

FEDERAL INSURANCE AND MITIGATION ADMINISTRATION

# HAZARD MITIGATION OVERVIEW

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# WHAT IS HAZARD MITIGATION?

A man wearing a light blue t-shirt, a tan baseball cap, and glasses is working with a large blue tarp. The tarp has the word 'SUBMATE' and 'WRAP' printed on it. He is pulling the tarp over a structure. A red circle is overlaid on the image, containing text.

Any sustained action taken to reduce or eliminate long-term risk to human life and property from natural hazards

# MITIGATION PLANNING

**Mitigation Plans** form the foundation for a community's long-term strategy to reduce disaster losses and breaks the cycle of disaster damage, reconstruction, and repeated damage.

## Mitigation Planning:

- Is the first step in the mitigation process.
- Identifies potential projects relative to hazard risk.
- Is required to receive project funding through FEMA's Unified Hazard Mitigation Assistance Grants.



# HAZARD MITIGATION GRANT PROGRAM (HMGP)



**Goal:** to provide opportunities to incorporate mitigation actions during recovery

- HMGP is made available when requested by the Governor, post a Presidential Major Disaster Declaration
- HMGP funds mitigation projects and plans that address all natural hazards
- Program is administered by the State or Eligible Indian Tribal Nation
- Local communities submit applications to the state. State prioritizes and selects projects to be submitted to FEMA
- FEMA reviews for eligibility
- Eligible projects are approved and funded.

# PRE-DISASTER MITIGATION PROGRAM (PDM)



**Goal:** to reduce overall risk to people and property from future hazard events

- Funding is made available annually by Congress
- PDM is a national competitive program but also provides set-aside funding for states
- PDM funds mitigation projects and plans that address natural hazards

# FLOOD MITIGATION ASSISTANCE PROGRAM (FMA)



- Goal:** to reduce or eliminate claims made under the NFIP
- Funded by the National Flood Insurance Fund
  - Funding is made available annually by Congress
  - NFIP participation is required
  - FMA funds only flood hazard mitigation activities or flood portion of a multi-hazard mitigation plan
  - FEMA prioritizes grant funding based on agency priorities

# EFFECTS OF CLIMATE CHANGE

## Changing sea levels

- Mainly sea level rise

## Precipitation changes

- Heavy downpours (“rain bombs”)
- Timing – more in winter, less in summer
- Less snowpack; drought

## Temperature changes

- Heat waves and extreme heat
- Urban Heat Island Effect
- Higher low temperatures – milder winters

## Changes in winter storm and hurricane intensity and frequency



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# ASSESS RISK FROM CLIMATE CHANGE

- **Damage**
  - Can it be repaired? Replaced?
  - Is there a threat to public health and safety?
- **Disruption**
  - Is there a disruption in service?
- **Cost**
  - What is the cost to repair or replace?
  - What are the economic (or health and safety) costs associated with disruption?
  - )?



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# REFORMING HAZARD MITIGATION ASSISTANCE

- 2015 HMA Guidance – a new focus on *climate resilience*
  - Commitment to Resilience and Climate Change Adaptation
  - Incorporating Sea Level Rise in eligible projects costs and BCAs
  - Mitigation Planning should address climate change and adaptation strategies
- New Climate Resilient Mitigation Activities
- Commitment to Green Infrastructure
  - Incorporate climate resilience in mitigation actions through use of green infrastructure methods
  - Design projects to increase ecosystem service benefits



