

## **News & Notes: El Niño & the San Diego Economy**

With the formation of a very strong El Niño event, climate scientists and meteorologists have projected an especially wet winter in Southern California. Using GIS tools and past damage assessments, the National University System Institute for Policy Research (NUSIPR) examined the potential for damage and disruption. We found that:

- **Recent severe El Niño storms caused \$804 million (1997-98) and \$2.04 billion (1982-83) in economic losses in California.**
- **Nearly 55,000 (54,560) county residents live in areas that are more susceptible to flooding during flood events.**
- **Countywide, nearly 5,000 (4,798) businesses are located in areas that are more susceptible to flooding during flood events.**
- **Tourism and agriculture are two economic sectors that are most likely to be affected by severe El Niño storms.**
- **Surprisingly, El Niño may generate some positive economic benefits, but most are limited to regions that typically experience colder winters and snowfall during the early months of the year.**

El Niño events are unique products of the weather patterns, atmospheric conditions and ocean temperatures of their particular time. There is a small sample size to extrapolate from for research purposes; still, we can make some baseline determinations about what effects El Niño can have on the local and state economy. For the 1982-83 El Niño winter storms, economic losses statewide were estimated at \$2.04 billion (2015 dollars).<sup>1</sup> In all, 6,661 homes and 1,330 businesses were damaged or destroyed, 481 state residents were injured, and 36 people died as a result of El Niño.<sup>2</sup> Conversely, the

---

<sup>1</sup> Golden Gate Weather Services. "El Nino and La Nina...Their Relationship to California Flood Damage." August 28, 2014. Accessed September 15, 2015. <[http://ggweather.com/enso/calif\\_flood.htm](http://ggweather.com/enso/calif_flood.htm)>.

<sup>2</sup> Western Regional Climate Center. "California's Top 15 Weather Events of the 1900's." Accessed September 15, 2015. <<http://www.wrcc.dri.edu/extreme-events/california/>>.

1997-98 El Niño storms incurred more than \$804 million in economic losses (2015 dollars), with only 17 deaths blamed on El Niño-related events that winter.

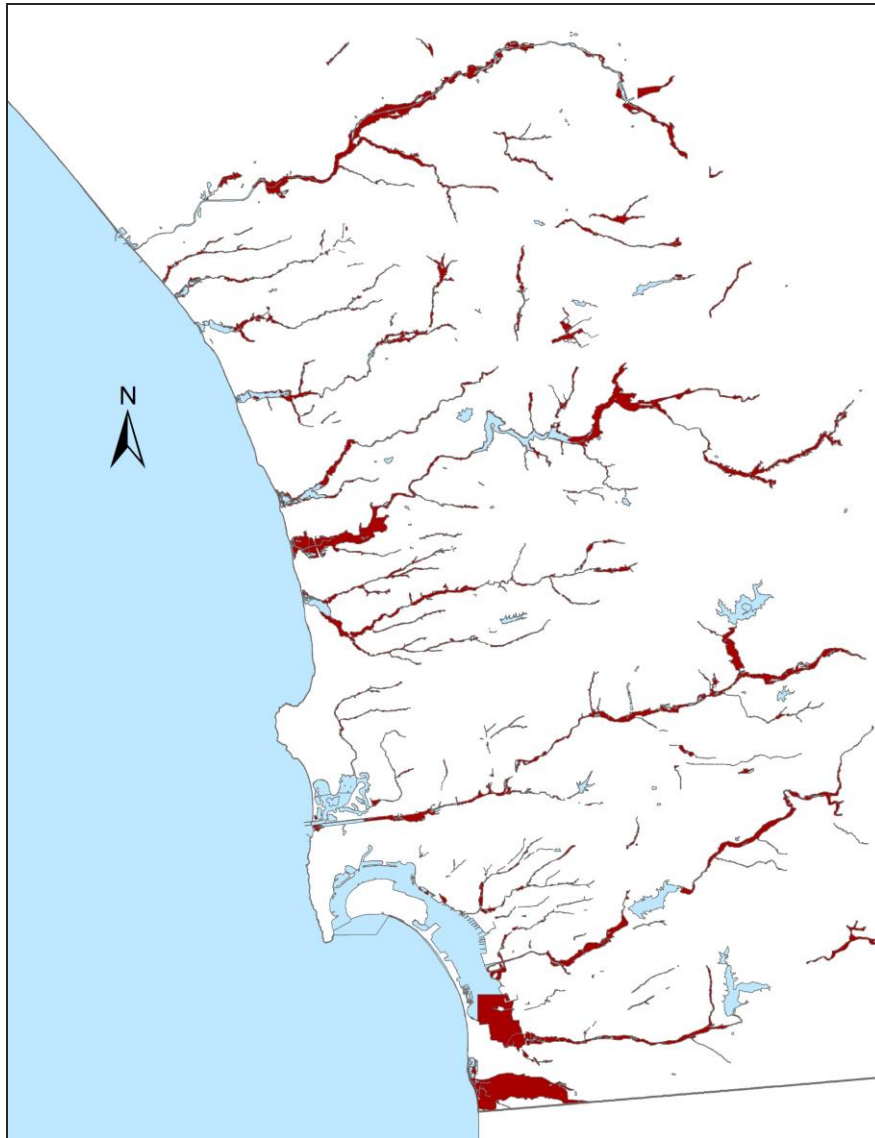
Coastal storms can have a pronounced effect in San Diego County; a 1998 report from the California Coastal Commission identified 23 El Niño-related emergency permits issued in San Diego County in the 1997-98 winter, including \$700,000 in storm related damage to the Oceanside Harbor, and \$1.6 million in damages in Del Mar.<sup>3</sup> The same report noted widespread seacliff erosion, damage to the Pacific/Mission Beach boardwalk, and frequent closure of the Highway 101 section in Cardiff. Statewide, El Niño-related damages include destroyed homes and buildings, landslides, mudslides, shoreline erosion, oil spills, and damage to roads, campgrounds, parks and parking lots.

