

City of Calgary Web App Migration

Prototyping a User Interface for Map Gallery 2.0

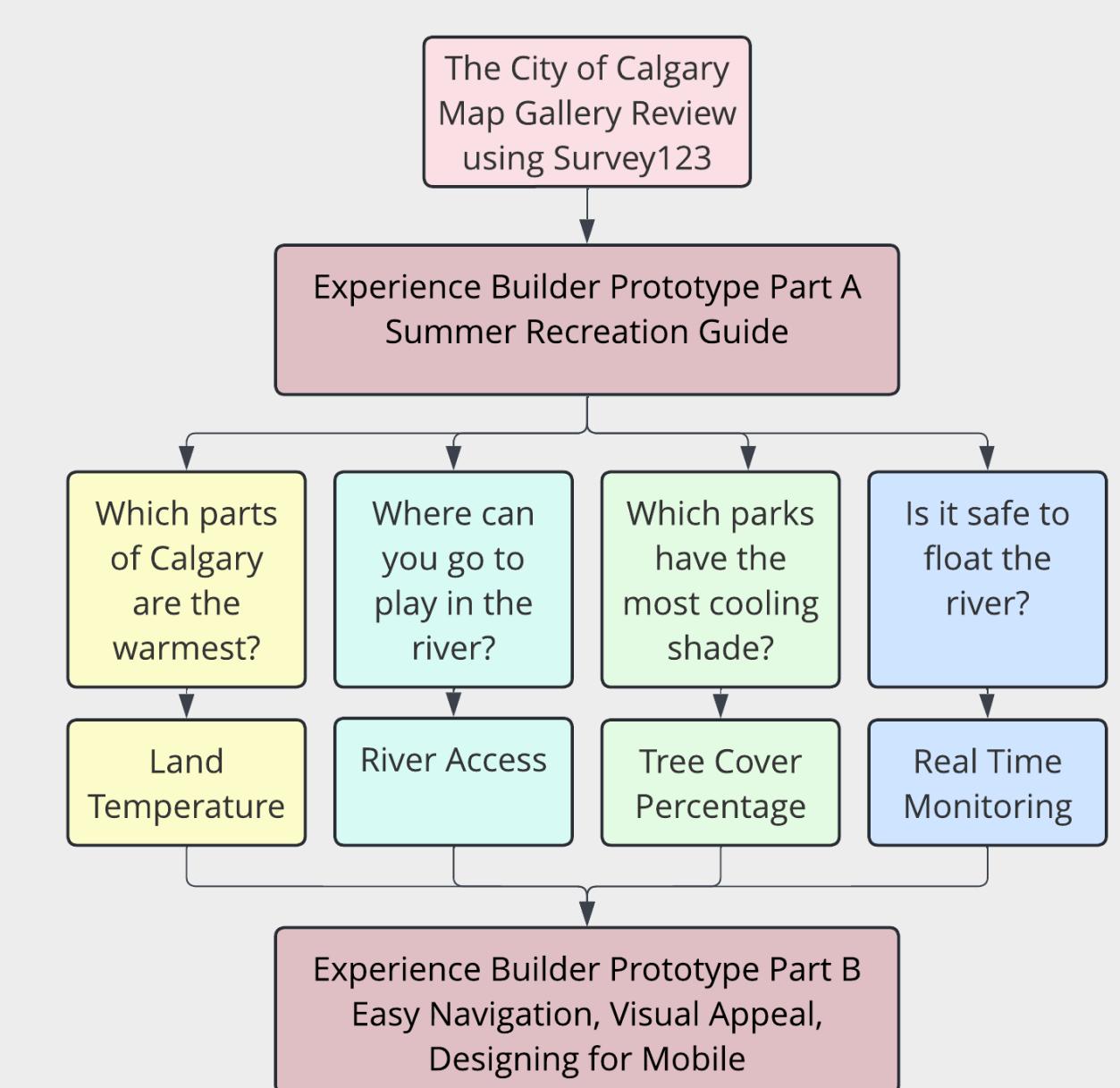
Project Overview

The City of Calgary Map Gallery hosts 10 years of evolving digital map products. In preparation for the gallery's migration from Javascript API 3.x to 4.x, which includes legacy Web AppBuilder products, the project focused on how Map Gallery 2.0 might be enhanced to improve the user experience.

The project aimed to identify GIS solutions for the City's evolving GIS needs. As part of the process, a fulsome review of the current Map Gallery was undertaken, including surveying a group of cartography savvy BGIS students.

Key takeaways from the review were incorporated into the design of an Experience Builder prototype - Esri's next generation 4.x web app replacing Web AppBuilder.

To increase the informational, interactive, aesthetic and experiential value for users, the prototype re-envisioned several of the current Map Gallery's standalone map products into a themed Summer Recreation Guide.



Key Design Objectives

More layers does not equate to more information.
Design for meaningful end use.

Web apps behave differently on Android versus iPhone and should be considered in designing the mobile version.

The user experience can be improved by simple fixes like zoom level settings, mindful design of labels and symbology, useful widgets, and providing map purpose in an information panel.

Navigation should be intuitive and simple.

Visual design should be eye catching at first glance.



Special Thanks to Our City of Calgary Mentors:
Marc Hummel, Leader Projects Group, Geospatial Business Solutions
Patricia Langevin, GIS Analyst, Geospatial Business Solutions



Thank you to Our Capstone Supervisors:
Tigran Melkumyan, SAIT Instructor
Jamie Johnston-Stewart, SAIT Instructor

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Geographic Coordinate System: WGS 1984
Projection: Transverse Mercator
Central Meridian: -114.0
Scale Factor: 3TM; 0.9999

Data Sources:
Tree Coverage - City of Calgary Open Data Portal
River Access - Manual digitization of Map Gallery River Access Map
Real Time Hydrometric Data - Environment and Natural Resources, Government of Canada
Land Temperature - Landsat Band 10 Thermal Imagery

Survey123 Methodology

The Survey123 form incorporated touchstones contained in the City's web application styles guide and QA/QC standards to align the questions with the client's guiding principles on developing map products.

The survey was broken into four parts that interrogated the user's experience with a single Map Gallery web app on both desktop and mobile devices. The four parts consisted of questions that investigated the informational, interactive, aesthetic and experiential value of the web app.

Is there too much information?*

Ask yourself:
Were there layers you felt did not add any informational value?
Were you uncertain why a particular layer or map was added?

