TECHNICAL MEMORANDUM

To: Gateway IRWMP Stakeholders

From: Dustin Bambic, P.H., Tetra Tech

Cc: Bill Bennett, GEI

Date: July 24, 2012

Subject: Stormwater Problem Areas for IRWMP Planning

Tetra Tech and GEI are working in partnership with the Gateway Authority, its members, and appointed committees in support of the development of an Integrated Regional Water Management Plan (IRWMP) for the Gateway IRWMP Region. The Gateway Authority is currently comprised of 19 cities and government entities which are responsible for the regional planning needs of about 2 million people in the Gateway Cities Region (Figure 1). In support of the IRWMP, this partnership is developing protocols and analytical methods for characterizing the watersheds in the Gateway IRWMP Region, assessing the existing conditions and management needs within each watershed, and developing a preliminary menu of best management practices (BMPs) that support the IRWM plan goals and objectives.

The Gateway Region IRWMP Goals are as follows:

- Identify and address the water dependent natural resources needs of the Gateway Region Watersheds.
- Protect and enhance water quality.
- Optimize and ensure water supply reliability.
- Coordinate and integrate water resources management.
- Provide stewardship of the region's water dependent natural resources.
- Manage flood and storm waters to reduce flood risk and water quality impacts.

This memo assesses stormwater issues within the region, including flooding and water quality "problem areas". This screening level assessment is based on a survey-based approach to characterize flooding, a watershed/water quality model to characterize stormwater quality, and a desktop GIS analysis to highlight potential stormwater problem areas. The purpose of this memo is to:

1) Summarize flooding problem areas using a survey-based approach.
2) Summarize stormwater quality problem areas using a watershed/water quality model.
3) Describe BMPs that may be appropriate for the Gateway IRWMP Region.

These results should provide an important first step for identifying projects to address stormwater issues.

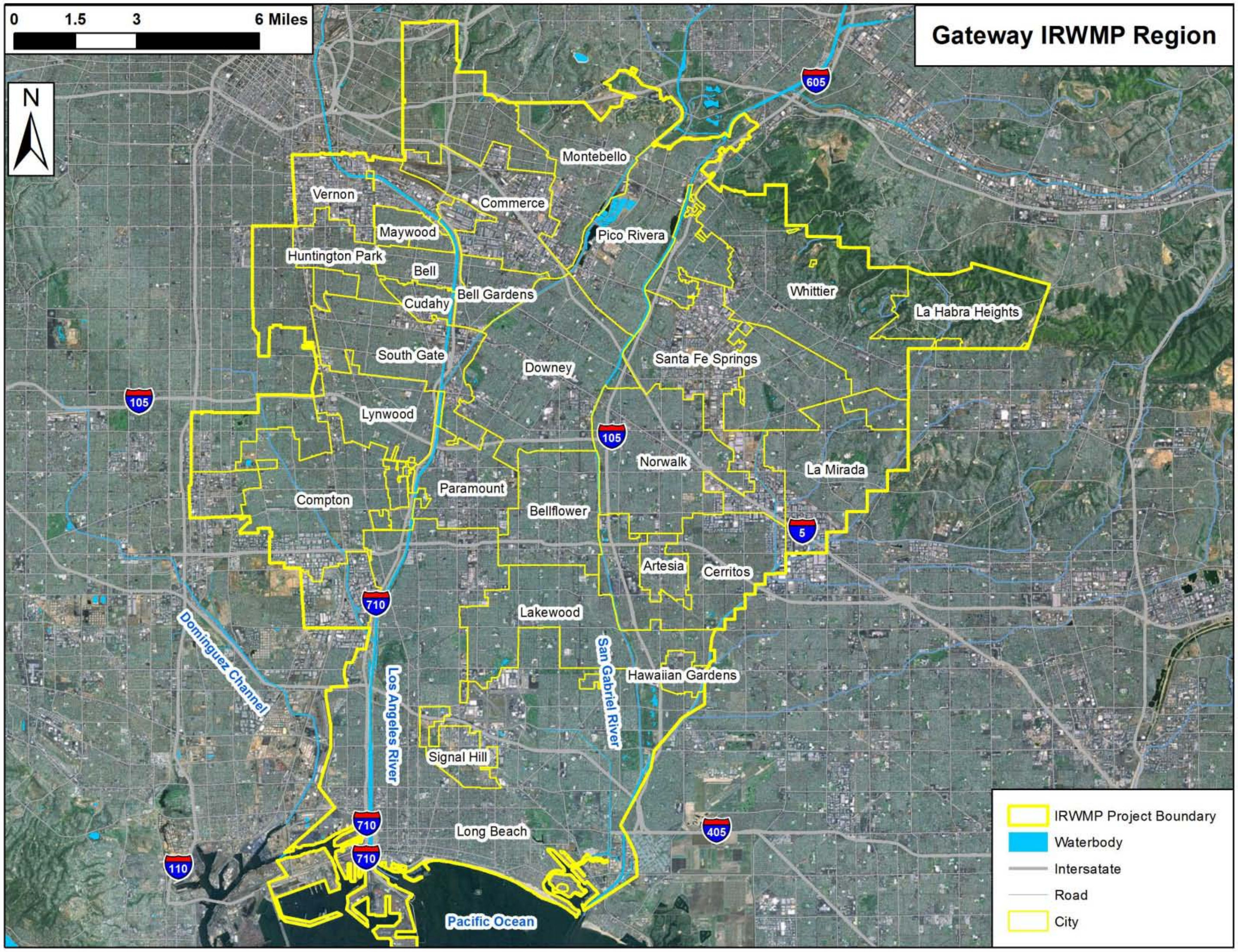

Figure 1 Gateway Cities Region

1 Flooding Problem Areas

In order to assess and catalog existing problem areas for flooding in the Gateway IRWMP Region, Tetra Tech created an online survey. The survey was intended to be a simple vehicle to collect flooding information from stakeholders who have extensive experience in their respective communities. The survey was created using www.surveymonkey.com and was provided in the following format:

1) Name
2) Affiliation/Organization
3) Title
4) Email Address
5) Describe the flooding issues at Location #1, including address or cross streets. [a] How sever is the flooding at this location? (e.g., mild, moderate, sever). [b] What size storms cause flooding at this location? (e.g., only large storms?)
6) Additional questions for Locations #2, #3, #4, and #5.

As shown above, the stakeholders were generally asked to describe the locations, frequency and severity of known flooding problems. The location of flooding problems was described by address and/or cross street. The severities of flooding were ranked as mild, moderate, or severe. Flooding frequency is related to the size storm event that causes the flooding (i.e., flooding during small storms means more frequent flooding). Areas that should be considered most problematic are those which exhibit severe flooding from small storms. It is acknowledged that the relative ranking of severity and frequency is not precisely defined and is subjective; follow-up work could be performed to quantify the flooding depths and frequency at identified locations.

Each of the surveys was compiled into an electronic database and is included in Appendix A. In total, there were responses from 17 agencies and 70 locations were reported. Responses to the survey indicate that there are several locations within the Gateway IRWMP Region that experience severe flooding and many more that experience mild to moderate flooding. Figure 1-1 highlights the results of the survey geographically with graphics that are color-coded to identify flooding severity and storm frequency. A general summary of the survey results includes the following:

- **Severe flooding:** nine areas in Huntington Park, sections of Downey, and one location in Bellflower were reported to have severe flooding from small storms. The second most susceptible areas were described as exhibiting severe flooding from medium storms. Two locations in Montebello and one location in Santa Fe Springs were reported to have severe flooding from moderate storms. The third most susceptible areas were described as exhibiting severe flooding from large storms. Several locations in Cudahy, South Gate, and Lynwood were reported to have severe flooding from large storms.
- **Moderate flooding:** many locations throughout the Gateway IRWMP Region were identified as having moderate flooding. Only one location in Santa Fe Springs was identified as susceptible to moderate flooding from small storms. Several locations in Montebello, Commerce, Downey, and Santa Fe Springs were reported as susceptible to moderate flooding from medium storms. And many locations in Vernon, Paramount, Bellflower, Lakewood, and Norwalk were reported as susceptible to moderate flooding from large storms.
- **Mild flooding:** Mild flooding associated with medium storms was reported in Bell Gardens and mild flooding associated with large storms was reported in Bell Gardens and Montebello.

