COUNTY OF SAN DIEGO, MEETING OF THE BORREGO SPRINGS COMMUNITY SPONSOR GROUP
*****MEETING AGENDA*****

Wednesday, April 1, 2026, 4:30 p.m.
In-person at the Borrego Library, 2850 Country Club Rd, Borrego Springs & also via Zoom
Topic: Borrego Springs Community Sponsor
LINK FOR THE SPONSOR GROUP MEETING
https://us02web.zoom.us/j/87282064608?pwd=aZB2aP1JwdGT5mxmaOllbxNY2HbpeD.1
THE PUBLIC IS ALWAYS WELCOME TO OUR MEETINGS
WE REPRESENT YOU WHEN ADVISING THE COUNTY OF SAN DIEGO ON LAND USE ISSUES
Please note that discussion items might be arranged according to interest in public discussion and might not exactly follow the agenda as given below.

A. CALL TO ORDER/ROLL CALL

B. APPROVAL OF MINUTES FOR THE MEETING of March 4, 2026, (Attached)

C. PUBLIC COMMUNICATION (will be limited to 3 min): Opportunity for members of the public to speak to the Group on any subject within the Group's authority that is not on the posted agenda.

D. ACTION ITEMS

1. Welcome Sondra Boddy to the Borrego Springs Community Sponsor Group Seat #9.
2. Report on flood control studies being conducted in the basin. Of specific note is the extent of the area of study. Presentation by the San Diego County Public Works Flood Control and Federal Emergency Management Administration (FEMA). Power Point Presentation. (Four Attachments)
3. Report on Climate Action Plan presentation by American Aceves PDS Planner II presenting.
4. Potential land development on Palm Canyon Road, Jan Stubbs presenting. (Note this is discussion item only, and likely not a "voting item" however I have placed it here on our agenda).

E. NON-ACTION ITEMS:

1. Communication and discussions regarding the status and role of the Revitalization Committee with regard to the CSG. John Peterson presenting.
2. Update on the Borrego Spirit award. Melissa Huston presenting.

F: GROUP BUSINESS:

1. Status of required training for all members of the CSG.
2. Need a point person for dark sky issues.
3. Correspondence received: none

G. ADJOURNMENT

The next regular meeting is scheduled for May 6, 2026, at 4:30 at the Borrego Springs Library.
The Chair has appointed the following BSCSG Members to serve as points of contact for the following areas:

a) Road Maintenance, Bill Haneline
b) Dark Sky Ordinance and issues, open
c) Association of Planning Groups, Jim Dax
d) Landscaping at the La Casa Solar Panel Field, Bill Haneline
e) Report from the Infrastructure Committee, Bill Haneline.

Potential items for our next Sponsor Group meeting which is scheduled for May 6, 2026:

a) Report from SDG&E regarding Microgrid and power shut offs.
b) Report from SDG&E regarding new power line project.
c) Presentation on Christmas Circle Non-profit organization, by Jeff Sloan.

Emails sent to the Chair at petersonenv@hotmail.com will be forwarded to the appropriate person.

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If this Agenda is revised, a revised copy will be posted 72 or more hours prior to the meeting. The final Agenda may include additional Administrative or Non-Action items. For further information and to be added to the Sponsor Group email list to receive agendas and agenda packets, contact the Chair at petersonenv@hotmail.com . Address U.S. mail to: Community Sponsor Group, P.O. Box 1371, Borrego Springs, CA 92004-1371. For agendas, minutes and Community Plan, visit: https://www.sandiegocounty.gov/content/sdc/pds/gpupdate/comm/borrego.html .

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Borrego Springs Community Sponsor Group Members:
Chairperson: John Peterson; Vice-Chairperson: Jim Dax; Secretary: Nancy McRae
Members: Bruce Durbin, Bill Haneline, Melissa Huston,
Anne O'Connor, vacate seat: #9 (Sondra Boddy who been recommend by the CSG for this open seat).

Standing Committees None

List of attachments: Click on this 2026-04-01 Public Folder

Draft meeting minutes Sponsor Group meeting dated February 4, 2026

1) Power Point Presentation for the item D.2 from Jan Stubbs
2) Letter regarding STR's in Borrego Springs. Borrego Springs CSG to Supervisor Desmond.

COUNTY OF SAN DIEGO
MEETING OF THE BORREGO SPRINGS COMMUNITY SPONSOR GROUP
*****DRAFT MINUTES*** Wednesday,**
March 4, 2026, 4:30 p.m.
In-person at the Borrego Library, 2850 Country Club Rd, Borrego Springs & also via Zoom
THE PUBLIC IS ALWAYS WELCOME TO OUR MEETINGS
WE REPRESENT YOU WHEN ADVISING THE COUNTY OF SAN DIEGO ON LAND USE ISSUES

A. CALL TO ORDER/ROLL CALL

John Peterson, Chair	Present
Jim Dax, Vice-Chair	Present
Bruce Durbin	Present
Bill Haneline	Present
Melissa Huston	Present
Rebecca Falk	Present
Anne O'Connor	Present
Nancy McRae, Secretary	Present
Seat #9 - Vacant	

B. APPROVAL OF MINUTES FOR THE MEETING of February 4, 2026, (AFached)

MOTION: Jim Dax
SECOND: Anne O'Connor
DISCUSSION: Haneline regarding LCDZ, Cecena is correct spelling of name.
VOTE: APPROVED

John Peterson, Chair	Yes
Jim Dax, Vice-Chair	Yes
Bruce Durbin	Yes
Bill Haneline	Yes
Melissa Huston	Yes
Rebecca Falk	Abstain (not at previous meeUng)
Anne O'Connor	Yes
Nancy McRae, Secretary	Yes
Seat #9 - Vacant	

C. PUBLIC COMMUNICATION (limited to 3 min per person): Opportunity for members of the public to speak to the Group on any subject within the Group's authority that is not on the posted agenda.

Nancy McRae let the group know of Bill Berkeley's passing on February 27. She read the following: "Bill was a valued member of the Sponsor Group serving during two separate

Umes. Bill loved Borrego Springs. The later years of his life were devoted to the revitalizaUon of the Rams Hill golf course and community. Thanks to Bill's vision, Rams Hill is once again the thriving golf course and acUve community that we know today. He worked with the investment group that turned Rams Hill from a barren and desiccated landscape in 2014 to the town's largest employer today. Bill had a tremendously posiUve and lasUng impact on our community and for that the BSCSG will always be grateful." Kathleen LippeF wants to share an item wriFen by Planning Group (not the BSCSG) member Robin Joy Maxon. In it she spells out what's been going on at the county. There is a trend to marginalizing planning groups. Their input and agendas were taken over by County Planning services who determined what their agendas were. The lack of transparency just got worst. There's liFle connecUon between what ciUes want and what unincorporated areas want, and now the unincorporated areas have lost their voice. Never heard backcountry clamoring for cannibis shops, bike lanes, green farming. County outreach about meeUngs was posted in newspapers that backcountry residents don't read, therefore only a handful of people came to the 3 meeUngs. Doesn't know how we can get the power back to the people. Nancy McRae requested that the "wriFen item" Kathleen referenced in her first sentence be emailed to John Peterson; Kathleen agreed to do so. Elena Thomson has a suggesUon. Last year we had code enforcement people out which helped them understand BS issues and held them accountable. Have them out annually on a field trip or via zoom.

John Peterson - Rebecca Falk will be leaving the BSCSG aher this meeUng.

D. ACTION ITEMS

1. Socially Equitable Cannabis Program, Nancy McRae to present a summary previous CSG acUon. Elena Thompson PresenUng

NM - Encouraged people to read minutes from April 2025 meeUng available on County website. Explained that 2 moUons were made regarding this issue, but neither got sufficient votes to enable wriUng a leFer to the County.

Falk - there is sUll a hearing before the County planning group on 4/10.

Elena Thomson - I am interested in this topic. I have been coming to Borrego since the 70s. Have seen the impacts of cannibis at the coast. Got interested in what the County was doing on this issue. I want to see BS kept free from the problems of the coast and keep our gem safe and protected.

AFended recent County meeUng. The source of info for her presentaUon comes from State and County websites. Diagram of county supervisors. Jim Desmond, District 5. History of Socially Equitable Cannibis (SEC) program. In 2006, Prop 64 legalized cannibis in California. The full Utle was "Control, Regulate and Tax the Adult Use of Marijuana." Within SD county, there were 27,000 individuals in jail or with misdemeanor or felony convicUons to do with marijuana. All those people had their cases dismissed.

What is the program exactly? The County's new program started evolving in 2020 under Nathan Fletcher and allows commercial cannibis businesses in unincorporated areas, where approx 550K people reside. The program is being designed for safe access to cannibis and to provide an equitable path to cannibis business ownership for those individuals previously convicted.

The program includes regulatory requirements, licensing, environmental consideraUons (maybe). The program is for "eligible" people provided they have no new convicUons, but "eligible" is not clearly defined.

The programs allows for cannibis retail dispensaries. Encinitas - where the proposiUon won 51-49 %, now has 5 dispensaries, and they have seen the impact. Cannibis lounges, events, culUvaUon, manufacturing. We've seen culUvaUon and manufacturing when we drive by Lake Henshaw. One of the tribes has a facility up there.
Stakeholders in BS. At the 1/14 County meeUng, many other planning/sponsor groups from all over County were represented - concerns were universally shared. Concerns include Sheriff and police - we don't have a local force; Fire/ambulance - we don't have enough; Medical providers are not strong in this town. The businesses, residents, youth, tourists, visitors and the wild animals will all be impacted. Countless studies throughout the state show the deleterious effects of marijuana on youth. She recommended that BS ask to be exempt.

Some of the BS conflicts and risks for BS: 1. Water adjudicaUon is trying to bring aquifer back into balance. Groves are closing out, how much sense would it make to bring in marijuana culUvaUon. Land is very cheap here. 2. Dark Skies. Light from nocturnal culUvaUon in greenhouses. Picture of lighted greenhouse shown. 3. Air polluUon. Stench of marijuana. Cathedral City has taken acUon about the stench affecUng residents and they are having to reverse course. 4. Public safety. 5. Driving on country roads (narrow and winding). 6. Burden on medical service providers.

Quality of Life - BS is a Park-centric community. We are about families and community We are the largest state park. Do we want to be known as a cannibis desUnaUon?
She is not fear mongering. These are real world decisions that we should be paying aFenUon to.

Next steps: Finalizing drah ordinance and EIR, drah licensing, then presenUng SEC program to County Planning Commission, then will go back one more Ume to County Board of Supervisors (BOS) which has already voted 3 -2 in earlier vote. Expect hearing to be this summer. To what extent it could roll out here, we don't know.

Final recommendaUon. Request the SG to send a leFer to the county requesUng an exempUon given the conflicts, risks and issues. The Major of El Cajon said you can have marijuana delivered anywhere, so dispensaries aren't needed.

Public discussion period opened

Anne O'Connor - My recollecUon was BS was exempt based on water restricUons. (That is not correct.) Could we ask for an exempUon?

Durbin - Have to have industrial zoning, which BS has very liFle so the likelihood of culUvaUon here is very unlikely.

Falk - County doesn't operate that way (meaning granUng exempUons) Durbin - Can't exempt your community from a county-wide ordinance. The other issue is equity. CommuniUes like Borrego, strong, volunteers, Ught knit; other communiUes are more ethnic, not as organized, people are working 2-3 jobs, because they're not organized enough to say no all this would get shoved on them.

O'Connor and McRae - Yes, just like the State shoved the Sexually Violent Predators (SVPs) on us and leh the coastal ciUes alone.

Public Discussion

LippeF - Prop 64 wriFen by marijuana industry They outspent those who opposed 11:1. It barely passed. It did not have an overwhelming majority. If the industry is struggling, taxes won't be collected. The idea of letng marijuana industry educate on prevenUon makes no sense. The DOJ did an analysis on the numbers we were told were in prison for simple possession - 1 in 3 was in for simple possession. Most were in for dealing on a large scale. To her, it is violence when you reach out to young people whose lives may be ruined. Treatment is expensive. They talk about harms to those convicted. They never menUon harms done to those in drug abuse or drug violence. The growers told the Planning Commissioners - we do not want to pay for municipal waters, we want to dig wells. They were given the right to do that.

Peterson asked that comments be kept relevant to Borrego Springs.

Brad Coe. Great presentaUon. We're in Santa Ysabel. When those greenhouse lights are on, it illuminates the enUre area.

MP (Member of Public) Great presentaUon. Water is definitely an issue. I'll bring this up to Water Master Board (WMB). They were going to put a grove on the other side of the mountain. WMB wrote a leFer in opposiUon. To say it's "unlikely" scares me. If it's unlikely, then let's just stop it. When you go by the 86, that smell is pervasive. Now two different ordinances (dark sky and SEC) will end up in court. If this is what community thinks, we should oppose and put it on record.

Brad Coe - The power they use. They run generators 24/7 - don't connect to SDGE. Go through 2K gallons of propane per week. Constantly growing. Manufacturing brings in other companies.

Durbin: False statements. There isn't a 24/7 growing operaUon. Only Ume you see lights are in winter hours unUl 8 pm. During winter, marijuana sUll needs 12 hours of daylight. Tribe is looking into installing interior curtains. The Iipay NaUon has a fully licensed, sovereign, and taxed cannibis operaUon. 60% of clientele at that dispensary are over the

age of 55. There are no teenagers working there. If there are generators, they supplement the power supplies that already exist. If you want info about their operaUons, anyone is welcome to go and ask.

MP Claire Leaphart. Thank you for presentaUon. Two points. A leFer is mandatory- even if it's not read, it's on file. The state park surrounds us - do they have a posiUon on this? Do they aFend our meeUngs? It would be great if they would make a statement - even though they are state government.

JP - Asked for addiUonal comments. Public comments closed.

O'Connor - Made a moUon to present a leFer in opposiUon to the County, based on our risks and issues. The town of BS is overwhelmingly against this (SEC program).

There was no Second.

Dax - has been aFending Planning Group meeUngs. BSCSG is not a voUng member, advisory only. It's a complicated issue. Everyone has said they do not want it. They said they would like AlternaUve 4. We did discuss this in the past.

Falk - The BOS meeUng that Elena and Anne went to voted on the opUons they wanted staff to pursue. Formal recommendaUon on zoning ordinance. Going to consider how to implement with zoning. Board will make final decision in June. Window of opportunity is before 4/10 meeUng. Another piece of info: The Planning Dept is going to carry forward the opUon of not doing anything. Points she wanted to make - this was discussed in April, 2025. BS has a dark skies ordinance that any project has to adhere to and county would enforce that. A new business would not be exempt. Water is adjudicated and managed. It is not even a possibility the cannibis will be grown here. The water and light issues are red herrings for Borrego. When she talks to members in the community most of whom are unaware of the SEC, the people who she talks to would like a dispensary. Doesn't mean the whole community is opposed to it.

McRae - We live next to an officially designated wilderness area, yet twice now we are having to baFle the installaUon of mega electrical transport towers right through the wilderness. Just because the government is not supposed to do something, doesn't mean that they won't change their mind and do it. We should at least write a leFer in opposiUon.
O'Connor - If we are truly as impotent as it seems, we have wasted an hour discussing this.

Falk: Could make a moUon that we sent a comment leFer to the Planning Commission and copy to the BOS voicing our opposiUon - urge them to do OpUon 1.

MOTION: O'Connor - that we provide a leFer recommending that we proceed with the opUon that says "No Project."

SECOND: Jim Dax **DISCUSSION:**

Falk: AI summary of BOS meeUng said - the moUon passed . Staff said the no project alternaUve will sUll be provided to the board. **VOTE: MOTION NOT APPROVED, VOTE SPLIT 4 - 4**

John Peterson, Chair No

Jim Dax, Vice-Chair	Yes
Bruce Durbin	No
Bill Haneline	No
Melissa Huston	Yes
Rebecca Falk	No
Anne O'Connor	Yes
Nancy McRae, Secretary	Yes

Seat #9 - Vacant

McRae asked if a moUon to write a leFer in support of the other Planning Groups/Sponsor Groups who have opposed all alternaUves except 1 and 4 might be approvedThe program helps former drug dealers and users get their lives back together.
. The answer was no.
2. PotenUal land development on Palm Canyon Road, Jan Stubbs presenUng. No presentaUon because Jan Stubbs was not in aFendance.

E. NON-ACTION ITEMS:

1. Report from the Borrego Springs Rotary. Diane Johnson, President of Rotary presenUng.

12 members, small but mighty. Raised $60K last two years and have given that away. Also have funds from an earlier Dennis Avery donaUon. Rotary Intl is all over the world. It has given away $4B since incepUon. The Gates FoundaUon partnered with Rotary to eradicate polio - have come so close.

Gave away last year $50K in scholarships for all kinds of educaUon, from beauty school to Stanford University. Two other iniUaUves: 1. Send youth to Leadership Development; 8 kids/year, weekend retreat camps learn to speak in public, great exposure to kids form other communiUes. 2. Community development for example Community Concert AssociaUon, Art InsUtute to buy new shelves for educaUonal art programs, Ernie Loza to help with orphanage in Calexico. Gave 22 scholarships this past year. If a student begins school, the amount increases from $1K to $2K in year two and stays at that as long as they're in school.

Dax - Primary way of raising funds? A: the gala. Also, the Miss Borrego Contest run by Sylvana Meeks, not at all just a beauty contest - the students taught how to speak and comport themselves in public. Is there a website for donaUons: borregospringsrotary.org

2. Report on the Borrego Spirit award. Melissa Huston presenUng.

Handed out informaUon about award. For a copy of info sheet, please email John Peterson. Huston said that the only since last meeUng was that Adrienne CisnerosSelekman (County staff) wants to cap at 4 recipients per cycle - 2 cycles per year.

Durbin - Some guidelines /definiUons on volunteerism, acts of service; these terms are closely aligned, ambiguous. Huston: Agreed to Ughten up so not leh to interpretaUon. Falk: Likes the word “heart” and would like “Heart of the Community” to be first choice.

3. Proposed Cross Walk on Palm Canyon Drive. Jim Dax presenUng. Nothing to discuss yet.

4. Status update on the leFer regarding Short Term Rentals update. John Peterson presenUng. Have not goFen a response from the County to the BSCSG leFer, which was also sent to the public.

F: GROUP BUSINESS:

1. Need a temporary secretary for the April 1, 2026 meeUng (Huston volunteered)
2. Schedule for the summer break for the CSG.

Last meeUng is June 3, October 7 will be next meeUng.

3. Status of required training for all members of the CSG. Per JP, up to each member.
4. Correspondence received: none

G. ADJOURNMENT

MOTION: Nancy
SECOND: Falk
VOTE: Unanimous Mee‘ng adjourned at 6:14

The next regular meeUng is scheduled for April 1, 2026, at 4:30 at the Borrego Springs Library.

The Chair has appointed the following BSCSG Members to serve as points of contact for the following areas:

1. Road Maintenance, Bill Haneline
2. Dark Sky Ordinance and issues, Rebecca Falk

Won’t be here to conUnue this, but is in the middle of follow up with county to have a web page for dark sky ordinance. Intl standards and county standards don’t match anymore. No one at the county to help with that. Would anyone like to take it on. Falk could work under the auspices of the Infrastructure commiFee. Anne O’Connor would like to know what is involved.

3. AssociaUon of Planning Groups, Jim Dax Nothing new.
4. Landscaping at the La Casa Solar Panel Field, Bill Haneline

Anne O’Connor spoke with Cecena - they are transiUoning to being self-managed, on back burner for now.

5. Report from the Infrastructure CommiFee, Bill Haneline. Nothing to report.

Jim Dax is taking over for Code Enforcement.

PotenUal items for our next Sponsor Group meeUng which is scheduled for April 1, 2026: 1. Report on flood control studies being conducted in the basin. Of specific note is the extent of the area of study. PresentaUon by the San Diego County Public Works Flood Control and Federal Emergency Management
AdministraUon (FEMA). Power Point PresentaUon. (Four AFachments)

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For further informaUon and to be added to the Sponsor Group email list to receive agendas and agenda packets, contact the Chair at petersonenv@hotmail.com . Address U.S. mail to: Community Sponsor Group, P.O. Box 1371, Borrego Springs, CA 92004-1371. For agendas, minutes and Community Plan, visit: hFps://www.sandiegocounty.gov/content/sdc/pds/gpupdate/comm/borrego.html .

US Army Corps of Engineers®

BORREGO SPRINGS, CALIFORNIA DETAILED PROJECT REPORT
CONTINUING AUTHORITIES PROGRAM (CAP)
SECTION 205
FLOOD RISK MANAGEMENT
SAN DIEGO COUNTY, CALIFORNIA

NOVEMBER 2024

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EXECUTIVE SUMMARY

This study is authorized under the Continuing Authority Program (CAP), Section 205 of the 1948 Flood Control Act, as amended. This Detailed Project Report (DPR) presents the findings of the Section 205 Flood Risk Management Study, Borrego Springs, California. The U.S. Army Corps of Engineers (USACE) is the lead agency under the National Environmental Policy Act (NEPA), and the non-Federal sponsor (NFS), the County of San Diego Department of Public Works, is the lead agency under the California Environmental Quality Act (CEQA). This report documents the feasibility phase and efforts completed prior to the point where the study was determined to not have a path forward in the design and implementation (aka construction) phase as a federal project under the CAP. The project will result in non-structural measures that will be carried out by the NFS. Under USACE definitions, this is considered a study termination. Work elements completed include affected environment, without-project technical analyses, plan formulation, including screening of initial measures, and recommendations. With-project analyses, including evaluation of a final array of measures, policy compliance determinations, and environmental and regulatory compliance activities, were not conducted.

The geographic scope of this study consists of approximately 450 square miles of watershed which is approximately 33 miles from north to south and consists of 7 alluvial fans. The unincorporated community of Borrego Springs is located in the Borrego Valley and the 7 alluvial fans are subject to flash floods from the canyons to the west and north of the valley. The study area encompasses the community of Borrego Springs and the 7 alluvial fans. The overall goal of this project is to evaluate flood risk management solutions and address flood risks along the 7 alluvial fans located in Borrego Springs, CA. Almost the entire valley floor is subject to inundation by one or more of these canyons. No comprehensive flood risk management improvements exist in the Borrego Valley.

Providing flood risk management to the community of Borrego Springs would provide safety and protection to the residents. The flood hazards in the study area are extensive. All of Borrego Springs is located in the 1% chance exceedance floodplain. Five measures were carried forward for further consideration; Emergency Preparedness (Measure 1), Flood Forecast and Warning (Measure 2), Elevate Critical Infrastructure and Emergency Evacuation Route(s) (Measure 3), Improve Development Regulations (Measure 4), and Debris Basin/Detention Structure (Measure 5). The project was determined to not have a path forward in the design and implementation phase as a federal project under the CAP. Prior to the selection of a recommended plan, the study was terminated. However, it is anticipated that with the implementation of the proposed recommendations, the community of Borrego Springs would be notified of potential floods and be better prepared for future flood events.

In past years, flood mitigation measures include a few desilting basins and a diversionary channel in the northwest corner of the Borrego Valley, which are to be maintained by the private property owners (USACE, 2016). Recent flood damages from flash flooding and mudslides damaged a housing sub-division, power and telephone lines were downed, over 4 feet of mud inundated roads and trees, and the golf course had over 3 feet of debris covering it. In 1972 the Borrego Valley General Plan for Flood Control recommended a series of dikes to control floods. However, the costs were too high and there were environmental and aesthetic objections from the community.

This DPR summarizes baseline existing conditions in the study area, develops and performs screening of structural and non-structural measures, and considers the anticipated environmental impacts of the without-project conditions of the study area. Hydrologic and hydraulic analyses were completed to better understand the flood risks the alluvial fans present for the study area and develop measures to reduce flood damages. Environmental impacts of the with-project conditions had not been evaluated at the time the decision was made for project termination.

This report documents the process which reduced the overall array of potential measures to a smaller final array which includes the combination of measures 1, 2, 3, 4 and 5. A combination of these measures could likely best meet the planning objectives of flood risk management within the study area and could align with the goals of the NFS. Further analysis of the final array was not conducted as the study was terminated prior to completing a thorough analysis in the feasibility phase.

The total expected annual damages estimated from the without-project are approximately $5 million. The period of analysis used to compute costs is 50 years. Costs are also presented in FY 2021 price levels. This report does not select a National Economic Development (NED) Plan, which represents a plan that reasonably maximizes net national economic benefits, since the study was determined to not have a path forward in the design and implementation phase as a federal project under the Continuing Authorities Program (CAP). Therefore, a National Economic Development Plan was not selected since there would be no federal project to implement. This study only takes the analysis as far as the without-project condition analysis and a screening of the measures.

An evaluation of benefits and the development of costs for each measure were not completed. During the feasibility phase of this project, the study was determined to not have a path forward in the design and implementation phase as a federal project under the CAP. Since the cost-shared project with USACE is being terminated, any design and implementation costs, should a future project be implemented, would not be eligible for funding under the USACE Continuing Authorities Program, and would be the responsibility of the non-federal sponsor, the County of San Diego Department of Public Works, to fund and implement.

