

# Flood Risk Management Course

FRM-PCX

Planning Associates 2016

**“Embracing Change  
Planning for a Better Future”**

## USACE Flood Risk Management Program

**Course Instructor:**

Rachael Orellana, P.E.

Flood Risk Program Manager

Sacramento District

April 28th, 2016

Atwater, CA



US Army Corps of Engineers  
**BUILDING STRONG**



# ICEBREAKER



Name and favorite waterway to visit



# What is the Flood Risk Management Program?

- USACE FRMP works across the agency to focus the policies, programs and expertise of USACE toward **reducing overall flood risk** such as
  - ▶ Appropriate **use and resiliency of structures** (levees and floodwalls)
  - ▶ Promoting **non-structural alternatives** to reduce the risk of loss of life, reduce economic damages, and improve the natural environment.



# Federal Flood Risk Management Activities

- **FPMS**

Flood Plain Management Services

- **PAS**

Planning Assistance to States

- **Silver Jackets**



# Flood Plain Management (FPMS) Services

## Authority

Section 206 of the 1960 Flood Control Act (PL 86-645)

## Objective

Foster public understanding of the options for dealing with flood hazards & promote prudent use and management of flood plains

## Types of Assistance

Full range of technical and planning guidance needed to support effective flood plain management



# Planning Assistance to States (PAS) Program

## Authority

Section 22 of the Water Resources Development Act (WRDA) of 1974, as amended

## Objective

Assist the States, local governments, Native American Tribes and other non-Federal entities, in the preparation of comprehensive plans for the development and conservation of water and related land resources

## Types of Assistance

Can encompass many types of studies dealing with water resources issues



# Silver Jackets

*“Many agencies, one solution”*

## Interagency Partnerships

Each dollar invested by USACE leverages another dollar in project-focused partner contributions

## Objective

Provides an opportunity to consistently bring together multiple state, federal, tribal and local agencies to learn from one another and jointly apply resources to reduce flood risk, The Silver Jackets teams are state-led interagency teams.

## Examples of Assistance

Nonstructural assessments, inundation mapping, flood warning systems, floodplain management plans, etc.



# Knowledge Check Authorities

- Which program is under **Section 22 of WRDA 1974**?
  - a) Flood Plain Management Services (FPMS)
  - b) Planning Assistance to States (PAS)
  - c) Silver Jackets (SJ)



# Knowledge Check

- Which program's motto is *“Many agencies, one solution”*?
  - a) Flood Plain Management Services (FPMS)
  - b) Planning Assistance to States (PAS)
  - c) Silver Jackets (SJ)



# Flood Plain Management Services

## Examples

- **Flood Plain Delineation/Flood Hazard Evaluation Studies**
- **Develop or interpret site-specific data on flooding**
- **Provide information on natural and cultural flood plain resources**
- **Dam Break Analysis Studies**
- **Flood Warning/Preparedness Studies**
- **Comprehensive Flood Plain Management Studies**
- **Flood Risk Management Studies**
- **Urbanization Impact Studies**
- **Stormwater Management Studies**
- **Flood Proofing Studies**
- **Inventory of Flood Prone Structures**



Pyramid Lake, Nevada – Pyramid Lake Paiute Tribe Flood Plain Management Plan (Sep 2016)



# Flood Plain Management Services



## California Grayson



### Project Description

- The objective of this Flood Risk Management Study is to develop solutions to manage flood risk in Grayson, California and offer possible ways the community can reduce flood risk. DWR is particularly interested in looking for opportunities for multi-benefit projects in this area as there may be a unique opportunity to provide habitat enhancement and public recreation benefits, as well as providing transportation and infrastructure benefits while reducing flood of Grayson Road.

### Flood Risk Reduction Outcomes

- Increase community resilience by identifying and characterizing flood hazards.
- Improve infrastructure resilience and increase benefits to enhance flood response efforts.