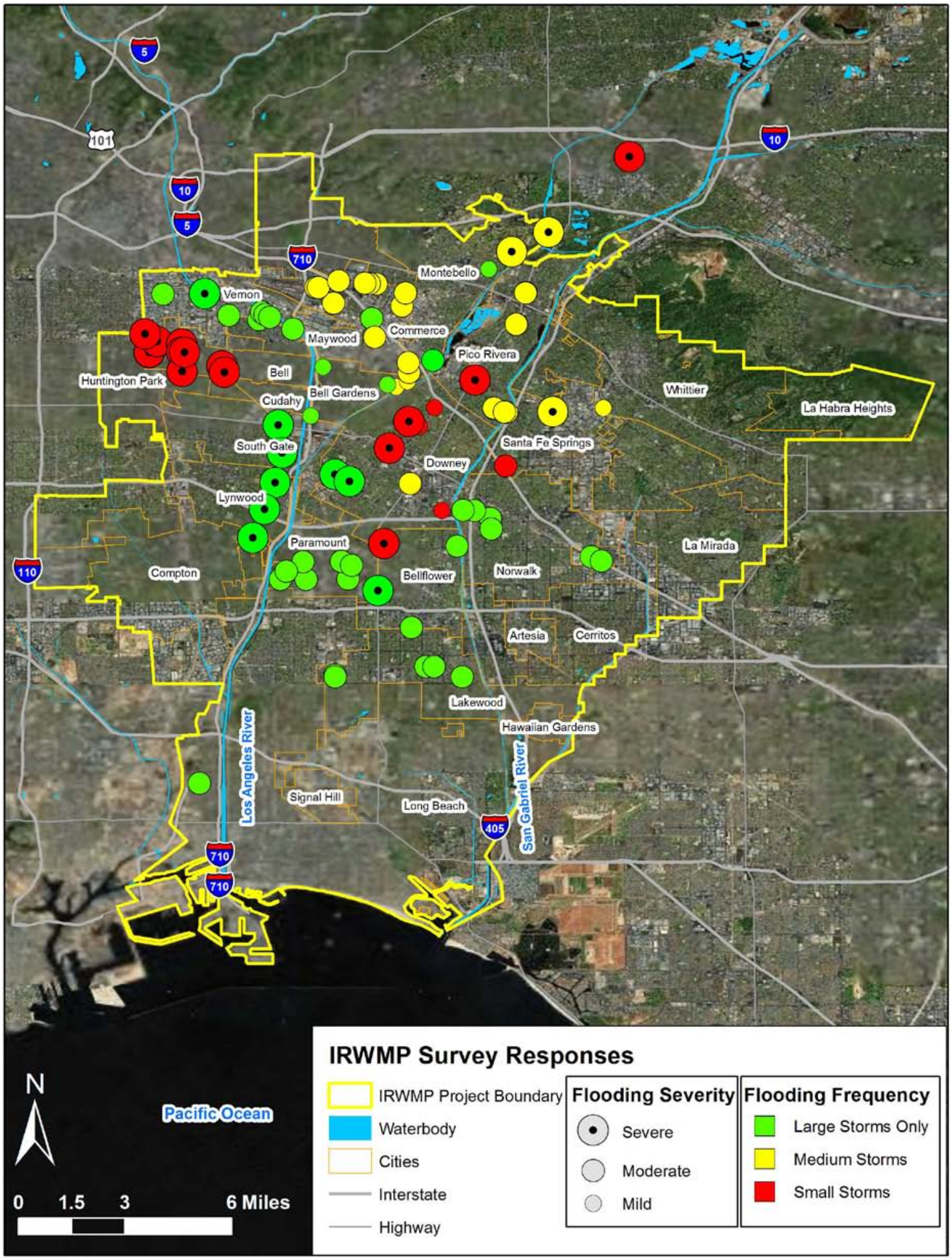

Figure 1-1 IRWMP Survey Responses for Flooding

2 Water Quality Problem Areas

Stormwater quality problem areas in the Gateway Region were assessed using a hydrodynamic water quality model. The approach used the water quality model to identify areas within the region that have the potential to *generate* stormwater pollutants. The Watershed Management Modeling System (WMMS) developed by Los Angeles County Flood Control District (Tetra Tech 2010a; Tetra Tech 2010b) was used to evaluate current water quality conditions within the Gateway IRWMP Region. The watershed model component of the WMMS is the Loading Simulation Program C++ (LSPC). LSPC is a comprehensive data management and modeling system that is capable of representing loading, both flow and water quality, from non-point and point sources and simulating in-stream processes. LSPC as configured for the WMMS simulates the Gateway IRWMP Region as a series of hydrologically connected sub-watersheds. The LSPC model in WMMS is calibrated to existing conditions in the Gateway IRWMP Region for runoff, total nitrogen (TN), total phosphorus (TP), copper (Cu), lead (Pb), zinc (Zn), total suspended solids (TSS), and fecal coliform.

The LSPC model was run over the period of 1998 to 2006, and the relative annual average yield of pollutants (e.g., pounds per acre per year) from each subwatershed within the Gateway Region was calculated. Results of the LSPC model are shown in Figures 2-1 through 2-8 to highlight “Hot Spot” contribution areas for each of the calibrated constituents. The figures are color coded to show the relative generation of stormwater runoff and pollutants. A “loading factor” was applied to each of the maps to facilitate a color-coded rendering of the stormwater runoff and pollutant generation within the Gateway IRWMP Region. To determine the range of average annual pollutant and/or runoff contributions by watershed, match the color on the map with the color in the loading key. Then, multiply the range of values in the loading key by the “baseline” shown at the top of the loading key. The resulting range of values is the average annual pollutant loads/runoff volume for the area of interest.

The results shown in Figure 2-1 through 2-8 are the first step in identifying stormwater best management practices (BMPs). To refine the analyses for stormwater/total maximum daily load planning, additional analyses should be performed including the following:

1. **Assess the relative *impact* of the pollutant-generating areas on receiving water quality.** For example, areas that are very close to receiving waters can have a higher impact on receiving water quality even if the pollutant load generated from those areas is lower compared to upstream areas (due to attenuation/decay during downstream travel).
2. **Consider the cost-effectiveness of available BMPs.** A wide array of BMPs are available to stormwater agencies to reduce flows and pollutants. Each type of BMP will have its own cost effectiveness depending on location, performance, capital cost, and operation/maintenance. Approaches to BMP selection should be compared, including using distributed BMPs across the watershed versus using centralized BMPs that capture and/or treat large drainage areas. The types of available BMPs are discussed in the next section.

These analyses can be performed within LSPC and the other components of the WMMS. The SUSTAIN component of WMMS is designed as a decision support system used to develop, evaluate, and select optimal BMP combinations at various watershed scales based on cost and effectiveness. SUSTAIN could help the Gateway Authority partnership determine which BMP alternatives (types, locations, and sizes) provide the greatest benefit for achieving management objectives while balancing costs.

Also, it should be noted that the results below are most useful for considering *wet weather* impacts. Dry weather impacts are often highly dependent on localized sources (e.g., leaking sewer lines or birds for bacteria loading).