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# CLIMATE-RESILIENT MITIGATION ACTIVITIES



## FIMA'S 3 CURRENT PRIORITY ACTIVITIES:

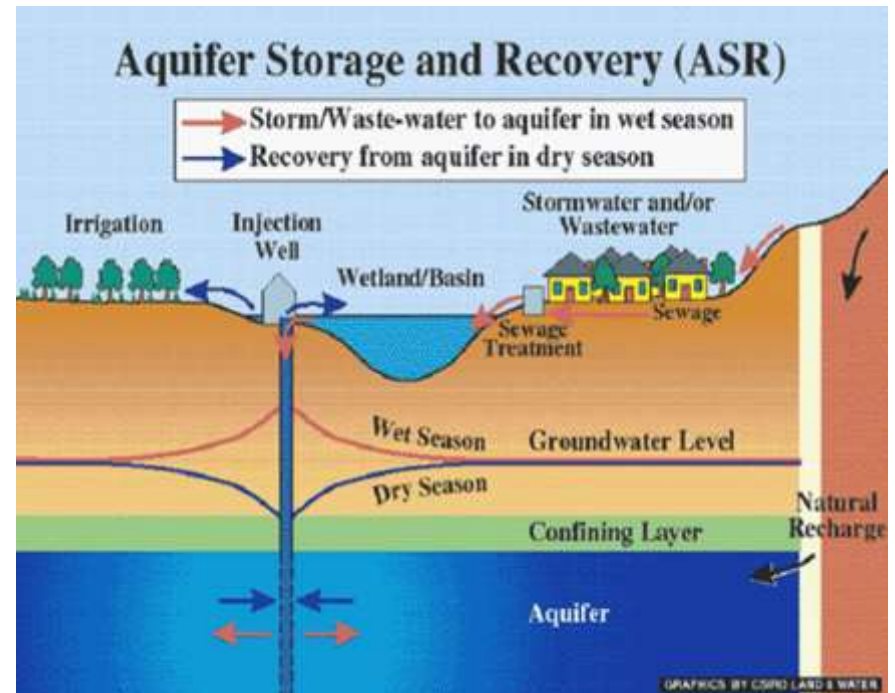
- Aquifer storage and recovery
- Floodwater diversion, storage, and recovery
- Floodplain and stream restoration
- **Green infrastructure** provides a framework to consider regional and localized projects for stormwater management
- Ecosystem service benefits

# AQUIFER STORAGE & RECOVERY (ASR)

## Subsurface storage of surface water runoff and groundwater in natural aquifer

- Capturing water when it is abundant
- Pumping and storing the water in subsurface aquifers
- Recovering the water when needed.

**Mitigation action for flood, drought, or salt water intrusion,**



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# AQUIFER STORAGE & RECOVERY

## Roseville, California

**Roseville's ASR Program is the first of its kind in the Central Valley of California and serves as a model for ASR development**

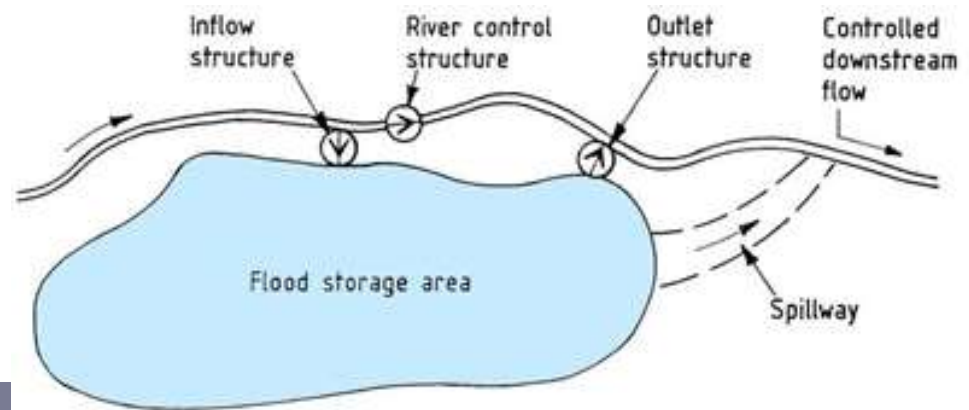
**Store surplus drinking water (10,000 acre-feet per year) in the underlying aquifer**

**Stored drinking water is then extracted and served to meet peak demands.**



# FLOOD DIVERSION AND STORAGE

- Diverting storm or floodwaters into lakes, channels, floodplains, irrigation canals, wetlands, or other natural or manmade green infrastructure surface storage
- Floodwater is detained and released slowly to facilitate ground infiltration
- Benefits include
  - Flood risk reduction and/or management
  - Harvest excess storm/surface water for later use in dry periods
  - Green infrastructure/potential ecosystem services



# FLOODPLAIN & STREAM RESTORATION

- Reestablishment of the structure and function of ecosystems and floodplains
- Flood risk reduction while improving water quality and habitat for fish and wildlife, recreational opportunities, and erosion control.