ACRONYMS

The following acronyms are used in this DPR and associated appendices:

AAC – Average Annual Costs
AAHU – Average Annual Habitat Unit
AAIC – Average Annual Investment Cost
AAO&M – Average Annual Operations and Maintenance
AAR – After Action Review
ABDSP – Anza Borrego Desert State Park
ACE- Annual Chance of Exceedance
AOC – Area of Concern
APE – area of potential effects
ASTM – American Society for Testing Materials
BCR – Benefit Cost Ratio
BMP – Best Management Practice
CAP – Continuing Authorities Program
CASE – Computer-Aided Structural Engineering
CE-ICA – Cost Effectiveness-Incremental Cost Analysis
CERCLA – Comprehensive Environmental Response Compensation Liability Act
CEQ – Council on Environmental Quality
CFR – Code of Federal Regulations
CO_2 – Carbon dioxide
CSO – Combined Sewer Overflow
CSRA – Cost Schedule Risk Analysis
CY – Cubic Yard
DPR – Detailed Project Report
DPR/EA – Detailed Project Report/Environmental Assessment
EA – Environmental Assessment
E&D – Engineering and Design
ER – Engineer Regulation
EO – Executive Order
ERP – Environmental Restoration Program
EV – emergent vegetation
FCD – Federal Consistency Determination
FCSA – Federal Cost Share Agreement
FEMA – Federal Emergency Management Agency
FID – Federal Interest Determination
FMP – Fill Management Practices
FONSI – Finding of No Significant Impact
FQAI – Floristic Quality Assessment Index
FWCAR – Fish and Wildlife Coordination Act Report
FY – Fiscal Year
GHG – Greenhouse gas
HHS – Department of Health and Human Services
HTRW – Hazardous, Toxic or Radioactive Waste
HUC – Hydrologic Unit Code
IDC – Interest During Construction

IJC – International Joint Commission
IPCC – Intergovernmental Panel on Climate Change
IWR – Institute for Water Resources
LERRDs - Lands, Easements, Rights of Ways Relocations and Disposals
LF – Linear feet
LOI – Letter of Intent
SPL – Los Angeles District, U.S. Army Corps of Engineers
LWD – Low Water Datum
MGD – million gallons per day
MSE – Mechanized Stabilized Earth
NAA – No Action Alternative
NAAQS – National Ambient Air Quality Standards
NED – National Economic Development
NEPA – National Environmental Policy Act
NER – National Ecosystem Restoration
NFS- non-federal sponsor
NLCD – National Land Cover Dataset
NPL – National Priorities List
NRCS – National Resources Conservation Service
NRI – Nationwide Rivers Inventory
O&M – Operations and Maintenance
OMRR&R - Operation, Maintenance, Repair, Rehabilitation, and Replacement
OSHA - Occupational Safety and Health Administration
P&G – Principles and Guidelines
PDT – Project Delivery Team
PED – Planning, Engineering and Design
P.L. – Public Law
PPA – Project Partnership Agreement
PWI – Project Work Item
QHEI – Qualitative Habitat Evaluation Index
RAC – Remedial Advisory Committee
RAP – Remedial Action Plan
REC – Recognizable Environmental Concerns
RSM – Regional Sediment Management
S&A – Supervision and Administration
SHPO – State Historic Preservation Office
SPT – Standard Penetration Test
TSP – Tentatively Selected Plan
USACE – U.S. Army Corps of Engineers
USCS – United Soil Classification System
USDA – U.S. Department of Agriculture
USEPA – U.S. Environmental Protection Agency
USFWS – U.S. Fish and Wildlife Service
WHO – World Health Organization

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1 INTRODUCTION

1.1 Study Purpose, Scope, and Need

This integrated Detailed Project Report has been prepared by the Los Angeles District (SPL) of the U.S. Army Corps of Engineers (USACE) to identify the most cost-effective measure for providing flood risk management to the unincorporated community of Borrego Springs, California (Borrego Springs) while minimizing environmental, economic, and social impacts. The San Diego County Department of Public Works is the non-federal sponsor (NFS). Initially, the NFS requested federal assistance from USACE in March 2008 through a Letter of Intent (LOI) to address the flooding under the Section 205 authority.

The primary purpose of this project is to evaluate flood risk management solutions to develop a long-term viable measure and provide a cost-effective means for minimizing impacts of flash flooding. The study area encompasses 7 alluvial fans; Henderson Canyon, Hellhole Canyon, El Vado Canyon, Dry Canyon, Culp Tubb Canyon, Coyote Canyon, and Borrego Palm Canyon, which are in Borrego Springs, San Diego County, California.

This report documents the study results for the proposed recommendations. The study has been conducted in accordance with feasibility study guidelines contained in the Planning Guidance Notebook (ER-1105-2-100) and other pertinent USACE regulations and guidance.

The other key features of this DPR Study include:

- Documenting the project objectives
- Discussing opportunities and constraints
- Describing existing and potential future conditions
- Identifying alternative means to achieve the project objectives

In accordance with ER-200-2-2 (Procedures for Implementing the National Environmental Policy Act (NEPA)), USACE has assessed the potential future conditions of the project area. The study was determined to not have a path forward in the design and implementation phase as a federal project under the CAP. Prior to the selection of a recommended plan, the study was terminated. Post project termination, project alternatives were not formulated to assess environmental effects on the quality of the natural environment.

The need for the proposed federal action arises from the significant flood risk in the study area, as described in Section 2 of this report. The purpose of the proposed federal action is to work within the defined study area to enact solutions within USACE authority for the flood risk management in Borrego Springs, CA.

This DPR documents the feasibility phase and efforts completed prior to the point where the study was determined to not have a path forward in the design and implementation phase as a federal project under the CAP. The project will result in non-structural measures that could be carried out by the NFS. Under USACE definitions, this is considered a study termination. This DPR did not analyze the effects of the measures, nor does it recommend a measure that best meets the project objective in a cost-effective manner. No recommended plan was chosen, however 5 measures are provided, as the determination of study termination was made prior to the decision point. This flood risk management study was planned in cooperation with the project's NFS.

1.2 Study Authority

Section 205 of the Flood Control Act of 1948, as amended, authorizes USACE to study, design and implement local flood risk management projects by the construction or improvement of structural flood damage reduction features such as dikes, channels, and dams. Nonstructural measures differ from structural measures in that they focus on reducing the consequences of flooding instead of focusing on reducing the probability of flooding. Section 205 falls within the Continuing Authorities Program[1] (CAP), which focuses on water resource related projects of relatively smaller scope, cost, and complexity. CAP is a delegated authority to plan, design, and construct certain types of water resource and environmental restoration projects without specific Congressional authorization.

The total federal investment for planning, design and construction of individual Section 205 projects is limited to a federal cost of $10,000,000. The first $100,000 of the feasibility phase for this project is 100% federally funded. Feasibility costs over $100,000 are shared equally (50 percent each) between USACE and the NFS pursuant to the terms of the June 2013 CAP Feasibility Cost Sharing Agreement (FCSA), executed between USACE and the NFS. During the design and implementation phase, the cost share is 65 percent federal and 35 percent non-federal.

Initially, the Los Angeles District received a Letter of Intent (LOI) from the NFS in March 2008 requesting an investigation under the Section 205 authority to address flood risk in the Borrego Valley and the threat to the community of Borrego Springs. Pursuant to the request, the District completed a Federal Interest Determination (FID) in January 2010. The FID investigated flood mitigation measures and provided the basis for developing the FCSA. The FID concluded that there was a federal interest in continuing with this Section 205 Feasibility Study.

1.3 Study Area/Project Setting, and Background

1.3.1 Study Area

Borrego Springs is located in San Diego County in southern California, approximately 60 miles northeast of San Diego. The community is located 780 feet above sea level, on the floor of the Borrego Valley, which is widely acknowledged as the westernmost extent of the great southwestern geographical region known as the Sonoran Desert. Borrego Springs is surrounded by the 600,000 acres of the Anza-Borrego Desert State Park (ABDSP). Borrego Springs lies within the Anza Borrego Watershed, which is approximately 450 square miles and 33 miles in length from north to south. The study area is diverse, complex, and supports a variety of protected threatened and endangered species. Figure 1 depicts the regional area.

[1] Additional information on this program can be found in Engineering Pamphlet (EP) 1105-2-58, Continuing Authorities Program.

Figure 1. Location Map.

Source: http://home.znet.com/kat/images/SoCalMapXxxC.JPG

1.3.2 Project Site

The study area includes 7 alluvial fans in the Borrego Valley that are subject to flash floods from canyons to the west of the valley. These canyons include, Coyote Canyon, El Vado Canyon, Henderson Canyon, Borrego Palm Canyon, Hellhole Canyon, Dry Canyon, and Culp Tubb Canyon (Figure 2 and 3). Note that an eighth alluvial fan is present in the Borrego Valley, Fire Canyon. Fire Canyon has not been explicitly considered in the Los Angeles District's hydrology but is considered in the Existing Conditions and Proposed Alternatives Floodplain Report (WEST report). Fire Canyon was not analyzed as a separate sub-basin in the hydrology analysis (Appendix C) because it has a drainage area of 0.7 square miles. However, that drainage area was accounted for within the West Borrego Valley sub-basin.

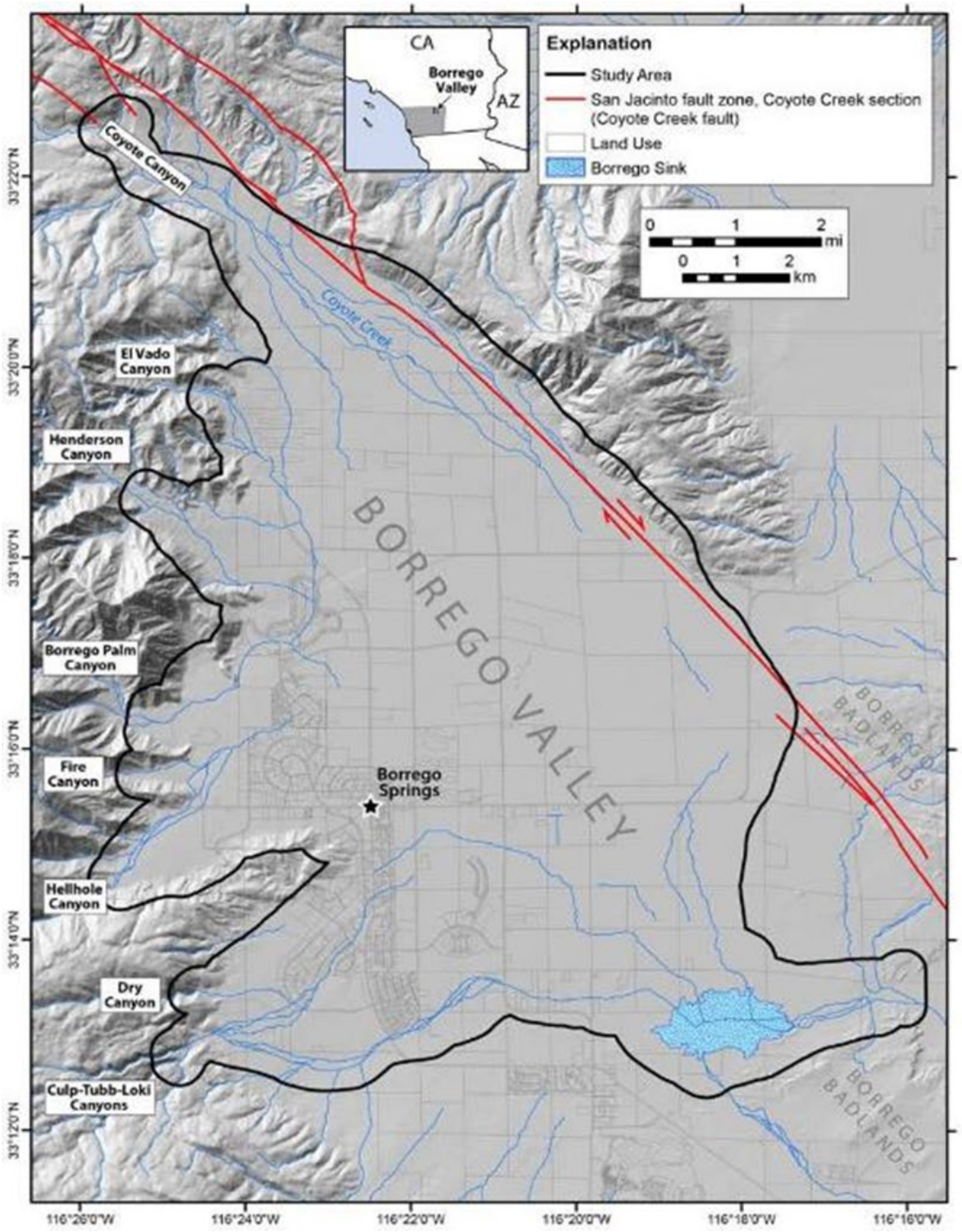

Figure 2. Borrego Springs study area. The canyons that drain into the Borrego Valley are noted on the left and the San Jacinto Fault zone is shown on the right.

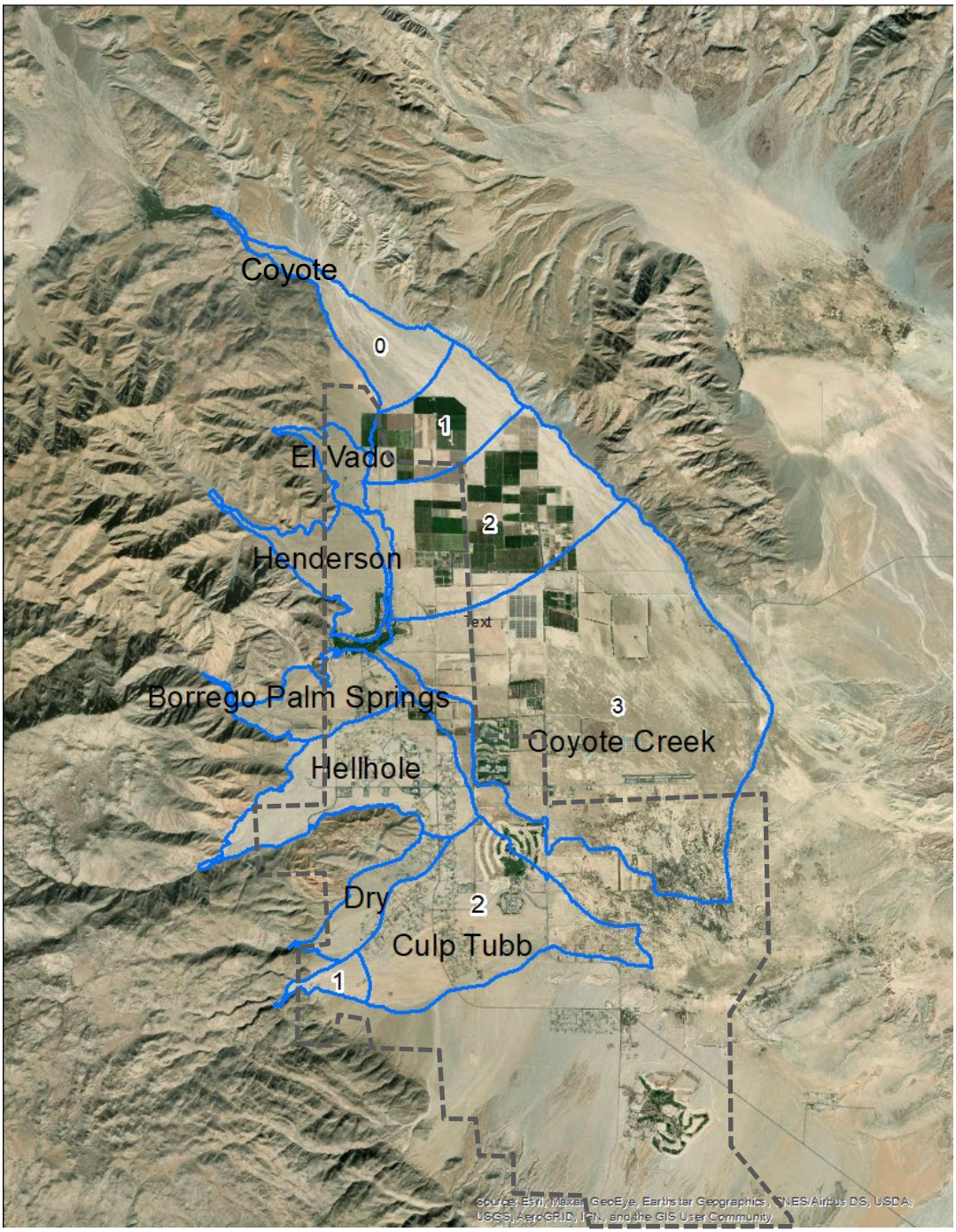

Figure 3. Map of the Borrego Springs Alluvial Fans

(Note: numerals indicate designated creek modeling reaches for Coyote and Culp Tubb).

1.3.3 Alluvial Fan Flood Hazard Setting

Alluvial fans represent a severe flood hazard due to the unpredictable locations and high velocity of their flow paths during flooding, which usually occurs with little or no advance warning. The characteristics of alluvial fans thus result in more complex flood hazards than experienced in riverine environments. Due to the unpredictable nature of fan spreading with high velocity, debris-laden flow, virtually all parts of the fan downstream of the apex are threatened by catastrophic flooding.

The nature of alluvial fan flooding and its hazards can be challenging to analyze and flood damages due to alluvial fans go beyond mere inundation and water damage. Alluvial fan flooding can bury structures, knock homes off foundations, and obliterate structures with the impact of high velocity water and debris, which can include large boulders. The sudden flash flood nature of desert events makes these events difficult to respond to in time to safely evacuate. The hazards are dangerous to both property and lives.

1.3.4 Historical Flood Damages & Existing Flood Mitigation Efforts

While almost the entire valley floor is subject to inundation by runoff from one or more canyons, there are currently no comprehensive flood control improvements in Borrego Springs (USACE, 2016). There are a few existing flood mitigation measures in place that help with flooding at low return intervals; however, for larger flood events, these mitigation measures will not significantly reduce flood hazards in the area.

The existing flood mitigation measures include a few de-silting basins and a diversion channel in the northwest corner of the Borrego Valley (USACE, 2016) and an existing large dike lying northwest to southeast across the mouth of Tubb Canyon (Boyle Engineering Corporation, 1989). This dike has been in place since the 1970s and is armored with a wire and rock fence revetment. The Federal Emergency Management Agency (FEMA) flood hazard study disregards this dike[1] as it is not a certified levee. Prior studies have been completed to determine flood mitigation solutions for Borrego Springs which are mentioned in section 1.4.

The Borrego Valley General Plan for Flood Control (SDCFCD, 1972) recommended a series of dikes to control floods. At that time, the community did not support the recommended options because the cost associated with the proposed plan were considered too high for the community to finance. There were also objections to the environmental and aesthetic aspect of constructing dikes through the community. In addition, the Borrego Valley General Plan for Flood Control was not considered adequate at the time because, despite the high cost, it did not address the serious groundwater overdraft problem in the Borrego Valley, which is discussed in section 2.3. The proposed comprehensive flood control plan did not include detention basins or other water conservation measures to incorporate groundwater recharge (USACE, 2016).

The Borrego Valley Flood Management Report (Boyle Engineering Corporation, 1989) provided a basis for the development of a revision to the 1972 plan (SDCFCD, 1972). The report concluded that a fan terminus alluvial wash should replace the dikes shown on the 1972 plan as the recommended method for flood management (USACE, 2016).

[1]A dike is an earthen embankment that is designed and constructed in accordance with sound engineering practices to contain, reduce or divert the flow of water so as to provide protection from temporary flooding.

Regulations can be used to help mitigate flood risk by avoiding risky flood-prone development in the future. San Diego County requires new homes located in the FEMA floodplain of the Borrego Springs area to be built in accordance with the Flood Damage Prevention Ordinance 811.501 (County of San Diego, 2024) and the appropriate FEMA FIRM Map (FEMA 2025). Continuing with this regulation in the future will help reduce future flood damages. This study will look at possible measures to improve development regulations based on the alluvial fan modeling of this study.

There are some homeowners within this area that have taken the additional precaution of having concrete walls or earthen berms built around their residences for flood protection (USACE, 2016). While this practice may help protect individual homes against flooding, this type of practice has the potential of increasing flood hazards to surrounding homeowners. The plans should be reviewed and approved by the County to make sure the construction does not adversely impact the adjacent properties.

1.4 Relevant Prior Studies and Reports

Previous studies have been conducted to assess flood mitigation solutions for Borrego Springs. These studies include the following:

- The *Borrego Valley General Plan for Flood Control* (SDCFCD, 1972), which recommended a series of dikes to control floods.

- *The Borrego Valley Flood Management Report* (Boyle Engineering Corporation, 1989), which concluded that a fan terminus alluvial wash should replace the dikes shown on the 1972 plan as the recommended method for flood management.

2 AFFECTED ENVIRONMENT

2.1 Climate

The study area lies within the Sonoran desert geomorphic area, which has a typical subtropical desert climate – hot summers, mild winters and less than 5 inches of annual precipitation. Temperatures in the summer are often in excess of 120 degrees Fahrenheit. Precipitation falls mainly during the winter months; however, monsoonal summer storms do occur.

2.2 Soils and Geology

The study area is located within the Peninsular Ranges geomorphic province and is close to the Colorado Desert geomorphic province border which roughly parallels California State Route 86 to the east of the study area. The Peninsular Range geomorphic province is characterized by elongated ranges and valleys, which are abruptly terminated to the north by the Transverse Range province and extend southward to form the Baja California Peninsula. The province is bordered on the east by Coachella Valley and the Salton Sea Trough. Although the study area technically lies within the Peninsular Ranges, Borrego Valley is a low-lying arid valley with geomorphic conditions similar to those observed in the adjacent Colorado Desert geomorphic province.

The study area lies within Borrego Valley which is bordered to the north by the Santa Rosa Mountains, to the west by the San Ysidro Mountains, and to the south by the Vallecito Mountains. The eastern portion of Borrego Valley is delineated by the Coyote Mountain and smaller hills and mountains that have been uplifted along the Coyote Creek fault trace. The geologic map for the study area is shown in Figure 4. Surficial geology of the study area consists primarily of Quaternary alluvial (Qal), Quaternary nonmarine terrace deposits (Qt), and lacustrine (Ql) deposits within Borrego Valley. Based on data available within the Soil Survey Geographic Database, the surficial soils are primarily composed of gravelly sands, sands, and silty sands. Borrego Valley is bounded by mountains composed of a combination of Cenozoic sedimentary rocks (Qc), Mesozoic and older meta-sedimentary rocks (mls), and Mesozoic and older igneous granitoids and gneisses (gr, grm; part of the basement complex). Due to the extensive tectonic activity that has occurred in the region over the past 80 million years many of the rocks are locally folded and faulted.

The study area is in a seismically active zone caused by the oblique convergence of the North American tectonic plate with the Pacific tectonic plate. The plate boundary stresses are accommodated on major, regional transverse faults in this region of the earth's crust. Most faults in this region are northwest to southeast trending right-lateral faults. A splay of the San Filipe fault zone locally trends southwest to northeast and underlies Borrego Springs. The main San Felipe fault zone is approximately 12 miles west of Borrego Springs. Other significant faults near Borrego Springs are the San Jacinto fault (4 miles east, Coyote Creek Segment), the Elsinore fault (15 miles west), and the San Andreas fault (35 miles east).