No Somewhat Yes

'Informational Value' Question

Overall, is it nice to look at?*

Do the colors, layout, and design feel good?

Yes Somewhat No

'Aesthetic Value' Question

Survey123 Results

84 reviews were conducted on 20 web apps/web maps located in the Map Gallery. All maps were reviewed a minimum of four times.

All reviewers were students in SAIT's Bachelor of Applied Technology Geographic Information Systems program and are familiar with cartographic principles. The capstone team reviewed all 20 maps for a total of 60 reviews. The remaining 24 reviews were conducted by 22 individuals.

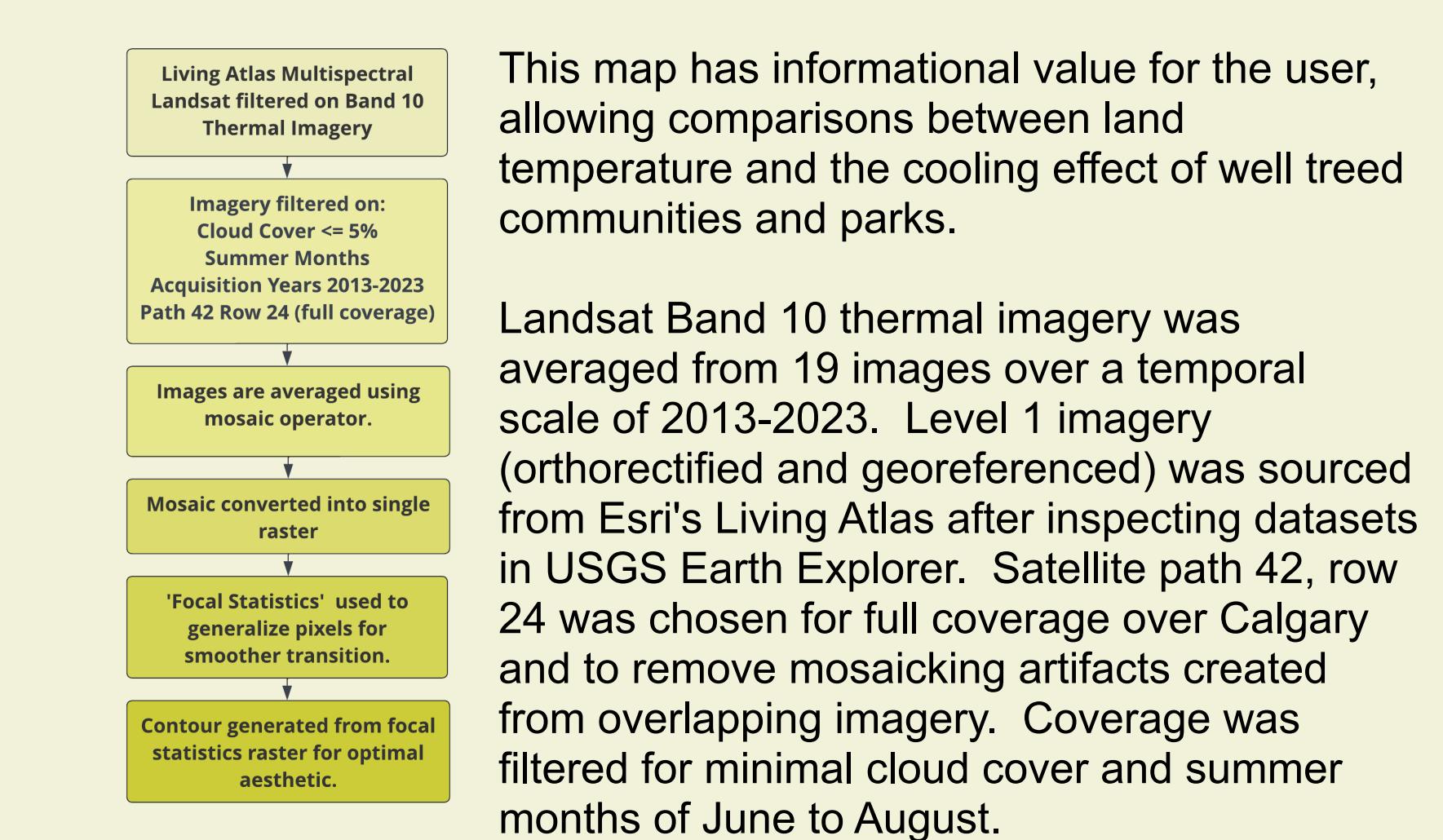
Responses were converted to a numerical value and totaled. Totals were averaged for each map product and then ranked.

Map Products	RANK	Average of all reviewer scores
Calgary River Flooding	1	132.5
Urban Forestry	2	128.75
Administrative Boundaries	3	127.75
River Access Locations	4	125.75
Traffic Information	5	123
My Property	6	122.6
Parking zones	7	121.75
Calgary Imagery	8	119.5
Off Leash Dog Areas	9	116.5
Road Conditions	10	114.8
Cemeteries	11	114.25
Roadway Activities	12	112.5
Urban Heat of Calgary	13	112.25
Calgary Ring Road	14	111.75
Parks Wayfinder	15	110.5
Calgary Language Map	16	109.5
Public Safety	17	109.25
Investing in growing communities	18	108.8
Calgary Pathways & Bikeways	19	100.8
My Calgary Services	20	98.75

