

Talus

Design Specification

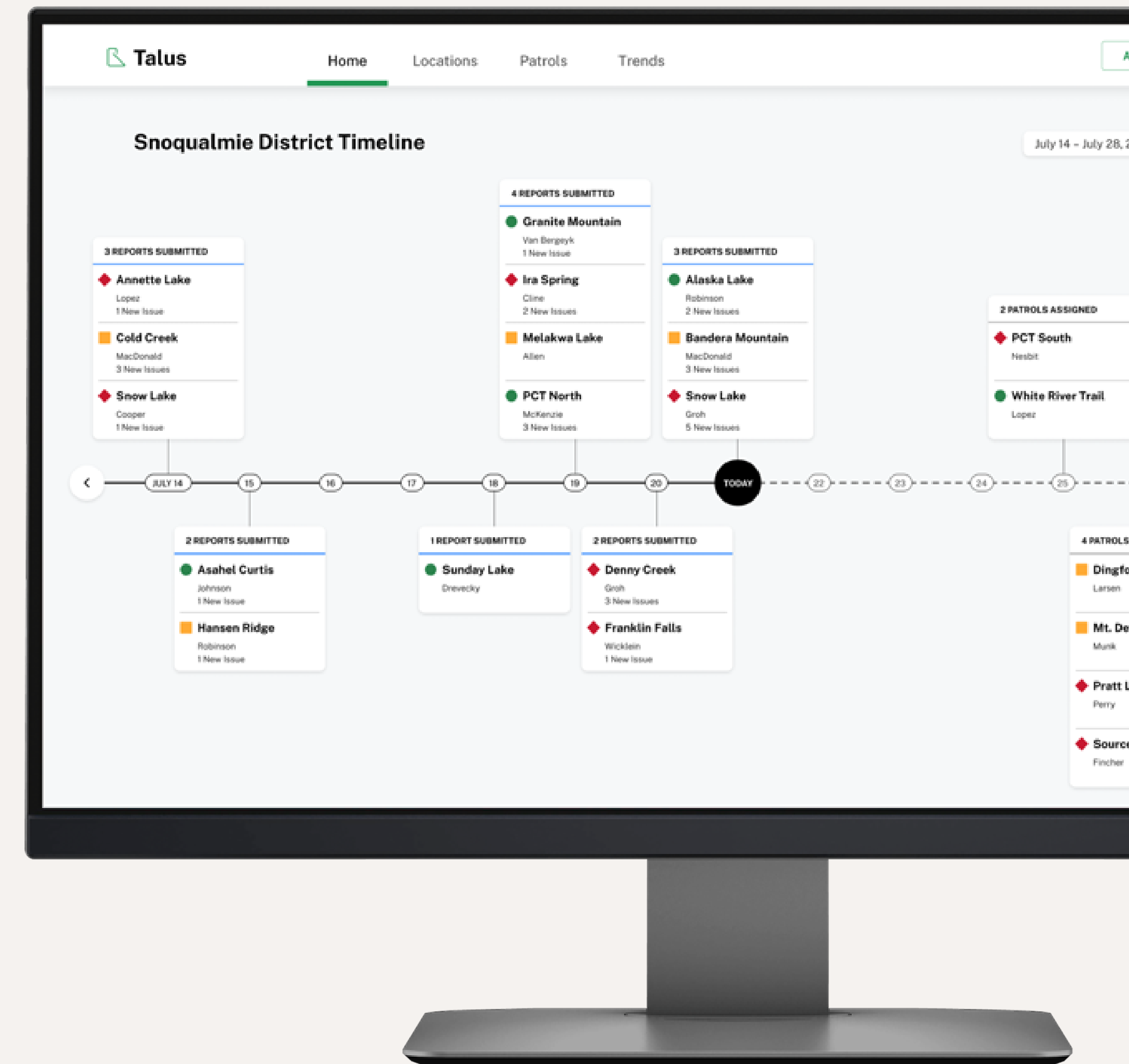


TEAM

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SPONSOR

REI Co-op



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Executive Summary

The US Forest Service’s mission can be summed up in their motto, “Caring for the Land and Serving People”. What’s not immediately apparent in this motto is the inherent tension those two missions strike. Promoting the preservation of natural environments while ensuring access, use, and enjoyment of these environments by people is a near-impossible task, one that Forest Rangers wrestle with daily.

In recent years, this tension has been exasperated by increased usage of trails alongside decreased funding of the Forest Service’s parent agency, the US Department of Agriculture. As more people participate in outdoor activities, the individual impacts they have on the environment become apparent. Rangers help mitigate this tension by educating the public on good conservation habits and doing trail maintenance.

Our research uncovered several opportunity areas for design intervention. The US Forest Service tracks numerous metrics related to visitor traffic and trail conditions. But current technology is segmented and hard to access, creating a dearth of actionable data for rangers to use to inform their decisions like which trails to visit or how many rangers to hire each season. While lots of data is collected (at the expense of ranger’s time), most of it sits in spreadsheets,

sometimes taking years to be turned into a report or grant proposal. Critical information — such as a tree down blocking a trail — gets treated the same way as long-term data like weekly trail counts, making it easy for rangers to miss important information. Weekly scheduling, a complex part of a station manager’s jobs, currently relies mostly on institutional knowledge. This presents challenges as many rangers are employed seasonally or will rotate stations year after year.



The Skykomish Ranger Station, one of five ranger stations in the Mount Baker Snoqualmie National Forest, whose territory spans over 1.7 million acres.

What Talus Does

Talus is an application designed to bring data collected by rangers together in one place, and present it intuitively and contextually. Talus helps wilderness rangers monitor and manage trail conditions, so they can spend more time in the field doing their most impactful work. After every patrol, wilderness rangers compile a comprehensive report of their trip, their interactions with other people, tasks they worked on, and anything new that needs future planning to take care of. Its main features include:

Actionable data: time and location views

From the timeline, managers can see what's been happening in their district over the course of the season, and schedule upcoming work for the next few weeks or months. Along with this time-based view, the district overview map lets rangers see issues organized spatially so they can see where problems occur most often and where to focus their efforts.

Trail health at a glance: contextual information

Location-specific detail pages elevate the most relevant information, making it easy to see the current conditions for a given trail, and the status of any issues that need attention. Talus helps rangers prioritize the places that are most in danger of degradation.

Streamlined workflow: intuitive mental model

New issues are continuously cropping up, and Talus gives rangers a simple way to view trail reports, rank issues, and assign work in a dynamic and unpredictable natural environment.

DESIGN PRINCIPLES

Ease communication and knowledge sharing for rangers and the public.

Design to maximize both conservation and access.

Value human–nature interaction over human–technology interaction.

Support ranger agency to act on their first-hand knowledge.