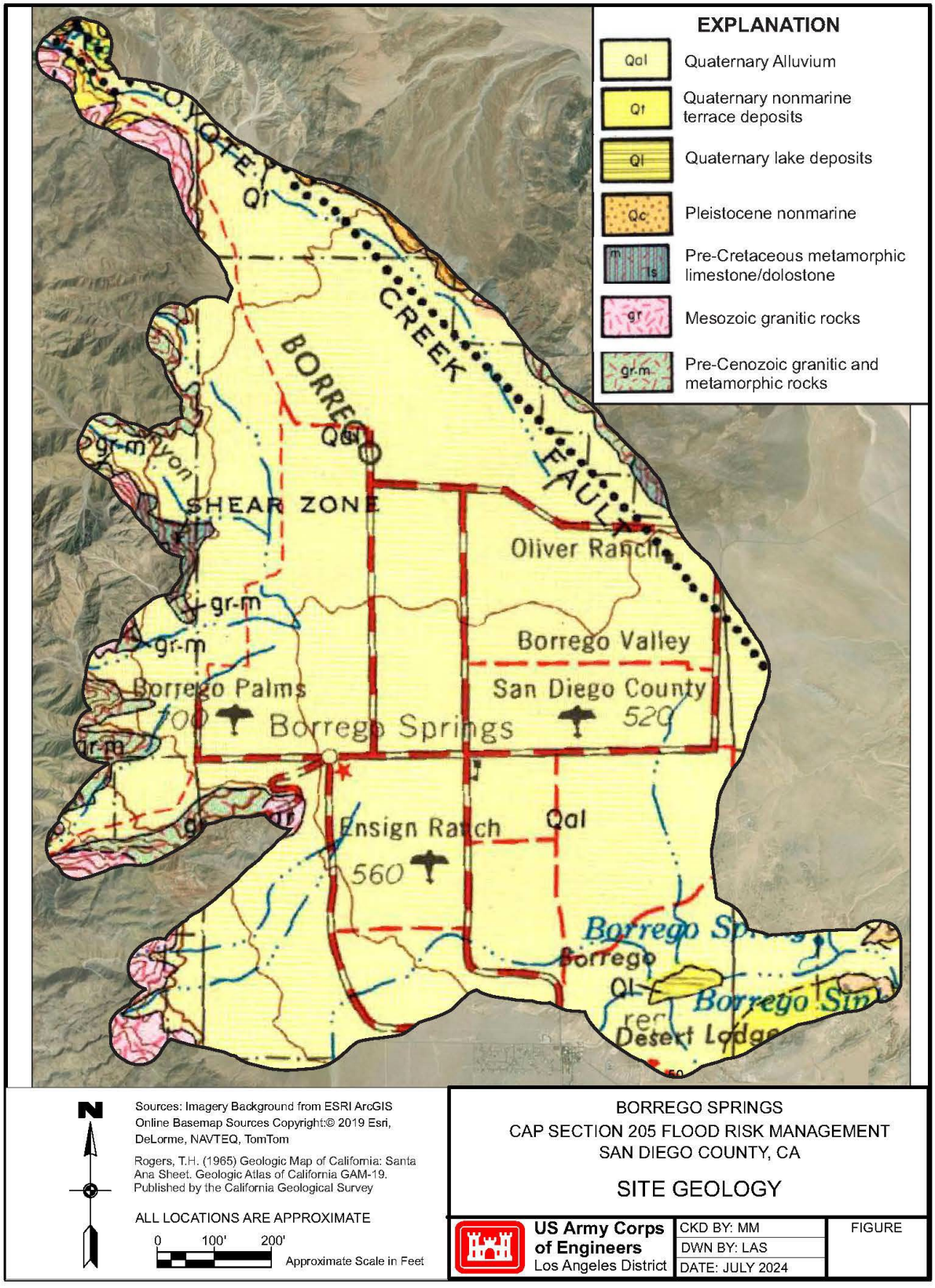

Figure 4. The geologic map for the study area.

2.3 Surface Water and Other Aquatic Resources

The study area is comprised of a hydrologically enclosed basin with the San Ysidro Mountains to the West and San Rosa Mountains to the east. The San Ysidro Mountains form a watershed divide between the San Diego Basin on the west, which drains towards the Pacific Ocean, and the Colorado River Basin on the east. The study area is located within the Anza-Borrego Watershed, which is on the western margin of the Colorado River Basin. The Borrego Valley topography features alluvial fans that empty into the valley from the mountains on the north, west and south sides causing significant flood hazards.

The study area is coterminous with the Borrego Valley-Borrego Sink Wash Watershed Area Hydrologic Unit Category (HUC), 1810020303, and includes 5 watershed subareas: the Borrego Palm Canyon, Dry Canyon, Lower Coyote Creek, Borrego Valley, and the Borrego Sink Wash. The total drainage area comprises just over 12,000 acres, mostly within San Diego County, with a small segment in Riverside County. Coyote Creek, located within the northeastern portion of the study area, and Borrego Palm Creek in the western portion of the study area are the principal surface water features in the study area. Smaller contributing water features within the study area confluence with these waterways in the Borrego Valley or discharge into the Borrego Sink. During high flow events, surface flows migrate further east and confluence with San Felipe Creek.

Surface waters originating in the Borrego Palm Canyon, Borrego Valley, Lower Coyote Creek, Dry Canyon, and Borrego Sink Wash Watersheds are supplied from the surrounding mountains. Groundwater originates mainly from precipitation and subsequent infiltration through soils and surface rocks into saturated subterranean water-bearing bodies, referred to as aquifers. Recharge also occurs from precipitation on the valley floor, underflow, irrigation, and land discharges from domestic wastewater systems. The study area generally overlies the Borrego Valley Groundwater Basin (Basin ID 7-24), which has a surface area of approximately 240 square miles. The study area is dependent solely on groundwater, which is managed by the Borrego Water District (BWD). The Borrego Springs area is anticipated to have future groundwater extractions of 22,000 acre-feet/year (AFY). This level of extraction would be greater than the estimated rate of recharge which ranges between 5,000 and 6,170 AFY. Greater extraction can lead to subsidence and can cause a variety of problems including broken utility lines, blocked drainage, or distorted property boundaries and survey lines. None of the water ways within the study area are listed as impaired on the Clean Water Act 303(d) list (2012) adopted by the SWRCB and U.S. EPA.

The National Wetland Inventory (NWI) indicates approximately 488 acres of waters of the U.S. and Wetlands are located within the study area; however, these areas have not been verified. Localized changes in drainage may result as new development is constructed on the valley floor. As new development is constructed, there is a potential for an increased number of properties (and building structures) to be subject to flooding hazards.

2.4 Fish and Wildlife Habitats

The fish and wildlife communities within the study area are diverse due to the large geographical area and topographical gradients. At the higher elevations in the north and west of the study area, montane woodland and forest habits transition to scrub and chaparral habitats at lower elevations and along the valley floor. The mountainous terrain along the western

boundary of the study area provides a moderately cool and moist climate that supports expanses of forest, woodlands, and meadows, commonly referred to as “montane” habitat. Transitionary habitats between the uplands and valley floor include chaparral, pinon-juniper woodland, and semi-desert succulent scrub (ABDSP 2005). Open Desert Scrub is the most common habitat within the study area, occupying the vast expanses of the desert floor, bajadas, lower elevation hills and slopes, and xeric mountains (ABDSP 2005). Sand dune systems are found in Borrego Badlands in the Ant Hill area, and in the Blow Sand Canyon area of the Borrego Buttes (ABDSP 2005).

In the study area the wetland and riparian areas are complex, often composed of a diverse assemblage of hydric soils, substrates, and plant species and communities associated with multiple types of surface and subsurface waters (ABDSP 2005). These sensitive vegetation communities are characterized by winter-deciduous, broad-leafed streamside forests up to about 60 feet tall, with dense understories (ABDSP 2005). Palm oases are sensitive riparian woodlands with the Fan Palm as the sole or dominant tree in the canopy (ABDSP 2005). Washes, arroyos, and terraces constitute the dry stream channels and closely associated banks and floodplains found in the lower elevations. Deep rooting mesquite take advantage of subsurface moisture, and therefore, are typically associated with upper or outer “perimeter” portions of desert surface water and often in regions where surface water is rarely seen. Significant wildflower areas are a relatively diverse assemblage of habitats, but typically encompass wide sandy washes, terraces, and desert floor regions (ABDSP 2005).

The study area is located within the San Diego East County Multi-Species Conservation Plan (MSCP) boundaries. Significant portions of the County are publicly owned, including areas designated as open space preserves, and parks, National Forests, and State Parks. These large contiguous areas provide wildlife corridors and linkages between areas of undeveloped lands that are important to wildlife species. The study area is also a major part of the Pacific Flyway for migratory birds. According to the California Department of Parks and Recreation, at least 38 exotic plant taxa constituting 4 percent of the ABDSP’s 932 taxa, have been identified to be located within ABDSP (ABDSP 2005). Of these, 16 species have a high priority for management due to their potential to alter natural habitats and/or because eradication efforts may have a high success rate.

There are 7 identified special status plant species that are threatened or endangered and have the potential to be located within the study area. These include, but are not limited to: California Orcutt grass, Mexican flannelbush, Nevin's barberry, Peirson's milk-vetch, San Bernardino blue grass, thread-leaved brodiaea, and triple-ribbed milk-vetch. There are 11 identified special status animal species that are threatened or endangered and have the potential to be located within the study area. These include but are not limited to: arroyo toad, California red-legged frog, Coachella Valley fringe-toed lizard, desert pupfish, desert slender salamander, least Bell's vireo, Mohave tui chub, Peninsular bighorn sheep DPS, quino checkerspot butterfly, and unarmored threespine stickleback. Under future conditions, populations of special status species within the study area would remain relatively unchanged.

In summary, the study area is diverse, complex, and supports a variety of protected threatened and endangered species.

2.5 Recreation and Aesthetic Resources

The study area contains the ABDSP and a small portion of the Bureau of Land Management (BLM) land to the west. The ABDSP was designated as a National Natural Landmark in 1974. The park spans over 600,000 acres, with over 400,000 acres set aside as State Wilderness. A series of primitive roads and hiking/equestrian trails are located throughout the study area that connect with other federal, state, and local lands. Local parks include Christmas Circle Park, which is maintained and managed by a non-profit association.

The area of Borrego Springs, surrounded by the ABDSP is an urbanized built environment; however, the buildings are low in profile and have color schemes that blend with the desert color palette. Considering the majority of the study area is located within the ABDSP, the visual character is of generally high quality that is subject to extensive viewer exposure and sensitive to change.

The Borrego Springs area has an International Dark Sky Community designation, awarded by the International Dark-Sky Association for its preservation and protection of the nighttime environment through environmentally responsible outdoor lighting. Two mountain observatories are located approximately 30 miles from Borrego Springs. Light pollution from local and encroaching growth can threaten local observatories.

Under future conditions, existing recreational opportunities within the study area would remain relatively unchanged. The ABDSP would continue to provide the greatest recreational opportunities within the study area. New trail facilities may be constructed by ABDSP in the future, thereby providing greater connectivity between Borrego Springs and existing trail networks within the ABDSP. Under future without-project conditions, the study area's visual character and aesthetic value would remain relatively unchanged.

2.6 Demographics and Land Use

Borrego Springs has approximately 4,031 individuals and is not considered a minority population (Census, 2020). Over 45% of the population is white and over 35% is Hispanic or Latino. Based on the income statistics, the median household income in Borrego Springs is greater than the Department of Health and Human Resources (HHS) poverty level and, therefore, no low-income populations are identified. According to the Borrego Springs Community Plan (as amended through 2014), the community of Borrego Springs occupies approximately 42.5 square miles with 2,300 dwelling units and 58 persons per square mile.

Approximately 4,000 acres located in the northern section of the Borrego Springs Valley is used for agriculture, including citrus, ornamentals, palm trees, and nursery products. The study area contains the following acreages of important farmland:

- Prime Farmland – 138 acres
- Farmland of Statewide Importance – 3,058 acres
- Unique Farmland – 309 acres
- Farmland of Local Importance – 856 acres

The San Diego County General Plan Update (2011) envisions that communities within the Desert Subregion, which includes the Borrego Valley and the ABDSP will double in population by 2035 and experience a 90 percent or greater increase in housing units as compared to existing conditions. This projected increase in growth would in turn more than double its number of housing units (294.2 percent) and population (408.2 percent) between now and build-out. Based on limitations centered around an available water supply, a more realistic maximum full-time permanent population would be 8,000 (San Diego County 2011). This will likely limit further population increase in the area.

2.7 Cultural Resources

No cultural resources records search or consultation with federal tribes were performed during the Draft Environmental Assessment. The study area contains evidence of human occupation over at least the last 10,000 years. Native American sites exist in locations such as the Borrego Sink, where the mesquite bosque was an important food gathering site to the nomadic natives for thousands of years. Other areas where cultural resources can be easily observed are in the dune areas of the northern and eastern Borrego Valley and the desert scrub flats.

Two historic resources listed on the National Register of Historic Preservation (NRHP) are located within the study area. These include the Fages-De Anza Trail-Southern Emigrant Road, listed January 29, 1973, and the Anza Borrego-Palo Verde Site, S-2, listed October 25, 1985 (NRHP 2015). The Borrego Springs Community Plan identified the Old Borrego town site as the only cultural site with the Historic District Preservation Special Area Designator. However, the local history committee has identified 40 other potential historically significant sites in the Community Plan Area (San Diego County 2014).

2.8 Air Quality

Both the U.S. Government and the State of California have enacted legislation designed to improve air quality. The closest air quality monitoring station to the study area is the Alpine-Victoria Drive monitoring station. This air quality monitoring station measures the criteria pollutants for attainment or non-attainment status. Existing air quality in the study area is influenced by particulates in the air, ozone, and pollutants from anthropogenic sources. Under future without-project conditions, air quality conditions within the study area would generally remain unchanged. Air quality improvements would be expected in the future as a result of improvements in vehicle technology; however, corresponding increases in population and climate change may counteract these improvements.

2.9 Noise

The majority of the study area is considered very rural, and the noise environment is relatively quiet. Noise in the Borrego Springs area is limited to truck noise along the main roadways (SR 22 and SR 3), transportation, construction activities, and small aircraft. Ambient noise measurements were completed throughout the County. Measurements recorded in the vicinity of the study area ranged between 43 and 50 decibels. Under future without-project conditions, noise within the study area would remain relatively unchanged.

2.10 Transportation

The community of Borrego Springs includes a network of paved (and unpaved) roadways, horse paths, bike paths, and footpaths or sidewalks. In general, the existing roadway network within the study area operates at an acceptable level of service with minimal to no delay. Peak traffic is typically experienced during the weekends and closely associated with peak visitation to ABDSP. The nearest County roadway is highway SR 78 located south of Borrego Springs.

Under future without-project conditions, existing transportation routes and networks within the study area would remain relatively unchanged. The Borrego Springs Community Plan identifies the roadway improvements that may be constructed in conjunction with future development. These improvements include traffic circles, traffic calming (speed reductions), and construction of new streets.

2.11 Demographics and Employment

2.11.1 Demographics

The population in Borrego Springs's Census Designated Places (CDP) was 2,566 in 2021, 1,864 in 2020, and 2,518 in 2015. The CDP is represented by a closely settled, unincorporated community such as Borrego Springs, that is locally recognized and identified by name. A CDP is a statistical geographic area defined by the U.S. Census Bureau for places that don't have their own local government. There were 2,654 housing units in 2021 and 2020 and 2,639 in 2015. In 2021, there are more housing units than population. The percent difference is only 3% which can be reasonably accounted for as an average vacancy rate. The racial makeup of the community is 45.2 percent white, 0.6 percent African American, 1.0 percent Native American, 0.7 percent Asian, 35.5 Hispanic or Latino, 2.4 percent from two or more races, and 14.6 percent listed as Other. Table 1 below provides a breakdown of the demographics within Borrego Springs and the County of San Diego.

Table 1. Ethnicity Composition (Percent) of Borrego Springs, California.

Area Name	White	Black and African American	American Indian and Alaska Native	Percent Asian and Hawaiian and Pacific Islander	Hispanic or Latino	Two or More Races	Other
Borrego Springs	45.2	0.6	1.0	0.7	35.5	2.4	14.6
San Diego County	39.4	5.6	1.4	13.6	35.0	5.0	0.0

Source: http://www.city-data.com/city/Borrego-Springs-California.html
(a) Includes persons reporting only one race.
(b) Hispanics may be of any race, so also are included in applicable race categories.

2.11.2 Employment

Employment in the study area is concentrated in the retail, hospitality and public sectors, notably at shopping centers and hotels/resorts [1]. Resorts and country clubs in Borrego Springs include: Rams Hill Country Club, Club Circle Golf Course, Borrego Roadrunner Country Club,

Christmas Circle, Borrego Palms Resort, De Anza Desert Country Club. Hotel locations in Borrego Springs are Borrego Valley Inn and Borrego Springs Resort. Public sector employers include Borrego Springs Fire Protection District, Borrego Springs Chamber of Commerce, Borrego Springs Branch San Diego County Library. Shopping centers in Borrego Springs include: The Galleria Shopping Center, The Plaza Shopping Center, and the Mall Shopping Center. A significant amount of construction jobs is supported by the development of residential and non-residential structures in the study area. In addition, there are agricultural crops in the region, including grapefruit, lemons, tangerines, tangelos, and palm trees, supporting many jobs in the agricultural sector. These types of crops can be found in the northern part of Borrego Springs. Employment by sector can be found in Table 2.

Table 2. Employment by Sector

Sector	**Percent**
Construction	20.1
Agriculture, Forestry, Fishing, Hunting, Mining	17.9
Arts and Entertainment	14.3
Education and Health	12.0
Retail/Wholesale	7.7
Finance/Real Estate	5.7
Professional	5.6
Manufacturing	5.2
Transportation, Warehousing	4.6
Others	3.9
Information	3.0
Total	100

[1] All points of interest obtained from: Borrego Springs, California (CA 92004) Profile at (http://www.city-data.com/city/Borrego-Springs-California.html#b).

Table 3 shows the Labor Force Data for the Borrego Springs area. San Diego County is the larger area surrounding Borrego Springs and is shown on the table for comparative purposes. Borrego Springs has a labor force of about 842. Employment is 755 and unemployment is 87. This means that out of a labor force of 842, 90% is employed and 10% is unemployed. The unemployment rate for California was 8% as of 2021. Unemployment was significantly impacted by the recent COVID-19 pandemic but have since recovered.

Table 3. 2021 Labor Force Data for Borrego Springs and San Diego.

Area Name	Labor Force	Employment	Unemployment	
			Number	Rate (%)
Borrego Springs	842	755	87	10%
San Diego County	1,563,716	1,465,686	98,030	6%

Source: https://www.census.gov/acs/www/ data-tables-and-tools/data-profiles/2021/

3 WITHOUT-PROJECT CONDITION

The existing and future without-project conditions are considered by USACE as the baseline condition over a fifty-year period of analysis and serve as the basis for comparison when evaluating the potential benefits of project measures.

The existing conditions of the study area have several alluvial fans that are subject to flash floods from canyons to the west of the valley. Alluvial fans represent a severe flood hazard due to the unpredictable location and high velocity of their flow paths during flooding, which usually occurs with little or no advance warning. The characteristics of alluvial fans thus result in more complex flood hazards than experienced in riverine environments. Due to the unpredictable nature of fan spreading with high velocity, debris-laden flow, virtually all parts of the fan downstream of the apex are threatened by catastrophic flooding. The without-project conditions would remain the same as the existing conditions.

Flood damages due to alluvial fans go beyond mere inundation and water damage. Alluvial fan flooding can bury structures, knock homes off foundations, and obliterate structures with the impact of high velocity water and debris, which can include large boulders. The sudden flash flood nature of desert events makes these events difficult to react to and respond to in time to safely evacuate. Thus, the hazards are difficult to analyze and to define. The hazards are dangerous to both property and lives (USACE, 2016).

The USACE performed a hydrologic analysis for the Borrego Spring watershed (Appendix C). In the hydrologic analysis, discharge-frequency flows were determined at the alluvial fan apex locations near Borrego Springs. The rainfall-runoff model was developed using the Hydrologic Engineering Center's Hydrologic Modeling System (HEC-HMS) software. The adopted discharge-frequency runoffs were calibrated using gauge data in the Borrego Palm Canyon Sub-basin. The USACE contracted WEST Consultants, Inc. (WEST) to develop an Existing Conditions and Proposed Alternatives Floodplain Report (WEST Report). The main objectives of the WEST Report were to prepare flood hazard maps for 8 annual chance exceedance (ACE) floods (50%, 20%, 10%, 4%, 2%, 1%, 0.5%, and 0.2%) and develop measures to reduce flood damages in Borrego Springs (Appendix B).

An alluvial fan hydraulic analysis was conducted using the FEMA FAN model for the 1% ACE and the WEST FAN model, which is the modified version of the FEMA FAN model was used for developing the other needed return frequencies. The USACE Hydrologic Engineering Center (HEC) reviewed the WEST FAN program and added it to the list of approved software in the Community of Practice (CoP). The WEST FAN software certification memorandum is included in Appendix D. Based on the results of the alluvial fan hydraulic analysis, non-structural and structural flood mitigation measures were investigated. A Draft Environmental Assessment is also included in the WEST Report. Further details can be found in Appendix B.

There is uncertainty when it comes to the Hydrologic and Hydraulic Analysis for the existing and without-project conditions for flood risk management studies. These uncertainties include the exceedance probability function, stage discharge function and levee exterior-interior relationship. Details are below.

1. Exceedance Probability Function (Depth/Probability Relationship): The exceedance probability function is a relationship of a flood magnitude and the probability of exceeding that magnitude, i.e. what is the probability of an event that will exceed the channel and cause flooding. Flood magnitude can be defined in terms of discharge[1] and stage[2]. For this study, depth/probability relationships were applied. The reliability of stage/probability estimates is directly linked to the historical record of stream gauge data available. In cases where sampling error occurs where records are few or incomplete, the associated uncertainty increases. If more stream gage data were available this uncertainty would decrease. Depth/probability data was imported from the flood profiles of 8 frequencies. The equivalent record length was assumed to be 47 years for the Borrego Palm Springs Canyon and 20 years for all the other fans within the HEC-FDA program. These estimates are in accordance with Equivalent Record Length Guidelines in EM 1110-2-1619.

2. Stage/Discharge Function: The stage discharge function is the relationship of stage to a range of discharge values at a specific location. Because exceedance probability/depth functions were applied for this study rather than exceedance probability/discharge functions, stage/discharge functions were not utilized.

3. Levee Exterior-Interior Relationship: The exterior-interior relationship is defined as a relationship between the interior and exterior stages of a given floodplain. The interior is the portion of the floodplain outside the channel and the exterior is the flood channel itself. This relationship is applied in analysis when differences between stages in the river or exterior side of the levee vary from stages in the floodplain or interior side of the levee. For this study, the levee exterior-interior relationship was not used because the alluvial fans in the Borrego Springs study area are not channelized. Flows can occur along any path within the fan boundary. Therefore, these flows are not constrained by levees.

4 FLOOD RISK ANALYSIS METHODOLOGY

Flood risk analysis procedures are used to evaluate without-project flood damages in the study area. Guidance for conducting flood risk analysis is included in USACE Engineering Regulation 1105-2-101, *Risk Assessment for Flood Risk Management Studies (15 July 2019)* and Engineering Manual EM 1110-2-1619 *Engineering & Design – Risk Based Analysis for Flood Damage Reduction Studies (1 August 1996)*. The USACE Hydrologic Engineering Center has developed software specifically designed for conducting risk and uncertainty-based flood risk management studies. This software is referred to as the HEC-FDA Program (Version 1.4.2), which was certified by the Flood Risk Management Planning Center of Expertise. This program applies a Monte Carlo simulation process, whereby the expected value of damages is determined explicitly through iterative runs of the program where the program selects from a distribution of data collected of basic parameters. The simulation then conducts a numerical integration technique accounting for uncertainty in basic parameters. Data requirements for the program include:

[1] Flood discharge is the volume of water that flows past a point in a river in a given amount of time. It's also known as streamflow. Discharge is typically measured in cubic feet per second (cfs) or cubic meters per second (cms).
[2] The water level at which a body of water rises enough to inundate areas that are not normally covered by water.

1. Configuration Information: This information is input directly into the program and includes streams, damage reaches, analysis years, and plan definition. Damage reaches are defined by dividing the impact area into smaller sections. The reaches for this study were identified to represent homogeneous hydraulic and economic characteristics. Analysis years generally apply when future development is represented as a future year of build out. This option was not applied for this study as future development is regulated to avoid increasing flood risk, and is assumed/projected to remain regulated. Plan definition identifies whether the plan is under the without-project condition, or a plan(s) is represented by the analysis of measures.

2. Hydrology, Hydraulics, and Geotechnical Engineering: Typical Hydrologic and Hydraulic data include water surface profiles, exceedance probability functions or probability-discharge relationships, stage discharge relationships. For this study, water surface profiles were not developed using the HEC-RAS program. Instead, flood depths were estimated by probability using a program developed specifically for the evaluation of flooding on alluvial fans. These depths for all 8 frequencies and 7 impact areas were input directly into the HEC-FDA program in the flood profile menu of the program. The exceedance probability functions were imported into the program from the depth/probability profiles. Because flood depths were used for the development of the flood profiles the stage discharge functions were not needed. Finally, the geotechnical levee function was also used under the without-project condition. A levee elevation of 0.1 feet was input to ensure the program does not compute for depths for a flood elevation of zero, which based upon the hydraulic inputs, represents that no flooding occurs in the given area for that probability. Engineering uncertainties will be described in more detail later in this section 5.4.

3. Economics: An economic database is typically prepared in Microsoft Excel according to specific guidelines outlined in the HEC-FDA manual and imported as a text file. Included in the file are a number of attributes about structures including the structure identifier number, structure category, stream location, ground and/or first floor elevation, and structure and content values. This data was collected through the San GIS website. The data is from the San Diego County Tax Assessors Office. The data was entered into Excel spreadsheets and imported into the HEC-FDA program. Other parameters specified in the importable Excel file are the depth/damage functions. Structure Depth damage functions were obtained from FEMA while specific depth/damage functions for the contents for non-residential structures were based upon the USACE Sacramento District Report: *Analysis of Nonresidential Content to Structure Ratios and Depth Damage Functions for Flood Damage Reduction Studies (Oct 2009).*

5 PLAN FORMULATION

This section discusses problems and opportunities, objectives and constraints related to the flooding within the study area. Based on these problems and opportunities, objectives and constraints, a series of measures have been developed.

