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CASMALIA WETLAND MITIGATION ALTERNATIVES

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PROBLEM STATEMENT

The goal of this project is to provide the U.S. EPA with preliminary wetland mitigation alternatives to compensate for wetlands lost during the Superfund cleanup of the Casmalia Resources Disposal site.

SIGNIFICANCE

The Superfund Program, established to identify and clean up America's most hazardous waste sites and recover cleanup costs from owners and operators of these sites, is currently experiencing an uncertain future due to proposed budget cuts.[2] The Casmalia Site, a former hazardous waste disposal site, is unique due to its environmental value in supporting wetlands with the presence of sensitive species. Therefore, cleanup of this site demonstrates the important need for continued Superfund funding and cleanup implementation.

What is Casmalia?

- A 252-acre former hazardous waste facility in Santa Barbara County.
- Listed as a Superfund site and currently undergoing cleanup activities.
- Contains five onsite wetlands (approximately 23.8 acres) that provide wetland function and habitat.
- Cleanup activities would destroy onsite wetlands, requiring mitigation under the Clean Water Act and other wetland regulations.

SITE HISTORY

Located north of Santa Maria in Santa Barbara County, CA., the Casmalia Resources Disposal facility (**Figure 1**) is a Superfund site currently undergoing cleanup activities under the Comprehensive

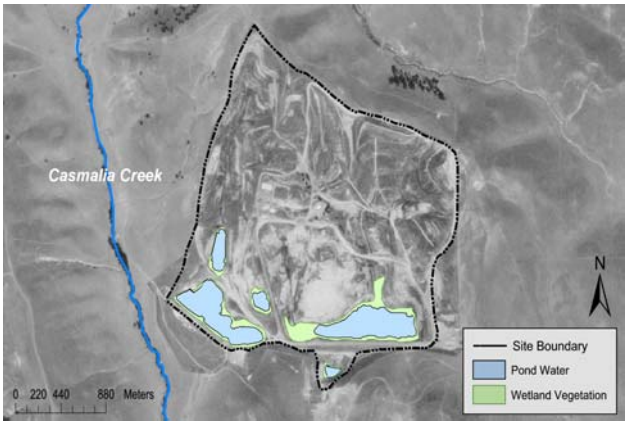

Figure 1. Existing Wetlands of the Casmalia Site
Source: Casmalia Wetland Mitigation Group, 2001

Environmental Response, Compensation and Liability Act (CERCLA). Between 1973 and 1989, the primary owner/operator of the site accepted more than 5.5 billion pounds of hazardous waste, which was treated, disposed, and stored in storage ponds. After operations ceased due to contamination of onsite soil and groundwater, the U.S. EPA initiated cleanup activities, which could potentially involve the draining and removal of sediments from the aforementioned ponds.

The cleanup activities would effectively destroy the onsite ponds, identified as functional wetlands providing habitat for Federally-listed species and state-listed species (California red-legged frog and western spadefoot toad, respectively), thereby triggering mitigation requirements under the Clean Water Act (CWA) and the national "no net loss" of wetlands policy. Therefore, given the regulatory complexity of the site, an approach was necessary to address the conflict between CERCLA and CWA and other wetland regulations.

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APPROACH

The approach taken to address the problem statement is illustrated in the following work flow model (**Figure 2**).

