

# Optimal places in Humboldt for install Stormwater LIDs

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## Abstract

The purpose of this assignment is present the results of a research for sites in Humboldt County, California that achieve the requirements to apply a LID. When features are built land cover is altered and the natural flow of water in the watershed is modified. As a result of that, infiltration decrease and runoff is generated causing pollution of streams and floods. Low Impact Development (LID's) are engineered features used to capture, infiltrate and treat storm water close to its source by small scale landscape-based. By the tools of ArcMap and Humboldt County GIS Data operations were made to find parcels that optimize the LID requirements. As result 158 sites were found in its majority areas zoned as commercial.

## Introduction

The natural movement of water through a watershed is shaped over centuries. When the land cover is altered by the construction of roads, parking lots, and rooftops, the natural movement of water is altered. Briefly, the amount of runoff increases and infiltration decreases. This results increase the volume, the peak flow rate, and the pollution levels in stormwater runoff (California Water & Land Use Partnership, 2014).

Humboldt County is known by its great amount of rain during the winter season. In order to avoid flooding problems and contamination of the streams by urban runoff, Low Impact Development (LID's) could be applied to different type of land use around the County.

According to the Santa Rosa Storm Water Manual, LID's aims to mimic the natural hydrologic character of the site by capturing, treating, and infiltrating storm water as close to the source as possible and using small scale landscape-based features located throughout the project site.

There are some constraints and preferential characteristics for the propitious areas to install an LID. The type of land use is a constraint, because in general just industry, commercial, and business centers can afford a LID, although LID's can also be applied to residential areas. The size the area is also a constraint, because big areas would result in huge volumes of runoff causing a low effectiveness in the water treatment. LID's are preferred to be placed in small slopes, because big slopes would increase the construction costs, besides causing increase of velocity of runoff that decrease the effectiveness of treatment. Other preferential areas to receive a LID are sites with historical flood problems.

The objective of this assignment is present the propitious sites in Humboldt County that respect the constraints, and characteristics required to implement LID's.

## Methods

A collection of geographic data for the Humboldt County was obtained from the Humboldt County GIS Data Download webpage. The following data were explored using ArcMap version 10.2 from Esri, Inc.:

- Agricultural Land Soils shapefile;
- Parcels shapefile;
- Areas of Potential Flooding raster;
- Percent Slope Less Than 30% shapefile.

Then, the following steps were accomplished:

1. The parcels with the applicable land uses was transformed to a new shapefile named “A” after using the “Selection by Attributes” tool in the Parcels shapefile.
2. The shapefile A was clipped with the Agricultural Land Soils shapefile and the Areas of Potential Flooding raster. The resulting shapefile was named “B”.
3. The areas with slopes higher than 30% was eliminated from the shapefile B using the “Eraser” tool, resulting in the shapefile “C”.
4. The parcels from the shapefile C with area lower than 3 acres was selected using the “Selection by Attributes” tools. The resulting shapefile, named “D” was defined as the partial result of this project. A map was made to show the partial result.

## Results

The map was made following the requirement for stormwater LIDs, then it was found optimal places in Humboldt (Figure 1).

