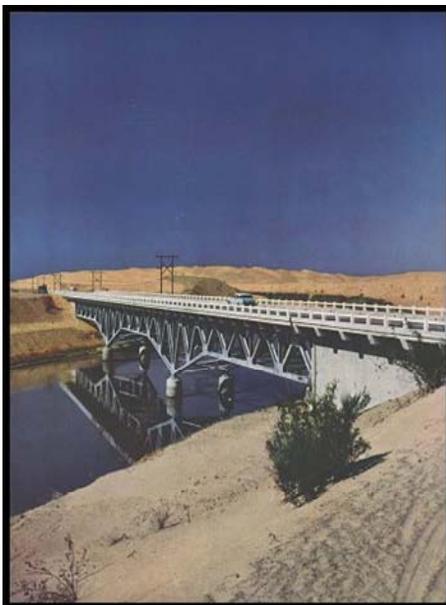




Imperial County Flood Management Plan

April 2007



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Flood Management Plan**

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**Adoption by Local Governing Body: §201.6(c)(5)
County of Imperial**

**RESOLUTION OF THE COUNTY OF IMPERIAL BOARD OF SUPERVISORS
ADOPTING A FLOOD MANAGEMENT PLAN**

RESOLUTION NO. _____

WHEREAS, the California State of Emergency Services (OES), through the Flood Hazard Mitigation Grant Program, provided the Imperial County Office of Emergency Services with grant funds to prepare a Flood Hazard Mitigation Plan.

WHEREAS, the Imperial County Office of Emergency Services has conducted meetings to obtain public input and comments on flood problems and the draft Flood Management Plan.

WHEREAS, the Imperial County Office of Emergency Services has prepared the Imperial County Flood Management Plan.

NOW, THEREFORE, BE IT RESOLVED that the Imperial County Board of Supervisors adopts the “Imperial County Flood Management Plan” as an official Plan; and

BE IT FURTHER RESOLVED, the County of Imperial, through the Emergency Services Coordinator, will submit this Adoption Resolution to the California Governor’s Office of Emergency Services and Federal Emergency Management Agency, Region IX officials to enable the Plan’s final approval.

PASSED AND ADOPTED By The Imperial County Board of Supervisors, State of California, this ____ day of _____ 2007, by the following vote: Larry Grogan, Joe Maruca, Gary Wyatt, Wally Leimgruber and Victor Carrillo.

Larry Grogan, Chairman
Imperial County Board of Supervisors

Sylvia Bermudez, Clerk of the Board
County of Imperial, State of California

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1. Executive Summary

Imperial County has developed this Flood Management Plan (FMP) to identify the County's known flood problem areas; establish goals, objectives, policies and implementation programs to reduce flooding and flood related hazards; and ensure the natural and beneficial functions of the floodplains are protected. Imperial County continues to address its flooding problems with constant planning and implementation of flood protection and mitigation measures; strict land use regulations and enforcement; and community-wide awareness and vigilance to minimize damages and repetitive losses when flooding occurs.

Imperial County has invited the cities of Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial and Westmorland; and the Imperial Irrigation District, Imperial County School District, and the Salton Community Services District to participate and input into the Plan.

The County has proclaimed four states of emergencies due to flooding and one state of emergency due to rain and high winds since 1958 (California State OES) and eight federal declarations have been issued since 1950. Residents have submitted \$762,416.00 in flood insurance claims since 1978 (FEMA NFIP Statistics, 2006). The County has experienced damage to roadways, culverts, utilities, pipelines, man-made canals, irrigation ditches and damage to soils used for agriculture.

The Imperial County FMP is a future-oriented approach to planning in flood risk areas. It is a pre-disaster planning approach that is required by the Federal Emergency Management Agency (FEMA) for the County to continue to participate in the National Flood Insurance Program (NFIP). When the community chooses to join the NFIP, it must adopt and enforce minimum floodplain management standards for participation. The floodplain management requirements within the Special Flood Hazard Area (SFHA) are designed to prevent new developments from increasing the flood threat and to protect new and existing buildings from anticipated flood events. When a community chooses to join the NFIP, it must require permits for all development in the SFHA and ensure that construction materials and methods used will minimize future flood damage.

In an effort to reduce the costs associated with flood hazard mitigation and flood insurance, the Imperial County FMP identifies flood hazards within Imperial County and proposes potential mitigation measures. The FMP also provides a forum through which various flood issues affecting watersheds were addressed leading to potential solutions being developed. The FMP primarily addresses the flooding hazards within the County identified by local residents, agencies, organizations, Imperial County staff, and when appropriate, the regulatory floodplain, as identified by FEMA Flood Insurance Rate Maps (FIRMs) as the Special Flood Hazard Areas (SFHAs).

Floodplain management is the key component to effective flood control within Imperial County. The Federal Insurance Administration delineates areas of special flood hazards, the

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risk premium zones, and floodways through official maps: the Flood Insurance Rate Map (FIRM); and the Flood Hazard Boundary Map (FHBM). FIRM is an official map of a community on which the Federal Insurance and Mitigation Administration has delineated the Special Flood Hazard Area (SFHA) and the risk premium zones applicable to the community. Most FIRMs include detailed floodplain mapping of some or all community floodplains. These official maps show all canals, drains, and rivers, and at 1"-1000' are a useful reference map.

Most of the County's irrigated valley is designated Zone "C" - reflecting the flat terrain and the canal system. Zone C areas that have been identified in a community flood insurance study as having moderate or minimal hazard from flooding. These are areas with:

- less than a 1% chance of flooding each year;
- areas that have less than a 1% chance of sheetflow flooding with an average depth of less than one foot;
- areas that have less than a 1% chance of stream flooding where the contributing drainage area is less than one square mile;
- or areas protected from floods by levees.

No base flood elevations or depths are shown within these zones. Buildings or other improvements in these zones could be flooded by severe, concentrated rainfall, in the absence of adequate drainage systems. Flood insurance is available in participating communities, but it is not required in these zones. (Zone X is used on newer maps in place of Zones B and C.)

Official Imperial County Flood Insurance Rate Maps (FIRMs) are available for public viewing and use at the Imperial County Planning Department.

National Flood Insurance Program

In 1968, Congress created the National Flood Insurance Program (NFIP) in response to the rising cost of taxpayer-funded disaster relief for flood victims and the increasing damages caused by floods. The NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in communities that adopt and enforce floodplain management ordinances to reduce future flood damage. For most communities participating in the NFIP, FEMA has prepared detailed flood insurance studies that present water surface elevations for floods of various magnitudes, including:

- A flood that has a 1 percent probability of being equaled or exceeded in any given year (also called the "100-year or "base" flood), and
- A flood that has a 2 percent probability of being equaled or exceeded in any given year (also called the "500-year flood").

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The water surface elevation of the 100-year flood event is called the Base Flood Elevation (BFE). BFE and the boundaries of the 100- and 500-year floodplains are shown on the participating community's Flood Insurance Rate Map (FIRM).

The following table indicates Imperial County and the participating jurisdictions that are currently participating in the FEMA NFIP. Also included are the dates the Flood Hazard Boundary Map (FHBM) and Flood Insurance Rate Map (FIRM) for the community were identified. Compliance and ongoing participation in the NFIP ensures that the residents of the County and participating jurisdictions can purchase flood insurance.

Community ID Number	Community Name	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map	Regular Phase Participation Date
060065	Imperial County	11/01/74	03/15/84	03/15/84	03/15/84
060066	Brawley	06/18/76		NSFH*	08/04/78
060067	Calexico	02/01/74	01/20/82	01/20/82	01/20/82
060068	Calipatria	04/12/74		NSFH*	06/01/82
060670	El Centro	02/01/74		NSFH*	08/04/78
060070	Holtville	04/05/74	01/20/82	01/20/82	01/20/82
060071	City of Imperial	02/01/74	06/30/76	NSFH*	06/30/76
060072	Westmorland	05/24/74	06/30/76	NSFH*	06/30/76

* NSFH: No Special Flood Hazard

Source: FEMA Community Status Book Report

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2. Documentation of the Planning Process

Imperial County Office of Emergency Services (OES) was responsible for the development of the Flood Management Plan (FMP). The County OES hired a consultant, Bluecrane, Inc., (*bluecrane*) to assist in the preparation of the Plan. The County OES formed a FMP Working Group with representatives from the following jurisdictions within the County: Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial, and Westmorland as well as the Imperial Irrigation District, the Imperial County School District, and the Salton Community Services District.

The Imperial County FMP was developed to comprise a comprehensive risk and capability assessment for the region and receive input from a wide range of stakeholders who would play a role during implementation of recommended mitigation actions at the local level.

The development, modification, revision and management of the FMP are accomplished through the direction and oversight of the Imperial County Office of Emergency Service with coordination of the FMP Working Group. The Working Group is comprised of representatives from the following departments.

- County Office of Emergency Services
- County Planning Department
- County Public Works Department
- Imperial Irrigation District
- County Office of Education
- Brawley Fire Department
- Calexico Fire Department
- Calipatria Fire Department
- El Centro Fire Department
- El Centro Regional Medical Center
- City of Imperial Police Department
- City of Imperial (Planner)
- Heber Public Utility District
- Holtville Fire Department
- Imperial Irrigation District
- Salton City Fire Department
- Salton Community Services District
- Westmorland Fire Department
- Winterhaven Fire Protection District

These departments were designated as the lead agency for each participating jurisdiction. The individuals from these departments, as members of the FMP Working Group, were responsible for communicating with and soliciting input from all applicable departments, offices and bureaus within their home jurisdiction as the FMP progressed through the various stages of

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development. In this manner, all departments, offices and bureaus from each participating jurisdiction were fully involved in the development of the FMP.

Following the County Board of Supervisors’ approval of the project, the effort was launched in August 2006 in a meeting of the FMP Working Group. The Working Group has participated actively in the FMP’s development, conferring every two to three weeks throughout the process to review draft documents and assess progress on the Plan.

An extensive effort was undertaken to solicit public input during the planning process through website postings, newspaper announcements, invitations to public discussions and activities within each participating jurisdiction. Public comments and input included neighboring communities, agencies, businesses, academia, non-profits and other interested parties. The typical agenda for these interactive information sharing and input gathering sessions with the public included:

- Introductions
- An overview of the Flood Management Plan purpose and planning process
- A detailed interactive discussion of the flood hazard (current and historical)
- A broad overview of the Draft Plan as it stood at that time
- Solicitation of all comments
- An interactive discussion of the next steps

In addition to the ongoing effort to include the presentation, discussion and input gathering on the FMP in all relevant internal government meetings and interaction by the Office of Emergency Services with the public, following is a list of the formally scheduled public outreach forums conducted in Imperial County.

Flood Management Plan Working Group and Other Related Meetings

Date	Details	Purpose
August 8	Meeting of FMP Working Group and Consultant – Kickoff Session	Flood Management Plan Schedule Overview and Discussion
September 13	Imperial County Disaster Council Meeting	Open Discussion / Input Session
October 25	Meeting of Flood Management Plan Working Group – Mitigation Workshop	Strategy Session, Hazard Assessment, and Schedule Development
January 17	Imperial County Disaster Council Meeting	Open Discussion / Input Session
February 6	Flood Management Plan Posted on County Website for Public Review	Obtain Public Input and Comments

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Plan Development

The overall purpose of the Imperial County FMP is to provide guidance to agencies and the public who are:

- Responsible for and interested in protecting life, property, agriculture and livestock;
- Involved in land use planning;
- Responsible for administering the FEMA NFIP; and,
- Responsible for responding to flood emergencies within Imperial County.

Imperial County approached developing the Flood Management Plan as a three phase process as documented in the County's FEMA Grant application:

Phase One: Risk Assessment

- Assess the risk and identify flooding and all hazards that are threats to the safety and security in Imperial County.
- Develop hazard event profiles and estimate potential losses in the County.
- Perform a vulnerability analysis and identify the most serious risks to human safety and security.
- Map risk areas.

Phase Two: Plan Development

- Develop the goals and strategies to respond to and recover from the most serious risks.
- Document the mitigation planning process.

Phase Three: Implement the Plan

- Submit draft Flood Management Plan to the State Flood Mitigation Officer for review and comments.
- Incorporate changes into the Final Flood Management Plan.

Imperial County currently utilizes the General Plan 2003, which includes a comprehensive Land Use Element and Seismic and Public Safety Element. The Land Use Element describes existing land uses within the County and the facilities and services which provide the public infrastructure to support these uses. Also stated are Goals and Objectives for future growth, expansion of public facilities, and environmental resource protection; and policies and programs to guide such future growth.

The Seismic and Public Safety Element identifies potential natural and human-induced hazards and provides policy to avoid or minimize the risk associated with hazards. Potential hazards must be addressed in the land use planning process to avoid the unfolding of dangerous situations. For example, the risk associated with dangerous flooding can be avoided by not allowing development in floodplains and imposing strict safety standards on water

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transmission facilities. The participating jurisdictions also utilize their General Plans in the same manner.

An extensive review of the County’s previous studies, reports and technical information has also been undertaken and pertinent information has been incorporated into the Flood Management Plan. These studies consist of:

Name of Study	Purpose / Description	Prepared By	Date
Flood Insurance Study	The purpose of this study was to delineate the flood hazards for approximately 82.5 linear miles of 25 stream reaches located within the unincorporated areas of Imperial County. The results of the analysis were used to update the Flood Insurance Rate Map (FIRM) for the community.	MapIX-Mainland	October 2004
Reconnaissance Report: Flood Control and Related Purposes	The Reconnaissance study was conducted in response to requests from local agencies, and other Congressional authorization, for the purpose of determining whether further Federal planning efforts to solve the flooding problems of the Imperial and Borrego Valley areas were warranted. The initial objective of the study was to make this determination through defining the flooding and related problems and opportunities to solve these problems, and through developing and evaluating potential solutions.	U.S. Army Corp of Engineers, Los Angeles District	September 1989
Interagency Flood Hazard Mitigation Report	This Report transmits the recommendations of the Region IX Interagency Flood Hazard Mitigation Team following the disaster declared on July 1, 1983 for the counties bordering the lower Colorado River – including Imperial County. The report and recommendations of the team were intended to provide the framework for flood hazard mitigation during the reconstruction process to reduce the potential for future flood losses.	Region IX, Interagency Flood Hazard Mitigation Team	July 1983
Flood Insurance Study	This Flood Insurance Study investigated the existence and severity of flood	FEMA	May 1982

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Name of Study	Purpose / Description	Prepared By	Date
	hazards in the unincorporated areas of Imperial County and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study was used to convert Imperial County to the regular program of flood insurance by FEMA. Local and regional planners used this study in their efforts to promote sound floodplain management.		
Flood Damage Report: San Bernardino, Riverside, Imperial counties	This Report describes the storms of September 11, 1976; September 23-25, 1976; Floods of October 11, 1976 and September 23-24 1976 in the California counties of Imperial, Riverside, and San Bernardino.	U.S. Army Corps of Engineers, Los Angeles District	September 1977
Tropical Storm Doreen – Storm Report	This Report describes the storm damage and rainfall totals caused by Tropical Storm Doreen.	San Diego County Department of Sanitation and Flood Control	August 1977
Tropical Storm Kathleen – Storm Report	This Report describes the storm damage and rainfall totals caused by Tropical Storm Kathleen.	California Department of Transportation, San Diego, CA	October 1976

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Local Capabilities Assessment

This section list the County and participating jurisdiction’s local capabilities and resources to achieve goals of reducing flood losses from future hazard events.

Financial Resources for Hazard Mitigation Projects
General Fund
Development fees (Restricted to expansion costs for new development)
Building Permit fees
Capital Improvements project funding
Impact fees for homebuyers or developers for new developments/homes
State Funding Sources: Commerce and Economic Development Program Infrastructure State Revolving Fund (ISRF) Program Rural Economic Development Infrastructure Program (REDIP) Proposition 13 California State Water Resources Control Board (SWRCB) – Proposition 40 California State Water Resources Control Board (SWRCB) – Proposition 50 Clean Water State Revolving Fund (SRF) Program Watershed Protection Program
Federal Funding Sources: FEMA Housing and Urban Development (HUD) Community Development Block Grant Program U.S. Army Corps of Engineers (USACE) U.S. Small Business Administration (SBA) Funding United States Department of Agriculture (USDA) Programs Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP) Small Watershed Program Flood Prevention Program Emergency Watershed Protection (EWP) Program Bureau of Land Management (BLM) Programs

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Administrative and Technical Capability	
Human Resources	Department/Agency
Emergency Managers	Office of Emergency Services County Managers City Managers Special District Managers Fire Departments Police Departments Public Works Department Heads Floodplain Managers
Planner(s) or Engineer(s) with knowledge of land development, land management practices, construction practices related to buildings and/or infrastructure.	Engineering Department Planning Department Building Departments Public Works Economic Development Community Development Surveyors
GIS expertise	County GIS Division Departmental GIS Divisions
Grant writers	City Managers Office of Emergency Services Department Heads

Local Ordinances and Regulations	
County of Imperial Title 9 Land Use Ordinance, Division 16, Flood Damage Prevention, Chapter 1, Section 91601.03	Methods of Reducing Flood Losses. In order to accomplish its purposes, this division includes methods and provisions for: A. Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities; B. Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction; C. Controlling the alteration of natural flood plains, stream channels, and natural protective barriers, which help accommodate or channel flood waters; D. Controlling, filling, grading, dredging and other development which may increase flood damage; E. Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas. (Ord. 1339 § 2, 2001: prior code § 91601.03)
County of Imperial Title 9 Land Use Ordinance,	Basis for establishing the areas of special flood hazard. The areas of special flood hazard and areas of mud-slide (i.e. mud-flow) hazards identified by the Federal Emergency Management Agency or the Federal Insurance

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Local Ordinances and Regulations	
<p>Division 16, Flood Damage Prevention, Chapter 1, Section 91603.01</p>	<p>Administration in a scientific and engineering report entitled “Flood Insurance Study” for Imperial County dated 09-15-83 with an accompanying Flood Insurance Rate Map(s) is adopted by reference and declared to be a part of this division. This flood insurance study is on file at the Court House (planning/building department). In addition, the board of supervisors also includes any area of land located around the Salton Sea and lying at or below the minus two hundred twenty (220) foot elevation contour. This flood insurance study is the minimum area of applicability of this division and may be supplemented by studies for other areas which allow implementation of this division and which are recommended to the board of supervisors by the floodplain administrator. (Ord. 1339 § 2, 2001: prior code § 91603.01)</p>
<p>County of Imperial Title 9 Land Use Ordinance, Division 16, Flood Damage Prevention, Chapter 1, Section 91604.00</p>	<p>Establishment of development permit. A development permit shall be obtained before construction or development begins within any area of special flood hazards or areas of mudslide (i.e., mudflow) established in Section 91603.01. Application for a development permit shall be made on forms furnished by the floodplain administrator and may include, but not be limited to, plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question; existing or proposed structures, fill, storage of materials, drainage facilities; and the location of the foregoing. Specifically, the following information is required:</p> <p>A. Site plan, including but not limited to:</p> <ol style="list-style-type: none"> 1. For all proposed structures, spot ground elevations at building corners and twenty (20)-foot or smaller intervals along the foundation footprint, or one-foot contour elevations throughout the building site, 2. Proposed locations of water supply, sanitary sewer, and utilities, 3. If available, the base flood elevation from the flood insurance study and/or Flood Insurance Rate Map, and 4. If applicable, the location of the regulatory floodway; <p>B. Foundation design detail, including but not limited to:</p> <ol style="list-style-type: none"> 1. Proposed elevation in relation to sea level, of the lowest floor (including basement) of all structures, 2. For a crawl-space foundation, location and total net area of foundation openings as required in this division and FEMA Technical Bulletins 1-93 and 7-93, and 3. For foundations placed on fill, the location and height of fill, and compaction requirements (compacted to ninety-five percent (95%)) using the Standard Proctor Test method; <p>C. Proposed elevation in relation to mean sea level to which any nonresidential structure will be flood proofed, as required in this division and FEMA Technical Bulletin TB 3-93;</p> <p>D. All appropriate certifications listed in this division; and</p> <p>E. Description of the extent to which any watercourse will be altered or relocated as a result of proposed development. (Ord. 1339 § 2, 2001: prior code § 91604.00)</p>

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<p>County of Imperial Title 9 Land Use Ordinance, Division 16, Flood Damage Prevention, Chapter 1, Section 91605.00</p>	<p>Standards for construction. In all areas of special flood hazards the following standards are required:</p> <p>A. Anchoring.</p> <ol style="list-style-type: none"> 1. All new construction and substantial improvements shall be anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy. 2. A licensed architect or registered professional engineer shall assess all new construction and any substantial improvements. 3. All manufactured homes shall meet the anchoring standards of Section 91605.03. <p>B. Construction Materials and Methods. All new construction and substantial improvement shall be constructed:</p> <ol style="list-style-type: none"> 1. With flood-resistant materials as specified in FEMA Technical Bulletin TB 2-93, and utility equipment resistant to flood damage; 2. Using methods and practices that minimize flood damage; 3. With electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding; and if 4. Within Zones AH or AO, so that there are adequate drainage paths around structures on slopes to guide flood waters around and away from proposed structures. <p>C. Elevation and Flood proofing. (See Division 14 of Title 9 for definitions for “basement,” “lowest floor,” “new construction,” “substantial damage” and “substantial improvement.”)</p> <ol style="list-style-type: none"> 1. Residential construction, new or substantial improvement, shall have the lowest floor, including basement: <ol style="list-style-type: none"> a. In an AO Zone, elevated above the highest adjacent grade to height equal to or exceeding the depth number specified in feet on the FIRM, or elevated at least two feet above the highest adjacent grade if no depth number is specified. (The state of California recommends that in AO zones without velocity the lowest floor be elevated above the highest adjacent grade to a height exceeding the depth number specified in feet on the FIRM by at least two feet, or elevated at least four feet above the highest adjacent grade if no depth number is specified.) b. In a Z Zone, elevated to or above the base flood elevation; said base flood elevation shall be determined by one of the methods in Section 91604.02(B) of this division. (The state of California recommends the lowest floor be elevated at least two feet above the base flood elevation, as determined by the county.) c. In all other zones, elevated to or above the base flood elevation. (The state of California recommends the lowest floor be elevated at least two feet above the base flood elevation, as determined by the county.) <p>Upon the completion of the structure, the elevation of the lowest floor including basement shall be certified by a registered professional engineer or surveyor, and verified by the county building inspector to be properly elevated.</p>

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	<p>Such certification and verification shall be provided to the floodplain administrator.</p> <p>2. Nonresidential construction, new or substantial improvement, shall either be elevated to conform with subsection (C)(1) of this section or together with attendant utility and sanitary facilities:</p> <p>a. Be flood proofed below the elevation recommended under subsection (C)(1) of this section so that the structure is watertight with walls substantially impermeable to the passage of water;</p> <p>b. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and</p> <p>c. Be certified by a registered professional engineer or architect that the standards of this subsection are satisfied. Such certifications shall be provided to the floodplain administrator.</p> <p>3. All new construction or substantial improvement with fully enclosed areas below the lowest floor (excluding basements) that are usable solely for parking of vehicles, building access or storage, and which are subject to flooding, shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwater. Designs for meeting this requirement shall follow the guidelines in FEMA Technical Bulletins TB 1-91 and TB 7-93, and must exceed the following minimum criteria:</p> <p>a. Have a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding. Openings may be equipped with screens, louvers, valves or other covering devices provided that they permit the automatic entry and exit of floodwater; or</p> <p>b. Be certified by a registered professional engineer or architect.</p> <p>4. Manufactured homes shall also meet the standards in Section 91605.03. (Ord. 1339 § 2, 2001: prior code § 91605.00)</p>
County of Imperial Title 9 Land Use Ordinance, Division 16, Flood Damage Prevention, Chapter 1, Section 91605.01	<p>Standards for utilities.</p> <p>A. All new and replacement water supply and sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the system and discharge from systems into flood waters.</p> <p>B. On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding. (Ord. 1339 § 2, 2001: prior code § 91605.01)</p>
County of Imperial Title 9 Land Use Ordinance, Division 16, Flood Damage Prevention, Chapter 1, Section 91605.02	<p>Standards for subdivisions.</p> <p>A. All preliminary subdivision proposals shall identify the flood hazard area and the elevation of the base flood.</p> <p>B. All final subdivision plans will provide the elevation of proposed structure(s) and pads. If the site is filled above the base flood, the final pad elevation shall be certified by a registered professional engineer or surveyor and provided to the floodplain administrator.</p> <p>C. All subdivision proposals shall be consistent with the need to minimize flood damage.</p> <p>D. All subdivision proposals shall have public utility and facilities such as</p>