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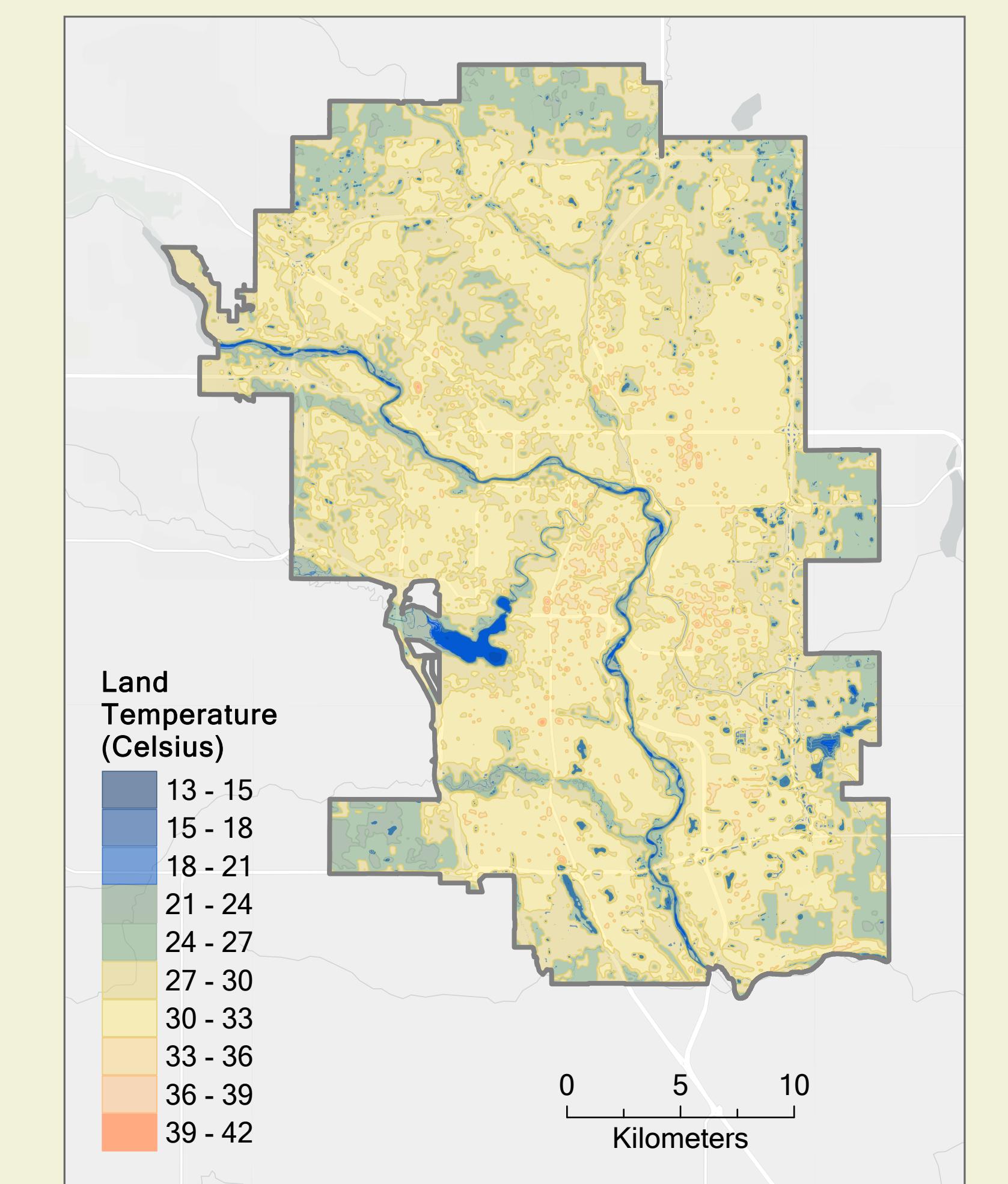


Land Temperature

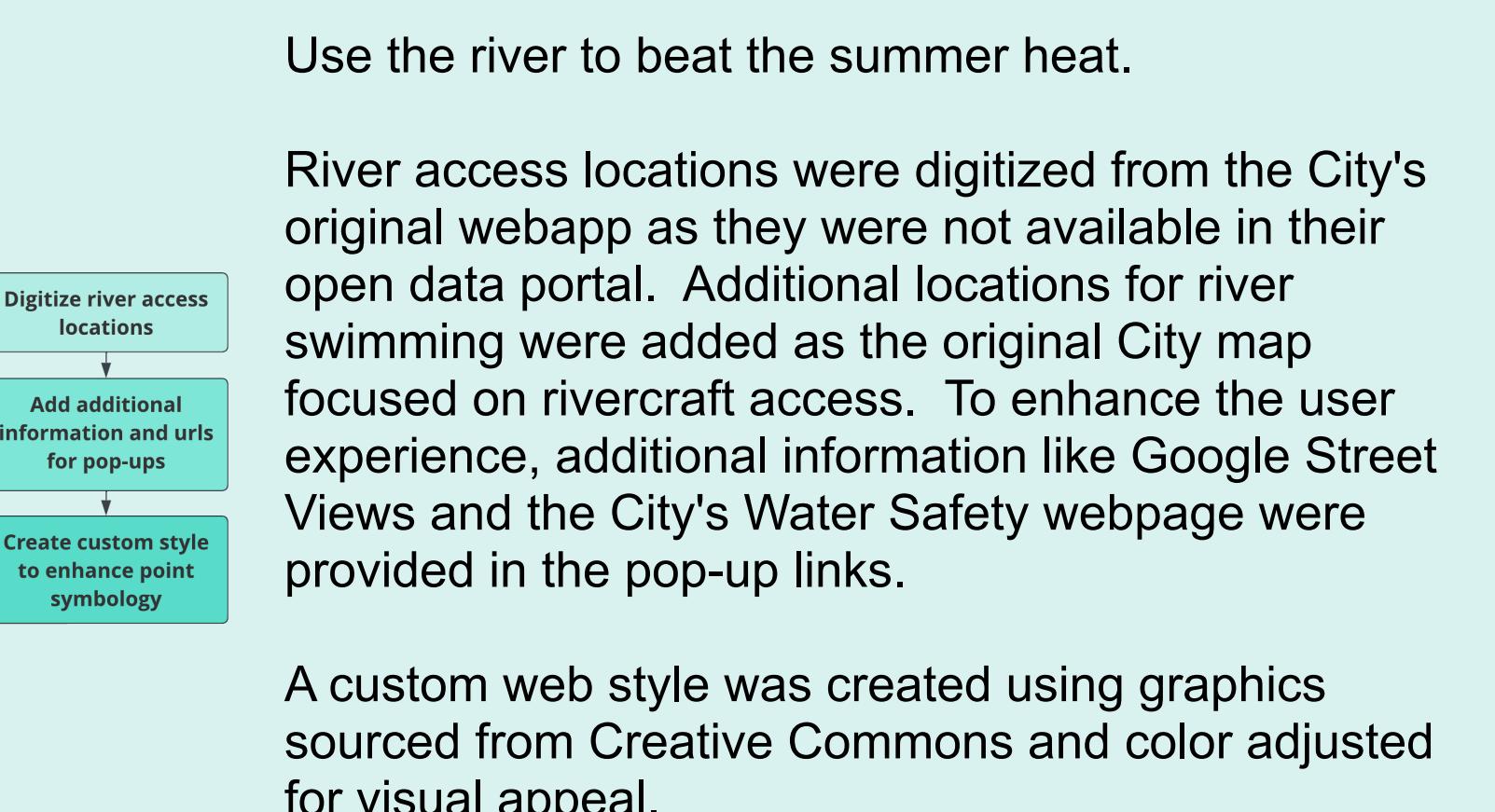


This map has informational value for the user, allowing comparisons between land temperature and the cooling effect of well treed communities and parks.

