Case Study
LCP Chemicals Site
Phytoremediation Pilot Project

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Remedial Project Manager

EPA Region 4

Outline of Presentation

- Background Information
- Groundwater Quality
- Groundwater Seeps
- Project Goal
- Implementation of Project
- Community and Agency Concerns
- Current Status
- Next Steps
- Lessons Learned

Background Information

- 550-acre site
- Former oil refinery, paint manufacturing co., power plant, and chlor-alkali facility operated from 1919-1994
- Significant PRP-led removal actions in 1999 ($60 million)
- Soil and sediment contaminated with lead, mercury, and PCBs
- Fish advisories
- Currently in RI/FS phase

Groundwater Quality

- Multiple rounds of horizontal and vertical well data
- Hg levels as high as 330 ppb and Pb as high as 120 ppb
- Hg found below a sandstone layer
- Caustic Brine Pool below old cell buildings
- Removal Action

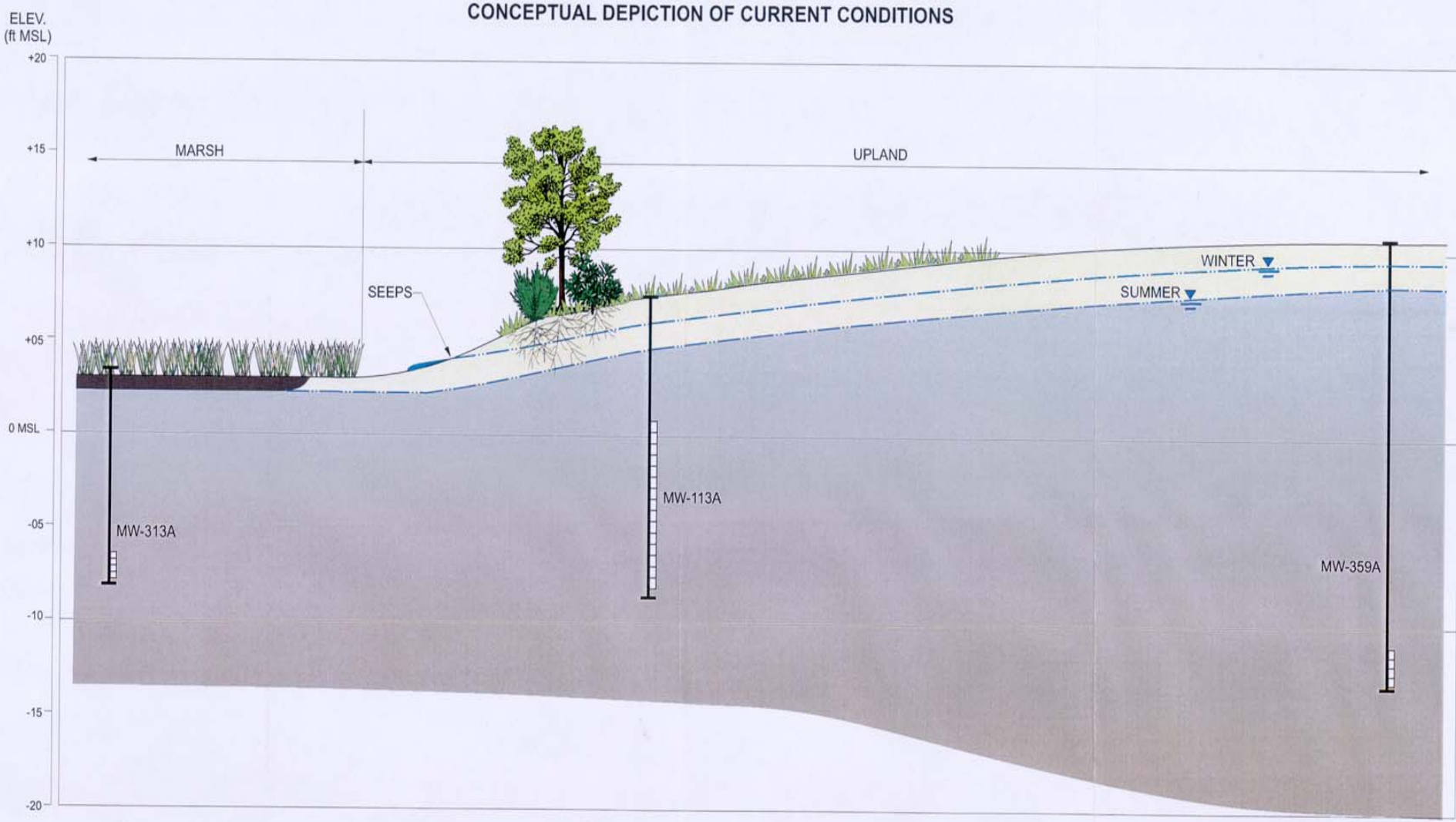
Groundwater Seeps

- During conditions of high water table, seepage of groundwater occurs along portions of the shoreline that separates the upland soils from the tidal marsh
- Dark brown color
- Some COCs present at elevated levels (74 ppb Hg and 60 ppb Pb)

Project Goal

- To locally suppress the groundwater table (0.9 ft) and therefore, prevent the seeps from recontaminating the marsh
- Secondary Goals
  - Create a root zone that will degrade organic contaminants through microbial degradation
  - Stabilize metals and take them up (lower mobility and availability)

CONCEPTUAL DEPICTION OF CURRENT CONDITIONS



LEGEND

POTENTIOMETRIC SURFACE

MW-1 MONITORING WELL IDENTIFICATION

WELL SCREEN

HORIZONTAL: NOT TO SCALE

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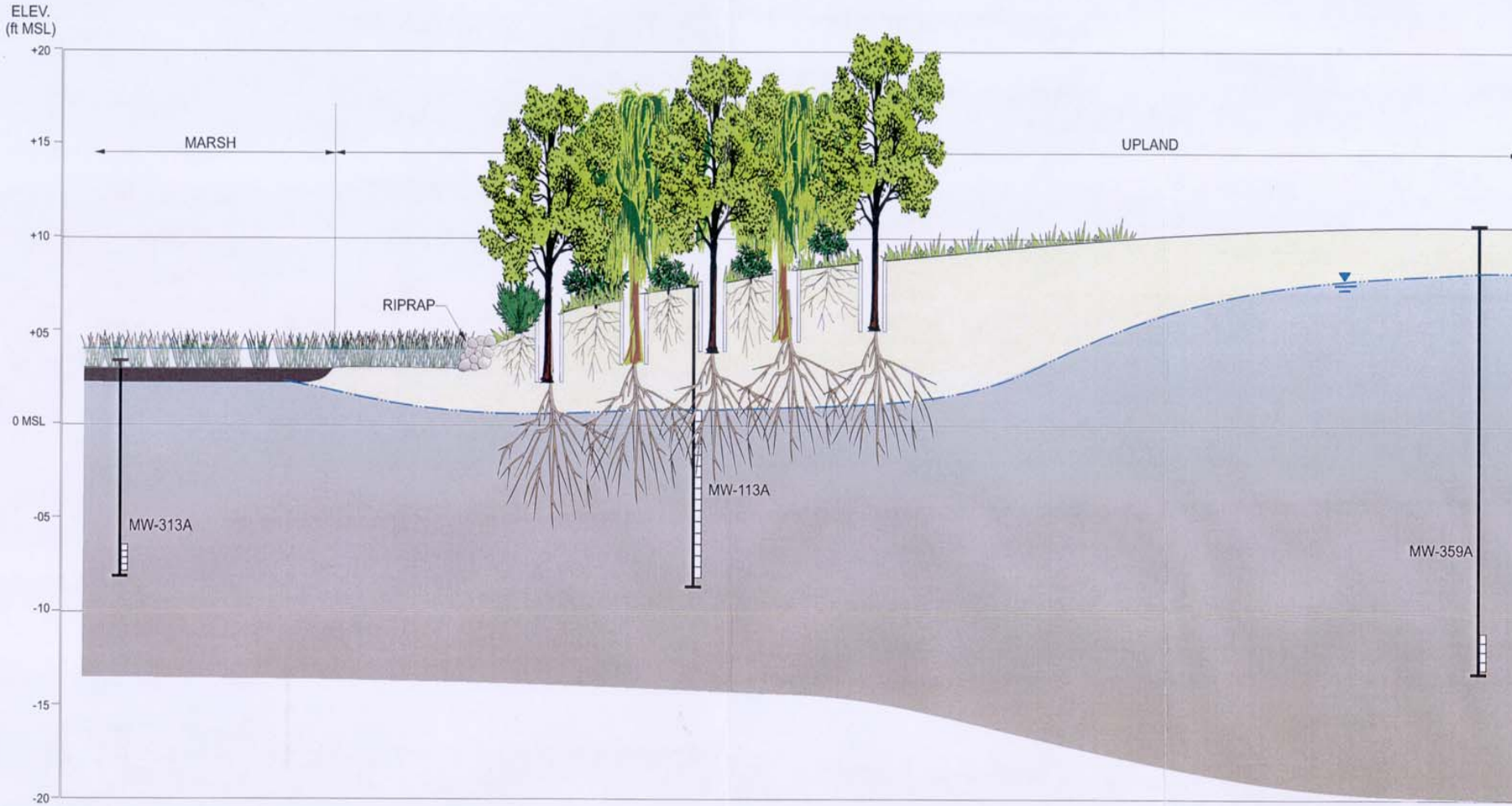
PROJECT NO.	GS3009-01	FIGURE NO.	2
DOCUMENT NO.	GA030000	FILE NO.	SEC.CDR

