

## CRS Activity 510

### Annual Progress Report on Implementation of Credited Plan

Which Plan is this for (use separate templates for each credited Plan):

- Floodplain Management Plan (Hazard Mitigation Plan)
- Repetitive Loss Area Analysis
- Floodplain Species Plan
- Substantial Damage Plan

Date this Annual Progress Report was prepared: July 29, 2022

Name of Community: County of San Diego CID 060284

Name of Plan: [2018 Multi-jurisdictional Hazard Mitigation Plan \(MJHMP\)](#)

Date of Adoption of Plan: February 13, 2018

5 Year CRS Expiration Date: February 13, 2023

1. How can a copy of the credited Hazard Mitigation Plan (Floodplain Management Plan) or Repetitive Loss Area Analysis be obtained?

The County of San Diego Floodplain Management Plan is incorporated in our MJHMP which may be downloaded from the County website at [https://www.sandiegocounty.gov/content/sdc/oes/emergency\\_management/oes\\_jl\\_mitplan.html](https://www.sandiegocounty.gov/content/sdc/oes/emergency_management/oes_jl_mitplan.html). The County of San Diego Office of Emergency Services (OES) is in the process of updating our MJHMP in collaboration with other County departments and local jurisdictions.

2. Describe how **this annual progress report** (not the credited Hazard Mitigation Plan or Repetitive Loss Area Analysis) was prepared and how it was submitted to the governing body, released to the media, and made available to the public:

This report was prepared by County of San Diego Department of Public Works (DPW) Flood Control (FC) section and was uploaded to our webpage for the governing body, media and public at <https://www.sandiegocounty.gov/content/sdc/dpw/flood.html>. We will also present it at a future San Diego County Flood Control District Advisory Commission ([FCDAC](#)) meeting who advise our governing body (County Board of Supervisors).

3. Provide a description of the implementation of each recommendation or action item in the action plan or area analysis report, including a statement on how the project was implemented or not implemented during the previous year:

Goal 9 of the MJHMP lists 5 objectives and 15 actions to reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to floods. Please refer to Appendix A Floodplain Management Plan Objectives and Actions (Goal 9 of the MJHMP) to see Goal 9. Please refer to Appendix B of this annual progress report for descriptions of the implementation of each recommendation or action item in the action plan.

4. Discuss why any objectives were not reached or why implementation is behind schedule:

The speed of achieving the objectives has been slightly impacted by emergencies such as the COVID-19 pandemic, the Valley Fire (September 2020), and the Willow Fire (December 2020), however, the implementation of the objectives and actions are still moving forward. Please refer to Appendix B for additional details.

5. What are the recommendations for new projects or revised recommendations?

The County had started to work on the revised MJHMP before the pandemic in 2019. That effort had to be put on hold temporarily to respond to the pandemic and the local fires but has resumed and will be completed prior to the expiration of the current MJHMP.

## **Appendix A – Floodplain Management Plan Objectives and Actions (Goal 9 of the MJHMP)**

The County of San Diego's Floodplain Management Plan is integrated in the MJHMP. Goal 9 of the MJHMP lists 5 objectives and 15 actions to reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to floods.

<b>Goal 8: Reduce the possibility of damage and losses to existing assets, including people, critical facilities /infrastructure, and public facilities due to <u>landslide</u>.</b>		<b>New, Existing or Both</b>
Action 8.C.2	Continue to streamline policies to eliminate conflicts and duplication of effort.	Both
Action 8.C.3	Develop and publish evacuation procedures to the public.	Both
<i>Objective 8.D: Address identified data limitations regarding the lack of information about the relative vulnerability of assets from landslide.</i>		
Action 8.D.1	Identify hazard-prone structures through GIS modeling.	Both
Action 8.D.2	Implement hazard awareness program.	Both