Plan formulation was conducted in accordance with existing laws, regulations, and policies, which limit the study to flood risk management projects. Section 205 of the Flood Control Act of 1948, as amended, specifically limits the federal contribution to the project at $10,000,000 or less.

5.1 Problems and Opportunities

5.1.1 Problems

The Borrego Springs study area is subject to flooding and flood damages from surrounding alluvial fans. At the present time, several on-going problems in the study area continue to exist, including:

a. Alluvial fan flooding in the study area can occur with little or no advanced warning time and represents a significant threat to life, health, and safety for local residents.

b. Existing development within the Borrego Springs study area is subject to flood damages from alluvial fans.

5.1.2 Opportunities

The following opportunities were identified over the course of the study process:

a. Reduce life safety risk, health risks, and other negative impacts due to alluvial fan flooding.

b. Reduce the probability and severity of alluvial fan flood damages to the surrounding community and critical infrastructure in Borrego Springs.

c. Should this area be studied again, there is a potential opportunity to restore, conserve, or enhance habitat in this area, which is complex and significant, supporting a variety of federal listed species.

5.2 Objectives and Constraints

5.2.1 Planning Objectives

The objectives of this study include:

a. Reduce the life safety risk and health risk caused by alluvial fan flooding in Borrego Springs throughout the period of analysis.

b. Reduce damages to public and private infrastructure caused by alluvial fan flooding in Borrego Springs throughout the period of analysis.

5.2.2 Planning Constraints and Considerations

Unlike planning objectives that represent desired positive changes, planning constraints represent restrictions that limit the planning process and should not be violated. Planning constraints are limitations or requirements that affect proposed measures. This study will consider resource, legal, and policy constraints. Resource constraints are those associated with limits on knowledge, expertise, experience, ability, data, information, money, and time. Legal and policy constraints are those defined by law, USACE policy, and guidance.

As previously stated, the study will discuss the most cost effective and environmentally acceptable solution for flooding issues in Borrego Springs. At this time, no planning constraints have limited the formulation of measures to address flood risks in the study area. The study team considered the nearby fault line and seismic activity, but it did not affect the plan formulation for this study.

5.3 Most Probable Future Without-Project Conditions

The USACE is required to consider the "Without-Project" condition as one of the measures in order to comply with the requirements of NEPA. "Without-Project" assumes that no project would be implemented by either the Federal Government or the local communities, to achieve the planning objectives. The "Without-Project" condition forms the "base condition" from which all other alternative plans are measured. The baseline condition is expected to occur over a 50-year period of analysis and serve as the basis for comparison when evaluating the potential benefits of project measures. The period of analysis begins with the Base Year which corresponds with the time period when proposed measures could be authorized, constructed, and begin accruing benefits. For this study, a base year of 2027 has been established.

Consequently, the primary purpose of this DPR is to develop a long-term viable measure for the protection of Borrego Springs. The community of Borrego Springs is located in the 1 percent chance exceedance floodplain. In the absence of a federal project or local community project, the study area is expected to incur continued damages associated with flooding. It is currently estimated that the without-project expected annual flood damages are about $5 million in the study area. These flood damages take into account damage categories that include structures and content, roads, clean-up, automobile, and emergency and displacement costs for the community (For detailed information, refer to Appendix E, Economic Analysis). In the absence of a plan for flood risk management improvements (i.e., the future "Without-Project" condition), it is assumed that the NFS will take action when a flood occurs, emergency response is needed, and damages arise.

5.4 Measures to Achieve Planning Objectives

This section details the measures (non-structural and structural) developed to address the flooding problem for Borrego Springs, in the project study area. Flood risk management projects can reduce the risk of flooding, but no project or combination of projects can guarantee 100% protection from flooding. Residual risk refers to the amount of risk that remains after a project is completed. While residual risk can be minimized, it can never be eliminated. For this study, risk is defined as the probability an area will be flooded in a given year, resulting in undesirable consequences.

Uncertainty is a measure of imprecision of knowledge of parameters and functions used to describe the hydraulic, hydrologic, geotechnical, structural, and economic aspects of a project plan. Risk and uncertainty arise from measurement inaccuracies, modeling uncertainties, and from the underlying variability of complex natural, social, and economic situations. Flood problems are multi-dimensional, making it difficult to fully understand, document, and model the physical nature of flooding, its magnitude, its probability of occurrence, and its consequences.

In water resource planning for flood risk management, uncertainties that can have a significant impact on residual damages, benefits, and cost estimates; planning; design; and the reliability of a proposed flood control project may include, but are not limited to:

- In the hydrologic and hydraulic data, estimates of discharges and flood stages, due to issues such as measurement uncertainty and short periods of data records that do not completely capture the range of variation in natural systems.

Alluvial fans represent a severe flood hazard due to the unpredictable location and high velocity of their flow paths during flooding, which usually occurs with little or no advance warning. The characteristics of alluvial fans thus result in more complex flood hazards than experienced in riverine environments. Due to the unpredictable nature of fan spreading with high velocity, debris-laden flow, virtually all parts of the fan downstream of the apex are threatened by catastrophic flooding. Flood damages due to alluvial fans go beyond mere inundation and water damage. The sudden flash flood nature of desert events, make these events difficult to react to and respond to in time to safely evacuate. Thus, the hazards are difficult to analyze and to define.

- In the economic data, uncertainties surround estimates of investment values, beginning damage elevations, and damages with various flood depths.

- In the engineering and design, there are uncertainties in the potential for geotechnical or structural failure of features in an existing flood control project.

- Climate change, through its impact on both precipitation and hydrology, introduces additional sources of uncertainty in estimates of future flood risk.

To account for risk and uncertainty, the analysis considers a range of possible values rather than a single value in its estimates of critical variables. The range of outcomes in some areas of risk and uncertainty can be reasonably described or characterized by a probability distribution. If there is no historical database, the probability distribution of events can be described subjectively, based on best available science and professional judgment.

USACE policy requires projects to explicitly catalog and evaluate risk and uncertainty in all aspects of project planning and execution.

During an initial Planning Charrette for the project, a number of structural and non-structural measures were first identified (Table 4, section 5.4.) that would meet one or more of the planning objectives. The goal of this step was to cast as wide a net as possible, so that potentially viable solutions are not subsequently overlooked. These measures include best management practices that are determined to be suitable to resolve the problems associated with the existing conditions in the study area. Each measure was assessed (scored) and a determination made regarding whether it should be retained for further formulation. The descriptions and results of the evaluations of the measures considered in this study are presented below.

5.4.1 Screened Measures

The table below was developed in 2011 during the initial Planning Charrette and depicts all of the conceptual measures that were preliminarily screened. The PDT evaluated these measures using various factors and screened each category. The factors are meeting goals and objectives, comparative cost range, environmental effects, socio-economic effects, and cost effectiveness.

After the screening, the measures were given a status of either being eliminated or retained. After evaluation was complete, four (4) non-structural measures and one (1) structural measure were retained. The retained measures are shaded in green. The Water Resources Development Act of 2016, Section 1184 requires study teams to consider natural and nature-based features, as do subsequent planning guidance and requirements. The team did not yet develop and consider natural and nature-based features prior to study termination, that is, the point when the project was determined to not have a path forward in the design and implementation phase as a federal project under the CAP. Any future effort by USACE would need to consider the potential for a feasible nature-based solution to flood risk management, though these structural features would face similar challenges to the traditional features which were considered and evaluated, given the challenging nature of working within alluvial fans.

Table 4. Initial Screening of Measures.

Measure	Meeting Goals and Objectives	Comparative Cost Range	Environmental Effects	Socio-Economic Effects	Cost Effectiveness	Status
NONSTRUCTURAL						
Raise/Flood-Proof Structures	Minimal	High	Minimal	High	Low	Eliminated
Relocate Structures	Minimal	High	Extensive	High	Low	Eliminated
Flood Warning System	Minimal	Low	Minimal	Low	High	Retained
Emergency Preparedness	Moderate	Low	Minimal	Medium	High	Retained
Elevate Critical Infrastructure and Emergency Evacuation Route(s)	TBD	TBD	TBD	TBD	TBD	Retained
Improve Development Regulations	TBD	TBD	Minimal	TBD	High	Retained
STRUCTURAL						
Dikes and Flood Walls	Minimal	High	Moderate	High	Low	Eliminated
Channel Improvements	Moderate	High	Moderate	Low	Low	Eliminated
Debris Basin/ Detention Structure	High	Moderate	Moderate	Low	High	Retained
NO-ACTION						
	Low	Low	Minimal	High	N/A	Retained

The screening criteria and rationale summarized in Table 4 is discussed in Section 5.4.2 and the evaluation and rationale used for retaining flood warning systems, emergency preparedness, zoning, improved development regulations, debris basin/detention structure measures are discussed in Section 5.4.2.

5.4.2 Excluded Measures

Based on several factors that the PDT evaluated, the non-structural measures which included raise/flood proofing and relocating structures and the structural measures such as dikes, flood walls and channel improvements were not retained for further evaluation as identified in Table 4. Several of these measures were eliminated for technical, economic, or environmental

considerations. Others would present an incomplete or ineffective solution. Specifically, the measures that were eliminated were found to be of very limited applicability, had a very high associated cost, may have extensive environmental effects, or did not address the established goals and objectives. Further details are provided below.

Wet Floodproofing – Generally, this is limited to structures with living spaces above flood stage and crawlspaces, basements, and underground garages that would not sustain damages if flooded. These measures may require the structure be adequately anchored to its foundation, alternation of a structure's design and construction, use of flood-resistant materials, adjustment of building operation and maintenance procedures, and the relocation and treatment of equipment and contents.

In most cases, some human intervention will be required for wet flood proofing when a flood is imminent, and it is extremely important that there be adequate time to execute such actions. This measure also requires some degree of periodic maintenance and inspection to ensure that all components will operate properly under flood conditions.

Floodproofing does nothing to remove property or transportation infrastructure from the floodplain and therefore would represent an incomplete solution to the flood problem. Due to the incomplete nature and limited applicability of this floodproofing method, this measure was not carried forward for further evaluation.

Dry Floodproofing – A dry flood-proofed structure is made watertight below the level set by FEMA and public ordinances to prevent floodwaters from entering. Making the structure watertight requires sealing the walls with waterproof coatings, impermeable membranes, or a supplemental layer of masonry or concrete. There are technical considerations that must be considered in order to accurately determine whether dry floodproofing will be successful.

Aside from the cost, dry flood proofed businesses can still suffer flood damages due to the potentially incomplete nature of the solution. Dry flood proofed homes are not a recommended measure when the flood waters could trap people in their homes, an evacuation hazard. Enclosures for windows and doors require human intervention to fully implement the solution and, this action would have to occur in a very short time frame. Once again, floodproofing does nothing to remove property or transportation infrastructure from the floodplain and therefore would represent an incomplete solution to the flood problem. Due to the incomplete nature and limited applicability of this floodproofing method, it was not carried forward for further evaluation.

Acquisition and/or Relocation – The relocation process is complex, expensive, and requires extensive pre-move planning. However, in some situations the pre-planning is costly, and this may not be a cheaper measure than acquiring and demolishing a flood prone structure. Acquisition requires the purchase of the flood prone property and structure; demolition of the structure; relocation assistance, if occupants are renters or are leasing the property; and applicable compensation required under Federal and State law. Under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, payments to displaced entities from acquisition and relocation will be paid more fairly and equitably for the negative impacts they experience as a result of a Federal or federally assisted project. FEMA estimates relocation costs between $99 and $116 per square foot (1999 price levels), which exceeds the depreciated replacement costs of just about every structure in the Borrego Valley

floodplain. This measure typically requires voluntary relocation by the property owners and/or eminent domain rights exercised by the NFS. This technique is more costly than relocation and therefore is uneconomical. As with relocations, there are over 2,600 structures identified and acquiring properties in a floodplain has limited utility unless you have a high rate of adoption, which may require use of eminent domain. Repurposing land for a public good like a park is also infeasible without high acquisition adoption rates, as it would represent an incomplete solution to the flood problem. Due to the incomplete nature and inefficiency of this measure, it was not carried forward for further evaluation. Further analysis can be done to evaluate the cost and opportunity associated with this measure.

Raising Structures in Place – When a structure is properly elevated, the living or commercial area will be above all but the most severe floods (such as the 1/500 annual chance flood). Several elevation techniques are available. In general, they involve (1) lifting the structure and building a new, or extending the existing, foundation below it or (2) leaving the structure in place and either building an elevated floor within the house or adding a new upper story.

This measure was not carried forward for further evaluation due to the cost involved with elevating the structure, foundation work and/or including an upper story. This measure was screened in early plan formulation as not being cost effective as a federal project.

Dikes and Flood Walls – Some homeowners have taken precautions of having concrete walls or earthen berms built around their property. The construction of dikes and flood walls around property may help protect an individual home against flooding. This type of practice has the potential of increasing flood hazards to other homeowners and businesses. This measure is not carried forward for cost, transfer of risk, environmental and constructability considerations.

Channel Improvements – Interceptor channels could be built across the alluvial fans. These channels would be designed to intercept the flows from the alluvial fans as side channel spillways, redirecting flow into conveyance channels. The flow would then be safely conveyed southeast of the populated areas back into its historical path. This measure would be appropriate for: Coyote, Henderson, Borrego Palm, Hellhole, Dry, and Culp-Tubb Canyons. This measure is not carried forward due to cost, public opposition to aesthetic impact, and environmental considerations of the measure. This measure would ultimately need to be combined with the debris basin/detention structure measure to render a measure that seeks to reduce flood threat for all of the canyons in the study area.

The non-structural measures: raise/flood-proof structures, relocate structures, flood warning system and emergency preparedness were analyzed. The flood warning system, emergency preparedness, elevating critical infrastructure and emergency evacuation route(s), and improving development regulation measures were carried forward for further evaluation.

5.4.3 Retained Non-Structural and Structural Measures

The non-structural and structural measures that were retained are described in further detail below.

5.4.3.1 Non-Structural Measures

Four non-structural measures were considered throughout plan formulation to address the flood risk to Borrego Springs and include the following:

Flood Warning System – This measure would provide timely warnings to potentially save lives and aid disaster preparedness. A flood warning and preparedness system is often the most cost-effective flood mitigation measure, and comprises computer hardware, software, gaging infrastructure, technical activities and/or organizational arrangements aimed at decreasing flood hazards.

Advanced warning is not generally effective in reducing structural damages (National Hydrologic Warning Council). The primary benefits of such a system are credited for providing early warning, mobilization, and evacuation of residents as well as some reduction in damages to vehicles and structure contents. However, since most flooding in the study areas results from localized summer thunderstorms, flood warning lead times are short. A flood warning in Borrego Springs currently provides less than 1 hour notice since there are no stream gages in any of the local canyons. Adding early warning gages in the canyon or rain gages in the upper watersheds could improve warning times by tens of minutes. The added warning time could make a difference in a life-threatening flood; however, they would not allow for effective reduction of structural damages.

A flood warning system could present benefits by reducing residential property subject to flooding. Residential contents represent half the residential flood damages. It is assumed that an effective and community recognized flood warning system would allow residents to protect structure contents. Removing damageable items from the dwelling or raising them above flood stage would decrease the magnitude of estimated damages. The high residual damages to private and commercial properties and to other infrastructure (roads, bridges, and utilities) suggests that a flood warning system is ineffective and incomplete on its own. Should an evacuation warning be issued based on life safety, residents should heed this warning. Efforts to reduce flood damages by removing damageable items need to be balanced against the imperative for life safety considerations where consequences are potentially catastrophic.

Emergency Preparedness – Having an evacuation plan in place before a flood occurs can help avoid confusion, prevent property damage, and decrease the risks to human health and safety. Flood response plans are developed to identify actions during the event of flooding, to include government buildings, community centers, education facilities and housing areas. Flood response plans should include identifying critical equipment, records and supplies prior to the onset of a flood to aid the recovery of operations. They should also include specific flood fighting and evacuation plans to enhance the likelihood of success. Implementing these emergency operations is usually the responsibility of appropriate agencies with the authority to implement plans.

Elevating Critical Infrastructure / Emergency Evacuation Routes – The future without-project description of transportation included a note of plans to construct new roads. The local transportation agency should consider elevating future roads outside of the floodplain, and identify any critical infrastructure or emergency evacuation routes and elevating those. Road elevations should consider including hydraulic connectivity under any elevated road to avoid any inadvertent induced flood damages. Elevating roads and critical infrastructure in the floodplain

would improve community resiliency and life safety to reduce the risk of evacuation routes becoming impassable and risking life safety. Even where cost effectiveness is low, this measure may be justified based on life safety benefits.

Improve Development Regulations – The existing regulations could be updated by incorporating the floodplain modeling performed during this study. By incorporating the modeling into the regulations, the areas identified within the flood prone zones could be excluded from future development and increase the regulatory effectiveness.

5.4.3.2 Structural Measures

A single viable structural measure was considered in the plan formulation process to address the flood risk to Borrego Springs. The structural measure considered is:

Debris Basin /Detention Structure– Debris basins are effective tools for sedimentation control, particularly if combined with detention basins which can also reduce the peak flow rate. One limitation for detention basins is that, while they reduce overall outflow volume, they may have no effect on overall flow magnitude for storms larger than the design storm.

The structural measures: dikes and flood walls, channel improvements, and debris basin/detention structure were analyzed. Only the debris basin/detention structure was carried forward for further evaluation.

6 FORMULATION AND COMPARISON OF SOLUTION SETS

6.1 Preliminary Formulation and Screening of Measures

The retained measures described in Section 5.4 were formulated to create a preliminary list of measures that would meet the desired objectives. This preliminary assessment of flood risk management measures was based upon qualitative assumptions and the best quantitative data available at the time. All measures were evaluated based on their performance over a 50-year period of analysis. Determinations were made regarding which measures should proceed forward. The basis for elimination included: limited applicability, high associated cost, extensive environmental effects or did not address the established goals and objectives.

6.2 Preliminary Measure Descriptions

The following measures were considered in response to the flood risk to Borrego Springs.

No Action: No Action assumes that no project would be implemented by the Federal Government or by local interests to achieve the planning objectives. The county would continue to require new homes located in the FEMA floodplain in Borrego Springs to be built in accordance to the Flood Damage Prevention Ordinance 811.501 (County of San Diego, 2024). Under no action, USACE would not implement a project to reduce the risk of flooding to Borrego Springs. This measure would result in continued flood impacts to the community. This measure is not considered to be acceptable due to the need to provide flood risk reduction to Borrego Springs. Without assistance from USACE, the County of San Diego would, as funding allows, likely continue to fund small flooding repairs as interim measures until funding is available for a permanent solution. With no action, there is a higher risk to human life, health, safety, and structures.

Measure 1 (Emergency Preparedness) – Relative to other measures presented, emergency preparedness provides high life safety risk reduction but minor reduction in monetary damages. Some damages to vehicles and structure contents would be prevented through this measure, however, it is by itself an incomplete solution. The community of Borrego Springs should collaborate with their county emergency managers to create a seamless Flood Response Plan prior to completion of any project construction. This measure is carried forward for consideration in combination with other measures.

Measure 2 (Flood Forecast and Warning System) – A flood warning and preparedness system (FWPS) is often the most cost-effective flood mitigation measure that is comprised of computer hardware, software, gaging infrastructure, technical activities and/or organizational arrangements aimed at decreasing flood hazards. The high residual damages suggest that a flood warning system is ineffective and incomplete on its own. Storm flows from the surrounding canyons are flashy and reach the ponding area that is the community of Borrego Springs, very quickly. Installation of stream gaging stations in the upper watersheds would increase warning times by tens of minutes. Some damages and a reduction of life safety risk would be accomplished however, they would not allow for effective reduction of structural damages, and it is by itself an incomplete solution.

This measure is effective in combination with a detention structure, however, so long as gauges are installed in the detention basin. Automated gages could warn emergency managers of remaining detention basin capacity and impending overtopping events. This measure is carried forward for consideration in combination with other measures.

Measure 3 (Elevate Critical Infrastructure and Emergency Evacuation Route(s)) – This measure would consider elevating future roads, emergency evacuation routes, and critical infrastructure in the floodplain. This measure would improve community resiliency and life safety to reduce the risk of evacuation routes becoming impassable and risking life safety. Even where cost effectiveness is low, this measure may be justified based on life safety benefits and is carried forward for consideration in combination with other measures.

Measure 4 (Improve Development Regulations) – This measure would include updating existing regulations for future development in the floodplain. Floodplain modeling done in this study could be used to update the regulations by identifying flooding inundation in the community during ACE events. This measure is carried forward to be used in combination with other measures to further increase their effectiveness.

Measure 5 (Debris / Detention Structure) – Debris basins are effective tools for sedimentation control, particularly if combined with detention basin capabilities which can also reduce the peak flow rate. One limitation for debris/detention basins is that, while they reduce overall outflow volume, they may have no effect on overall peak flow rates for storms larger than the design storm. The proposed structural solution applies to both Fire Canyon and El Vado Canyon because of their relatively small watershed and would include constructing small dams (or large debris basins). These debris/detention structures would completely retain the chosen design storm event and would have to be cleaned out routinely as part of an operation and maintenance plan. Flood detention basins can be successful in mitigating flood risk, but they can give communities a misleading sense of safety since they are generally designed to handle only minor to moderate flood events. More significant

storms and/or back-to-back events can cause the basins to fill up and raise the likelihood of overtopping or breach. This would result in increased risk to life due to flooding. Some of the alluvial fans (e.g., apex of El Vado Canyon) are located within the limits of the ABDSP. Structural flood mitigation measures proposed within the park boundaries would likely be considered to have a significant adverse impact. This impact will limit the structural mitigation measures that can be proposed within park limits. The dam considered for El Vado Canyon, for example, may not be feasible due to its location in the ABDSP. This measure is carried forward for consideration in combination with other non-structural measures.

6.2.1 Final Array of Measures Considered

Those measures remaining after the preliminary screening process constitute the array of measures considered (Table 5). This array of plans reflects the trade-offs between effectiveness and efficiency, environmental impacts, and the completeness of the measure, as possible, while being generally cost effective.

Table 5. Array of Measures Screening.

Measure	Measure Title	Measure Description	Carried Forward	Justification
No Action	No Action	No Action taken	YES	USACE Planning policy.
1	**Emergency Preparedness**	Create an emergency action plan.	YES	Cost effective; efficient construction, meets project objectives.
2	**Flood Forecast and Warning**	Increase warning times and notification system	YES	Meets project objectives, past success.
3	**Elevate Critical Infrastructure and Emergency Evacuation Route(s)**	Identify the community's critical infrastructure and necessary evacuation routes.	YES	Further evaluation needed.
4	**Improve Development Regulations**	Improve development regulations.	YES	Minimal environmental effects and cost effective. Further evaluation needed.
5	**Debris Basin/ Detention Structure**	Sediment and flow detention control.	YES	Compliments non-structural measures; incomplete plan as it only addresses 2 fans out of 8; environmental and aesthetic concerns associated with ABDSP, on-going O&M costs make this not cost effective.

6.3 Further Screening Criteria of Measures

No further evaluations were completed as the study was terminated after the initial analysis.

7 DECISION OF STUDY TERMINATION

The study has been terminated as it was determined to not have a path forward in the design and implementation phase as a federal project under the CAP. The project will result in non-structural measures that could be carried out by the NFS at their own expense. USACE will provide a complete summary of work accomplished, including hydrologic and economic appendices, Existing Conditions and Proposed Alternatives Floodplain Report (WEST, 2017) that documents study area existing conditions and results of the hydraulic analysis performed for this study.

8 RECOMMENDATIONS

Each individual measure, implemented on its own would still offer an effective solution. However, combinations of Measures 1 through 5 could provide a more comprehensive solution. Other effective measures could be implemented singly and not in combination with Measure 1, Measure 2, Measure 3, Measure 4, or Measure 5. The study was terminated before the completion of this evaluation. Measure 1 is least costly and has the least construction risk associated with the plan; Measure 2 is most efficient; Measure 3 will need to be further evaluated; Measure 4 has the least environmental effects and will need to be evaluated further; and Measure 5 is the best for reducing the magnitude of debris and flood flow impacts for 2 of the alluvial fans. A combination of measures is recommended for further evaluation by the NFS as a continuing effort following termination of this study.