Landsat Band 10 thermal imagery was averaged from 19 images over a temporal scale of 2013-2023. 1st imagery (orthorectified and georeferenced) was sourced from Esri's Living Atlas after inspecting datasets in USGS Earth Explorer. Satellite path 42, row 24 was chosen for full coverage over Calgary and to remove mosaicking artifacts created from overlapping imagery. Coverage was filtered for minimal cloud cover and summer months of June to August.



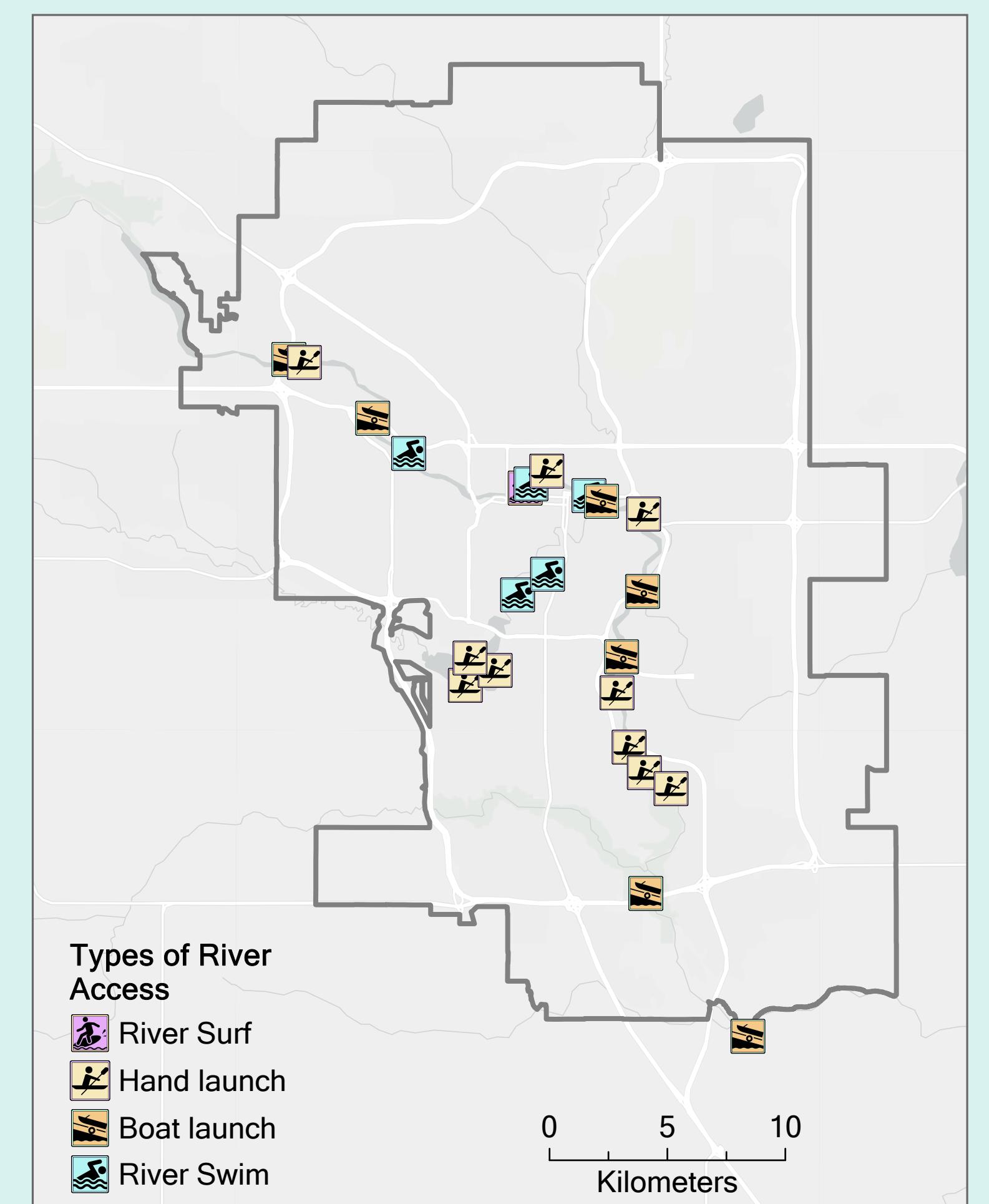
River Access



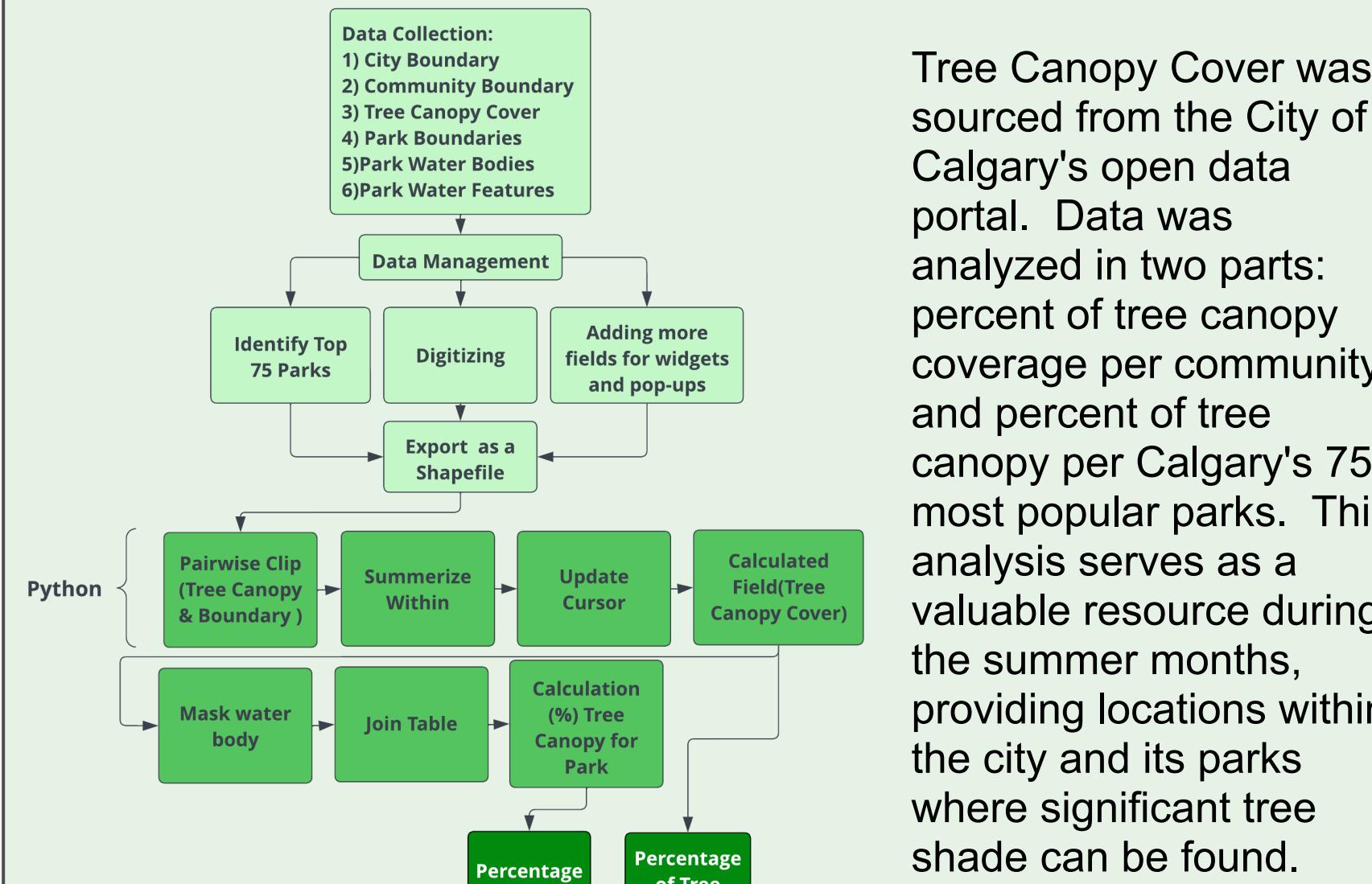
