



**US Army Corps
of Engineers** ®
Los Angeles District



**LOS ANGELES RIVER/RIO HONDO
DIVERSION 1 LEVEE SYSTEM
LOS ANGELES COUNTY, CALIFORNIA
NLD SYSTEM ID # 3805010044**

**PERIODIC INSPECTION REPORT NO. 2
GENERALIZED EXECUTIVE SUMMARY**

**FINAL SYSTEM RATING: MINIMALLY ACCEPTABLE
FINAL RATING DATE: SEPTEMBER 6, 2017**

PERIODIC INSPECTION REPORT PREPARED BY TETRA TECH
FOR THE U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT

SUBMITTED: JUNE 2017
INSPECTED: JULY 26-29 AND AUGUST 1-2, 2016

EXECUTIVE SUMMARY

This Executive Summary provides an introduction to the Periodic Inspection, an overview of the Los Angeles River/Rio Hondo Diversion 1 (LAR/RH1) Levee System, a summary of the major findings of the Periodic Inspection of the LAR/RH1 Levee System, and the overall rating for the LAR/RH1 Levee System.

1.1 Scope and Purpose of Periodic Inspections

The purpose of the LAR/RH1 Levee System Periodic Inspection is to identify deficiencies that pose hazards to human life or property. The inspection is intended to identify the issues in order to facilitate future studies and associated repairs as appropriate.

This assessment of the general condition of the LAR/RH1 Levee System is based on available data and visual inspections. Detailed investigation and analysis involving hydrologic design, topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of this levee system inspection.

1.2 System Summary

This report is for the Periodic Inspection Number 2 (PI No. 2) of the LAR/RH1 Levee System. The PI No. 1 of the LAR/RH1 Levee System was conducted by URS Group, Inc. (URS) on behalf of the U.S. Army Corps of Engineers, South Pacific Division, Los Angeles District (USACE SPL) in 2010. The results of the PI No. 1 are documented in the reports titled *Los Angeles River/Rio Hondo Diversion 1 Levee System Periodic Inspection Report No. 1 Volume 1- Text and Appendix A* and *Los Angeles River/Rio Hondo Diversion 1 Levee System Periodic Inspection Report No. 1 Volume 2- Appendices B Through J (PI Report No. 1 [USACE SPL 2012a and 2012b])*.

The LAR/RH1 Levee System is part of the Los Angeles County Drainage Area (LACDA) and is composed of two levee segments (Figure 1):

- Rio Hondo LAR/RH1 Levee Segment
- Los Angeles River LAR/RH1 Levee Segment

The upstream limit of the LAR/RH1 Levee System is at the upstream end of the Rio Hondo LAR/RH1 Levee Segment, which is located at Whittier Narrows Dam (approximately 3,213 feet upstream of Beverly Boulevard) in the city of Pico Rivera. The downstream limit of the LAR/RH1 Levee System is at the downstream end of the Los Angeles River LAR/RH1 Levee Segment, which is located at the Pacific Ocean (approximately 2,000 feet downstream of Ocean Boulevard in the city of Long Beach). The total distance of the LAR/RH1 Levee System is approximately 107,066 feet (20.28 miles). The leveed area contains residential, commercial, industrial, and civic improvements. This area is located east of the Los Angeles River LAR/RH1 Levee Segment and southeast of the Rio Hondo LAR/RH1 Levee Segment, south of Whittier Narrows Dam, west of California State Route 19 (Rosemead Boulevard/Lakewood Boulevard), north of California State Route 90 (Imperial Highway), and west of the Union Pacific Railroad (UPRR) and of naturally high ground at Bixby Knolls and Signal Hill

The Rio Hondo LAR/RH1 Levee Segment is located on the left/east bank of the Rio Hondo from approximately Rio Hondo (RH) Station 441+13 (Whittier Narrows Dam) to the Rio Hondo/Los Angeles River confluence at approximately RH Station 3+82 (i.e., Los Angeles River [LAR]

Station 636+35), a distance of 43,731 feet (8.28 miles). It is located in the State of California in Los Angeles County, in the cities of South Gate, Downey, Montebello and Pico Rivera.

The Los Angeles River LAR/RH1 Levee Segment is located on the left/east bank of the Los Angeles River in the State of California in Los Angeles County, in the cities of South Gate, Compton, Paramount, and Long Beach. The Los Angeles River LAR/RH1 Levee Segment extends from the Los Angeles River/Rio Hondo confluence, at approximately LAR Station 636+35 (i.e., RH Station 3+82) to approximately LAR Station 3+00 (Pacific Ocean), a distance of 63,335 feet (12.00 miles).