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Local Ordinances and Regulations	
	<p>sewer, gas, electrical and water systems located and constructed to minimize flood damage.</p> <p>E. All subdivisions shall provide adequate drainage to reduce exposure to flood hazards. (Ord. 1339 § 2, 2001: prior code § 91605.02)</p>
<p>County of Imperial Title 9 Land Use Ordinance, Division 16, Flood Damage Prevention, Chapter 1, Section 91605.02</p>	<p>Standards for subdivisions.</p> <p>A. All preliminary subdivision proposals shall identify the flood hazard area and the elevation of the base flood.</p> <p>B. All final subdivision plans will provide the elevation of proposed structure(s) and pads. If the site is filled above the base flood, the final pad elevation shall be certified by a registered professional engineer or surveyor and provided to the floodplain administrator.</p> <p>C. All subdivision proposals shall be consistent with the need to minimize flood damage.</p> <p>D. All subdivision proposals shall have public utility and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage.</p> <p>E. All subdivisions shall provide adequate drainage to reduce exposure to flood hazards. (Ord. 1339 § 2, 2001: prior code § 91605.02)</p>
<p>County of Imperial Title 9 Land Use Ordinance, Division 16, Flood Damage Prevention, Chapter 1, Section 91605.03</p>	<p>Standards for manufactured homes.</p> <p>A. All new construction and substantial improvements shall be anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.</p> <p>B. All new construction and any substantial improvements shall be assessed by a licensed architect or registered professional engineer.</p> <p>C. All manufactured homes that are placed or substantially improved, within Zones A1-A30, AH, and AE on the County's Flood Insurance Rate Map, on sites located:</p> <ol style="list-style-type: none"> 1. Outside of a manufactured home park or subdivision; 2. In a new manufactured home park or subdivision; 3. In an expansion to an existing manufactured home park or subdivision; or 4. In an existing manufactured home park or subdivision on a site upon which a manufactured home has incurred substantial damage as the result of a flood, shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to or above the base flood elevation (the state of California recommends at least two feet above the base flood elevation) and be securely fastened to an adequately anchored foundation system to resist flotation, collapse, and lateral movement. <p>D. All manufactured homes that are placed or substantially improved on sites located within Zones V1-30, V and VE on the County's Flood Insurance Rate Map will meet the requirements of subsection C of this section.</p> <p>E. All manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision within Zones A1-30, AH, AE, V1-30, V and VE on the County's Flood Insurance Rate Map that are not subject to the provisions of subsection C of this section will be securely fastened to an adequately anchored foundation system to resist flotation,</p>

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Local Ordinances and Regulations	
	<p>collapse, and lateral movement, and be elevated so that either the:</p> <ol style="list-style-type: none"> 1. Lowest floor of the manufactured home is at or above the base flood elevation (the state of California recommends at least two feet above the base flood elevation); or 2. Manufactured homes chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than thirty-six (36) inches in height above grade. <p>Upon the completion of the structure, the elevation of the lowest floor including basement shall be certified by a registered professional engineer or surveyor, and verified by the county building inspector to be properly erected. Such certification and verification shall be provided to the floodplain administrator. (Ord. 1339 § 2, 2001: prior code § 91605.03)</p>
<p>County of Imperial Title 9 Land Use Ordinance, Division 16, Flood Damage Prevention, Chapter 1, Section 91605.04</p>	<p>Standards for recreational vehicles.</p> <p>A. All recreational vehicles placed or sited within Zones A1-30, AH, and AE on the County’s Flood Insurance Rate Map will either:</p> <ol style="list-style-type: none"> 1. Be on a site for fewer than one hundred eighty (180) consecutive days, and be fully licensed and ready for highway use. A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or 2. Meet the permit requirements of Chapter 91604 and the elevation and anchoring requirements for manufactured homes in Section 91605.03. <p>B. Recreational vehicles placed on sites within Zones V1-30, V and VE on the County’s Flood Insurance Rate Map will meet the requirements of subsection A of this section. (Ord. 1339 § 2, 2001: prior code § 91605.04)</p>
<p>County of Imperial Title 9 Land Use Ordinance, Division 16, Flood Damage Prevention, Chapter 1, Section 91605.05</p>	<p>Flood-related erosion-prone area.</p> <p>A. The floodplain administrator shall require permits for proposed construction and other development within all flood-related erosion-prone areas as known to the county.</p> <ol style="list-style-type: none"> 1. Permit applications shall be reviewed to determine whether the proposed site alterations and improvements will be reasonable safe from flood-related erosion and will not cause flood-related erosion hazards or otherwise aggravate the existing hazard. 2. If a proposed improvement is found to be in the path of flood-related erosion or would increase the erosion hazard, such improvement shall be relocated or adequate protective measures shall be taken to avoid aggravating the existing erosion hazard. 3. With Zone E on the Flood Insurance Rate Map, a setback is required for all new development from the ocean, lake, bay, riverfront or other body of water to create a safety buffer consisting of a natural vegetative or contour strip. This buffer shall be designated according to the flood-related erosion hazard and erosion rate, in relation to the anticipated useful life of structures, and depending upon the geologic, hydrologic, topographic, and climatic characteristics of the land. The buffer may be used for suitable open space purposes, such as for agricultural, forestry, outdoor recreation and wildlife

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Local Ordinances and Regulations	
	habitat areas, and for other activities using temporary and portable structures only. (Ord. 1339 § 2, 2001: prior code § 91605.05)
County of Imperial Title 9 Land Use Ordinance, Division 16, Flood Damage Prevention, Chapter 1, Section 91605.06	Floodways. Located within areas of special flood hazard established in Section 91603.01 are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of floodwaters which carry debris, potential projectiles, and erosion potential, the following provisions apply: A. Prohibit encroachments, including fill, new construction, substantial improvements, and other development unless certification by a registered engineer or licensed architect is provided demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge. B. If subsection A of this section is satisfied, all new construction and substantial improvements shall comply with all other applicable flood hazard reduction provisions of this chapter. (Ord. 1339 § 2, 2001: prior code § 91605.06)
California Civil Code 1103	This article mandates three natural hazard disclosures and consolidates these and previously required disclosures onto a statutory form called the Natural Hazard Disclosure Statement (NHDS). This form is now a legally required part of most residential property transactions.
Cobey-Alquist Floodplain Management Act	The Cobey-Alquist Floodplain Management Act encourages local governments to plan, adopt and enforce land use regulations for floodplain management in order to protect people and property from flooding hazards. This act also identifies requirements which jurisdictions must meet in order to receive state and financial assistance for flood control.
Flood Damage Prevention Code, Earthquake Hazard Reduction in Existing Building Code	These codes address safety issues associated with flooding and earthquakes directly.

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In-progress/On-going/Completed Mitigation Projects and Programs		
Program or Project	Status	Description
Multi-Jurisdictional Hazard Mitigation Plan	In-Progress	A Multi-Jurisdictional Pre-Disaster Hazard Mitigation Plan for Imperial County and the participating jurisdictions: Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial City, and Westmorland. The overall intent of this Plan is to reduce or prevent injury and damage from hazards in the County. It identifies past and present mitigation activities, current policies and programs, and mitigation strategies for the future. This Plan also guides hazard mitigation activities by establishing hazard mitigation goals and objectives.
Flood Management Plan	In-Progress	Countywide Flood Management Plan including the participating jurisdictions: Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial City, Westmorland. The Imperial County Flood Management Plan will be developed to: <ul style="list-style-type: none"> • Identify the County's known flood problem areas, • Establish goals, objectives, policies and an implementation plan to reduce flooding and flood related hazards, and • Ensure the natural and beneficial functions of the floodplains are protected.
Emergency Operations Plan	Completed	Countywide Emergency Operations Plan has been designed to establish the framework for implementation of the National Response Plan, predicated on a new National Incident Management System (NIMS).
Annual Countywide Disaster Drills	Ongoing	Members of the participating jurisdictions' Police and Fire Departments, Office of Emergency Services personnel, and Emergency Managers participate in annual tabletop and/or field exercises.
ICS/SEM Training	Ongoing	Incident Command System/Standardized Emergency Management System training for appropriate personnel.

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3. Imperial County Profile

Imperial County, originally part of San Diego County, was founded on August 7, 1907. The area was visited as early as 1540 by Hernando de Alarcon, discoverer of the Colorado River. It was further explored by Spanish explorers and Catholic friars. White settlements existed along the Butterfield State Route as early as 1858, but no real development took place until water was brought into the area in 1901.

Imperial County is the youngest of California's 58 counties. In 1907 San Diego County extended from the Pacific Ocean on the west, to the Colorado River, Arizona border on the east, with Mexico being its southern border. By a vote of the people, the County was divided in half, and the eastern portion became Imperial County. Imperial County is located in the southeast corner of California. It is bordered on the west by San Diego County, on the north by Riverside County, on the east by the Colorado River which also forms the Arizona boundary and on the south by 84 miles of the International Boundary with the Republic of Mexico (Baja California).

The County oversees an area of 4,597 square miles (2,942,080 acres). The area includes over 400,000 acres of irrigated farmland that is among the most productive agricultural regions in the world. Imperial County has three international ports of entry. There are two ports of entry located in Calexico, and the third port is at Andrade in eastern Imperial County. Through these three ports travel over 35 million people and over 250,000 cargo trucks each year.

The County contains seven incorporated cities: the County Seat of El Centro, Brawley, Calexico, Calipatria, Holtville, Imperial and Westmorland, and several small unincorporated rural communities.

The County is characterized as a semi-arid desert with the lowest point being approximately 275 below sea level and the highest point being 4,284 feet above sea level and most of the landmass being a flat terrain at or near sea level. The County has an arid climate with warm, dry summers and mild winters. Typically, temperatures of 100 degrees occur more than 100 days each year with freezing temperatures averaging less than 10 days per year. The average annual air temperature is 72 degrees, the average "frost-free" season is about 300 days, and the average rainfall is about 2.92 inches.

Based on the 2000 U.S. Census Bureau Report, the total population for the Imperial County is 142,361. The predominant economic base in Imperial County is agricultural and its related industries. Other significant contributors to the local economy are government, geothermal electric power plants, state prisons, retail trade, and services.

Located immediately adjacent to the Imperial County along the "Mexican" border is the City of Mexicali with a population at or near one million and numerous international businesses, such as the diversified "maquiladora" industry, and other cultural facilities. The full impacts of

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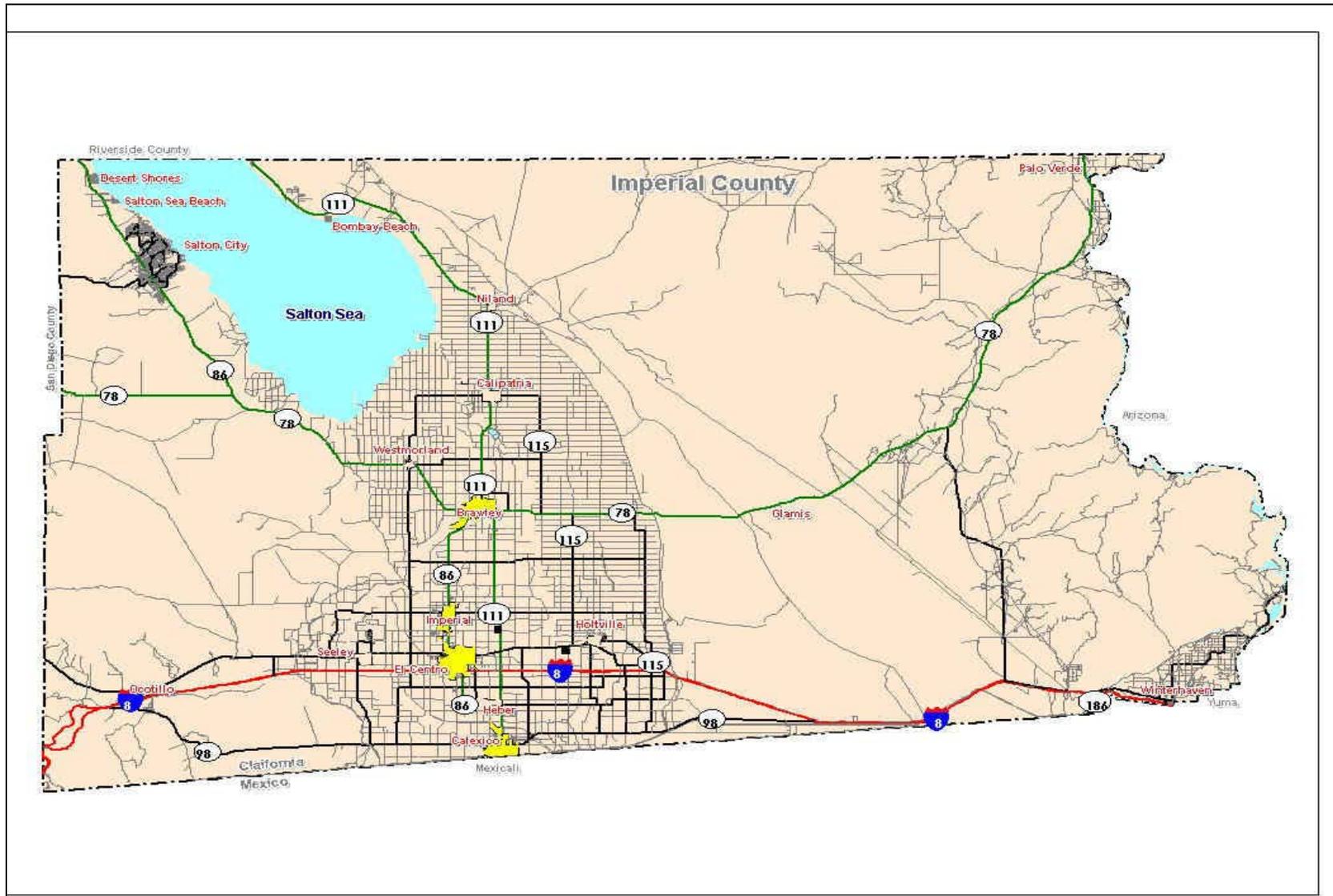
NAFTA are not yet noticeable but are anticipated to eventually have a major impact on the County.

The following maps depict the location of Imperial County within California and the County's seven incorporated cities: the County Seat of El Centro, Brawley, Calexico, Calipatria, Holtville, Imperial and Westmorland, and several small unincorporated rural communities.



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Population

Area	2005*	2004*	2000**
Imperial County	155,823	152,448	142,361
City of Brawley		22,255	22,052
City of Calexico		34,326	27,109
City of Calipatria		7,678	7,289
City of El Centro		38,350	37,835
City of Holtville		5,505	5,612
City of Imperial		9,612	7,560
City of Westmorland		2,091	2,131

** Source: U.S. Census Bureau, Census 2000

* U.S. Census Bureau Estimates

The seven incorporated cities of Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial, and Westmorland, account for 75 percent of the total population; and, in the past, have grown at a faster pace than the rural areas.

Climate

The climate in Imperial County is hot and dry, ranging from lows in the mid 30s in January to highs of 110+ in July and August (mean temperatures: low of 55.0 degrees; high of 89.6 degrees), with little moisture (average annual rainfall: 2.92 inches; 25 percent average relative humidity).

Temperatures

The lowest minimum temperature ever recorded was 16 degrees on January 22, 1937. The highest maximum temperature ever recorded was 121 degrees on July 28, 1995. The lowest maximum temperature was 42 degrees, recorded on January 24, 1949, and the highest minimum temperature was 92 degrees on June 30, 1946. The highest monthly mean temperature was 95.9 degrees, recorded in August 1969 and the lowest mean temperature was 42.3 degrees in February 1939.

Rainfall

The 85-year average annual rainfall is 2.92 inches with June being the driest month. Since 1914, there has only been measurable rainfall three times during the month of June: 0.04 of an inch on June 2, 1948; 0.01 of an inch on June 18, 1988; and 0.01 of an inch on June 7, 1997. The highest rainfall in one day was recorded on September 6, 1939, when 4.08 inches was measured. The total for the month, 7.06 inches, made September 1939 the month with the highest rainfall on record. The year 1939 was also the highest year on record with 8.52 inches. The lowest annual rainfall record was in 1956 with 0.16 of an inch.

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Snow

The only recorded snowfall of consequence occurred on December 12, 1932. Snow began falling at 8:45 p.m. and by 5:00 a.m. the following day, 2½ inches had been recorded. In the southwest portion of Imperial Valley, four inches of snow was reported that day. This was the only snowfall of record to cover the entire Valley.

Geography

Imperial County extends over 4,597 square miles (2,942,080 acres), bordering on Mexico to the south, Riverside County to the north, San Diego County on the west, and the State of Arizona on the east. The terrain varies from 235 feet below sea level at the Salton Sea to 4,548 feet at Blue Angel Peak.

Economy

Year	Time Period	Industry Title	No. of Employed
2006	Feb	Total Wage and Salary	58,000
2006	Feb	Total Non-Farm	43,900
2006	Feb	Service Providing	39,400
2006	Feb	Total Private	36,800
2006	Feb	Residual-Private Services Providing	22,300

Source: State of California, Employment Development Department

Agriculture and its related industries constitute the predominant economic base in Imperial County and is the largest employer with 35.1% of the work force. Government is the second largest employer with 21.3%, followed by retail trade with 15.2%. Due to the County's good soils, a year-round growing season, gently sloping topography and complex system of irrigation canals, it has become one of the most productive agricultural regions in the world.

Other significant contributors to the local economy are government; retail trade; winter visitors or "snowbirds"; the construction of two state prisons in the County; the growth of the geothermal industry in the area; mining of gold, aggregate, and other mineral resources; the expansion of the Naval Air Facility; an additional U.S./Mexico border crossing; and approval of the North American Free Trade Agreement (NAFTA).

Transportation Systems

Highways. State Highway 86 traverses the County and intersects with Interstate 8 four miles south of Imperial. Interstate 8 connects to San Diego to the West, and Arizona to the East.

Rail. Union Pacific Railroad offers mainline service to Portland, St. Louis, Rock Island, Tucumcari and New Orleans for agriculture and industry.

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Truck. Regular and irregular common carriers for Intrastate and Interstate services. Overnight delivery to San Diego, Los Angeles, Phoenix, Tucson, and intermediate points.

Air. Imperial County Airport (Boley Field) has general aviation facilities, and provides scheduled passenger service to Los Angeles, Phoenix, and other points in Arizona and California. Boley Field meets the general aviation, air transportation, and air cargo needs of the entire County. Regularly scheduled passenger services are provided and they offer connecting flights worldwide.

Bus. Greyhound, Shuttle Bus, and Dial-A-Ride.

Water. Nearest water port facilities are located in San Diego, and Los Angeles.

Major Recreation Areas

Imperial Sand Dunes (formerly called the Algodones Dunes). The dunes is a well-known landmark to both local residents and the thousands of travelers who pass by them each year. It extends along the east perimeter of the Imperial Valley. This 40-mile dune system is one of the largest in the United States. The dunes were formed from the windblown beach sands of prehistoric Blake Sea. Some dune crests reach heights of more than 300 feet. The largest and tallest dunes are located in the central area and west side, while the east side contains smaller dunes and numerous washes. The three most popular areas are Glamis/Gecko, Buttercup Valley and Dunebuggy Flats. It is also a popular filming location.

Anza-Borrego Desert State Park. With over 600,000 acres, Anza-Borrego Desert State Park is the largest desert state park in the contiguous United States. 500 miles of dirt roads, two huge wilderness areas (comprising 2/3 of the park) and 110 miles of riding and hiking trails provide visitors with an unparalleled opportunity to experience the wonders of the Colorado Desert. The park features washes, wildflowers, palm groves, cacti and sweeping vistas. Visitors may also have the chance to see roadrunners, golden eagles, kit foxes, mule deer and bighorn sheep as well as desert iguanas, chuckwallas and four species of rattlesnake.

Coyote Mountain Wilderness. Described as a fish hook shaped mountain range, the Coyote Mountains make up 40% of this wilderness. Part of the Carrizo Badlands lie within the northern portion of the wilderness, their narrow and twisting gullies giving the landscape its austere, forbidding appearance. A group of unusual sandstone rock formations, believed to be 6,000,000 years old, add to the character of this region.

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Desert Oasis (Hot Spring Spa and Long Term Visitor Area). This year-round hot springs attracts both local and winter visitors. Average water temperature is in the 100° F range.

Desert View Tower. To honor the builders of the railroad and highway that made the journey so much easier, the tower was built in 1923 as a commemoration to the pioneers who crossed the desert and mountains. The tower is located at the edge of the mountains that overlook the southern area of Anza-Borrego Desert State Park and the desert of Imperial County.

Fish Creek Mountains Wilderness. This wilderness area resembles a plateau rising as a great wall above the desert basin. Close up, you can see a land of jagged ridges and peaks that appear above twisting canyons and small valleys. The mountain slopes contain limestone outcrops that have resisted erosion. A gypsum mining operation in the western mountains provides raw material for the U.S. Gypsum plant at Plaster City.

Fossil Canyon. The weathering of copper, iron and sulfur within the rock has stained the multicolored canyon walls. The upper section of the gorge contains marine fossils.

Mesquite Mine Overlook Trail. This one-mile trail leads to an overview of the second largest gold mine in California.

Mud Pots and Mud "Volcanoes" (Freaks of Nature). The mud "volcanoes" are cones built up out of viscous mud that bubbles up through central vents. This area is near a formerly commercial carbon dioxide gas field. The age of these mud pots is not known, but survey reports in the late 1800's and early 1900's reported mud pots and steam vents in the area. These mud volcanoes can be found near the Salton Sea shore. The Wister mud pots are found on Hot Mineral Spa Road, just off Highway 111. The fluid level of these mud pots varies throughout the year. Several mud pots located next to each other will have different fluid levels and different colors in the mud. The temperature of the fluid is slightly higher than the ambient air temperature.

Salton Sea. Salton Sea is the largest lake in California covering 380 square miles. It is 35 miles long and about 15 miles wide at its widest point and about 50 feet deep at its deepest point. Farther north the Salton Sea State Recreation Area encourages camping, fishing, bird watching and just plain relaxing. Salton Sea is a major stop for migratory birds on the Pacific Flyway. At least 375 different species of birds annually visit the wetlands along the shores of the Sea as well as the agricultural fields, canals and drains that feed it. The annual Salton Sea International Bird Festival attracts enthusiasts from all over the world. The Sea is considered one of the world's most productive fisheries, attracting recreationists year around.

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Sonny Bono Wildlife Refuge. The Sonny Bono Salton Sea National Wildlife Refuge is a treasure of the Sea's ecological systems, especially birds. With over 375 bird species, this refuge provides World Class Bird Watching. Hundreds of thousands of birds use this refuge to winter and as a migration stop. Endangered species such as the Bald Eagle, the Peregrine Falcon, and the California Brown Pelican can be seen here. Other species that frequent the reserve are the Fulvous Whistling Duck, the Wood Stork, the Mountain Plover, the Borrowing Owl, and the Long Billed Curlew. In February the reserve is host to Salton Sea International Bird Festival which draws thousands of visitors from around the world.

Governing Bodies

The County Seat is El Centro. The governing body of the County is the Board of Supervisors, comprised of five members elected by the voters for four (4) year terms in each of the five County districts. Normally, the Board meets every Tuesday, plus other special meeting times, to conduct the affairs and business of the County. Certain departments are administered by elected department heads, while others are administered by persons selected and appointed by the Board.

Land Use and Development Trends

Imperial County oversees an area of 4,597 square miles (2,942,080 acres). The area includes over 400,000 acres of irrigated farmland that is among the most productive agricultural regions in the world.

Imperial County is, and will continue for the foreseeable future to be, a predominantly agricultural area. Presently, one-fifth of the nearly three million acres of the County is irrigated for agricultural purposes, most notably the central area known as Imperial Valley. Approximately fifty percent of County lands are undeveloped and under Federal ownership and jurisdiction. The developed area, where the County's incorporated cities, unincorporated communities, and supporting facilities are situated comprises less than one percent of the land. Approximately seven percent of the County is the Salton Sea.

The seven incorporated cities: Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial, and Westmorland, account for 75 percent of the total population. In the past, incorporated cities have grown at a faster pace than the rural areas. Recently, residential development has increased in agricultural areas away from cities and communities.

The Urban Area designation on the Land Use Plan includes the previously adopted Brawley, El Centro, Heber, Holtville, Seeley, and Calexico Current Land Use Plans; the Winterhaven portion of the Bard/Winterhaven Current Land Use Plan; and the previously proposed Imperial Current Land Use Plan. Urban Area is also proposed adjacent to the cities of Calipatria and Westmorland and for the unincorporated communities of Niland

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and West Shores/Salton City. These areas are characterized by a full level of urban services, in particular public water and sewer systems, and contain or propose a broad range of residential, commercial, and industrial uses.