### Partners and Project Cost

Agency	Investment
USACE	\$750K
<b>TOTAL</b>	<b>\$750K</b>



**USACE Project Point of Contact**  
Rachael Orellana  
USACE Sacramento District

# Flood Plain Management Services



## Utah Ephraim City



### Project Description

- The Ephraim City, Utah Floodplain Management Services Project will develop floodplain mapping for Ephraim City. The City plans to provide the mapping to the Federal Emergency Management Agency (FEMA) in support of a Letter of Map Revision (LOMR).

### Flood Risk Reduction Outcomes

- Determination of the threat of alluvial fan flooding will assist help update insurance requirements for residents of Ephraim.
- Granular floodplain mapping project provides high resolution data to create accurate models which will quantify the risk communities face.



### Partners and Project Cost

Agency	Investment
USACE	\$300K
<b>TOTAL</b>	<b>\$300K</b>

### Successes/Best Practices

- Strengthened Ephraim City by facilitating discussions on improved floodplain management practices.
- Assisted economically disadvantaged community by providing resources necessary to effectuate change through implementation of better floodplain management planning.

### USACE Project Point of Contact

Rachael Orellana  
USACE Sacramento District

# Flood Plain Management Services



## California DWR Levees Evaluation



### Project Description

• The State of California Department of Water Resources (DWR) has embarked on a major study to evaluate the geotechnical adequacy of levees in California's Central Valley (Sacramento and San Joaquin River Flood Reduction Systems). This study provides the State and local communities with information about the status of the levees as one piece in the floodplain management equation. This piece provides communities with information about the geotechnical characteristics, which influences floodplain and flood risk management decisions.



Throughout the Central Valley, levees provide essential protection for communities and farmland, preventing possible catastrophic flooding and loss of life. DWR is currently evaluating more than 200 miles of project levees protecting the urban areas of Marysville, Yuba City, Sacramento, and Stockton-Tafttop.



### Flood Risk Reduction Outcomes

• The benefits from this program included improved flood protection and better informed flood risk management decisions. The current and future repaired levees will decrease the potential of flooding and the loss of life from flood events.

### Partners and Project Cost

Agency	Investment
USACE	\$200
DWR	\$2.6M in-kind
<b>TOTAL</b>	<b>\$2.6M</b>

### Successes/Best Practices

- Having an Independent Consulting Board ensured that the program performed work according to the current state of practice.
- Established Program's Guidance Document to create uniformity across individuals, consulting firms, USACE and DWR. This also ensured analyses' consistency and resulted in decreased review times.

### USACE Project Point of Contact

Judy Soutiere  
USACE Sacramento District

# Planning Assistance to States (PAS) Program

## Examples

- Water Supply and Demand Studies
- Water Quality Studies
- Environmental Conservation/Restoration Studies
- Wetlands Evaluation Studies
- Dam Safety/Failure Studies
- Flood Risk Management Studies
- Flood Plain Management Studies
- Coastal Zone Management/Protection Studies
- Harbor/Port Studies
- GIS Development
- Land Use Studies
- Master Planning



Nashville District birds-eye view of Riverfront Park Design Plan in Nashville, Tennessee



# Planning Assistance to States



## Utah Geological Survey



### Project Description

• Provide a unified flood hazard map intended to supplement to the FEMA maps to provide local governments and the public with additional flood hazard information so that they can make informed decisions, ultimately reducing the risk to life and property. A web viewer will be developed so that maps are accessible to the public.



### Partners and Project Cost

Agency	Investment
USACE	\$165K
UGS	\$165K in-kind
<b>TOTAL</b>	<b>\$330K</b>

### Flood Risk Reduction Outcomes

- Increase community resilience by identifying and characterizing flood hazards.
- Create higher resolution flood risk map that will allow smarter planning for rapidly expanding Utah communities.