8.1 Planning Considerations for the Retained Measures

For non-structural project measures, San Diego County should continue to require new homes in Borrego Springs to be built in the FEMA floodplain of the Borrego Springs in accordance with the Flood Damage Prevention Ordinance 811.501 (County of San Diego, 2024) and the appropriate FEMA FIRM Map (FEMA, 2025). Increasing the pad height requirement as a function of predicted depth of the fan (depth shown on the WEST Report flood hazard maps) should also be investigated.

The most important non-structural measure is the development of a flood warning and preparedness system. A flood warning and preparedness system for the Borrego Valley Watershed needs to take into consideration a large amount of auxiliary information to watch and track existing storms, to identify the formation of convective cells, and to quantify and predict precipitation. The development of an integrated flood information system, specific to Borrego Valley Watershed, is recommended to automatically integrate, process, and manage this information. Additionally, it is recommended that the number of rain gages installed in Borrego Valley Watershed be increased. Multiple configurations of these new gages are possible; therefore, a detailed study is required for a final layout.

Incorporating outreach and education into the emergency action planning for the residents and businesses that occupy the 2,600 structures is a critical component of any early warning and preparedness system. A 2 phased approach may then warrant further evaluation of additional nonstructural measures including elevation, acquisition or relocation which can further reduce the consequences of flood hazards.

Possible structural solutions consist of debris basins / detention structures that could be built for some of the small canyons to capture flow and debris. Some issues facing the structural measures are cost, aesthetics, operation and maintenance, and construction within the ABDSP limits. Considering use of a nature-based detention structure could potentially allay aesthetic concerns with this measure. Furthermore, there might be an opportunity to achieve groundwater recharge with detention, which could provide additional benefits given the groundwater and subsidence concerns in this area. Groundwater recharge should be examined in future analyses.

Further detailed analyses are needed to fully define a flood warning and preparedness system and any proposed structural measures for the Borrego Valley Watershed.

9 REFERENCES

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BORREGO SPRINGS CONTINUING AUTHORITIES PROGRAM (CAP) SECTION 205

Los Angeles District
Civil Works Branch

Facilitated by:
Megan Whalen, Project Manager
Gabrielle Dodson, Lead Planner
Moosub Eom, Technical Specialist
Jeannine Hogg, Economist

PRESENTATION DATE:
23 January 2026

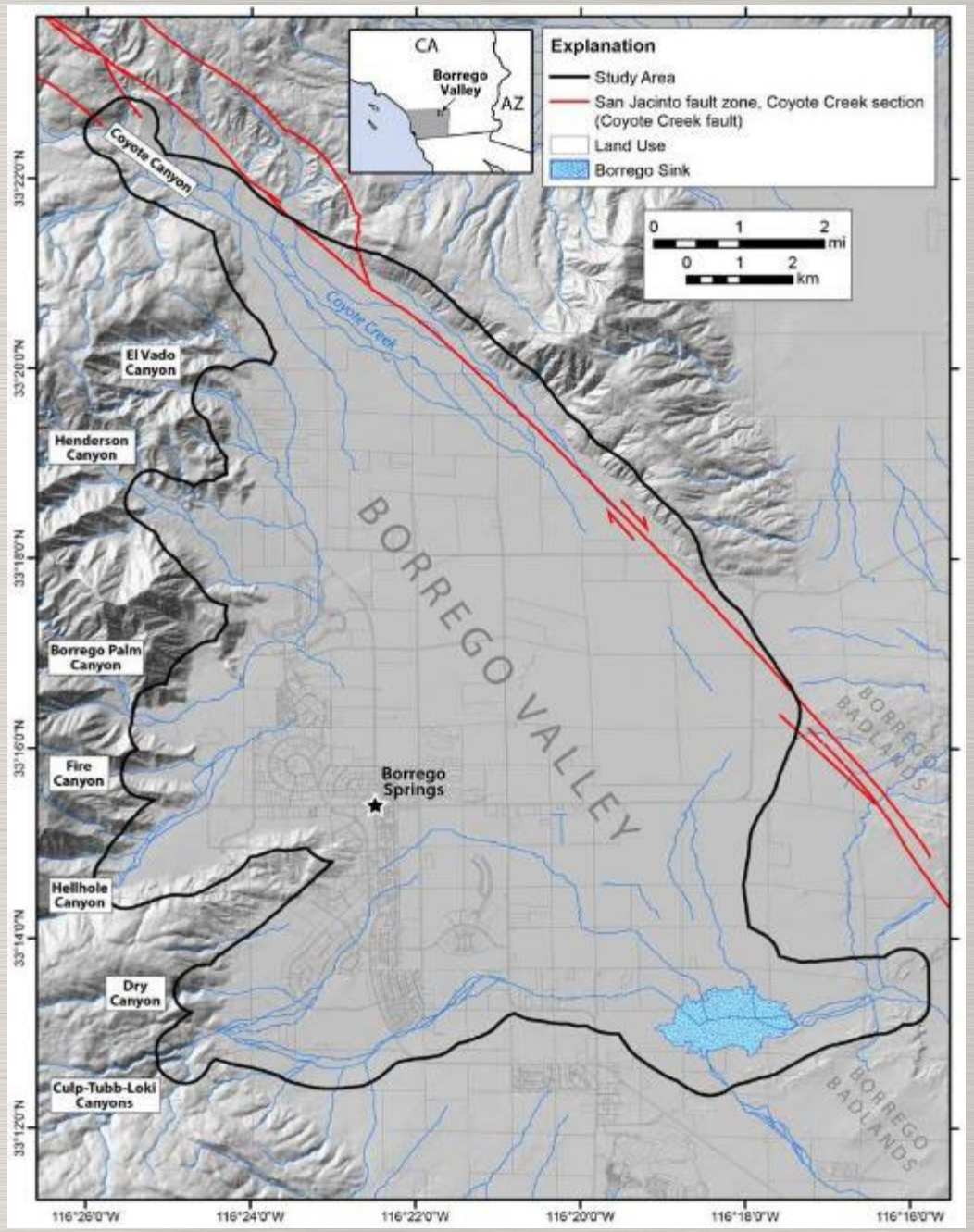
U.S. ARMY

US Army Corps of Engineers

PROJECT AREA

Alluvial Fans subject to flash floods

- Coyote Canyon
- El Vado Canyon
- Henderson Canyon
- Borrego Palm Canyon
- Hellhole Canyon
- Dry Canyon
- Culp-Tubb Canyons



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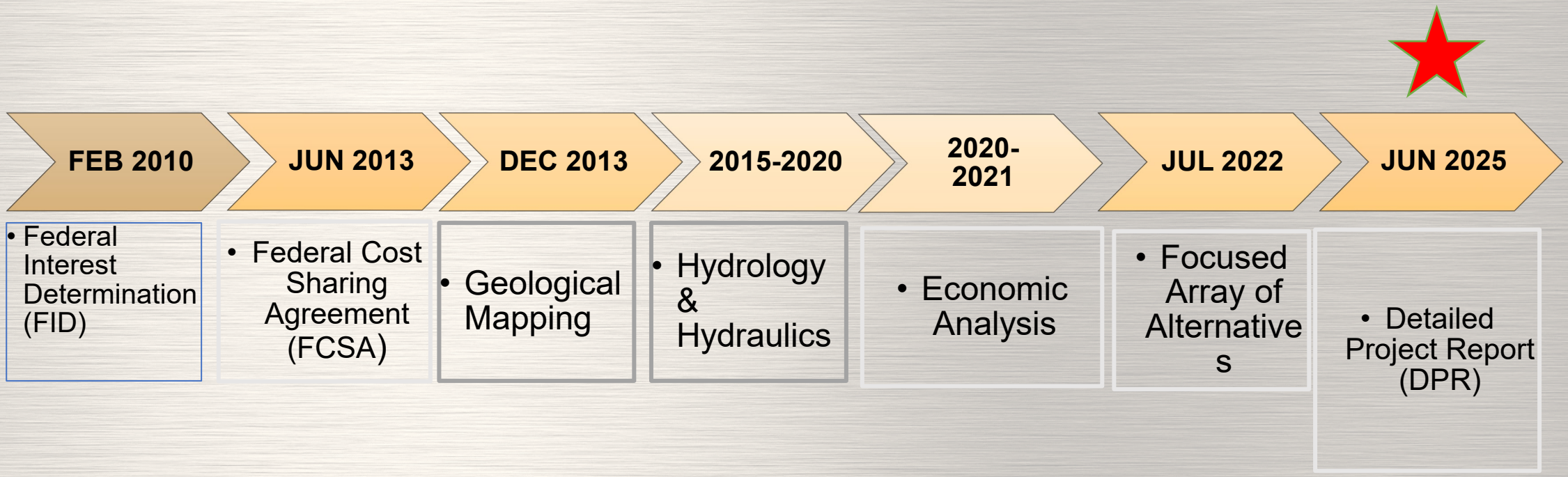
Study Overview



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Federal Interest Determination (FID)

Problems: The community of Borrego Springs is subject to severe flood and debris risk.

- Active Alluvial Fans
- No effective structural flood control measures
- Current and future water availability (baseline and forecasting)
- Considered a Severely Disadvantaged Community and located within an Economically Distressed Area.

Sponsor Interest: Ability to update FEMA flood maps with data from USACE maps

- Mapping of flood hazards
- Flood Warning System
- Expansion of and/or improvement to existing detention basins
- Development/zoning recommendations to guide future development
- Water conservation benefits

Planning Considerations

- Lack of community support for Structural Measures (cost/assessment district).
- Construction limitations within Anza-Borrego Desert State Park.
- Conventional flood control improvements are costly
- Concrete channels not compatible with the desert environment
- The Borrego Springs is considered a Severely Disadvantaged Community and located within an Economically Distressed Area

Background – Work Completed

Alluvial Fan Mapping

Hydrology and Hydraulics

- USACE Hydrology
- West Consultants Fan Modeling (Existing Conditions Report & Alternatives)

Economic Analysis

- Without Project Analysis Completed

Environmental Compliance

- Draft Environmental Assessment (EA) included in West Consultants Existing Conditions Report

Planning

- Detailed Project Report

Hydrology & Hydraulics

- Hydrology → How much water
  - Rainfall-runoff relationships, flood discharge estimate, etc.

Hydraulics → How water moves

- Water surface elevations, flow depth and velocity, flood extents, etc.

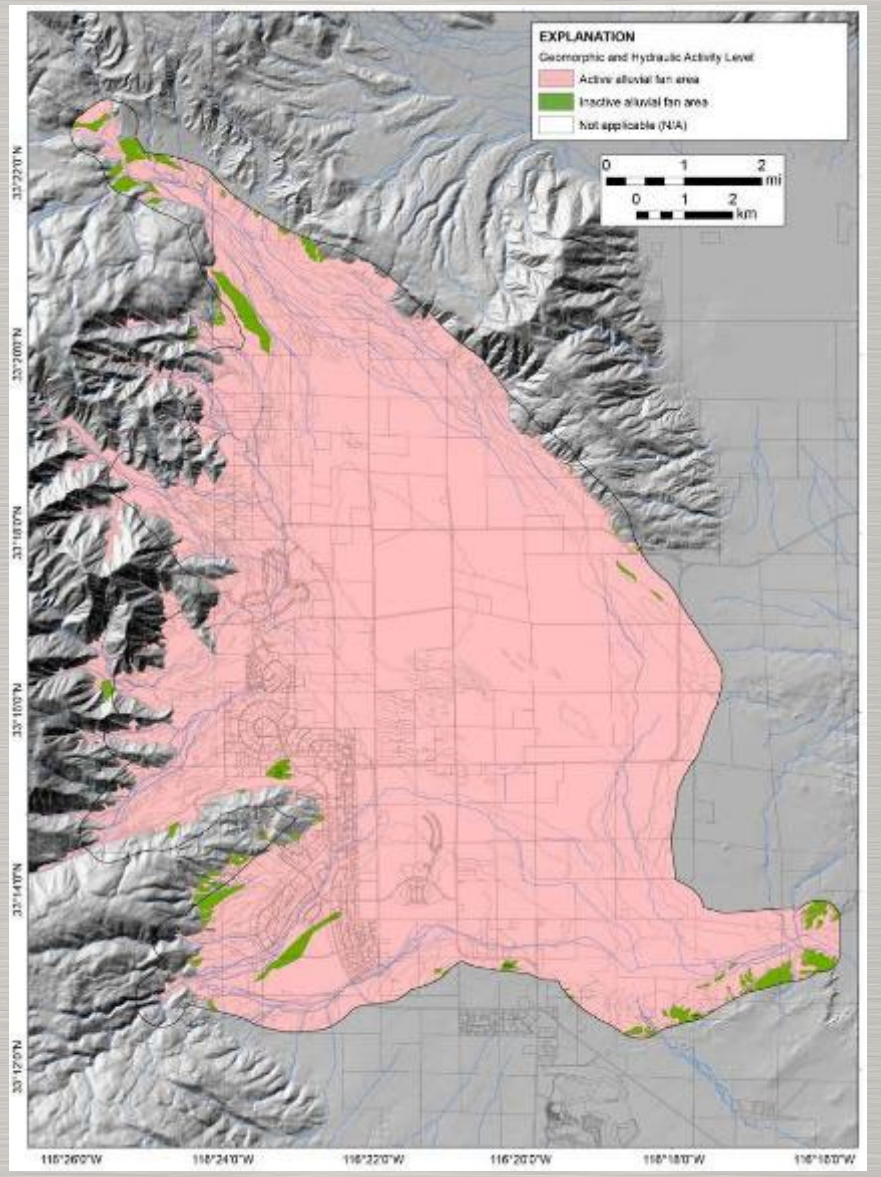
Active *versus* Inactive Alluvial Fan Areas of the Borrego Valley Study Area

- 90% of the 61 mi^2 of the Borrego Springs Study Area contain geomorphically and hydraulically active alluvial fan landforms
  - ➢ Active alluvial fan: Currently receiving sediment and flood flows; ongoing sediment deposition, channels that shift, split, or avulse during floods
  - ➢ Inactive alluvial fan: No longer receiving significant sediment or flood flows; no recent sediment deposition, stable channels

EXPLANATION

Geomorphic and Hydraulic Activity Level

- Active Alluvial Fan Area
- Inactive Alluvial Fan Area
- Not Applicable (N/A)



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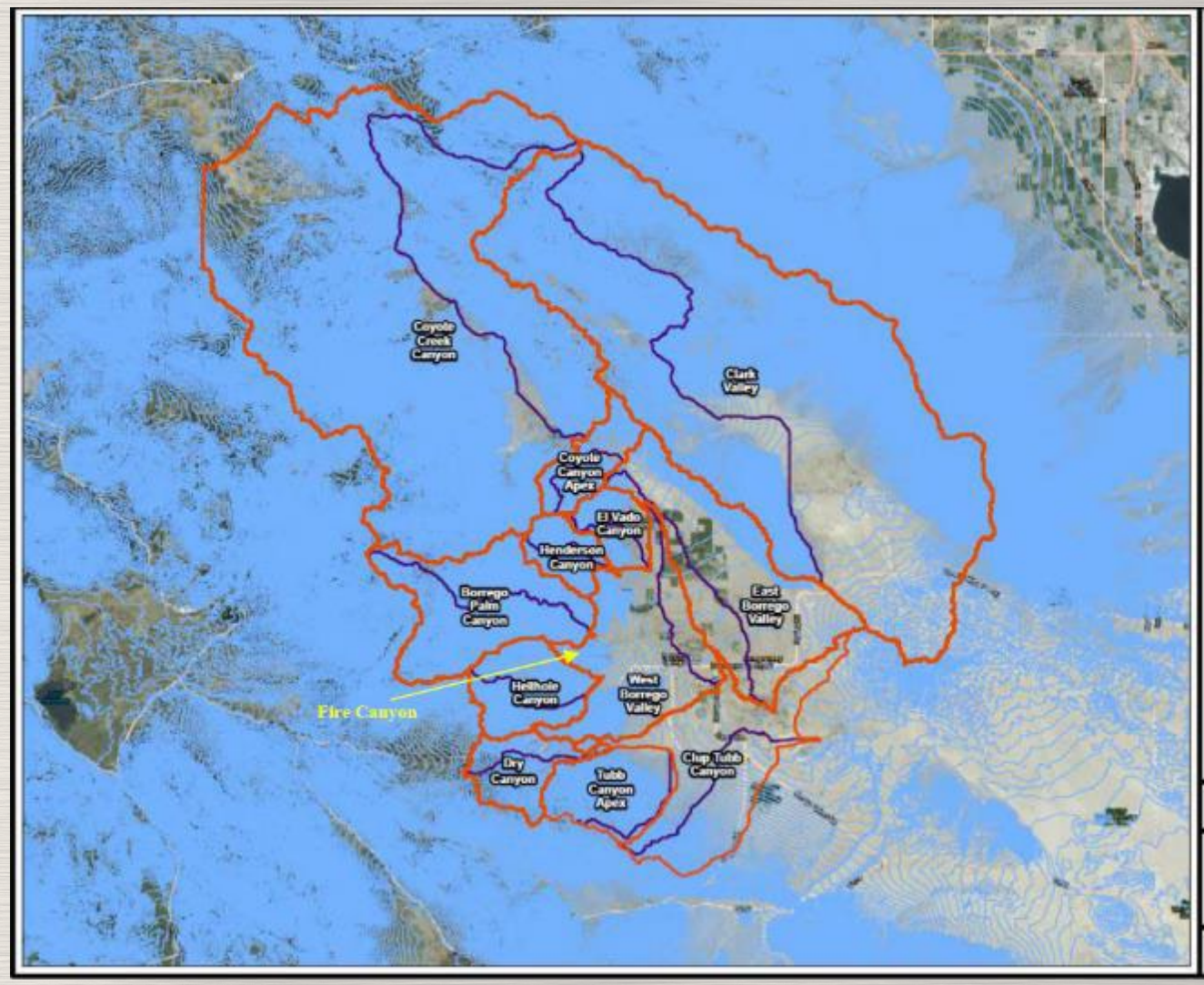
H&H Study Area

Alluvial fans subject to flash floods

- Coyote Creek Canyon
- El Vado Canyon
- Henderson Canyon
- Borrego Palm Canyon
- Hellhole Canyon
- Dry Canyon
- Culp-Tubb Canyon

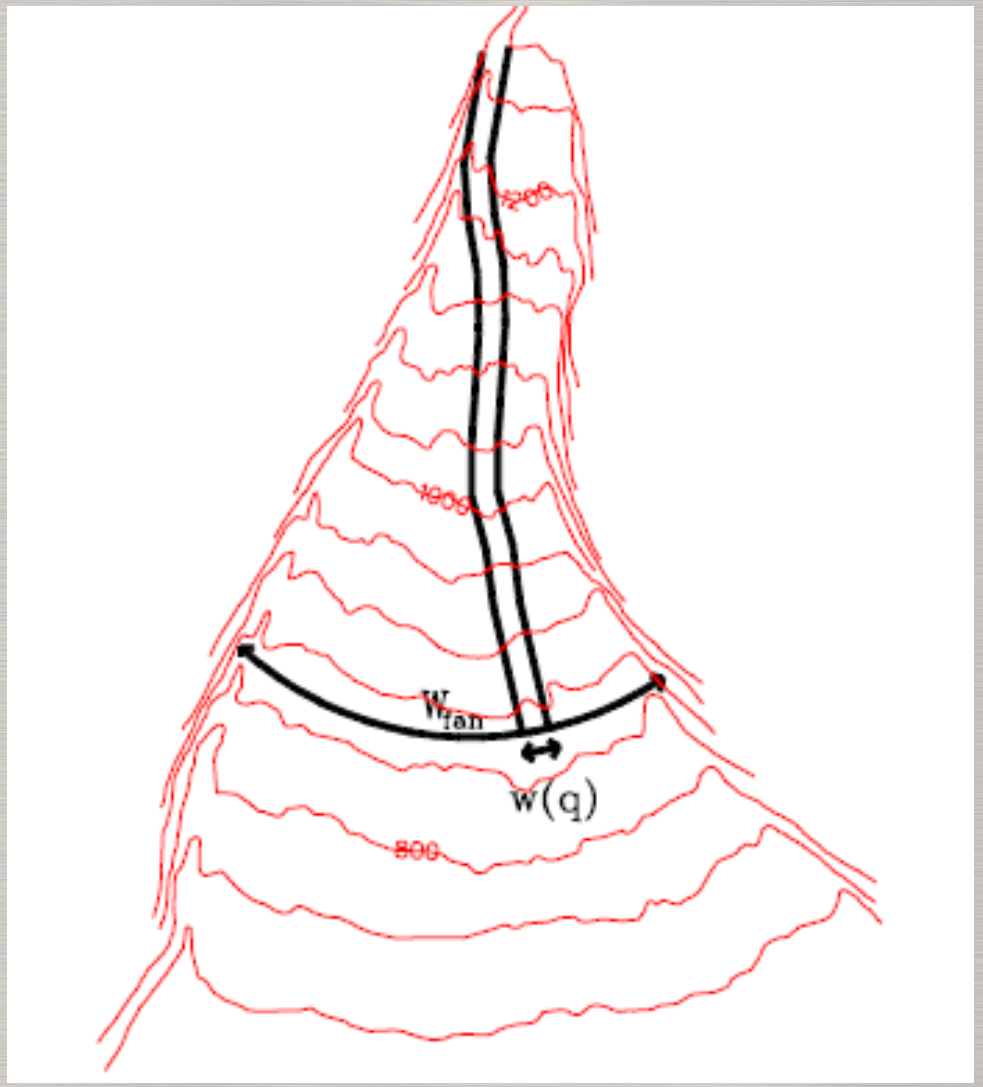


*Clark Valley was not considered as it enters the Borrego Springs area well south of the major population areas

**Fire Canyon was not explicitly considered

Concept of FEMA FAN Model

- Simple application of the definition of a 100-year Flood.
  - 100-year flood: 1% (1/100) chance of occurring in any given year at a specific location.
  - It does not mean the flood happens once every 100 years. Such floods can happen multiple times in a short period or not at all.
  - Engineers and regulators use the 100-year flood to define floodplains, set design standards, and determine flood insurance requirements.
- The location of the flow path during an alluvial fan flooding event is unpredictable
- To determine the probability of a given point on the fan surface being flooded as a result of a storm over the watershed, the following two probabilities must be considered;
  - the probability of the storm occurring
  - the probability that the flowpath of the floodwaters include that point



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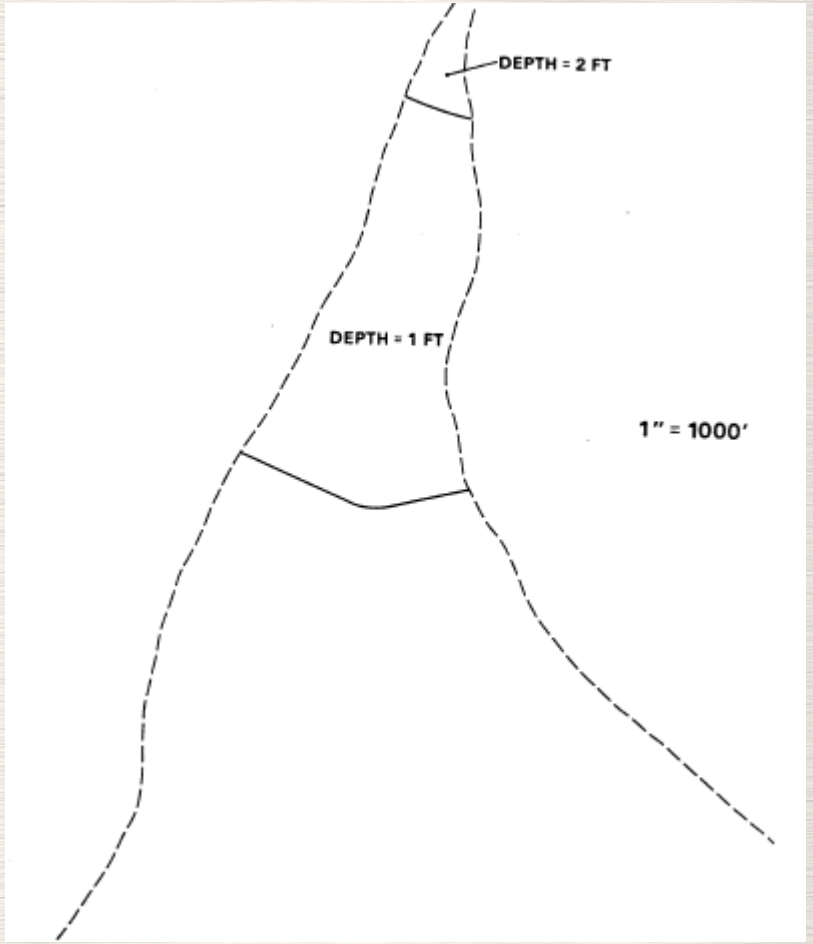
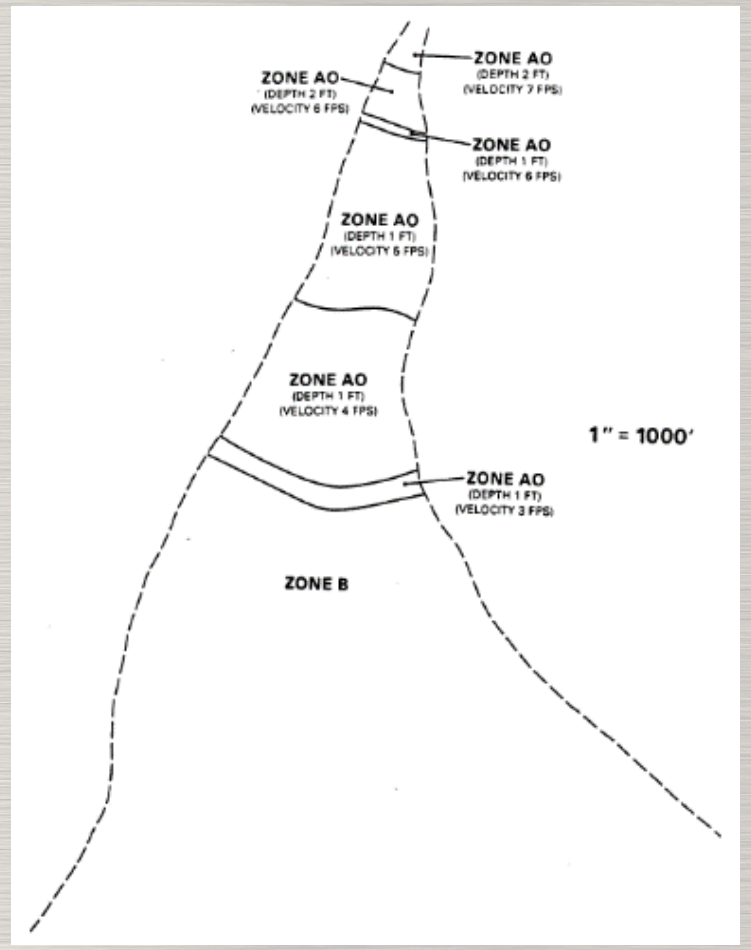
Concept of FEMA FAN Model