It is anticipated that these areas will eventually be annexed or incorporated and should be provided with the full range of public infrastructure normally associated with cities. Therefore, development in these areas shall provide for the extension of full urban services such as public sewer and water, drainage improvements, street lights, fire hydrants, and fully improved paved streets with curbs and, in many cases, sidewalks. If located within an urban area, such improvements shall be consistent with city standards as determined by the City Engineer, Department of Public Works, Fire Marshal, and Planning/Building Department.

Increasingly, the local economy is becoming more diversified and less reliant on the economic cycles of agriculture. In addition to economic diversification, there are a number of other factors which may accelerate population growth in the future. For example, the construction of two State prisons in the area; the growth of the geothermal industry in the area; the expansion of the Naval Air Facility; an additional U.S./Mexico border crossing; and approval of the North American Free Trade Agreement (NAFTA) between the U.S., Mexico, and Canada.

The Federal government owns approximately one-half of all land in Imperial County, primarily the Department of the Interior's Bureau of Land Management (BLM) property and U.S. Military lands. Other Federal sites include the National Wildlife Refuges at the south end of the Salton Sea and two sites on the Colorado River-Cibola near Palo Verde, and Imperial farther south. U.S. Border Patrols are located at the Mexicali/Calexico and Algodones/Andrade Ports of Entry, with Border Patrol inspection stations also operating on Highway 86/78 south of Salton City, Highway 111 north of Bombay Beach, and Highway 78 south of Palo Verde.

The following table and map shows the generalized land uses for Imperial County.

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Imperial County Land Use Distribution

IMPERIAL COUNTY LAND USE DISTRIBUTION (IN ACRES*)	
Irrigated (Agriculture)	
Imperial Valley	512,163
Bard Valley (Including Reservation)	14,737
Palo Verde Valley	7,428
TOTAL	534,328 (18.2%)
Developed	
Incorporated	9,274
Unincorporated	8,754
TOTAL	18,028 (0.6%)
Salton Sea **	211,840 (7.2%)
Desert/Mountains	
Federal	4,459,926
State	37,760
Indian	10,910
Private	669,288
TOTAL	2,177,884 (74.0%)
IMPERIAL COUNTY TOTAL	2,942,080 Acres
* All acreages are approximations and should, therefore, only be used for informational purposes.	
** Calculated at elevation of – 230'	

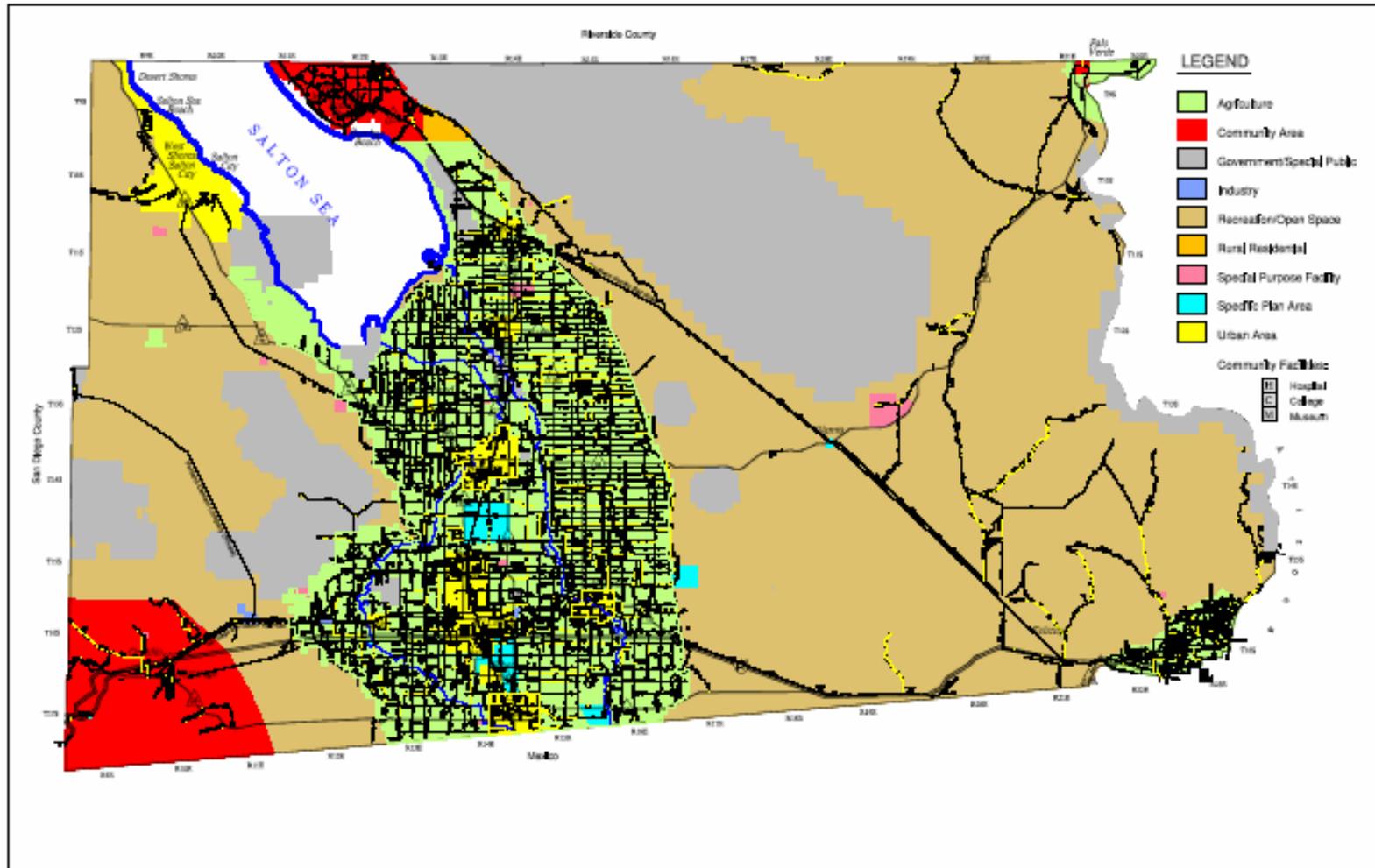
Source: Imperial County General Plan, County Overview

Development and land use changes are minimal throughout the County and within the cities of the County. However, as development and land use changes may be presented to the governing body of each jurisdiction, careful and thorough consideration is given to the potential impact by each hazard to the proposed development and or land use change. Approvals, as necessary and appropriate, may be conditioned with actions which mitigate the potential exposure to hazards.

Following is Imperial County and the participating jurisdictions land use maps and plans.

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Imperial County
General Plan

Imperial County Land Use Plan

Updated: January 14, 2004

Adopted November 5, 1990 by the Board of Supervisors through Minute Order # 16-D

Land Use Element



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4. Flood Management Plan

4.1 Phase One: Risk Assessment

Under Title 44 of the Code of Federal Regulations (44 CFR), Section 201.6 (c)(2)(i) of the Disaster Mitigation Act (DMA), Local Hazard Mitigation Plans are required to include a risk assessments describing the types of natural hazards that could affect the jurisdiction. This FMP has been coordinated with and developed in cooperation with all of the local jurisdictions within the geographic area.

Following is the identified Flood Risk faced by Imperial County and the participating jurisdictions from the Flooding Hazard Section of the County's Multi-Jurisdictional Hazard Mitigation Plan. The following list describes the flood risk probability and severity assessment as related to the County and participating communities.

For the rating of "**probability**" of occurrence, for each of the following hazards, the participants in the workshop for the Butte County MHMP were asked to provide ratings of the likelihood that an event would occur in the future. The ratings that were used were:

- High Probability (highly likely to occur)
- Medium Probability (likely to occur)
- Low Probability (not very likely to occur)

These were subjective, order-of-magnitude ratings that participants could relate to whether they were highly skilled in a hazards area (e.g., members of a fire department) or not. This approach facilitated utilizing a consensus approach with the participating group.

For the rating of "**severity**", the participants in the workshop for the Butte County MHMP were asked to provide ratings of the likely severity of an event, assuming one occurred in the future. The ratings that were used were:

- High Severity (extensive loss of life and/or property)
- Medium Probability (moderate loss of life and/or property)
- Low Probability (relatively modest loss of life and/or property)

These were subjective, order-of-magnitude ratings that participants could relate to whether they were highly skilled in a hazards area (e.g., members of a fire department) or not. This approach facilitated utilizing a consensus approach with the participating group.

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Hazard: Flooding

Jurisdictions Affected by Flooding

Flooding risk probability and risk severity assessments listed below were identified by the Flood Management Plan Working Group as related to the County and participating communities.

Imperial County Probability: High	Imperial County Severity: High
Brawley Probability: High	Brawley Severity: High
Calexico Probability: Medium	Calexico Severity: Medium
Calipatria Probability: High	Calipatria Severity: High
El Centro Probability: Medium	El Centro Severity: High
Holtville Probability: Medium	Holtville Severity: Medium
Imperial City Probability: Medium	Imperial City Severity: Medium
Westmorland Probability: High	Westmorland Severity: High

Hazard Definition

A flood is defined as an overflowing of water onto an area of land that is normally dry. Floods generally occur from natural causes, usually weather-related, often in conjunction with a wet or rainy spring or with sudden and very heavy rainfalls. Floods can, however, result from human causes as a dam impoundment bursting. Dam break floods are usually associated with intense rainfall or prolonged flood conditions.

Floods are generally classed as either slow-rise or flash floods. Slow-rise floods may be preceded by a warning time lasting from hours to days, or possibly weeks. Evacuation and sandbagging for a slow rise flood may lessen flood-related damage. Conversely, flash floods are the most difficult for which to prepare due to the extremely short warning time, if

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there is any at all. Flash flood warnings usually require immediate evacuation. On some occasions in the desert areas, adequate warning may be impossible.

For floodplain management purposes, the following discussion describes the Federal Emergency Management Agency (FEMA) definition of "100-year flood." The term "100-year flood" is misleading. It is not a flood that will occur once every 100 years. Rather, it is the flood elevation that has a one percent chance of being equaled or exceeded each year. Thus, a 100-year flood could occur more than once in a relatively short period of time. The 100-year flood, which is the standard used by most Federal and State agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management and to determine the need for flood insurance. A structure located within a special flood hazard area shown on a map has a 26 percent chance of suffering flood damage during the term of a 30-year mortgage.

Riverine Flooding

Channels are defined features on the ground that carries water through and out of a watershed. When a channel receives too much water, the excess flows over its banks and into the adjacent floodplain. Flooding that occurs along a channel is called riverine flooding. What happens in a watershed will affect events and conditions downstream. Terrain helps determine the dynamics of riverine flooding. In relatively flat areas, shallow, slow-moving floodwater may cover the land for days or even weeks. In hilly and mountainous areas, a flood may come scant minutes after a heavy rain. Such a flash flood gives short notice and moves so fast that it is particularly dangerous to people and property in its path.

Overbank Flooding

The most common type of flooding in the United States is called overbank flooding. Overbank flooding occurs when downstream channels receive more rain from their watershed than normal, or a channel is blocked by debris. For either reason, excess water overloads the channels and flows out onto the floodplain. Overbank flooding varies with the watershed's size and terrain. One measure of a flood is the speed of its moving water, which is called velocity. Velocity is measured in feet per second. Hilly and mountainous areas have faster moving water, so velocity can pose a serious hazard. In flat areas, the flood may move slowly, making its velocity less of a hazard. Terrain may affect how much warning people have that a flood is building. Conditions on a river that drains a large watershed may warn of a pending flood hours or even days before actual flooding. On the other hand, streams in hilly areas may give no warning that a flash flood is about to strike.

Flood depths vary, as do flood durations. Generally, the larger the river, the deeper the flood and the longer it will last. However, in hilly or mountainous areas with narrow valleys, flooding can be very deep in small watersheds. Depending on the size of the river and terrain of its floodplain, flooding can last for days and cover wide areas.

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Flash Flooding

A severe storm that drops much rainfall in a short time can generate a flash flood. All flash floods strike quickly and end swiftly. While flash floods occur in all fifty states, areas with steep slopes and narrow stream valleys are particularly vulnerable, as are the banks of small tributary streams. In hilly areas, the high-velocity flows and short warning time make flash floods hazardous and very destructive. In urban areas, flash flooding can occur where impervious surfaces, gutters and storm sewers speed runoff. Flash floods also can be caused by dam failure or the collapse of debris dams. Flash floods rank first as the cause of flood-related deaths in the United States.

Flood Profiles/Patterns in Imperial County

The entire County of Imperial is subject to various degrees of flooding in the form of flash floods or slow floods caused by heavy precipitation. Where not irrigated, most of Imperial County is a barren, sandy, low desert, stretching east to the State's border along the Colorado River. Although the County is located in a desert with very low precipitation, it is sometimes subject to heavy rains and subsequent flooding. Flash flooding is not infrequent in desert areas. Such flooding occurs when sudden downpours over the mountains and/or desert tend to create instantaneous peak flows which roughly follow empty stream beds and mountain washes. Flooding could occur either in floodplains or floodways.

Floodplains are generally located adjacent to rivers and other bodies of water and in low lying areas near a water source. The external boundary of floodplains is defined by the predicted extent of inundation that would result from the most intense storm that occurs once every one hundred years. Floodways are defined by discernible drainage channels. Floodways are more hazardous due to the anticipated velocities of the flood waters and expected damage to life and property. Such designations occur along the Myer Creek (through Ocotillo) and within the levees along the Colorado River.

Imperial County is located in the southeastern corner of California and was organized in the wake of disastrous floods and water control projects along the Colorado River in 1905 and 1907 that diverted waters into the then-dry Salton Sink and created the Salton Sea. The Salton Sea is largely below sea level and is the largest inland body of water in California (over 2/3 of the Salton Sea is within Imperial County; the north end is in Riverside County). From north to south the sea is 35 miles long.

Although precipitation may occur at any time during the year, most rainfall occurs during late summer and in the early winter. Three types of storms produce rainfall over Imperial Valley:

1. General winter storms, which originate in the Pacific Ocean, characterized by moderate rain spread over broad areas;

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2. Local cloudburst storms which produce high intensity rain for a short duration over small areas; and
3. General summer storms, which normally consist of general rain and local thunderstorms.

These storms are often associated with moisture from tropical storms moving into the area from the Gulf of California or the Pacific Ocean.

The Alamo and New Rivers are the two main drainages in the valley portion of Imperial County. These watercourses flow in a northerly direction from Mexico to Salton Sea and carry mainly agricultural return flow. The majority of this water is diverted from Colorado River and reaches these rivers via the irrigation drains throughout Imperial and Mexicali Valleys.

There are several washes which originate in the mountains along the western border of Imperial Valley. Myer Creek is located in the southwestern part of Imperial County and flows in the north-easterly direction. This wash has a drainage area of 21.8 square miles and flows through the town of Ocotillo. Arroyo Salada is located in the northwestern portion of Imperial County and flows in an easterly direction. This wash has a drainage area of 34.8 square miles and flows directly into the Salton Sea.

Alamo River, near Holtville, has very little development near the floodplain. The wide floodplain at the bottom of the gorge is, however, a potential area of development in the future. There is both commercial and residential development in the Myer Creek floodplain near Ocotillo, and Arroyo Salada flows adjacent to an area of potential development. Salton Sea has both commercial and residential development within its floodplain.

Flooding has affected residential and commercial uses of land in the Imperial Valley. Homes in Ocotillo have been destroyed; homes and businesses in El Centro, Imperial, Niland, Calipatria, Bombay Beach and other surrounding cities and communities have been damaged. In addition, sewer, power, telephone services and other public utilities throughout the area have been interrupted by flooding. Flooding has also impacted transportation throughout the area. County, State and Federal roads, and railroads have been damaged, or their use interrupted.

The County has proclaimed four States of Emergencies due to flooding and one State of Emergency due to rain and high winds since 1958 (California State OES) and eight Federal declarations since 1950. Residents have submitted over \$762,000.00 in flood insurance claims since 1978 (FEMA NFIP Statistics, 2006). The County has experienced damage to roadways, culverts, utilities, pipelines, man-made canals and irrigation ditches and damage to soils used for agriculture.

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In the “Flood Control and Related Purposes” Reconnaissance Report prepared by the U.S. Army Corps of Engineers in 1989 it is noted that there are two types of flooding that occur in Imperial County.

1. Major destructive floodflows result from runoff that originates outside the developed (agricultural and urban) areas of the Imperial Valley and is conveyed into these areas by alluvial fan washes. There are essentially no facilities to convey these flows through the developed areas; flows therefore impact the developed areas before they reach points of disposal such as the New and Alamo Rivers and their tributaries, and ultimately the Salton Sea.
2. Runoff developed within the developed area of the Imperial Valley constitutes the second type of flooding in the report’s study area. This runoff develops from rain falling directly on the Valley. The existing interior drainage facilities - irrigation drains in the agricultural areas, and storm drains in the communities - convey part of the interior runoff.

The patterns of flooding on the alluvial fan washes of Imperial Valley are typically very broad, covering thousands of acres of land. Average depths of inundation may range up to three feet. Ponding of floodwaters requires pumping or other measures to drain. Flooding could also result from damage to the All-American Canal and associated transmission aqueducts. A few hazardous waste facilities are located in the County and accidents could dangerously pollute air and water.

Within the County jurisdiction, the communities of Bombay Beach and Ocotillo are considered to be the most likely to experience significant flooding. In El Centro, the Gillett/Cannon Roads area receives the heaviest flooding. It is at a low elevation east of El Centro and south of East Evan Hewes Highway. Bombay Beach is located in a pocket created by the Salton Sea on the west and the Chocolate Mountains on the east. Severe flooding could isolate the community. In the event of a major flood, approximately 300 to 1,000 residents would have to be evacuated.

Historical Floods

During the storms of 1995, the communities of Desert Shores, Bombay Beach, and Salton Sea Beach were affected by the high winds and water. Wind swept waves overtopped dikes along the southern portions of the Salton Sea causing several county roads to be flooded. These communities, including Salton City, are vulnerable to future flooding since each is located in the floodplain and are near or adjacent to the Salton Sea.

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Bombay Beach Flooded Waterfront



Bombay Beach along the shores of the Salton Sea

During the storms of September 9-11, 1976 and September 23-25, 1976 flood damaged the following areas in the Imperial Valley

Ocotillo Area/Myer Creek. The town of Ocotillo is built on the alluvial fan formed by Myer Creek. Myer Creek first flooded the southern portion of town and then shifted to the northern portion of town. It also combined with the flow from Devil's Canyon Wash before entering Palm Canyon and Coyote Washes. The flood caused damages by undermining foundations, pushing in walls, battering structures with boulders and cobbles, and depositing one to four feet of silt. Six fatalities occurred. Myer Creek floodwaters moved several houses and trailers from their foundations; eight homes were totally destroyed; another five received major damage; 14 required major cleaning and some renovation; and 28 needed major cleaning. Major damage to Interstate Highway 8, State Highway 98, and the San Diego and Arizona Eastern Railroad occurred. There were several roadbed washouts on Interstate Highway 8. The abutments of the bridge across Myer Creek were washed out causing the end spans to collapse.

Track, roadbed, and bridges were washed out at the mouth of Myer Creek. The eastern portion of the trestle bridge over the South Fork of Coyote Wash was also washed away. The track was suspended in mid-air. High business losses and emergency cost were attributable to the inconvenience from the closure of highway and rerouting of traffic for several days.

San Felipe Creek. The overflow occurred upstream of State Highway 86, from one to three feet deep, and continued to the Salton Sea, causing extensive damage to approximately 3,390 acres of agricultural land, irrigation and drainage facilities, and some damage to roads. The major crops destroyed or damaged were: cotton, alfalfa, and stacked hay. There was extensive damage caused by sediment deposit. Fields had to be re-leveled and replanted. The loss of profit was due to late planting.

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Carrizo Wash and Adjacent Streams. Comingled flow from several streams washed out roads and railroad tracks and then joined San Felipe Creek, contributing to the resulting damages.

Coyote Wash and Yuha Wash. Overflow from these two streams spread out over the flatland causing damage to railroad tracks and to approximately 2,000 acres of agricultural land. The major crops severely damaged were: grain, sudan grass, cotton and alfalfa. Erosion to cropland was also severe. The depth of overflow was from one to four feet.

Pinto Wash and the Westside Main Canal Break. Extensive damage was caused from overflows from this wash and from the breached Westside Main Canal. The floodwaters originated in Mexico and built up to a head of water, eight to ten feet high in places where first the cultivated fields were flooded, then spread out inundating a large area three to four feet deep. Crops damaged in this area were mostly cotton and alfalfa. Grain and sudan grass were also damaged. Large quantities of sediment were deposited in fields resulting in total destruction of crops. Fields had to be re-leveled and replanted, causing some late planting of crops which resulted in loss of profits. Approximately 1,750 acres of agricultural land were flooded.

Mammoth and Iris Wash Area. East Highline Canal laden with discharge from Mammoth and Iris Washes overflowed flooding cropland and washing out irrigation facilities. The major crops damaged were: cotton, alfalfa, milo and carrots. Extensive damage to crops and cropland resulted from large sediment deposits. Land had to be re-leveled and replanted causing loss in profits from late planted crops. Cotton also brought a lower price due to water damage. Streets and highways had to be cleared of mud and debris. The town of Niland had minor flood damages consisting of highway, street, and residential yard damage.

Salton Sea. Salton Sea has been rising for many years due to irrigation wastewater from Imperial and Coachella Valleys. This has caused extensive private and public property losses along the shore. The September 1976 floods contributed to this condition and during the September 1976 storms the Sea rose an unprecedented eight inches. The increasing water-surface elevation of Salton Sea forced abandonment of both residential and commercial buildings which were originally built near the shoreline. The amount of damage contributable to the two floods is undetermined therefore no attempt was made to allocate property damages resulting from the September 1976 storms.

Problem Flood Areas

The following are areas identified within the County and participating jurisdictions where flooding has been experienced and is considered a problem:

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Ocotillo and Nomirage. The communities of Ocotillo and Nomirage are at risk due to their location at the base of an alluvial fan originating at the base of Myer Creek. More specifically, Myer Creek is located in the southwestern part of Imperial County and flows in a northeasterly direction through the townsites of Ocotillo and Nomirage, draining over 21.8 square miles. Myer Creek, a tributary of Coyote Creek in western Imperial County, runs through the center of the community of Ocotillo. During heavy rainstorms, the wash carries major runoff from the Jacumba Mountains. In 1976 Ocotillo suffered major damages due to flooding from Tropical Storm Kathleen.

East El Centro. An area east of the El Centro City limits has also been flooded during major storms. Water has ponded up to a depth of about 12 inches throughout the agricultural areas and residential areas during these events. The area is approximately one-half square mile in size, generally bounded by Interstate 8 to the south, State Highway 111 to the east, the Alder Canal, located about one-quarter mile east of Dogwood Road to the west and railroad tracks to the north.

North El Centro. The north El Centro area has been plagued by similar flooding problems as east El Centro. The area is bounded by State Highway 86 (Imperial Avenue) on the west, Villa Avenue on the south, the Southern Pacific Railroad tracks on the east, and the Central Drain, located one-half mile south of Aten Road, on the north. This 0.65 square mile (420 acres) area is subdivided into two areas that are separated by the Date Canal. The one-half square mile sub-area on the west of the canal drains into the Central Drain through two 12-inch drains located at the northeast corner of the sub-area; the smaller sub-area on the east drains through a culvert under the railroad tracks into a small ditch along the east side of the railroad track embankment, and ultimately into the Central Drain.

During the 1976 and 1977 storms, the northeastern corner of the west sub-area was flooded. Sheetflow runoff from the fields to the south was unable to drain into the Central Drain, which was apparently already filled to capacity. Water ponded in this area to a depth of 12 inches and flooded crops. The northern end of the east sub-area was also flooded during the 1976 and 1977 storms. The depth of standing water in this area was approximately 12 inches.

South El Centro. South El Centro is located in the southern part of the City along and on the north side of Interstate 8. During the 1976 and 1977 storms, runoff from south of Interstate 8 exceeded the capacity of the Date Drain and flowed north across the highway. According to the City of El Centro, there was approximately six to eight inches of Sheetflow, which was carried by the streets into the drainage system. Homes in this area were built above grade and there were no damages reported.

Niland. The Niland area has been flooded when storms hit in the Chocolate Mountains and runoff flows across the Coachella Canal and then across the northeasterly part of Imperial

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Valley. Not only is the community of Niland impacted by the runoff, but the entire agricultural areas in the northern part of the Valley are inundated as well.

Bombay Beach. Bombay Beach is a community sitting on the northeast shore of the Salton Sea south of State Highway 111. In the early 1970's, the community constructed a dike along the shore to protect the developed area from the rising Salton Sea water level. The level of the Sea rises during and after major storms, which caused flooding around the Sea. In 1980 the existing dike was constructed with funds provided by a State grant. Although the dike appears to be doing an adequate job of protecting the community from the Sea, local runoff from the north drains into Bombay Beach and is trapped, causing flooding problems.

