



Appendix C MITIGATION STRATEGY

Appendix C: Mitigation Strategy contains the following documents in this order:

- Mitigation Strategy Guidance Criteria
- Mitigation Strategy HMPC #3 Meeting documentation
 - Meeting Agenda
 - Meeting Minutes
 - Sign-In Sheet
 - Meeting Presentation
- Mitigation Action Selection and Prioritization Criteria
- Typical Mitigation Actions by FEMA/Community Rating System Categories
- 2019 Mitigation Action Worksheet

Mitigation Strategy Guidance Criteria: Categories of Mitigation Measures Considered

The following categories are based on the Community Rating System.

- Prevention
- Emergency Services
- Property Protection
- Natural Resource Protection
- Structural Projects
- Public Information

Alternative Mitigation Measures per Category

Prevention

Preventive measures are designed to keep the problem from occurring or getting worse. Their objective is to ensure that future development is not exposed to damage and does not increase damage to other properties.

- Planning
- Zoning
- Open space preservation
- Land development regulations





- Subdivision regulations
- Floodplain development regulations
- Stormwater management
- Fuels management, fire breaks
- Building codes
 - Firewise construction
- (also see Property Protection)

Emergency Services

Emergency services protect people during and after a disaster. A good emergency services program addresses all hazards. Measures include:

- Warning (floods, tornadoes, ice storms, hail storms, dam failures)
 - NOAA weather radio all hazards
 - Sirens
 - Reverse 911
- Evacuation and sheltering
- Communications
- Emergency planning
 - Activating the emergency operations room (emergency management)
 - Closing streets or bridges (police or public works)
 - Shutting off power to threatened areas (utility company)
 - Holding children at school/releasing children from school (school district)
 - Passing out sand and sandbags (public works)
 - Ordering an evacuation (mayor)
 - Opening evacuation shelters (red cross)
 - Monitoring water levels (engineering)
 - Security and other protection measures (police)
- Monitoring of conditions (dams)
- Critical facilities protection (buildings or locations vital to the response and recovery effort, such as police/fire stations, hospitals, sewage treatment plants/lift stations, power substations)
 - Buildings or locations that, if damaged, would create secondary disasters, such as hazardous materials facilities and nursing homes
 - Lifeline utilities protection
 - Health and safety maintenance





Property Protection

Property protection measures are used to modify buildings subject to damage rather than to keep the hazard away. A community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Many of the measures do not affect the appearance or use of a building, which makes them particularly appropriate for historical sites and landmarks.

- Retrofitting/disaster proofing
 - Floods
 - Wet/dry floodproofing (barriers, shields, backflow valves)
 - Relocation
 - Acquisition
 - Tornadoes
 - Safe rooms
 - Securing roofs and foundations with fasteners and tie-downs
 - Strengthening garage doors and other large openings
 - Drought
 - Improve water supply (transport/storage/conservation)
 - Remove moisture competitive plants (tamarisk/salt cedar)
 - Water restrictions/water saver sprinklers/appliances
 - Grazing on CRP lands (no overgrazing-see noxious weeds)
 - Create incentives to consolidate/connect water services
 - Recycled wastewater on golf courses
 - Earthquakes
 - Removing masonry overhangs, bracing, and other parts
 - Tying down appliances, water heaters, bookcases, and fragile furniture so they will not fall over during a quake.
 - Installing flexible utility connections that will not break during shaking (pipelines, too)
 - Wildland fire
 - Replacing building components with fireproof materials (roofing, screening)
 - Creating "defensible space"
 - Installing spark arrestors
 - Fuels modification
 - Noxious weeds/insects
 - Mowing
 - Spraying
 - Replacement planting
 - Stop overgrazing
 - Introduce natural predators
- Insurance





Natural Resource Protection

Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of floodplains and watersheds to be better realized. These natural and beneficial floodplain functions include the following:

- Storage of floodwaters
- Absorption of flood energy
- Reduction in flood scour
- Infiltration that absorbs overland flood flow
- Groundwater recharge
- Removal/filtering of excess nutrients, pollutants, and sediments from floodwaters
- Habitat for flora and fauna
- Recreational and aesthetic opportunities

Methods of protecting natural resources include:

- Erosion and sediment control
- Wetlands protection
- Riparian area/habitat protection
- Threatened and endangered species protection
- Fuels management
- Set-back regulations/buffers
- Best management practices-Best management practices ("BMPs") are measures that reduce nonpoint source pollutants that enter the waterways. Nonpoint source pollutants come from non-specific locations. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams. BMPs can be implemented during construction and as part of a project's design to permanently address nonpoint source pollutants. There are three general categories of BMPs:
 - Avoidance-Setting construction projects back from the stream.
 - Reduction-Preventing runoff that conveys sediment and other water-borne pollutants, such as planting proper vegetation and conservation tillage.
 - Cleanse-Stopping pollutants after they are en route to a stream, such as using grass drainageways that filter the water and retention and detention basins that let pollutants settle to the bottom before they are drained
- Dumping regulations
- Water use restrictions
- Weather modification





- Landscape management

Structural Projects

Structural projects have traditionally been used by communities to control flows and water surface elevations. Structural projects keep flood waters away from an area. They are usually designed by engineers and managed or maintained by public works staff. These measures are popular with many because they "stop" flooding problems. However, structural projects have several important shortcomings that need to be kept in mind when considering them for flood hazard mitigation:

They are expensive, sometimes requiring capital bond issues and/or cost sharing with Federal agencies, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service.

- They disturb the land and disrupt natural water flows, often destroying habitats.
- They are built to a certain flood protection level that can be exceeded by a larger flood, causing extensive damage.
- They can create a false sense of security when people protected by a structure believe that no flood can ever reach them.
- They require regular maintenance to ensure that they continue to provide their design protection level.

Structural measures include:

- Detention/retention structures
- Erosion and sediment control
- Basins/low-head weirs
- Channel modifications
- Culvert resizing/replacement/maintenance
- Levees and floodwalls
- Fencing (for snow, sand, wind)
- Drainage system maintenance
- Reservoirs (for flood control, water storage, recreation, agriculture)
- Diversions
- Storm sewers

Public Information

A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. These activities can motivate people to take protection

- Hazard maps and data





- Outreach projects (mailings, media, web, speaker's bureau)
- Library resources
- Real estate disclosure
- Environmental education
- Technical assistance

Climate Adaptation and Social Equity Strategies

Climate adaptation strategy guidance materials were distributed prior to and during the mitigation strategy planning session. Materials included the *California Adaptation Planning Guide (APG)*, a set of four complementary documents that provide guidance to support communities in addressing the unavoidable consequences of climate change. The documents provide a step-by-step process on adaptation strategy development. *California's Climate Adaptation Strategy: Safeguarding California Plan: 2018 Update* was also distributed prior to and during the mitigation strategy planning session. While information on climate change impacts was integrated into the LHMP Risk Assessment, the mitigation strategy planning session focused on discussing how climate change would affect major natural hazards in the City of Petaluma Planning Area. The HMPC was then able to review potential adaptation strategies that would help them meet adaptation needs. The APG documents provide a broad sampling of different policies and programs that address climate change. Several of the adaptation example policies and programs also focus on addressing environmental justice (EJ), reducing risk in disadvantaged communities, and promoting social equity. As a result, the HMPC considered various planning tools and resources to support compliance with California Government Code Section 65302 (Senate Bill 379). Subsection (g)(4) requires all cities and counties to include climate adaptation and resiliency strategies in the safety elements of their general plans.

Environmental Justice and Social Equity Strategies

HMPC members reviewed the *Senate Bill 1000 Implementation Toolkit: Planning for Healthy Communities*. The toolkit helped the HMPC consider various planning resources to support compliance with California Government Code Section 65302.10 and Senate Bill 1000. Senate Bill 1000, the Planning for Healthy Communities Act, mandates that cities and counties adopt an EJ element or integrate EJ goals, objectives, and policies into other elements of their General Plan. The HMPC discussed and developed various community engagement and outreach programs during the planning sessions, as well as programs that would better assess existing demographics in the City that may influence engagement, such as language access, age, and educational attainment. The intent of the strategies is to promote collaboration with community members and maintain effective relationships with Community-Based Organizations to ensure that hazard mitigation actions are prioritized in disadvantaged and vulnerable communities in Petaluma.

The resulting climate adaptation and social equity strategies were also considered during prioritization exercises. The policies and programs were then integrated into the mitigation strategy as specific actions tailored to fit the hazard mitigation, adaptation, and social equity needs of all of Petaluma's residents.