Input Data





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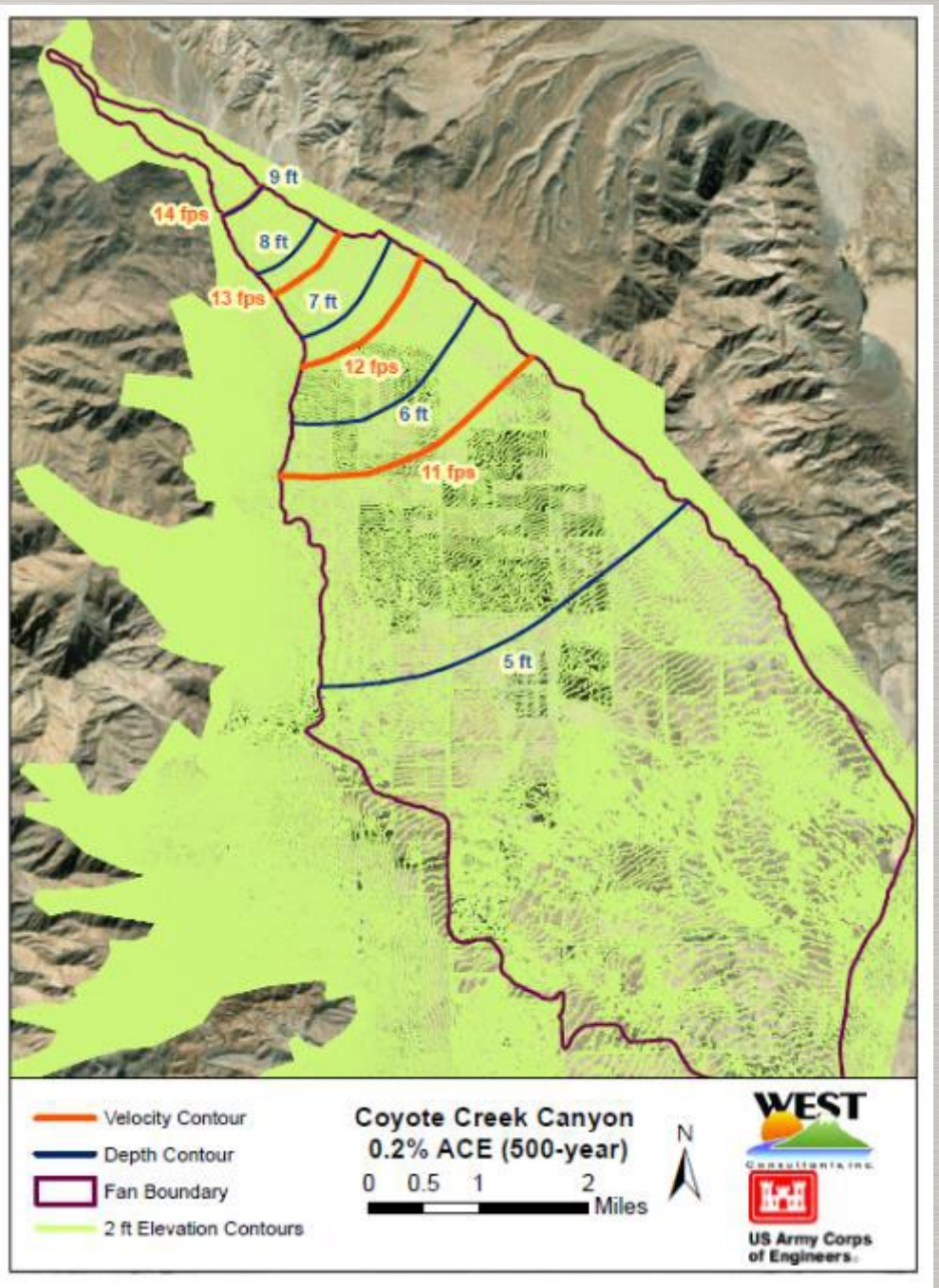
West FAN Model

WEST Consultants modified the FEMA FAN program to generate flood hazard maps for 8 flood events; i.e., 2-year, 5-year, 10-year, 25-year, 50-year, 100-year, 200-year, and 500-year events



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Economics

Economics- Structures & Depths

Borrego Springs Alluvial Fan Floodplains – Number of Structures by Fan and Structure Type

CATEGORY	HENDERSON	HELLHOLE	EL VADO	DRY	CULP TUBB	COYOTE	BORREGO PALM	TOTAL
COMMMERCIAL		56		1	6	1	4	68
INDUSTRIAL		5				1		6
WAREHOUSE		8						8
PUBLIC	4	19		2	3	0	0	28
SFR	119	203	18	57	469	117	145	1,128
CONDO	12	37			92		31	172
DUPLEX		29		5	20			54
MULT-UNIT		9	1	6	6	2		24
APARTMENT					2			2
MOBILE HOME		298		6	213	326	26	869
TOTAL	**135**	**664**	**19**	**77**	**811**	**447**	**206**	**2,359**

Depths by Reach and Frequency

		2	5	10	25	50	100
Fan/Canyon	Reach	0.5	0.2	0.1	0.04	0.02	0.01
Henderson	1	0.000	0.000	0.000	0.000	0.210	0.470
Hellhole	1	0.000	0.000	0.000	0.610	1.500	1.280
El Vado	1	0.000	0.000	0.000	0.150	0.230	1.060
Dry	1	0.000	0.000	0.000	1.030	1.060	1.310
Culp Tubb	1	0.000	0.110	0.390	1.180	1.470	2.350
	2	0.000	0.000	0.000	0.000	0.530	1.000
Coyote	1	0.000	0.000	0.000	1.000	1.670	2.570
	2	0.000	0.000	0.000	1.000	1.004	2.000
	3	0.000	0.000	0.000	0.000	1.000	2.000
Borrego Palm Springs	1	0.000	0.000	0.600	1.100	1.670	2.570

Fan & REACH MAP

Borrego Springs Alluvial Fan Floodplains – Expected Annual Damages Summary

CATEGORY	EAD	Percentage of Total
Structure & Content	$3,865,350	77%
Structural Cleanup	$340,630	7%
Vehicle Damages	$330,800	7%
Emergency Costs	$479,380	9%
Total	**$5,016,160**	**100%**

Depths by Reach and Frequency

		2	5	10	25	50	100
Fan/Canyon	Reach	0.5	0.2	0.1	0.04	0.02	0.01
Henderson	1	0.000	0.000	0.000	0.000	0.210	0.470
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	2	0.000	0.000	0.000	0.000	0.530	1.000
Coyote	1	0.000	0.000	0.000	1.000	1.670	2.570
	2	0.000	0.000	0.000	1.000	1.004	2.000
	3	0.000	0.000	0.000	0.000	1.000	2.000
Borrego Palm Springs	1	0.000	0.000	0.600	1.100	1.670	2.570

US Army Corps of Engineers

Initial Screening of Measures

Measure	Meeting Goals and Objectives	Comparative Cost Range	Environmental Effects	Socio-Economic Effects	Cost Effectiveness	Status
NONSTRUCTURAL						
Raise/Flood-Proof Structures	Minimal	High	Minimal	High	Low	Eliminated
Relocate Structures	Minimal	High	Extensive	High	Low	Eliminated
Flood Warning System	Minimal	Low	Minimal	Low	High	Retained
Emergency Preparedness	Moderate	Low	Minimal	Medium	High	Retained
Elevate Critical Infrastructure and Emergency Evacuation Route(s)	———	———	———	———	———	Retained
Improve Development Regulations	———	———	Minimal	———	High	Retained
STRUCTURAL						
Dikes and Flood Walls	Minimal	High	Moderate	High	Low	Eliminated
Channel Improvements	Moderate	High	Moderate	Low	Low	Eliminated
Debris Basin/ Detention Structure	High	Moderate	Moderate	Low	High	Retained
NO-ACTION						
	Low	Low	Minimal	High	N/A	Retained

Non-structural project alternatives

Regulation

- San Diego County requires new homes located in the FEMA floodplain of the Borrego Springs area to be built in accordance with the Flood Damage Prevention Ordinance 811.501 (County of San Diego, 2024) and the appropriate FEMA FIRM Map (FEMA 2025).
- Continuing with this regulation in the future will help reduce future flood damages

Flood Warning System

- Flash Flood Prediction
- Hazard Data
- Flash Flood Risk Estimation
- Integrated Flood Information Systems

Adopted Mitigation Strategies

Note: Permit needed from the County to adopt these strategies.

House elevated above grade.

House on piers.

Array of Measures

This array of plans reflects the trade-offs between effectiveness and efficiency, environmental impacts, and the completeness of the measure, as possible, while being generally cost effective.

Measure	Measure Title	Measure Description	Carried Forward	Justification
No Action	No Action	No Action taken	YES	USACE Planning policy.
1	**Emergency Preparedness**	Create an emergency action plan.	YES	Cost effective; efficient construction, meets project objectives.
2	**Flood Forecast and Warning**	Increase warning times and notification system	YES	Meets project objectives, past success.
3	**Elevate Critical Infrastructure and Emergency Evacuation Route(s)**	Identify the community's critical infrastructure and necessary evacuation routes.	YES	Further evaluation needed.
4	**Improve Development Regulations**	Improve development regulations.	YES	Minimal environmental effects and cost effective. Further evaluation needed.
5	**Debris Basin/ Detention Structure**	Sediment and flow detention control.	YES	Compliments non-structural measures; incomplete plan as it only addresses 2 fans out of 8; environmental and aesthetic concerns associated with ABDSP, on-going O&M costs make this not cost effective.

Recommendations

Each individual measure, implemented on its own would still offer an effective solution. Combinations of Measures 1 through 5 could provide a more comprehensive solution.

- Measure 1 (Emergency Preparedness) is least costly and has the least construction risk associated with the plan
- Measure 2 (Flood Forecast and Warning) is most efficient
- Measure 3 (Elevate Critical Infrastructure and Evacuation Routes) will need to be further evaluated
- Measure 4 (Improve Development Regulations) has the least environmental effects and will need to be evaluated further
- Measure 5 (Debris Basin/Detention Structure) is the best for reducing the magnitude of debris and flood flow impacts for 2 of the alluvial fans. Most costly.

A combination of measures is recommended for further evaluation by the NFS as a continuing effort following termination of this study.

Detailed Project Report

- This report documents the feasibility phase and efforts completed prior to the point where the study was determined to not have a path forward in the design and implementation (aka construction) phase as a federal project under the CAP.
- The project will result in non-structural measures that will be carried out by the County of San Diego (Non-Federal Sponsor).
- Work elements completed:
  - affected environment,
  - without-project technical analyses
  - plan formulation, including screening of initial measures, and recommendations.
- Work elements not completed:
  - With-project analyses
  - Evaluation of a final array of measures
  - Policy compliance determinations
  - Environmental and regulatory compliance activities

Thank you!

Borrego Springs Community Meeting

Overview of Borrego Springs Continuing Authorities Program Section 205 Flood Risk Management Study

US Army Corp of Engineers
San Diego County Flood Control District

January 23, 2026

US Army Corps of Engineers

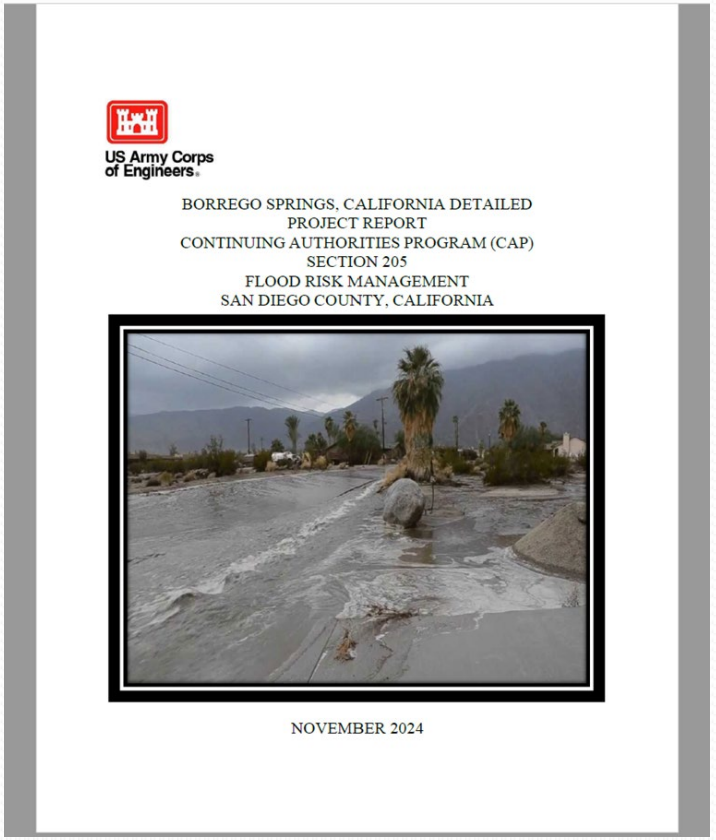
COUNTY OF SAN DIEGO PUBLIC WORKS

Introductions

- County of San Diego
  - Sara Agahi, Flood Control District Manager, Sara.Agahi@sdcounty.ca.gov
  - Vicky Zhang, Senior Civil Engineer, Vicky.Zhang@sdcounty.ca.gov
  - Tyler Heckstall Rodenbaugh, Senior Meteorologist, Tyler.Heckstall-Rodenbaugh@sdcounty.ca.gov
- USACE
  - Megan Whalen, Project Manager, Megan.A.Whalen@usace.army.mil
  - Gabrielle Dodson, Lead Planner, Gabrielle.Z.Dodson@usace.army.mil
  - Moosub Eom, Engineering Technical Specialist, Moosub.Eom@usace.army.mil
  - Jeannine Hogg, Economist, Jeannine.H.Hogg@usace.army.mil

Agenda

- Introductions
- USACE and CAP Section 205 Project
- County of San Diego Flood Warning System
- Next Steps
- Discussion and Questions
- Closing Remarks



County-USACE Collaboration

Public Law 110–114
110th Congress

An Act

To provide for the conservation and development of water and related resources, to authorize the Secretary of the Army to construct various projects for improvements to rivers and harbors of the United States, and for other purposes.

Nov. 8, 2007
[H.R. 1495]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

Water Resources Development Act of 2007.
Intergovernmental relations.
33 USC 2201 note.

(a) SHORT TITLE.—This Act may be cited as the "Water Resources Development Act of 2007".

(b) TABLE OF CONTENTS.—The table of contents for this Act is as follows:

SEC. 1002. SMALL PROJECTS FOR FLOOD DAMAGE REDUCTION.

(a) IN GENERAL.—The Secretary shall conduct a study for each of the following projects and, if the Secretary determines that a project is feasible, may carry out the project under section 205 of the Flood Control Act of 1948 (33 U.S.C. 701s):

(1) HALEYVILLE, ALABAMA.—Project for flood damage reduction, Haleyville, Alabama.

(2) WEISS LAKE, ALABAMA.—Project for flood damage reduction, Weiss Lake, Alabama.

(3) FORT YUKON, ALASKA.—Project for flood damage reduction, Fort Yukon, Alaska.

(4) LITTLE COLORADO RIVER LEVEE, ARIZONA.—Project for flood damage reduction, Little Colorado River Levee, Arizona.

(5) CACHE RIVER BASIN, GRUBBS, ARKANSAS.—Project for flood damage reduction, Cache River Basin, Grubbs, Arkansas.

(6) BARREL SPRINGS WASH, PALMDALE, CALIFORNIA.—Project for flood damage reduction, Barrel Springs Wash, Palmdale, California.

(7) BORREGO SPRINGS, CALIFORNIA.—Project for flood damage reduction, Borrego Springs, California.

(8) COLTON, CALIFORNIA.—Project for flood damage reduction, Colton, California.

(9) DUNLAP STREAM, YUCAIPA, CALIFORNIA.—Project for flood damage reduction, Dunlap Stream, Yucaipa, California.

San Diego County Flood Control District

Governing Body
GREG COX, First District
DIANNE JACOB, Second District
PAM SLATER-PRICE, Third District
RON ROBERTS, Fourth District
BILL HORN, Fifth District

AGENDA ITEM

DATE: October 31, 2012

FL02

TO: Flood Control District Board of Directors

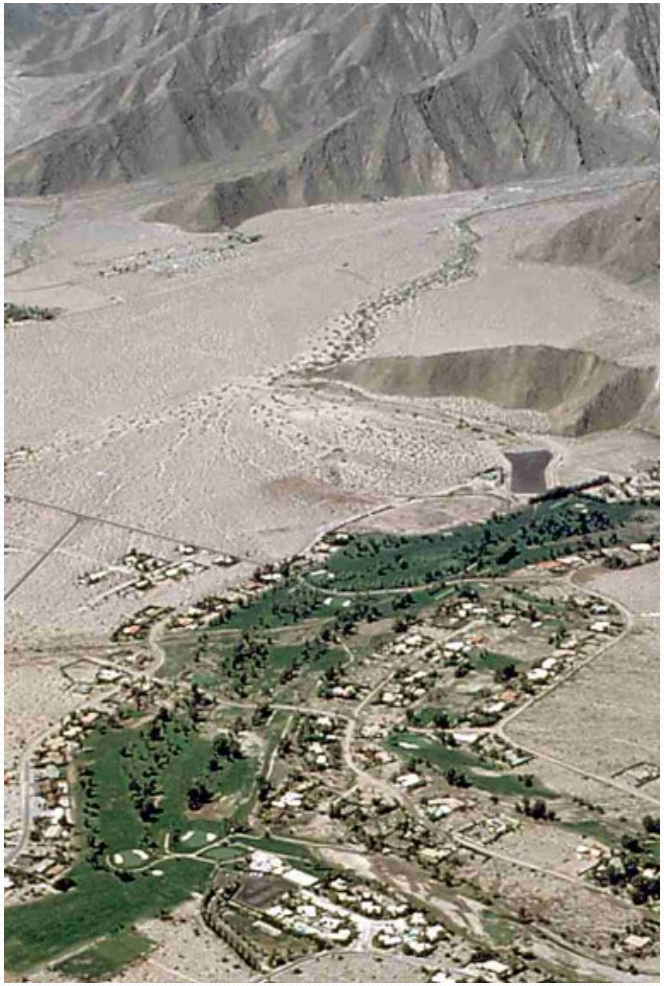
SUBJECT: AUTHORIZE A COST SHARE AGREEMENT WITH U.S. ARMY CORPS OF ENGINEERS FOR A COMPREHENSIVE HYDROLOGY AND HYDRAULIC ANALYSIS AND UPDATE OF THE COUNTY OF SAN DIEGO FLOOD MAPS IN THE BORREGO SPRINGS AREA (DISTRICT: ALL)

SUMMARY:

Overview

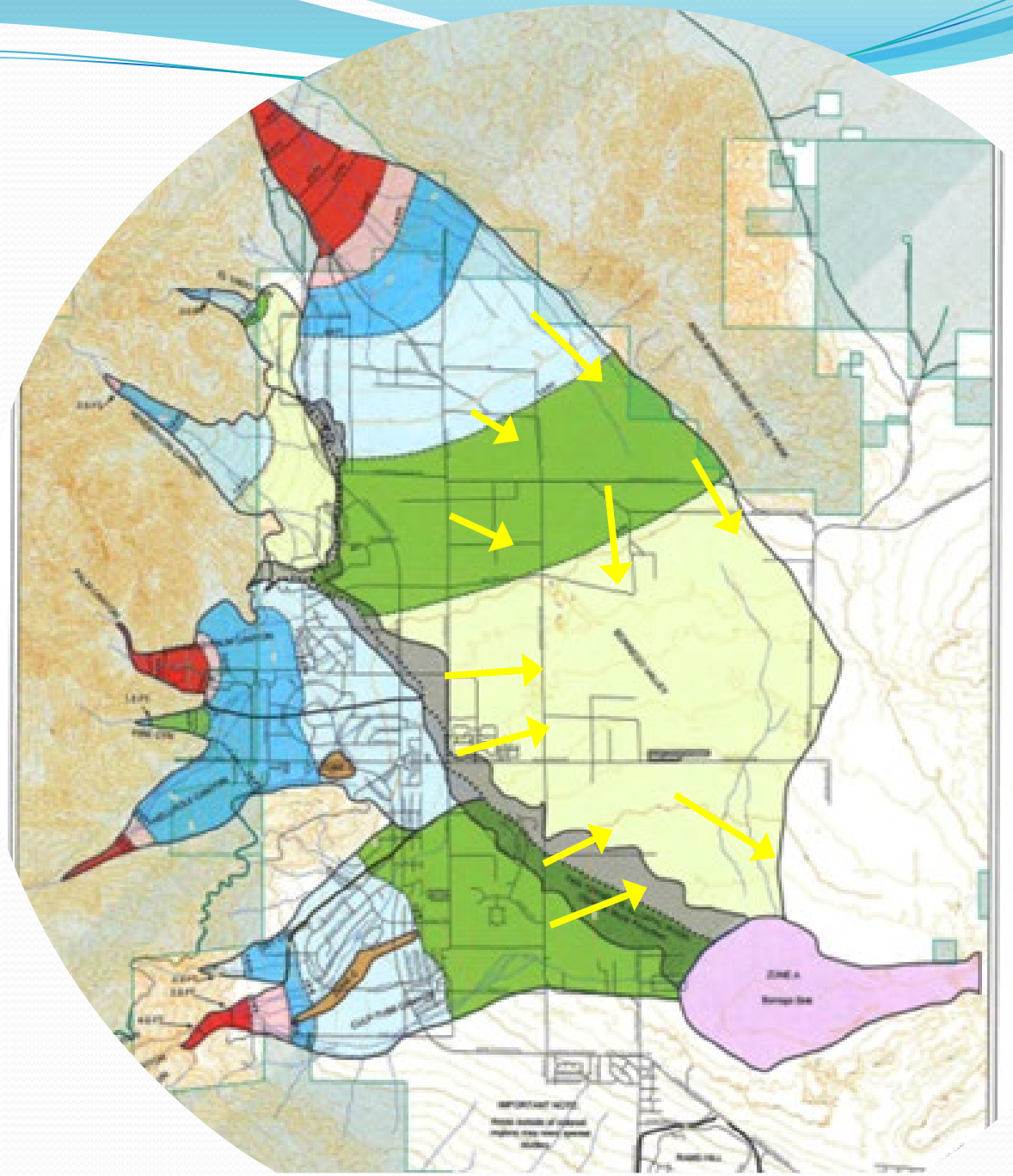
The Borrego Springs area is a desert area. Many deserts of Southern California have a feature called alluvial fan deposits. These are deposits of gravel and dirt that are generated over thousands of years by runoff that flows down through canyons. Alluvial fans are broad cone shaped sedimentary features that result from meandering stream and surface flows of water and debris. When you stand on the valley floor and look toward nearly any high ground with canyons, you will see these broad, sloped, cone-shaped formations. These formations seem solid, but they are unstable and significant rain events originating from any of the canyons at the top of the alluvial fan generate runoff that travels through unpredictable paths. Rainwater can move very quickly over and through the canyons and can cause flooding and debris flows on the alluvial fan.