Architecture

Site map

Workflow

Interaction Flows

Key Paths

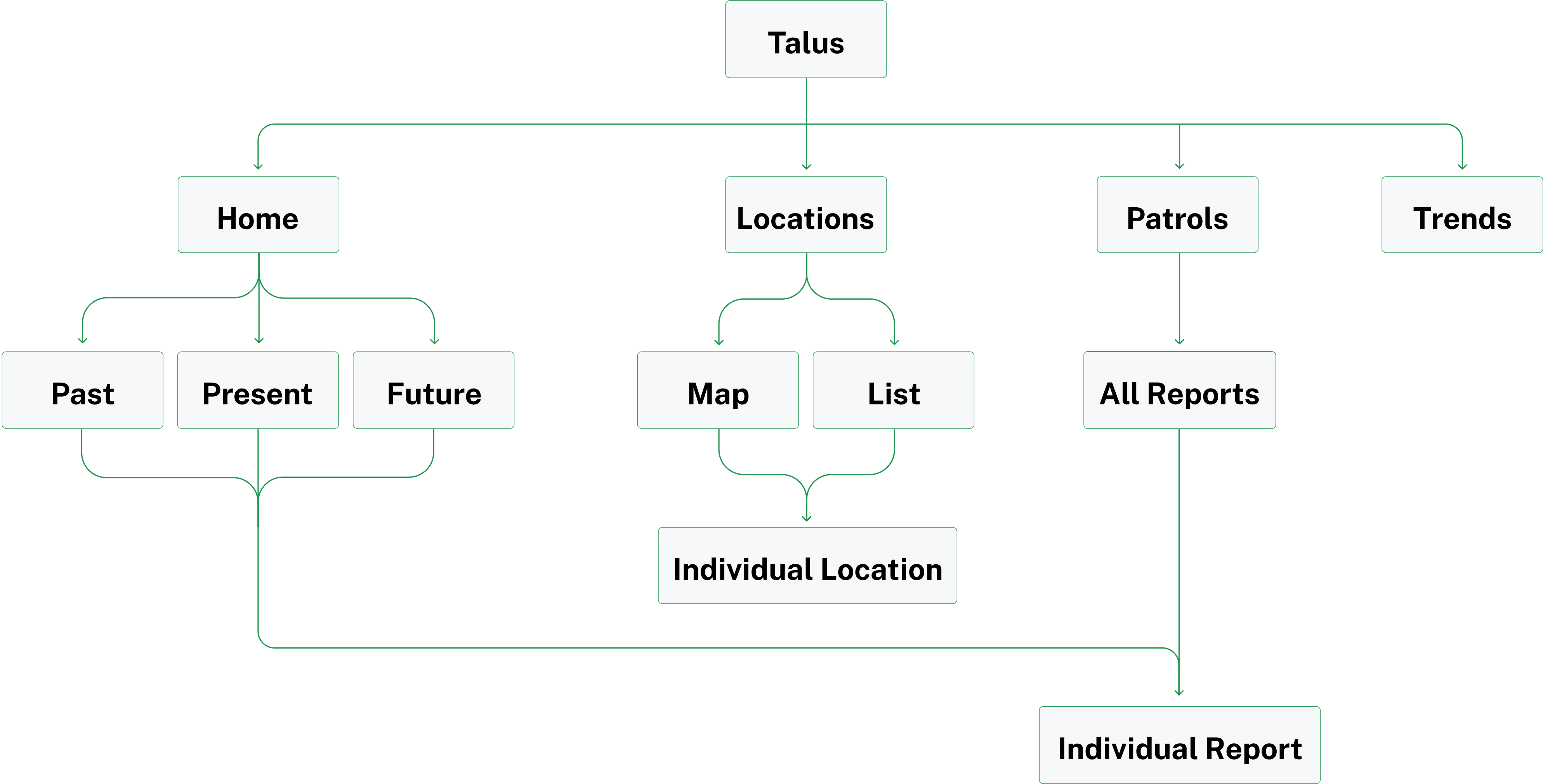
Screen Annotations

Entity Relationship Diagram

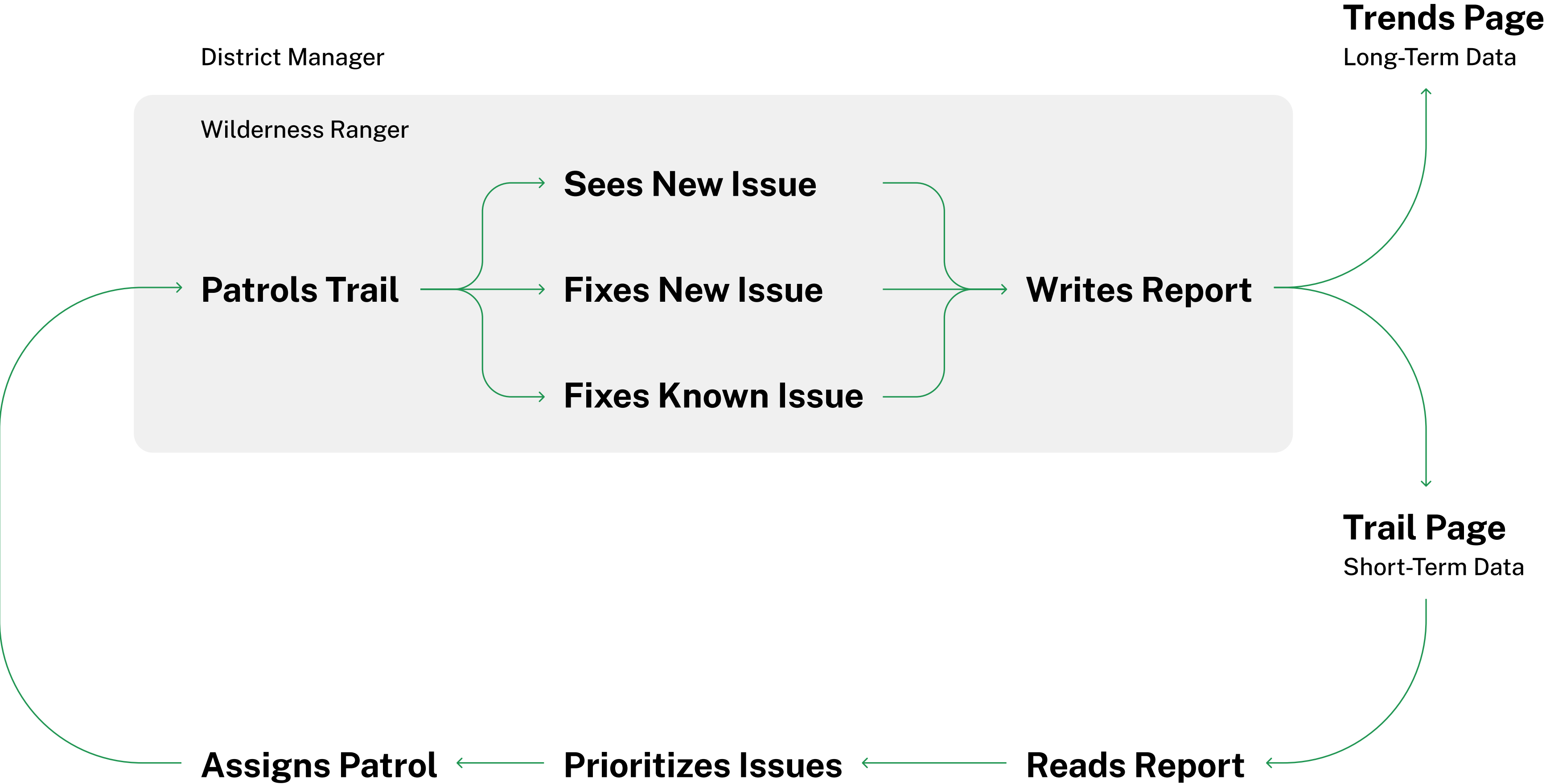
Land Organization



Site Map

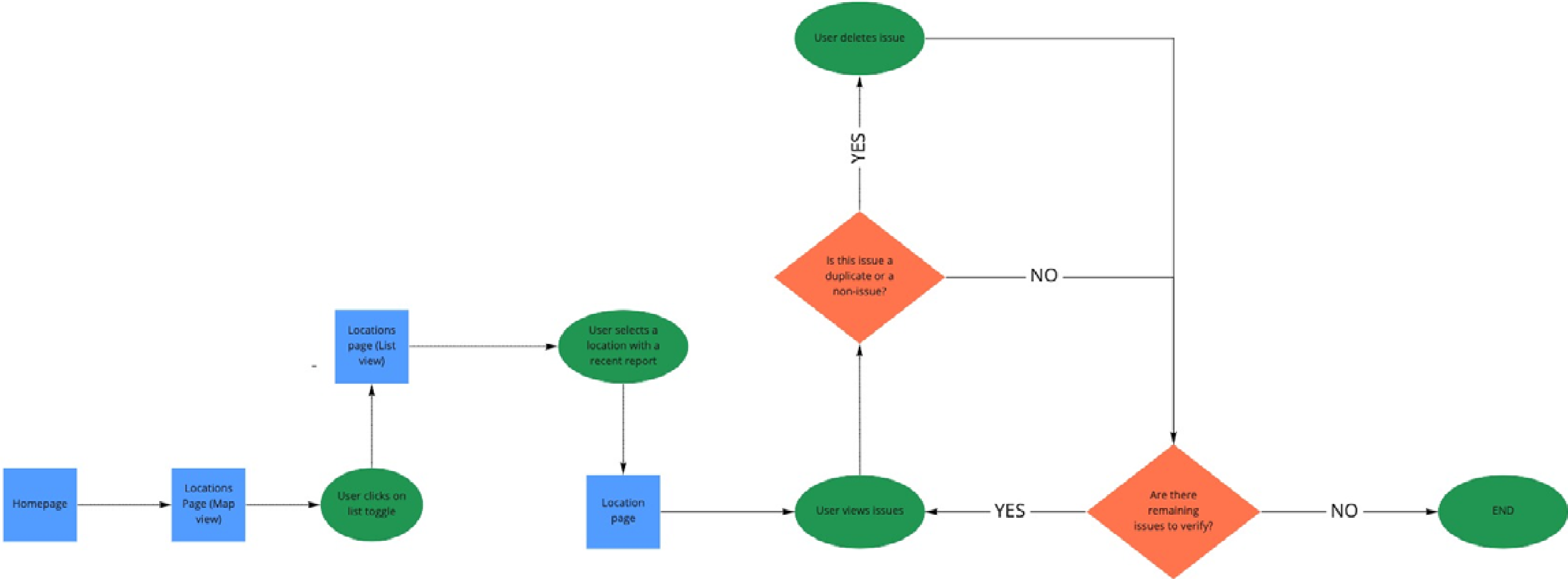


USFS Ranger Workflow



Interaction Flow

ASSESSING REPORTED ISSUES



Interaction Flow

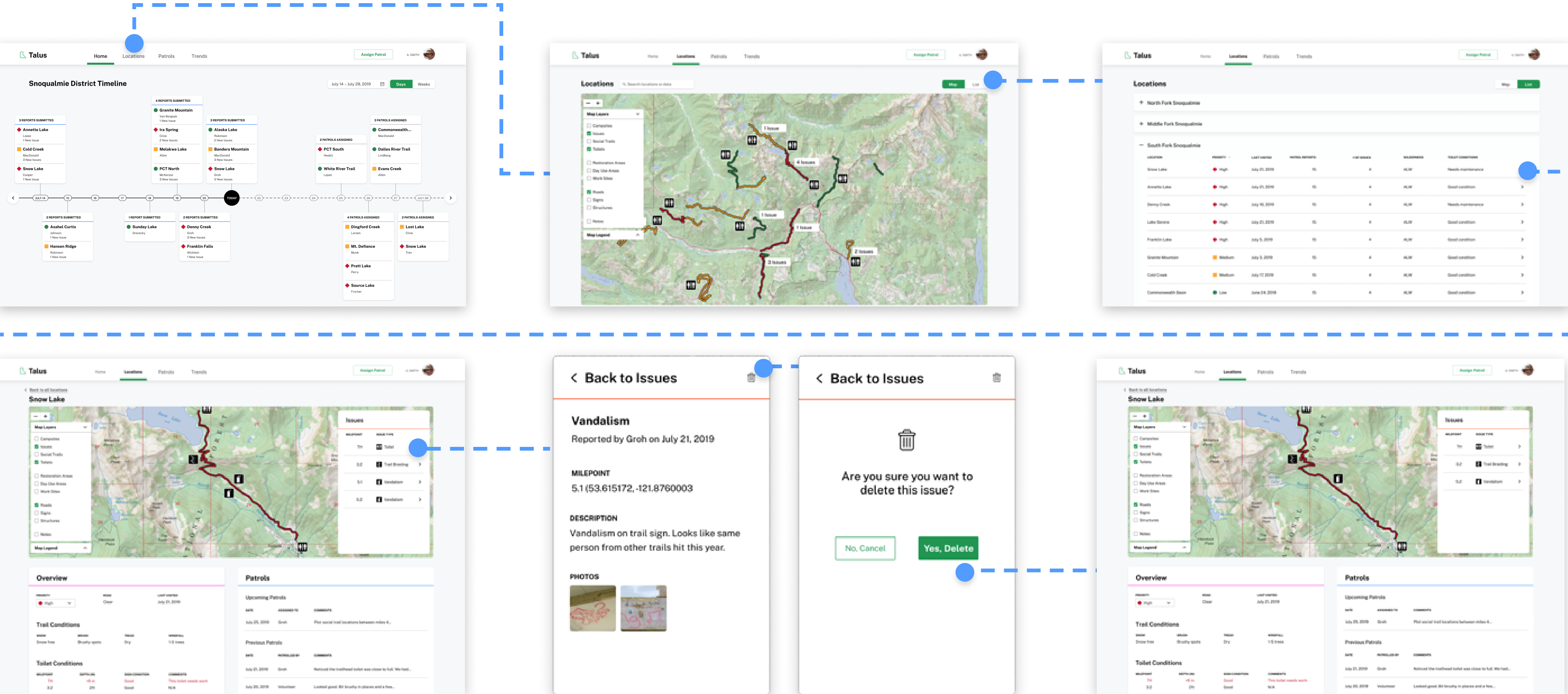
ASSIGNING A PATROL



ARCHITECTURE

Key Path - Assessing Reported Issues

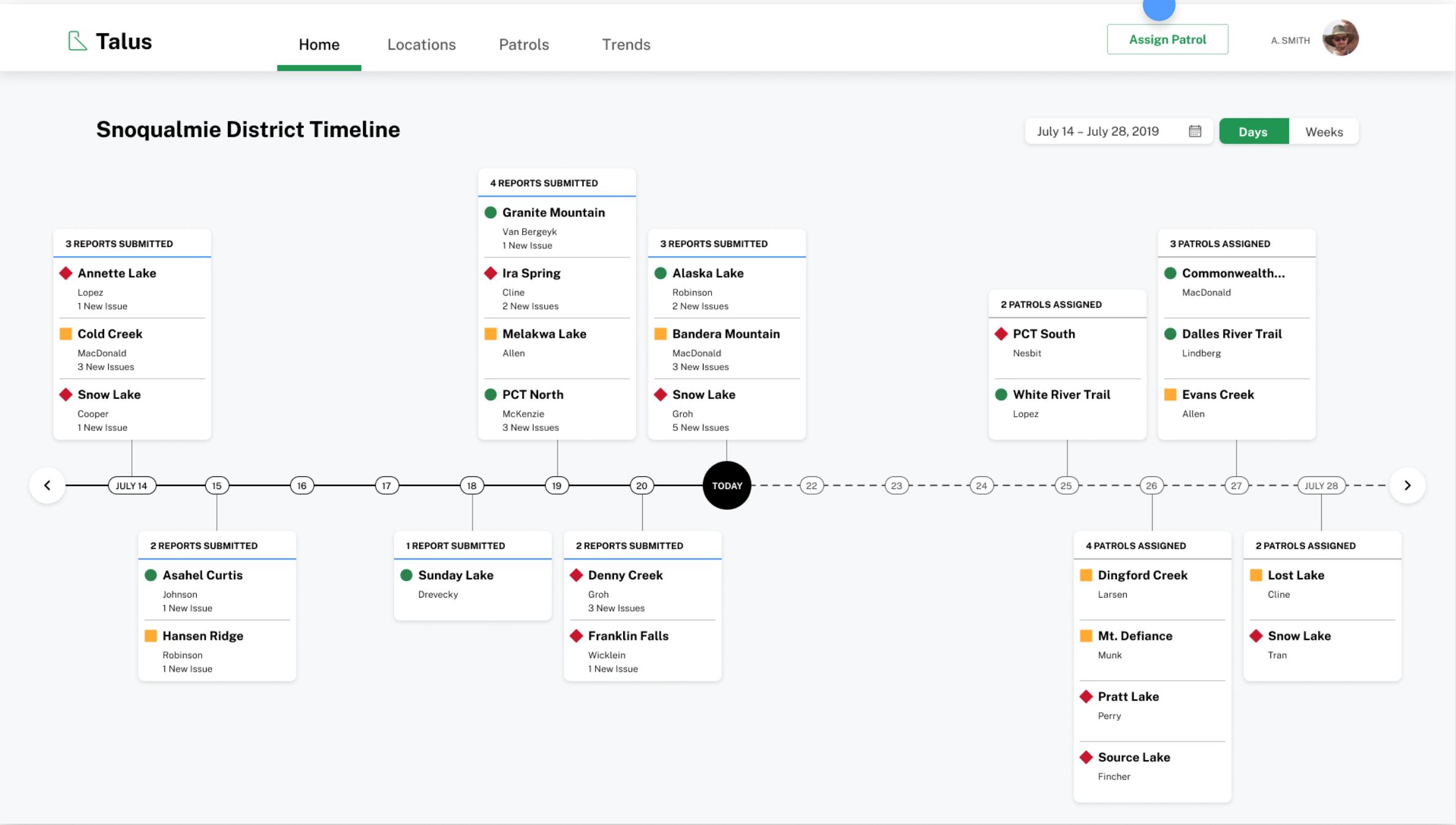
Rangers can view specific issues on a trail page and go in to view things like their GPS coordaintes or any photo evidence. If they find a duplicate issue or a non-issue, they can go in and archive the ticket so it no longer appears on the trail page.



ARCHITECTURE

Key Path - Assign a Patrol

Rangers are able to assign a patrol from any screen in the system by clicking on the “Assign a Patrol” button. If a user clicks the button while on a specific trail page, the trail name will be auto-filled.