Use the river to beat the summer heat.

River access locations were digitized from the City's original webapp as they were not available in their open data portal. Additional locations for river swimming were added as the original City map focused on rivercraft access. To enhance the user experience, additional information like Google Street Views and the City's Water Safety webpage were provided in the pop-up links.

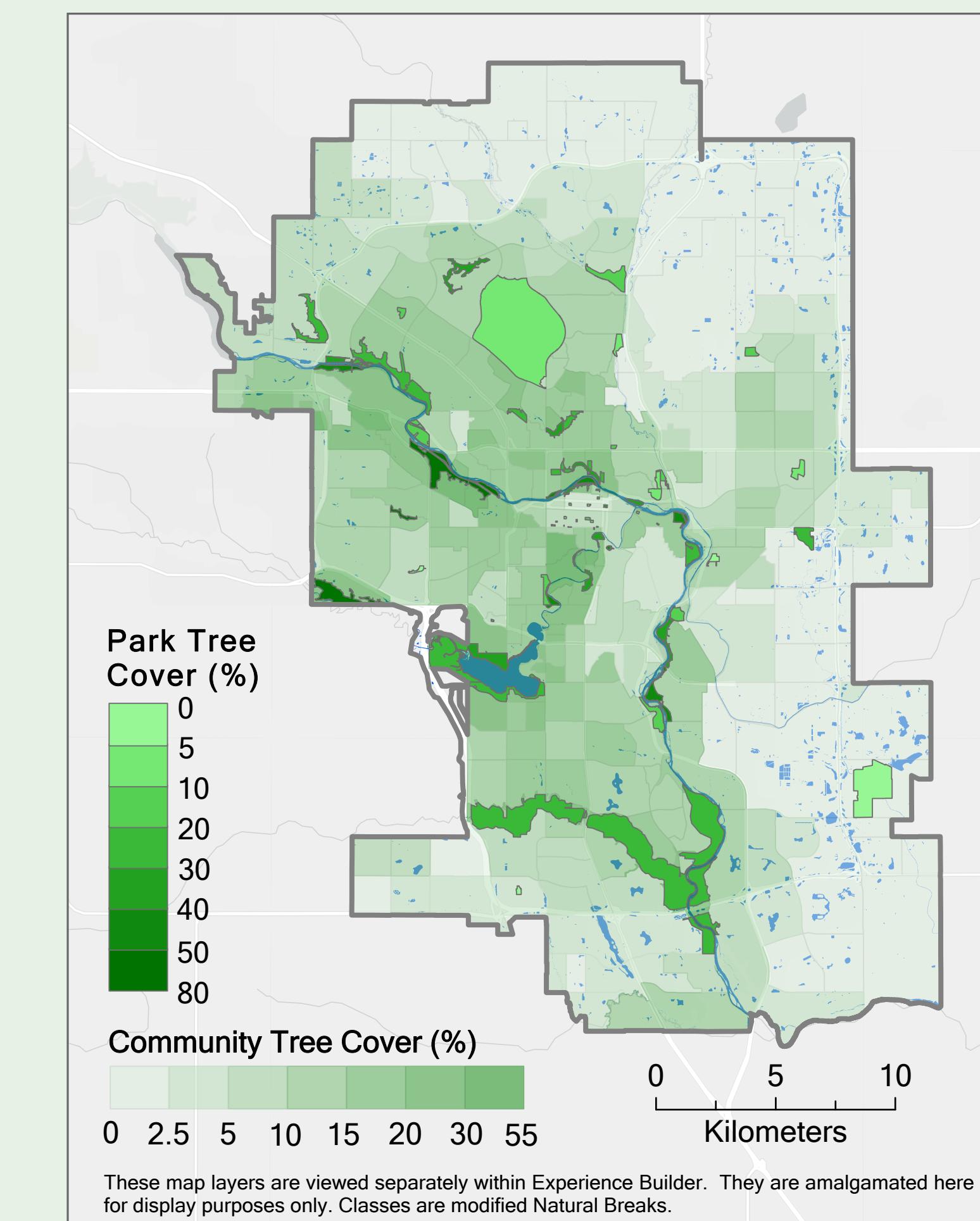
A custom web style was created using graphics sourced from Creative Commons and color adjusted for visual appeal.