The Borrego Springs community has experienced rapid population growth and increased development, including development on alluvial fans. Not all areas of an alluvial fan present the same level of flooding risk to development. This means that for someone building on an alluvial fan, the flood risk can vary. Because of this, it is important to ensure that there is a clear understanding of the risks, since it could impact how a building should be constructed, insurance costs, and the like. To best protect the interests of property owners in Borrego Springs, there is a need to study the alluvial fans in the Borrego Springs area to attempt to better understand those areas within known alluvial fans where development may be subject to a significant risk of flooding, and produce a definitive analysis and report. Without such a report, there is a potential that the County would be forced to require special and more costly construction components based on outdated data that could increase construction costs unnecessarily.

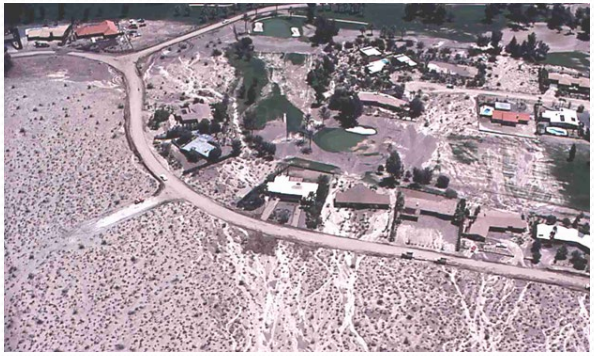


WHAT IS AN ALLUVIAL FAN?

BORREGO FLOOD RISK



HISTORICAL FLOODING IN BORREGO



DAMAGE TO INFRASTRUCTURE

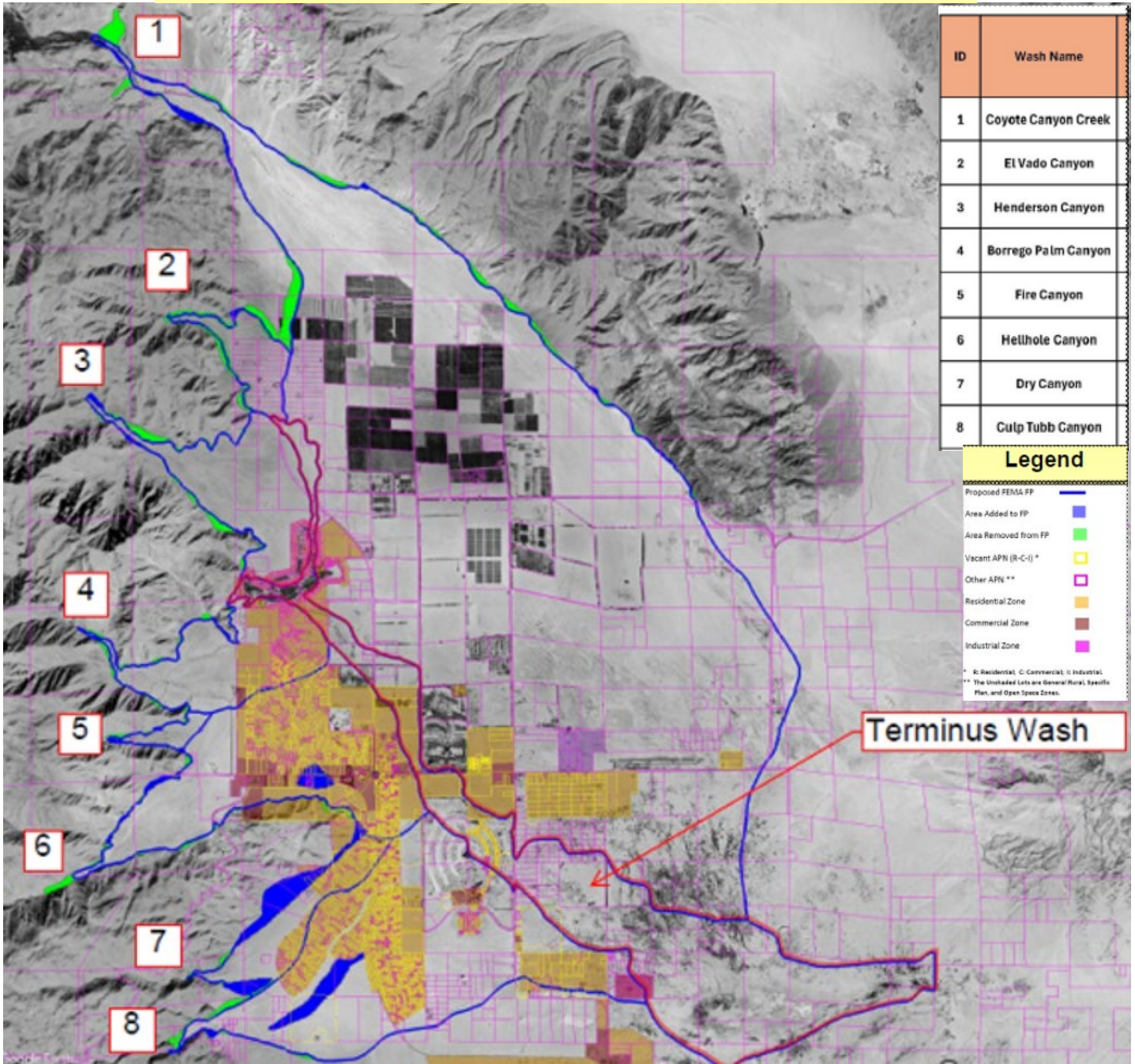
USACE and CAP Section 205 Project

County of San Diego Flood Warning System

Next Steps

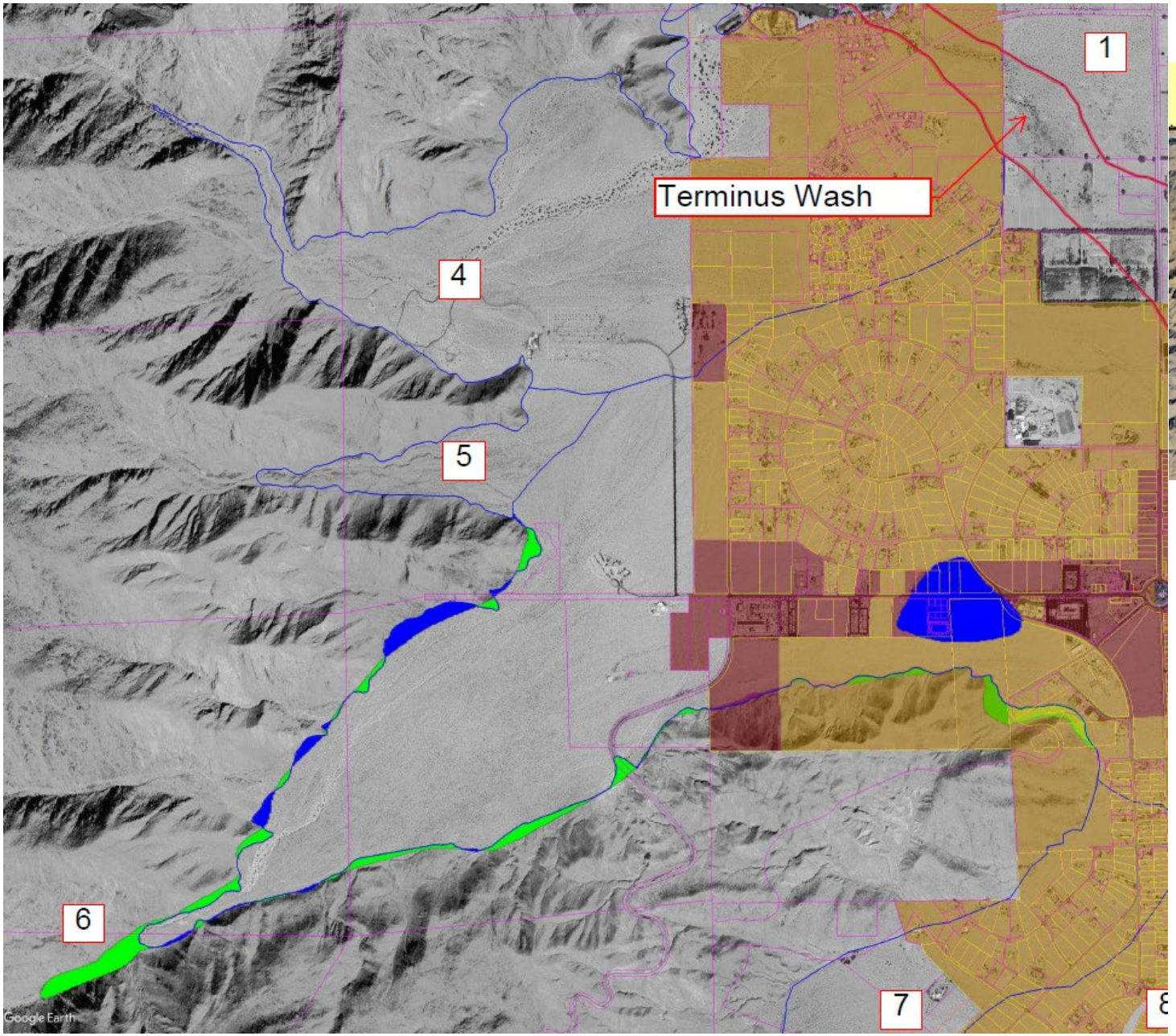
Borrego Springs

Comparisons of FEMA Effective Floodplain to the Recent USACE Study



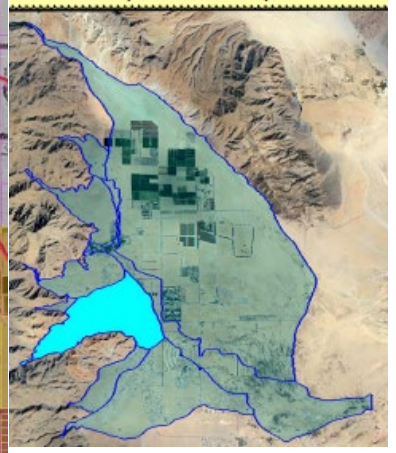
ID	Wash Name
1	Coyote Canyon Creek
2	El Vado Canyon
3	Henderson Canyon
4	Borrego Palm Canyon
5	Fire Canyon
6	Hellhole Canyon
7	Dry Canyon
8	Culp Tubb Canyon

6 - Hellhole Canyon



Vicinity Map

(Not To Scale)



Legend

- Effective FEMA FP
- USACE Study FP
- Area Added to FP
- Area Removed from FP
- Vacant APN (R-C-I) *
- Other APN **
- Residential Zone
- Commercial Zone
- Industrial Zone

* R: Residential; C: Commercial; I: Industrial.

** The Unshaded Lots are General Rural, Specific Plan, and Open Space Zones.

Next Steps and Timeline

- Restudy Terminus Wash – Years 1-2
- Submit restudy and USACE study to FEMA to update Floodplain Maps – Years 3-4
- FEMA update Floodplain Maps – Year 5

Discussion and Questions

Closing Remarks

Thank you

- County of San Diego
  - Sara Agahi, Flood Control District Manager, Sara.Agahi@sdcounty.ca.gov
  - Vicky Zhang, Senior Civil Engineer, Vicky.Zhang@sdcounty.ca.gov
  - Tyler Heckstall Rodenbaugh, Senior Meteorologist, Tyler.Heckstall-Rodenbaugh@sdcounty.ca.gov
- USACE
  - Megan Whalen, Project Manager, Megan.A.Whalen@usace.army.mil
  - Gabrielle Dodson, Lead Planner, Gabrielle.Z.Dodson@usace.army.mil
  - Moosub Eom, Engineering Technical Specialist, Moosub.Eom@usace.army.mil
  - Jeannine Hogg, Economist, Jeannine.H.Hogg@usace.army.mil

San Diego County Flood Warning System

An Overview of the ALERT System

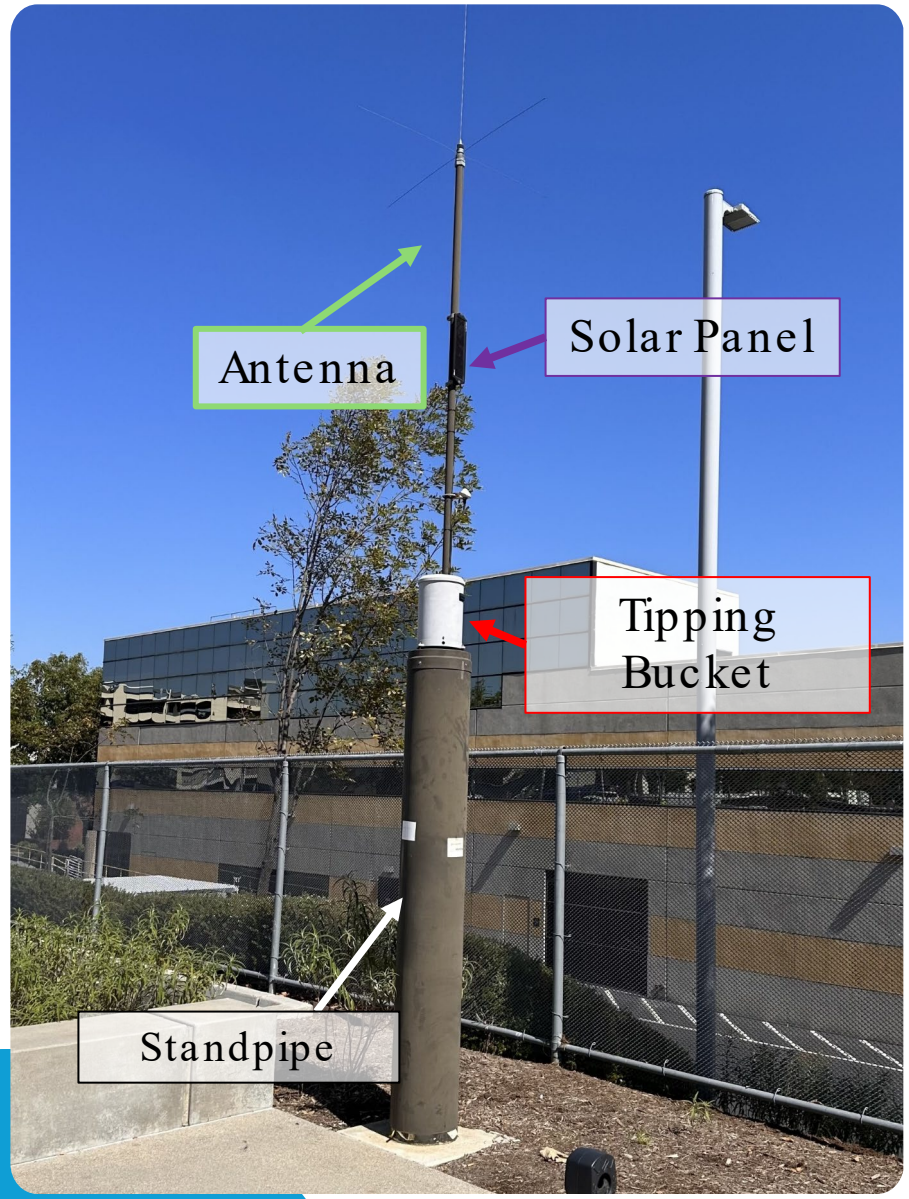
Presented By: Tyler Rodenbaugh

COUNTY OF SAN DIEGO

PUBLIC WORKS

Introduction to the ALERT System

- ALERT stands for Automatic Local Evaluation in Real Time
- Provides real time monitoring of rainfall and stream levels
- First county wide ALERT system in the nation in 1982
- More than 100 stations across the regional network



System Components

- 103 Rain Gauges

System Components

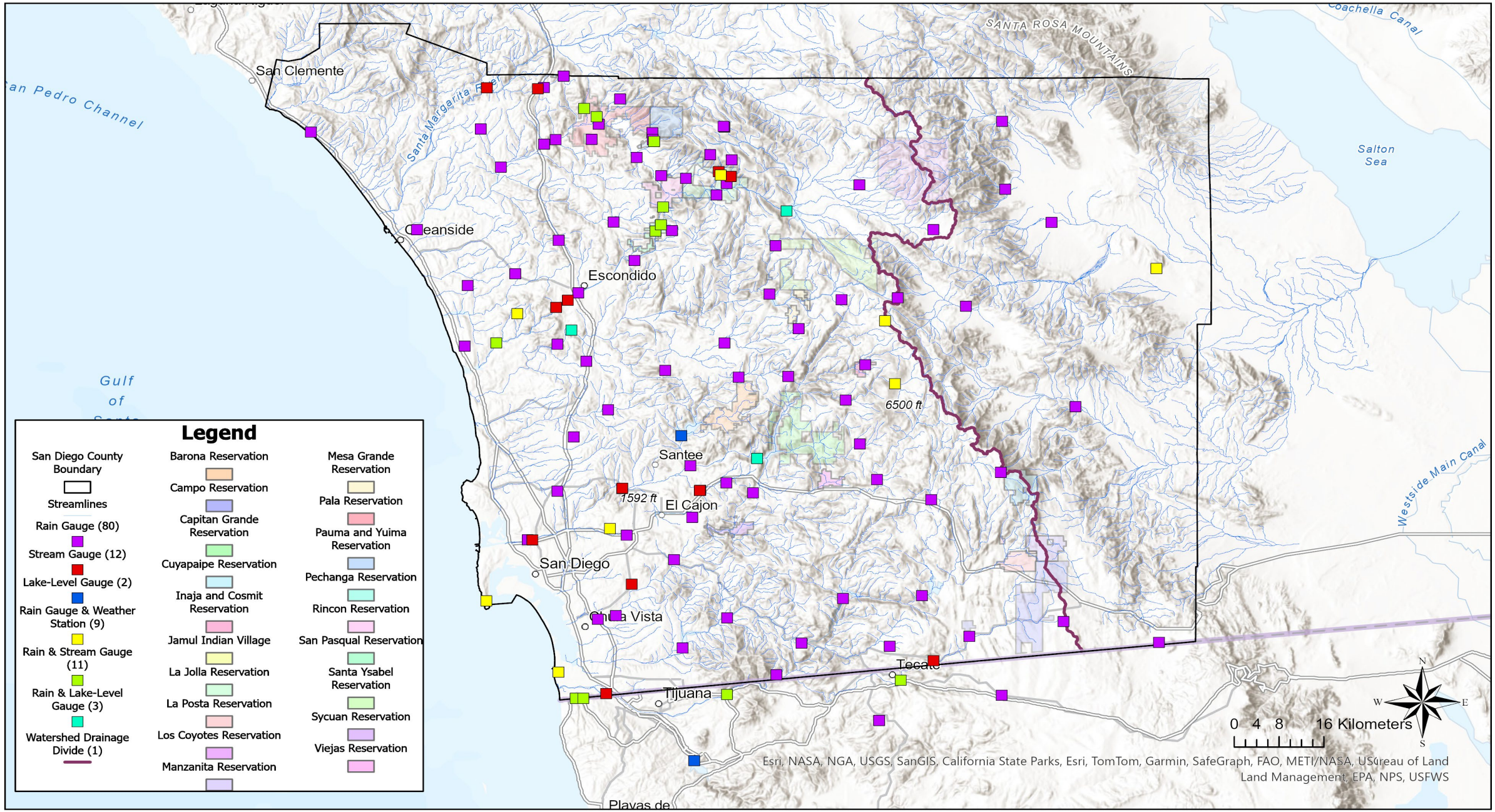
- 103 Rain Gauges
- 32 Stream Gauges

System Components

- 103 Rain Gauges
- 32 Stream Gauges
- 12 Weather Stations

San Diego County ALERT Flood Warning System: Station Locations

Current as of November 2025

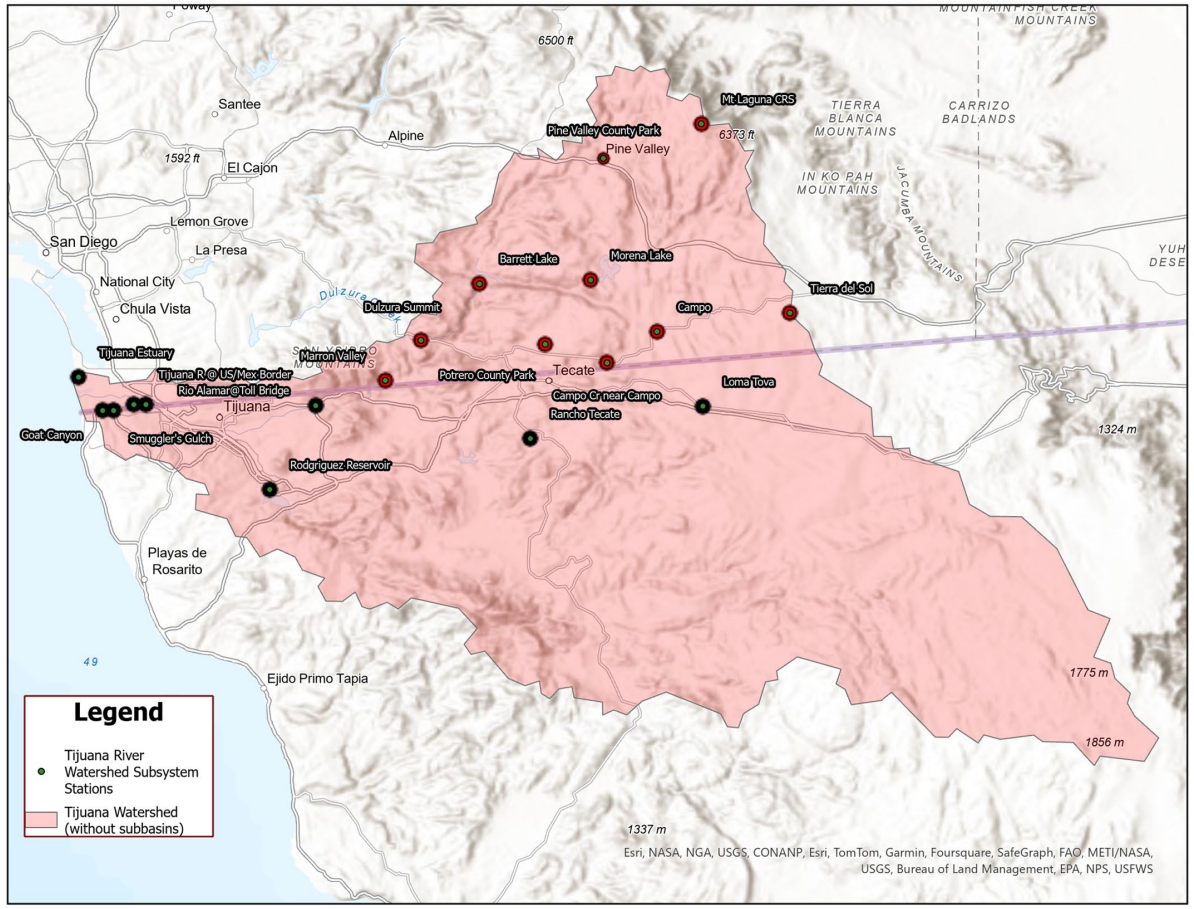


Flood Warning Sub-Systems

Upper Tijuana River Watershed Flood Warning System

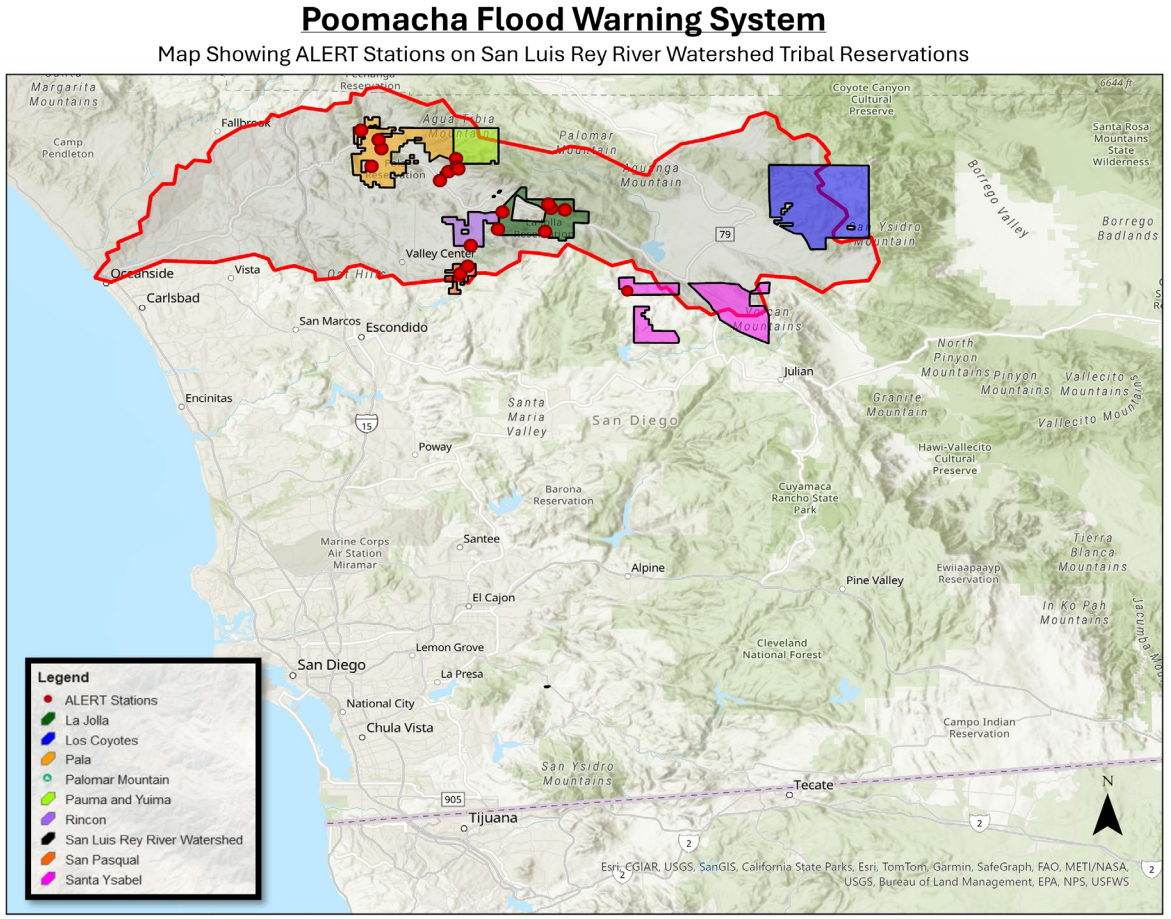
Tijuana River Watershed Flood Warning System