# FLOODPLAIN AND STREAM RESTORATION

- Restore original function of floodplains and associated wetlands of flood prone river and stream systems to pre-development conditions
- Restore or increase connectivity and storage capacity
- Restore or increase the physical stability, hydrology, and biological functions of impaired stream and river banks to restore a natural stable riparian system
- Can take advantage of seasonal variations in water supply
- Capture spring rain or snowmelt to recharge both surface water and groundwater supplies
- Provide erosion mitigation to stabilize banks, avoid bank collapse
- Projects lend themselves readily to green infrastructure methods maximizing ecosystem service benefits

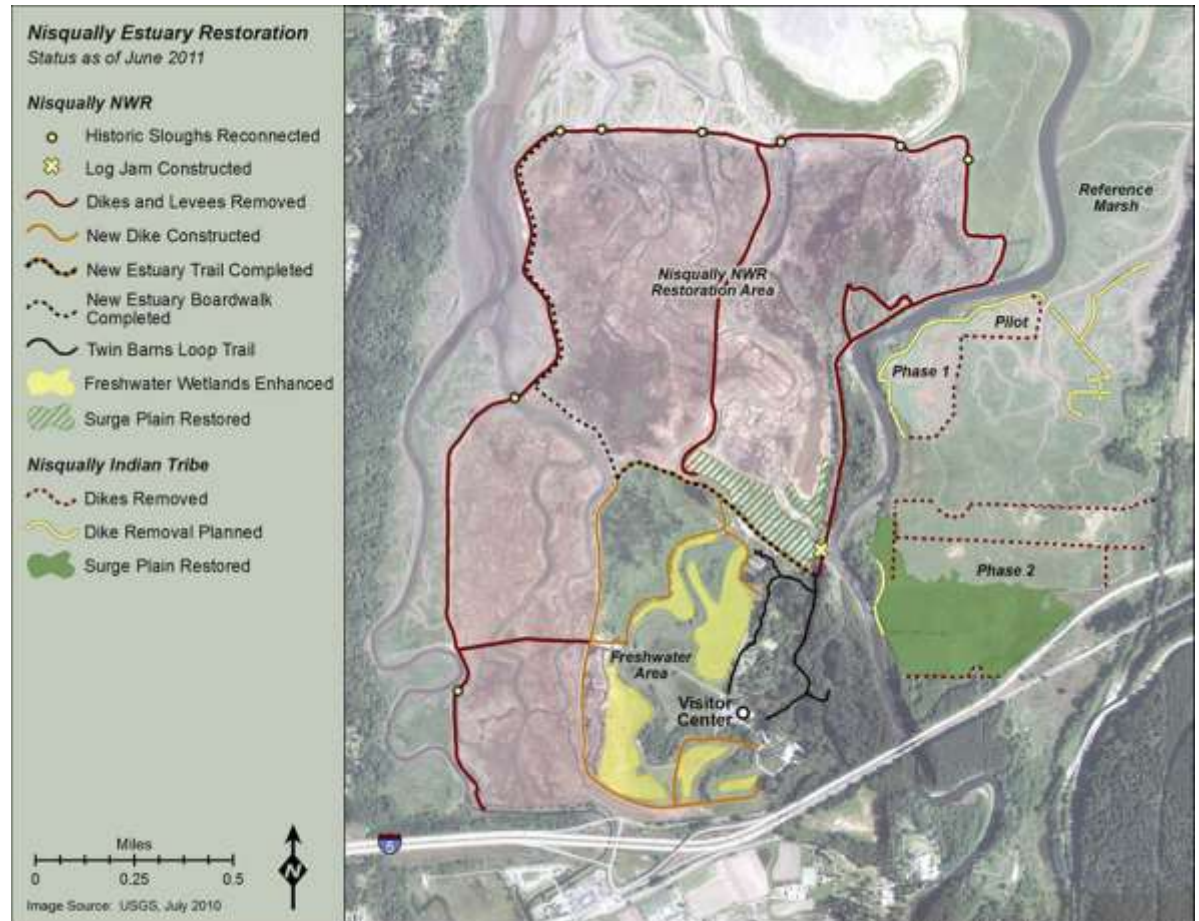
# NISQUALLY DELTA RESTORATION

Nisqually Tribe in Washington State

Post-disaster HMGP project

\$1.2 million in funding

19 properties purchased and buildings demolished



Cartography by: J. Cudde, Nisqually Indian Tribe



# GREEN INFRASTRUCTURE



## Examples

- Rain Gardens
- Bio-retention Areas
- Bio-swales
- Green Roofs
- Green Streets
- Porous Pavement
- Stream Buffer Restoration
- Constructed Wetlands



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# GREEN INFRASTRUCTURE/ NATURE-BASED DESIGN

- Projects that use an integrated, natural systems-based design approach in hazard mitigation actions
- Restore or replicate a site's natural function
- Reconnect disrupted natural systems (e.g. reconnect interrupted watersheds or drainage systems)
- For HMA application:
  - Project must demonstrate measurable natural hazard risk reduction
  - Should also provide additional ecosystem services
  - Encourage most sustainable design and method

# SEA LEVEL RISE



FEMA will pay for including Sea Level Rise in the design of HMA Projects

- The extra cost to build to protect for the design life of the structure are eligible costs for the HMA grant
- The effects of Sea Level Rise are also included in FEMA's Benefit Cost Analysis



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# SEA-LEVEL RISE – OLYMPIA, WA

Major engineering study in 2011

