2019 EARLY SEASON REPORT

Columbia Shuswap Regional District
Golden, BC (Area 'A') Mosquito Program

Submitted by Morrow BioScience Ltd.
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Introduction

This report is provided to the Columbia Shuswap Regional District (CSRD) for use as a projection tool in 2019 with regards to the magnitude of potential flooding within Golden/Area 'A', as it relates to mosquito larval abundance potential. The update will include information on current snow pack data within basins contributing to the Columbia River and Kicking Horse River near Golden, the projected weather outlook for the mosquito season, and a reminder of sources for up-to-date information regarding Morrow BioScience Ltd. (MBL) early season field work. This report is an estimate of how the season may develop based on current weather predictions and snow levels; it is possible that conditions could change in late April and early May. The mid-season report will have more thorough explanations of environmental conditions affecting mosquito larval levels.

Snowpack

The snowpack in regionally relevant basins can be a good indicator of how much water will come through a river system over the course of the spring and summer. Specifically, the snowpack in the Upper Columbia basin directly relates to local Columbia River (Donald, Nicholson gauge) and Kicking Horse River (Golden gauge) fluctuations. These fluctuations are important to track because they inform the timing and extent of annual floodwater mosquito hatching events.

The percentage reported in Table 1 reflects the most recent snowpack estimate as well as that reported from 2018 at the same point in time[1]. Leading up to the 2019 mosquito season, the weather in February was generally cold across the province. While the first half of March was also considered cool, higher-than-average ambient temperatures were experienced in the second half of March in the southern portion of BC. Thus, snowpacks in basins directly affecting the regional Columbia River and Kicking Horse River were not augmented this March, as they had been in March 2018. In fact, lower elevation snowpack in the southern portion of the province was reduced in the latter half of March. Table 1 provides a point of comparison between snowpacks in 2019 and those in 2018 – a considerably high-water year. Average snowpack percentages for 2019 (April 1) is 22 percentage points lower than that reported at the same time in 2018 for the Upper Columbia basin.

[1] https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/river-forecast/2019_april1.pdf

Table 1. Snow basin indices for basins that directly affect the Columbia River and Kicking Horse River, determined by the April 1, 2018 and April 1, 2019 bulletins. Note: 2018 values are delineated parenthetically. (https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/drought-flooding-dikes-dams/river-forecast-centre/snow-survey-water-supply-bulletin).

Basin	Percent of Normal Snow Pack
Upper Columbia	89 (111)

As of April 1, the contributing snow basin is below normal. However, it should be mentioned that only two of six survey stations within the Upper Columbia basin are operating[2]. Thus, the assessment of snowpack within the Upper Columbia basin is not based on a robust data set, as it has been in previous years. The stated average may not be representative of the snowpack in all areas of that basin.

High flood levels are expected for rivers associated with basins containing high snow packs. Because the reported snowpacks in the contributing basin is below normal, a lower flood level relative to the previous two seasons is anticipated. According to the River Forecast Centre, approximately 95% of the snowpack has typically accumulated as of April 1[1]. As such, the April 1 survey is considered largely indicative of the flooding forecast for the season. It should also be noted that late season snow accumulation at high elevation stations occurred in 2017 and contributed considerably to the freshet. While additional snow input has occurred through early May, current weather forecasts do not include late-season snow input predictions in 2019.

Weather

El Nino conditions have been present in the equatorial Pacific Ocean since early February and predicted to remain through Spring 2019[3]. When this occurs, warmer-than-normal temperatures dominate the basins contributing to the Columbia River and Kicking Horse River. In this region, normal or below-normal snowpacks are associated with winter El Nino conditions. Interestingly, a strong Arctic airmass moderated the effects of El Nino in mid-February. As the Arctic airmass receded in early March, El Nino conditions returned as the primary influence over weather systems within southern BC. Warmer-than-normal ambient temperatures are expected in southern BC through June 2019[4]. Given this prediction, it is likely that the Columbia River and Kicking Horse River freshets will be early. Specifically, the River Forecast Centre predicts that larger rivers, such as the Columbia River and Kicking Horse River, may peak in early-to-mid May[3].

The lower-than-normal snowpacks in contributing basins likely indicate lower peak river levels than in recent seasons. However, significant precipitation events that occur simultaneously with the Columbia River and Kicking Horse River freshet can cause localized flooding. Typically, April

[2] https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/river-forecast/asp_summary_2018-19.pdf

[3] https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/river-forecast/2019_mar1.pdf

[4] https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/river-forecast/2019_april1.pdf

and May are wet months. Precipitation received at the peak of the freshet – typically in May - could artificially augment the freshet, causing the regional peaks of the Columbia River and Kicking Horse River levels to be higher-than-expected for an El Nino year.

Reporting Schedule

In addition to this pre-season report, the reporting schedule for 2019 will consist of a mid-season report and a final report. The mid-season report will summarize field activities, relevant weather data, and expectations for the remainder of the season; it will be provided to the CSRD immediately following the peaks in the Columbia River (Nicholson, Donald gauges) and Kicking Horse River (Golden gauge). The final report will summarize and discuss all program deliverables. Supplementary reports can be provided, upon request, if required in the interim.

To accompany the traditional reports, a real-time dashboard will be made accessible to the CSRD program manager. Dashboard information currently includes information snapshots of larval mosquito abundance and location, treatment amounts, and total samples taken. Future upgrades will include relevant environmental parameters (i.e. weather, primary river level), and a map depicting cumulative treatments. Dashboard data snapshots will allow the program manager to acquire up-to-the-minute program information for internal uses. Dashboard data will go through rigorous quality assurance/quality control checks on a weekly basis.

Contacts

MBL recognizes the importance of being available to residents within each of our program areas as well as keeping the public informed of relevant mosquito abatement activities and information. In an effort to continue to provide these connection opportunities, MBL regional managers check their email and phone messages on a daily basis. Replies to email and phone inquiries are returned within 24 hours.

As a reminder, the following people may be contacted directly for any questions from the Columbia Shuswap Regional District.

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If questions from the public arise, please direct residents to MBL's mosquito hotline (1-877-986-3363) or to the MBL website contact form at www.morrowbioscience.com. Additionally, residents may find helpful information on our Facebook page (Morrow BioScience Ltd.). Subscribe to our Twitter feed (@MorrowMosquito) for interesting and important mosquito facts, as well as updates from our technicians in the field.