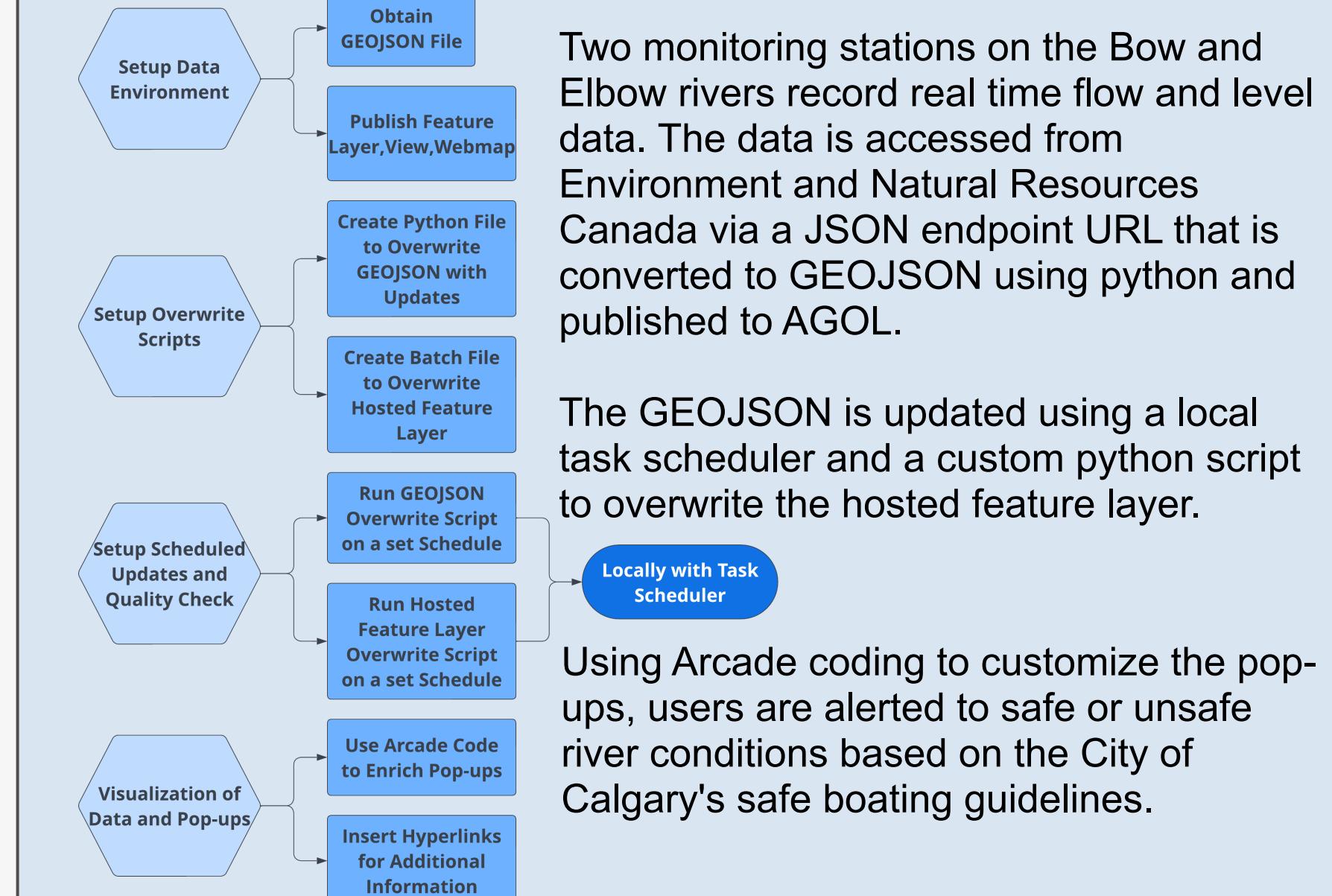
Tree Canopy Cover



Tree Canopy Cover was sourced from the City of Calgary's open data portal. Data was analyzed in two parts: percent of tree canopy coverage per community and percent of tree canopy per Calgary's 75 most popular parks. This analysis serves as a valuable resource during the summer months, providing locations within the city and its parks where significant tree shade can be found.



