Potential Heliport Locations for Emergency Response in Upper Bidwell Park Butte County, California

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Introduction

The need for heliports in parks and areas with difficult terrain can mean the difference between life and death for those injured during numerous recreational activites such as hiking, rock climbing, mountain biking, and swimming. Examples of these accidents in Upper Bidwell Park include:

* 2013: Mountian biker in his 30's loses control on lose gravel, causing him to crash and hit his head. Steep ravine resulted in delayed extraction of injured male.
* 2012: 26-year old female rock climber fell 20 feet, fire fighters had to hike 5,000 feet on difficult terrain.
* 2010: 22-year old male injures head, shoulder and ribs while attempting a summersault off a rope swing. Difficult terrain resulted in a 40 minute delay in arriving at Enloe Medical Center.

* Five year helicopter-based emergency medical services (HEMS) study for 921 rescue missions:
  - Life threatening injuries found in 246 escue missions (27%)
  - Fall accounted for 700 rescues (76%) and Illness another 81 patients (9%)
  - 429 cases of trauma to extremities (47%), 108 head injuries (12%), 197 diagnosis of multiple injuries (21%)

(Pasquier 2012)

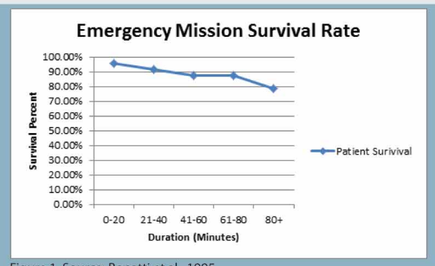


Figure 1. Source: Bonatti et al., 1995

*Helicopters are used to reach areas with difficult locations such as geographically isolated places or regions without road access.

*Non-designated landing zones increase the risk of accidents, particularly at night or in bad weather.

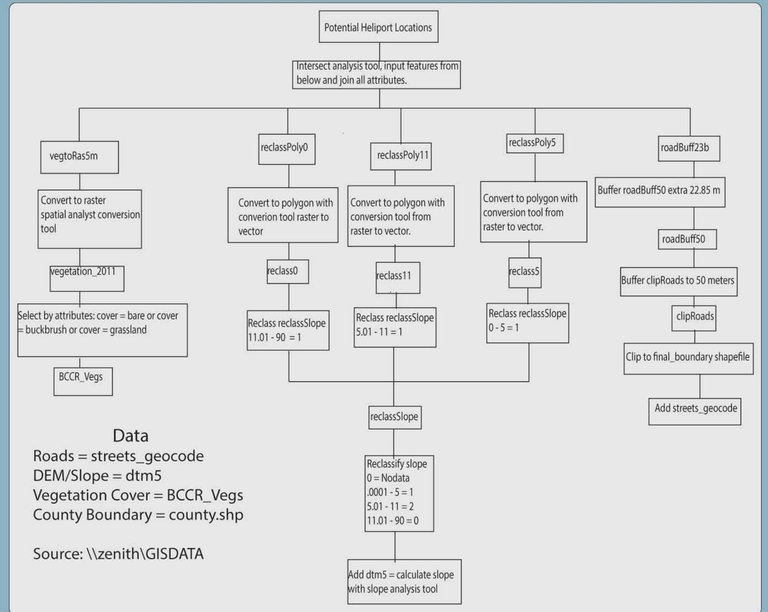
*Over a 22-year study period, the United States averaged eight HEMS crashes per year.
-39% of the crashes were fatal.
-Odds of fatality increase by three times in darkness and eight times in bad weather.

*Building secure landing sites such as helipads mitigate risk while maintaining HEMS access.