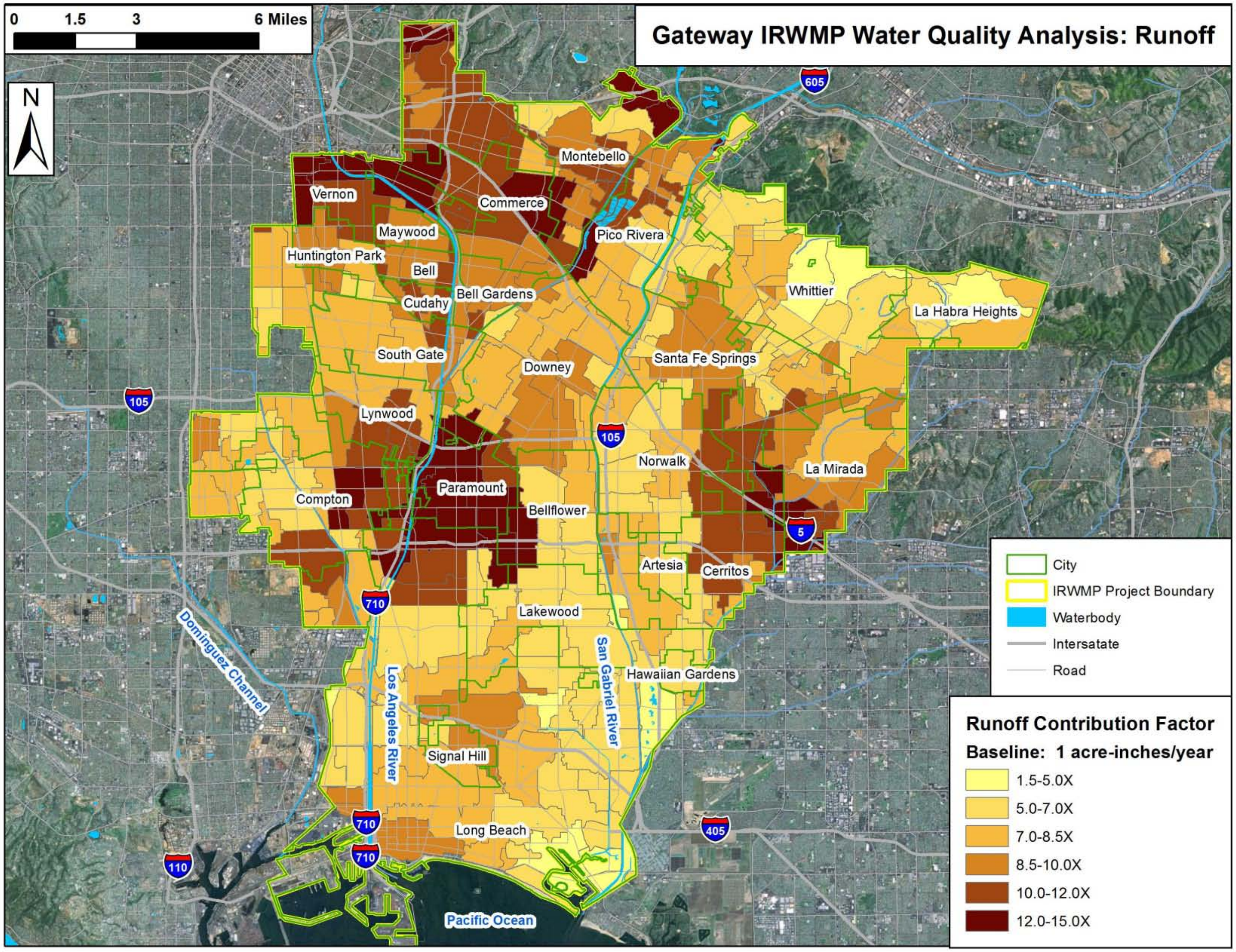

Figure 2-1 LSPC Modeling Results (1998 – 2006) – Runoff

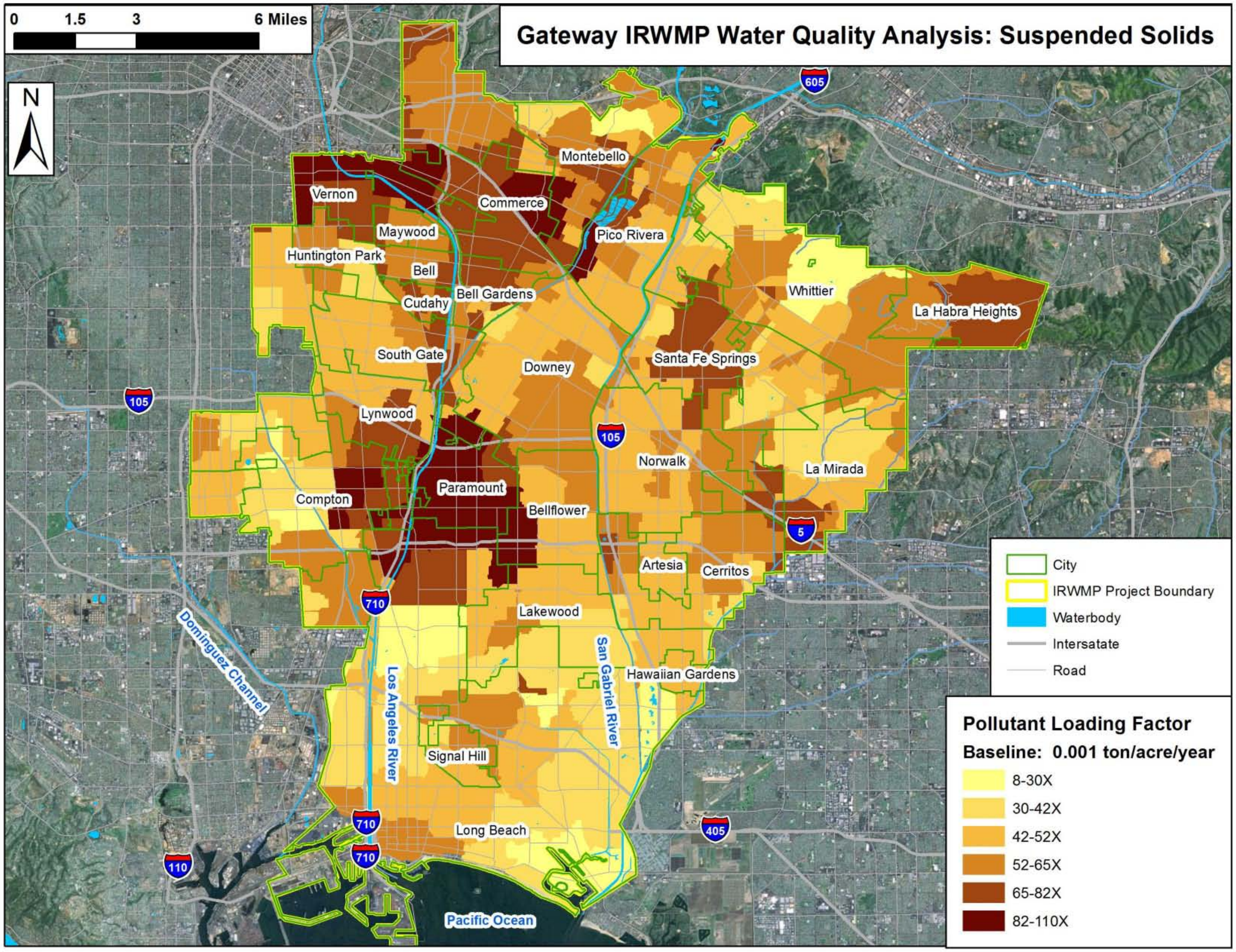

Figure 2-2 LSPC Modeling Results (1996 – 2008) – Total Suspended Solids

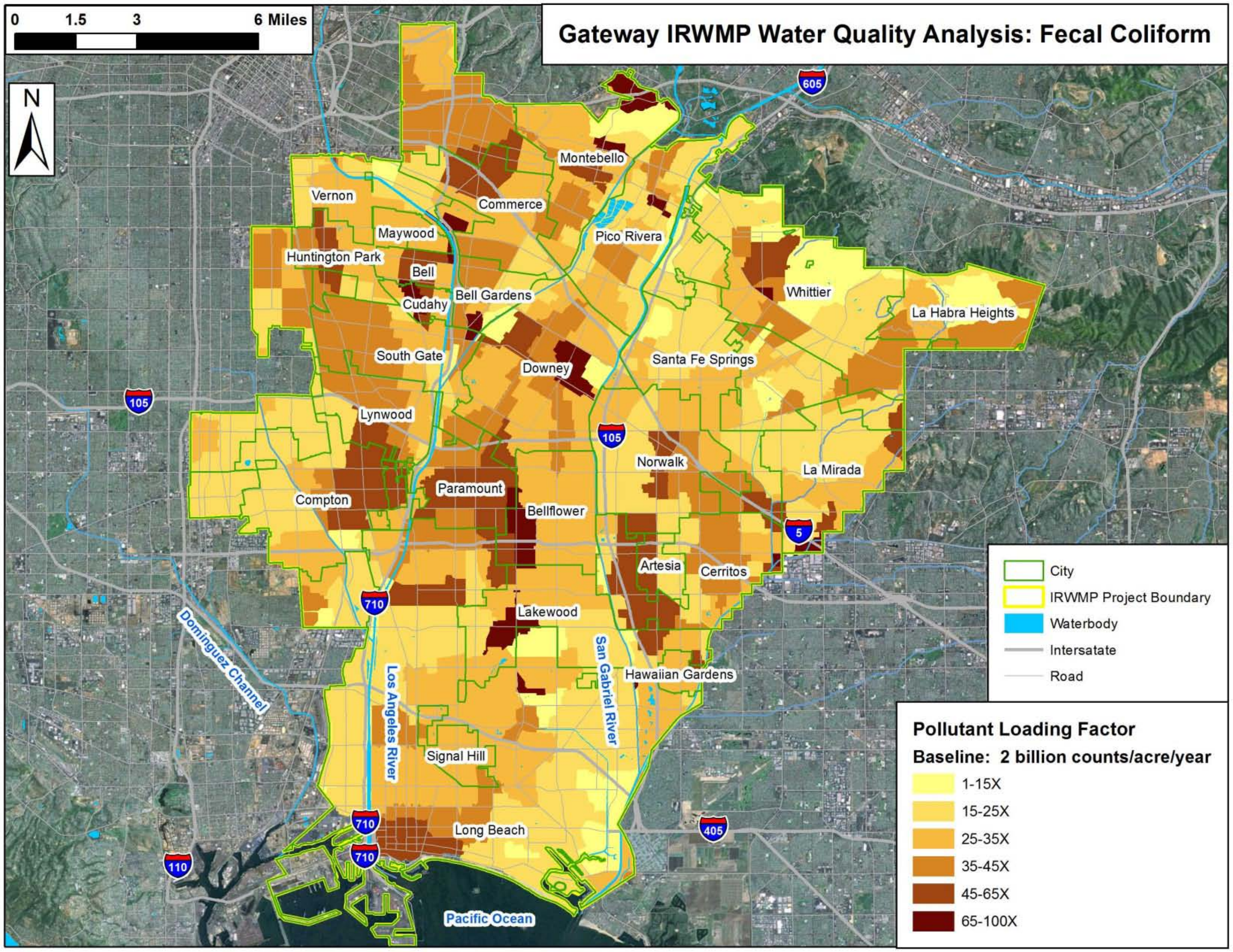

Figure 2-3 LSPC Modeling Results (1996 – 2008) – Fecal Coliform

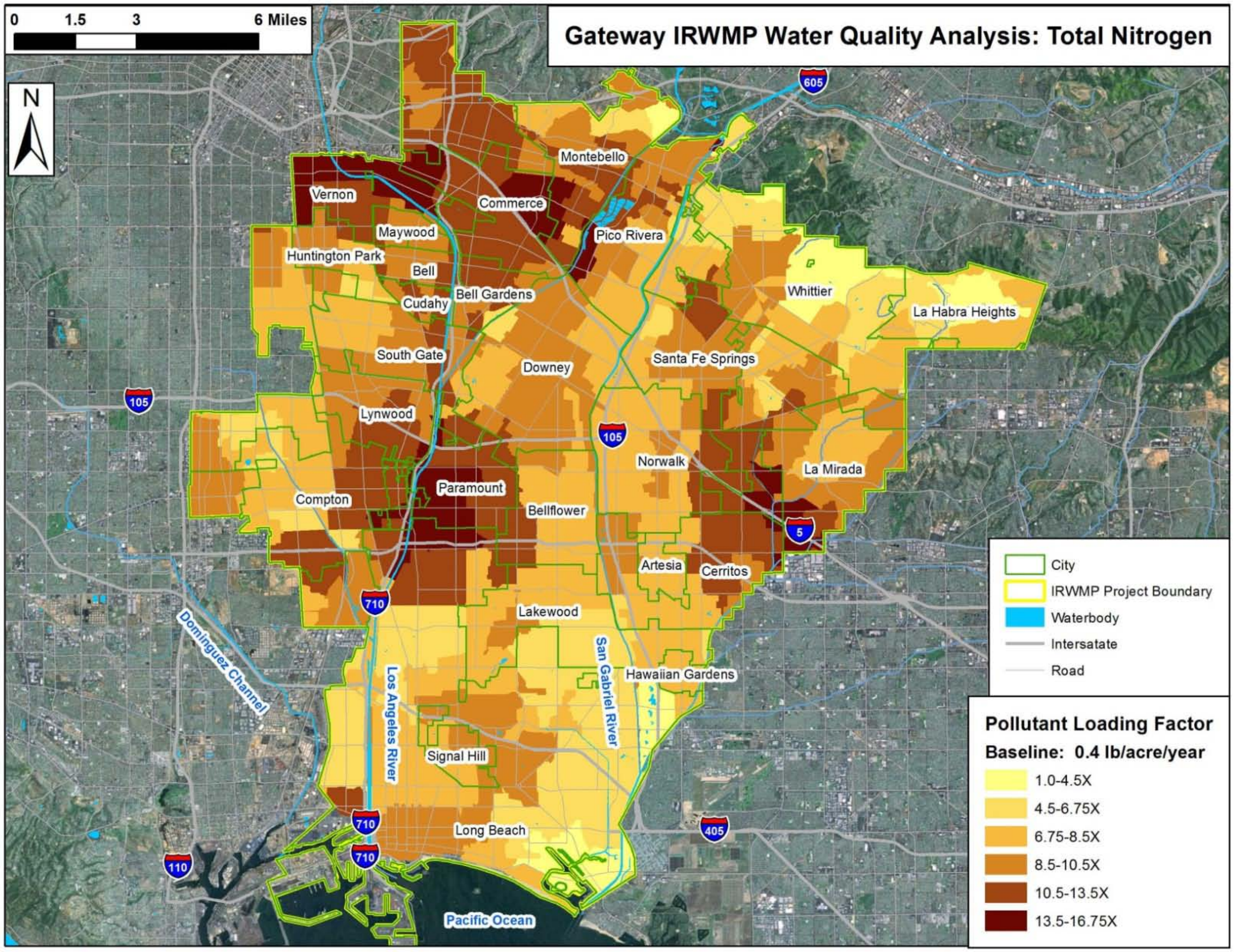

Figure 2-4 LSPC Modeling Results (1998 – 2006) – Total Nitrogen

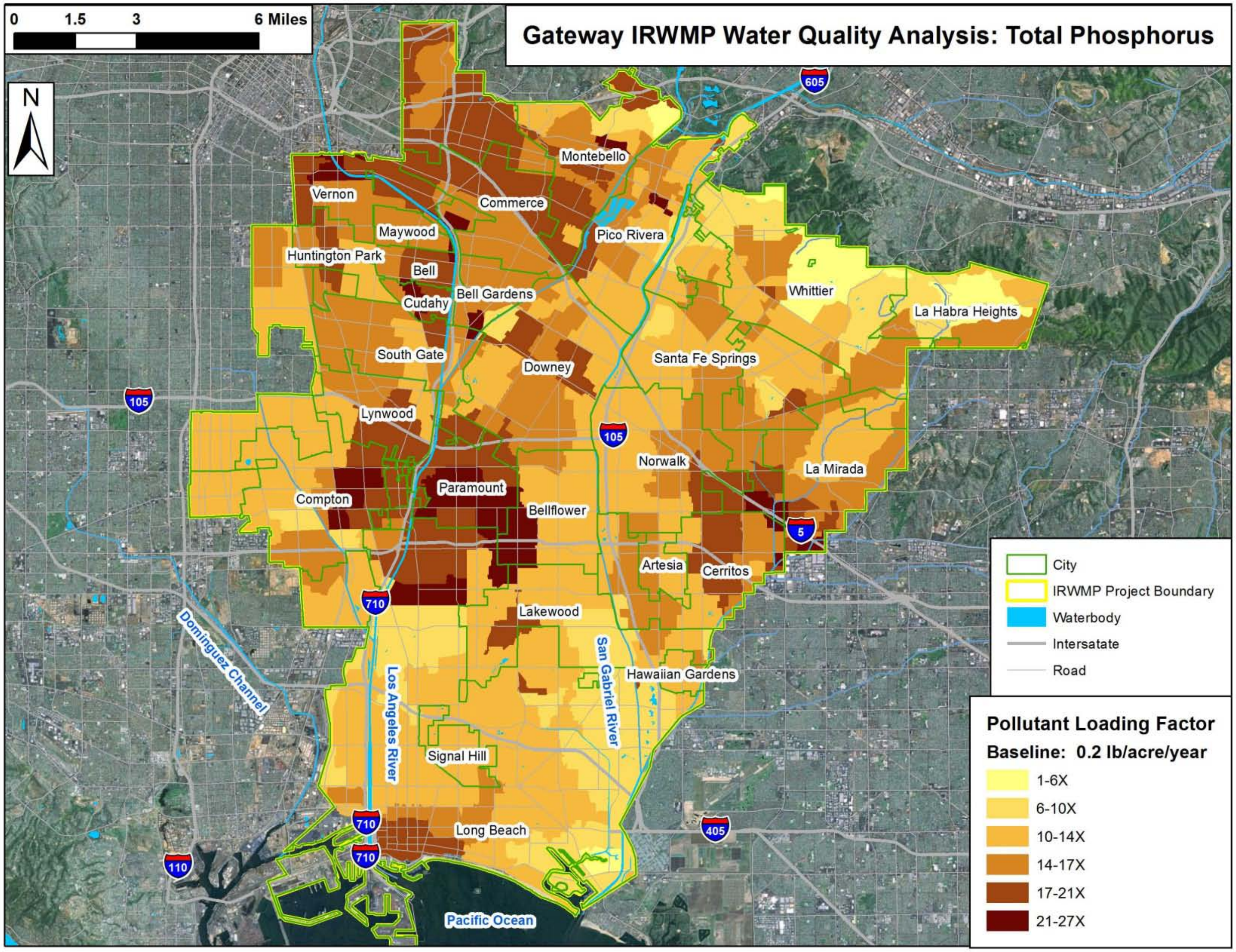