Create New Patrol

Patrol Information

LOCATION: Enter location

ASSIGNED RANGER: Select a ranger

SCHEDULED FOR: Select a date

PATROL INSTRUCTIONS: Write patrol instructions...

Cancel Create

Create New Patrol

Patrol Information

LOCATION: Commonwealth Basin

ASSIGNED RANGER: MacDonald

SCHEDULED FOR: July 27, 2019

PATROL INSTRUCTIONS: Go on a routine patrol of Commonwealth Basin. This has not been patrolled in about 20 days.

Cancel Create

✓

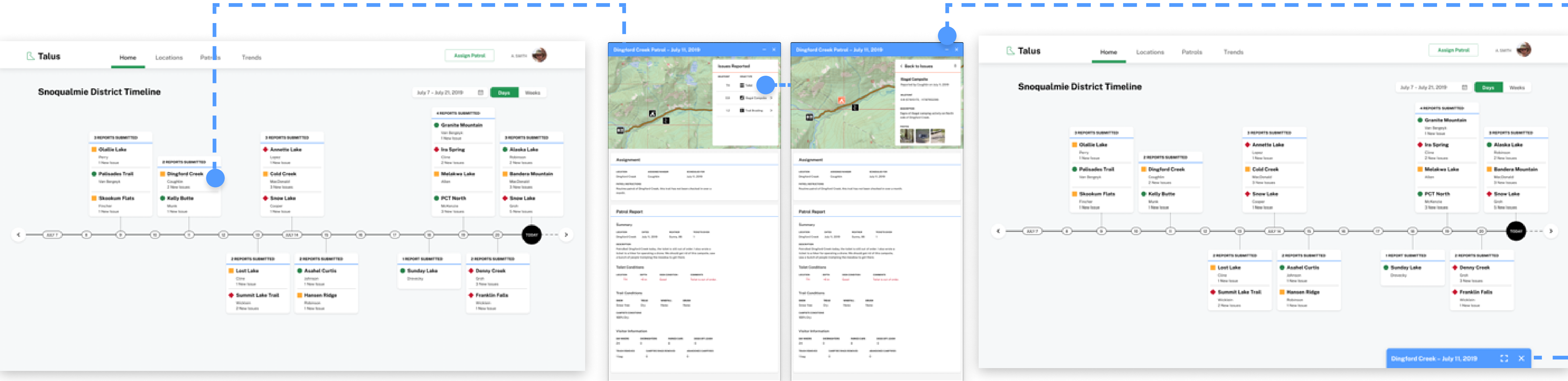
Patrol for Commonwealth Basin assigned to MacDonald for July 27, 2019

Okay

ARCHITECTURE

Key Path - View and Minimize Patrol

Rangers can view patrols from both the trail page as well as the timeline on the homepage. Patrols can be minimized and are kept at the bottom of the screen.

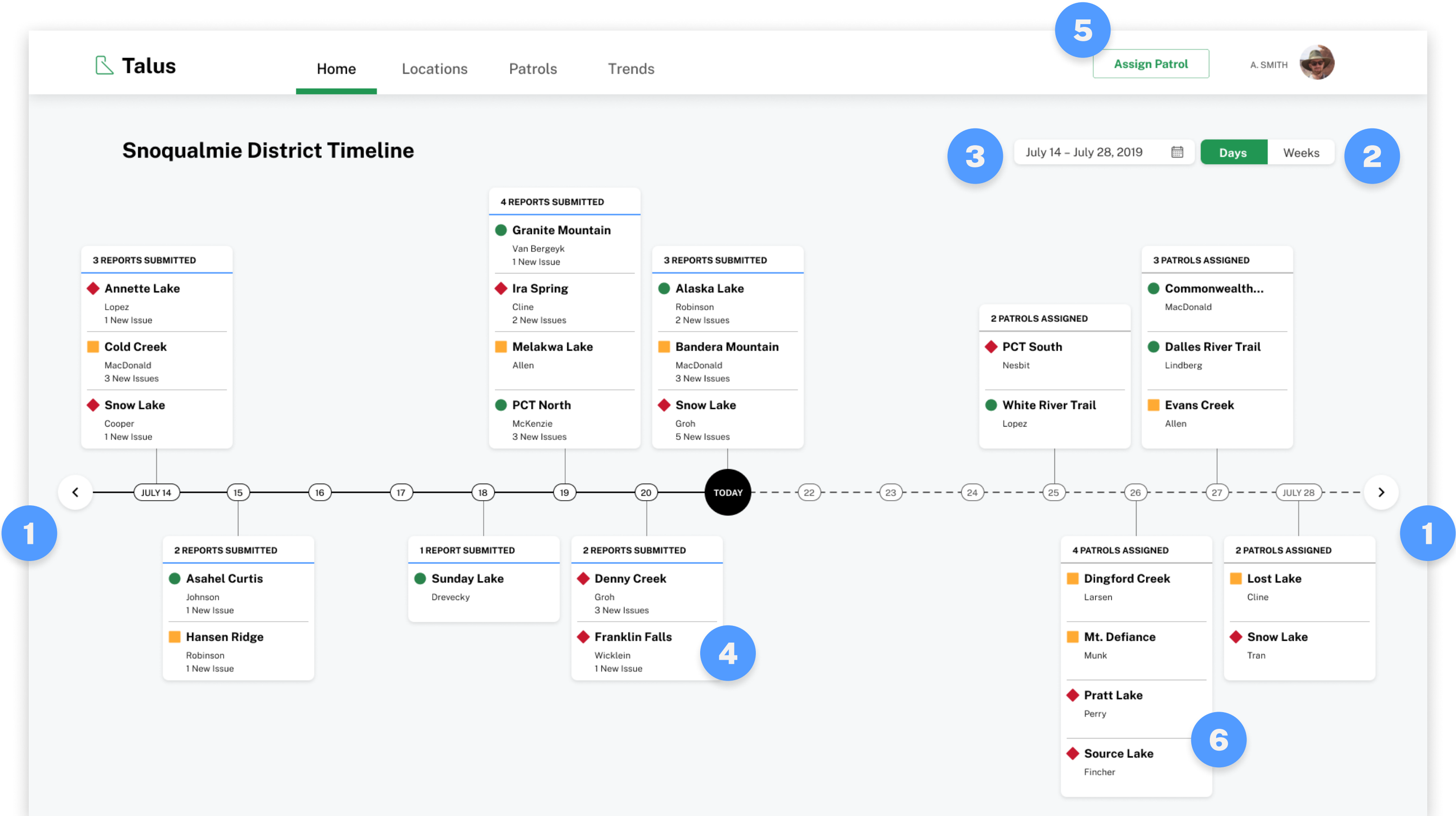


Annotation

TIMELINE

The timeline view is the homepage of Talus. Here the user can see any patrols that have occurred within a set time frame, as well as future pending patrols.

