	DENSE FOG 2010	0	0	975.00
## 429	DENSE SMOKE 2010	0	0	0.00
## 430	DROUGHT 2010	0	0	0.00
## 431	DUST DEVIL 2010	0	0	61.10
## 432	DUST STORM 2010	0	0	140.00
## 433	EXCESSIVE HEAT 2010	39	63	90.00
## 434	EXTREME COLD/WIND CHILL 2010	1	0	0.00
## 435	FLASH FLOOD 2010	67	188	118701.96
## 436	FLOOD 2010	41	127	97018.55
## 437	FREEZING FOG 2010	0	0	182.00
## 438	FROST/FREEZE 2010	0	0	158.02
## 439	FUNNEL CLOUD 2010	0	0	0.00
## 440	HAIL 2010	0	42	27889.55
## 441	HEAT 2010	44	39	0.00
## 442	HEAVY RAIN 2010	0	7	3609.00
## 443	HEAVY SNOW 2010	2	18	4037.80
## 444	HIGH SURF 2010	17	20	240.42
## 445	HIGH WIND 2010	7	17	16970.62
## 446	HURRICANE 2010	0	0	0.00
## 447	ICE STORM 2010	0	1	842.30

## 448	LAKE-EFFECT SNOW 2010	0	0	5416.00
## 449	LAKESHORE FLOOD 2010	0	0	0.00
## 450	LANDSLIDE 2010	0	0	416.00
## 451	LIGHTNING 2010	29	182	43326.55
## 452	MARINE HAIL 2010	0	0	0.00
## 453	MARINE HIGH WIND 2010	0	0	20.01
## 454	MARINE STRONG WIND 2010	2	0	1.63
## 455	MARINE THUNDERSTORM WIND 2010	0	2	11.10
## 456	RIP CURRENT 2010	49	45	0.00
## 457	SEICHE 2010	0	0	0.00
## 458	SLEET 2010	0	0	0.00
## 459	STORM SURGE/TIDE 2010	0	0	795.00
## 460	STRONG WIND 2010	8	28	9960.57
## 461	THUNDERSTORM WIND 2010	15	323	154912.55
## 462	TORNADO 2010	45	699	88280.14
## 463	TROPICAL STORM 2010	0	0	721.40
## 464	TSUNAMI 2010	0	0	305.00
## 465	WATERSPOUT 2010	0	0	1.00
## 466	WILDFIRE 2010	2	24	4029.77
## 467	WINTER STORM 2010	6	4	9400.60
## 468	WINTER WEATHER 2010	3	5	2705.30
## 469	ASTRONOMICAL LOW TIDE 2011	0	0	0.00
## 470	AVALANCHE 2011	9	8	55.00
## 471	BLIZZARD 2011	2	0	2742.00
## 472	COASTAL FLOOD 2011	1	1	2299.00
## 473	COLD/WIND CHILL 2011	21	1	70.00
## 474	DENSE FOG 2011	0	0	162.00
## 475	DENSE SMOKE 2011	0	0	0.00
## 476	DROUGHT 2011	0	0	114.00
## 477	DUST DEVIL 2011	0	8	33.00
## 478	DUST STORM 2011	0	4	848.00
## 479	EXCESSIVE HEAT 2011	36	138	1143.20
## 480	EXTREME COLD/WIND CHILL 2011	2	1	1041.00
## 481	FLASH FLOOD 2011	68	30	82067.98
## 482	FLOOD 2011	58	10	133748.97
## 483	FREEZING FOG 2011	0	0	0.00
## 484	FROST/FREEZE 2011	0	0	45.50
## 485	FUNNEL CLOUD 2011	0	0	40.10
## 486	HAIL 2011	0	31	57214.06
## 487	HEAT 2011	63	611	0.00
## 488	HEAVY RAIN 2011	1	1	2000.80
## 489	HEAVY SNOW 2011	0	0	5136.30
## 490	HIGH SURF 2011	11	11	222.00
## 491	HIGH WIND 2011	4	11	14728.25
## 492	HURRICANE 2011	0	0	510.00
## 493	ICE STORM 2011	0	0	6339.00
## 494	LAKE-EFFECT SNOW 2011	0	0	853.00
## 495	LAKESHORE FLOOD 2011	0	0	7.50
## 496	LANDSLIDE 2011	1	0	5461.69
## 497	LIGHTNING 2011	26	194	34491.42
## 498	MARINE HAIL 2011	0	0	0.00
## 499	MARINE HIGH WIND 2011	0	0	11.00
## 500	MARINE STRONG WIND 2011	2	5	351.60
## 501	MARINE THUNDERSTORM WIND 2011	3	14	108.80

