



Lopez, John A., 2006, *The Multiple Lines of Defense Strategy to Sustain Coastal Louisiana*, Lake Pontchartrain Basin Foundation, Metairie, LA January 2006 at <http://www.saveourlake.org/>

- 1. Offshore Shelf:** During Hurricane Katrina there were 60-foot waves in the Gulf Of Mexico. These huge waves did not hit land because the offshore shelf greatly reduces wave height by reducing the depth of the water. However, the offshore shelf does cause the storm surge to increase. The shape of the shelf needs to be studied to determine the effect its shape has on wave and surge height.
- 2. Barrier Islands:** Barrier islands cause the waves associated with tropical storms to break, protecting the interior sound and coastal marsh. They also help to reduce storm surge.
- 3. Sounds:** Sounds provide a buffer to strong currents from deeper water, but allow waves to regenerate.
- 4. Marsh Land Bridges:** These are areas of continual marsh, commonly adjacent to natural ridges or levees. Land bridges reduce waves and impede storm surge, protecting areas further inland that perform the same function.
- 5. Natural Ridges:** Natural ridges are the remains of natural levees from abandoned river channels. They can extend for miles and typically have an elevation of a few feet above sea-level. Many have state highways along them. They commonly determine the natural flow of water throughout the region. They reduce waves and storm surge.
- 6. Highways:** Many highways in the coast are elevated several feet to reduce their probability of flooding, which can reduce the height of waves and storm surges similar to natural ridges.
- 7. Flood Gates:** Floodgates are designed to hold high waves and storm surge out of an area but allow natural flow during calm weather. Because our coast is only a few feet above sea level floodgates must be placed along levees or spoil banks
- 8. Levees:** Levees are designed to be an absolute barrier to flooding, storm surge and high waves, used to protect highly developed areas such as Orleans, Jefferson, and St. Bernard parishes.
- 9. Pump Stations:** Pump stations are designed to remove runoff from heavy rainfall. They are not designed to deal with the type of flooding that can occur if a levee is breached.
- 10. Hurricane:** All homes and businesses in southeast Louisiana are subject to flooding if they are not raised above the recommended height. Elevating our assets that cannot be easily moved is their last line of defense.
- 11. Evacuation:** Evacuation is the last line of defense for anyone living in hurricane-prone areas. While highways are the most common form, railroads and airline travel can also be used.