- 1 Users can scroll forward or backwards a week or month at a time.
- 2 View one week's worth of patrols at a time, or zoom out to view an entire month's worth.
- 3 Users can also set their own date range.
- 4 Patrols are listed with that trail's status (red, yellow, or green), alongside the name of the ranger or volunteer who completed the patrol, and if there were any issues discovered on the patrol.
- 5 The assign patrol button is always available on the top nav, and gives the user easy access to assign a patrol to a specific location, ranger, and date.
- 6 Users can view upcoming patrols and who they're assigned to.

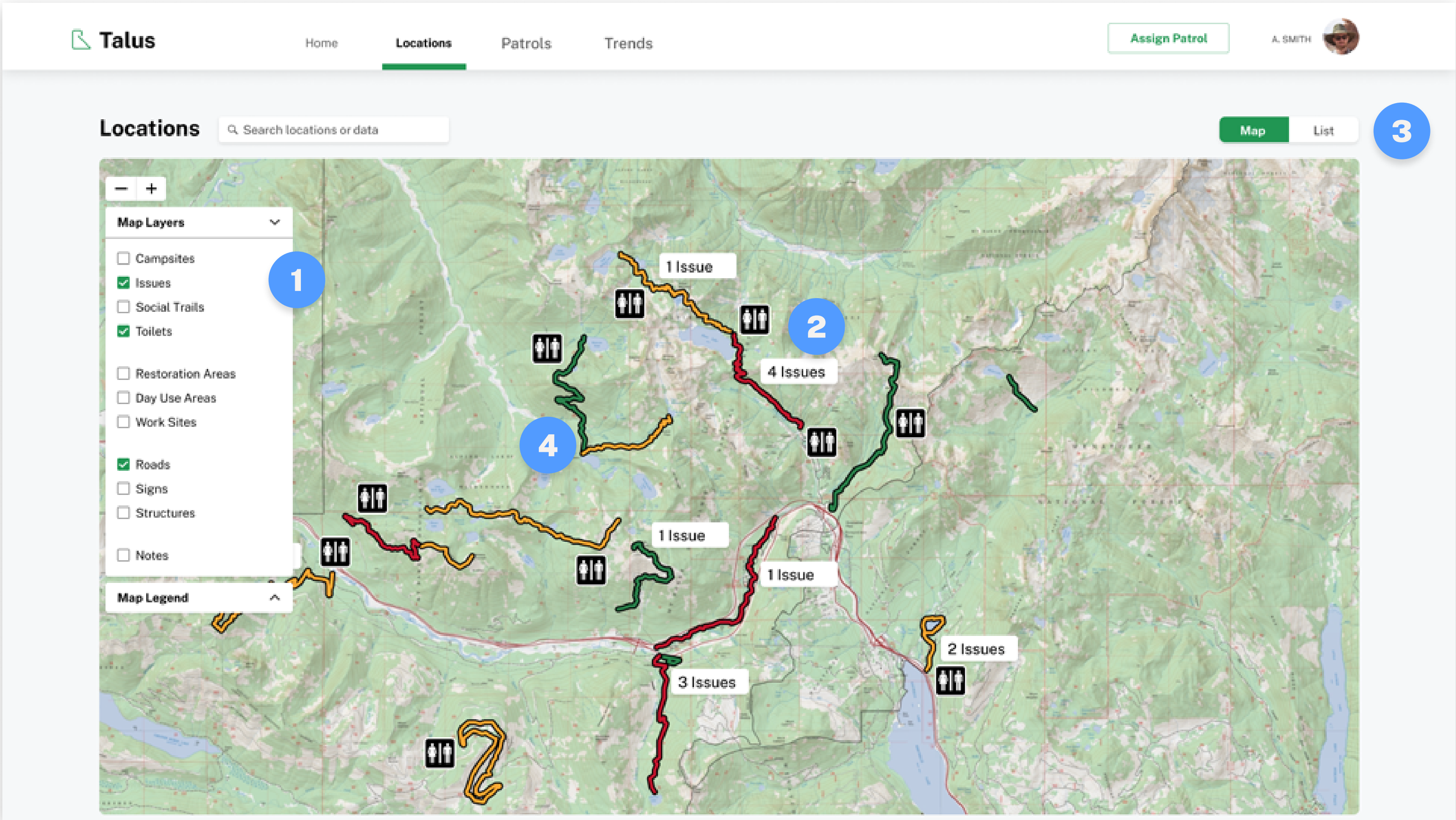


Annotation

LOCATION//MAP VIEW

The trails page is where users can view all the trails in their district. The map contains layers for all sorts of data like wilderness toilets, open issues, social trail locations and more. The map view provides a visible representation of how the district's trails look as a whole.

- 1 Map layers can be turned on and off depending on what a ranger is using the map for.
- 2 All unresolved issues will show up next to the associated trail.
- 3 Quick toggle to list view.
- 4 Quick at-a-glance trail health with the corresponding priority-level colors:
 - high priority
 - medium priority
 - low priority



Annotation

LOCATION//LIST VIEW

The trails page contains a data table of trail information, sortable by priority status, trail name, and date last visited. Here rangers can navigate to specific trail pages for a deeper view into that trail's status.

- 1 Users can collapse and expand specific subregions to move quickly through the trail list.
- 2 The trail list is sortable by data points like the date a trail was last visited, its priority level, or number of open issues.
- 3 Quick toggle to map view.
- 4 By clicking on a trail in the list, it opens up that trail's page which contains all the data for that specific location.

Talus

HomeLocationsPatrolsTrends

Assign PatrolA. SMITH

Locations

3

MapList

1

+ North Fork Snoqualmie

+ Middle Fork Snoqualmie

2

— South Fork Snoqualmie

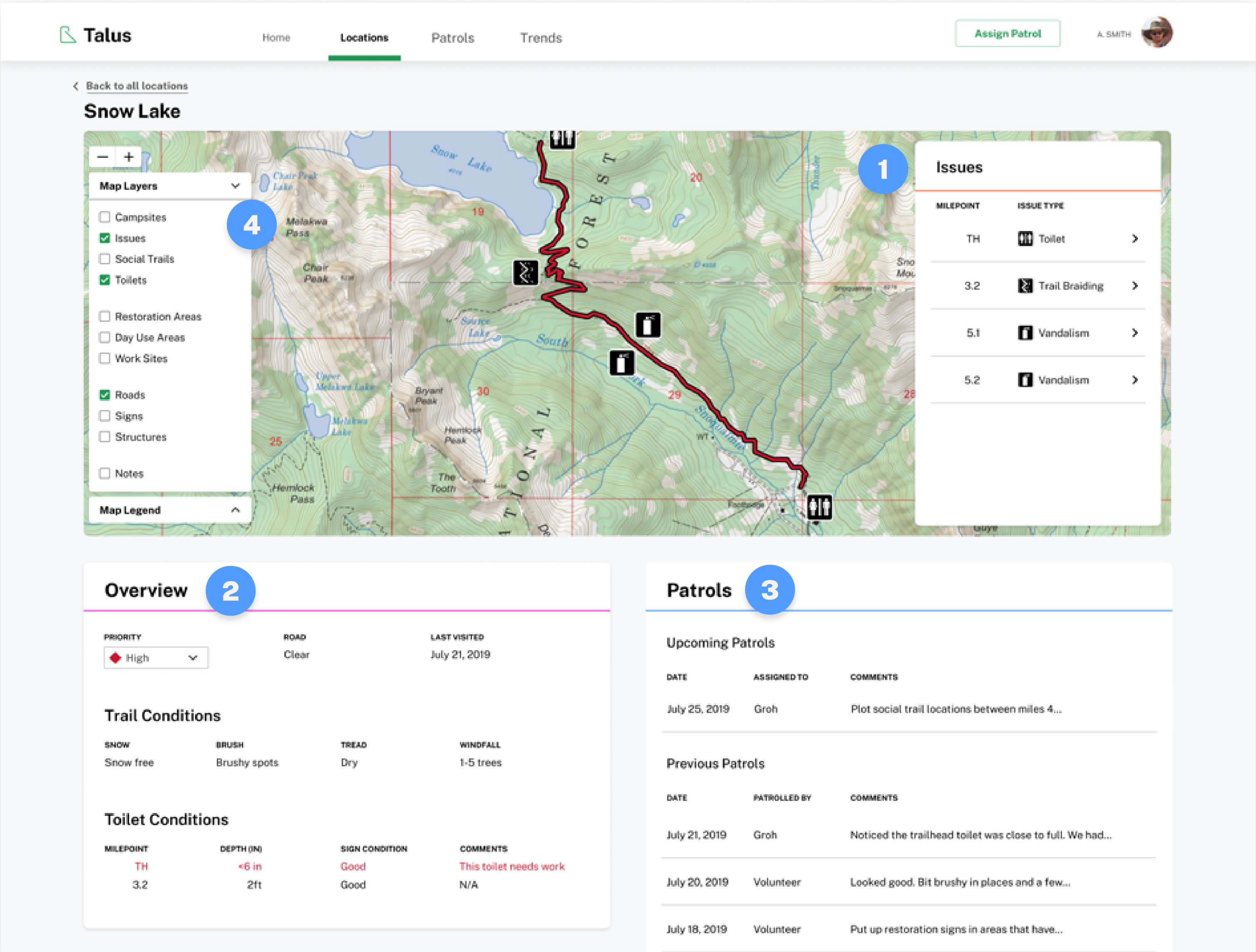
LOCATION	PRIORITY	LAST VISITED	PATROL REPORTS	# OF ISSUES	WILDERNESS	TOILET CONDITIONS	
Snow Lake	High	July 21, 2019	15	4	ALW	Needs maintenance	>
Annette Lake	High	July 21, 2019	15	4	ALW	Good condition	>
Denny Creek	High	July 16, 2019	15	4	ALW	Needs maintenance	>
Lake Serene	High	July 21, 2019	15	4	ALW	Good condition	>
Franklin Lake	High	July 5, 2019	15	4	ALW	Good condition	>
Granite Mountain	Medium	July 3, 2019	15	4	ALW	Good condition	>
Cold Creek	Medium	July 17, 2019	15	4	ALW	Good condition	>
Commonwealth Basin	Low	June 24, 2019	15	4	ALW	Good condition	>

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Annotation

LOCATION PAGE

- The trail page contains everything one may need to know about a specific trail—patrol reports, long-term data, and pending trail issues.
- 1 Unresolved issues are listed by mileage point as well as mapped onto the trail map to help decrease the subjectivity of reporting trail issues, while alerting rangers to possible duplicate issue reports.
 - 2 The overview section contains data that concerns the overall health of a trail. This data doesn't change every day, but is vital to understanding the trail as a whole. Toilet conditions, one of the top issues for a ranger to visit a trail, are also contained here, highlighting in red if a report states a toilet will need to be moved soon.
 - 3 All patrols from the operating season can be found in the patrols section, alongside any scheduled patrols.
 - 4 The map contains any number of data points a ranger may want to see to help successfully plan a patrol such as wilderness areas, location of trail toilets, and common day use areas.