CONCEPTUAL DEPICTION OF PHYTOREMEDIATION ALONG SHORELINE



LEGEND

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PROJECT NO.	GS3009-01	FIGURE NO.	3
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Plant Selection

- List of potentially applicable plants was examined
- List narrowed based on tolerance to site conditions (i.e. high pH) and desirable quantities such as high water use and deep roots

Selected Plants

- Salt tolerant Japanese black pine
- Hybrid poplar trees (fast-growing with a high water demand)
- Myrtle (a shrub)
- Grasses (i.e. Bermuda and Spartina)
- Slash pine

Planting Design

- Shrubs and trees mixed together to maximize evapotranspiration and to access different rooting layers
  - A grass cover will be established to help minimize erosion and maximize water uptake in different soil layers
  - A variety of species increases the health and stability of the ecosystem

Implementation of Project

- Installed a rip-rap border between the upland areas and the newly dredged zone using concrete pieces from on-site stockpiles

Implementation of Project

- **Excavated and stockpiled approximately 1,160 CY of marsh sediments**

Implementation of Project

- **Planted trees, shrubs, and grasses within the specified area**

Community and Agency Concerns

- Methylation
- Role of soil fertility during selection of plant species
- Encased root zone
- Additional monitoring
- Final remedy?

Current Status

- Plants have been in place a year and a half
- Water level measurements
- Too early to measure success