Figure 2-5 LSPC Modeling Results (1998 – 2006) – Total Phosphorus

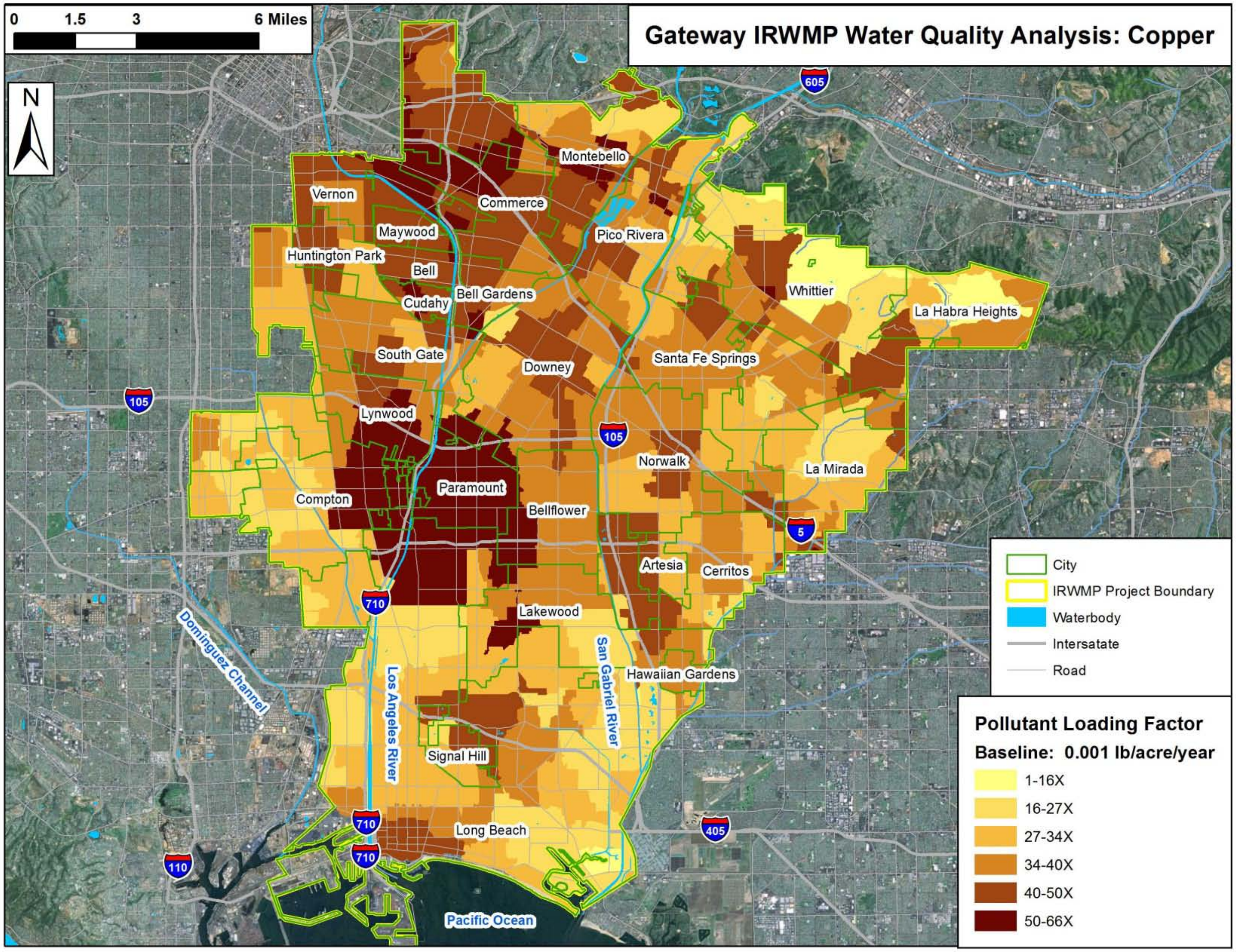

Figure 2-6 LSPC Modeling Results (1998 – 2006) - Copper

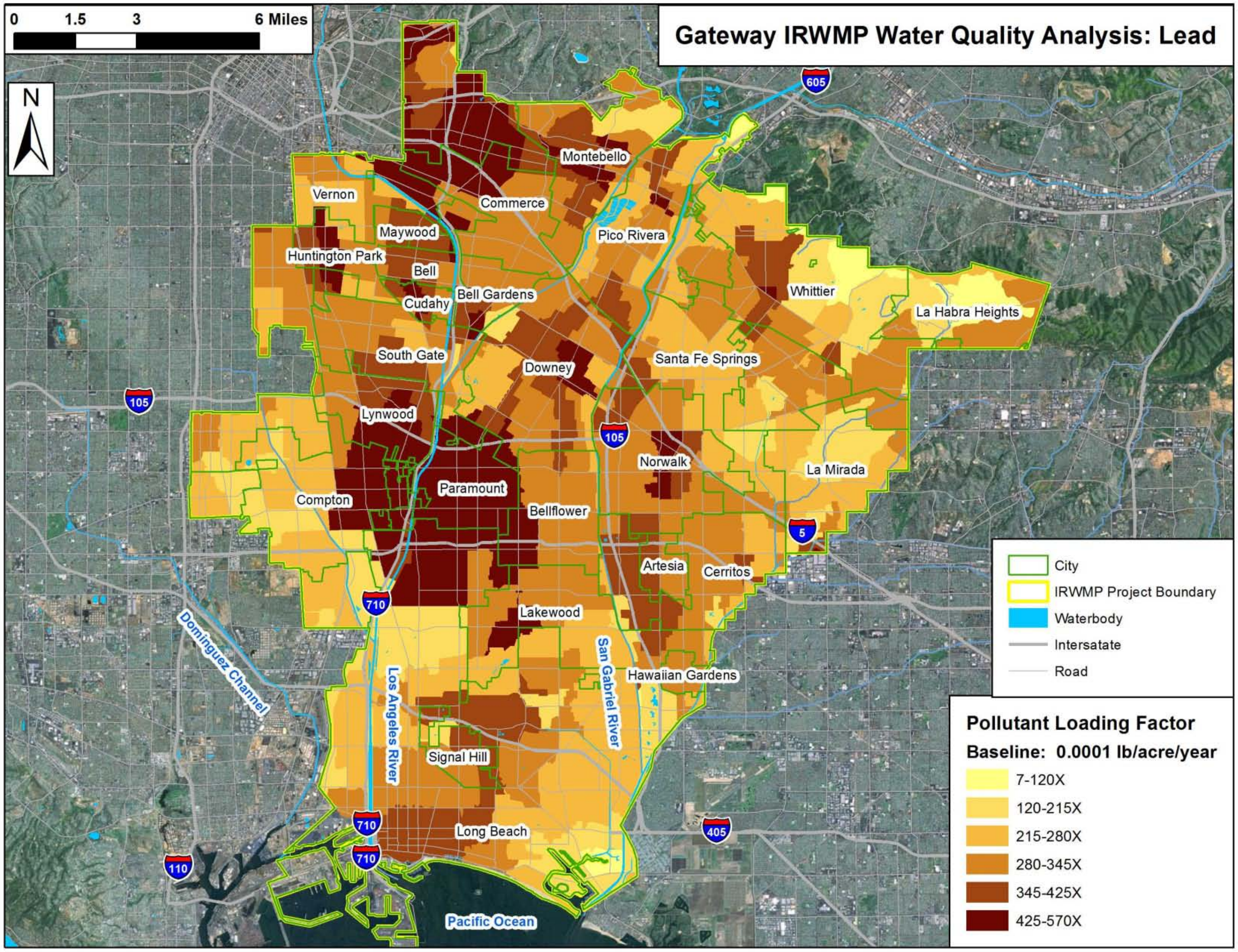

Figure 2-7 LSPC Modeling Results (1996 – 2008) - Lead

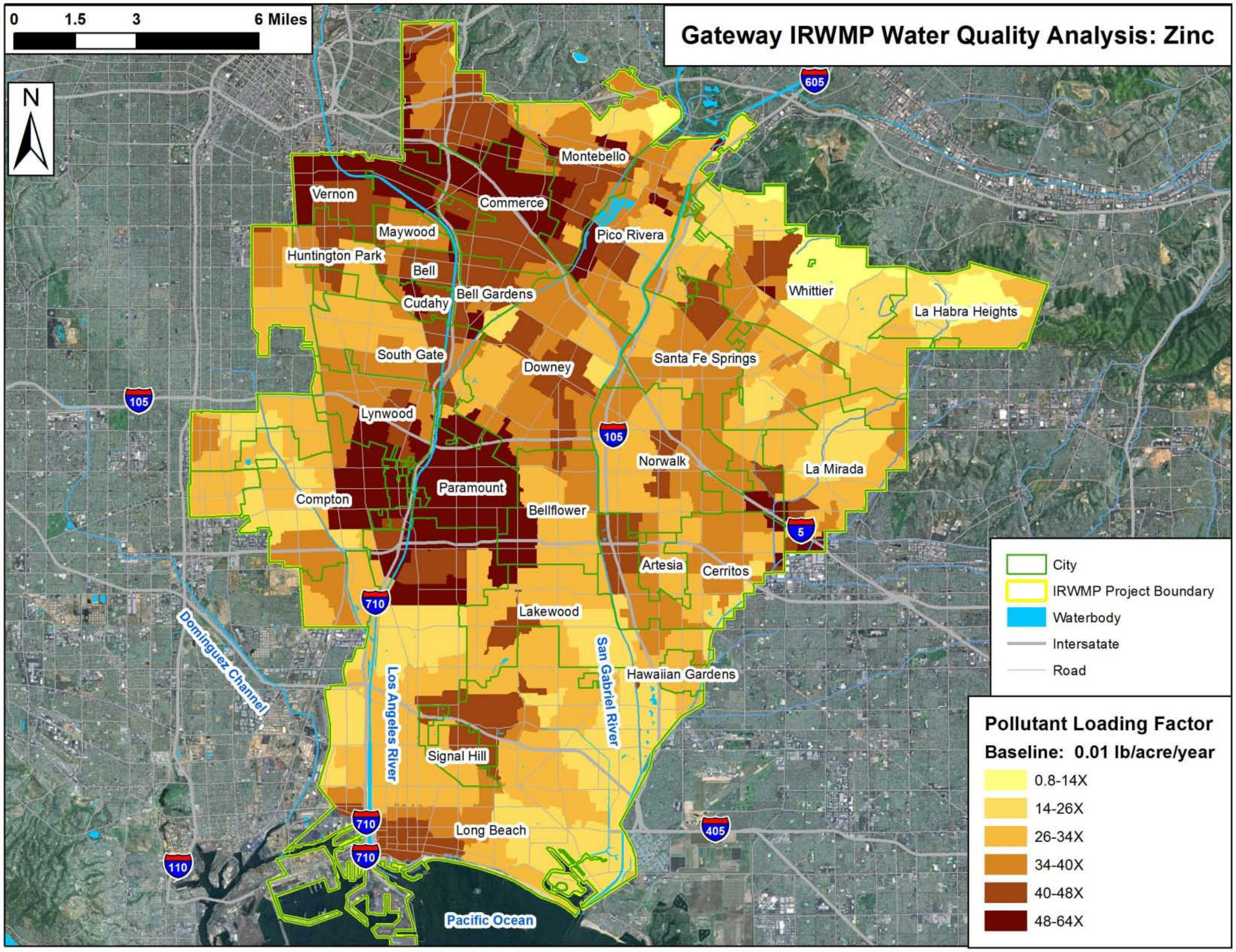

Figure 2-8 LSPC Modeling Results (1996 – 2008) - Zinc

3 Best Management Practices

Given the multiple sources of stormwater impacts and diverse urban land uses in the Gateway IRWMP Region, the Gateway Authority faces multiple challenges when selecting stormwater BMPs, including their locations, types, sizes, and quantifying their performance. Most of the structural BMPs that are appropriate for the Gateway Region fall into two main categories:

1. **Centralized BMPs:** practices that treat relatively large drainage areas including extended dry detention basins and water quality wet ponds.