Salton Sea. In April 1980, several homes were flooded after windswept waves broke dikes on the western shores of Salton Sea. Flooding occurred in Salton Sea Beach, Salton City, and Desert Shores. There was only one marina left operating on the Sea and its floor elevation is below the level of the Sea. The marina is protected by a concrete retaining wall. A sump pump was used to remove seepage into the building.

County Roads. During major storms, the County's two major north-south highways – State Highway 86 and State Highway 111 – have been closed to traffic due to the large runoff from the desert areas. State Highway 111 has been closed to traffic during major storm flows for many hours causing Bombay Beach to be isolated from the rest of the County. Both Highways connect the Imperial Valley with Indio and the Palm Springs areas, and lead to Interstate 10 and the Los Angeles area.

Other Storm Damages. Other storm damages were from local runoff, rainfall, and from other streams in the County where no major overflow occurred. Flooding, due to dam failure, is a factor which could seriously affect eastern Imperial County, however, inundation of communities is considered unlikely and hazard analysis suggest that dam failure would likely occur only if heavy precipitation was coupled with significant seismic activity near the dam.

The following table depicts the most recent flood events in Imperial County.

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Location	Date	Type	Death/Injuries	Reported Property Damage
Imperial County	08/09/2005	Flash Flood	0	Widespread strong thunderstorms with heavy rainfall caused rapid flooding of low lying areas and roadways throughout central Imperial County. A measured rainfall of 3.36 inches fell between 4 p.m. and 6 p.m. as reported by the Cahuilla Remote Automatic Weather Station. California State Route 78 at Mile Post 66 was washed out by the flash flood waters.
Niland	12/28/2004	Flash Flood	0	Heavy rains resulted in flooded roads and running washes and creeks. Near Bombay Beach, on the north shore of Salton Sea, homes were flooded and at least three vehicles became stranded in water.
Glamis	08/11/2001	Flash Flood	0	Strong thunderstorms with very heavy rainfall caused washes and secondary roads to be flooded quickly. A camp ground near Senator Wash Reservoir flooded and campers moved to higher ground to escape the flood waters. State Highway 78, between Glamis and S34 Ogilby Road, was closed due to the flood waters.
El Centro	08/29/2000	Flash Flood	0	Heavy rain resulted in some road closures with flooded streets in town.
Imperial	09/10/1999	Urban/Small Stream Flooding	0	Considerable street flooding in and around Imperial as radar estimated amounts over 1.50 inches per hour.
Imperial	09/09/1998	Flooding Thunderstorm Winds Mag. 60 kts.	0	Power lines and power poles downed across parts of Imperial and Niland. Numerous roofs were damaged. At least one billboard was toppled along Highway 86 south of town, and The Movies marquee was shattered. California Highway Patrol investigated a storm-related seven car pileup which occurred between 3:45 and 3:48 p.m. on Highway 111 just south of Aten Road. Some streets were flooded with about an inch reported at Imperial. Dense blowing dust reduced visibility to less than 1/8 mile before the heavy rain began.
Imperial County	03/12/1995	Flooding	0	During the storms of 1995, the communities of Desert Shores, Bombay Beach, and Salton Sea Beach were affected by the high winds and water. Wind swept waves overtopped dikes along the southern portions of the Salton Sea causing several County roads to be flooded.
Imperial County	01/10/1995	Flooding	0	The communities of Desert Shores, Bombay Beach, and Salton Sea Beach were affected by the high winds and water. Wind swept waves

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Location	Date	Type	Death/Injuries	Reported Property Damage
				overtopped dikes along the southern portions of the Salton Sea causing several County roads to be flooded.
Imperial County	08/18/1977	Flooding (Tropical Storm Doreen)	0	Tropical storm Doreen swept through Imperial Valley, the second "100 year storm" in two years.
Imperial County	09/07/1976	Flooding (Tropical Storm Kathleen)	6 drowning	California received record rainfall as a result of Tropical Storm Kathleen. Flooding caused catastrophic destruction to Ocotillo. Because Ocotillo is situated atop an alluvial fan, the path of the raging floodwaters was wide and changing, with over half of the town being totally destroyed. The waters piled a layer of sand that was over three meters high in some places. Six people drowned in the mud and waters in that City. Other parts of Imperial County experienced severe flash flooding. Flooding disrupted transportation routes in the City. Part of Interstate 8 along the San Diego and Imperial County border was washed out. Agriculture was disrupted throughout the area.
Bombay Beach	01/1976	Flooding (Tropical Storm)	0	In January 1976 tropical storms threatened the existence of Bombay Beach as water levels rose several feet. A sump and water pump was located on the corner of 5 th Street and Aisle of Palms, the lowest point in town. However, the Salton Sea continued to rise and as a result 536 lots south of Fifth Street were inundated, sinking a popular mobile home park, and permanently affecting the development of the town.
Imperial County	08/27/1951	Flooding (Tropical Storm)	0	A hurricane moving north northwestward just off the west coast of Baja California moved northeastward into northern Baja California and dissipated. Moisture from this tropical cyclone resulted in rainfall of two to five inches in the southern mountains and deserts of southern California on the 27th through 29th. Many roads were washed out in the Imperial Valley, but otherwise no major damage occurred in southern California. This occurred during the El Niño of 1951- 1952.

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Location	Date	Type	Death/Injuries	Reported Property Damage
Imperial County	09/1939	Flooding (Tropical Storm)	0	Four storms affected southern California during the one month of September 1939, including the only storm on record as actually hitting California as a tropical storm. All these storms occurred during the El Niño of 1938-39. The remnants of a hurricane tracked northeastward across northern Baja California into southwest Arizona generating rainfall of up to seven inches in the southern mountains and southern and eastern deserts of southern California on the 4th through 7th with the heaviest rain on the 5th and 6th. Imperial received more rain than would normally fall in two years.

Source: NOAA National Climatic Data Center

Repetitive Loss Property

A Repetitive Loss property is any insurable building for which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A Repetitive Loss property may or may not be currently insured by the NFIP. Currently there are over 122,000 Repetitive Loss properties nationwide.

Historical Repetitive Loss Data for Imperial County

Currently there are no historical data of repetitive flood losses in Imperial County or any of the cities within the County.

Map of Risk Areas

Following is a FEMA map which identifies areas in Imperial County subject to flooding.

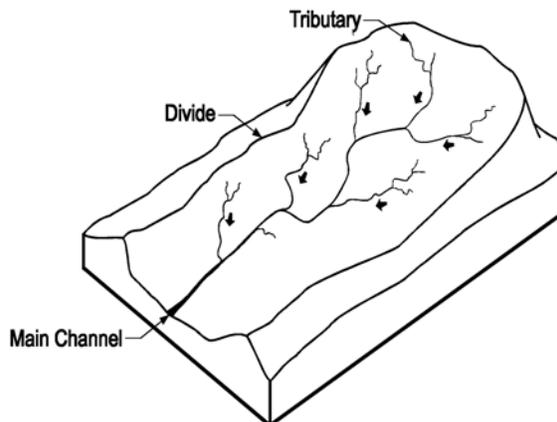
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Imperial County Watersheds

Watershed

A watershed is an area that drains into a lake, stream or other body of water. Other names for it are basin or catchment area. Watersheds vary in size. Larger ones can be divided into sub-watersheds. The boundary of a watershed is a ridge or divide. Water from rain and snowmelt are collected by the smaller channels (tributaries) which send the water to larger ones and eventually to the lowest body of water in the watershed (main channel). Channels are defined features on the ground that carries water through and out of a watershed. They may be called rivers, creeks, streams or ditches. They can be wet all the time or dry most of the time.



Riverine Watershed and Floodplain

Region 7 Watersheds

Imperial County is located in the Colorado River Watershed Region 7. Region 7 covers approximately 13,000,000 acres (20,000 square miles) in the southeastern portion of California. It includes all of Imperial County and portions of San Bernardino, Riverside, and San Diego Counties. It is bounded on the east by the Colorado River; to the south by the Republic of Mexico; the west by the Laguna, San Jacinto, and San Bernardino Mountains; and to the north by the New York, Providence, Granite, Old Dad, Bristol, Rodman, and Ord Mountain Ranges.

The Colorado River Basin Region is located in the most arid area of California. Despite the relatively dry climate, the Region contains some substantial surface water bodies, including the Colorado River and the Salton Sea. Water from the Colorado River irrigates more than 700,000 acres of productive farmland in the Imperial, Coachella, Bard, and Palo Verde Valleys. The river also provides drinking water to several million people in California's southern coastal cities. Water imported from the Colorado River has created an irrigated

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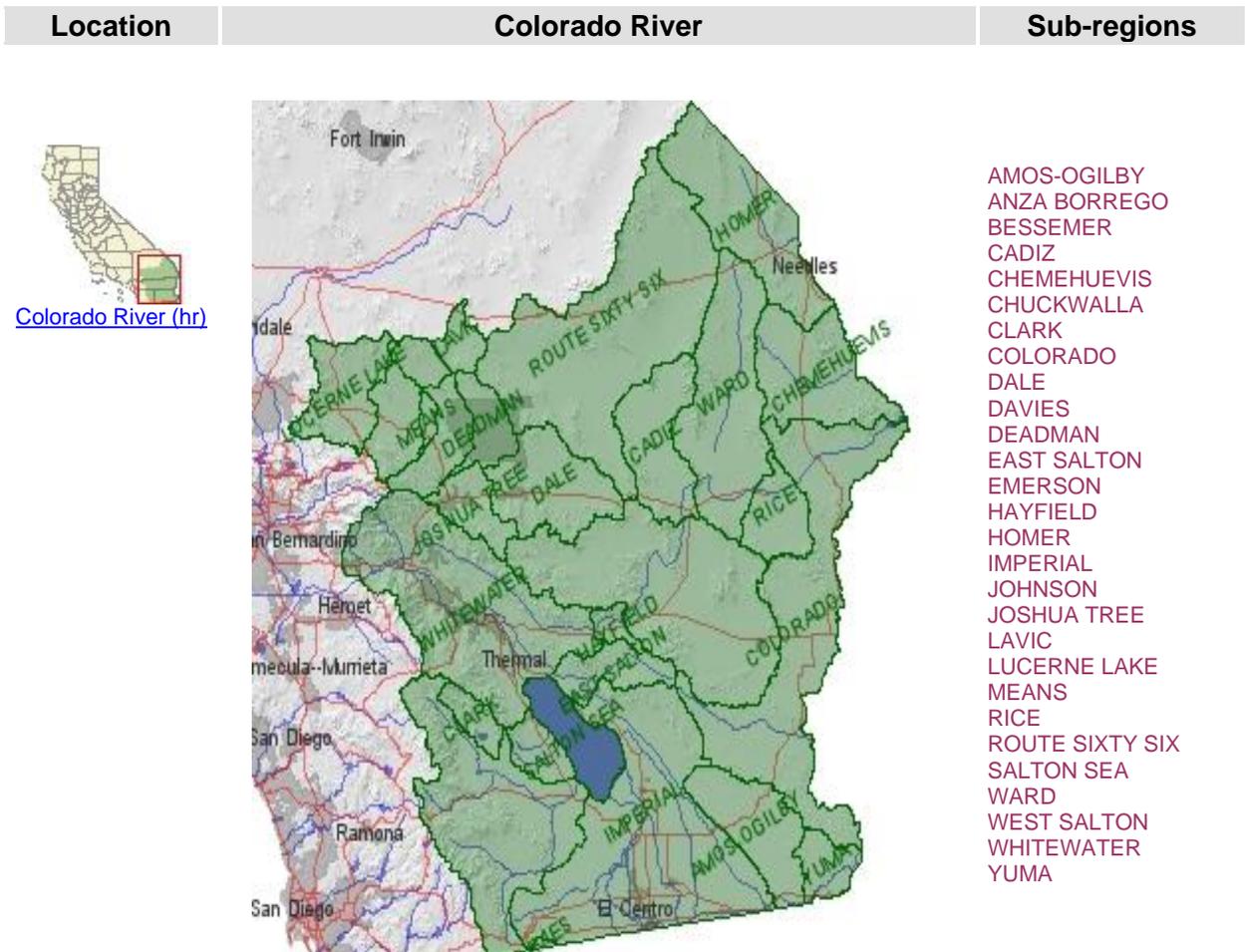
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agricultural ecosystem in the watershed; wildlife and aquatic species are dependant on habitat created by the discharge of agricultural return flows.

The Imperial County cities located in Colorado River Watershed Region 7 are listed below.

Bard	Glamis	Salton City
Bombay Beach	Heber	Salton Sea Beach
Brawley	Holtville	Seeley
Calexico	Imperial	Westmorland
Calipatria	Niland	Winterhaven
Desert Shores	Ocotillo	
El Centro	Palo Verde	

Following is a map of Region 7 and its sub-regions.



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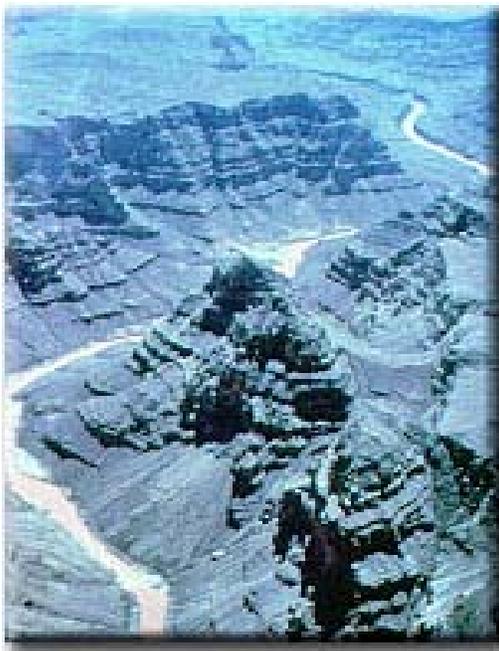
Colorado River

The Colorado River is the lifeline of the Imperial Valley. Its course runs a 1,400-mile distance and its watershed covers 157 million acres of land. The river produces approximately 14 million acre-feet of water per year. One acre-foot is equal to 325,900 gallons - enough to sustain the water needs of a family of five for one year.

The river makes it possible to irrigate nearly 700,000 acres in the Imperial Valley. Most of the agricultural use is in the southeastern part of the state -- north and south of the Salton Sea, along the river near Blythe and across the river from Yuma, Arizona. This area supplies the nation with a large part of its winter fruits and vegetables and many other farm products -- more than \$1 billion worth every year.

Six large public agencies have the major rights in Southern California to the State's share of the water and power resources of the Colorado including the Imperial Irrigation District which serves Imperial County south of the Salton Sea and the Coachella Valley Water District which serves portions of Imperial, Riverside, and San Diego counties north of the Salton Sea.

The lower Colorado River basin has a higher risk of flooding than most regions of the United States. Most of the Colorado River Basin below Hoover Dam is desert. Numerous dams and reservoirs have been constructed on the Colorado River and its tributaries. Imperial Dam controls diversions into an elaborate system of canals that serves both sides of the river including the vast agricultural complex in the Imperial Valley.



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Salton Sea

The Salton Sea Transboundary Watershed, which contains the Salton Sea, is the Region's Priority Watershed. The Salton Sea is California's largest lake and has been famous for its sport fishing and other recreational uses. It is a saline lake in a closed basin that is approximately 35 miles long and 9 to 15 miles wide, with approximately 381 square miles of water surface area and 105 miles of shoreline. Although lakes have existed in this basin in the past, the current body of water was formed in 1905 when a levee break along the Colorado River caused its flows to enter the basin for 18 months. Since 1905, the Sea has fluctuated in size with varying inflow.

The Salton Sea is located in Imperial and Riverside Counties south of Indio and north of El Centro. At a surface elevation of 227 feet below sea level, it has no natural outlet. As the Colorado River and its tributaries carved out the Grand Canyon and incised channels in the upper river basin, enormous quantities of sediment were carried downstream to the river's mouth. These sediments eventually created a drainage divide, located near present-day Yuma, Arizona that cut off the Salton Sink from the gulf.

The maximum depth of the Salton Sea is about 51 feet and the average depth 31 feet and consists of 8,360 square miles of drainage area. The annual inflow averages about 1,300,000 acre-feet, carrying approximately 4,000,000 tons of dissolved salt.

The Salton Sea is a Federal and State designated repository to receive and store agricultural, surface, and subsurface drainage waters from the Imperial and Coachella Valleys. Without this use of the Sea, land in the Imperial and Coachella Valleys would be too water logged and/or saline for agriculture. Instead of evaporating over a period of years, the Salton Sea is sustained largely by agricultural runoff from the Imperial and Coachella Valleys, which are irrigated with Colorado River water diverted through the All-American and Coachella canals.

Agricultural fields in the region join with the Salton Sea to support an ecosystem that attracts hundreds of species of birds and other wildlife. The Salton Sea is a key stop on the Pacific Flyway for many species of migratory birds; its importance has been magnified by the tremendous loss of wetlands in California. The Salton Sea National Wildlife Refuge has over 375 species of birds, among the highest totals of all national refuges. The Salton Sea provides important habitat for several endangered species including the desert pupfish, Yuma clapper rail, and brown pelican.

Major flash floods had hit the desert nearly every year from 1976 to 1983. In 1976 tropical storm Kathleen swept through Imperial County flooding farmland and increasing the level of the Salton Sea. Above average rainfall for the next seven years, along with increased agricultural runoff and increased flows from Mexico, caused flooding of shoreline resorts. In 1977 tropical storm Doreen swept through Imperial County – the second “100 year storm” in two years. In 1979 and 1980, for the first time since Hoover Dam was built, all

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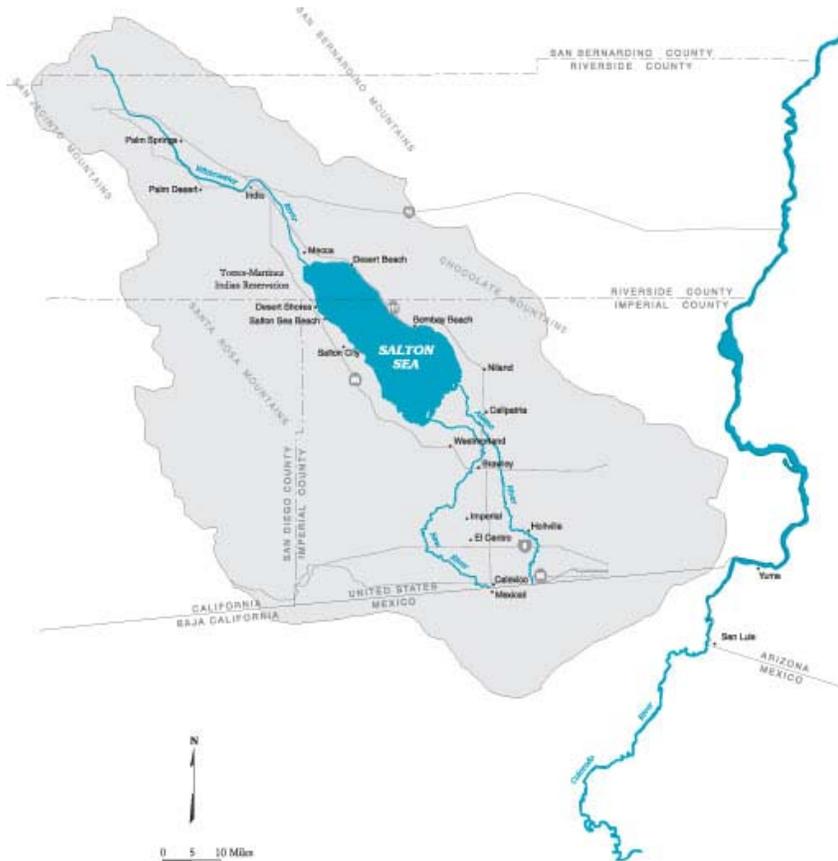
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major reservoirs on the Colorado system were full and water was released for flood orders. The Imperial Irrigation District controls flooding rights on most of the land below the minus 220-foot elevation.

The Salton Sea's elevation has gradually risen. Homes and businesses have been flooded and abandoned. A problem facing recreational facilities around the Sea is its fluctuating water levels. With the relatively flat shoreline, a slight change in elevation can cause some flooding and most of the recreational facilities are located at water's edge.

Within the County jurisdiction, the communities of Bombay Beach and Ocotillo are considered to be the most likely to experience significant flooding. In El Centro, the Gillett/Cannon Roads area receives the heaviest flooding. It is at a low elevation east of El Centro and south of East Evan Hewes Highway. Bombay Beach is located in a pocket created by the Salton Sea on the west and the Chocolate Mountains on the east. Severe flooding could isolate the community. In the event of a major flood, approximately 300 to 1,000 residents would have to be evacuated.

Following is a map of the Salton Sea Watershed.



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Imperial Dam

The Imperial Dam (and Desilting Works) is situated on the Colorado River approximately 15 miles north of Winterhaven and 20 miles northeast of Yuma, Arizona. Imperial Dam is a diversion dam (a dam to divert water from a waterway or stream into a different watercourse) and the diversion point for water flowing from the Colorado River to the All-American Canal, which serves Imperial and Coachella Valleys. Imperial Dam was a first for the world of irrigation, where river water would be held and then diverted into a giant desilting plant before being released into the All-American Canal. The purpose of the dam is to raise the water surface 25 feet and provide controlled gravity flow of water into the All-American and Gila Gravity Main Canals. The desilting works remove most of the sediment carried by the Colorado River. This sediment removal prevents clogging of the canals and subsequent, expensive, difficult maintenance.

The Imperial Dam that delivers water to the Valley is 175 feet above sea level. The Salton Sea, where runoff eventually collects, is more than 200 feet below. Everything in between is downhill with the amount of water directed to a given field regulated by 7,000 farm gates. To meet the irrigation diversion requirements at Imperial Dam, the flow of water in the Colorado River arriving at the dam is controlled by releases from Parker Dam, 150 miles upstream.

Imperial Dam is one of a few major structures on the lower Colorado River, such as the Hoover Dam and the Parker Dam, built by the Bureau of Reclamation to control flooding and to supply water for irrigation. Hoover Dam, 303 miles upstream; Davis Dam, 235 miles upstream and Glen Canyon Dam, 657 miles upstream; along with other dams, provide essential flood protection and storage. Ordinarily, the quantity of water released from these dams is coordinated with annual downstream requirements. However, during years of high runoff from the mountains, any extra water that cannot be held in allotted reservoir space is released at rates designed to minimize flooding while maintaining essential flood storage space in the reservoirs.



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All-American Canal

Originally Colorado River water was delivered to the Imperial Valley via the Alamo Canal. The canal's diversion point was a short distance north of the Mexican border and most of its length, all gravity flow, ran through Mexico before it re-crossed the border into the Valley. Recognizing that unstable political conditions in Mexico could at any time interrupt the vital water supply, early Valley pioneers pushed for the construction of a canal that would put the Imperial Valley's water entirely within the United States. Construction of the All-American Canal was authorized under the 1928 Boulder Canyon Project, an act that also created the Hoover and Imperial dams.

In 1934, construction began on the All-American Canal and in 1942 it became the sole water source for Imperial Valley residents and area farmlands. The All-American Canal system, located in the southeastern corner of California, consists of the Imperial Diversion Dam, the 82-mile gravity-flow All-American Canal, the 123-mile Coachella Canal, and appurtenant structures. It is the largest irrigation canal in the world, carrying up to 26,155 cubic feet of water per second. The All-American Canal begins at Imperial Dam on the Colorado River about 20 miles northeast of Yuma, Arizona. Dropping a total of 175 feet between Imperial Dam and the Westside Main Canal, the All-American Canal extends south and then west, following the Mexican/American border much of the way. Crossing 14 miles of sand dunes on the east side of the Imperial Valley, the All-American Canal ends in the southwest corner of the Imperial Irrigation District's delivery area.

The All-American Canal feeds, from east to west, the Coachella Canal, East Highline Canal, Central Canal and the Westside Main Canal. These four main branches of the canal and a network of smaller canals gradually reduce the flow of the All-American Canal until it ends at a small drop in the western Imperial Valley where it drains into the Westside Main Canal. The canal gets smaller as it runs west because it carries less water.