To take a closer look at the potential threat of intense flooding and coastal storms to residents, businesses and buildings in the county, NUSIPR first identified areas within the county most susceptible to flood events. The U.S. Geological Survey measures the 1-percent annual exceedance probability of flooding within a geographic area for insurance purposes. This “100-year flood” estimate provides the long-term average recurrence interval for flooding, and is available in local and state GIS datasets. Illustrated in red in Figure 1 are the 100-year flood zones found throughout the San Diego region. Most of the areas are in known floodplains, near coastal inlets or rivers, but are spread throughout the county. Factors that affect the degree of flooding generally include topography, soil saturation, debris, and drainage.

---

<sup>3</sup> California Coastal Commission. “Coastal Impacts of the 1997-98 El Nino and Predictions for La Nina.” August 21, 1998. Accessed September 15, 2015. <<http://documents.coastal.ca.gov/reports/1998/9/T11-9-1998.pdf>>.

Figure 1: 100-Year Flood Zones, San Diego County



Using GIS software and 2010 Census data, NUSIPR identified 54,560 county residents living in 100-year flood zones.<sup>4</sup> This amounts to approximately two percent (1.75%) of the population regionwide. These figures are similar to population totals from 2000 (56,563). We also examined residential structures and businesses at risk of flood events. Using 2010 county housing data, NUSIPR identified approximately 21,706 housing units located within 100-year flood zones. This total is nearly identical to 2000, when 21,789 housing units were located within the zones. NUSIPR also found that nearly 5,000 (4,798) businesses are located in 100-year flood zones, which is approximately 4.8% of all businesses countywide (99,570 total).

---

<sup>4</sup> Zones included as part of our analysis include Zones A, AE, AH, AO, and VE.

The potential effects of El Niño winter storms on the economy are wide-ranging. From flood hazard modeling software, we know that business sector economic losses could potentially include the cost of repair and replacing damaged and destroyed buildings; damage to building contents (goods sold and equipment used to provide services); income loss; wage losses; and rental income loss. Prior research indicates that two economic sectors in San Diego most likely to be affected by El Niño-related weather conditions are agriculture and tourism.

Attendance at San Diego theme parks and the San Diego Zoo could wane under heavy flooding. In 1998, Disneyland officials blamed El Niño rains as contributing to lower park attendance that year.<sup>5</sup> Attendance was also down 7% at Seaworld San Diego, due to El Niño and a lack of new park attractions.<sup>6</sup> As in prior wet years, public parks and beaches are likely to close after heavy flooding and storm-related hazards. However, a drop off in attendance is likely to be mitigated somewhat by the smaller off-peak season crowds during the winter months. Furthermore, San Diego residents who would otherwise leave the region for recreation and entertainment may instead choose to stay local under the threat of inclement weather.