Annotation

PATROLS PAGE

The patrols page offers rangers an easy way to scan through trails to see which one's have seen a lot of ranger or volunteer activity. The most important information about a trail report have been surfaced for easy access as well.

- 1 Users can collapse and expand specific subregions to move quickly through the trail list.
- 2 A list of all patrols from the current operating season let rangers see which trails have had fewer patrols by scanning through the list
- 3 The most important information — the general description from the ranger as well as trail toilet conditions — can be seen without clicking into the specific patrol.

Talus

HomeLocationsPatrolsTrends

Assign PatrolA. SMITH

Patrols

Search locations or data

1

+ North Fork Snoqualmie

+ Middle Fork Snoqualmie

– South Fork Snoqualmie

● Alaska Lake (0)

◆ Annette Lake (9)

DATE	RANGER	DESCRIPTION	TOILET COMMENTS
July 19, 2019	Parker (V)	Campsites next to lake very clean, but large amt of cans, camper trash remove...	-
July 15, 2019	Robinson	Porta potty is NOT at the trailhead; trail in good shape, a few muddy spots near....	Waste 15" below ground level
June 5, 2019	Van Bergeyk	Brush work done in the chutes, more neededasdfsdfasdfsdfasdfsdfasdfsdf	-
June 4, 2019	MacDonald	-	Waste 12-16 inches below ground level
May 31, 2019	MacDonald	Brush work done from top switchbacks through avalanche chutes. Six fire pit...	Waste 12-18 inches below ground level
May 26, 2019	Wicklein	Trail was snow free and in very good condition. There were 5 Or 6 short muddy...	-
May 23, 2019	McKenzie	Trail in good shape. 3 or 4 snow walk sections. 5 or 6 short muddy sections. So...	Toilet in good condition but no TP!
May 22, 2019	Larsen (V)	Trail in good shape. 1.8 cleared a bit of rotted log to widen the trail. Some mu...	Toilet in good condition and 20 inches below ...

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Annotation

PATROL MODAL

A patrol modal contains all the information a ranger filled out in their report upon returning from their patrol. Information is ordered by most important to least, making it easily scannable by other rangers.

- 1 Specific issues found on patrol can be found at the trail map. From here, rangers can archive duplicate issues or non-issues, while also visually seeing the issues on the trail map.
- 2 The most important information has been surfaced to the top of the report for easy scanning by the ranger manager.
- 3 Toilet conditions are shown in red if they are high priority.
- 4 Rangers collect important data for long term planning and grant proposals. It's important to be able to reference these numbers, but aren't as important to the day-to-day use of the application. This data can be found in the 'Trends' tab of the application to be accessed when necessary.

Snow Lake Patrol – July 21, 2019



Issues Reported

MILEPOINT	ISSUE TYPE
TH	Toilet
5.1	Vandalism

Assignment

LOCATION	ASSIGNED RANGER	SCHEDULED FOR
Snow Lake	Groh	July 21, 2019

PATROL INSTRUCTIONS

Go on a weekly patrol of Snow Lake, check for campers and review list of issues seen during last week's patrol.

Patrol Report

Summary

LOCATION	DATES	WEATHER	TICKETS GIVEN
Snow Lake	July 21, 2019	Sunny, 95	0

DESCRIPTION

Noticed the trailhead toilet was close to full. This will need to be resolved by next weeks patrol. Trail remains in decent condition and no urgent issues to report. Clear day no issues at the lake. No tickets written.

Toilet Conditions

MILEPOINT	DEPTH	SIGN CONDITION	COMMENTS
TH	<6 in	Good	This toilet is full, needs fixing.
3.2	2ft	Good	N/A