<b>Goal 9: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to <u>floods</u>.</b>		<b>New, Existing or Both</b>
<i>Objective 9.A: Develop a comprehensive approach to reducing the possibility of damage and losses due to floods.</i>		
Action 9.A.1	Continue to review and compare existing flood control standards, zoning and building requirements.	Both
Action 9.A.2	Identify flood-prone areas by using GIS.	Both
Action 9.A.3	Adopt policies that discourage growth in flood-prone areas.	Both
<i>Objective 9.B: Protect existing assets with the highest relative vulnerability to the effects of floods within the 100-year floodplain.</i>		
Action 9.B.1	Assure adequate funding to restore damaged facilities to 100-year flood design.	Both
Action 9.B.2	Update storm water system plans and improve storm water facilities in high-risk areas.	Both
Action 9.B.3	Plan for evacuation in case of major hazard event.	Both
<i>Objective 9.C: Coordinate with and support existing efforts to mitigate floods (e.g., US Army Corps of Engineers, US Bureau of Reclamation, and California Department of Water Resources).</i>		
Action 9.C.1	Develop a flood control strategy that ensures coordination with Federal, State and local agencies.	Both
Action 9.C.2	Improve hazard warning and response planning.	Both
<i>Objective 9.D: Minimize repetitive losses caused by flooding.</i>		
Action 9.D.1	Identify those communities that have recurring losses.	Both
Action 9.D.2	Develop project proposals to reduce flooding and improve control in flood prone areas.	Both
Action 9.D.3	Acquire properties, when feasible, on floodway to prevent development.	Both

<b>Goal 9: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to <u>floods</u>.</b>		<b>New, Existing or Both</b>
<i>Objective 9.D: Minimize repetitive losses caused by flooding.</i>		
Action 9.D.4	Seek pre-disaster mitigation funding.	Both
<i>Objective 9.E: Address perceived data limitations regarding the lack of information about the relative vulnerability of assets from flooding.</i>		
Action 9.E.1	Continue to encourage the public to prepare and maintain a 3-day preparedness kit for home and work.	Both
Action 9.E.2	Increase participation and improve compliance with the National Flood Insurance Program (NFIP).	Both
Action 9.E.3	Develop and implement hazard awareness program.	Both
<b>Goal 10: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to <u>structural fire/wildfire</u>.</b>		<b>New, Existing or Both</b>
<i>Objective 10.A: Develop a comprehensive approach to reducing the possibility of damage and losses due to structural fire/wildfire.</i>		
Action 10.A.1	Update the County Consolidated Fire Code as necessary.	Both
Action 10.A.2	Develop model Weed Abatement and Fuel Modification Ordinances.	Both
Action 10.A.3	Utilize GIS as an information tool.	Both
Action 10.A.4	Coordinate with and support existing efforts to mitigate structural fire/wildfire.	Both
Action 10.A.5	Continue to develop partnerships for a countywide vegetation management program.	Both
<i>Objective 10.B: Protect existing assets with the highest relative vulnerability to the effects of structural fire/wildfire.</i>		
Action 10.B.1	Enforce standardized Defensible Space Clearance distances.	Both
Action 10.B.2	Work with community-based groups to pilot chipping programs.	Both
Action 10.B.3	Continue to research options to provide low cost insurance to cover landowners who allow prescribed burning on their lands.	Both
<i>Objective 10.C: Coordinate with and support existing efforts to mitigate structural fire/wildfire.</i>		
Action 10.C.1	Establish a continuing wildland fire technical working group.	Both
Action 10.C.2	Continue to develop partnerships for a countywide vegetation management program.	Both

## Appendix B – Implementation Description of Objectives and Actions

This appendix provides a description of the implementation of the objectives and actions that were set under Goal 9 of the [County of San Diego's 2018 Multi-jurisdictional Hazard Mitigation Plan](#).

Objective 9.A. Develop a comprehensive approach to reducing the possibility of damage and losses due to floods.

The County has been adapting to the changes in Federal Emergency Management Agency (FEMA)'s [Community Rating System \(CRS\)](#) program following the 2017 revision of the [CRS Coordinator's Manual](#) and its [2021 Addendum](#), to continue developing our comprehensive approach to reducing the possibility of damage and losses due to floods.

Action 9.A.1. Continue to review and compare existing flood control standards, zoning and building requirements.

FC continues to review and compare our existing zoning and building requirements and standards including our [Flood Damage Prevention Ordinance \(FDPO\)](#) which was revised and adopted on 11/29/2019, to other jurisdictions. FC has been in contact with FEMA, our stakeholders, and [FCDAC](#) to evaluate and gauge potential improvements to the FDPO.