2. **Distributed BMPs:** practices that treat local runoff including swales, bioretention, rain barrels, cisterns, parking lot retrofits, permeable pavement, and downspout disconnection.

In many areas, centralized BMPs provide an economy-of-scale over distributed practices because they are able to capture/treat a larger drainage area; however, the cost and availability of land in the Gateway Region could greatly increase the cost of centralized BMPs. Nevertheless, centralized BMPs would still be considered for flow reduction/ water quality treatment in at least two cases: (1) where publicly-owned land is available, and (2) for TMDLs with large pollutant reduction requirements, meaning centralized BMPs might be necessary to meet flow and/or water quality objectives (despite their high cost).

When distributed BMPs are implemented correctly and maintained, significant stormwater flow and water quality improvements can be realized, perhaps more cost-effectively than centralized facilities. It should be noted that it is often difficult to ensure that distributed BMPs are being maintained to perform as designed. For example, rain barrels are only effective if they are emptied regularly for irrigation. Permeable pavement is only effective when it is free of sediment and other clogging debris. The large and/or varied distribution of distributed BMPs often makes it difficult to implement a regular maintenance program. On the other hand, distributed BMPs may provide additional multi-use benefits when compared to centralized BMPs including improved neighborhood aesthetics.

Some pollutant sources – like metals, fertilizers and pet waste – cannot be addressed by a limited number of structural BMPs; therefore, non-structural BMPs including public policies, education, and outreach may be necessary to support pollutant load reduction efforts. Potential non-structural BMPs include water conservation, true source control (e.g., eliminating copper from brake pads or banning pesticide use), citizen education, illicit discharge elimination, and channel restoration. Also, there are dry weather-specific BMPs that could be considered including low flow diversions which are not discussed herein.

The following descriptions outline the general characteristics of centralized and distributed BMPs.

Centralized BMPs (draining/treating larger areas)

Dry Extended Detention

These devices store stormwater runoff and reduce stormwater peak flow rates. Stormwater enters the device through an inlet, which may be a grass-lined channel or stormwater pipe. An embankment detains stormwater, and an outlet riser controls the downstream release rate of the impounded water. Stormwater is detained for a longer period of time than in conventional dry detention ponds; the longer detention time allows for more removal of Total Suspended Solids (TSS) and nutrients from the stormwater.

Water quality (wet) ponds

A wet pond maintains a permanent pool of water. This device stores stormwater runoff and reduces stormwater flow. The ponding of stormwater allows excess sediment to settle out of the water and encourages bacteria to use excess nutrients. Portions of other pollutants may also be removed. Stormwater first enters a forebay, which is a small depression lined with rocks that slows the incoming stormwater flow and settles out larger particles. The outlet structure and emergency spillway control the rate of water draining out of the pond.

Distributed BMPs (draining/treating smaller areas)

Bioretention

Bioretention areas are depressions filled with 2 to 4 feet of sandy soil and planted with drought and flood tolerant plants. Stormwater drains into the surface of the bioretention area and, as the water infiltrates through the sandy soil, the soil and plants remove a portion of pollutants. In areas with sandy loam or other highly permeable soils, the water treated by the bioretention cell will infiltrate into the native soil. In areas that have soils with low permeability (typically clay-dominated soils), a gravel layer and underdrain pipe are placed below the sandy soil layer. Once the stormwater infiltrates through the treatment cell's sandy soil, it is drained out of the device through the underdrain pipe. Most bioretention areas are designed so that up to a foot of water can pond in the cell during a rain event. A weir is included in the bioretention area to bypass excess water above the ponding depth. Since bioretention areas use mulch and a variety of shrubs and small trees, they can be easily incorporated into existing landscaping.

Swales

A grass swale is a grass-lined channel with sloped banks. Culverts are used to pass stormwater under driveways and streets. Unlike water quality swales, grass swales do not have a sandy soil layer or gravel underdrains. Grass swales are used to convey stormwater runoff and slow stormwater flow. They are an alternative to storm sewer pipes, which produce higher stormwater flows than grass swales, especially for smaller storm events. Grass swales also remove some sediment if the stormwater flow is controlled.

Rainwater harvesting

Rainwater harvesting reduces runoff during a storm event by retaining a portion of the runoff for future use. This can be accomplished by using storage tanks called cisterns or rain barrels. Cisterns are tanks that hold rainwater for irrigation and other uses. The cistern pictured to the right can hold over 200 cubic feet of water. These can be pre-manufactured or constructed onsite. They also can be incorporated inconspicuously into the side of a building. Rain barrels typically hold less water than cisterns, about 8 cubic feet per rain barrel. If these devices are designed properly and if water is reused frequently, they can be used to control stormwater runoff, reduce stormwater flow, and remove some pollutants.

Retrofit of parking area to disconnect impervious surfaces

This strategy involves the re-design of a parking lot so that runoff is captured and treated in distributed stormwater BMPs like bioretention. Grass swales may be employed as a conveyance to the bioretention, providing additional pollutant removal.

Disconnect downspouts

This practice involves reducing the amount of concentrated stormwater runoff leaving a site by disconnecting roof downspouts from drainage systems. Some houses or other buildings may not be directly connected to the municipal storm sewer system, but still may have an onsite drainage system or diffused runoff that could be disconnected. The roof runoff is diffused and directed into natural areas, gardens, bioretention cells, etc.

Permeable pavement

Permeable pavement differs from conventional asphalt and concrete in that it allows for infiltration of water during a rainfall event. Permeable pavement types include porous asphalt, porous concrete (shown to the right), and paving stones interspersed with sandy soil or other porous fill. These types of pavement vary in vehicular traffic capacity. Grass parking lots, reinforced with plastic rings, are typically used for overflow parking, while some permeable pavement can be designed to handle more frequent traffic.

4 Summary of Stormwater Problem Areas

The flooding survey and LSPC water quality model generated a multitude of maps with areas that could potentially be targeted by stormwater management strategies. These maps were combined into two figures that compose a *screening level* assessment to assist with prioritization management needs within the Gateway IRWMP Region, as follows:

- Figure 4-1 shows prioritized focus areas for flood mitigation measures based on results from the flooding survey. The map is not intended to be an exhaustive list of flood prone areas; rather, it is intended to be a *starting point* when developing a more rigorous plan for addressing flooding issues. The potential prioritization in terms of flooding severity/frequency is expressed in order from 1 (red) to 4 (green). Note that these are *areas in which flooding issues occur*; it may be necessary or cost-effective to capture stormwater in other/upstream areas to reduce the frequency/severity of flooding in these highlighted areas.

- Figure 4-2 shows primary and secondary focus areas for runoff and water quality management needs for the entire Gateway IRWMP Region. Like the flooding maps, the runoff and water quality maps and discussion below are solely intended to be a *starting point* when developing a more rigorous water quality improvement plans (TMDL implementation plans). The potential prioritization for efforts to reduce stormwater runoff/pollutants is shown as high priority (purple) and secondary priority (green). As described in Section 2, these highlighted areas are based on wet weather pollutant *generation*; efforts to quantify the relative *impact* of these areas on receiving water quality and *cost-effectiveness* of BMPs in these areas are important next steps.

The identified stormwater problem areas provide another "layer" of information for the Gateway stakeholders to develop projects that meet the overall goals and objectives of the IRWMP. The stormwater information herein should be combined with water supply and water quality information to identify, rank, and implement projects that provide multiple uses and benefits for the Gateway Region.