Map Showing ALERT Stations in Tijuana River Watershed



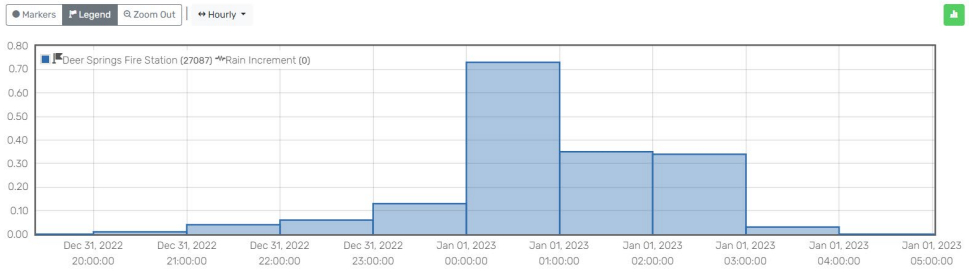
Flood Warning Sub-Systems

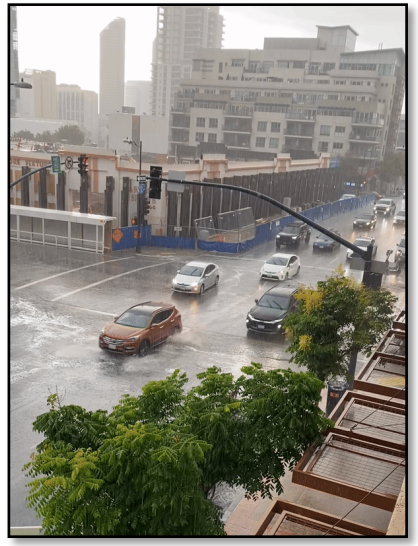
Poomacha Flood Warning System



Alarm Thresholds

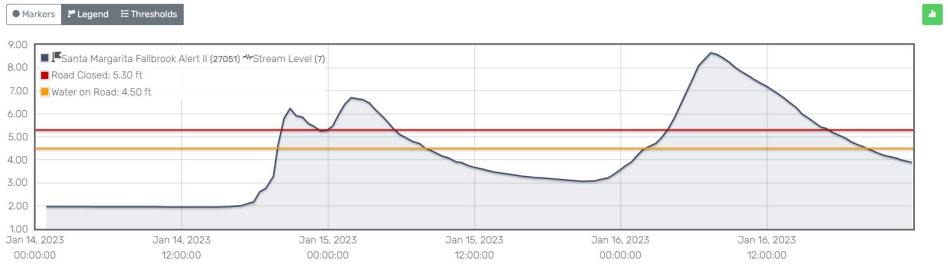
- Rainfall Alerts
  - Based on rainfall rates
  - 2 year/1-hour (~40 % chance of annual occurrence)
  - ~0.5 inches per hour





Alarm Thresholds

- Rainfall Alerts
  - Based on rainfall rates
  - 2 year/1-hour (~40 % chance of annual occurrence)
  - ~0.5 inches per hour
- Stream Gauge Alerts
  - Based on water level
  - Alerts determined at stage roadway flooding occurs or imminent



San Diego County
Flood Control District

Home | Map | Sites | News | Dashboards | Bookmarks

Home

Real-time Rainfall Frequency Charts

Click on the Dashboard tab to find real-time rainfall frequency charts for each watershed. Each station displays the rain totals for the last 1-hr, 3-hr, 6-hr, and 12-hr period. They are color-coded for various rainfall frequency ranges.

2019-04-25 14:24:50

https://sandiego.onerain.com

San Diego County Rainfall and Stream Level Information System

This site is intended to provide real-time and historical rain, water level, and weather information. For general help on using the Contrail System, click on the gear in the upper right corner and select the help button. For specific help on using the San Diego County flood warning website, click on the TUTORIAL.

NWS Public Alerts

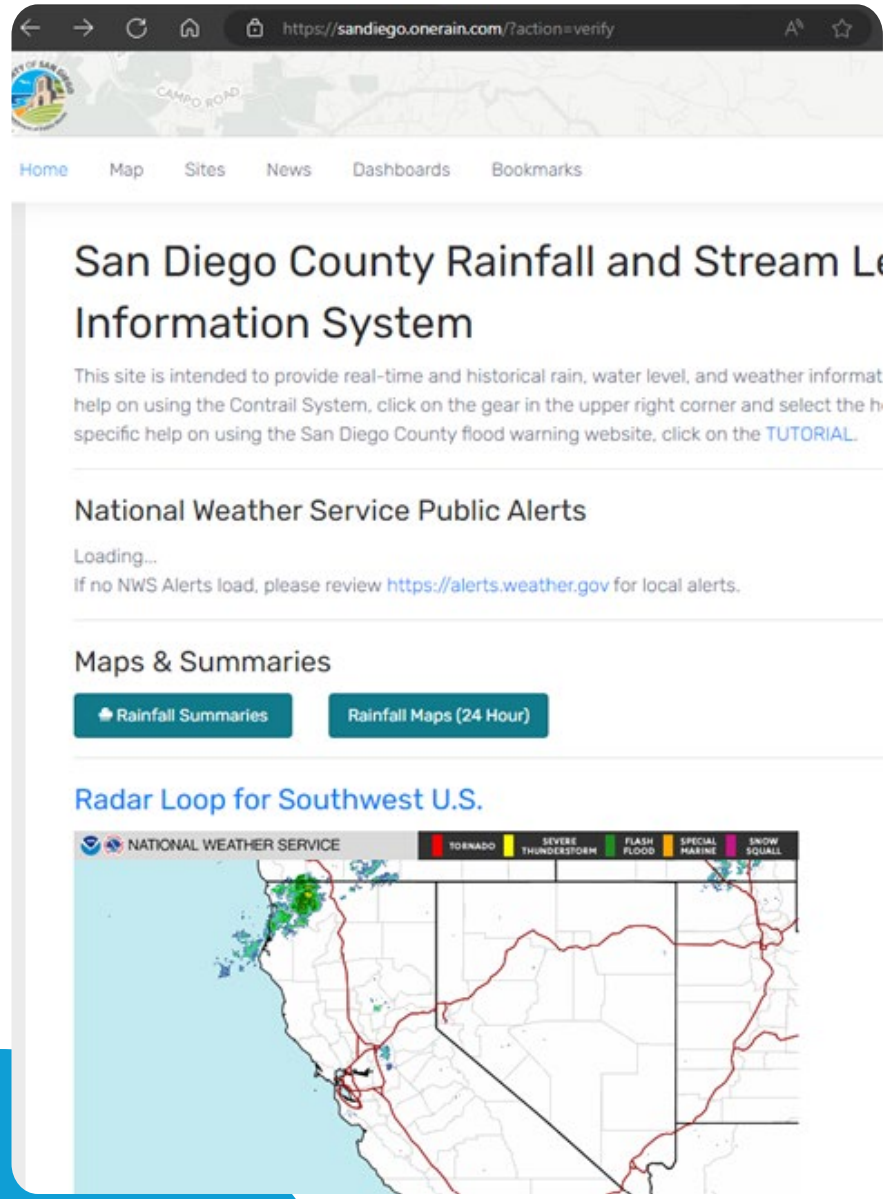
There are no active watches, warnings or advisories

Maps & Summaries

Rainfall Summaries | Stream Summaries | Rainfall Maps (24 Hour) | Stream Maps

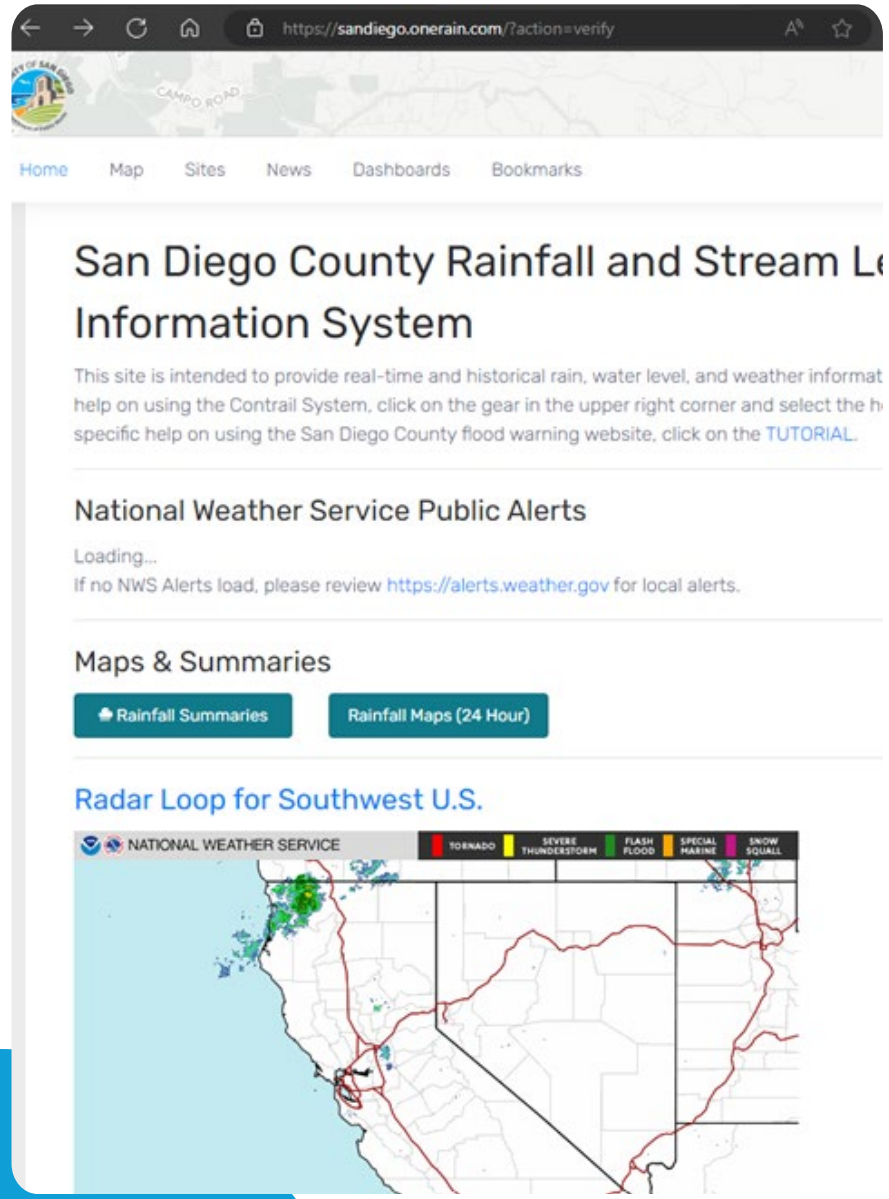
San Diego, CA 7-Day Forecast
Issued 1:14 PM PST Tue Nov 17 2020
Click for more details
WeatherForYou.com

Wednesday Thursday Friday Saturday Sunday Monday Tuesday



San Diego Onerain Webpage

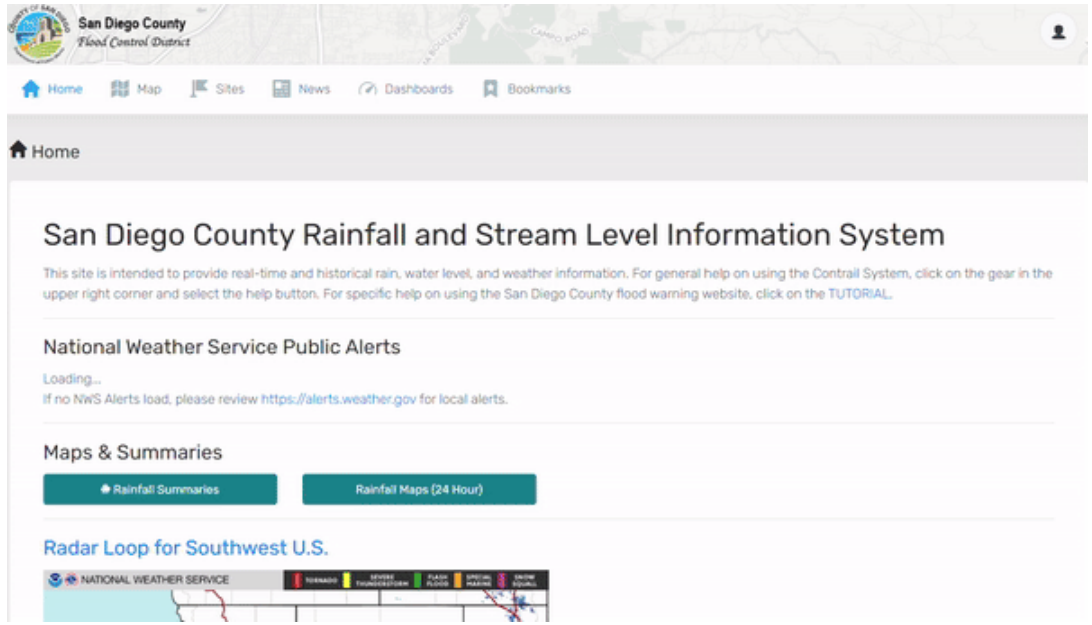
- Pulls in ALERT data from the entire network.
- Easy-access to rainfall, fluvial stream levels, and hydrologic conditions.
- Extends from San Diego County into northern Baja California.
- Monitoring cross-border water management and binational flood mitigation.



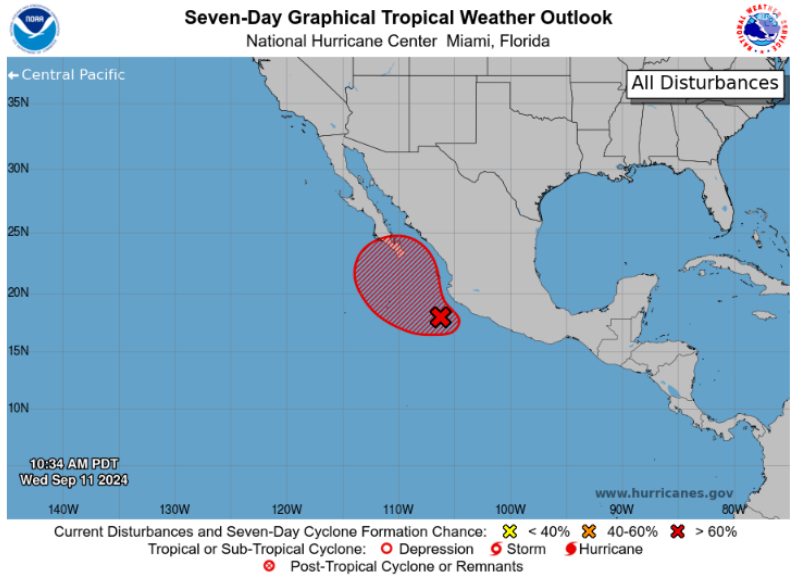
San Diego Onerain Webpage

- Go to sandiego.onerain.com
- Six Tabs:
  - Home.
  - Dashboards.
  - Map.
  - Sites.
  - News.
  - Bookmarks.

- Real-time data from ALERT stations can help predict the start of flash floods, improve coordination between agencies, and mitigate flood risks.



National Hurricane Center-Eastern North Pacific Outlook

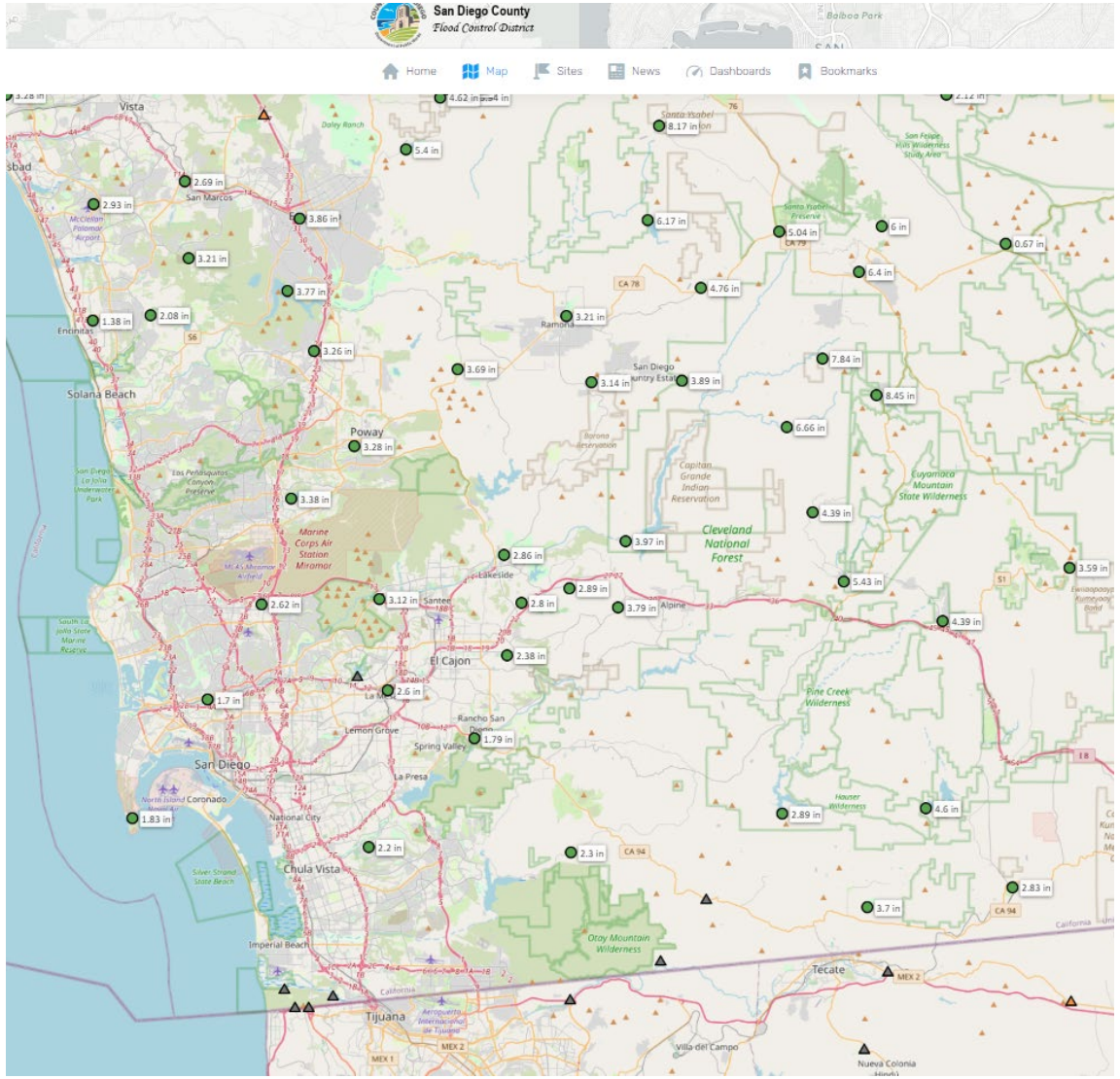


San Diego Onerain Webpage

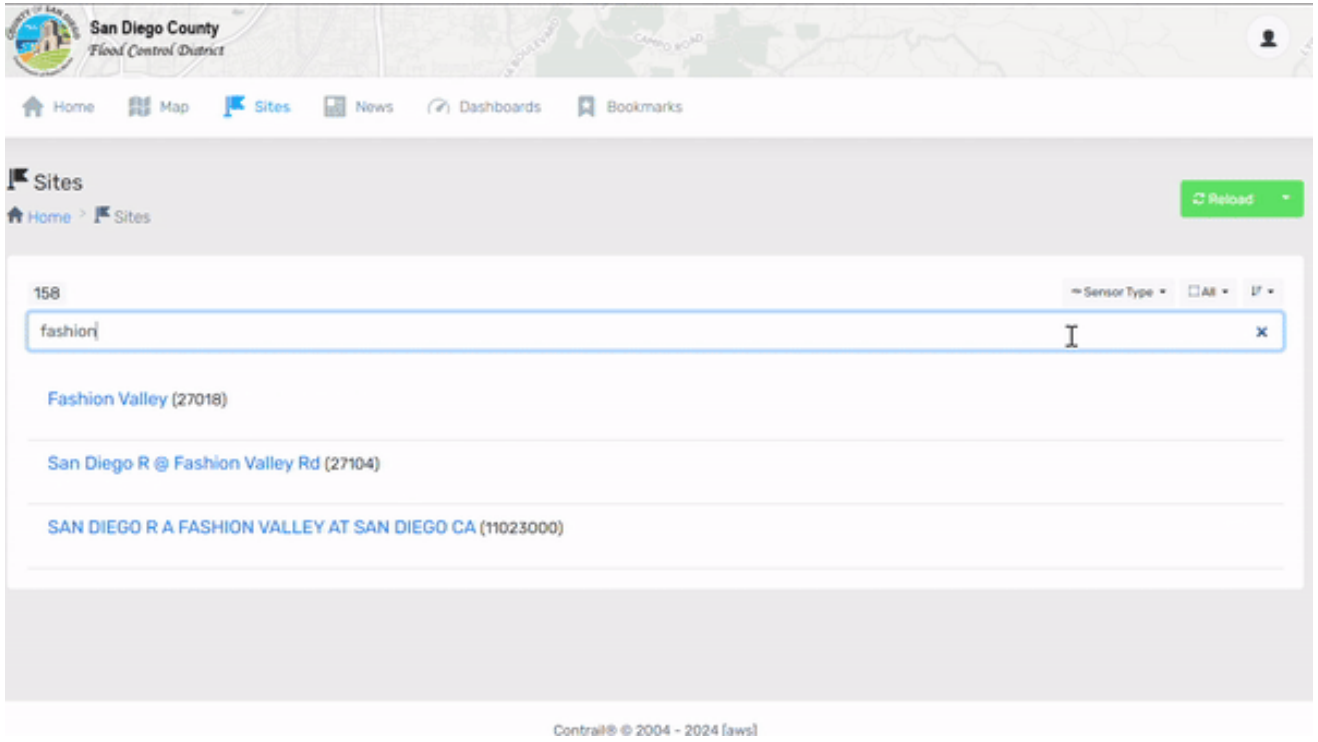
- The Home tab.
- Key National Weather Service alerts.
- Maps and summaries of rainfall.
- Radar composite.
- Updates from the National Hurricane Center (new).

San Diego Onerain Webpage

- The map tab.
- Scroll through all the ALERT and ALERT 2 rain gauges in the County of San Diego network.
- Stream gauges (flow rates).
- Traditional weather stations (temperature, pressure, wind, rainfall).
- Most are rain gauges.



San Diego OneRain Webpage



- The sites tab.
- Explore all the sites in the network.
- ALERT and ALERT2 rain gauges.
- Sensors run by the County, USGS, etc.
  - Reservoir Elevation.
  - Stage Height.
  - Meteorological Parameters (when available).

Final Notes

- Our ALERT network can use many hydrologic and meteorologic sensors, including rainfall, stream stage, and fire weather instruments.
- If you are interested in monitoring a location or adding your station to our network, please contact us.

Thank you!

https://sandiego.onerain.com/

COUNTY OF SAN DIEGO
PUBLIC WORKS

Contact Us

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