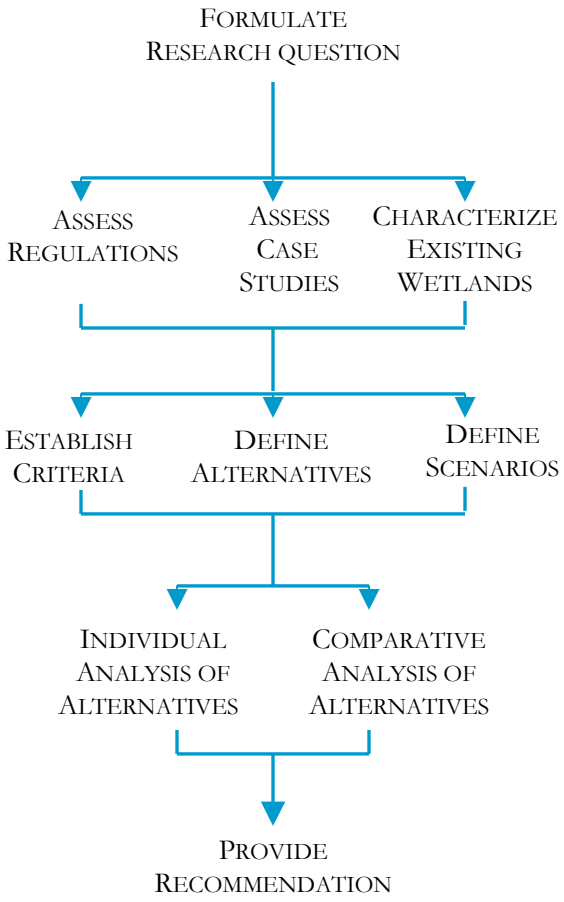

Figure 2. Project Approach

MITIGATION GOAL

The mitigation goal of this project was to create wetlands of similar type, characteristics, functions and values as those of the existing Casmalia site wetlands. Specifically, our goal included creating freshwater emergent wetlands to support the listed species of concern. In addition, the created wetlands would be compensated at a 3:1 mitigation ratio (i.e., 3 acres of wetlands created for every acre lost).

What is the Mitigation Goal?

- Create freshwater emergent wetlands
- Provide habitat for sensitive species
- Compensate for wetlands lost at 3:1 ratio (i.e., 3 acres created for 1 acre lost)

WETLAND MITIGATION ALTERNATIVES

Consultation with project stakeholders resulted in the identification of a no mitigation alternative and three onsite and one offsite mitigation alternatives. The three onsite alternatives are located south of the project site (**Figure 3**). An environmental characterization and conceptual determination of the available area of each alternative site were performed through a number of site visits and integrated into a Geographic Information System (GIS).[3] The total acreage of each alternative, as well as the description of mitigation within each alternative is summarized in **Table 1**.

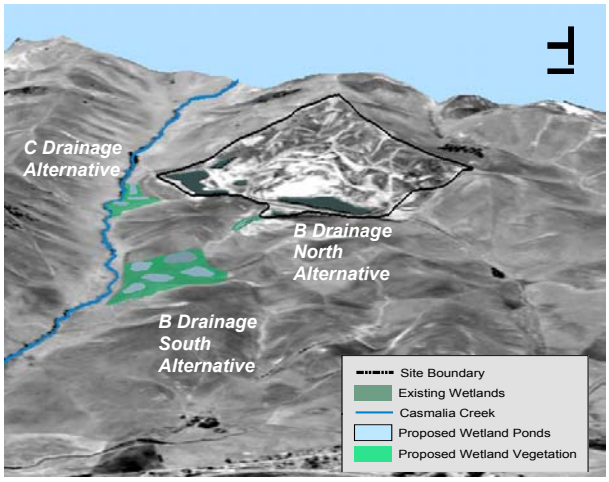

Figure 3. Casmalia Site and Wetland Mitigation Alternatives

Source: Casmalia Wetland Mitigation Group, 2002

CASMALIA WETLAND MITIGATION ALTERNATIVES

Alternatives	Description of Mitigation
No Mitigation Alternative	Existing Casmalia site wetlands are drained but not mitigated.
Onsite B Drainage North Alternative (2 acres)	Wetland creation via diked surface water runoff, planting of emergent wetland and willow/woodland vegetation.
Onsite B Drainage South Alternative (30.4 acres)	Wetland creation via shallow excavation using surface water runoff, planting of emergent wetland and willow/woodland vegetation.
Onsite C Drainage Alternative (9.6 acres)	Wetland creation via shallow excavation near Casmalia Creek using surface water runoff, planting of emergent wetland and willow/woodland vegetation.
Offsite Mitigation Bank (as required)	Purchase of necessary credits at offsite mitigation bank.

Table 1. Description of Wetland Mitigation Alternatives

SCENARIOS

Given the possibility that one of the five onsite ponds may not need to be remediated, a range of realistic mitigation scenarios was selected. The scenarios range from not draining or mitigating of the wetlands (Scenario 1); the draining and mitigation of four wetlands (Scenario 2); and the draining and mitigation of five wetlands (Scenario 3). No acreage would be mitigated under Scenario 1, while the required mitigation acreage would be 21.1 and 54.4 acres for Scenario 2 and Scenario 3, respectively.

EVALUATION CRITERIA

To evaluate these alternatives, a set of criteria was developed from a review of wetland mitigation case studies and consultation with relevant agencies. The criteria were adapted from the Remedial Investigation and Feasibility Study criteria under CERCLA, as well as criteria outlined in case studies.

The specific criteria consist of overall protection of human health and the environment, regulatory compliance, short-term effectiveness, long-term effectiveness (e.g., biological, hydrological, and geological components), implementability and cost. These criteria were subdivided into two categories: threshold criteria and primary balancing criteria. Alternatives had to meet the threshold criteria before further analysis under the primary balancing criteria could occur.