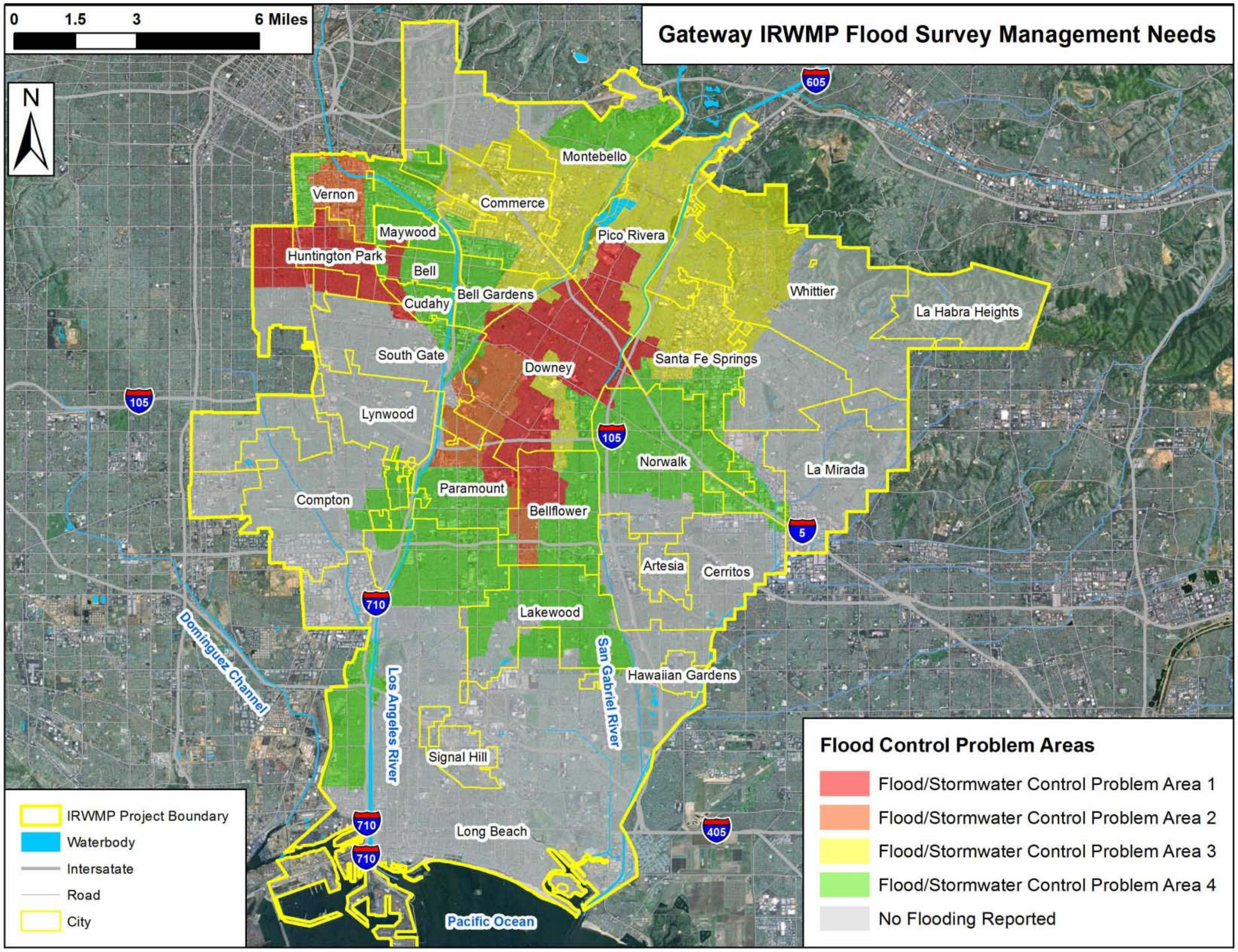

Figure 4-1 Prioritized Problem Areas for Flood Mitigation Measures

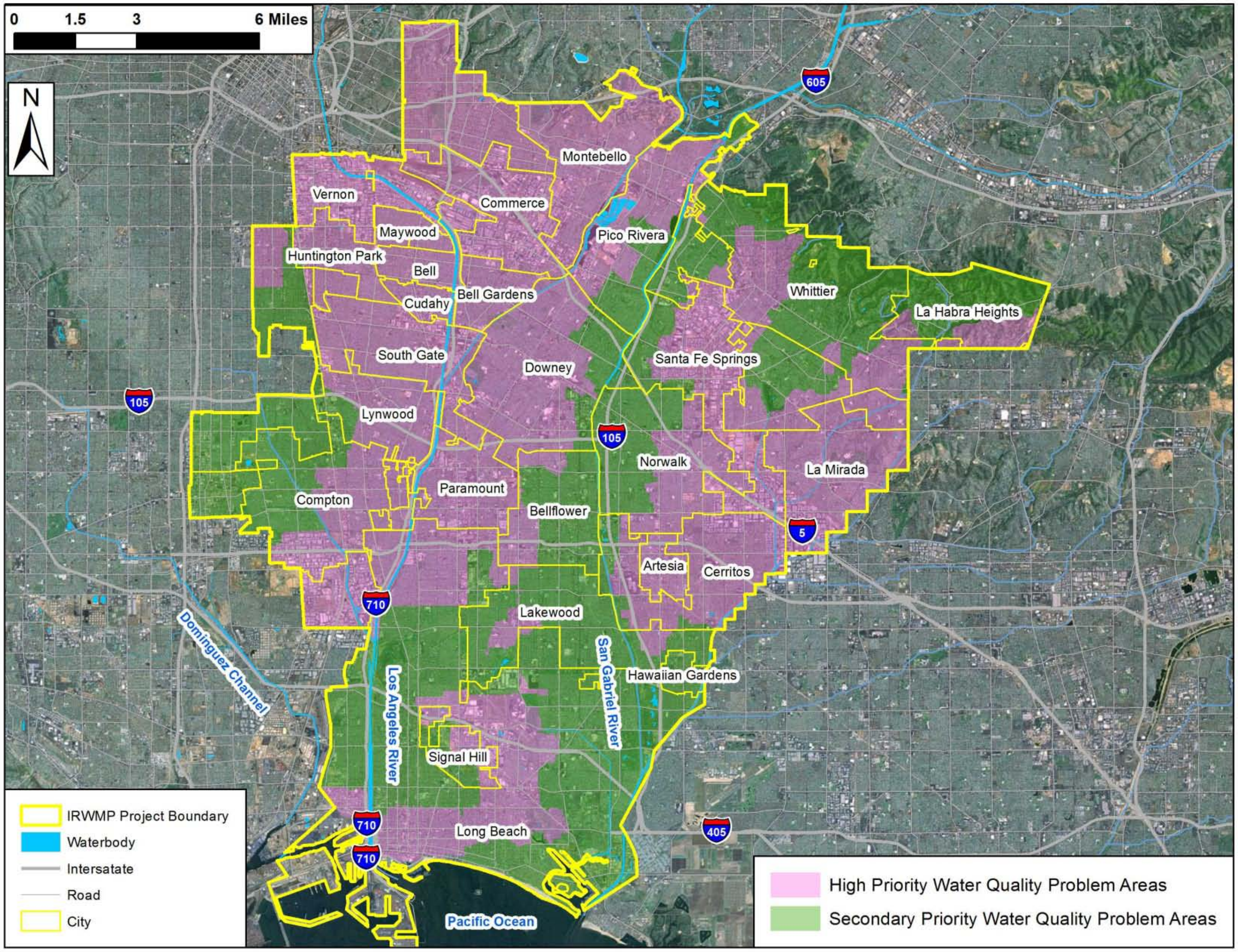

Figure 4-2 Primary and Secondary Problem Areas for Stormwater Quality Improvement Efforts

5 References

Tetra Tech. 2010a. *Los Angeles County Watershed Model Configuration and Calibration—Part I: Hydrology*. Prepared for County of Los Angeles Department of Public Works, Watershed Management Division, Los Angeles County, CA, by Tetra Tech, Pasadena, CA.

Tetra Tech. 2010b. *Los Angeles County Watershed Model Configuration and Calibration—Part II: Water Quality*. Prepared for County of Los Angeles Department of Public Works, Watershed Management Division, Los Angeles County, CA, by Tetra Tech, Pasadena, CA.