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PIEZOMETER LOCATIONS

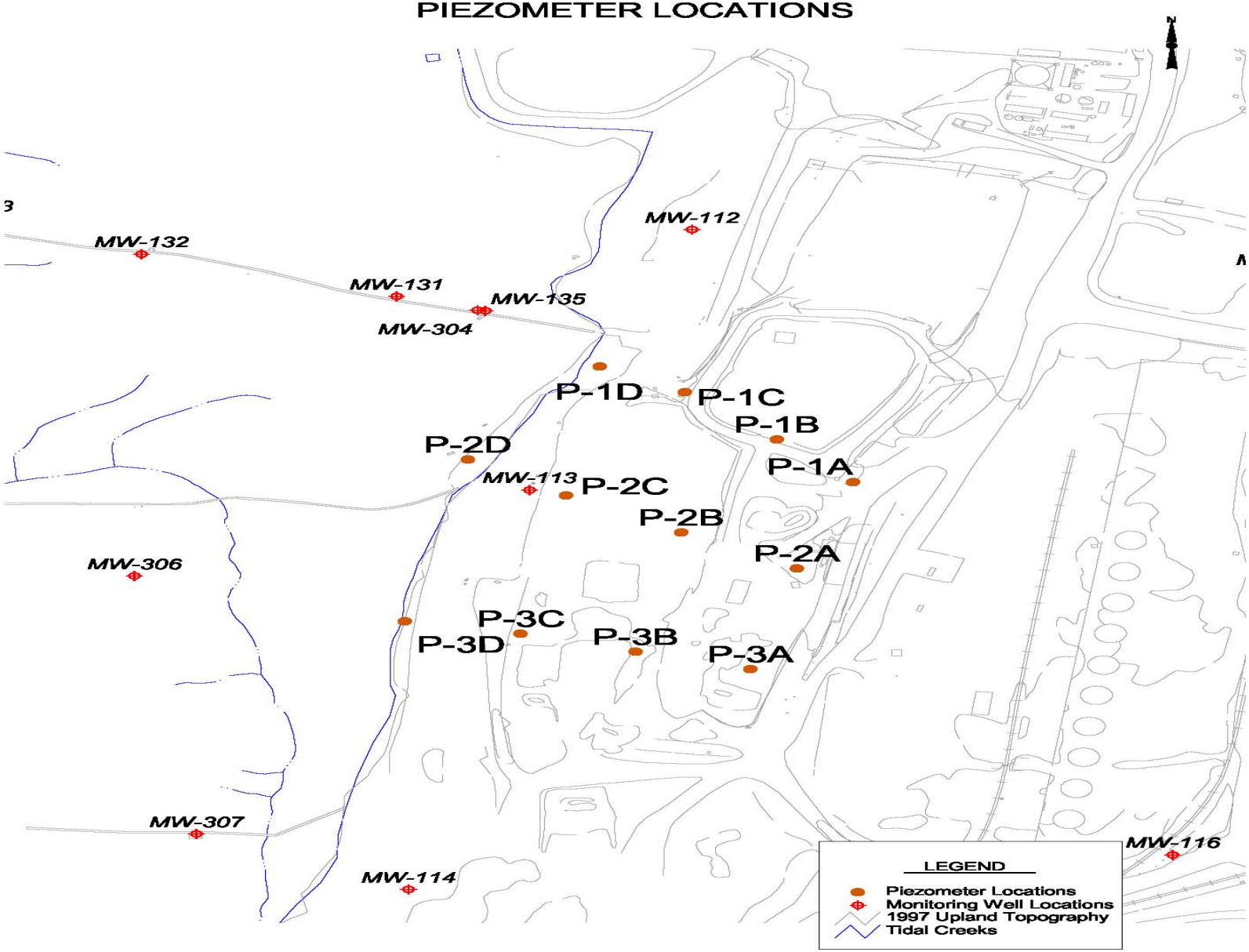

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FIGURE NO.	2-1
PROJECT NO.	GS3481
DOCUMENT NO.	GA040532
FILE NO.	Well_Loc.APR

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Water Level Measurements

- Data collected March 2004 - February 2005
- Top of Casing – Water Levels (measured in the field) = Water Elevation (ft MSL)
- Goal: To reverse the elevation and gradient between C and D Piezometers
- Less than 30% of the P-2 and P-3 Piezometers are showing a reverse in gradient

Next Steps

- Monitor progress by reviewing water levels and groundwater data
- Visit site periodically to see plant growth
- Visually inspect marsh area for seepage of dark brown water
- Investigate the need for air monitoring

Lesson Learned

- Keep community and stakeholders involved
- Although research project, EPA approval needed
- Regular monitoring program needed

Contact Information

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