Trail Conditions

SNOW	TREAD	WINDFALL	BRUSH
Snow free	Muddy	> 5 trees	Brushy spots

LAKE CONDITIONS	CAMP SITE CONDITIONS
Open	100% Dry

Visitor Information

DAY HIKERS	OVERNIGHTERS	PARKED CARS	DOGS OFF LEASH
5	5	3	2

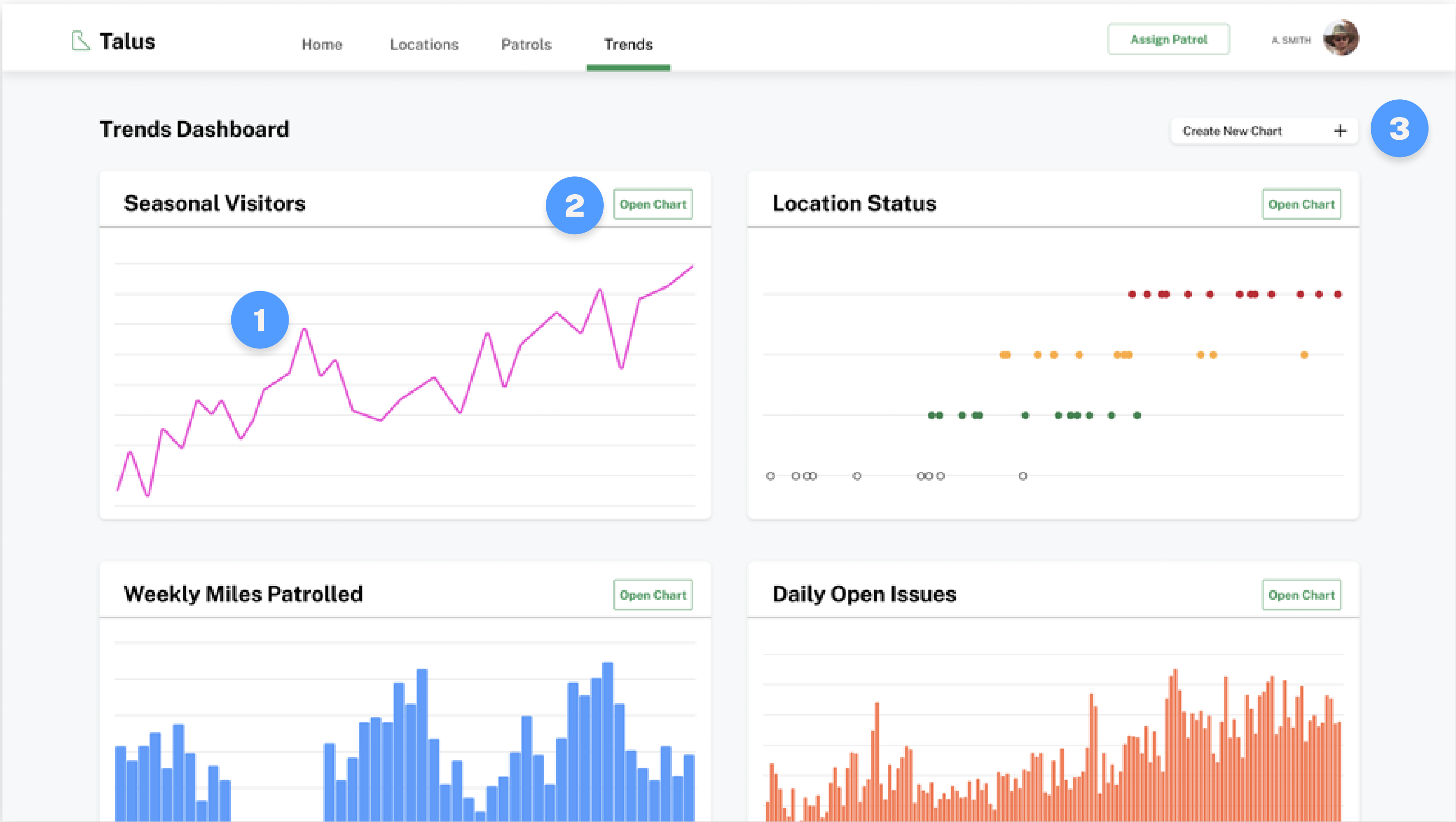
TRASH REMOVED	CAMPFIRE RINGS REMOVED	ABANDONED CAMPFIRES
0	2	0

Annotation

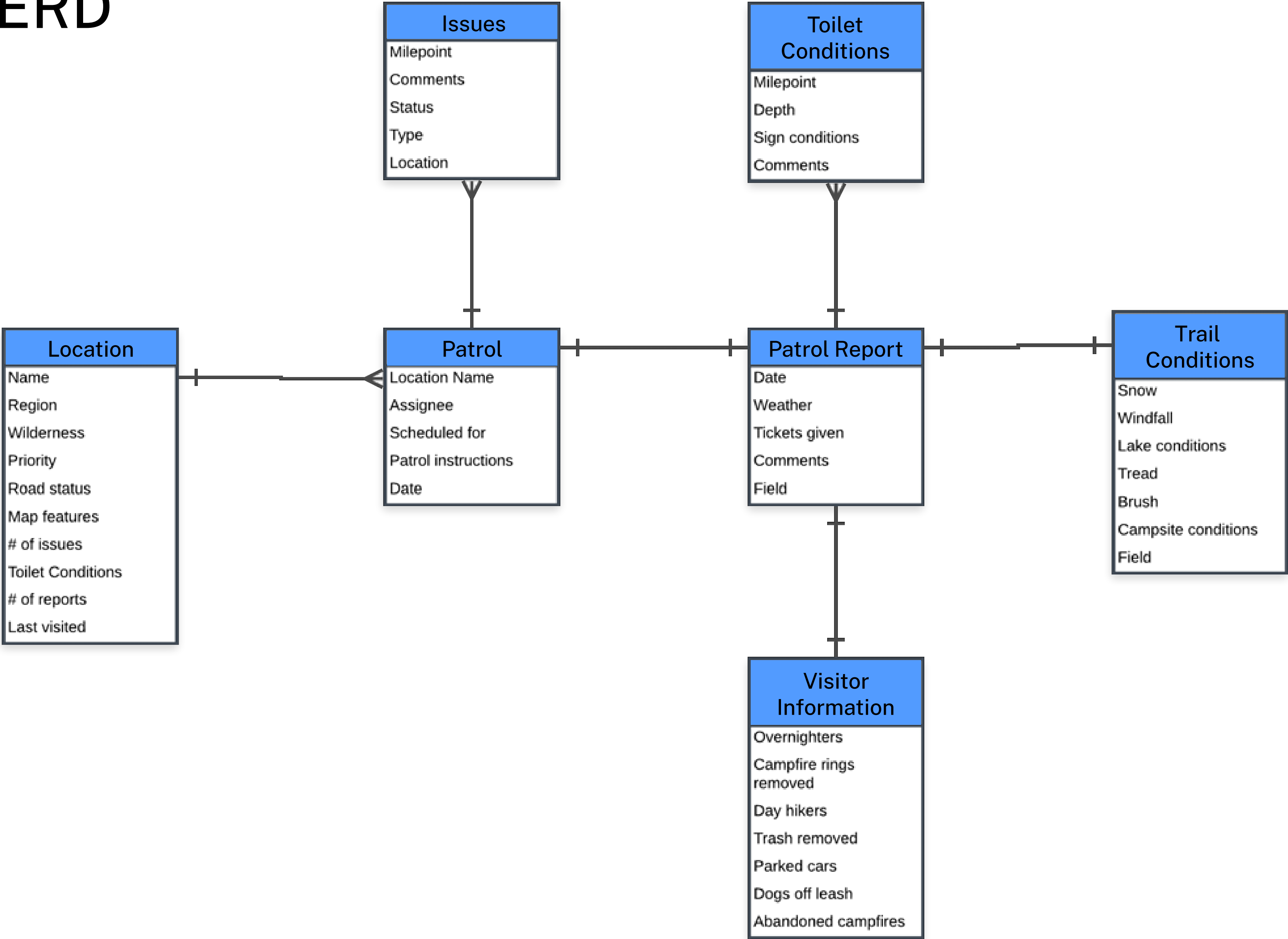
TRENDS DASHBOARD

The trends dashboard gives district managers a way to view long-term patterns in the data collected from patrol reports and visitor counters. Managers use this data to quantify their work when applying for grants and securing funding and staff.

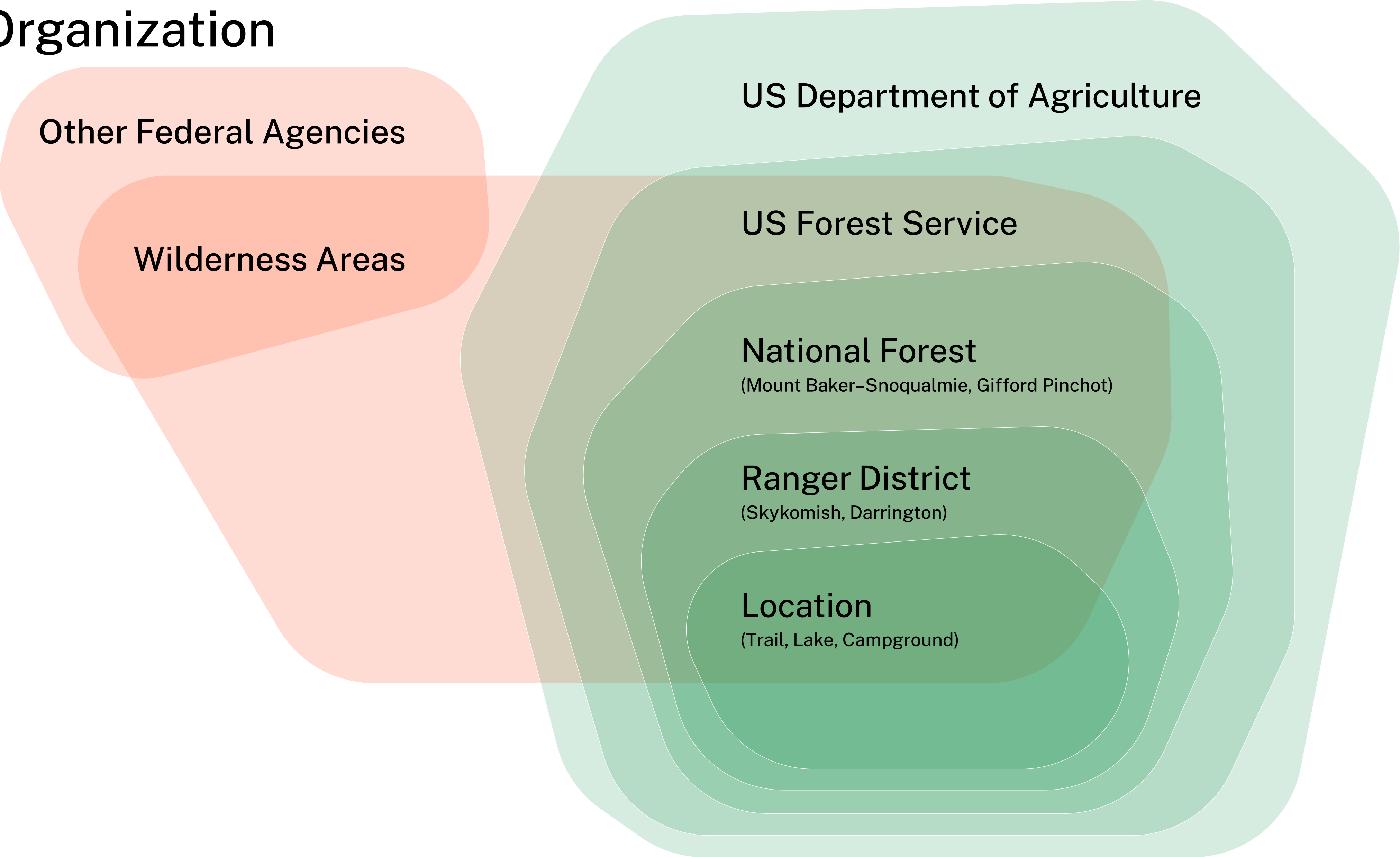
- 1 The dashboard gives users a quick glance at the charts they have created. Hovering on the plotted data shows the exact values.
- 2 Opening the chart reveals the axes labels and values, and allows users to change the scale or range of the data displayed.
- 3 Users can create new charts to plot data for specific locations or different periods of time. Managers and wilderness rangers have different data needs, and Talus makes it easy for each of them to customize the display of long-term information.



Conceptual ERD



Land Organization



Visual System

Typography

Color Palette

Iconography

Motion

Components & Redlines



Typography

Our typeface is Public Sans, an accessible and legible sanserif. As an open-sourced typeface that was developed for the U.S. Web Design System to “help designers across the government sector build reliable and consistent websites,” it is a fitting tribute to our users, federal employees themselves.

H1 weight: bold font size: 29px line height 35

H2 weight: semibold font size: 24px line height: 29px

H3 weight: medium font size: 20px line height: 24px

H4 weight: bold font size: 12px, uppercase line height: 14px

Body weight: regular font size: 16px line height: 24px

Subheading weight: light font size: 12px line height: 14px tracking: 1.2%

VISUAL SYSTEM

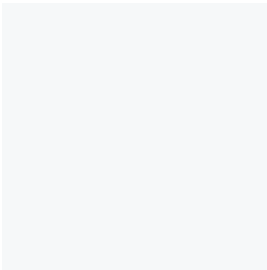
Color Palette

Our interface uses primarily neutrals to keep the focus on the data, but screens are accented with several bright colors to help maintain consistency within different data types like patrols, issues, or static data. Because our secondary colors are used sparingly, we wanted them to stand out amongst the data and chose bright hues that break from the often drab coloring of US government interfaces. Additionally, trail status is denoted across the interface by using red, yellow, or green.

Primary

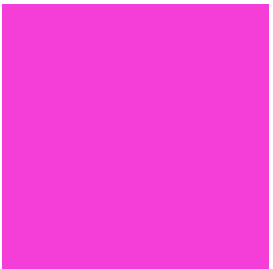


Lake Bean Green
#219653



Background
#F6F8F9

Secondary



Bear-y Purple
#F53DD7



Gorge Orange
#FF744D



Blanca Blue
#529BFF

Priority



High Priority
#C7172F

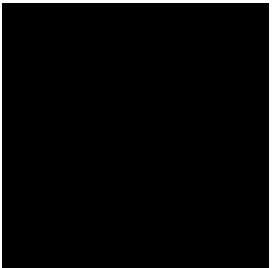


Medium Priority
#FFAA33

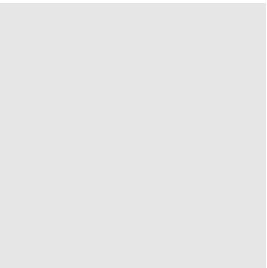


Low Priority
#2A834C

Grays



Text
#000000



Hover State
#E5E5E5



Disabled State
#BCBCBC

VISUAL SYSTEM

Iconography 1 2

The map icons are taken directly from the Manual on Uniform Traffic Control Devices (MUTCD), a document issued by the United States Department of Transportation (USDOT) that the Forest Service also uses. Several other layers exist on each map like active restoration areas, all of which can be toggled on or off.

MAP LEGEND

designated trail

social trail

roadway

restoration area

note

MAP ICONS

Default State














 toilets	 vandalism	 trail braiding	 camp
 day use	 work sites	 structures	 illegal camp

Hover State



Selected State

Iconography 1 2

UTILITY

 caret	 delete	 plus	 minus	
 close	 minimize	 expand	 search	
 back	 forward	 calendar	 check box	 check box, selected

TRAIL STATUS ICONS

-  High priority
-  Medium priority
-  Low priority

Motion

Elements should move naturally and fluidly. Animations are fast enough to make the application feel responsive, but not so fast as to be abrupt or confusing. Users should know where they are, how they got there, and where their inputs will take them next.