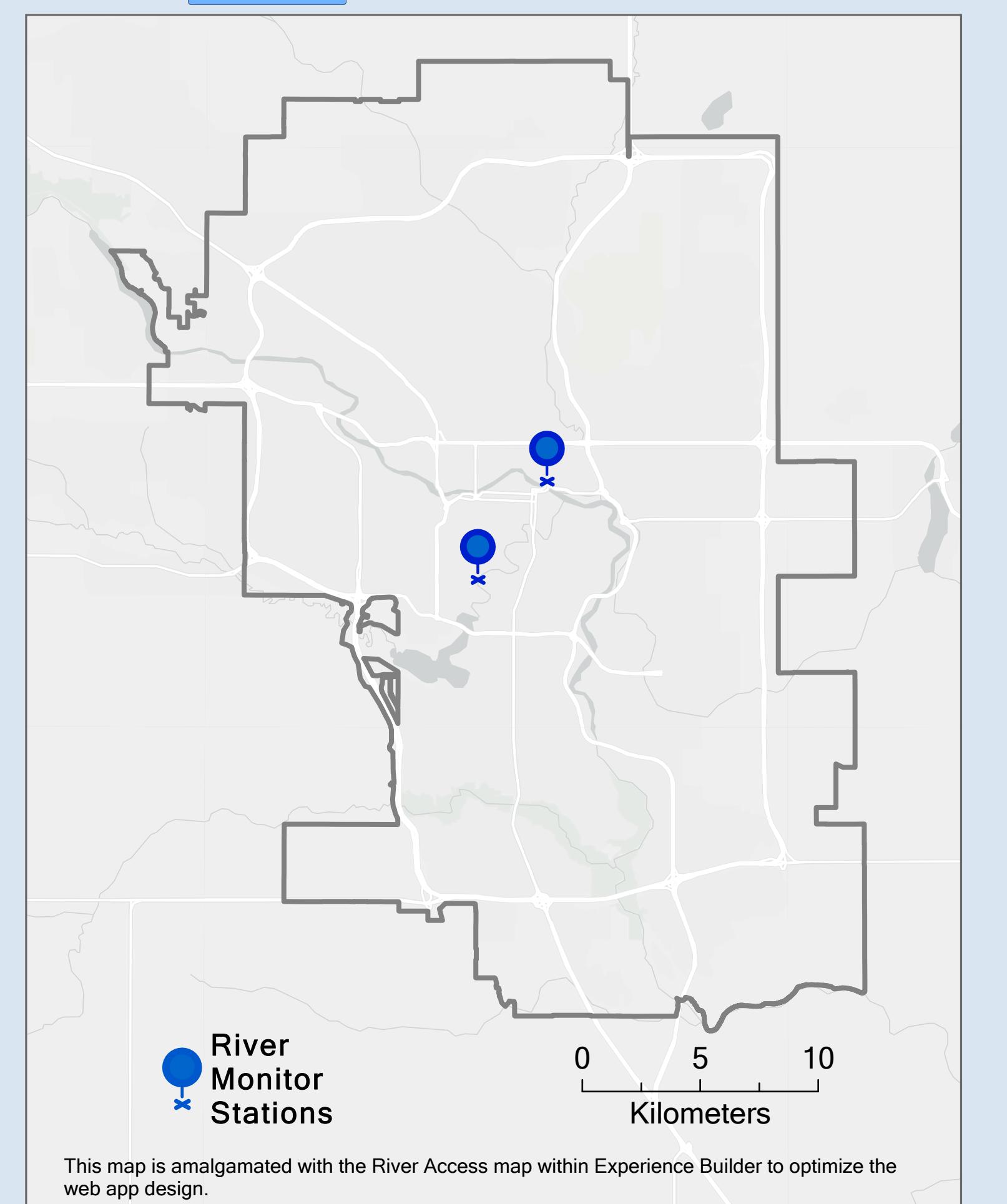
Real-Time River Monitoring



Two monitoring stations on the Bow and Elbow rivers record real time flow and level data. The data is accessed from Environment and Natural Resources Canada via a JSON endpoint URL that is converted to GEOJSON using python and published to AGOL.

The GEOJSON is updated using a local task scheduler and a custom python script to overwrite the hosted feature layer.

Using Arcade coding to customize the pop-ups, users are alerted to safe or unsafe river conditions based on the City of Calgary's safe boating guidelines.



Experience Builder

(1) Intuitive navigation menu.

(2) Side panel explains app purpose.

