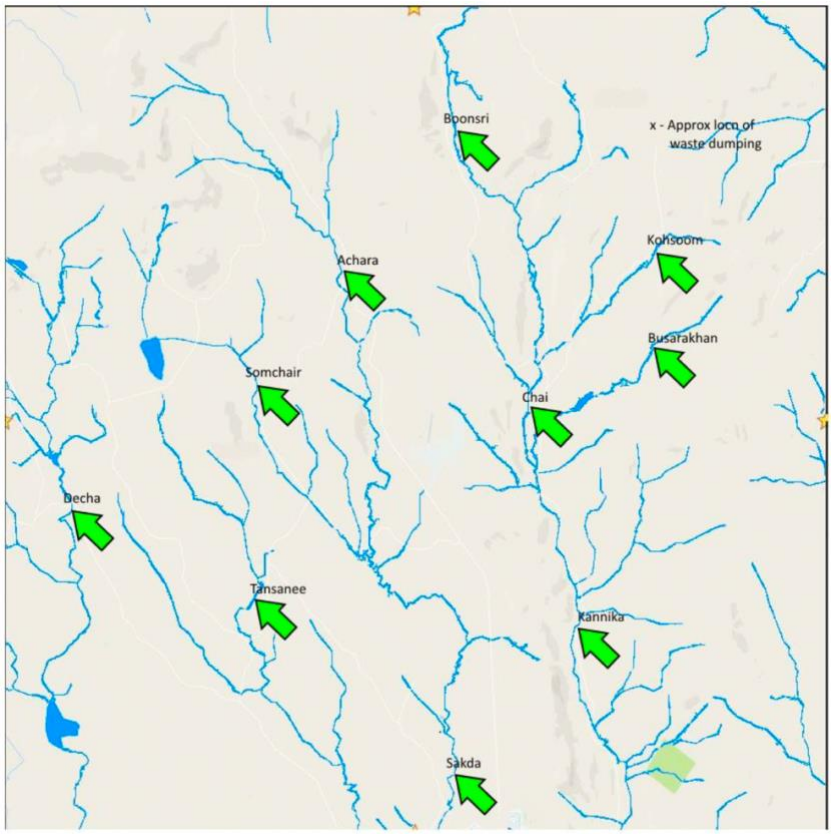
Provenance: **VAST Challenge 2018**
Title: **Mini-Challenge 2**

Overview
Mistford is a mid-size city located to the southwest of the Boonsong Lekagul Wildlife Preserve (BLWP). The city has a small industrial area with four light-manufacturing endeavors. Mistford and the wildlife preserve are struggling with the possible endangerment of the Rose-Crested Blue Pipit, a locally loved bird. The bird's nesting pairs seem to have decreased alarmingly, prompting an investigation last year implicating Kasios Office Furniture, a Mistford manufacturing firm. Since the initial investigation, the situation has evolved: Kasios insists that they have done nothing wrong! They assert that grad student Mitch Vogel and his professors are mere media-seekers trying to draw attention away from their lackadaisical research. Kasios presents itself as an extremely eco-friendly organization. They have launched their own very public investigation into the issues raised last year and are reporting very different results! It's time to apply your visual analytics expertise to help illuminate the path to good science.

Mini-Challenge 2, "Like a Duck to Water"
Last year, the Kasios Furniture Company was implicated in environmental damage to the Boonsong Lekagul Wildlife Preserve for both dumping toxic waste and polluting the air with chemicals from its manufacturing process. But Kasios is not taking these accusations lying down, and they deny any accusation of industrial waste dumping! Kasios' spokespersons state that there isn't any ground contamination near the remote ranger station that was suggested by last year's mini-challenge 1 and 3 participants, and they have inspected that area and found it as pristine as the rest of the preserve.
Outraged ornithology professors from Mistford College journeyed out to look over the dumping site themselves and perform soil analyses. They returned to report that the site looked like there had been recent excavation and building activities going on. Boonsong Preserve rangers later confirmed that a new ranger station was being built at that site! Soil samples taken from the site were inconclusive in detecting Methylosmolene (the toxic manufacturing chemical in the suspected dumping) or any other contaminant, as new top soil had been trucked in.
With a primary piece of evidence against Kasios now gone, investigators will need to take another approach. Professors in the Mistford College Hydrology Department have come forward with several years of water sensor readings from rivers and streams in the preserve. These samples were taken from different locations scattered throughout the area and contain measurements of several chemicals of possible interest, but they have never been analyzed due to lack of funding. Could visual analytics help reveal something in this data that could make up for the soil evidence that was destroyed?
The contestant's tasks were to investigate the hydrology data from across the Preserve. They were given a map of the Preserve (with the same base as last year's challenge), with named sampling sites indicated on the map (the names have local significance, but are just mnemonics for your study). They were also provided with readings from each sampling station over time for several different chemicals and water properties.

Ground Truth



A map of the Boonsong Lekagul Wildlife Preserve showing the 10 sites that have hydrology measurements

Data

Challenge participants were provided with the above map of the BLWP showing 10 sites where hydrology measurements have been made over the years. Participants were given a csv file containing hydrology measurements, a readme file to explain the data fields, and a file giving the chemical units of measure. There are 106 different hydrology measurements in the data set. Data goes back to January of 1998 and ends in December 2016. In total, there are more than 136,000 hydrology measurements in the data set.

Download data using your Rowan account at

https://drive.google.com/file/d/1-doL9tnynPrwdtEmZGkJzVJvQuQRrPKD/view?usp=sharing

Contestant Questions

1. Characterize the past and most recent situation with respect to chemical contamination in the Boonsong Lekagul waterways. Do you see any trends of possible interest in this investigation? Your submission for this questions should contain no more than 10 images and 1000 words.

2. What anomalies do you find in the waterway samples dataset? How do these affect your analysis of potential problems to the environment? Is the Hydrology Department collecting sufficient data to understand the comprehensive situation across the Preserve? What changes would you propose to make in the sampling approach to best understand the situation? Your submission for this question should contain no more than 6 images and 500 words.

3. After reviewing the data, do any of your findings cause particular concern for the Pipit or other wildlife? Would you suggest any changes in the sampling strategy to better understand the waterways situation in the Preserve? Your submission for this question should contain no more than 6 images and 500 words.