## 502	RIP CURRENT 2011	29	27	0.00
## 503	SEICHE 2011	0	0	0.00
## 504	SLEET 2011	0	0	0.00
## 505	STORM SURGE/TIDE 2011	0	0	735.00
## 506	STRONG WIND 2011	10	33	5356.33
## 507	THUNDERSTORM WIND 2011	54	373	243100.34
## 508	TORNADO 2011	587	6163	155464.51
## 509	TROPICAL STORM 2011	4	1	11769.30
## 510	TSUNAMI 2011	1	0	507.10
## 511	WATERSPOUT 2011	0	0	5110.00
## 512	WILDFIRE 2011	6	116	33094.24
## 513	WINTER STORM 2011	1	0	11663.50
## 514	WINTER WEATHER 2011	2	0	1645.25
##	CropDamage			
## 1	0.00			
## 2	0.00			
## 3	0.00			
## 4	0.00			
## 5	0.00			
## 6	0.00			
## 7	0.00			
## 8	0.00			
## 9	0.00			
## 10	0.00			
## 11	941.43			
## 12	0.00			
## 13	0.00			
## 14	1.00			
## 15	0.00			
## 16	0.00			
## 17	0.00			
## 18	0.00			
## 19	130.30			
## 20	0.00			
## 21	0.00			
## 22	0.00			
## 23	3226.50			
## 24	1850.50			
## 25	0.00			
## 26	0.00			
## 27	0.00			
## 28	0.00			
## 29	0.00			
## 30	0.00			
## 31	0.00			
## 32	0.00			
## 33	0.00			
## 34	0.00			
## 35	30396.92			
## 36	0.00			
## 37	0.00			
## 38	1050.00			
## 39	0.00			
## 40	0.00			

## 41	0.00
## 42	0.00
## 43	0.00
## 44	0.00
## 45	283.00
## 46	268.00
## 47	0.00
## 48	0.00
## 49	0.00
## 50	0.00
## 51	0.00
## 52	0.00
## 53	19.00
## 54	0.00
## 55	0.00
## 56	0.00
## 57	0.00
## 58	0.00
## 59	0.00
## 60	0.00
## 61	0.00
## 62	0.00
## 63	0.00
## 64	0.00
## 65	201.20
## 66	0.00
## 67	0.00
## 68	0.00
## 69	0.00
## 70	0.00
## 71	0.00
## 72	0.00
## 73	0.00
## 74	0.00
## 75	799.01
## 76	0.00
## 77	5.90
## 78	9687.00
## 79	50.25
## 80	0.00
## 81	0.00
## 82	0.00
## 83	0.00
## 84	0.00
## 85	12.00
## 86	0.00
## 87	0.00
## 88	0.00
## 89	0.00
## 90	8.63
## 91	0.00
## 92	300.00
## 93	0.00
## 94	0.00

## 95	0.00
## 96	0.00
## 97	0.00
## 98	0.00
## 99	0.00
## 100	0.00
## 101	0.00
## 102	0.00
## 103	0.00
## 104	0.00
## 105	0.00
## 106	0.00
## 107	572.48
## 108	0.00
## 109	0.00
## 110	2.00
## 111	0.00
## 112	50.00
## 113	17.00
## 114	6296.50
## 115	1928.00
## 116	0.00
## 117	0.00
## 118	131.00
## 119	0.00
## 120	33693.45
## 121	272.61
## 122	0.00
## 123	0.00
## 124	1084.96
## 125	528.87
## 126	8.55
## 127	0.00
## 128	43.00
## 129	0.00
## 130	0.00
## 131	0.00
## 132	0.00
## 133	0.00
## 134	0.00
## 135	0.00
## 136	0.00
## 137	0.00
## 138	2221.20
## 139	0.00
## 140	1490.47
## 141	3485.90
## 142	0.00
## 143	0.00
## 144	0.00
## 145	0.00
## 146	0.00
## 147	0.00
## 148	496.20