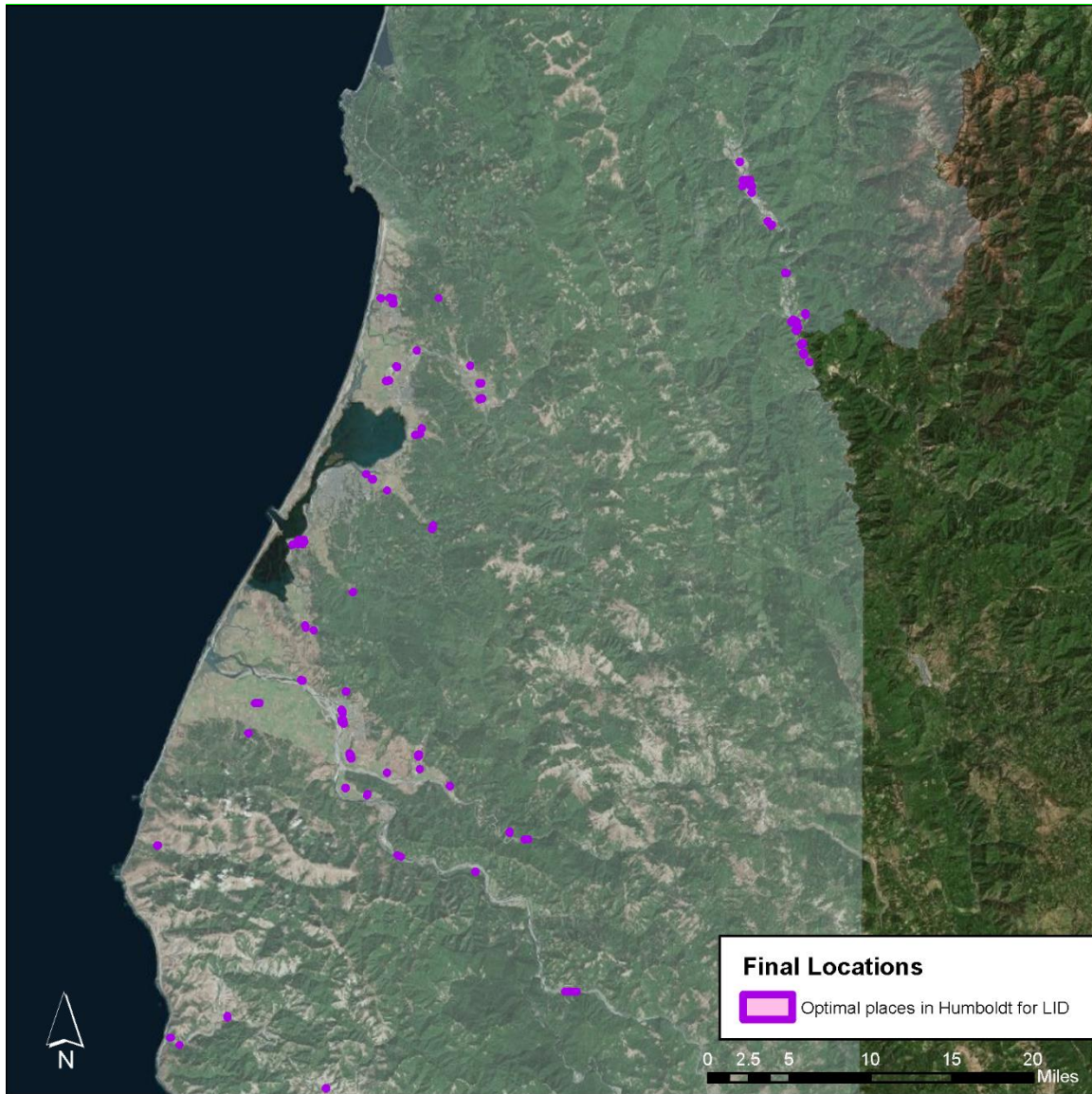


Figure 1 – Location map for all the optimal places in Humboldt County for stormwater LIDs

Therefore, according with the final results it could be find what is the percentage corresponding with each land use susceptible to implement LID (Figure 2).

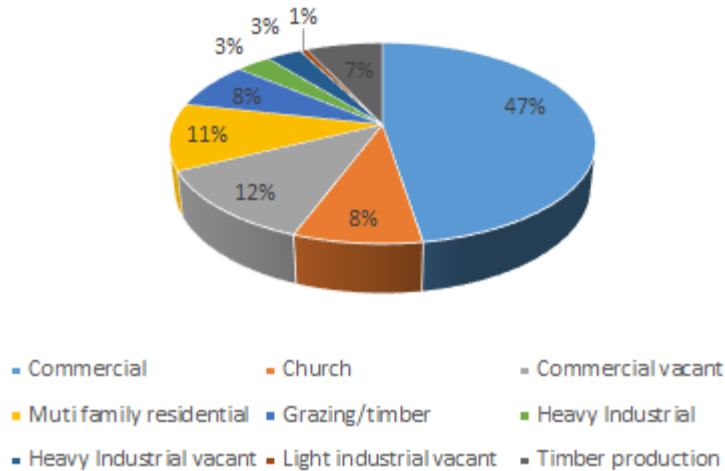


Figure 2 - Percentage of land use of all places in Humboldt County susceptible to implement LID.

## Conclusion

Finally there are 158 places that follow the requirement to implement stormwater LID and most of this places is commercial (47%). 12% is commercial vacant, 11% multi family residential, 8% church, 8% grazing/timber and 7 industry in general. Therefore it can be concluded that commercial places are the majority percentage of the results.

## Bibliography/Sources

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