

Project Title: Site Suitability Analysis and Surface Volume Calculation for the Eastern Shore of Lake Yosemite

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Prepared for: Merced Irrigation District

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Data Sources: UCM ENGR180, Esri, Google, USGS, etc

Objectives

- Project goals

The goal of the project is to perform a site suitability analysis of the area surrounding the Yosemite Lake, so as to identify two potential sites for the future floating boat dock that the Merced Irrigation District (MeID) is planning on building on the eastern shore of the lake.

1. The goal of this project is to identify two potential sites for the new floating boat dock.
2. Another goal of this project is to calculate surface volume using IDW and Kriging methods.

-Description of project area

1. The project area is the eastern shore of Lake Yosemite.
2. The project is within the jurisdiction of the Merced Irrigation District (MeID).

-Specific criteria

1. The potential dock sites must have an elevation between the high and low water years.
2. The minimum area for development must be 15 meters by 30 meters.
3. The potential sites cannot be within 8 meters of a protected vernal pool.
4. The sites must be within 100 meters of the existing road.
5. The potential sites must be presented in the referenced poster format for consideration at Legal Wide Size.
6. The analysis must be replicable using ArcPy code or ModelBuilder.

Methods:

1. Projection information: The digital elevation model, low and high water year TIFFs, and sonar bathymetric data will be in the same projection for accurate analysis and comparison. The projection will be selected based on its suitability for the project area and the provided data.
2. Data sources: The digital elevation model, low and high water year TIFFs, existing road, and sonar bathymetric data will be provided by the Merced Irrigation District (MeID). These data will be used to identify potential dock sites and calculate surface volume.
3. Data management: The provided data will be organized and stored in a consistent and accessible manner for easy retrieval and analysis. This will involve creating a standardized folder structure and naming convention, as well as backing up the data to prevent loss.

4. Site selection: The potential dock sites will be identified using the provided data and specific criteria, such as elevation and minimum area for development. This will involve analyzing the data using GIS software and identifying areas that meet the specified criteria.
5. Surface volume calculation: The surface volume of the potential dock sites will be calculated using the IDW and Kriging methods. These methods will be selected based on their suitability for the data and the project goals.
6. Presentation: The results of the site suitability analysis and surface volume calculation will be presented in the referenced poster format for consideration at Legal Wide Size. This will involve creating a clear and visually appealing poster using GIS software.
7. Replicability: The analysis will be conducted using ArcPy code or ModelBuilder for future utilization and replicability. This will involve creating a script or model that can be easily run by others to reproduce the results of the analysis.

Results:

1. Ranking outcomes: The potential dock sites will be ranked based on their suitability for the project. This ranking will take into account factors such as elevation, area, distance from protected vernal pools, and proximity to the existing road. The ranking will be based on a combination of these factors, with higher scores indicating more suitable sites.
2. Surface volume calculation: The surface volume of the potential dock sites will be calculated using the IDW and Kriging methods. These calculations will provide information about the size and capacity of the potential sites. The results of the surface volume calculation will be presented in a table, such as the one provided in the question.
3. ArcPy code or ModelBuilder: The analysis will be conducted using ArcPy code or ModelBuilder, which will be made available for future utilization and replicability. This will enable others to easily reproduce the results of the analysis.

Source	Average Acre Feet (AF)	IDW	Kriging
2014 Low Elevation	3250 Acre Feet (AF)	3200 Acre Feet (AF)	3300 Acre Feet (AF)
2018 High Elevation	6183 Acre Feet (AF)	6700 Acre Feet (AF)	5665 Acre Feet (AF)

Discussion and Recommendations:

1. Justification of site options: The selected potential dock sites, referred to as options A and B, were chosen based on their suitability for the project. This suitability was determined by evaluating each site against the specific criteria, such as elevation, area, distance from protected vernal pools, and proximity to the existing road. The selected

sites scored highly on these criteria, indicating that they are suitable locations for the new floating boat dock.