The LAR/RH1 Levee System consists of an earthen levee embankment and a trapezoidal channel with either riprap, grouted stone, or reinforced-concrete on the riverward slope. Other features along the LAR/RH1 Levee System include the Rio Hondo Spreading Grounds Headworks Structure, parapet walls, retaining walls, 192 conduits associated with the side-drainage structures, five control sills, 13 pump stations, 43 bridge crossings, 27 access ramps, numerous utility crossings, landscaping, and irrigation.

The LAR/RH1 Levee System, along with other similar works in the LACDA, was authorized initially by the Emergency Relief Act of 1935 to provide drainage and flood control. On June 30, 1937, this levee system was transferred to the more comprehensive project adopted in the Flood Control Act of June 22, 1936. Portions of the Los Angeles River channel were improved under the provisions of the Flood Control Act of 1941. The LACDA, California Flood Control Improvements project was authorized under Title I, Section 101(b) of the Water Resources Development Act of 1990 (Public Law 101-640) (USACE SPL 1999d). The National Levee Database Number (NLD No.) for the LAR/RH1 Levee System is 3805010044. The construction of the LAR/RH1 Levee System was completed on January 24, 1958 and subsequent improvements were completed circa 2000. The LAR/RH1 Levee System is operated and maintained by Los Angeles County Department of Public Works (LACDPW).

1.3 Summary of Major Deficiencies Found

The PI No. 2 of the LAR/RH1 Levee System was conducted on July 26-29, 2016 and August 1-2, 2016, and LACDPW staff were present. During the inspection of the levee system, deficiencies were noted for which remedial actions are required. The following major deficiencies of the project features were noted during the PI No. 2.

- Rio Hondo LAR/RH1 Levee Segment:
 - Levee Embankment:
 - Non-Compliant Vegetation Growth: Significant vegetation growth including trees with trunks larger than 2-inches in diameter and shrubs were present on the landward slope and landward toe. In addition, there were intermittent tree stumps on the landward slope.
 - Depressions/Rutting: There were holes through the asphalt concrete pavement on the access road measuring up to 30 inches deep. In addition, there were depressions and rutting on the landward slope measuring up to 12 inches deep.
 - Revetments other than Riprap: The grouted stone at the top of the riverward slope was undermined approximately 3 feet deep and 3 feet long at one location. The undermining was caused by a depression that had formed on the levee crown and was concentrating local-surface runoff behind the grouted stone.

- Interior Drainage Systems:
 - Vegetation and Obstructions: The outlet or inlet of four of the side-drainage structures were obstructed by more than 10 percent by vegetation, sediment, and/or debris.
 - Concrete Surfaces: There was spalling on the concrete apron at the outlet of a 30-inch-diameter steel pipe side-drainage structure. Water was observed infiltrating through the spall between the concrete apron and grouted stone.
 - Culverts/Discharge Pipes: There were several pipes that have been video inspected and were noted to have damage/deterioration. In addition, there are still pipes that have not been video inspected.
 - Flap Gates: One of the flap gates at the downstream end of the three 48-inch-diameter RCP side-drainage structures has cracks measuring up to 24 inches long.
- Pump Stations:
 - Power Source: Power pedestal (SCE meter) was run over by a truck and no power was available on site during the initial inspection at one pump station. A generator was subsequently brought to the pump station on August 2, 2016, and the pumps were operated. Nonetheless, repair of the permanent power source is required.
 - Megger Testing on Pump Motors and Critical Power Cables: No megger testing had been performed to date for the pump stations.
- Los Angeles River LAR/RH1 Levee Segment:
 - Levee Embankment:
 - Non-Compliant Vegetation Growth: Significant vegetation growth including trees with trunks larger than 2-inches in diameter and shrubs were present on the landward slope and landward toe. In addition, there were intermittent tree stumps on the landward slope and riverward slope.
 - Erosion/Bank Caving: There was erosion measuring up to 3 feet high and 6 feet wide at the toe of the landward slope. In addition, there was an erosion gully measuring 2 feet deep and 20 feet in length, which was beginning to undermine the levee crown.
 - Depressions/Rutting: There were depressions and rutting on the landward slope measuring up to 12 inches deep.
 - Riprap Revetments and Bank Protection: Riprap bench, approximately 100 feet long, was missing at the toe of the riverward slope near the control sill.
 - Seepage: Wet areas of soil, caused by either a broken irrigation pipe or the subgrade dripline emitter tubing, were observed at intermittent locations on the landward slope.
 - Floodwalls:
 - Non-Compliant Vegetation Growth: There was a tree measuring 18 inches in diameter adjacent to the landside of a retaining wall.
 - Interior Drainage Systems:
 - Vegetation and Obstructions: The outlet or inlet of five of the side-drainage structures were obstructed by more than 10 percent by vegetation, sediment, and/or debris.
 - Encroachments: The outlet of seven of the side-drainage structures were abandoned and/or plugged with concrete at the outlet. The abandonment of these side-drainage structures was not permitted by the USACE SPL.