## 149	0.00
## 150	0.00
## 151	0.00
## 152	0.00
## 153	0.00
## 154	0.00
## 155	1190.00
## 156	0.00
## 157	0.00
## 158	0.00
## 159	0.00
## 160	9225.00
## 161	8988.40
## 162	0.00
## 163	0.00
## 164	35910.20
## 165	450.00
## 166	200.00
## 167	0.00
## 168	1677.70
## 169	1865.32
## 170	0.00
## 171	0.00
## 172	41.80
## 173	0.00
## 174	0.00
## 175	0.00
## 176	0.00
## 177	0.00
## 178	0.00
## 179	98.40
## 180	7136.50
## 181	0.00
## 182	101.50
## 183	5254.15
## 184	0.00
## 185	0.00
## 186	300.00
## 187	0.00
## 188	0.00
## 189	0.00
## 190	0.00
## 191	0.00
## 192	0.00
## 193	0.00
## 194	0.00
## 195	1810.58
## 196	0.00
## 197	0.00
## 198	0.00
## 199	0.00
## 200	5891.97
## 201	1792.17
## 202	0.00

##	203	164.20
##	204	0.00
##	205	18860.30
##	206	1298.54
##	207	110.00
##	208	0.00
##	209	0.00
##	210	351.00
##	211	2404.29
##	212	35.00
##	213	0.00
##	214	0.00
##	215	415.00
##	216	0.00
##	217	0.00
##	218	0.00
##	219	0.00
##	220	0.00
##	221	0.00
##	222	0.00
##	223	0.00
##	224	605.00
##	225	9977.10
##	226	0.00
##	227	66.50
##	228	4438.50
##	229	0.00
##	230	0.00
##	231	222.90
##	232	0.00
##	233	0.00
##	234	0.00
##	235	0.00
##	236	0.00
##	237	0.00
##	238	0.00
##	239	0.00
##	240	0.00
##	241	8794.40
##	242	0.00
##	243	751.50
##	244	492.40
##	245	0.00
##	246	12525.50
##	247	959.30
##	248	0.00
##	249	11.94
##	250	0.00
##	251	27182.86
##	252	76.50
##	253	933.86
##	254	0.00
##	255	0.00
##	256	0.00

## 257	44.00
## 258	0.00
## 259	0.00
## 260	0.00
## 261	20.00
## 262	14.00
## 263	0.00
## 264	0.00
## 265	0.00
## 266	0.00
## 267	0.00
## 268	0.00
## 269	0.00
## 270	0.00
## 271	0.00
## 272	0.00
## 273	121.50
## 274	229.00
## 275	2691.00
## 276	1032.30
## 277	8748.40
## 278	0.00
## 279	0.00
## 280	0.00
## 281	1222.10
## 282	0.00
## 283	0.00
## 284	0.00
## 285	0.00
## 286	0.00
## 287	0.00
## 288	0.00
## 289	500.00
## 290	0.00
## 291	0.00
## 292	2224.00
## 293	0.00
## 294	0.00
## 295	0.00
## 296	0.00
## 297	22016.00
## 298	13013.00
## 299	0.00
## 300	5433.00
## 301	0.00
## 302	19405.00
## 303	0.00
## 304	903.00
## 305	0.00
## 306	0.00
## 307	49.00
## 308	0.00
## 309	0.00
## 310	0.00