Evaluation Criteria

The alternatives were evaluated as to how well they met the following criteria:

Threshold Criteria

- Overall protection of human health and the environment (OPHH& E); and
- Compliance with applicable or relevant and appropriate regulations (ARARs)

Primary Balancing Criteria

- Short-term effectiveness
- Long-term effectiveness
- Implementability
- Cost

ANALYSIS

The six evaluation criteria were used to analyze each wetland mitigation alternative within each of the three mitigation scenarios. After each alternative was qualitatively analyzed, a comparative analysis was conducted to compare the five alternatives against

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each other. The two-step comparative analysis involved a qualitative comparative analysis and a numerical ranking of alternatives. This analysis served as the basis for assessment through a pair-wise ranking system using the Analytical Hierarchy Process (AHP),[4] illustrating the relative preference for each alternative.

RESULTS

The results of the analytical process provided the sequence of alternatives that best met the criteria critical for successful wetland mitigation (**Figure 4**). Specifically, the order the alternatives were ranked was: B Drainage South, B Drainage North, C Drainage, and Mitigation Banking. These results reflect the relative importance of each criteria from the AHP, with long-term implementability having the greatest weight and cost having the lowest weight.

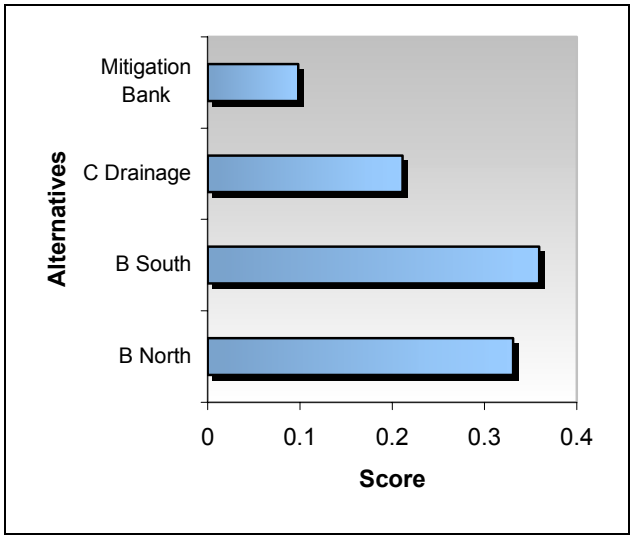

Figure 4. Results of Comparative Analysis

RECOMMENDATION

Our analysis highlighted the advantages and disadvantages associated with each alternative within each scenario. In the case of Scenario 2, the B Drainage South Alternative most successfully met the criteria, including the mitigation size requirement. In the case of Scenario 3, the inclusion of all onsite and offsite alternatives would be necessary for the mitigation size requirement to be met. The following sequence of mitigation alternatives is therefore recommended: create wetlands first at B South Alternative, followed by B North Alternative, and finally C Drainage, with the remainder of any acres to be purchased from the Santa Ynez Mitigation Bank.

FUTURE OUTLOOK

The existing Casmalia wetlands are located on a Superfund site, demonstrating that wetlands can develop in unexpected environments. Currently, wetlands in the United States are being lost at an unprecedented rate.[5] Therefore, in light of the vulnerability of wetlands in general and impending cuts to the Superfund budget for site remediation, compensating for the loss of these particular wetlands is more important now than ever.

This project focused on creating wetlands based on a conservative mitigation size requirement of 3:1. It should be noted there are limitations to such regulatory requirements that were not thoroughly addressed in our analysis. For instance, wetland mitigation regulations often overemphasize quantity over quality, neglecting to adequately replace the functional value of wetlands. Consequently, stakeholders should focus on the importance of wetland function when proceeding with this project.

CONTACT INFORMATION

For additional information on this project, please visit our website: http://www2.bren.ucsb.edu/~wetlands/. Comments and questions can be directed to the following e-mail address: wetlands@bren.ucsb.edu.

[1] Professors Trish Holden and Michael Ginnis, Faculty Advisors.
[2] Seelye, Katharine Q. "Bush Proposing to Shift Burden of Toxic Cleanups to Taxpayers." *New York Times*, February 23, 2002.
[3] ArcGIS v. 8.1 Software.
[4] Criterium DecisionPlus
[5] Dahl, Thomas E. and Greg [illegible] 1994. *Technical Aspects of Wetlands: History of Wetlands in the Conterminous United States.* USGS Water Supply Paper 24-25.