2016 follow-up planning

Seawalls, a Budd Inlet barrier, better stormwater management, all are being discussed.

## 1 foot SLR 100-yr Flood Extents



## Flood Walls



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# ECOSYSTEM SERVICES BENEFITS

- All HMA projects must demonstrate they reduce risk and are cost effective
- 75% of benefits must derive from risk reduction benefits
- May 2016, released tools for ecosystem services in HMA
  - Aquifer Storage and Recovery BCA Tool
  - Ecosystem Service Benefits Calculator
  - Supplemental BCA Guidance for Floodwater Diversion and Storage Projects
  - Supplemental BCA Guidance for Floodplain and Stream Restoration Projects
  - Pre-calculated benefits for post-wildfire mitigation actions
- Next BCA software update will incorporate all ecosystem services into the BCA Tool

# CLIMATE CHANGE ADD-ONS FOR TRADITIONAL HMA PROJECTS



Add climate change adaptation features to traditional HMA projects to improve the overall resiliency of the community.

- **ACQUISITIONS:** include wildlife habitat restoration with native trees and shrubs, reconnecting the floodplain to the stream, building side channels and engineered log jams
- **SEISMIC and FLOOD RETROFITS:** add on-site stormwater detention in rain gardens and swales, maybe even underground storage tank; plant shade trees to address urban heat island effect
- **HAZARD MITIGATION PLANNING:** use grant funds to develop pilot projects or overall strategy for green and blue infrastructure; fund a street canopy study, city tree planting and maintenance plan



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# CLIMATE RESILIENT MITIGATION ACTIONS - RESOURCES

- Hazard Mitigation Assistance website: <https://www.fema.gov/hazard-mitigation-assistance>
- Climate Resilient Mitigation Activities website: <https://www.fema.gov/climate-resilient-mitigation-activities-hazard-mitigation-assistance>
- Benefit Cost Analysis: <https://www.fema.gov/benefit-cost-analysis>
- Sign-up for FEMA GovDelivery Notifications: <https://subscriberhelp.govdelivery.com/hc/en-us>



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