	Description	Details	Where Applied
Timeline Scroll Timeline Zoom Out	Used to scroll the timeline horizontally and to zoom the timeline out.	Trigger: tap Animation: Push left/right; expand Easing: ease both Duration: 340ms	Timeline
Timeline Zoom In	Used to zoom in the timeline.	Trigger: tap Animation: Condense Easing: ease both Duration: 340ms	Timeline
Report Open	Used when any patrol report modal is opened.	Trigger: tap Animation: Slide up from bottom Easing: ease out Duration: 220ms	Patrol modal on open
Report Close	Used when any patrol report modal is closed.	Trigger: tap Animation: Slide down to bottom Easing: ease in Duration: 220ms	Patrol modal on close
Report Minimize	Used when a patrol report modal is minimized.	Trigger: tap Animation: Minimize to tab Easing: ease both Duration: 330ms	Patrol on minimize

Components - Buttons 1 2

PRIMARY BUTTON

Default



Corner-radius: 2px
text-style: Public sans bold
State: Default
fill-color: 219653
text-color: FFFFFFFF

Hover



State: Hover
fill-color: 082213
text-color: FFFFFFFF

Disabled



State: Disabled
fill-color: 595959
text-color: 082213

Redlines



SECONDARY BUTTON

Default



State: Default
Corner-radius: 2px
fill-color: FFFFFFFF
Stroke-color: 219653
text-color: 219653
text-style: Public sans bold

Hover



State: Hover
Stroke-color: 000000
text-color: 000000

Disabled



State: Disabled
fill-color: 595959
text-color: 082213

Components - Buttons 1 2

TERTIARY BUTTON

Default

Cancel

Corner-radius: 2px
text-style: Public sans bold
State: Default
fill-color: 219653
text-color: FFFFFFFF

Hover

Cancel

State: Hover
fill-color: 082213
text-color: FFFFFFFF

Disabled

Cancel

State: Disabled
fill-color: 595959
text-color: 082213

Redlines



Components - Input Controls 1 2

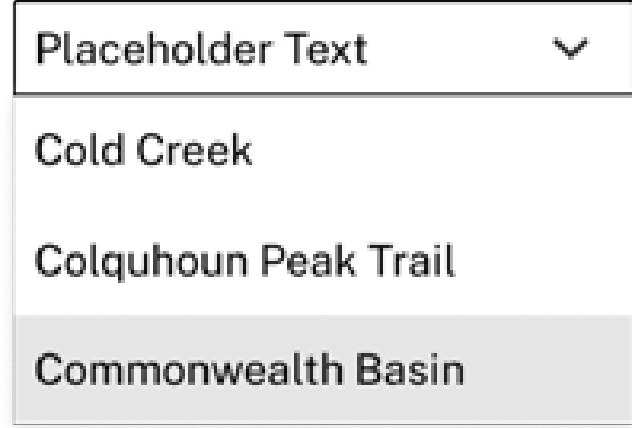
DROPDOWN

Default



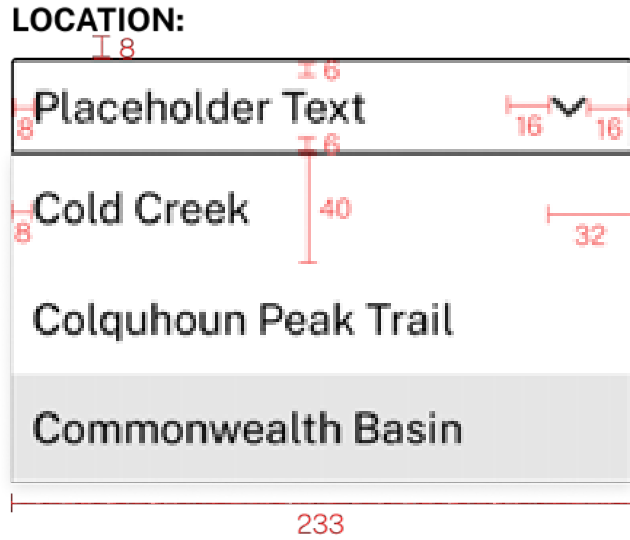
Corner-radius: 2px
Fill-color: FFFFFFFF
Stroke-color: ABABAB
Text-color: 323130
Text-style: Body

Selected/Expanded



Fill-color: FFFFFFFF
Stroke-color: 000000

Redlines



INPUT FIELD

Default



Corner-radius: 2px
Fill-color: FFFFFFFF
Stroke-color: ABABAB
Text-color: 323130
Text-style: Body

Hover



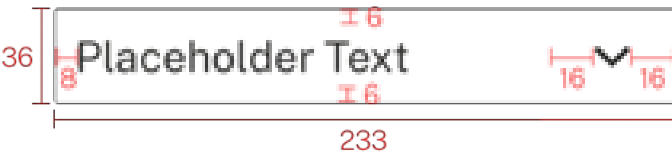
Stroke-color: 000000
Text-color: 000000

Selected



Stroke-color: 000000
Text-color: 000000

Redlines



Components - Input Controls 1 2

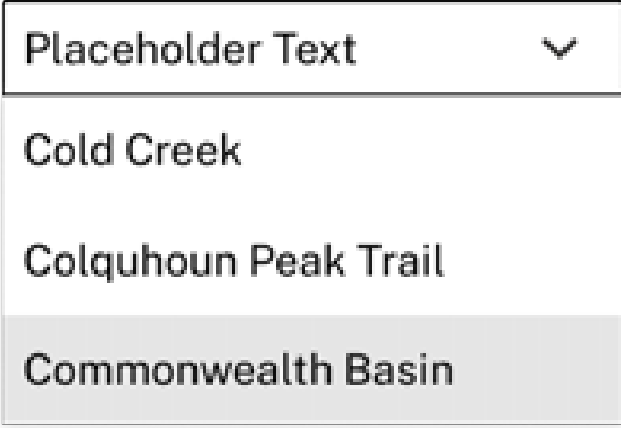
DROPDOWN

Default



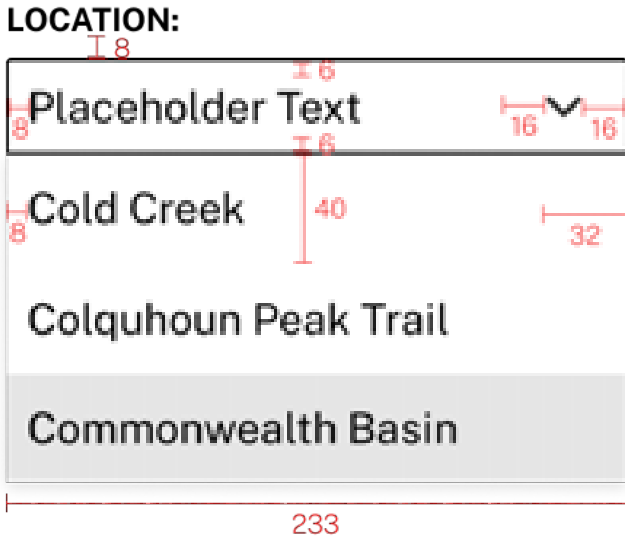
Corner-radius: 2px
Fill-color: FFFFFFFF
Stroke-color: ABABAB
Text-color: 323130
Text-style: Body

Selected/Expanded



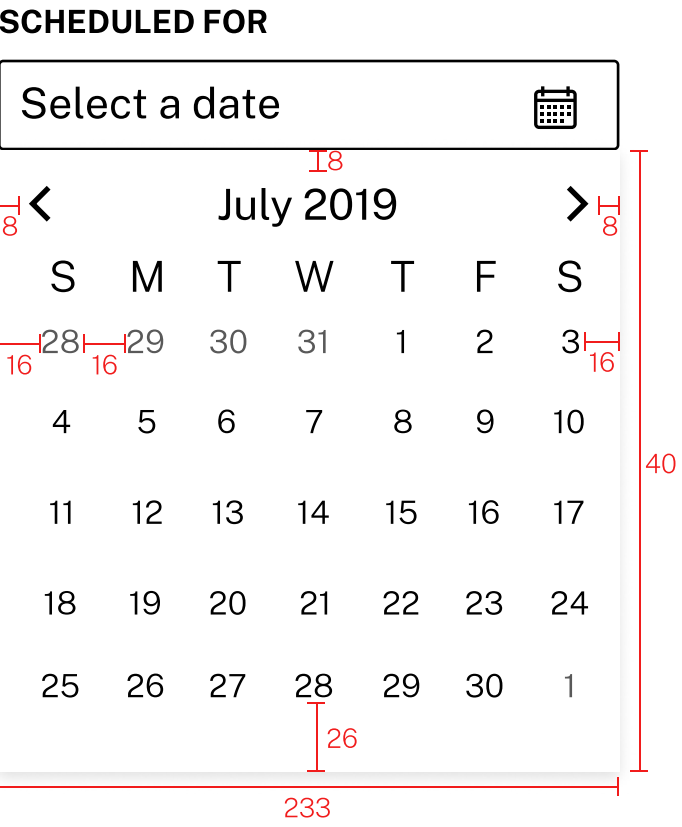
Fill-color: FFFFFFFF
Stroke-color: 000000