### USACE Project Point of Contact

Rachael Orellana  
USACE Sacramento District



# Silver Jackets

## Interagency Projects

- Directly protects life safety, reduces or stems increases in loss of property, and/or increases resiliency; or reduces future expenditures
- Promotes shared responsibility
- Not a grant, funds enable USACE involvement
- All proposals must leverage resources
- Must be completed within 12-18 months



# Silver Jackets



## California

### QR (Quick Response) Codes



#### Project Description

- Develop a StoryMap to tell the story of Sacramento's flooding history
- Develop a map tourists and locals can use to learn about flood risk
- Create a Quick Response (QR)codes to link to the Story Map and walking map and distribute it to stores and agencies conducting tours
- Present at Watershed University and FMA Conference



#### Partners and Project Cost

Agency	Investment
CA Department of Water Resources	\$30K In-kind
CA State Parks	\$5K In-kind
USACE	\$34K Cash
City of West Sacramento	\$10 In-kind
<b>TOTAL</b>	<b>\$79K</b>

#### Successes/Best Practices

- Greater public awareness to flood risk is the first step in protecting life and property.
- By walking around Sacramento, tourists and members of the public will immediately learn about Sacramento's flood history and risk.
- Use technology to educate local communities and allows them to share information with smart phones or tablets.

#### USACE Project Point of Contact

Hunter Merritt  
USACE Sacramento District

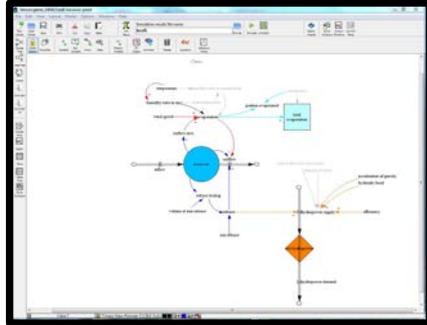
# Silver Jackets



## California Flood Risk Education Project

### Project Description

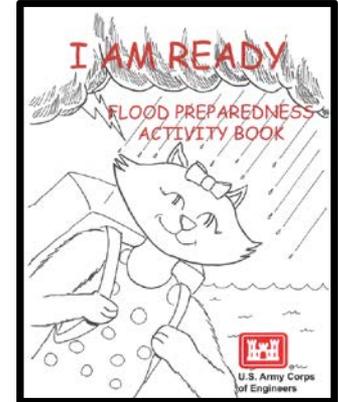
- Increasing awareness in students, especially in STEM-related classes, of the importance of flood risk management and non-structural measures to reduce flood risk
- Improve USACE involvement in the STEM, Common Core and Next Generation Science Standards



### Flood Risk Reduction Benefits

These products are intended to:

- Reduce Flood Risk (via non-structural)
- Results in action by others (individuals and families, teachers and students)



### Challenges Overcome / Continuing Challenges

- Teacher schedules (summer break)
- Developing outreach package for models
- Grade level relevance of modules
- Reaching younger audiences
- Availability of modelers
- Acquisition of appropriate modeling software
- PAO approval schedule due to existing workload

### Partners and Project Cost

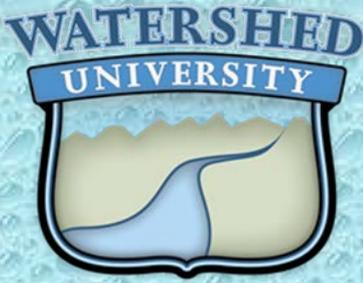
Agency	Investment
USACE	\$130,000
CA Dept of Education	\$5,000
Water Ed Foundation /Project WET	\$8,000
Sac Co. Office of Ed	\$8,000
Green 360	\$2,000
NOAA/NWS	\$2,000
CA Dept of Water Resources	\$8,000
<b>TOTAL</b>	<b>\$314,000</b>

### Successes/Best Practices

- The parent – child activity in the coloring book was found to be an effective way to get the flood risk awareness message to parents
- High school teachers were enthusiastic about piloting the SWMM Model and helping their students understand water management trade-offs

### USACE Project Point of Contact

Rhiannon Kucharski  
USACE Sacramento District



# SAVE THE DATE!

## Come to the 2016 Watershed University Event!

Wednesday, April 27<sup>th</sup> &  
Thursday, April 28<sup>th</sup>  
Atwater, CA

Merced County Office  
of Emergency Services  
Building, OR VIRTUALLY!

You are invited to attend, or participate by webinar, in this FREE 2-day event to network with professionals and learn about the current challenges of water management flood management, and emergency management, from local, State, and Federal perspectives.