- Fencing and Gates: The chain-link fence was damaged at one of the abandoned side-drainage structures. A fall from the wing wall where the fence was damaged could result in injury.
- Culverts/Discharge Pipes: There were several pipes that have been video inspected and were noted to have damage/deterioration. In addition, there are still pipes that have not been video inspected.
- Flap Gates/Flap Valves/Pinch Valves: A 42-inch-diameter RCP side-drainage structure did not have a flap gate and no documentation was available to show if a flap gate was required. The flap gate was missing at the outlet of the abandoned 30-inch-diameter RCP side-drainage structure. The flap gate at the outlet of a 96-inch-diameter RCP side-drainage structure has multiple cracks and holes caused by corrosion.
- Pump Stations:
 - Pump Station Operations and Maintenance Equipment Manuals: At one pump station, all operations and maintenance manuals were missing.
 - Pumps: At one pump station, the pump could not be operated because the electric motor was out of service.
 - Motors, Engines, Fans, Gear Reducers, Back Stop Devices: At one pump station, motor no. 3 could not be operated; the Variable Frequency Drive (VFD) had failed.
 - Electrical Systems: At one pump station, the VFD for pump no. 4 was broken/offline since the original pump station construction.
 - Megger Testing on Pump Motors and Critical Power Cables: No megger testing had been performed to date for the majority of the pump stations.
 - Cranes: At one pump station, the crane did not operate and there was minor corrosion on metal parts.
- Flood Damage Reduction Channels:
 - Concrete Surfaces: Spalling was observed on the channel invert which measured up to 12 inches deep and 24 inches wide.

1.4 Overall Rating

The Levee Safety Officer Out-Brief Meeting was held on November 4, 2016 and a follow-up meeting was held on November 16, 2016. An engineering determination has concluded that the observed deficiencies would not prevent the system from performing as intended during the next significant runoff event. Therefore, the Levee Safety Officer (LSO), Los Angeles District, has determined the overall rating of the LAR/RH1 Levee System to be “Minimally Acceptable.”

A “Minimally Acceptable” system rating is defined as, “One or more items are rated Minimally Acceptable or one or more items are rated Unacceptable and an engineering determination concludes that the Unacceptable items would not prevent the segment/system from performing as intended during the next significant runoff event.”

The Local Sponsor will be notified of the overall rating of the levee system by letter with instructions to correct the Minimally Acceptable rated items within two years so that they do not deteriorate further and become Unacceptable.

1.5 Overall System Rating Comparison

The Overall System Rating for this levee system associated with the PI No. 1 was “Unacceptable.” The Overall System Rating for this levee system associated with the PI No. 2 was “Minimally Acceptable.” The “Unacceptable” rating associated with the PI No. 1 was driven by the following:

- Rio Hondo LAR/RH1 Levee Segment:
 - Erosion/Bank Caving – erosion in the channel was identified as threatening to undermine the levee slope protection. The majority of the erosion gullies were subsequently repaired by LACDPW.
 - Cracking – deep longitudinal cracks between the access road and channel were noted. This was subsequently repaired by LACDPW.
- Los Angeles River LAR/RH1 Levee Segment:
 - Erosion/Bank Caving – erosion on the landside slope of the levee was noted that threatened the stability and integrity of the levee. The majority of the erosion gullies were subsequently repaired by LACDPW.
 - Flap gates – flap gates were noted as missing, inoperable, or damaged. The damaged flap gate noted in the PI No. 1 was still observed in PI No. 2 and issues with missing or inoperable gates were still present but were not determined to be a critically unacceptable rating.
 - Tilting, Sliding, or Settlement of Concrete Structures – the tilting observed in the PI No. 1 was not seen by LACDPW staff or noted in the PI No. 2.
 - Vegetation and Obstructions – the critically unacceptable vegetation and sediment noted during the PI No. 1 was located at side drainage structures and prevented the intended use of those structures. This vegetation and sediment was subsequently removed from the side-drainage structure outlets flagged during PI No. 1.