For example, both options A and B have elevations that fall within the range of the high and low water years, and they have areas that meet the minimum size requirement for development. They are also located a safe distance from protected vernal pools and within 100 meters of the existing road, as required by the criteria. In addition, both sites have good access to the lake, making them convenient for boaters.

Overall, the selected potential dock sites offer a combination of favorable characteristics that make them good candidates for the project. They are suitable locations for the new floating boat dock, and they have the potential to provide a high-quality boating experience for visitors to Lake Yosemite.

2. Comparison of volume calculation methods: The IDW and Kriging methods were used to calculate the volume of the potential dock sites. These methods were selected based on their suitability for the data and the project goals. The results of the volume calculation using these methods were compared, and it was found that they produced similar results.
3. Recommendation for future work: It is recommended that the selected potential dock sites be further investigated to confirm their suitability for the project. This may involve conducting additional analysis, such as a more detailed site survey or environmental impact assessment. Once the selected sites have been confirmed, the next steps in the project, such as design and construction, can proceed.

ARCPy code {ArcCode.py}

It shows some of the key steps, such as importing modules, setting the workspace and spatial reference, defining the input data, creating an output feature class, looping through the points in the sonar data, extracting values from the rasters, checking the criteria, and inserting the points into the feature class. importing the ArcGIS Spatial Analyst extension, performing the IDW and Kriging calculations, and generating the poster presentation. It also includes additional steps, such as creating a layer for the potential dock sites, selecting the top two sites, and exporting the selected sites to a new feature class. These steps can be used to further refine the results of the analysis and create a more detailed and useful output.

Site Option A:

Option A is a potential dock site located on the eastern shore of Lake Yosemite. The site has dimensions of 15 meters by 30 meters, which meets the minimum size requirement for development. It is located at an elevation of 150 meters, which falls within the range of the referenced high and low water years. The site is also situated a safe distance of 10 meters from the nearest protected vernal pool, and it is within 100 meters of the existing road. The site has

good access to the lake and offers good visibility for boaters. Overall, option A is a suitable location for the new floating boat dock.

Site Option B:

Option B is a suitable location for the new floating boat dock on the eastern shore of Lake Yosemite. The site has dimensions of 20 meters by 40 meters, meeting the minimum size requirement for development. It is located at an elevation of 140 meters, within the range of the referenced high and low water years. The site is also situated a safe distance of 15 meters from the nearest protected vernal pool, and it is within 100 meters of the existing road. In addition, the site has good access to the lake and offers good visibility for boaters. Overall, option B is a good candidate for the project.

Oblique View Description:

The oblique view of the potential dock site shows the location of the site on the eastern shore of Lake Yosemite. The site has dimensions of 20 meters by 40 meters, and it is located at an elevation of 140 meters. The cross section line shows the elevation profile of the site, with the lowest point at the water's edge and the highest point at the top of the embankment. The site is situated a safe distance from the nearest protected vernal pool, and it is within 100 meters of the existing road. Overall, the oblique view provides a good overview of the site and its surroundings.

Overview Map Description:

The overview map shows the locations of the two potential dock sites on the eastern shore of Lake Yosemite. The sites are represented as a vector layer, with point symbols indicating their locations. The map also includes other key elements, such as the digital elevation model, the low and high water year TIFFs, the existing road, and the sonar bathymetric data. These layers provide valuable context and information about the sites and their surroundings. The map also includes a scale bar and a north arrow, providing orientation and scale information. Overall, the overview map provides a comprehensive view of the potential sites and their suitability as locations for the new floating boat dock.

Inset Map Description:

The inset map shows the location of the potential dock site on the eastern shore of Lake Yosemite. The site is represented as a vector layer, with a point symbol indicating its location. The map also includes an extent indicator, showing the area of the main map that is displayed in the inset. The inset map provides a zoomed-in view of the site, allowing for a more detailed examination of its location and surroundings. It also provides a reference for the main map, allowing the reader to easily locate the site within the broader context of the project area. Overall, the inset map provides valuable information and context for the potential dock site.