Space is limited, but virtual participation is not! Register by calling 916-574-0625 or emailing [Maria.Lorenzo-Lee@water.ca.gov](mailto:Maria.Lorenzo-Lee@water.ca.gov) or call for more information. Registrants will receive more details on agenda and call in information.



# Silver Jackets



## NEVADA

### Pyramid Lake Paiute Tribe Flood Plain Management Plan



#### Project Description

- The Pyramid Lake Paiute Tribe would like to develop a floodplain management plan in order to reduce the risk from flood hazards on their land.
- The plan will increase flood risk awareness, communicate roles and responsibilities, and assist with disaster planning.
- The intent will be for the plan to fall within the State Hazard Mitigation Plan.
- A new challenge to managing flood risks for the tribe is due to anticipated peak flow increases from the Truckee River flood project upstream. So it is timely for the tribe to revisit flood preparedness and watershed management.



#### Flood Risk Reduction Benefits

- This effort will bring the tribe and agencies to look at the community's flood risk, increase life safety, reduce property losses, and identify other opportunities for managing the watershed in an integrated fashion.
- The floodplain management plan will be a guide on how to manage flood risk and will help the community to understand where and how to build. This will decrease future disaster expenditures and provide a more resilient community. Additionally, when an entity has a hazard mitigation plan, it is eligible for various FEMA grants.
- As the tribe learns more about flood risk management, the members can take actions to protect lives and property. The floodplain management plan will help guide their efforts.

#### Challenges Overcome / Continuing Challenges

- Down cutting and degradation of Truckee River due to human related activities.
- Instability of river morphology has given rise to increased erosion that is more susceptible to flooding.



#### Partners and Project Cost

Agency	Investment
Nevada Department of Water Resources	\$20K In-kind
Nevada Division of Emergency Management	\$15K In-kind
Pyramid Lake Paiute Tribe	\$15K In-kind
USACE	\$60K
<b>TOTAL</b>	<b>\$110K</b>



#### Successes/Best Practices

- Proactively addressing changing conditions to reduce the risk of flood hazards in the future.
- The Flood Plain Management Plan will supply the Tribe with guidelines for further restoration projects and prioritize the areas in need of stabilization.
- A Flood Plain Management Plan will provide the Tribe an opportunity to protect their resources .



**Project Point of Contact**  
 Vanessa Niño-Tapia  
 USACE Sacramento District

# Silver Jackets



## Utah

### Nonstructural Workshops

#### Project Description

•The Corps conducted three workshops around the state of Utah to educate the local flood agencies about alternative flood mitigation methods.

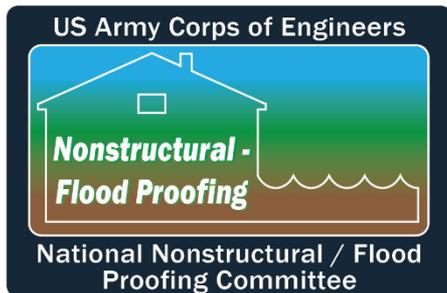


#### Flood Risk Reduction Outcomes

- Provided community leaders, state officials and stakeholders with information regarding floodplain management and the benefits of nonstructural flood risk adaptive measures to reduce future flood losses
- Empowered property owners to know how to implement non-structural methods to reduce potential flood damages.

#### Challenges Overcome

•Weather and scheduling challenges were overcome to make the workshops happen



#### Partners and Project Cost

Agency	Investment
Utah Division of Emergency Management	\$10K In-kind
FEMA Region VIII	\$15K In-kind
USACE	\$26K
<b>TOTAL</b>	<b>\$51K</b>

#### Successes/Best Practices

- Strengthened Utah communities by facilitating discussions on improved floodplain management practices.
- Benefited underserved Utah communities that did not have the resources to create a comprehensive flood plan management plan about the value of non structural alternatives.

#### USACE Project Point of Contact

Melissa Hallas  
USACE Sacramento District

# Silver Jackets



## California Webinar Support



### Project Description

The California Silver Jackets team is in the forming stages. The California Silver Jackets team is made up of around 52 federal, state and local agencies at this time. As part of the forming, each meeting the team discusses potential projects. At this time there are 10 potential projects on the list. One of the potential projects is a series of webinars.