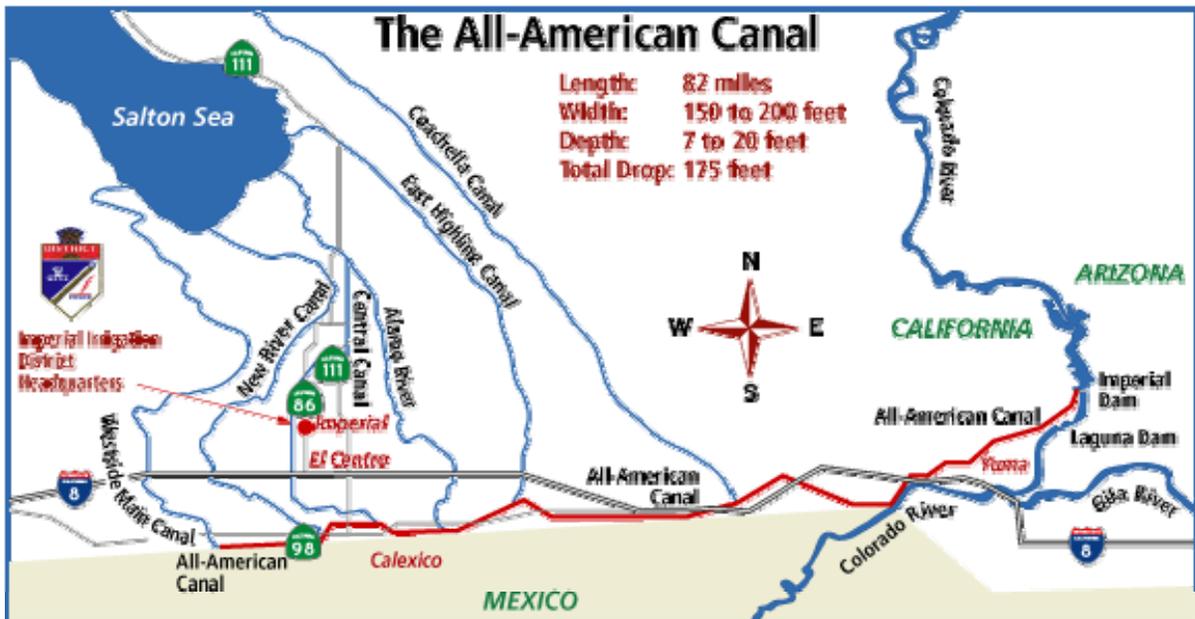
The system has the capacity, through water diversions from the Colorado River at Imperial Dam, to irrigate about 530,000 acres of fertile land in the Imperial Valley and about 78,530 acres in the Coachella Valley.

The All-American Canal is operated and maintained – along with the American Canal Works, the Imperial Dam and the Gila Headworks – by the Imperial Irrigation District (IID). With over one-half million acres irrigated by the All-American, the IID is the single largest irrigation project in the country.

Damage to the All-American Canal and associated transmission aqueducts could result in flooding.

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Senator Wash

Senator Wash Dam, Reservoir, and Pumping-Generating Plant are located two miles upstream from Imperial Dam. The need for additional storage near Imperial Dam resulted in the construction of Senator Wash Dam on Senator Wash. The Senator Wash facility, although not considered a diversion structure, can divert water from the river immediately above Imperial Dam for storage in the Senator Wash Reservoir. This is done only when flow arriving exceeds the requirements of the diverters at Imperial Dam.

Senator Wash facilities were not constructed as part of the All-American Canal System, but are an integral part of operations at Imperial Dam. This facility was designed for use only in case of emergencies and is supplied normally by regulation of releases at Parker Dam.

It has greatly improved the availability of water in these emergency situations as well as providing space for storage of unpredictable flood inflow.



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Imperial Irrigation District

With more than 3,000 miles of canals and drains, the Imperial Irrigation District (IID) is one of the largest irrigation districts in the nation and the 6th largest power utility in California. The IID services irrigation water to nearly 500,000 acres of fertile farmland and provides electricity to a 6,741 square mile area.

IID is a consumer owned utility and the IID Water Department is responsible for the timely operation and maintenance of the extensive open channel system and effectively delivers up to 3.1 million acre-feet of IID's Colorado River entitlement annually to nearly one-half million irrigated acres. Of the water IID transports, approximately 97% is used for agricultural purposes, making possible Imperial County's ranking as one of the top ten agricultural regions nationwide. The remaining 3% of its water deliveries supply seven municipalities, one private water company and two community water systems as well as a variety of industrial uses and rural homes or businesses.

IID has constructed 10 regulating reservoirs in the past 24 years, as part of its ongoing water conservation program. The reservoirs (each named for pioneering Valley farmers) receive and store water that would normally go unused. The 10 IID reservoirs have a combined storage capacity of more than 3,300 acre-feet of water – one-half of which would be spilled without the conservation system. As a part of its operating system, IID maintains an extensive gravity flow drainage system. The lateral drain system is laid out to provide a drainage outlet for each governmental subdivision of approximately 160 acres and, as such, the drains usually parallel the canals.

IID is obligated to provide its drains at sufficient depth, generally 6 to 10 feet deep, to accept tile drain discharge. Where the drain cannot be maintained at sufficient depth, a sump and pump are provided and maintained by IID. These drains are used to collect excess surface flow from agricultural fields, subsurface tile discharges and operational discharge from canals and laterals. There are over 1,406 miles of surface drains that can be divided into three main areas: Alamo River System, New River System and drains that flow directly into the Salton Sea. Approximately 430 control structures are installed along the drainage system.

The 3,000 miles of canals and drains that make up the Imperial Irrigation District's extensive irrigation system efficiently delivers and controls over 2-1/2 million acre-feet of water diverted from the Colorado River annually for agriculture and other uses in the Imperial Valley. The drains in this system, designed to remove small volumes of agricultural waste water, were never intended to accommodate storm runoff. Localized flooding thus constitutes a problem in areas of the Imperial Valley.

The Imperial Irrigation District has implemented flood control measures in localized areas which proved to be flood-prone during past storms in order to protect the Irrigation District and the County's interests. The IID also coordinates with Imperial County, the

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incorporated areas within the County, and other agencies in flood control and related water resources problems and issues. The IID has implemented measures in several of the localized areas that were flooded during tropical storms Kathleen (1976) and Doreen (1977).



The following washes enter the irrigated lands of Imperial Valley causing flooding and damage to IID facilities and private property.

Pinto Wash. Runoff carried by Pinto Wash during past severe storm events overflowed the Westside Main Canal and broke the canal banks causing serious flooding and damage to adjacent farmland properties, and the Wixom and Diehl county road crossing. Portions of the IID Fig Drain and Fig Drain No. 1 were destroyed and required reconstruction. In addition, some roads in the area were closed. Runoff from Pinto Wash has resulted in greater damages than any of the other washes.

Yuha Wash During past severe storm events, Yuha Wash overflowed the Westside Main Canal and broke the banks causing serious flooding and damage to adjacent farmland properties and IID facilities, including portions of the Forgetmenot Drain system and the Dixie Drain system. Interstate I-8 was flooded and had to be closed.

Coyote Wash Coyote Wash also overflowed the Westside Main Canal during past severe storm events, and broke the canal banks, which caused serious flooding and damage to adjacent farmland properties and IID facilities, including portions of the Dixie Drain system.

Superstition Dry Lake During recent storm events, the dry lake broke through the ancient beach line causing serious flooding and damage to adjacent properties and IID facilities, including portions of the Fillaree Canal (an extension of the Westside Main Canal) and

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Fillaree Drain system. In its present state, Superstition Dry Lake functions as a detention basin, and thus provides some level of flood protection.

Unnamed Wash Storm runoff carried by a wash that originates in the U. S. Navy Drop and Bombing Area on the north side of Superstition Mountain overflowed the Thistle Canal, breaking the concrete lining and causing serious flooding and damage to adjacent farmland properties, IID and County facilities, including portions of the Thistle 5, 5-A, an 5-A-1 Drain system, and the Trifolium 9 Drain system. Also Cady and Monte Roads were washed out where the Thistle 5 Drain crosses.

Chocolate Mountain Washes During past storm events, portions of the East Highline Canal and Highline Extension have been filled with sand and mud carried by runoff carried by these washes, causing flooding of adjacent farmland properties and portions of the town of Niland, as well as IID and County facilities. The most serious flood threat is posed by runoff from the Chocolate Mountains on the east, from several ranges of mountains on the west, and from overflow from the New and Alamo Rivers. Typically runoff from intense summer thunderstorms is quickly conveyed from the mountains to the valley in normally dry desert washes. The runoff usually breaks through the upstream bank of the main canal on either side of the valley, floods the canal, clogs it with a heavy deposit of sediment, and breaks through the opposite bank of the canal. The flow then overtakes the main drain adjacent to the canal, inundates the agricultural land downstream, deposits more sediment, and overwhelms the agricultural drainage system.

Additional Lakes, Streams, Dams and Reservoirs

The following table list additional lakes, streams, dams and reservoirs throughout Imperial County that could be subject to localized flooding but highly unlikely.

Name	Type	Latitude	Longitude	USGS 7.5' Map
Alamo River	Stream	331244N	1153715W	Niland
American Girl Wash	Stream	324637N	1145211W	Ogilby
Amerosa Wash	Stream	331847N	1155553W	Truckhaven
Ahan Yava Kothickwa	Stream	315400N	1145700W	Yuma West
Ancon de San Andres	Stream	315400N	1145700W	Yuma West
Anza Ditch	Stream	331917N	1155607W	Truckhaven
Araz Wash	Stream	324430N	1144218W	Yuma West
Arrastia Wash	Stream	325951N	1143745W	Picacho Peak
Arroyo Salada	Stream	331750N	1155420W	Truckhaven
Arroyo Seco	Stream	331540N	1144141W	Cibola
Arroyo Seco	Stream	332000N	1150545W	Little Mule Mountains
Bard Lake	Lake	324617N	1143320W	Bard
Bear Canyon Tank	Reservoir	330100N	1144009W	Picacho SW
Bee Wash	Stream	324712N	1143736W	Araz
Big Dry Lake	Lake	332000N	1155000W	Durmid SE

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Name	Type	Latitude	Longitude	USGS 7.5' Map
Big Wash	Stream	332141N	1155852W	Truckhaven
Biloxi Wash	Stream	331723N	1155710W	Truckhaven
Blake Sea	Lake	332000N	1155000W	Durmid SE
Blue River	Stream	315400N	1145700W	Yuma West
Boulder Creek	Stream	324022N	1160431W	In-Ko-Pah Gorge
Bullhead Slough	Stream	324814N	1154235W	Seeley
Bunkara River	Stream	315400N	1145700W	Yuma West
Buqui Acqumuri	Stream	315400N	1145700W	Yuma West
Burro Wash	Stream	325842N	1143809W	Picacho Peak
Campbell Wash	Stream	331541N	1155502W	Truckhaven
Cane Creek	Stream	325234N	1160243W	Carrizo Mountain NE
Canon of the Colorado River	Stream	315400N	1145700W	Yuma West
Carrizo Creek	Stream	325234N	1160243W	Carrizo Mountain NE
Copper Basin	Basin	325846N	1143700W	Little Picacho Peak
Coral Wash	Stream	332019N	1155702W	Truckhaven
Davis Lake	Lake	331844N	1144350W	Cibola
Desert Lake	Lake	332000N	1155000W	Durmid SE
Draper Lake	Lake	330935N	1144058W	Picacho NW
Dry Bed Lake	Lake	332000N	1155000W	Durmid SE
El Centro WPP 2016 Dam	Dam	324830N	1153430W	El Centro
El Rio de Buena Guia	Stream	315400N	1145700W	Yuma West
Ferguson Lake	Lake	325858N	1143016W	Little Picacho Peak
Ferguson Wash	Stream	325803N	1142945W	Imperial Reservoir
Finney Lake	Lake	330338N	1153009W	Westmorland East
Fish Creek	Stream	330521N	1155648W	Harpers Well
Gables Wash	Stream	330445N	1145631W	Ninemile Wash
Garner Wash	Stream	332547N	1160223W	Oasis
Gatuna Wash	Stream	330018N	1144152W	Picacho SW
Gavilan Wash	Stream	330316N	1144028W	Picacho SW
German Diggins Wash	Stream	331608N	1151452W	Pegleg Well
Gert Wash	Stream	325316N	1160338W	Carrizo Mountain NE
Gieselmann Lake	Lake	330121N	1152832W	Wiest
Gold Basin	Basin	330930N	1145040W	Buzzards Peak
Grand River	Stream	315400N	1145700W	Yuma West
Gravel Wash	Stream	332058N	1155740W	Truckhaven
Green River	Stream	315400N	1145700W	Yuma West
Greeson Wash	Stream	324442N	1153900W	Mount Signal
Gritetho	Stream	315400N	1145700W	Yuma West
Hah Weal Asientic	Stream	315400N	1145700W	Yuma West
Haughtelin Lake	Lake	324621N	1143501W	Bard
Iberia Wash	Stream	331759N	1155458W	Truckhaven
Indian Wash	Stream	325149N	1145848W	Cactus
Iris Wash	Stream	331654N	1153131W	Wister
Javill	Stream	315400N	1145700W	Yuma West
Julian Wash	Stream	330524N	1144228W	Picacho SW
Lake Cahuilla	Lake	332000N	1155000W	Durmid SE
Lake LeConte	Lake	332000N	1155000W	Durmid SE

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Name	Type	Latitude	Longitude	USGS 7.5' Map
Little Picacho Wash	Stream	330130N	1143632W	Picacho
Mammoth Wash	Stream	330733N	1152217W	Tortuga
Mar Bermejo	Stream	315400N	1145700W	Yuma West
Marcus Wash	Stream	330117N	1143544W	Picacho
Milpitas Wash	Stream	331540N	1144141W	Cibola
Mission Wash	Stream	325000N	1143239W	Bard
Myer Creek	Stream	324421N	1160007W	In-Ko-Pah Gorge
Nah Oon Kara	Stream	315400N	1145700W	Yuma West
New River	Stream	330818N	1154138W	Obsidian Butte
Ninemile Wash	Stream	330445N	1145631W	Ninemile Wash
North Dike Dam	Dam	325500N	1142900W	Imperial Reservoir
North End Dam	Dam	330610N	1153235W	Westmorland East
North Fork	Stream	315400N	1145700W	Yuma West
North Fork Arroyo Salada	Stream	331457N	1160007W	Shell Reef
North Fork Colorado River	Stream	315400N	1145700W	Yuma West
North Fork of Grand River	Stream	315400N	1145700W	Yuma West
North Fork Palm Wash	Stream	331721N	1160500W	Seventeen Palms
Pa-na-weep	Stream	315400N	1145700W	Yuma West
Packet-to	Stream	315400N	1145700W	Yuma West
Palm Canyon Wash	Stream	324534N	1155621W	Painted Gorge
Palm Wash	Stream	332014N	1155654W	Truckhaven
Para Wash	Stream	330354N	1144059W	Picacho SW
Picacho Wash	Stream	324749N	1143650W	Bard
Ramer Lake	Lake	330435N	1153039W	Westmorland East
Red River of the West	Stream	315400N	1145700W	Yuma West
Red Rock Lake	Lake	330125N	1143528W	Picacho
Reservation Levee	Dam	324836N	1143119W	Bard
Reservation Levee	Levee	324431N	1143547W	Yuma East
Rio Buena Guia	Stream	315400N	1145700W	Yuma West
Rio Colorado Del Norte	Stream	315400N	1145700W	Yuma West
Rio Cosnina	Stream	315400N	1145700W	Yuma West

Existing Vulnerability and Risk

Flooding is a natural hazard present in Imperial County due to the County's geography, geology and climate. Floods that affect Imperial County can be attributed to three different types of storm events, namely:

- A general winter storm that combines high-intensity rainfall
- A tropical storm out of the southern Pacific Ocean
- A summer thunderstorm, particularly in the desert areas

There are three principal types of flood hazards that could affect Imperial County, namely:

- Stream flooding (including bridge scour and stream erosion)
- Flash flooding (including debris and mud flows)
- Sheetflow flooding (including alluvial fan flooding)

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Storms with high volumes of precipitation in a short period of time have occurred in the County causing flash floods. In addition, land that has been stripped of foliage and trees due to fire or human activity has experienced serious erosion. Excessive precipitation can inundate soil in slopes causing mudslides and landslides. This activity can destroy homes, block highways, and destroy power lines. Imperial County is vulnerable to this type of flood damage. Heavy storms also can strand individuals playing near or crossing streams, rivers, flood control channels and intersections.

Areas subject to flooding are located throughout the County. The topography of the County varies from several thousand feet above sea level to areas below sea level. Areas subject to flooding drain either naturally into flood controls or rivers, washes, and creeks. Most can handle normal flows. In the desert areas, flooding can be rapid and quite severe during the period of July and August. Winter rains are generally more widespread in the desert, but flashflood potential is less due to steady-state rain fall. Winter rains are nonetheless flood-prone, but may be slightly more predictable. There is a danger to motorists who may attempt to drive through flooded washes. Most flooding in the areas other than the desert is predictable and will provide time for evacuation and mitigation measures such as sandbags.

Flooding due to heavy precipitation or dam failure is a potential hazard in Imperial County with the resultant possibilities for damage to property and loss of life. Severe flooding can be particularly costly. In a relative sense, flooding due to precipitation does not present the degree of danger posed by other hazards such as major earthquakes. On the other hand, if there is flooding due to dam failure, the danger could be cataclysmic.

The following Table, developed by the FMP Working Group in a Flood Management Plan workshop, illustrates the areas in the County that are particularly at risk to flood hazards, the potential impact and potential losses if flooding should occur.

Flood Prone Area	Cause	Potential Impact	Potential Losses
Ocotillo	Myer Creek overflow	Evacuation of approximately 300 to 1,000 residents	Less than \$100,000
Within the levees along the Colorado River	Levee breach	Severe wide-area flooding	More than \$10,000,000
Bombay Beach	High winds and water	Localized flooding	Less than \$100,000
Nomirage	Myer Creek overflow	Localized flooding	Less than \$100,000
Desert Shores	High winds and water	Localized flooding	Less than \$100,000

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Flood Prone Area	Cause	Potential Impact	Potential Losses
Salton Sea Beach	High winds and water	Localized flooding	Less than \$100,000
Bard-Winterhaven area	Dam inundation	Severe wide-area flooding	More than \$10,000,000
Brawley	New River overtopping	Localized flooding	More than \$1,000,000
Calexico	New River overtopping	Localized flooding	More than \$1,000,000
Calipatria	Alamo River overtopping	Localized flooding	Less than \$100,000
El Centro	Overflowing of Gillett/Cannon Roads drains	Localized flooding	Less than \$100,000

- **Effects on people and housing.** Direct impacts of flooding can include injuries and loss of life, damage to property and health hazards from ruptured sewage lines and damaged septic systems. Secondary impacts include the cost and commitment of resources for flood fighting services, clean-up operations, and the repair or replacement of damaged structures. A slow-rising flood situation will progress through a series of stages, beginning with minor rainfall and evolving to a major event such as substantial flooding. Once flooding begins, personnel will be needed to assist in rescuing persons trapped by flood waters, securing utilities, cordoning off flood areas, and controlling traffic. These actions may overtax local agencies, and additional personnel and resources may be required. It is anticipated that existing mutual aid resources would be used as necessary to augment local resources.
- **Effects on commercial and industrial structures.** Depending on the geographic area involved and the economic and demographic characteristics of the area, the effects on industry and commerce may be significant.
- **Effects on infrastructure.** Flooding can cause damage to roads, communication facilities and other infrastructure.
- **Effects on agriculture.** Flooding can cause damage to vegetation, crops, livestock and dairy stock. In addition to the obvious impacts on animals and crops, flooding can have deleterious effects on soil and the ability to reinvigorate the agricultural activities impacted once the flood waters recede.

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Relationship to Other Hazards – Cascading Effects

Although the County is located in a desert with very low precipitation, it is sometimes subject to heavy rains and subsequent flooding. Flooding could also result from damage to the All-American Canal and associated transmission aqueducts. A few hazardous waste facilities are located in the County and accidents could dangerously pollute air and water. Fire can break out as a result of dysfunctional electrical equipment. In many instances during a flood, the drinking water supply will be contaminated.

Risk Assessment Conclusion

There are various facets to flooding; all of which are relevant to Imperial County. Flood hazards include the following: natural floodplains, seiches, and dam failure. Flooding due to heavy precipitation or dam failure is a potential hazard in Imperial County with the resultant possibilities for damage to property and loss of life. Severe flooding can be particularly costly. In a relative sense, flooding due to precipitation does not present the degree of danger posed by other hazards such as major earthquakes. On the other hand, if there is flooding due to dam failure the danger could be cataclysmic.

The flows of the rivers in Imperial County are agricultural return flows. Sewage effluent and manufacturing waste discharges flow in the New River across the border from Mexicali, Mexico. Furthermore, due to the flatness of the terrain in populated towns, flooding is aggravated after prolonged heavy storm periods resulting in standing water. In addition, the high mineral content of standing water when left in crop lands renders some lands unsuitable for crop production.

The major flooding problems in Imperial Valley require flood control measures that attenuate high peak discharges and confine large extents of flooding from the alluvial fan washes. Structural flood control measures must temporarily store (detain) floodflows upstream of the areas susceptible to damage; convey floodflows through these areas in a controlled, confined manner; or divert floodflows from these areas to areas less susceptible to damage.

The 1989 U.S. Army Corps of Engineers Reconnaissance Report evaluated the feasibility of structural and nonstructural flood control measures. The most practical measures for the Imperial Valley area included detention, channelization and diversion of floodflows.

The costs of these measures were found to exceed the benefits the measures would provide. The costs of flood control measures in this area are extremely high due to the large extent of flooding, and due to the nature of alluvial fan washes, which tend to change direction over time and require extensive flood control works to ensure adequate control of floodflows. The benefits are not *as high as the costs*, primarily because of the infrequent occurrence of major flooding in this area and the relative scarcity of urban development.

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Flood Protection Measures

Structural flood protection measures include a dike on the eastern side of Salton Sea at Bombay Beach and breakwaters at various locations near the shore of the Salton Sea to prevent damage from wave action. The dike at Bombay Beach protects the community from 100- and 500-year floods on Salton Sea.

Several of the washes along the western shore of Salton Sea were channelized when that area was developed. Many of these washes contain the 100-year flood within their channel banks. Non-structural measures are being utilized to aid in the prevention of future flood damage. These are in the form of land use regulations adopted from the Code of Federal Regulations which control building within areas that have a high risk of flooding. Imperial County has an ordinance which requires a permit for any construction near Salton Sea below the minus 220 foot contour.

The Upper Reservation Levee, which is located along the north bank of Colorado River just upstream of the City of Yuma, Arizona, will be overtopped by the 100-year flood. These floodflows will inundate the area known as “The Island” in Imperial County.

The dams on Colorado River in the immediate area of the City of Yuma, Arizona, contribute little to flood control. Imperial and Laguna Dams, located upstream of the City of Yuma, are diversion dams for irrigation. These dams are operated at nearly constant level and, therefore, cannot reduce floodflows.

Per the U.S. Army Corps of Engineers Reconnaissance Report: Flood Control and Related Purposes, of September 1989, the IID drainage system, are typically earthen open channels paralleling irrigation canals on the downstream side of the fields. The drains collect excess surface flows from the agricultural fields, subsurface flows from a system of tile drains underlying the fields, and waste spills from the canals and laterals. The entire system was designed strictly to drain excess irrigation water; consequently, the system has no more than incidental capacity to intercept and convey storm runoff from either the surrounding mountains or from the urban areas in the valley.

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4.2 Phase Two: Plan Development

Imperial County and Jurisdictions Within the Geographic Area - Current Flood Plans and Programs

The communities of Desert Shores, Bombay Beach, and Salton Sea Beach were affected by the high winds and water during the storm of 1995 and resulted in State and Federal Declarations (DR-1044/1046). Wind swept waves overtopped dikes along the southern portions of the Salton Sea causing several County roads to be flooded. These communities, including Salton City, are vulnerable to future flooding since each is located in the floodplain and are near or adjacent to the Salton Sea. The following Mitigation Plan was developed as a result of the 1995 storms.

Dates Adopted or Last Updated: March 29, 1996

Priorities: To identify and prioritize measures to prevent further intrusion by the Salton Sea on the public and private lands and to improve the drainage of system of lands that is currently impacted by the high level of the Salton Sea.

Proposed Mitigation Measures: From HMGP inventory of submitted projects (1044/46):

- Salton Sea Drain Pumping Project
- Salton Sea Dike Construction
 - Salton Land Acquisitions

Other Agencies Involved in Mitigation Work: No other agencies identified based on the information available.

Details of Existing Mitigation Projects: No declared disaster projects currently in progress based on the information available.

This assessment is done with Imperial Irrigation District Hazards Mitigation Plan; the Southern California Counties vulnerabilities to flood damage; and the 1996 OES SFHMP; and the 1997 California Planner's Book of Lists.

Floodplain management is the key component to effective flood control within Imperial County. Following is Imperial County and the participating jurisdictions' current Flood Plans and Programs which have been identified in their General Plans.