Action 9.A.2. Identify flood-prone areas by using GIS<sup>1</sup>.

The County and FEMA delineated flood-prone areas are available to County staff through our internal GIS and to the public through the [SanGIS website](#). County GIS section regularly updates the FEMA maps by fetching the latest layers from federal sources. FC staff work with County GIS on retiring County mapping in areas where more reliable and accurate FEMA mapping is available.

Action 9.A.3. Adopt policies that discourage growth in flood-prone areas.

The County Board of Supervisor adopted revisions to the [FDPO](#) in 2019 to implement higher constructions standards and elevate the safety of structures in flood-prone areas in the following specific ways:

- Section 811.403.d.4 – new section added to clarify that a floodway revision can be allowed only if no practicable alternative exists and only if there are no adverse impacts to adjacent properties or public roads discouraging changes that would place new areas within the SFHA.

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<sup>1</sup> Geographic Information System

- Section 811.501.c.4 – new section added to require structures in the SFHA be elevated on piers, columns, or stem walls and the bottom of the lowest horizontal structural member elevated above the base flood elevation or base flood depth. The cost of elevating structures on piers vs. slab on grade (outside the SFHA) discourages growth in the SFHA.
- Section 811.503.c – new section added to include County floodplain and floodway mapping to address County floodplain and floodway that either differs from, or was not previously included on, the FEMA FIRM. Incorporating County flood mapping into FEMA mapping greatly assists in floodplain management to ensure any growth in the SFHA is done according to FEMA and County standards.

Other revisions to the FDPO were in response to FEMA’s Community Assistance Visit (CAV) conducted in November 2018, where they requested to further clarify the duties of the Floodplain Administrator and to update the requirements for manufactured homes to be more consistent with the State Model Floodplain Ordinance.

Objective 9.B. Protect existing assets with the highest relative vulnerability to the effects of floods within the 100-year floodplain.

FC field staff regularly inspects, and conducts required maintenance on FC-maintained facilities throughout the County. The County of San Diego DPW conducts periodic, routine flood control maintenance including debris, vegetation and/or sediment removal, of culverts, bridges, storm drains, pipes, ditches, and other facilities, to prevent flooding of either adjacent roadways or dwellings throughout the County of San Diego, including all unincorporated areas maintained by the County. DPW uses Regional General Permit 53 to maintain the facilities as needed while complying with environmental laws. RGP-53 involves blanket regional general permits issued by the United States Army Corps of Engineers (USACE), California State Water Resources Control Board (SWRCB), and California Department of Fish and Wildlife (CDFW) that allows DPW to conduct this work without the need to apply for separate permits for each facility.

Action 9.B.1. Assure adequate funding to restore damaged facilities to 100-year flood design.

FC is reviewing grant opportunities within Bipartisan Infrastructure Law (BIL) and Infrastructure Investment and Jobs Act (IIJA) to identify opportunities for new grant applications on projects that can improve our infrastructure and provide a safer community for our residents and visitors.

FC has signed three separate on-call consultant contracts to receive up to one million dollars of engineering services annually. The three contracts have the option

to be extended up to four extra years. This means FC has the option to have access to up to \$15M of funds to received services from our three on-call consultants.

FC allocates at least \$400k from fund balance annually for repair of existing facilities.

In 2021 we received \$116,222 in Community Development Block Grant (CDBG) following our application for the Broadway Creek Restoration Project in collaboration with the City of El Cajon.

DPW withdrew our 2021 Hazard Mitigation Grant Program (HMGP) sub-applications to the California Governor's Office of Emergency Services (CalOES) for two reaches of the Broadway Creek Widening and Restoration Project to further refine it. Our 2021 Advance Assistance<sup>2</sup> sub-application to leverage green stormwater infrastructure investments for flood and fire risk mitigation is in the process of being reviewed by FEMA. We have responded to a request for information by FEMA and are awaiting results.

Action 9.B.2. Update storm water system plans and improve storm water facilities in high-risk areas.

The County of San Diego is seeking Advance Assistance funding to identify where planned green stormwater infrastructure (GSI) investments in the unincorporated communities of San Diego County can also serve to mitigate fire and flood risk. These types of projects have the potential to significantly reduce both local flood and fire risk; however, data on the mitigation potential of different GSI project types, sizes, and locations is very limited and risk mitigation criteria are rarely (if ever) incorporated into GSI project development and prioritization.