## 311	0.00
## 312	0.00
## 313	62.00
## 314	0.00
## 315	0.00
## 316	0.00
## 317	0.00
## 318	0.00
## 319	0.00
## 320	0.00
## 321	135.00
## 322	9604.00
## 323	3270.00
## 324	0.00
## 325	5.00
## 326	0.00
## 327	0.00
## 328	126.00
## 329	23.00
## 330	0.00
## 331	0.00
## 332	0.00
## 333	0.00
## 334	0.00
## 335	0.00
## 336	0.00
## 337	0.00
## 338	545.00
## 339	0.00
## 340	0.00
## 341	0.00
## 342	0.00
## 343	41150.00
## 344	33338.00
## 345	0.00
## 346	212.00
## 347	0.00
## 348	62332.00
## 349	0.00
## 350	1503.00
## 351	0.00
## 352	0.00
## 353	5173.00
## 354	170.00
## 355	0.00
## 356	0.00
## 357	0.00
## 358	103.00
## 359	0.00
## 360	0.00
## 361	0.00
## 362	0.00
## 363	0.00
## 364	0.00

## 365	0.00
## 366	850.00
## 367	49.00
## 368	22615.00
## 369	14214.00
## 370	0.00
## 371	1555.00
## 372	0.00
## 373	0.00
## 374	12.00
## 375	0.00
## 376	0.00
## 377	0.00
## 378	0.00
## 379	0.00
## 380	0.00
## 381	0.00
## 382	0.00
## 383	0.00
## 384	951.00
## 385	0.00
## 386	750.00
## 387	0.00
## 388	0.00
## 389	8049.00
## 390	5754.00
## 391	0.00
## 392	65.00
## 393	0.00
## 394	28317.00
## 395	0.00
## 396	160.00
## 397	0.00
## 398	0.00
## 399	30.00
## 400	10.00
## 401	0.00
## 402	0.00
## 403	0.00
## 404	11.00
## 405	0.00
## 406	0.00
## 407	0.00
## 408	0.00
## 409	0.00
## 410	0.00
## 411	0.00
## 412	0.00
## 413	2.00
## 414	10444.00
## 415	4492.00
## 416	0.00
## 417	0.00
## 418	20.00

## 419	0.00
## 420	128.00
## 421	500.00
## 422	0.00
## 423	0.00
## 424	0.00
## 425	0.00
## 426	0.00
## 427	100.00
## 428	0.00
## 429	0.00
## 430	5807.00
## 431	0.00
## 432	0.00
## 433	0.00
## 434	0.00
## 435	4828.00
## 436	19795.00
## 437	0.00
## 438	594.00
## 439	0.00
## 440	15067.00
## 441	100.00
## 442	105.00
## 443	0.00
## 444	0.00
## 445	68.00
## 446	0.00
## 447	0.00
## 448	0.00
## 449	0.00
## 450	0.00
## 451	452.00
## 452	0.00
## 453	0.00
## 454	0.00
## 455	0.00
## 456	0.00
## 457	0.00
## 458	0.00
## 459	0.00
## 460	532.00
## 461	6816.00
## 462	4668.00
## 463	15.00
## 464	0.00
## 465	0.00
## 466	52.00
## 467	0.00
## 468	15.00
## 469	0.00
## 470	0.00
## 471	0.00
## 472	0.00

## 473	0.00
## 474	0.00
## 475	0.00
## 476	305.00
## 477	0.00
## 478	0.00
## 479	0.00
## 480	0.00
## 481	5530.00
## 482	25002.00
## 483	0.00
## 484	423.00
## 485	0.00
## 486	26390.00
## 487	0.00
## 488	733.00
## 489	20.00
## 490	0.00
## 491	1336.00
## 492	510.00
## 493	80.00
## 494	0.00
## 495	0.00
## 496	17.00
## 497	112.00
## 498	0.00
## 499	0.00
## 500	0.00
## 501	50.00
## 502	0.00
## 503	0.00
## 504	0.00
## 505	0.00
## 506	74.00
## 507	16955.00
## 508	18374.00
## 509	525.00
## 510	0.00
## 511	0.00
## 512	1805.00
## 513	70.00
## 514	0.00

Health Impact

Economic Impact

END