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The Imperial County General Plan includes the following Flood Hazard mitigation measures.

1. Provide technical and policy information regarding flood hazards to developers, interested parties, and the general public.
2. Regulate and restrict development near major water courses and floodplains through application of appropriate land use measures.
3. Both the ground floor elevation of any building for human occupancy and the driving surface, if designated evacuation routes within the 100-year floodplain, shall be constructed above the projected profile of a 100-year flood event.
4. Require all new development for human occupancy within the 100-year floodplain to be adequately flood-proofed.
5. Establish technical design criteria which minimizes or mitigates impacts associated with crossing of floodplains by development. Unless such engineering alternatives are implemented, development in floodplains is to be restricted or prohibited.

City of Brawley

Although the City of Brawley is located within an arid climate, flooding of the New River can occur during intermittent heavy rains. As growth occurs in Brawley, new development will increase the amount of impervious surface, resulting in greater surface water run-off and the need for an adequate flood control system. The risk of flood damage in the City can be reduced through proper land use planning and actions related to new development and redevelopment of land. Following are the City of Brawley's Flooding Hazards Goal and Policies.

Goal #1: Reduce the risk to the community's inhabitants from flood hazards.

Policy 1.1: Identify flood hazard areas and provide appropriate land use regulations for areas subject to flooding.

Policy 1.2: Coordinate with the appropriate agencies to assure that existing bridges are constructed according to accepted standards to avoid damage by flooding.

Policy 1.3: Consider participating in the National Flood Insurance Program.

Policy 1.4: Cooperate with the Imperial Irrigation District to plan for and make needed improvements to drainage infrastructure depositing runoff in the New River.

Policy 1.5: Require detention basins as a flood control measure where applicable to reduce the risk from flood hazards.

Policy 1.6: Design future development located near water storage facilities to minimize damage caused by leak, rupture, or flooding from a water storage facility.

Policy 1.7: Establish open space required to protect the public from flood hazards.

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Policy 1.8: Coordinate with Caltrans and road builders to ensure proper roadway design for drainage purposes.

Policy 1.9: Prevent cross-lot drainage.

Policy 1.10: Prepare a master plan of drainage for the planning area.

City of Calexico

Flooding is unlikely to affect the City of Calexico under normal rain and runoff conditions. The FEMA hazard area map of the Calexico area shows that the 500-year floodplain of the New River within the City is contained within the area north of the Calexico International Airport that is currently zoned as Open Space land. Conditions upstream in Mexico do affect the river. As the Mexicali area becomes more urbanized and very little has been done to control urban runoff there, the potential for flooding could increase in downstream areas such as Calexico. Flooding could also result from seismic damage to a major IID Canal. The City of Calexico is traversed by two major canals: the All-American and the Central Main. Following is Calexico's Flood Hazards Policy:

Policy 3

- a. The City shall ensure the adequacy of existing emergency preparedness plans to handle effectively and efficiently known hazards and emergencies.
- b. The City shall review evacuation procedures to make sure that in case of an evacuation, the residents of Calexico will be quickly notified and that the evacuation will be orderly.
- c. The City shall require the heads and staff of each department to participate in the maintenance of a city-wide emergency preparedness plan.
- d. The City shall cooperate with IID to prepare or update an emergency plan for the rapid removal and repair of downed power lines and/or damaged/breached water facilities in the event of an earthquake.

Following are Calexico's Emergency Preparedness Goal, Objective and Policies:

8.5 Goal, Objectives, and Policies

8.5.1 Goal: To identify and minimize, to the extent possible or feasible, the risks to persons and property caused by natural and human-induced hazards.

8.5.1.1 Levels of Risk

Objective 1: To maintain acceptable risk levels when conducting land use planning.

Policy 1

- a. The Scale of Acceptable Risk for New Structures shall continue to be used to determine the type and location of future land use.
- b. Land uses should not be subjected to greater risk than the level the scale suggests unless no other alternative exists.

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8.5.1.3 Emergency Preparedness

Objective 3: Minimize the potential hazards to public health, safety, and welfare and prevent the loss of life and property damage from natural and human induced phenomena.

Calexico has also adopted a Flood Damage Prevention Code to address safety issues associated with flooding directly.

City of Calipatria

The only identified floodplain in the Calipatria area is along the Alamo River. The Alamo River is located in the extreme southwest corner of Calipatria. There are no residential uses planned for construction in the Alamo River floodplain area and none will be allowed. Localized flooding of streets will occur during periods of severe storms. However, these flood waters should be contained within the streets and should not impact any dwelling units. During approval of grading plans for new projects, building pads are required to be constructed at least 16 inches above the top of the adjacent curb. This ensures that even if the floodwaters breach the top of the curb, no homes will be flooded.

All new subdivisions constructed in the City, or other major projects, will be required to have grading and drainage plans approved by the City Engineer to ensure adequate control of floodwaters. Following are the flood hazard Goals, Objectives, Actions and Policies for the City of Calipatria.

Objective 2: Ensure Public Safety from Flooding Hazards.

Policies

1. Map flood hazard areas.
2. Prevent issuance of building permits for residences in flood hazard areas.
3. Require storm drains, catch basins, retention basins and other flood control facilities in new developments to control flooding during periods of severe storms.
4. Encourage the formation of a Countywide Flood Control District to deal with County wide flooding issues.

The following Goals, Objectives and Action items are from Calipatria's Hazard Plan:

Goal 1. Promote disaster-resistant future development.

Objective 1.A: Facilitate the development or updating of General Plans and Zoning Ordinances to limit development in hazard areas.

Action 1.A.1 Update the General Plan every year or as needed.

Action 1.A.2 Attract and retain qualified, professional and experienced staff.

Goal 2. Build and support local capacity and commitment to continuously become less vulnerable to hazards.

Objective 2.A: Increase awareness and knowledge of hazard mitigation principles and practices among local officials.

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Action 2.A.1 Build and support local partnerships.

Action 2.A.2 Build a team of community volunteers to work with the community before, during and after a disaster.

Action 2.A.3 Build hazard mitigation concerns into City of Calipatria planning and budgetary processes.

Objective 2.B: Solicit community organizations to incorporate hazard mitigation activities.

Action 2.B.1 Communicate with local civic groups, schools and employees to encourage them to promote hazard mitigation as common safe working conditions.

Objective 2.C: Increase awareness and knowledge of hazard mitigation principles and practices among local residents.

Action 2.C.1 Publish educational information in the City newsletter and on the City's website.

Goal 3. Improve hazard mitigation coordination and communication with federal, state, and local governments.

Objective 3.A: Establish and maintain closer working relationships with federal, state and local governments.

Action 3.A.1 Build and support local partnerships.

Action 3.A.2 Encourage development of standardized Emergency Operations Plans within the City of Calipatria that coordinate with countywide Emergency Operations Plans.

Action 3.A.3 Develop multi-jurisdictional multi-functional training and exercises to enhance hazard mitigation.

Action 3.A.4 Leverage resources and expertise that will further hazard mitigation efforts.

Objective 3.B: Support a coordinated permitting activities process.

Action 3.B.1 Develop notification procedures for all permits that support affected agencies.

Action 3.B.2 Streamline policies to eliminate conflicts and duplication of effort.

Action 3.B.3 Exchange resources and work with other agencies.

Goal 4. Reduce the possibility of damage and losses to existing assets, particularly people, critical infrastructure and public facilities due to floods.

Objective 4.A: Develop a comprehensive approach to reducing the possibility of damage and losses due to floods.

Action 4.A.1 Review and compare existing flood control standards, zoning and building requirements.

Action 4.A.2 Adopt policies that discourage growth in flood-prone areas.

Action 4.A.3 Seek pre-disaster mitigation funding.

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City of El Centro

Floodplains located in and around El Centro present a potential natural hazard to the City. Proper land use planning can limit the risk of exposure. The City will continue to fund needed infrastructure improvements, identify new funding sources as necessary and also promote programs and actions that educate the public about flood hazards and reduce the risk of flood losses. Following are El Centro's Safety Goal and Policies related to Flooding Hazards.

Safety Goal 2: Promote programs and actions that educate the public about flood hazards and reduce the risk of flood losses.

Policy 2.1: Identify and evaluate potentially hazardous flood risks in the community and educate the public about how best to minimize the safety hazards associated with these risks.

Policy 2.2: Maintain all drainage and flood control facilities so that they function correctly.

Policy 2.3: Improve drainage ways and flood control facilities to lessen recurrent flood problems and include necessary improvements in the City's Capital Improvement Program.

Policy 2.4: Review all new proposed development to ensure that it will not aggravate poor drainage conditions and will, to the extent possible, improve poor drainage conditions.

Policy 2.5: Require all proposed development projects to submit a hydrological analysis of a project's expected runoff that will enter the City's drainage system, as well as the cumulative impact of the project and surrounding development (existing and planned) on the drainage system and flood prone areas.

Policy 2.6: Avoid new development that would create runoff volumes or velocities that may cause the City's existing drainage system to exceed its design capacity until appropriate site design and mitigation steps are taken.

Policy 2.7: Continue to fund needed infrastructure improvements, identifying new funding sources as necessary.

Implementation Program

Following are the City of El Centro's Implementation Program to implement the adopted policies:

S-5: Flooding Risk Reduction: Reduce the risk to the community from hazards related to flooding by requiring feasible mitigation of such impacts on existing, new development and redevelopment. Assess development proposals for potential hazards pursuant to the California Environmental Quality Act. Require measures to mitigate all identified significant public safety hazards.

Responsible Agency/Department: Development Services, Public Works

Funding Source: Project proponent

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Time Frame: Ongoing

Related Policies: 2.4, 2.5, 2.6

S-6: Storm Drainage Facilities: Enforce the City's Public Works Standards, which give specific requirements for design of drainage facilities to ensure that they are properly sized to handle storm runoff and flash floods. Require new development to provide adequate flood control facilities, if needed, to control runoff generated by the project. Identify new public and private funding sources to fund needed improvements.

Responsible Agency/Department: Public Works

Funding Source: Project proponent, General Fund

Time Frame: Ongoing

Related Policies: 2.2, 2.3, 2.4, 2.5, 2.6, 2.7

S-7: Flood Hazard Education: Promote programs and actions that educate the public about flood hazards and how to reduce the risks and losses associated with flooding.

Responsible Agency/Department: Development Services, Public Works

Funding Source: Project proponent

Time Frame: Ongoing

Related Policies: 2.4, 2.5, 2.6

City of Holtville

While the City of Holtville has generally not experienced substantial adverse flooding impacts, the City acknowledges that they should be prepared for disasters resulting from floods. The City of Holtville has identified the following programs:

- Conduct City-wide drainage study to identify anticipated problem areas and mitigation measures.
- Encourage continued efficiency with the Public Works Department and support the expansion and maintenance of all sewer, water and drainage facilities.
- Maintain and improve all drainage and flood control facilities to be sure that they function as required; and mitigate or disallow development that increases the City's drainage system to exceed design capacity, unless mitigation steps are implemented by the developer.
- Identify and evaluate hazardous flood locations, inform the public, and particularly proposed developers.

City of Imperial

There are no identified floodplains within the City of Imperial. The nearest floodplains are located along the New and Alamo Rivers and neither of these rivers are located within the City's planning area. Flooding within the City of Imperial would be mostly localized and would be concentrated in streets and intersections within low lying area. Flooding hazards can be minimized by ensuring adequate drainage systems are constructed and maintained.

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Following are the Flood Hazards Objective and Policies for the City of Imperial.

Objective 7: Minimize exposure of the public to flooding hazards caused by severe storms, earthquakes or other phenomena.

Policy 7

- A. Require the finished floor elevation of new structures to be built a minimum of 12 inches above the top of the adjacent curbs for flood protection.
- B. Require all new development projects to contain a grading and drainage plan based upon the requirement to adequately accommodate storm waters from a 100-year flood in order to prevent flooding of structures.
- C. Utilize flood hazard maps produced by the Federal Emergency Management Agency to determine flood hazards within the planning area.
- D. Establish a storm drain system for flood control when feasible.

City of Westmorland

The City of Westmorland is located a significant distance from the Salton Sea and is not prone to annual changes in lake levels, however, failure of any of the dam systems (Imperial and Hoover) can result in flooding of Westmorland. Prolonged periods of heavy rain can also contribute to flooding conditions, but overall flood risk seems to be minimal, as the Alamo River and New River floodplains are located many miles east of the City.

Localized flooding of City streets will occur during periods of severe storms, but flood waters are mostly contained within the streets thus not impacting dwelling units. New construction projects are required to address grading and proper drainage of storm runoff, thereby minimizing flood water breach.

Following are the City of Westmorland's Flooding Hazards Goal, Objective, and Policies.

Goal #1: Protect the public from natural and man-made hazards.

Objective 1.2: Ensure public safety from flooding hazards.

Policies:

- 1. Map flood hazard areas.
- 2. Prevent issuance of building permits for residences in flood hazard areas.
- 3. Require storm drains, catch basins, retention basins and other flood control facilities in new development to control flooding during periods of severe storms.
- 4. Encourage the formation of a Countywide Flood Control District to deal with Countywide flooding issues.

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4.2.1 Goals, Objectives and Mitigation Measures

Setting Goals

Based on the flood hazards facing Imperial County, the FMP Working Group drafted goals, policies and objectives that would be appropriate for inclusion in the FMP. As part of this process, the FMP Working Group reviewed existing goals, objectives, policies and programs regarding flood protection and mitigation.

In establishing the goals, objectives, policies and programs for the FMP, attention was given to ensure that the FMP will not conflict with other goals, objectives, policies, and programs contained in other County documents such as the General Plans and Safety Elements. In addition, the FMP Working Group determined that there are several existing goals, objectives, policies and programs that address several flood hazard issues. The FMP Working Group decided that these existing goals should be incorporated in the FMP, as appropriate, and that new goals, objectives, policies and programs should be created if necessary to supplement those that already exist.

Goals, Objectives and Policies

In developing the Flood Management Plan, the FMP Working Group conducted a workshop to assess the flood risks in the County and participating cities, determine appropriate action items and outlined an implementation strategy. The following items resulted from this workshop.

The overriding goals of the Imperial County Flood Management Plan can be summarized as follows:

1. Protect citizens from the life threatening hazards associated with flooding;
2. Protect public and private property from damage relating to flooding;
3. Provide for optimal use and enjoyment of public and private property while maintaining the greatest level of flood protection possible.

The Imperial County Flood Management Plan addresses each of these goals with a range of activities, which will improve general public information on the various aspects of flood prevention and mitigation, increase the level of regulatory review in regard to new development in floodplains, and provide the various public improvements, which will lessen future flood damage.

The Flood Management Plan for Imperial County and participating jurisdictions is organized around the three basic components:

- Flood damage prevention and reduction
- Public information
- Flood threat recognition, response and post-disaster mitigation

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For each of these components an overall goal is presented, which is supported by a series of policy statements. Along with these policy statements, various activities are listed that, when implemented, will contribute to the implementation of the policy.

Goal 1: Flood Damage Prevention and Reduction

Objective: Provide timely and adequate public improvements and programs that will limit potential flood damage and reduce threat to both property and human life. The policies developed to attain this goal range from the programming of various capital projects that will improve storm water drainage and protect natural features to the development of flood warning and evacuation plans.

Policies:

Policy 1.1 Undertake a regionally coordinated study and development of flood water management models using existing Imperial Irrigation District and other conduits within the County.

Policy 1.2 Undertake a regionally coordinated study and development of alternative models for relocating existing canals, if feasible, around cities within the County.

Policy 1.3 Undertake a regionally coordinated study of the impact of storm runoff and related contamination to the water treatment capabilities within the County.

Policy 1.4 Maintain and improve the County's storm water drainage system including continued development of localized storage and retention basins.

Policy 1.5 Implement and monitor the emergency evacuation plans for the County and cities.

Policy 1.6 Undertake a regionally coordinated effort of storm related emergency and damage assessment activities.

Policy 1.7 Obtain State and Federal funding sources for flood hazard remediation projects.

Goal 2: Public Information

Objective: Provide all information available to the citizens of Imperial County pertaining to flood potential, regulation requirements, and insurance and protection measures. Public information is critical in a number of ways to attaining the overall goal of reducing flood hazard and damage in the County. Providing site-specific flood related information to builders, developers, and property owners will enable new construction to be built to the latest specifications regarding such things as base floor elevations, setbacks, and elevations for mechanical equipment. The dissemination of this information will ultimately provide for more safe and sound construction in regards to the reduction of flood damage and losses.

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Policies:

Policy 2.1 Provide technical, zoning and policy information regarding flood hazards to developers, interested parties, and the general public.

Policy 2.2 Regulate and restrict development near major water courses and floodplains through application of appropriate land use and zoning measures.

Policy 2.3 Both the ground floor elevation of any building for human occupancy and the driving surface, if designated evacuation routes within the 100-year floodplain, shall be constructed above the projected profile of a 100-year flood event.

Policy 2.4 Require all new development for human occupancy within the 100-year floodplain to be adequately flood-proofed.

Policy 2.5 Establish technical design criteria which minimizes or mitigates impacts associated with crossing of floodplains by development. Unless such engineering alternatives are implemented, development in floodplains is to be restricted or prohibited.

Goal 3: Flood Threat Recognition, Response and Post-Disaster Mitigation

Objective: Maintain a high state of readiness to any potential flood threat and continue a program of effective post-disaster responsiveness.

Policies:

Policy 3.1 Emergency Preparedness and Evacuation Plan: For the purpose of understanding the evacuation process, it is important to distinguish between catastrophic and non-catastrophic flooding. Catastrophic flooding occurs with very little or no warning, as in the case of an unexpected levee break or dam inundation. Non-catastrophic flooding provides advance warning, such as during storm events when floodwater rises over hours or days.

An effective evacuation plan is a tool for preventing the loss of life in a flood event. For determining responsibilities in a flood emergency, a distinction of time is made between a rescue effort and an evacuation effort. An area where people would be endangered within a couple of hours from the time an event occurs would be targeted for a rescue effort. An area where people would be endangered more than two hours after a flood event would be targeted for an evacuation effort.

Policy 3.2 Flood Threat Recognition: Planning, early warning, and decision-making are important components of an effective evacuation plan. Ample advanced warning to Imperial County and City agencies provides communities time for evacuation and rescue.

Policy 3.3 Flood Response: An imminent threat is considered the period of up to four days prior to a predicted severe storm that may cause flooding, and is determined by the County

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as advised by the NWS, and State OES of a predicted storm event. Upon determination of a probable storm event, the County will determine the severity of the threat, the potential impact of the storm on Imperial County, and the storm timeline, such as time of impact and duration. The County will make public notification of the imminent threat to the public.

Policy 3.4 Critical Facilities: Critical facilities comprise of essential facilities and systems that include transportation systems, lifeline utility systems, high potential loss facilities, and hazardous material facilities (FEMA, 2001). Protecting critical facilities during a flood is a vital part of the emergency services effort with the Imperial County Office of Emergency Services coordinating a comprehensive emergency response.

Policy 3.5 Post-Disaster Recovery and Mitigation: Post-disaster reconstruction regulation and mitigation planning procedures should be coordinated as part of the post-flood response planning. Preliminary damage assessments should be conducted immediately following a flood to evaluate conditions and to identify appropriate mitigation measures. The Federal, State, and local mitigation efforts should evaluate the warning and response activities that were implemented during the disaster.

Measures that could be coordinated and delegated by the Imperial County Office of Emergency Services to assist in the repair and recovery process after a disaster include:

- Regulating reconstruction to ensure that it meets all code requirements, including the NFIPs substantial damage regulations;
- Disseminate public information to advise residents about mitigation measures they could incorporate into their reconstruction work, for example, elevating structures, using waterproof or fireproof materials, elevating utilities above flood level;
- Evaluating damaged public facilities to identify mitigation measures that could be included during repairs;
- Acquiring substantially or repeatedly damaged properties from willing sellers;
- Planning for long-term mitigation activities; and
- Applying for post-disaster mitigation funds.

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4.2.2 Flood Mitigation Actions

Prioritizing Strategies

The process used to prioritize the mitigation strategies involved lengthy discussions with various jurisdictional stakeholders, followed by citizen and community review. The end result is a mitigation Action Plan with a prioritized list of strategies that Imperial County expects to carryout during the next five years.

The process was to first prioritized goals and their respective objectives based on priority maps created during the risk assessments. Available resources and public input were also considered. Imperial County next assessed each strategy listed under the prioritized list of goals. The County then prepared a draft Action Plan that listed goals followed by a prioritized list of strategies and estimated costs.

In assessing and evaluating each strategy, Imperial County considered the following factors:

1. The cost was justified
2. Financial resources were available; local or outside resources
3. Staff resources were adequate
4. Minimal impact on County department functions
5. Strategies mitigate risks for the riskiest hazard events
6. Strategies reflect the goals and objectives

The final Action Plan will include the principal contact and cooperating parties, timeframe and cost involved in carrying out the strategy. The use of FEMA's Benefit-Cost Analysis (BCA) software (FEMA Mitigation BCA Toolkit CD Version 3.0) will be used to identify the cost-effectiveness of each activity/project undertaken.

Each year the Action Plan will be revisited and the first year will be dropped as those activities are completed and another year will be added so that the Action Plan always reflects a five-year timeframe and remains current. Strategies undertaken and completed will be evaluated as to their effectiveness.

For the planning areas subject to flood hazards, the mitigation actions and projects that reduce flood risk and deal with repetitive loss structures will be in compliance with the NFIP. Those activities not completed during the first year will be re-evaluated and included in the first year of the new Action Plan if still appropriate.

The following table was developed by the FMP Working Group in a FMP Workshop, and summarizes the proposed Imperial County Flood Mitigation Actions.

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Proposed Action	Description	Type of Action	Responsible Agency/ Department	Priority	Estimated 10-Year Cost	Funding Source
Flood water management study	Undertake a regionally coordinated study and development of flood water management models using existing Imperial Irrigation District and other conduits within the County.	Prevention	To Be Determined	1	\$5,000,000	To Be Determined
Canal relocation study	Undertake a regionally coordinated study and development of alternative models for relocating existing canals around cities within the County.	Prevention	To Be Determined	2	\$2,000,000	To Be Determined
Impact on water treatment study	Undertake a regionally coordinated study of the impact of storm runoff and related contamination to the water treatment capabilities within the County.	Prevention	To Be Determined	3	\$1,500,000	To Be Determined
Storage and retention basins	Maintain and improve the County's storm water drainage system including continued development of localized storage and retention basins.	Prevention	To Be Determined	4	\$5,000,000	To Be Determined
Evacuation plans	Implement and monitor the emergency evacuation plans for the County and cities.	Response	Imperial County OES	5	\$100,000	To Be Determined
Storm assessments	Undertake a regionally coordinated effort of storm related emergency and damage assessment activities.	Prevention	To Be Determined	6	\$2,000,000	To Be Determined
Funding	Obtain State and Federal funding sources for flood hazard remediation projects.	Prevention	To Be Determined	7	\$100,000	To Be Determined
Information to developers	Provide technical and policy information regarding flood hazards to developers, interested parties, and the general public.	Public Information	To Be Determined	8	\$100,000	To Be Determined
Regulation of development	Regulate and restrict development near major water courses and	Public Information	To Be	9	\$100,000	To Be

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Proposed Action	Description	Type of Action	Responsible Agency/ Department	Priority	Estimated 10-Year Cost	Funding Source
	floodplains through application of appropriate land use measures.		Determined			Determined
Regulation of construction	Both the ground floor elevation of any building for human occupancy and the driving surface, if designated evacuation routes within the 100-year floodplain, shall be constructed above the projected profile of a 100-year flood event.	Prevention	To Be Determined	10	\$100,000	To Be Determined
Flood-proofing	Require all new development for human occupancy within the 100-year floodplain to be adequately flood-proofed.	Prevention	To Be Determined	11	\$100,000	To Be Determined
Development in floodplains	Establish technical design criteria which minimizes or mitigates impacts associated with crossing of floodplains by development. Unless such engineering alternatives are implemented, development in floodplains is to be restricted or prohibited.	Prevention/ Public Information	To Be Determined	12	\$100,000	To Be Determined

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4.2.3 Assets at Risk

List of Jurisdiction's Assets at Risk for Flood Related Hazards
(Including Location and Potential Dollar Losses)

Methodology used to prepare estimates: Assessor's values, replacement costs, insurance coverage, estimated costs based on recent construction procurements and/or local standard construction costs per square foot. There is no way to make an accurate estimate of the potential limits one hazard may cause. % denotes the approximate damage / loss to the identified asset as a result of each relevant hazard. The method used to establish each % was to logically assess the practical extent of loss or damage to each asset as balanced by the vulnerability of the asset to each hazard.