Action 9.B.3. Plan for evacuation in case of major hazard event.

The Multi Jurisdiction Evacuation Planning Committee (Evacuation Working Group) is a multi-agency coordination body that discusses notification, coordination, and execution of evacuations during multi-hazard events. It is composed of California Department of Forestry and Fire Protection (Cal Fire), Law Enforcement, Public Health, County OES, and County of SD Fire Protection District Partners. It has taken several steps to standardize evacuation operations across the County of San Diego. This includes introducing a grid system for identifying areas for evacuation and

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<sup>2</sup> Section 1104 of the Sandy Recovery Improvement Act (SRIA) authorizes the use of Advance Assistance, which allows advancing certain FEMA grants to applicants, to accelerate project implementation. Applicants may use Advance Assistance to develop mitigation strategies and obtain data to prioritize, select and develop complete grant applications timely.

standardizing language across departments and agencies. The group also assists agencies throughout the County with training materials and opportunities to prepare for all hazard event types. The Operational Area Emergency Operations Plan Annex Q (Evacuation) is kept up to date.

Objective 9.C. Coordinate with and support existing efforts to mitigate floods (e.g., US Army Corps of Engineers, US Bureau of Reclamation, and California Department of Water Resources).

FC has been working closely with the California Department of Water Resources and California Office of Emergency Services to identify opportunities and apply for FEMA grants on projects that mitigate flood risks. FC is working closely with US Army Corps of Engineers on hazard mitigation on the alluvial fans in Borrego Springs area. The ongoing project will re-map the alluvial fan area to describe the active alluvial debris and mud flow depths and identify mitigation measures to reduce impact from such flows more accurately.

FEMA has performed a detailed restudy (hydrology & hydraulics) of the San Diego River from El Capitan to the ocean and a new study of Sycamore Creek with the intention of publishing updated floodplain mapping in winter 2023. The County has hired a consultant to perform the hydraulic modeling and to produce the updated floodplain mapping, which we will provide to FEMA.

FC maintains a flood warning system called ALERT. One hundred twenty stations transmitting data over 450 hydrologic sensors comprise FC's ALERT network. The sensors transmit their information via radio signal. The radio communication protocol is event-based, meaning the sensors only disseminate their data when a predefined event occurs. So, for example, if a rain gauge records 0.01" of rain, that data is immediately transmitted via radio signal. The information is sent to the County of San Diego Operations Center. If it exceeds the set criteria for flood hazards, messages are sent to FC staff and emergency officials.

As the Southern California ALERT network expanded over the years, it was inevitable that many stations would transmit their data simultaneously. Unfortunately, when that occurs, it results in data collision and ultimately data loss. Fortunately, the National Hydrologic Warning Council and the ALERT Users Group developed a newer communication protocol called time division multiple access (TDMA) to overcome this flaw. TDMA permits stations to only transmit data at designated time slots, eliminating the potential of data collision and ensuring timely delivery of vital flood warning messages.

ALERT 2 equipment contained the new TDMA technology, and the estimated cost to upgrade the entire San Diego County network to ALERT 2 was around \$450,000. For

that reason, in 2013, San Diego County, several Southern California counties, and National Weather Service offices applied for Flood Emergency Response Projects state grant to upgrade the entire Southern California ALERT network to ALERT 2. The California Department of Water Resources awarded the state grant to Ventura County to fund the equipment acquisition for the Southern California Counties. The funds were dispersed to participating agencies accordingly. Since 2013, FC has received three grants totaling \$593,647.71, which FC has used to upgrade the network to ALERT 2 and eliminate coverage gaps.

Action 9.C.1. Develop a flood control strategy that ensures coordination with Federal, State, and local agencies.

FC continues to participate in the California Flood Preparedness Week Partner Calls during which local, state, and federal agencies across the state work together to inform the public about the dangers of flooding, how to prepare their homes and families for a flood, and plan for recovery. FC regularly coordinates with federal, state and local agencies on local implementation of flood control policies in the Special Flood Hazard Areas of the County.

Action 9.C.2. Improve hazard warning and response planning.