APPENDIX A Flood Survey Results

Name	Affiliation/ Organization	Title	Email address	Num	Response
Ed Estrella	City of Downey	Assistant Civil Engineer	eestrell@downeyca.org	1	DOWNEY AV: Between Florence Av and Gallatin Rd - area subject to street flooding particularly the west side of the street on mild rain storm event.
				2	PARAMOUNT BL: Between Firestone Bl and Florence Av - severe flooding during mild rain storm event, particularly on the west side of Paramount Bl (L.A. County Flood Control District had plans to construct "FLORMONT DRAIN" however was never built).
				3	IMPERIAL HWY: Between Woodruff Av and Rio Sans Gabriel - we encounter constant flooding on any mild rain storm event along the north side of Imperial Hwy and the frontage Rd adjacent to the Gabriel River Bridge.
				4	QUILL DRIVE: Between Old River School Rd and Rives Av - severe street flooding and overflows onto Rives Av during any large storm event.
				5	DOS RIOS: Between Glencliff Dr and Allengrove St - street is prone to flooding on a moderate rain storm event.
				6	LAKEWOOD BL: At Stewart & Gray Rd intersection - moderate street flooding on a moderate rain storm event
Christina Dixon	City of Huntington Park	Analyst	cdixon@huntingtonpark.org	7	1. a. severe 2000 Gage/ Alameda b. mild storm
				8	2. a. severe 1900 Slauson/ Alameda b. mild storm
				9	3. severe 2200 Randolph/ Albany b. mild storm
				10	4.a.severe 2700 Randolph/ Seville b. mild storm
				11	5. a.severe Gage/ Seville NE corner b. mild storm
				12	6 a.severe Florence/ Seville NE corner b. mild storm
				13	7. a. severe 2750 Gage/ Stafford b. mild storm
				14	8. a. severe 2900 Slauson/ Bicket b. mild storm
				15	9.a. severe 6900- 7100 Bissell b. mild storm Note nine locations with severe flooding in mild storm conditions
Bernardo Iniguez	City of Bellflower	Environmental Services Manager	biniguez@bellflower.org	16	Rosecrans Ave. at Sonrisa St. a. Severe flooding on street. b. During any storm event.
				17	Lakewood Blvd. at Oak St. a. Moderate to severe flooding on street. b. During large storm event.
				18	Virginia Ave. at Alondra Blvd. a. Mild to moderate flooding on street. b. During medium to large storm event.
				19	Carfax Ave. at Greenhurst St. a. Mild to moderate flooding on street. d. During medium to large storm event.
				20	17915 and 17914 Ardmore St. a. Mild to moderate flooding on street. b. During medium to large storm event.
Anthony Howard	Los Angeles County Sanitation Districts	Supervising Engineer II	ahoward@lacsd.org	21	General street flooding along Atlantic Ave. in the Cities of Lynwood and South Gate. LACSD has a sewer that runs along this street as well as a pumping plant in close proximity. Over the last 4-5 years the largest return frequency of storms we have seen has been about 5 years, and we have noticed street flooding with even less severe storms. So this area is subject to flooding with storms having return frequencies of less than 5 years. Also, storm runoff from this area has to be pumped into the LA River.
Sarah Ho	City of Paramount	Management Analyst	sho@paramountcity.com	22	Texaco St. between Alondra Blvd. and Somerset Blvd. a)moderate b)large storms
				23	Hunsaker Ave. and Alondra Blvd. a)moderate b)large storms
				24	Hunsaker Ave. and Myrrh St. a)moderate b)large storms
				25	Somerset Blvd. and Orizaba Ave. a)moderate b)large storms
				26	Adams St. and Indiana St. a)moderate b)large storms

Name	Affiliation/ Organization	Title	Email address	Num	Response
Samuel T Kouri	City of Montebello	Deputy City Engineer	skouri@cityofmontebello.com	27	Beverly Bl and Poplar Av. During moderate to heavy storms there is flooding due to the deteriorated condition of the CMP Connector Pipes.
				28	Lincoln Av. between San Gabriel Bl and LaMerced Av. During a moderate storm event Lincoln Av has to be closed because all lanes are under water. The catch basins and connector pipes in this area need to be reconstructed. The drainage in this area discharges into the Rio Hondo settling basin.
				29	Chapin Rd north of Union St. Chapin flooding is due to sunken areas. Chapin Rd is built over a landfill and there is no storm drain system
Shauna Clark	City of La Habra Heights	City Manager	shaunac@lhhcity.org	30	La Habra Heights doesn't have storm drains as other cities do. Water soaks into the earth and doesn't run off the way it would in other cities. However, having said large storms can create problems
Chau Vu	City of Bell Gardens	Acting PW Director	cvu@bellgardens.org	31	Gage at Specht north side. At times the storm drains cannot handle the amount of water but when the rain subsides they drain. Mild & only large storms.
				32	Chalet at Foster Bridge, mild & only large storms
				33	Shull and Jaboneria floods but that area drains to a flood control channel and when the channel is high our streets don't drain. Mild & only large storms.
Adrian Diaz	City of Pico Rivera	Senior Tech	adiaz@pico-rivera.org	34	All of Pico Rivera, and many other cities are in a flood zone. It takes 45 inches of rain to cause the whittier dam to overflow and flood cities. Not certain how this is being handled by IRWM.
				35	1.5600 Lindsey & Reichling Lane (Moderate) storm drain 4 blocks way size?
				36	2.Corner of 9700 Terradell and Orange (Moderate) Stormdrain 3 blocks away
				37	3. 4600 Rosemead at Olympic (Moderate) No storm drians
				38	4. Paramont at Loch Alene (Moderate) storm drian 5 blocks away
				39	5. 8800- 8900 Washington Blvd
				40	Corner of 9900 Terradell and Pico Vista(Moderate) San Gabriel River dumps onto street and floods area, issue with flood control gate- outfall .
Ramiro Hernandez	City of South Gate	Water Operations Foreman	rhernanderz@sogate.org	41	The area bounded by the Los Angeles River to the east to Atlantic ave. to the west; from Firestone Blvd. to the north to Imperial Hwy. to the south, experience moderate to severe flooding during large storms when the L.A. River is more than half full.
				42	The area bounded by the Los Angeles River to the west to the Long Beach Frwy (710) to the east; from Firestone Blvd. to the north to the Long Beach Frwy (710) over the Los Angeles River to the south, is a mobile home park (Thunderbird Villas) that is next to the Bandini Flood Control Channel that has faced potential evacuations during large storms when the Los Angeles River is more than half full. The Bandini Flood Control Channel is very close to overflowing during large storms to within one foot from the top of the Bandini Flood Control Channel.
Scott B. Rigg	City of Vernon	Public Works & Water Superintendent	srigg@ci.vernon.ca.us	43	Location No. 1: Boyle Avenue at Vernon Avenue. Severe. Large Storm.
				44	Location No. 2: Fruitland Avenue east of Gifford Avenue. Moderate. Large Storm.
				45	Loaction No. 3: District Blvd. east of Heliotrope Avenue. Moderate. Large Storm.
				46	Location No. 4: Santa Fe Avenue at Vernon Avenue. Moderate. Large Storm.
				47	Location No. 5: 48th Street west of District Blvd. Moderate. Large Storm
				48	Location No. 6: 49th Street west of District Blvd. Moderate. Large Storm.
				49	Location No. 7: 50th Street west of District Blvd. Moderate. Large Storm.
				50	Location No. 8: 27th Street west of Santa Fe Avenue. Moderate. Large Storm.
				51	Location No. 9: Maywood Avenue at Fruitland Avenue. Moderate. Large Storm.

Name	Affiliation/ Organization	Title	Email address	Num	Response
Frank D. Beach	City of Santa Fe Springs	Utility Services Manager	Frankbeach@santafesprings.org	52	Orr and Day Road and Florence Avenue Moderate flooding 1 inch of rainfall within 24 hrs.
				53	Norwalk Blvd North of Los Nietos Road Severe Flooding Moderate rain fall
				54	Slauson Ave west bound from Santa Fe Springs Road Mild flooding Moderate rain fall
Gina Nila	City of Commerce	Environmental Services Manager	ginan@ci.commerce.ca.us	55	Jillson St. - c/s Eastern to Fitzgerald, moderate during consistent rains.
				56	Kuhl - c/s Gage & rear entrance to Veteran's Park, moderate during consistent rains.
				57	Washington Blvd. - c/s under I-5 freeway bridge. Experienced moderate flooding for the first time this month from a heavy storm.
				58	Bandini Blvd. - West of Malt, moderate flooding from consistent rains.
				59	Greenwood Ave. - c/s Slauson Blvd., moderate flooding from consistent rains.
				60	6008-5824 Ferguson and between Atlantic and Gerhart, moderate flooding from consistent rains.
				61	Garfield Ave. - c/s Washington Blvd. and Flotilla, moderate flooding from consistent rains.
				62	Astor - c/s Jardine & Quigley, moderate flooding from consistent rains.
Grissel Chavez	City of Norwalk	Public Service Superintendent	gchavez@ci.norwalk.ca.us	63	Curtis and King, north of Imperial Highway - Moderate - flooding caused by large storms; insufficient drainage issues and grading of street
				64	Dalwood, south of Adoree - Moderate - flooding caused by large storms; grading of street
				65	Hoxie, north of Imperial Highway - Moderate - flooding caused by large storms; grading of street; insufficient drainage
				66	Firestone Blvd, from Shoemaker to Dinard - Moderate - flooding caused by large storms; grading of street / insufficient drainage
				67	Dalwood, south of Foster Road- Moderate - flooding caused by large storms; grading issues / insufficient drainage
Lisa Ann Rapp	City of Lakewood, Department of Public Works	Diretor of Public Works	lrapp@lakewoodcity.org	68	Candlewood Street from Briercrest to Ocana. Flooding can be mild to moderate when there are extended length storms, and the water level in the open drainage channels has risen. Flap gates close and do not allow the water on the streets to drain into the channel. Once it stops raining and the water level in the adjacent channel goes down, the street will drain. Several years ago, about 15 cars stalled out on this segment of roadway.
				69	Harwick Street and Yearling Street west of Paramount Blvd. This area can flood when there are large storms for several days. The water will come up to the resident's garages and front doors. This happens infrequently.
				70	Carfax Avenue west of Palo Verde Avenue. Flooding can be mild to moderate when there are extended length storms, and the water level in the open drainage channels has risen. Flap gates close and do not allow the water on the streets to drain into the channel. Once it stops raining and the water level in the adjacent channel goes down, the street will drain.
Dan Wall	City of Whittier	Assistant Director of Public works	dwall@cityofwhittier.org	71	n/a
				72	n/a
				73	n/a
				74	n/a
				75	n/a
Carlos Alba	City of Artesia	City Enginner	acecivil@aol.com	76	No flooding issues in tha last 16 years.