Commercial agriculture in San Diego County is economically significant, weighing in at a value of \$1.85 billion in 2013.<sup>7</sup> Researchers in other regions have found that during El Niño years, some crop yields are lower, and there is an increase in pest populations, disease, and rot.<sup>8</sup> Other research suggests that heavier rains and longer, hotter summers can have a positive impact on crop production. AgriBank examined corn and soybean production during the 1982/3 and 1997/8 El Niño years, and found that only 1983 resulted in poor crop production: “in that year, heavy rains in the spring delayed or prevented planting, and the onset of hot, dry conditions in the summer severely stressed the late-planted crop.”<sup>9</sup> Produce prices may temporarily increase as a result of heavier precipitation, as they did in January and March 1998, where national prices rose 7.9% and 5%, respectively, due to El-Niño related crop shortages.<sup>10</sup>

---

<sup>5</sup> E. Scott Reckard. “New Disneyland Hours Put Twist in Private Parties.” Los Angeles Times. October 2, 1998. <<http://articles.latimes.com/1998/oct/02/business/fi-28454>>.

<sup>6</sup> E. Scott Reckard. “Local Theme Parks Hit by Slump.” Los Angeles Times. December 19, 1998. <<http://articles.latimes.com/1998/dec/19/business/fi-55477>>.

<sup>7</sup> County of San Diego Department of Agriculture, Weights and Measures. 2013 Crop Statistics and Annual Report. 2014. Accessed September 15, 2015. <<http://www.sandiegocounty.gov/content/dam/sdc/awm/docs/2013%20Crop%20Report%20-%20Copy.pdf>>.

<sup>8</sup> United States Department of Agriculture, National Institute of Food and Agriculture. “El Nino, La Nina and Climate Impacts on Agriculture: Southeastern U.S.” <<http://agroclimate.org/climate/ENSO-Impacts-southeast.pdf>>.

<sup>9</sup> AgriBank. “El Nino: Could This Cyclical Extreme Be Good for Corn and Soybean Production?” July 2015. <[http://info.agribank.com/agrithought/Documents/AgriThought\\_ElNino2015\\_Final.pdf](http://info.agribank.com/agrithought/Documents/AgriThought_ElNino2015_Final.pdf)>.

<sup>10</sup> Changnon, Stanley A. “Impacts of 1997-98 El Nino-Generated Weather in the United States.” Bulletin of the American Meteorological Society. Vol. 8, No. 9, September 1999, pg. 1822. <[http://www.atmos.washington.edu/~davidc/ATMS211/articles\\_optional/El\\_Nino\\_cost.pdf](http://www.atmos.washington.edu/~davidc/ATMS211/articles_optional/El_Nino_cost.pdf)>.

Eric Larson, Executive Director of the San Diego County Farm Bureau, explained to NUSIPR that the concern among local farms is mostly over wind; “storms with heavy wind can knock fruit off of trees, flatten field crops, and damage greenhouses.” Larson also noted that flooding would be mitigated to some degree, as farms are located on hilly terrain that drains quickly. Pests, disease and rot may or may not be a factor, depending on the intensity of the El Niño rains and drying time between rainfall, which are unknown.

Surprisingly, there are some economic benefits that have been attributed nationally in whole or in part to El Niño-related weather conditions. Warmer winters and reduced snowfall resulted in billions of dollars worth of reduced heating costs, lower gasoline prices, and decreases in transit operating costs and street and highway clearance of snow and ice. Consumer expenditures also increased as a result of milder winter weather; as one report noted, “thousands went out of doors more, millions went shopping, many altered their types of recreation, and most everyone enjoyed better health than in normal winters.”<sup>11</sup> However, these economic benefits are largely limited to areas that typically experience colder winters with snowfall and severe storms, such as the Northeast and Midwest.

### **About the National University System Institute for Policy Research**

The National University System Institute for Policy Research (NUSIPR) is a non-partisan, non-profit organization that formulates and promotes high quality economic policy, and public opinion research so as to improve the efficiency and effectiveness of local governments in San Diego County and to improve the quality of life enjoyed by the region’s residents.

NUSIPR publishes regular independent research and analysis for the public on a range of topics, including unemployment, business growth, and the San Diego housing market. The Institute also works collaboratively with clients to develop high quality research products that are tailored to their policy needs.

---

<sup>11</sup> Changnon, 1823.