FC continues to improve our flood warning system and response planning utilizing HEC-RTS (Hydrologic Engineering Center-Real Time Simulation), Automatic Local Evaluation in Real-Time (ALERT) and other tools. ALERT systems are used around the world to provide real-time flood warning to local communities at risk from flooding threat. An ALERT system is characterized by its real-time nature, accomplished by the instantaneous transmission of weather events primarily by radio transmission, and to a lesser extent by satellite, telephone, and cell phone transmission. Changes in rainfall, stream, weather, and lake levels throughout San Diego County are transmitted by radio to mountaintop repeaters, which in turn relay the transmission to our Weather Center in Kearny Mesa. In Kearny Mesa, the data are also relayed by internet to the National Weather Service (NWS) in San Diego. This data is received by ALERT computers which check the data for validity, check against established warning criteria for that data, update any displayed maps, then place the data into a database. If any warning criteria are met, the computers will put out a visible warning and assemble a text message to warn appropriate emergency staff. In San Diego County, a partnership has evolved between the Flood Control District (FCD), the NWS, and OES. The FCD is responsible for the maintenance and operation of the ALERT Flood Warning System. When flooding conditions develop, the FCD evaluates the flooding potential presented by the ALERT data and advises the NWS and OES on possible flooding in the County. The NWS will complete the

assessment of flooding potential using their resources and will issue a forecast update, special weather statement, flash flood watch, or flash flood warning. OES will pass along the NWS warnings and watches to relevant agencies within San Diego County and will coordinate Disaster Relief Operations whenever necessary. FC continuously explores areas of the county to increase coverage of the ALERT network. Recently, FC embarked on a project to identify gaps in the network, particularly for underserved communities. Adding hydrologic sensors in these areas would significantly impact them by providing increased lead time from flash flood hazards. So far, FC has identified five key locations to install the new ALERT stations. FC is currently in the process of purchasing equipment and securing land to install the new sensors.

Objective 9.D. Minimize repetitive losses caused by flooding.

We continue our proactive outreach efforts to minimize flood losses in areas surrounding repetitive loss properties. We mail out informative letters and two flyers (titles ‘Protect Your Property Against Flooding’ and ‘Flood Insurance: Protect Your Future’) to the properties that have experienced repetitive loss in the recent year and their surrounding properties. These flyers and more resources are also available on [FC website](#). Our efforts are aimed at informing people about their risk so they can take steps to minimize flood losses. The outreach materials advise the recipients in repetitive loss areas of the following tips:

- The property is in or near an area subject to flooding;
- What property protection measures are appropriate for the flood situation;
- What sources of financial assistance are available for property protection measures;
- Basic facts about flood insurance.

Action 9.D.1. Identify those communities that have recurring losses.

The County has obtained information from FEMA that identifies the areas that have experienced recurring losses in previous years.

Action 9.D.2. Develop project proposals to reduce flooding and improve control in flood prone areas.

FC has identified and sought funding for multiple flood control projects to address flood hazard. Some of these projects are in collaboration with other local agencies. Some examples are Broadway Creek Widening and Restoration Project in collaboration with the City of El Cajon, Green Stormwater Infrastructure (GSI) Investments Planning in collaboration with other County departments. FC obtained federal grant and completed Woodside Avenue Culvert in 2017 to enhance flood control in Lakeside. Wing Avenue project completed in 2014 and Central Avenue

Flood Control Channel project completed in 2008 have also contributed to reducing flood hazards in the County.

FC took on the Broadway Channel Drainage Improvements project to enhance community infrastructure and facilities to provide a suitable and sustainable living environment for our residents and visitors. We received \$116,222 in CDBG federal funds which will be utilized to improve the Broadway Channel and increase capacity through flood control and vegetation enhancements. The project begins approximate 200 feet downstream and west of Ballantyne Street at Hart Drive. The proposed improvements continue upstream and south and connect to earlier channel improvements. The Broadway Creek Restoration project will improve portions of a natural creek channel to prevent erosion and to protect residents from flooding in the surrounding community of El Cajon (unincorporated area). Approximately 2,485 persons and families, of which 79.28% are low to moderate income, will be served by this activity. There has been notable progress on Reach A of the project: Overall 80% of the construction of the Reach A channel improvements have been completed. Most of the channel has been widened and regraded and permanent slope protection has been installed. The box culvert replacement under Ballantyne St is about halfway complete. The road is currently closed with a detour in place and the road should be reopened by the end of August 2022. The last section of Reach A channel will be completed once the box culvert is in place. The overall project is on track to be completed by October 31, 2023.