Many of the local agencies are not aware of many of the federal and programs or initiatives that are going on in the state. A series of webinars will help the various agencies understand and utilize the information for future projects or works.

### Flood Risk Reduction Outcomes

- Increased public and policymaker awareness of flood risks which improved decision making processes. Increased support for flood emergency preparedness, response and recovery programs to reduce flood impacts. Encouraged more responsible land use planning practices. Establish sufficient and stable funding mechanisms to reduce flood risk.

### Partners and Project Cost

Agency	Investment
USACE (SPK)	\$39K
USACE (SPD)	\$2.5K
USACE (SPL)	\$2.5K
<b>TOTAL</b>	<b>\$44K</b>

### Webinars

- Emergency Restoration Program
- Flood Risk Communication – Roles & Responsibilities
- FEMA High Water Mark Initiative
- Education Materials
- Non-structural Techniques



Flood Preparedness Week

### USACE Project Point of Contact

Rachael Orellana  
USACE Sacramento District

# Silver Jackets



## California

### Communication of Flood Risk- Multimedia



#### Project Description

- Develop informational video product to increase public awareness of flood risk and specific non-structural actions to manage risk.
- Videos focus on the specific flood risks in California's different regions.
- Videos are being used in trainings, conferences and are a great way to take the information to other groups during presentations.

#### Flood Risk Reduction Outcomes

- Reduces future expenditures by encouraging citizens to take action to minimize risk, which in turn saves funds during emergency and recovery.



#### Challenges Overcome / Continuing Challenges

- Staying focused on flood risk in a time of drought.
- Reaching the over 7 million people that are exposed to flood hazards in CA.

#### Partners and Project Cost

Agency	Investment
CA Department of Water Resources	\$20K In-kind
U.S. Army Corps of Engineers	\$94K Cash
<b>TOTAL</b>	<b>\$114K</b>

#### Successes/Best Practices

- Raise the public's awareness of flood risks, even during a drought.
- Reinforce the message that flood awareness is everyone's responsibility and that it is important to be prepared.
- Videos in Spanish targeting Spanish speaking population

#### USACE Project Point of Contact

Rachael Orellana, PE  
USACE Sacramento District



# Silver Jackets

## Interagency Projects

# VIDEO



# AUDIENCE PARTICIPATION



Peer Examples of PAS/FPMS/SJ Projects





# Alaska

## Juneau Jokulhlaup Inundation



### Project Description

- Modeling & mapping of flood inundation caused by jokulhlaups (glacial-outburst flooding) on the Mendenhall River in Juneau, AK



### Flood Risk Reduction Benefits

- While not regulatory in nature, the inundation maps based on USGS gage elevations, enable the community and NOAA to provide more effective warnings of potentially hazardous areas as a result of jokulhlaup events.
- Greater warning times allow for flood-fighting activities and transportation of large valuables outside of flood areas. The maps also provide planning and transportation engineers information to construct more resilient egress routes.

### Challenges Overcome / Continuing Challenges

- Obtaining permits to survey on National Forest lands proved to be challenging
- Ensuring inundation extents are used appropriately by explaining they are not intended as regulatory maps

### Partners and Project Cost

Agency	Investment
USACE	\$60
NWS/NOAA	\$30k In-kind
USGS	\$32K
City and Borough of Juneau	\$334K
<b>TOTAL</b>	<b>\$456k</b>

### Successes/Best Practices

- Collaborative effort with NOAA in developing the river model and inundation maps
- Excellent community support identifying high water marks from 2014 jokulhlaup event; and providing recent LiDAR along the Mendenhall River

### Project Point of Contact

Wendy Shaw  
USACE-Alaska District

# AUDIENCE PARTICIPATION



Take a minute to list what you learned,  
then share one highlight





# Comments, Ideas, Questions

Rachael Orellana, Flood Risk Program Manager  
Vanessa Niño-Tapia, Civil Engineer