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Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Airport	Calexico International Airport	Imperial County	32.67	-115.51	\$ 10,500,000	\$ 500,000	25%
Airport	Calipatria Municipal Airport	Imperial County	33.13	-115.52	\$ 5,000,000	\$ 2,000,000	25%
Airport	Johnson Brothers Airport	Imperial County	32.67	-115.56	\$ 750,000	\$ 100,000	25%
Airport	Salton Sea Airport	Imperial County	33.24	-115.95	\$ 750,000	\$ 100,000	25%
Airport	Salton Sea Base B-2	Imperial County	33.28	-115.99	\$ 750,000	\$ 100,000	25%
Airport	Salton Sea Test Base B-1	Imperial County	33.27	-115.92	\$ 750,000	\$ 100,000	25%
Bridge	Cibola Bridge	Palo Verde	33.4130556	-114.656944	\$ 300K per site *	n/a	X
Bridge	Coachella Bridge Number One	Glamis SE	32.8430556	-115.100278	\$ 300K per site *	n/a	X
Bridge	Coachella Bridge Number Two	Glamis NW	32.9713889	-115.186944	\$ 300K per site *	n/a	X
Bridge	Farmers Bridge	Palo Verde	33.4130556	-114.656944	\$ 300K per site *	n/a	X
Dam	Reservation Levee	Bard	32.81	-114.521944	\$ 500K per site**	n/a	X
Dam	Imperial Dam	Imperial County	32.8833333	-114.466944	\$ 500K per site**	n/a	X

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Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Dam	Imperial Diversion Dam	Imperial County	32.8833333	-114.466667	\$ 500K per site**	n/a	X
Dam	North Dike Dam	Imperial County	32.9166667	-114.483333	\$ 500K per site**	n/a	X
Dam	Senator Wash Dam	Imperial County	32.91	-114.478333	\$ 500K per site**	n/a	X
Dam	Squaw Lake Dike Dam	Imperial County	32.905	-114.476667	\$ 500K per site**	n/a	X
Emergency	Heber Fire Station	Heber	32.73	-115.52	\$ 1,500,000	\$ 1,000,000	25%
Government	Heber Branch Library	Imperial County	32.74	-115.53	\$ 3,500,000	\$ 2,000,000	25%
Hospital	Imperial County Hospital	Imperial County	32.75	-115.56	\$ 15,000,000	\$ 6,000,000	25%
Levee	Reservation Levee	Yuma East	32.7419444	-114.596389	\$ 500K per site**	n/a	X
Reservoir	Bear Canyon Tank	Picacho SW	33.0166667	-114.669167	\$ 500K per site**	n/a	X
Reservoir	Imperial Reservoir	Imperial County	32.8833333	-114.466944	\$ 500K per site**	n/a	X
Reservoir	Senator Wash Reservoir	Imperial County	32.9166667	-114.483333	\$ 500K per site**	n/a	X
Reservoir	Senator Wash Reservoir	Imperial County	32.91	-114.478333	\$ 500K per site**	n/a	X
Reservoir	Senator Wash Reservoir	Imperial County	32.905	-114.476667	\$ 500K per site**	n/a	X
Reservoir	Tadpole Tank	Wiley Well	33.4036111	-114.9075	\$ 500K per site**	n/a	X
School	Grace Smith Elementary School	Imperial County	33.24	-115.52	\$ 5,000,000	\$ 1,000,000	25%
School	Heber Elementary School	Imperial County	32.73	-115.53	\$ 5,000,000	\$ 1,000,000	25%
School	Heber Junior High School	Imperial County	32.73	-115.53	\$ 5,000,000	\$ 1,000,000	25%
School	Lantana School	Imperial County	32.82	-115.73	\$ 5,000,000	\$ 1,000,000	25%
School	Magnolia Elementary School	Imperial County	32.98	-115.42	\$ 5,000,000	\$ 1,000,000	25%
School	Mount Signal School	Imperial County	32.70	-115.64	\$ 5,000,000	\$ 1,000,000	25%
School	Mulberry Elementary School	Imperial County	33.04	-115.42	\$ 5,000,000	\$ 1,000,000	25%
School	North End School (historical)	Imperial County	33.13	-115.60	\$ 5,000,000	\$ 1,000,000	25%
School	Pine Elementary School	Imperial County	32.89	-115.38	\$ 5,000,000	\$ 1,000,000	25%
School	Rose Mesquite School	Imperial County	32.88	-115.48	\$ 5,000,000	\$ 1,000,000	25%
School	San Pasqual School	Imperial County	32.73	-114.61	\$ 5,000,000	\$ 1,000,000	25%

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Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
School	San Pasqual Valley School	Imperial County	32.75	-114.60	\$ 5,000,000	\$ 1,000,000	25%
School	Seeley Elementary School	Imperial County	32.79	-115.69	\$ 5,000,000	\$ 1,000,000	25%
School	Silsbee School	Imperial County	32.76	-115.64	\$ 5,000,000	\$ 1,000,000	25%
School	Verde School	Imperial County	32.72	-115.34	\$ 5,000,000	\$ 1,000,000	25%
School	Vincent Memorial High School	Imperial County	32.68	-115.51	\$ 5,000,000	\$ 1,000,000	25%
School	Westside School	Imperial County	32.68	-115.73	\$ 5,000,000	\$ 1,000,000	25%
Utility	All American Canal (AAC)	Imperial County	n/a	n/a	\$ 500K per site**	n/a	X
Utility	Central Main Canal	Imperial County	n/a	n/a	\$ 500K per site**	n/a	X
Utility	Coachella Canal	Imperial County	n/a	n/a	\$ 500K per site**	n/a	X
Utility	Highline Canal	Imperial County	n/a	n/a	\$ 500K per site**	n/a	X
Utility	Westside Main Canal	Imperial County	n/a	n/a	\$ 500K per site**	n/a	X
Utility	All Lateral Canals	Imperial County	n/a	n/a	\$ 500K per site**	n/a	X
Utility	All Heading Canals	Imperial County	n/a	n/a	\$ 500K per site**	n/a	X
Utility	All American Canal Div. (Housing)	Imperial County	32.52142	-115.28891	\$ 2,726,066	\$ 3,115,504	25%
Utility	Winterhaven Trouble Shooter Office	Imperial County	32.44298	-115.38242	\$ 412,456	\$ 471,378	25%
Utility	S1030 - Barrett	Bard	32.51976	-114.294	\$ 5,000,000	n/a	25%
Utility	S2040 - Desert Shores	Desert Shores	33.24724	-116.03031	\$ 25,000	n/a	25%
Utility	S1220 - Heber	Heber	32.43731	-115.31427	\$ 126,903	n/a	25%
Utility	S5050 - Heber Geo.	Heber	32.42905	-115.31019	\$ 5,000,000	n/a	25%
Utility	S5070 Second Imperial Geo.	Heber	32.42861	-115.3206	\$ 5,000,000	n/a	25%
Utility	S1045 - Black Mtn.	Imperial County	32.03329	-114.49728	\$ 5,000,000	n/a	25%
Utility	S1210 - Goldfields	Imperial Valley	32.03215	-114.59031	\$ 5,000,000	n/a	25%
Utility	S1215 - Gold Mine Tap	Imperial Valley	33.02822	-114.53033	\$ 1,666,877	n/a	25%

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Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Utility	S1410 - U.S Gypsum	Plaster City	32.47421	-115.5124	\$ 5,000,000	n/a	25%
Utility	S1125 - Dixieland	Seeley	32.47642	-115.46736	\$ 5,000,000	n/a	25%
Utility	S1130 - Dixieland Prison	Seeley	32.49582	-115.47335	\$ 2,353,511	n/a	25%
Utility	S3005 - Imperial Valley	Seeley	32.42983	-115.43077	\$ 3,848,460	n/a	25%
Utility	S1185 - Navy Base	Seeley	32.48668	-115.40829	\$ 141,926	n/a	25%
Utility	S1330 - Plaster City	Seeley	32.47457	-115.50965	\$ 1,000,000	n/a	25%
Utility	S1332 - Plaster City (new)	Seeley	32.47512	-115.41498	\$ 5,000,000	n/a	25%
Utility	S1015 - Araz	Winterhaven	32.44298	-114.42855	\$ 5,000,000	n/a	25%
Utility	S1025 - Bard	Winterhaven	32.46903	-114.34468	\$ 5,000,000	n/a	25%
Utility	S1255 - Imperial Dam	Winterhaven	32.52847	-114.28411	\$ 5,000,000	n/a	25%
Utility	S1295 - No Man's Land	Winterhaven	32.4517	-114.35404	\$ 5,000,000	n/a	25%
Utility	S4020 - Pilot Knob Hydro	Winterhaven	32.44199	-114.42856	\$ 25,000,000	n/a	25%
Utility	S1340 - Quechan Farm #1	Winterhaven	32.44763	-114.36793	\$ 5,000,000	n/a	25%
Utility	S1440 - Winterhaven	Winterhaven	32.44323	-114.38007	\$ 5,000,000	n/a	25%
Utility	S1445 - Yucca	Winterhaven	32.43178	-114.42621	\$ 5,000,000	n/a	25%
Utility	S1443 - Winterhaven Pole Yard	Winterhaven	32.44298	-114.38238	\$ 5,000,000	n/a	25%
Utility	Mnt. Signal Wash	Imperial County	32.43545	-115.44005	\$ 200,000	n/a	25%
Utility	Pinto Wash #1	Imperial County	32.44644	-115.44945	\$ 200,000	n/a	25%
Utility	Pinto Wash #2	Imperial County	32.44703	-115.45102	\$ 200,000	n/a	25%
Utility	Pinto Wash #3	Imperial County	32.45384	-115.45164	\$ 200,000	n/a	25%
Utility	Yuha Wash	Imperial County	32.45798	-115.45705	\$ 200,000	n/a	25%
Utility	Dunaway Wash #1	Imperial County	32.46978	-115.46363	\$ 200,000	n/a	25%
Utility	Dunaway Wash #2	Imperial County	32.47109	-115.46383	\$ 200,000	n/a	25%
Utility	Dunaway Wash #3	Imperial County	32.47253	-115.46359	\$ 200,000	n/a	25%

**Imperial County
Flood Management Plan**

April 2007

Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Utility	Coyote Wash	Imperial County	32.49829	-115.45335	\$ 200,000	n/a	25%
Utility	Fillaree Wash	Imperial County	32.51451	-115.47829	\$ 200,000	n/a	25%
Utility	Fillaree Wash East	Imperial County	32.51276	-115.46186	\$ 200,000	n/a	25%
Utility	Superstition Lake Bed	Imperial County	32.40192	-115.43183	\$ 200,000	n/a	25%
Utility	Power Lines	Imperial County	32.4057	-115.42232	\$ 200,000	n/a	25%
Utility	Hwy 98	Imperial County	32.40827	-115.40906	\$ 200,000	n/a	25%
Utility	S1030 - Barrett	Bard	32.51976	-114.294	\$ 5,000,000	n/a	25%
Utility	S2040 - Desert Shores	Desert Shores	33.24724	-116.03031	\$ 25,000	n/a	25%
Utility	S1220 - Heber	Heber	32.43731	-115.31427	\$ 126,903	n/a	25%
Utility	S5050 - Heber Geo.	Heber	32.42905	-115.31019	\$ 5,000,000	n/a	25%
Utility	S5070 Second Imperial Geo.	Heber	32.42861	-115.3206	\$ 5,000,000	n/a	25%
Utility	S1045 - Black Mtn.	Imperial County	32.03329	-114.49728	\$ 5,000,000	n/a	25%
Utility	S1210 - Goldfields	Imperial Valley	32.03215	-114.59031	\$ 5,000,000	n/a	25%
Utility	S1215 - Gold Mine Tap	Imperial Valley	33.02822	-114.53033	\$ 1,666,877	n/a	25%
Utility	S1410 - U.S Gypsum	Plaster City	32.47421	-115.5124	\$ 5,000,000	n/a	25%
Utility	S1125 - Dixieland	Seeley	32.47642	-115.46736	\$ 5,000,000	n/a	25%
Utility	S1130 - Dixieland Prison	Seeley	32.49582	-115.47335	\$ 2,353,511	n/a	25%
Utility	S3005 - Imperial Valley	Seeley	32.42983	-115.43077	\$ 3,848,460	n/a	25%
Utility	S1185 - Navy Base	Seeley	32.48668	-115.40829	\$ 141,926	n/a	25%
Utility	S1330 - Plaster City	Seeley	32.47457	-115.50965	\$ 1,000,000	n/a	25%
Utility	S1332 - Plaster City (new)	Seeley	32.47512	-115.41498	\$ 5,000,000	n/a	25%
Utility	S1015 - Araz	Winterhaven	32.44298	-114.42855	\$ 5,000,000	n/a	25%
Utility	S1025 - Bard	Winterhaven	32.46903	-114.34468	\$ 5,000,000	n/a	25%
Utility	S1255 - Imperial Dam	Winterhaven	32.52847	-114.28411	\$ 5,000,000	n/a	25%

**Imperial County
Flood Management Plan**

April 2007

Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Utility	S1295 - No Man's Land	Winterhaven	32.4517	-114.35404	\$ 5,000,000	n/a	25%
Utility	S4020 - Pilot Knob Hydro	Winterhaven	32.44199	-114.42856	\$ 25,000,000	n/a	25%
Utility	S1340 - Quechan Farm #1	Winterhaven	32.44763	-114.36793	\$ 5,000,000	n/a	25%
Utility	S1440 - Winterhaven	Winterhaven	32.44323	-114.38007	\$ 5,000,000	n/a	25%
Utility	S1445 - Yucca	Winterhaven	32.43178	-114.42621	\$ 5,000,000	n/a	25%
Utility	S1443 - Winterhaven Pole Yard	Winterhaven	32.44298	-114.38238	\$ 5,000,000	n/a	25%
Utility	Mnt. Signal Wash	Imperial County	32.43545	-115.44005	\$ 200,000	n/a	25%
Utility	Pinto Wash #1	Imperial County	32.44644	-115.44945	\$ 200,000	n/a	25%
Utility	Pinto Wash #2	Imperial County	32.44703	-115.45102	\$ 200,000	n/a	25%
Utility	Pinto Wash #3	Imperial County	32.45384	-115.45164	\$ 200,000	n/a	25%
Utility	Yuha Wash	Imperial County	32.45798	-115.45705	\$ 200,000	n/a	25%
Utility	Dunaway Wash #1	Imperial County	32.46978	-115.46363	\$ 200,000	n/a	25%
Utility	Dunaway Wash #2	Imperial County	32.47109	-115.46383	\$ 200,000	n/a	25%
Utility	Dunaway Wash #3	Imperial County	32.47253	-115.46359	\$ 200,000	n/a	25%
Utility	Coyote Wash	Imperial County	32.49829	-115.45335	\$ 200,000	n/a	25%
Utility	Fillaree Wash	Imperial County	32.51451	-115.47829	\$ 200,000	n/a	25%
Utility	Fillaree Wash East	Imperial County	32.51276	-115.46186	\$ 200,000	n/a	25%
Utility	Superstition Lake Bed	Imperial County	32.40192	-115.43183	\$ 200,000	n/a	25%
Utility	Power Lines	Imperial County	32.4057	-115.42232	\$ 200,000	n/a	25%
Utility	Hwy 98	Imperial County	32.40827	-115.40906	\$ 200,000	n/a	25%
Utility	Imperial Comm. Microwave Site	Imperial	32.50883	-115.33917	\$ 182,919	n/a	25%
Utility	Black Mt. Comm. Microwave Site	Imperial County	33.03167	-114.49567	\$ 182,919	n/a	25%
Utility	Potholes Comm. Microwave Site	Imperial Valley	32.5	-114.31033	\$ 182,919	n/a	25%

**Imperial County
Flood Management Plan**

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Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Utility	Pilot Knob Comm. Microwave Site	Imperial Valley	32.44633	-114.428	\$ 182,919	n/a	25%
Utility	Drop # 1 Comm. Microwave Site	Imperial Valley	32.42633	-114.56533	\$ 182,919	n/a	25%
Utility	IV Sub. Comm. Microwave Twr	Seeley	32.43017	-115.4305	\$ 182,919	n/a	25%
Utility	Imperial Dam Comm. Microwave Twr	Winterhaven	32.53033	-114.282	\$ 182,919	n/a	25%
Utility	A & D Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	A Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	A3 Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	AW Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	AX Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	B Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	BD Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	BH Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	BO Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	BP Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	BV Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	C Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	CA Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	CD Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	CE Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	CI Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	CL Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	CM Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X

**Imperial County
Flood Management Plan**

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Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Utility	CN Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	CS Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	CU Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	CW Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	D Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	DP Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	DS Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	DU Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	DV Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	E Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	ED Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	EO Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	F Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	G Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	GF Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	H Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	HL - 1 Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	HL - 4 Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	HX Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	J Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	K Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	KM Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	KN Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	KS Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X

**Imperial County
Flood Management Plan**

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Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Utility	L Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	LB Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	LC Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	LM Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	LU Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	LW Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	M Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	MR Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	MW -1 Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	MW -2 Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	MW -3 Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	MW -4 Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	N Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	P Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	PDP Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	PN Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	PW Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	PX Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	R Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	RBE Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	RC Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	RW Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	S Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	T Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X

**Imperial County
Flood Management Plan**

April 2007

Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Utility	U Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	USBR - A Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	VXE Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	WAPA Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X
Utility	Y Line	Imperial County	n/a	n/a	\$ 500K per site***	n/a	X

* Bridge damage estimates are based on a per site cost figure, with each site covering an estimate road length of 2 to 300 feet. Each asset may experience multiple damaged sites from one hazard event, or multiple assets may experience one event each. There is no way to make an accurate estimate of the potential limits one hazard may cause.

** Canal, Levee, Dam and Reservoir Damage estimates are based on a per site cost figure, with each site covering an estimate canal length of 2 to 300 feet. Each asset may experience multiple damaged sites from one hazard event, or multiple assets may experience one event each. There is no way to make an accurate estimate of the potential limits one hazard may cause.

*** Power Line damage estimates are based on a per site cost figure, with each site covering an estimate power line length of 2 to 300 feet. Each power line may experience multiple damaged sites from one hazard event, or multiple power lines may experience one event each. There is no way to make an accurate estimate of the potential limits one hazard may cause.

**Imperial County
Flood Management Plan**

April 2007

Brawley

Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Airport	Brawley Municipal Airport	Brawley	32.99	-115.52	\$ 10,500,000	\$ 500,000	n/a
Airport	O'Connell Brothers Airport	Brawley	32.96	-115.54	\$ 750,000	\$ 100,000	n/a
Airport	Pioneers Memorial Hospital Heliport	Brawley	32.96	-115.55	\$ 2,000,000	n/a	n/a
Government	Brawley Chamber of Commerce	Brawley	32.98	-115.53	\$ 2,500,000	\$ 500,000	n/a
Government	Brawley City Hall	Brawley	32.98	-115.53	\$ 4,500,000	\$ 1,500,000	n/a
Government	Brawley Public Library	Brawley	32.98	-115.53	\$ 3,500,000	\$ 2,000,000	n/a
Government	Imperial County Building	Brawley	32.98	-115.54	\$ 6,000,000	\$ 1,500,000	n/a
Hospital	Pioneer Memorial Hospital	Brawley	32.96	-115.55	\$ 15,000,000	\$ 6,000,000	n/a
School	Brawley Junior College	Brawley	32.98	-115.53	\$ 10,000,000	\$ 2,000,000	n/a
School	Hidalgo Elementary School	Brawley	32.97	-115.53	\$ 5,000,000	\$ 1,000,000	n/a
School	Oakley School	Brawley	32.98	-115.52	\$ 5,000,000	\$ 1,000,000	n/a
School	Reid School	Brawley	32.98	-115.54	\$ 5,000,000	\$ 1,000,000	n/a
School	Sacred Heart Primary School	Brawley	32.97	-115.53	\$ 5,000,000	\$ 1,000,000	n/a
School	Soroptimist Elementary School	Brawley	32.99	-115.52	\$ 5,000,000	\$ 1,000,000	n/a
School	Swing Elementary School	Brawley	32.99	-115.54	\$ 5,000,000	\$ 1,000,000	n/a
School	Union High School	Brawley	32.98	-115.53	\$ 8,000,000	\$ 2,500,000	n/a
School	Western Baptist Christian School	Brawley	32.98	-115.54	\$ 5,000,000	\$ 1,000,000	n/a
School	Witter School	Brawley	32.97	-115.54	\$ 5,000,000	\$ 1,000,000	n/a

**Imperial County
Flood Management Plan**

April 2007

Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
School	Worth School	Brawley	32.98	-115.53	\$ 5,000,000	\$ 1,000,000	n/a
Utility	Northend Division	Brawley	32.02500	-115.32571	\$ 5,194,441	\$ 5,936,504	n/a
Utility	Environmental Compliance Office	Brawley	32.58656	-115.31827	\$ 4,104,985	\$ 4,691,308	n/a
Utility	S1005 - Alamorio	Brawley	32.57193	-115.25402	\$ 17,369	n/a	n/a
Utility	Beef Plant	Brawley	32.59943	-115.31114	\$ 5,000,000	n/a	n/a
Utility	S1065 - Brawley	Brawley	32.58207	-115.32096	\$ 5,985,032	n/a	n/a
Utility	S1070 - Brawley Diesel	Brawley	32.58111	-115.32092	\$ 715,250	n/a	n/a
Utility	S1095 - Casel Rd. Gin	Brawley	32.58406	-115.25512	\$ 5,000,000	n/a	n/a
Utility	S1305 - Orita Feed	Brawley	32.48653	-115.24316	\$ 5,000,000	n/a	n/a
Utility	S1310 - Panno	Brawley	32.57807	-115.33595	\$ 88,487	n/a	n/a
Utility	S1313 - Parkview	Brawley	32.59207	-115.32612	\$ 125,576	n/a	n/a
Utility	S1355 - Rockwood	Brawley	32.5732	-115.32136	\$ 18,003,300	n/a	n/a
Utility	S4045 - Rockwood Gas Turbine	Brawley	32.57316	-115.3217	\$ 12,002,200	n/a	n/a
Utility	S5080 - Western Power #1	Brawley	32.54405	-115.30598	\$ 5,000,000	n/a	n/a
Utility	S5085 - Western Power #2	Brawley	32.54253	-115.30598	\$ 5,000,000	n/a	n/a
Utility	Brawley Diesel Comm. Microwave	Brawley	32.14567	-115.30069	\$ 182,919	n/a	n/a

**Imperial County
Flood Management Plan**

April 2007

Calexico

Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Government	Amarena Memorial Library Station	Calexico	32.68	-115.52	\$ 1,500,000	\$ 500,000	n/a
Government	Amerena Memorial Public Library	Calexico	32.68	-115.49	\$ 3,500,000	\$ 2,000,000	n/a
Government	Calexico City Hall	Calexico	32.67	-115.49	\$ 4,500,000	\$ 1,500,000	n/a
Government	Camarena Memorial Library	Calexico	32.67	-115.49	\$ 3,500,000	\$ 2,000,000	n/a
Government	Carnegie Public Library	Calexico	32.67	-115.49	\$ 3,500,000	\$ 2,000,000	n/a
Hospital	Calexico Hospital	Calexico	32.68	-115.49	\$ 15,000,000	\$ 6,000,000	n/a
School	Aurora High School	Calexico	32.67	-115.50	\$ 8,000,000	\$ 2,500,000	n/a
School	Calexico Adventist Mission School	Calexico	32.67	-115.49	\$ 5,000,000	\$ 1,000,000	n/a
School	De Anza Junior High School	Calexico	32.67	-115.49	\$ 5,000,000	\$ 1,000,000	n/a
School	Dool Elementary School	Calexico	32.67	-115.49	\$ 5,000,000	\$ 1,000,000	n/a
School	Jasper-Alamitos Union School	Calexico	32.71	-115.44	\$ 5,000,000	\$ 1,000,000	n/a
School	Jefferson Elementary School	Calexico	32.67	-115.48	\$ 5,000,000	\$ 1,000,000	n/a
School	Kennedy Garden School	Calexico	32.69	-115.50	\$ 5,000,000	\$ 1,000,000	n/a
School	Our Lady of Guadalupe School	Calexico	32.67	-115.50	\$ 5,000,000	\$ 1,000,000	n/a
School	Rockwood Elementary School	Calexico	32.68	-115.49	\$ 5,000,000	\$ 1,000,000	n/a
School	SDSU Imperial Valley Campus	Calexico	32.67	-115.49	\$ 3,500,000	\$ 1,000,000	n/a
School	Union High School	Calexico	32.68	-115.49	\$ 8,000,000	\$ 2,500,000	n/a
Utility	Calexico Division	Calexico	32.40066	-115.29939	\$ 410,295	\$ 468,908	n/a