Action 9.D.3. Acquire properties, when feasible, on floodway to prevent development.

The County continues to purchase vacant lands near streams where possible and zones them as open space to prevent development. In 2020 alone the County Department of Parks and Recreation (DPR) acquired 661 acres of open space.

Action 9.D.4. Seek pre-disaster mitigation funding.

The County applied for grants and help our neighboring community (City of El Cajon) apply for grants to fund the Broadway Channel improvement project which reduces flooding and improves control in flood prone areas.

Objective 9.E. Address perceived data limitations regarding the lack of information about the relative vulnerability of assets from flooding.

The County field staff conduct regular inspections of the FC facilities and record the data in County GIS. Facilities are inspected regularly and as needed to ensure adequate functionality. Most of the facilities for which FC is responsible are in County

GIS and LEAMS<sup>3</sup> databases. There could be facilities though for which FC is responsible, but they are missing from County databases. FC has been working with County GIS and Department of General Services (DGS) to address this perceived data limitation and vulnerability by filling in these gaps. Student engineers have been working on locating and entering the remaining facilities into our databases.

Action 9.E.1. Continue to encourage the public to prepare and maintain a 3-day preparedness kit for home and work.

[Ready San Diego website](#) and other County's outreach efforts continues to encourage the public to prepare and maintain at least three 72-hour emergency supplies kits: one full kit at home and smaller portable kits in their workplace, vehicle or other places they spend time.

Action 9.E.2. Increase participation and improve compliance with the National Flood Insurance Program.

After the update of the National Flood Insurance Programs (NFIP) CRS Manual in 2017 and its 2021 Addendum, FC has been evaluating and is working to improve our CRS activities. As an example, we have issued a task order to one of our newly on-call consultants to assist us with upgrading our CRS Class from 7 to 6. They are also helping us update County's MJHMP in accordance with CRS requirements so that our community can get much higher CRS points from it which translate into a safer community that is more resilient against the flooding hazard. FC is in regular communication with FEMA, FCDAC and our stakeholders to ensure awareness of the latest regulations and is considering whether another update to our [2019 FDPO](#) would be appropriate and in the best interest of our flood resilience. County Office of Emergency Services (OES) has public outreach goals as part of the annual operational plan, which includes information on flooding and the NFIP. FC engineers are Certified Floodplain Managers (CFMs) and take continuing education to stay up to date with the latest scientific advances in their field. FC staff attend the Floodplain Management Association (FMA) annual conferences and the California Extreme Precipitation Symposiums to learn from experts and stay informed of changes in science and regulations. Additionally, the [flood portion of our website](#) includes multiple outlets for flood preparedness. OES Public Outreach Specialist position has annual goals for how many people go to our website, sign up for [AlertSanDiego](#), request materials and public seminars, etc. [AlertSanDiego](#) is the County's regional

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<sup>3</sup> Land Use and Environmental Group Enterprise Asset Management System: County's integrated asset management system which synchronizes GIS data with asset database information and serves as the primary system of record and reference for planning and managing maintenance operations.

notification system that is able to send telephone notifications to residents and businesses within San Diego County impacted by, or in danger of being impacted by, an emergency or disaster. This system is used by emergency response personnel to notify those homes and businesses at risk with information on the event and/or actions (such as evacuation, shelter in place, gas leak, missing person, etc.) we are asking them to take. The system utilizes the region's 9-1-1 database, provided by the local telephone companies, and thus can contact landline telephones whether listed or unlisted. It is TTY<sup>4</sup>/TDD<sup>5</sup> capable.

Action 9.E.3. Develop and implement hazard awareness program.

Among other prongs, the County mailed out emergency plan templates to County residents to further implement our hazard awareness program. County residents are also encouraged to sign up for [AlertSanDiego](#) to receive timely warnings about imminent threats.

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<sup>4</sup> TeleTYpe

<sup>5</sup> Telecommunications Device for the Deaf