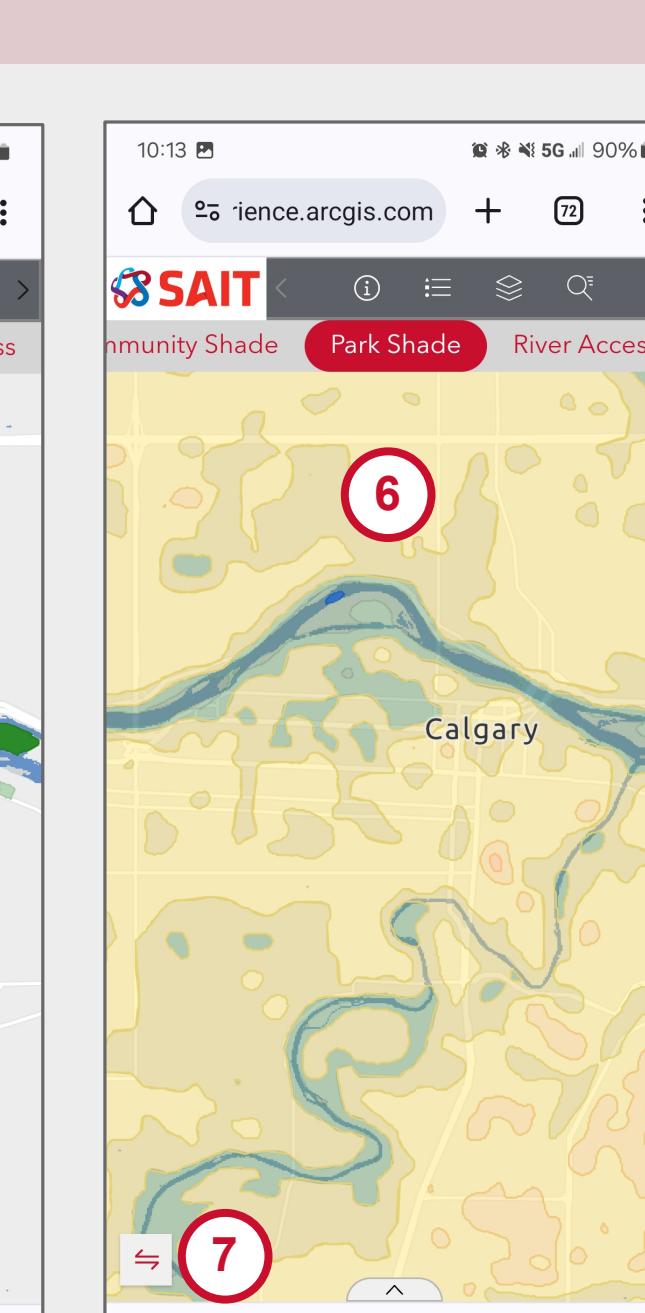
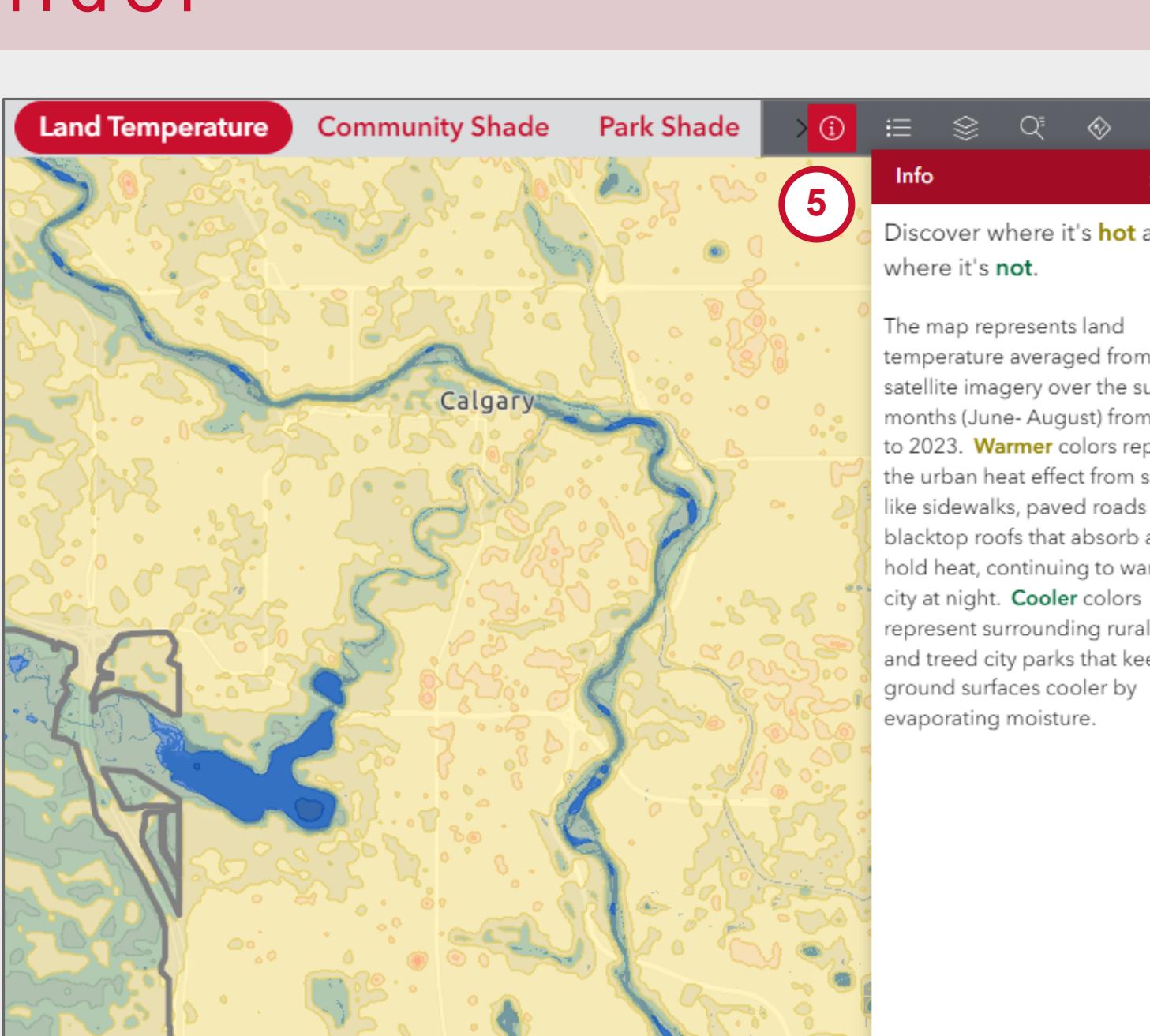
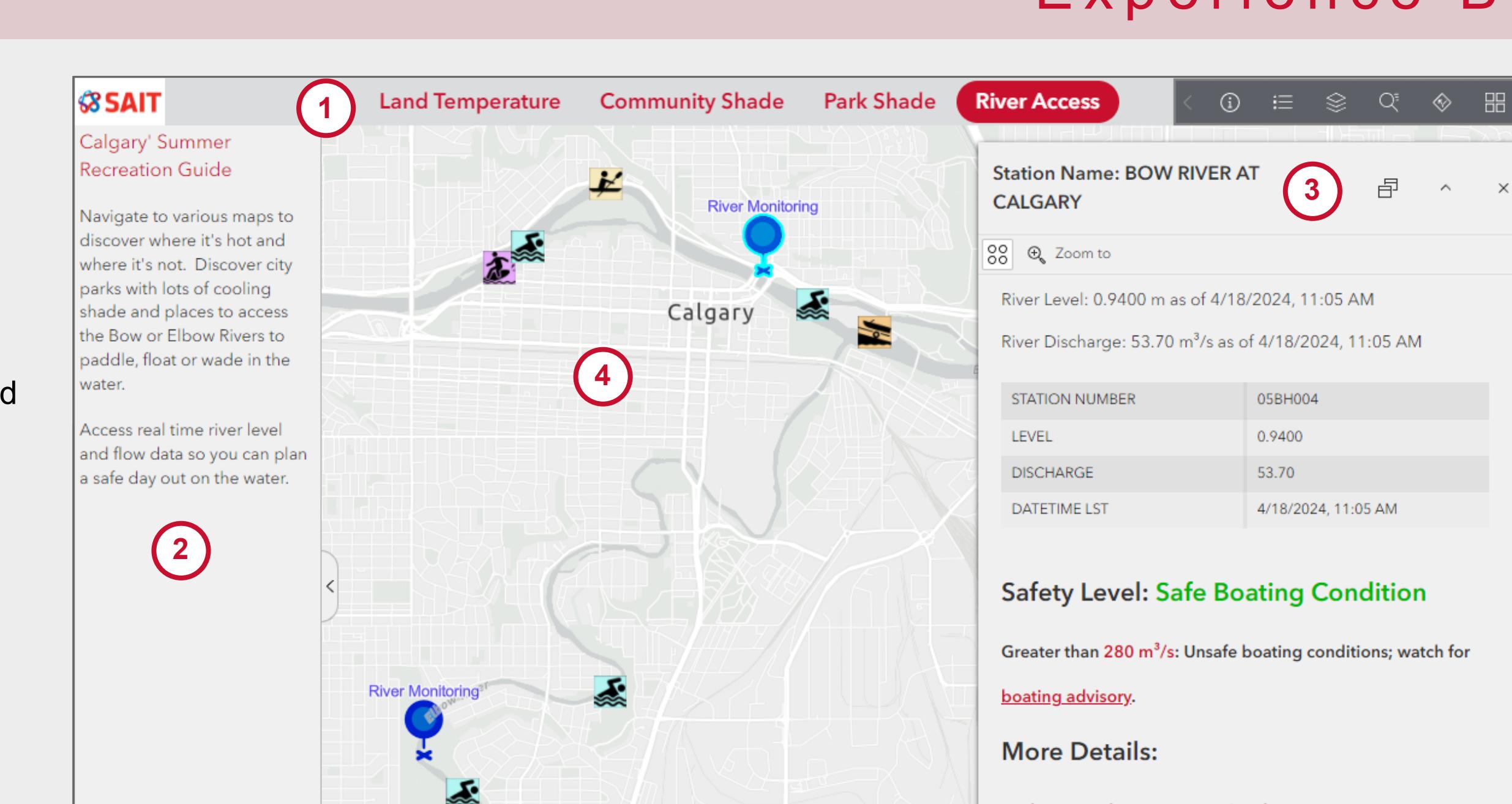
(3) Customized pop-ups for high informational value.

(4) River Access and River Monitoring layers amalgamated for meaningful end use.

(5) Widget menu to interact with map features.

(6) Uncluttered mobile interface.

(7) 'Switch' button allows users to discover relationship between land temperature and the cooling effect of evapotranspiration and shade.



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