(Foo 2010)

Figure 1. Example of Heliport. Source: Fredriksen, No date

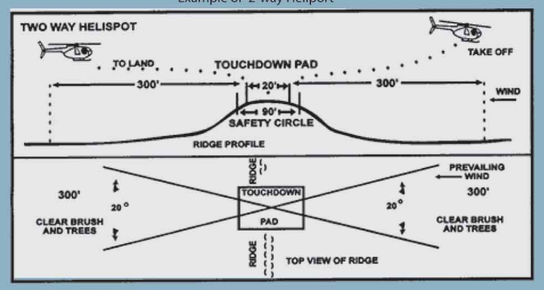
Data & Methods



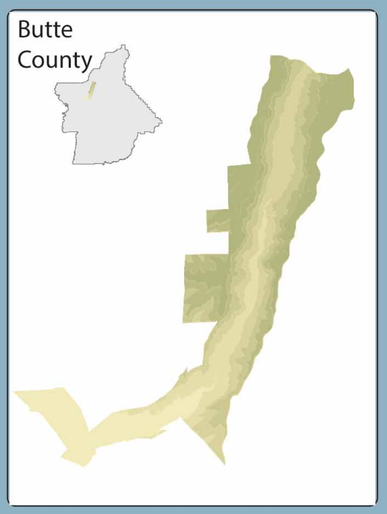
Data
Roads = streets_geocode
DEM/Slope = dtm5
Vegetation Cover = BCCR_Vegs
County Boundary = county.shp

Source: \\zenith\GISDATA

Example of 2-way Heliport



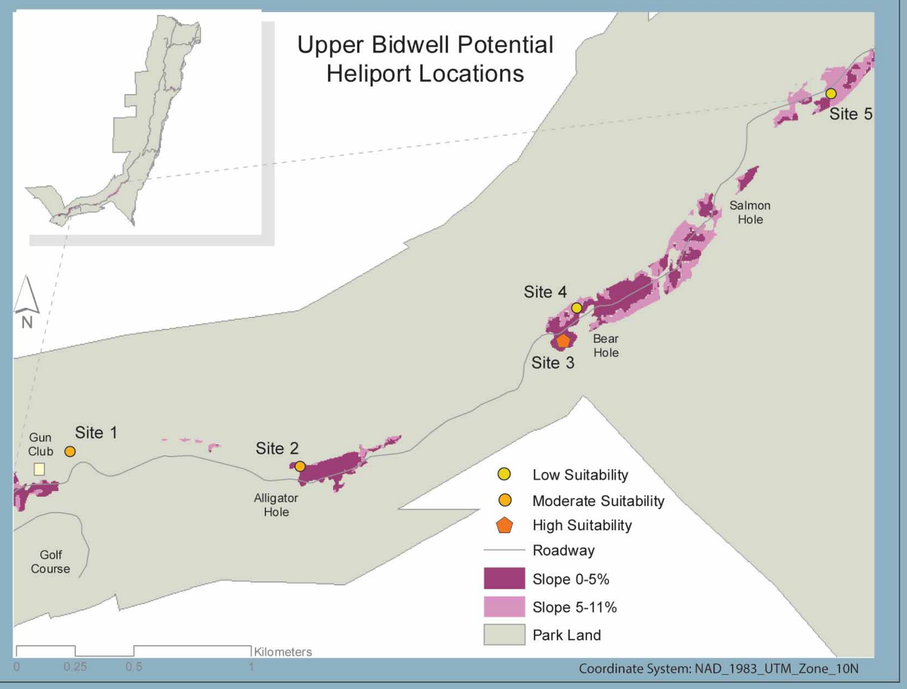
Source: Helicopter Landing Areas



Site 2. Source: Freitas and Mudd, May 4th, 2014

Site 3. Source: Freitas and Mudd, May 4th, 2014

Results & Analysis



*Our analysis showed that there were various potential locations that suited the requriements for a heliport.

*From this data we conducted field observations to assess the validity of our results and proposed 5 locations as presented in the map above.

*The main limiting factor when assessing location further east into the park was the deterioration of the roads given that they are not condusive to safe transportation of injured persons. This was notable after Site 3 and Site 4.

*Site 1 may have issues with regards to land use rights due to it's close proximity to the Chico Rod and Gun Club.

Conclusion

*Most suitable location was Site 3 because less than 5 degree slope, good road quality and access, relative seclusion within surrounding landscape, as well as ample vertical clearance suitable for all types of heliports.

*Site 2 had all elements to fulfill the heliport requirements, but the presence of high-voltage power lines increased the likelihood of potential accidents with regards to emergency helicopter use.

References

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