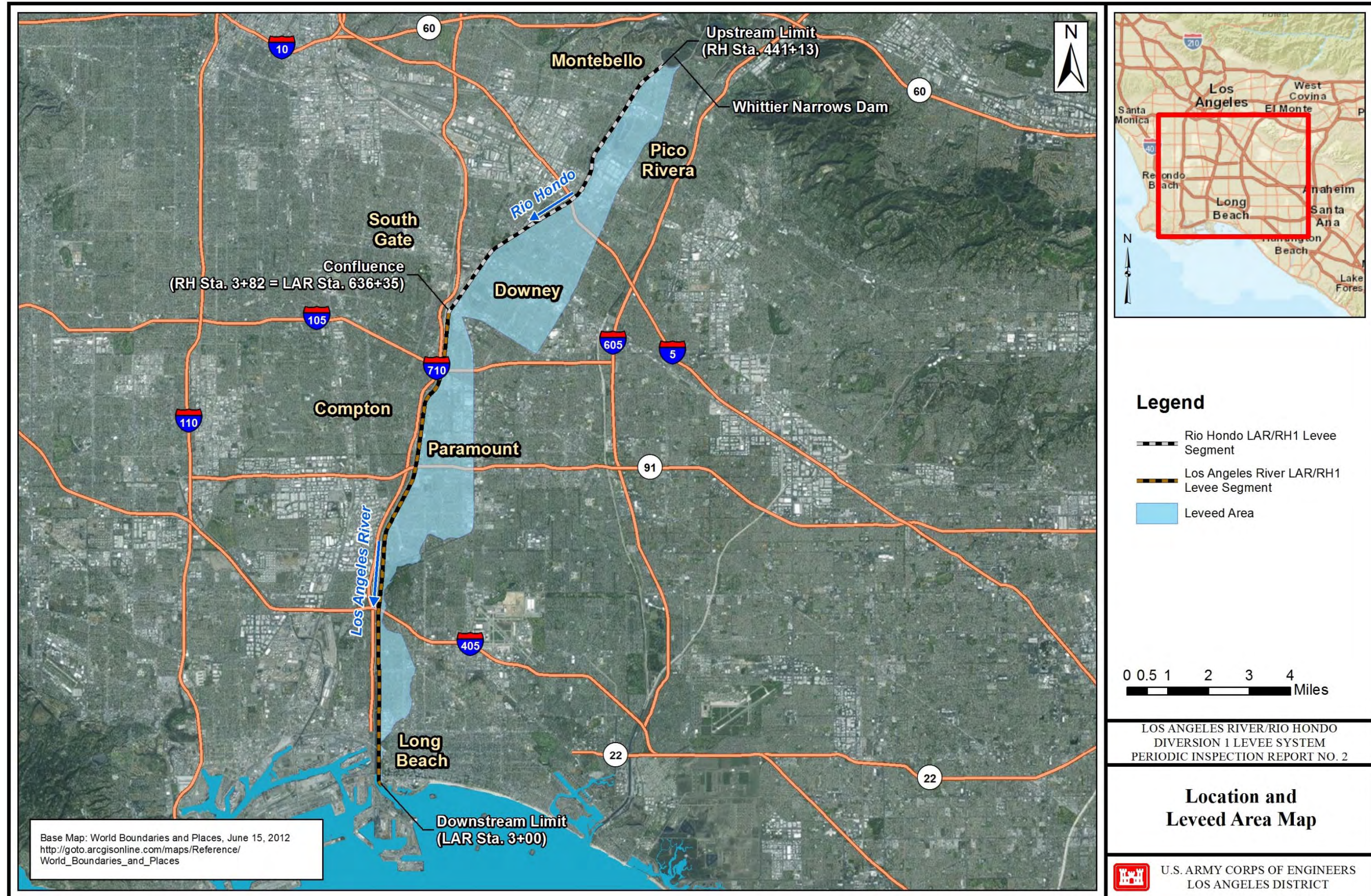


Figure 1