**Imperial County
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Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Utility	Western Division	Calexico	32.41278	-115.27905	\$ 561,865	\$ 642,132	n/a
Utility	S1055 - Border	Calexico	32.94	-115.29251	\$ 5,000,000	n/a	n/a
Utility	S1060 - Bravo	Calexico	32.40182	-115.26172	\$ 735,441	n/a	n/a
Utility	S1080 - Calexico	Calexico	32.40126	-115.30003	\$ 388,019	n/a	n/a
Utility	S1205 - Gateway	Calexico	32.40547	-115.22411	\$ 5,000,000	n/a	n/a
Utility	S1315 - Perry	Calexico	32.41423	-115.2946	\$ 2,521,668	n/a	n/a
Utility	S1335 - Pruett	Calexico	32.4115	-115.30492	\$ 211,760	n/a	n/a
Utility	Perry Substation Comm. Microwave	Calexico	32.41233	-115.289	\$ 182,919	n/a	n/a
Utility	Western Comm. Microwave Tower	Calexico	32.41267	-115.27817	\$ 182,919	n/a	n/a

**Imperial County
Flood Management Plan**

April 2007

Calipatria

Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Airport	Calipatria Municipal Airport	Calipatria	33.1297222	-115.521667	\$ 5,000,000	\$ 1,000,000	25%
Emergency	Niland Fire Station	Niland	33.24	-115.51	\$ 1,500,000	\$ 1,000,000	25%
Government	Calipatria Br. Imperial Co. Free Lib.	Niland	33.13	-115.52	\$ 3,500,000	\$ 2,000,000	25%
Government	Calipatria City Hall	Niland	33.13	-115.52	\$ 4,500,000	\$ 1,500,000	25%
Government	Niland Branch Imperial Co. Free Lib.	Niland	33.24	-115.52	\$ 3,500,000	\$ 2,000,000	25%
School	501 W. Main Street, Calipatria	Calipatria	33.125563	-115.521694	\$ 5,000,000	\$ 1,000,000	25%
School	220 S. International Blvd, Calipatria	Calipatria	33.124363	-115.519263	\$ 5,000,000	\$ 1,000,000	25%
School	401 Main Street, Calipatria	Calipatria	33.125563	-115.519382	\$ 5,000,000	\$ 1,000,000	25%
School	601 W. Main Street, Calipatria	Calipatria	33.125563	-115.524812	\$ 5,000,000	\$ 1,000,000	25%
School	9 East 4th Street	Niland	33.238	-115.518	\$ 5,000,000	\$ 1,000,000	25%
Utility	S1050 - Bombay	Niland	33.23112	-115.41334	\$ 52,330	n/a	25%
Utility	S1085 - Calipatria	Calipatria	33.07587	-115.30578	\$ 988,726	n/a	25%
Utility	S1115 - Crummer Rd.	Calipatria	33.09397	-115.3841	\$ 5,000,000	n/a	25%
Utility	S5030 - Elmore Geo.	Calipatria	33.10697	-115.36266	\$ 5,000,000	n/a	25%
Utility	S5010 - Hoch Geo.	Calipatria	33.29859	-115.36905	\$ 5,000,000	n/a	25%
Utility	S5055 - Leathers Geo	Calipatria	33.10709	-115.33959	\$ 5,000,000	n/a	25%
Utility	S1265 - Lindsey Rd.	Calipatria	33.08895	-115.37352	\$ 5,000,000	n/a	25%
Utility	S1280 - Midway	Calipatria	33.11493	-115.23067	\$ 3,311,876	n/a	25%
Utility	Niland Substation Comm. Microwave	Niland	33.14567	-115.30083	\$ 182,919	n/a	25%
Utility	S1285 - Inland	Calipatria	33.14515	-115.30098	\$ 3,921,258	n/a	25%
Utility	S5020 - Salton City #1 Geo.	Calipatria	33.09495	-115.38833	\$ 5,000,000	n/a	25%
Utility	S5025 - Salton City #2 Geo.	Calipatria	33.09419	-115.38789	\$ 5,000,000	n/a	25%
Utility	S5015 - Salton City #3 Geo.	Calipatria	33.09407	-115.3841	\$ 5,000,000	n/a	25%

**Imperial County
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Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Utility	S5023 - Salton City #4 Geo.	Calipatria	33.09466	-115.38408	\$ 5,000,000	n/a	25%
Utility	S5027 - Salton City #5 Geo.	Calipatria	33.09214	-115.38383	\$ 5,000,000	n/a	25%
Utility	S5075 Vulcan Geo.	Calipatria	33.09729	-115.37058	\$ 5,000,000	n/a	25%
Utility	S1090 - Calipatria Prison	Calipatria	33.10123	-115.29522	\$ 988,726	n/a	25%
Utility	Midway Substation Comm. Microwave	Calipatria	33.11508	-115.26068	\$ 182,919	n/a	25%

**Imperial County
Flood Management Plan**

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El Centro

Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Airport	Boley Field	El Centro	32.8341667	-115.578611	\$ 750,000	\$ 100,000	n/a
Airport	Douthitt Strip	El Centro	32.7888889	-115.529444	\$ 750,000	\$ 100,000	n/a
Airport	Imperial County Airport	El Centro	32.8341667	-115.578611	\$ 10,500,000	\$ 500,000	n/a
Dam	El Centro Wpp 2016 Dam	El Centro	32.8083333	-115.575	\$500K per site**	n/a	n/a
Emergency	Fire Station Number 1	El Centro	32.79	-115.56	\$ 1,500,000	\$ 1,000,000	n/a
Government	Community Center Branch Library	El Centro	32.79	-115.54	\$ 3,500,000	\$ 2,000,000	n/a
Government	El Centro Public Library	El Centro	32.79	-115.56	\$ 3,500,000	\$ 2,000,000	n/a
Government	Imperial City Hall	El Centro	32.84	-115.57	\$ 4,500,000	\$ 1,500,000	n/a
Government	Imperial County Courthouse	El Centro	32.79	-115.56	\$ 6,000,000	\$ 1,500,000	n/a
Government	Imperial County Jail	El Centro	32.79	-115.56	\$ 8,000,000	\$ 3,000,000	n/a
Government	Imperial County Law Library	El Centro	32.79	-115.56	\$ 3,500,000	\$ 2,000,000	n/a
Government	Imperial Public Library	El Centro	32.85	-115.57	\$ 3,500,000	\$ 2,000,000	n/a
Government	Imperial Valley Pioneer Museum	El Centro	32.84	-115.57	\$ 750,000	\$ 400,000	n/a
Hospital	El Centro Regional Medical Center	El Centro	32.78	-115.57	\$ 15,000,000	\$ 6,000,000	n/a
School	Ben Hulse Elementary School	El Centro	32.85	-115.58	\$ 5,000,000	\$ 1,000,000	n/a
School	Central High Adult Education School	El Centro	32.78	-115.55	\$ 5,000,000	\$ 1,000,000	n/a
School	Central High School	El Centro	32.79	-115.56	\$ 8,000,000	\$ 2,500,000	n/a
School	De Anza School	El Centro	32.78	-115.57	\$ 5,000,000	\$ 1,000,000	n/a

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Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
School	Desert Gardens Elementary School	El Centro	32.78	-115.56	\$ 5,000,000	\$ 1,000,000	n/a
School	Desert Oasis High School	El Centro	32.78	-115.55	\$ 8,000,000	\$ 2,500,000	n/a
School	Douglas Junior High School	El Centro	32.79	-115.54	\$ 5,000,000	\$ 1,000,000	n/a
School	Eucalyptus School	El Centro	32.80	-115.60	\$ 5,000,000	\$ 1,000,000	n/a
School	Exceptional Children's School	El Centro	32.78	-115.57	\$ 5,000,000	\$ 1,000,000	n/a
School	Harding Elementary School	El Centro	32.78	-115.56	\$ 5,000,000	\$ 1,000,000	n/a
School	Imperial Avenue Holbrook School	El Centro	32.84	-115.57	\$ 5,000,000	\$ 1,000,000	n/a
School	Imperial Valley College	El Centro	32.79	-115.56	\$ 12,000,000	\$ 5,000,000	n/a
School	Kennedy Middle School	El Centro	32.80	-115.56	\$ 5,000,000	\$ 1,000,000	n/a
School	Lincoln Elementary School	El Centro	32.79	-115.56	\$ 5,000,000	\$ 1,000,000	n/a
School	Margaret Hedrick Elem School	El Centro	32.79	-115.57	\$ 5,000,000	\$ 1,000,000	n/a
School	Martin Luther King Jr Elem School	El Centro	32.80	-115.58	\$ 5,000,000	\$ 1,000,000	n/a
School	McCabe Elementary School	El Centro	32.75	-115.59	\$ 5,000,000	\$ 1,000,000	n/a
School	McKinley Elementary School	El Centro	32.80	-115.56	\$ 5,000,000	\$ 1,000,000	n/a
School	McKinley School	El Centro	32.80	-115.55	\$ 5,000,000	\$ 1,000,000	n/a
School	Park Avenue Continuation HS	El Centro	32.80	-115.55	\$ 5,000,000	\$ 1,000,000	n/a
School	Saint Mary School	El Centro	32.79	-115.57	\$ 5,000,000	\$ 1,000,000	n/a
School	Seventh Day Adventist School	El Centro	32.79	-115.56	\$ 5,000,000	\$ 1,000,000	n/a
School	Southwest High School	El Centro	32.78	-115.58	\$ 8,000,000	\$ 2,500,000	n/a
School	Union High School	El Centro	32.85	-115.57	\$ 8,000,000	\$ 2,500,000	n/a

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Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
School	Washington School	El Centro	32.79	-115.54	\$ 5,000,000	\$ 1,000,000	n/a
School	Wilson School	El Centro	32.79	-115.57	\$ 5,000,000	\$ 1,000,000	n/a
School	Wright School	El Centro	32.85	-115.57	\$ 5,000,000	\$ 1,000,000	n/a
Utility	Customer Operations	El Centro	32.47526	-115.34445	\$ 1,319,222	\$ 1,758,963	n/a
Utility	El Centro Steam Plant	El Centro	32.48166	-115.32354	\$ 13,244,978	\$ 15,137,118	n/a
Utility	Fish Farm	El Centro	32.47899	-115.32593	\$ 766,957	\$ 876,522	n/a
Utility	Human Resources El Centro Div	El Centro	32.47614	-115.34036	\$ 5,701,280	\$ 6,841,535	n/a
Utility	Southend Division	El Centro	32.44785	-115.34824	\$ 3,321,491	\$ 3,795,990	n/a
Utility	Southend Trouble Shooters	El Centro	32.47302	-115.32979	\$ 1,761,753	\$ 2,013,432	n/a
Utility	System Operating Center "SOC"	El Centro	32.48001	-115.32162	\$ 3,875,062	\$ 6,642,963	n/a
Utility	Executive Office	El Centro	32.47655	-115.34099	\$ 2,443,406	\$ 3,257,874	n/a
Utility	Valley Plaza	El Centro	32.47445	-115.34349	\$ 1,375,477	\$ 1,571,974	n/a
Utility	Valley Plaza	El Centro	32.47474	-115.34408	\$ 1,592,477	\$ 1,819,974	n/a
Utility	Valley Plaza (Environmental Office)	El Centro	32.47435	-115.34401	\$ 1,561,791	\$ 1,784,904	n/a
Utility	Commercial (Corner Bldg.)	El Centro	32.47701	-115.32945	\$ 486,261	\$ 529,522	n/a
Utility	Commercial (Green Bldg.)	El Centro	32.47700	-115.3297	\$ 486,261	\$ 529,522	n/a
Utility	S1100 - Central	El Centro	32.4909	-115.34694	\$ 1,483,089	n/a	n/a
Utility	S1110 - Clark	El Centro	32.45802	-115.33895	\$ 611,382	n/a	n/a
Utility	S1120 - Dahlia	El Centro	32.46882	-115.34691	\$ 117,424	n/a	n/a
Utility	S4015 - El Centro Steam Plant	El Centro	32.48224	-115.32409	\$ 50,000,000	n/a	n/a

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Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Utility	S1190 - El Centro Switch Station	El Centro	32.48147	-115.32147	\$ 19,618,636	n/a	n/a
Utility	S1200 - Euclid	El Centro	32.47966	-115.34731	\$ 1,570,075	n/a	n/a
Utility	S1040 - Gios Mobile Home Park	El Centro	32.4532	-115.34707	\$ 5,000,000	n/a	n/a
Utility	S1235 - Holtville	El Centro	32.48763	-115.23289	\$ 989,001	n/a	n/a
Utility	S1250 - Imperial	El Centro	32.51347	-115.33828	\$ 5,519,645	n/a	n/a
Utility	Imperial Valley Mall	El Centro	32.45543	-115.3207	\$ 7,049,900	n/a	n/a
Utility	S1375 - Seeley	El Centro	32.47493	-115.41684	\$ 1,179	n/a	n/a
Utility	S1385 - Silsbee	El Centro	32.4518	-115.38268	\$ 5,000,000	n/a	n/a
Utility	S1395 - System Operating Center	El Centro	32.47991	-115.32163	\$ 25,000,000	n/a	n/a
Utility	S1405 - Terminal Station	El Centro	32.47774	-115.32928	\$ 5,000,000	n/a	n/a
Utility	S1415 - Valley	El Centro	32.46021	-115.32315	\$ 5,000,000	n/a	n/a
Utility	S1020 - Aten	El Centro	32.4922	-115.30588	\$ 25,000	n/a	n/a
Utility	S.O.C Communication Microwave	El Centro	32.47986	-115.32196	\$ 182,919	n/a	n/a

** Canal, Levee, Dam and Reservoir Damage estimates are based on a per site cost figure, with each site covering an estimate canal length of 2 to 300 feet. Each asset may experience multiple damaged sites from one hazard event, or multiple assets may experience one event each. There is no way to make an accurate estimate of the potential limits one hazard may cause.

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Holtville

Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Airport	Holtville Airport	Holtville	32.84	-115.27	\$ 5,000,000	\$ 2,000,000	n/a
Bridge	McKim Bridge	Holtville	32.8544444	-115.434722	\$ 300K per site *	n/a	n/a
Dam	Rositas Dam	Holtville	32.8191667	-115.435556	\$ 500K per site**	n/a	n/a
Government	Holtville Br Imperial Co. Free Lib.	Holtville	32.81	-115.38	\$ 3,500,000	\$ 2,000,000	n/a
Government	Holtville Chamber of Commerce	Holtville	32.81	-115.38	\$ 2,500,000	\$ 500,000	n/a
Government	Holtville City Hall	Holtville	32.81	-115.38	\$ 4,500,000	\$ 1,500,000	n/a
Hospital	Imperial Valley Sanitarium	Holtville	32.84	-115.28	\$ 4,000,000	\$ 2,000,000	n/a
School	Acacia School	Holtville	32.78	-115.49	\$ 5,000,000	\$ 1,000,000	n/a
School	Alamo School	Holtville	32.77	-115.30	\$ 5,000,000	\$ 1,000,000	n/a
School	Finley Elementary School	Holtville	32.81	-115.37	\$ 5,000,000	\$ 1,000,000	n/a
School	Holtville Christian School	Holtville	32.81	-115.38	\$ 5,000,000	\$ 1,000,000	n/a
School	Holtville Middle School	Holtville	32.82	-115.37	\$ 5,000,000	\$ 1,000,000	n/a
School	Meadows Elementary School	Holtville	32.80	-115.47	\$ 5,000,000	\$ 1,000,000	n/a
School	Rose School	Holtville	32.85	-115.46	\$ 5,000,000	\$ 1,000,000	n/a
School	Saint Josephs Elementary School	Holtville	32.81	-115.37	\$ 5,000,000	\$ 1,000,000	n/a
School	San Webb Continuation HS	Holtville	32.82	-115.39	\$ 5,000,000	\$ 1,000,000	n/a
School	Union High School	Holtville	32.82	-115.38	\$ 8,000,000	\$ 2,500,000	n/a
School	UC Imperial Valley Fir	Holtville	32.80	-115.45	\$ 3,500,000	\$ 1,000,000	n/a

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Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Utility	Holtville Office	Holtville	32.48731	-115.22876	\$ 889,910	\$ 1,017,040	n/a
Utility	S1105 - Chestnut Cooling	Holtville	32.48599	-115.2244	\$ 5,000,000	n/a	n/a
Utility	S1175 - East Mesa II	Holtville	32.47214	-115.14923	\$ 955,593	n/a	n/a
Utility	S1180 East Mesa III	Holtville	32.46486	-115.15872	\$ 955,593	n/a	n/a
Utility	S5040 - Gem 2 Geo.	Holtville	32.4653	-115.15805	\$ 5,000,000	n/a	n/a
Utility	S5045 - Gem 3 Geo.	Holtville	32.46488	-115.15771	\$ 5,000,000	n/a	n/a
Utility	S1225 - Highline	Holtville	32.46139	-115.16371	\$ 51,117	n/a	n/a
Utility	S5060 - Ormesa I Geo.	Holtville	32.48979	-115.15425	\$ 5,000,000	n/a	n/a
Utility	S1425 - Verde	Holtville	32.4337	-115.20255	\$ 5,000,000	n/a	n/a
Utility	S1430 - Walnut Ave. Cooling	Holtville	32.48376	-115.22644	\$ 5,000,000	n/a	n/a
Utility	S1170 East Mesa I	Holtville	32.48978	-115.1543	\$ 210,263	n/a	n/a
Utility	Drop # 4 Comm. Microwave Site	Holtville	32.42483	-115.12967	\$ 182,919	n/a	n/a
Utility	Holtville Substat Comm. Microwave	Holtville	32.4875	-115.23217	\$ 182,919	n/a	n/a
Utility	Highline Substat Comm. Microwave	Holtville	32.462	-115.1635	\$ 182,919	n/a	n/a

* Bridge damage estimates are based on a per site cost figure, with each site covering an estimate road length of 2 to 300 feet. Each asset may experience multiple damaged sites from one hazard event, or multiple assets may experience one event each. There is no way to make an accurate estimate of the potential limits one hazard may cause.

** Canal, Levee, Dam and Reservoir Damage estimates are based on a per site cost figure, with each site covering an estimate canal length of 2 to 300 feet. Each asset may experience multiple damaged sites from one hazard event, or multiple assets may experience one event each. There is no way to make an accurate estimate of the potential limits one hazard may cause.

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City of Imperial

Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Government	Imperial Public Library	City of Imperial	32.84	-115.57	\$ 3,500,000	\$ 2,000,000	n/a
Utility	Risk Management	City of Imperial	32.50798	-115.34195	\$ 647,504	\$ 740,004	n/a
Utility	Operating Headquarters	City of Imperial	32.51011	-115.33987	\$ 29,758,057	\$ 34,009,208	n/a
Utility	Public Programs Office	City of Imperial	32.40843	-115.33925	\$ 1,567,356	\$ 1,791,264	n/a
Utility	Purchasing	City of Imperial	32.50853	-115.34073	\$ 1,941,443	\$ 2,218,792	n/a
Utility	Records Management Office	City of Imperial	32.50869	-115.3411	\$ 3,735,526	\$ 4,269,172	n/a
Utility	S1230 - Holly Sugar	City of Imperial	32.54726	-115.3409	\$ 5,000,000	n/a	n/a
Utility	S1400 - Superstition	City of Imperial	32.52829	-44714	\$ 5,000,000	n/a	n/a
Utility	Superstition Mtn Comm Microwave	City of Imperial	32.57483	-115.5035	\$ 182,919	n/a	n/a

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Westmorland

Type	Name	Jurisdiction	Latitude	Longitude	Structure Value	Contents Value	Flooding Event
Dam	North End Dam	Westmorland	33.1027778	-115.543056	\$ 500K per site**	n/a	X
School	Bonita School	Westmorland	33.12	-115.50	\$ 5,000,000	\$ 1,000,000	n/a
School	Calipatria High School	Westmorland	33.12	-115.52	\$ 5,000,000	\$ 1,000,000	n/a
School	Fremont Elementary School	Westmorland	33.12	-115.52	\$ 5,000,000	\$ 1,000,000	n/a
School	Midway High School	Westmorland	33.12	-115.52	\$ 8,000,000	\$ 2,500,000	n/a
School	Westmorland Elementary School	Westmorland	33.04	-115.62	\$ 5,000,000	\$ 1,000,000	n/a
Utility	S1010 - Anza	Westmorland	33.07546	-115.58935	\$ 202,286	n/a	n/a
Utility	S1360 - Salton City	Westmorland	33.17125	-115.58186	\$ 5,000,000	n/a	n/a
Utility	S1370 - San Felipe	Westmorland	33.06015	-116.036913	\$ 113,412	n/a	n/a
Utility	S1435 = Westmorland	Westmorland	33.02287	-115.37126	\$ 5,000,000	n/a	n/a

** Canal, Levee, Dam and Reservoir Damage estimates are based on a per site cost figure, with each site covering an estimate canal length of 2 to 300 feet. Each asset may experience multiple damaged sites from one hazard event, or multiple assets may experience one event each. There is no way to make an accurate estimate of the potential limits one hazard may cause.

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4.3 Phase Three: Implement the Plan

The Flood Management Plan will be submitted to the State of California OES Flood Mitigation Officer for review and comments. Changes will be incorporated into the Final Flood Management Plan before official adoption by Imperial County.

Plan Update Management

Imperial County OES has the responsibility for maintaining, monitoring, evaluating and updating the FMP Plan. FEMA regulations require an update every five years. Imperial County OES and the FMP Working Group will conduct periodic evaluations and make revisions to the FMP as applicable, including the development of a progress report every five years. Specific steps will include:

- Review of the original Imperial County Flood Management Plan
- Review of flood events and impacts that occurred during the past five years
- Summary of important mitigation activities accomplished by participating agencies or communities
- Review of the mitigation strategies, including how much was accomplished during the previous five years
- Discuss mitigation strategies that were not completed or why implementation is behind schedule
- Include new and/or revised mitigation strategies
- Include other planning efforts and studies that may affect the original Imperial County Flood Management Plan

The five-year progress report will be forwarded and distributed by Imperial County OES to the State OES Mitigation Section, watershed groups, local entities, as well as members of the public. All status reports will be tracked and become a part of documenting, evaluating, and updating the Imperial County FMP.

Following any significant flood hazard event that may occur before the five-year anniversary, the Imperial County OES and the FMP Working Group will meet to discuss what was learned during and after the event and the Imperial County FMP should be evaluated, updated, and revised accordingly.

Implementation through Existing Programs

Imperial County and the participating jurisdictions currently uses land use planning and building codes to guide and control development in the County and its floodplains. After the County officially adopts the Flood Management Plan, these existing mechanisms should incorporate the flood hazard mitigation strategies. The Imperial County Planning

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Department will conduct periodic reviews of Imperial County's land use policies, analyze the Imperial County FMP amendments, and provide technical assistance to other local municipalities in implementing these requirements.

Continued Public Involvement

Although the Imperial County FMP Working Group represents the public to some extent, the public will be invited to directly comment on and provide feedback about the Imperial County FMP. Copies of the Plan and any proposed changes will be posted on the Imperial County website. This site will also provide mailing and e-mail addresses and telephone numbers for the public to contact.

Public input will be solicited after each annual Imperial County FMP Working Group meeting. This process will provide the public with the opportunity to express concerns, opinions, or share ideas about the Imperial County FMP.

Plan Maintenance

Imperial County OES will utilize the FMP Working Group to poll agencies to see if they want to continue to participate and if their elements of the Plan are up-to-date.

Factors that will be considered in evaluating whether a Plan update or revisions are required are:

- Relevance of FMP goals and objectives to the evolving situation in Imperial County
- Consistency of FMP goals and objectives with changes in State and Federal laws, regulations or policies
- Relevance of FMP goals and objectives to current and expected conditions
- New technologies
- New information

The risk assessment portion of the Plan will be reviewed to determine if the information should be updated or modified. The parties responsible for the various implementation actions will report on:

- Status of their projects
- Implementation processes that worked well
- Any difficulties encountered
- How coordination efforts are proceeding
- Which strategies should be revised

Imperial County is committed to involving the public in the continual reshaping and updating of the FMP. The FMP Working Group members are responsible for the annual review and update of the Plan. Although they represent the public to some extent, the public will be able to directly comment on and provide feedback about the Plan.

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April 2007

Imperial County currently uses comprehensive land use planning, capital improvements planning, and building codes to guide and control development within the County. The hazard mitigation strategies of the Imperial County and participating jurisdictions' General Plan, Hazard Mitigation Plan, and Safety Elements have been integrated into this FMP. This FMP will be provided to those responsible for the County and participating jurisdictions' General Plan development mechanisms to insure that consistency is maintained.

The County has initiated a comprehensive update to its General Plan and Zoning Ordinance. This update is expected to take approximately three years. The cities within the County are also in early stages of updating their General Plans. This FMP will serve as an important document in the General Plan update processes particularly as it relates to the safety and related elements.

Copies of the Plan will be kept on hand at County OES and the County Library. These copies will include the address and phone number of the County OES staff member responsible for tracking public comment.