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**Introduction and Objectives**

Our team aims to maximise the amount of evacuation time for the most vulnerable campers, to minimise potential casualties in the event of a wildfire at Glacier National Park. We shall find the most optimal way to dispatch the rangers to inform the campers whose campgrounds are at imminent risk of wildfire.

**Assumptions**

We assume that all hikers can be found on the tracks, and that all hikers have a similar hiking speed that can be approximated by the Naismith’s rule to be around 3 mph. Hikers also do not need a ranger to escort them back to safety, and only need a notification. We also assume that the fire is detected in its early stages.

**Our Model**

Our model consists of two parts, the simulation of the spread of wildfire, as well as the evaluation of the rangers’ path. The speed of spread of wildfire is modelled by three parameters – a base rate, wind speed and the angle of the slope, in an equation with constants tuned to match the Rothermal model in the R library. The propagation of wildfire was modelled as a conical shape, in the direction of wind travel.

As for the rangers, we decided to dispatch one team of rangers from each permit office. We start with few preset routes available for the rangers to choose from, and they can run the ranking algorithm that tells them which route to choose. The ranking algorithm ranks the routes according to an “urgency score”, which tells them which route is most urgently in need of evacuation. Should a location be already burning, or should there be insufficient time for the rangers to reach the target location safely, those locations/evacuation routes would be taken out of consideration for land rangers. Evacuation can take from 20-30 hrs.

**Areas of Improvement**

We think that impassable terrain for fires, such as lakes and glaciers, should have been considered as factors in our wildfire model. We also did not consider scenarios when another forest fire suddenly appearing after all the rangers have already been deployed. While we could weigh between two set of paths, we have not developed an algorithm that guarantees the most optimal path configuration.

**Conclusion**

Our model was tested to be robust during our simulations, and it could deal with cases where multiple fires are detected at once. It is also not more difficult to adapt our model for use in other forests, by introducing another map and changing hyperparameters like wind speed, the angle of slope, etc.