Redlines

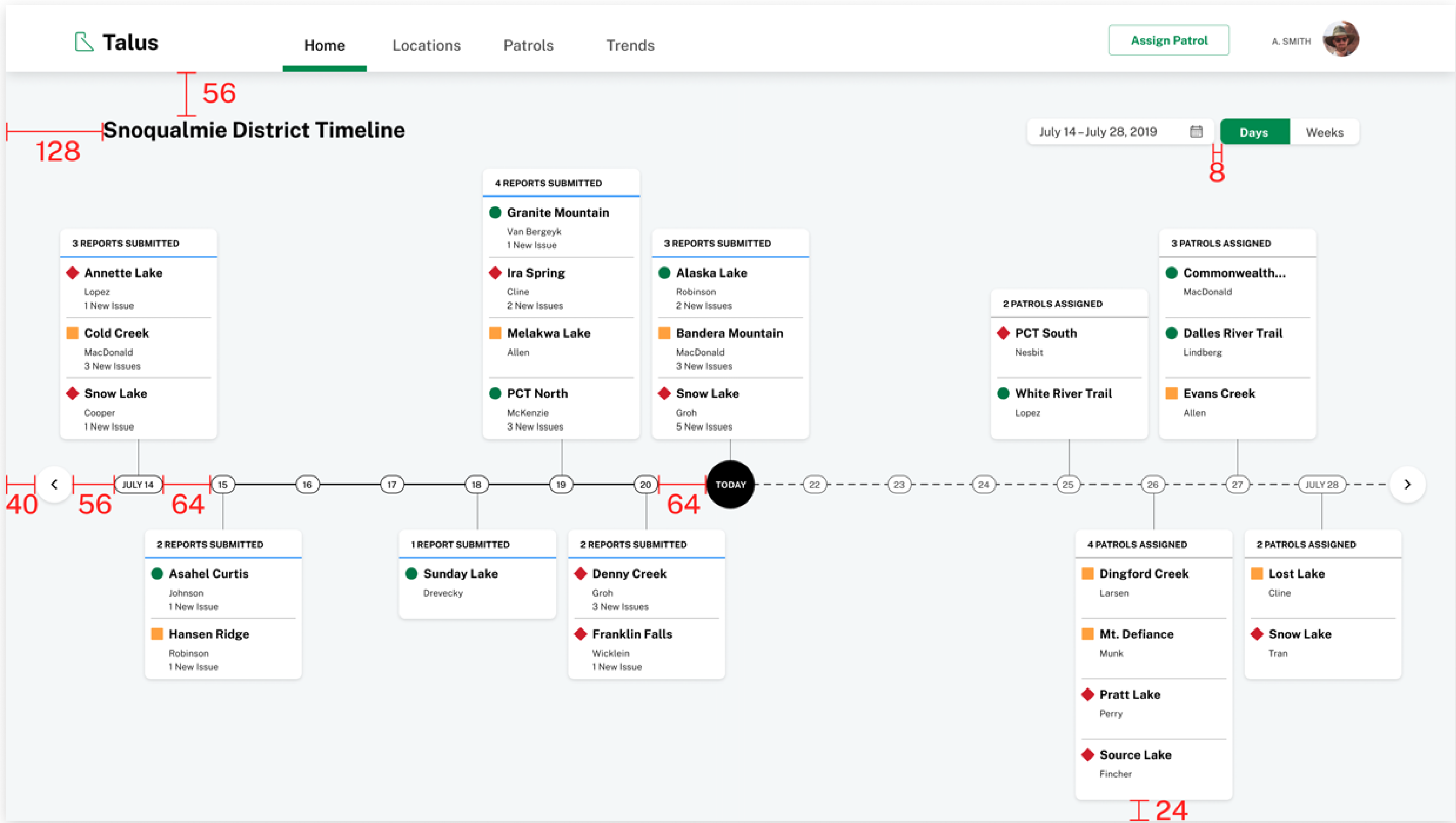


CALENDAR DROPDOWN

Redlines

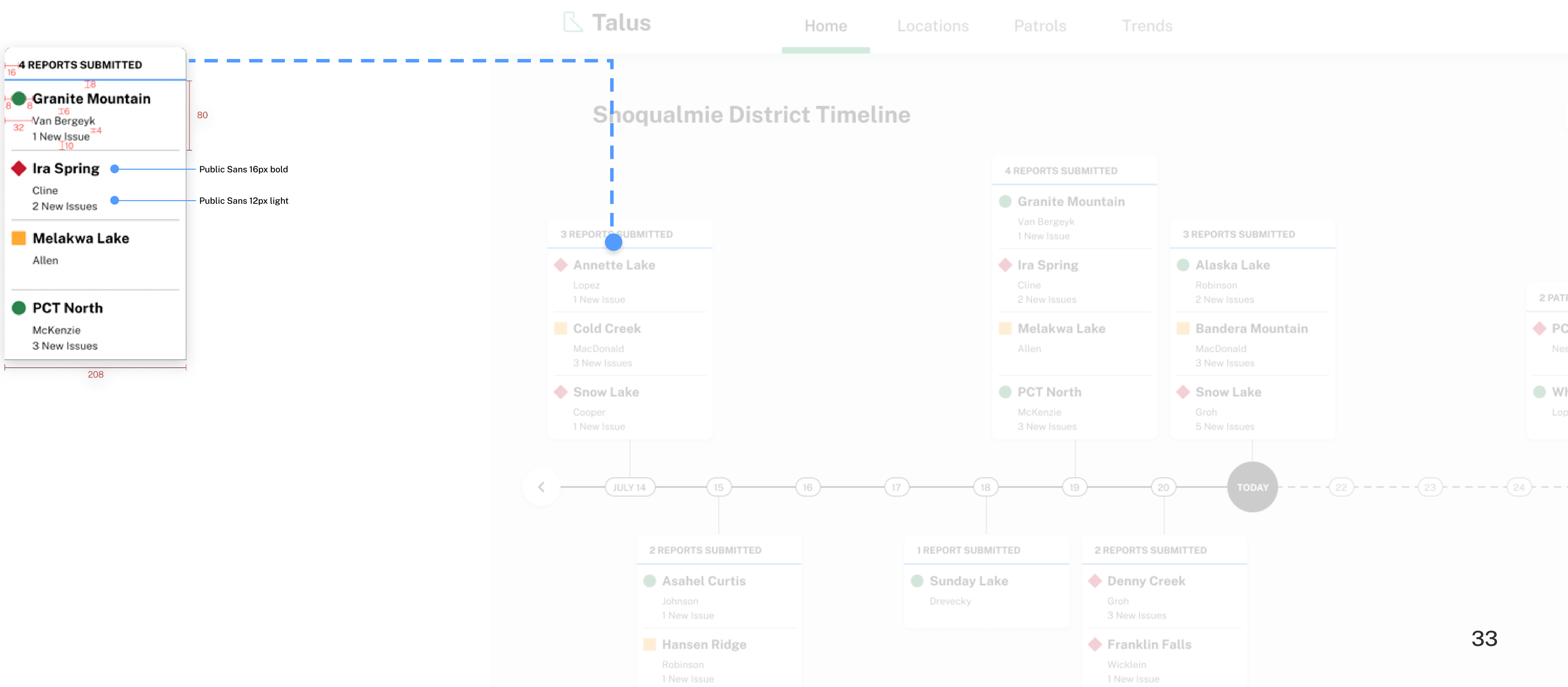


Homepage Redlines

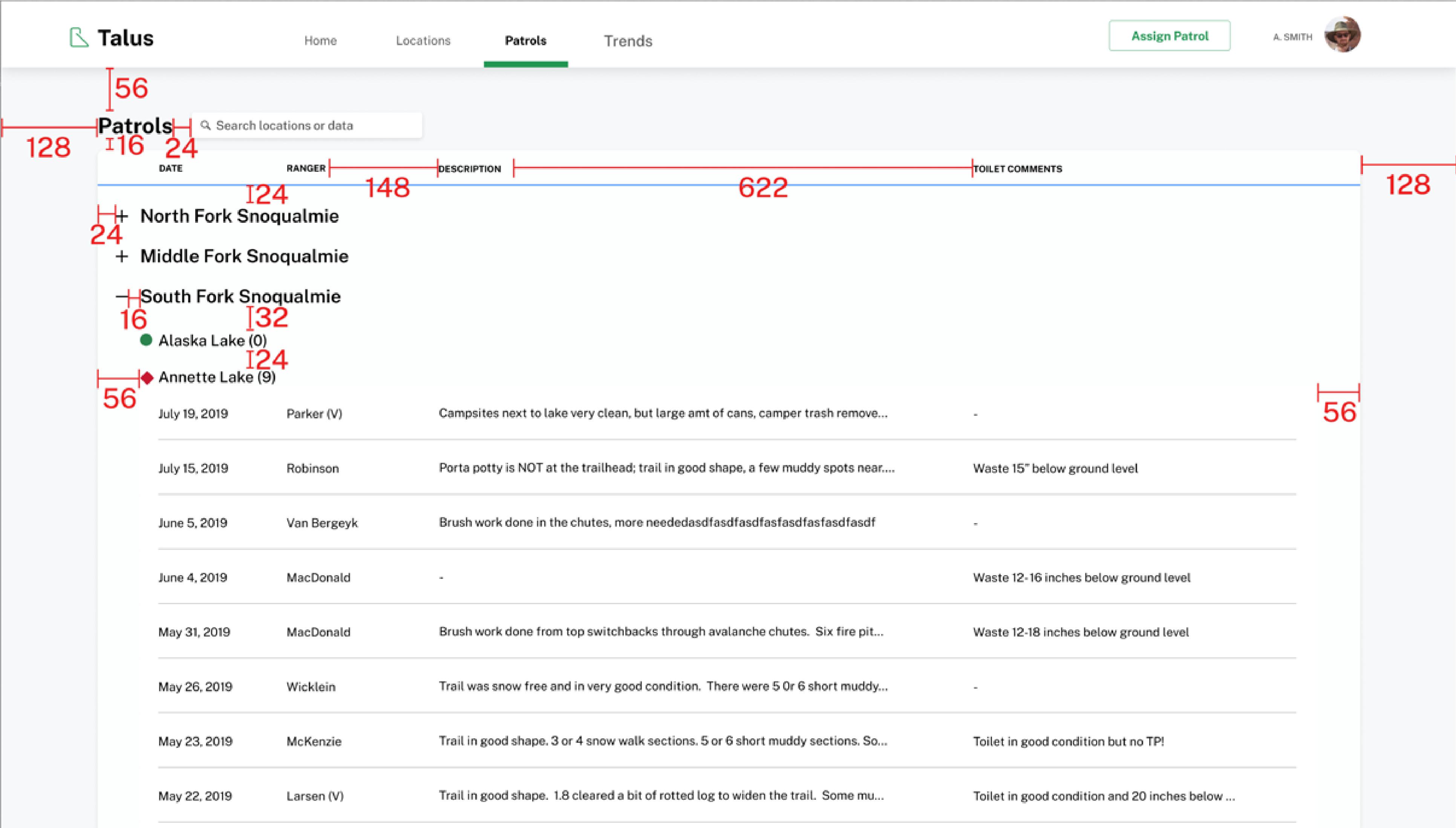


Homepage Components

TIMELINE CARD

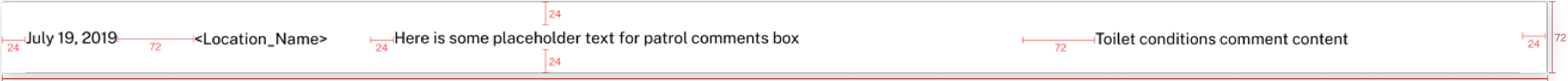


Patrols Page Redlines



Patrols Page Components

LIST COMPONENT



Talus

HomeLocationsPatrolsTrends

Assign Patrol

Patrols

Search locations or data

	DATE	RANGER	DESCRIPTION	TOILET COMMENTS
+	North Fork Snoqualmie			
+	Middle Fork Snoqualmie			
-	South Fork Snoqualmie			
	● Alaska Lake (0)			
	◆ Annette Lake (9)			
	July 19, 2019	Parker (V)	Campsites next to lake very clean, but large amt of cans, camper trash remove...	-
	July 15, 2019	Robinson	Porta potty is NOT at the trailhead; trail in good shape, a few muddy spots near....	Waste 15" below ground

Locations Page Redlines

Talus

Home

Locations

Patrols

Trends

Assign Patrol

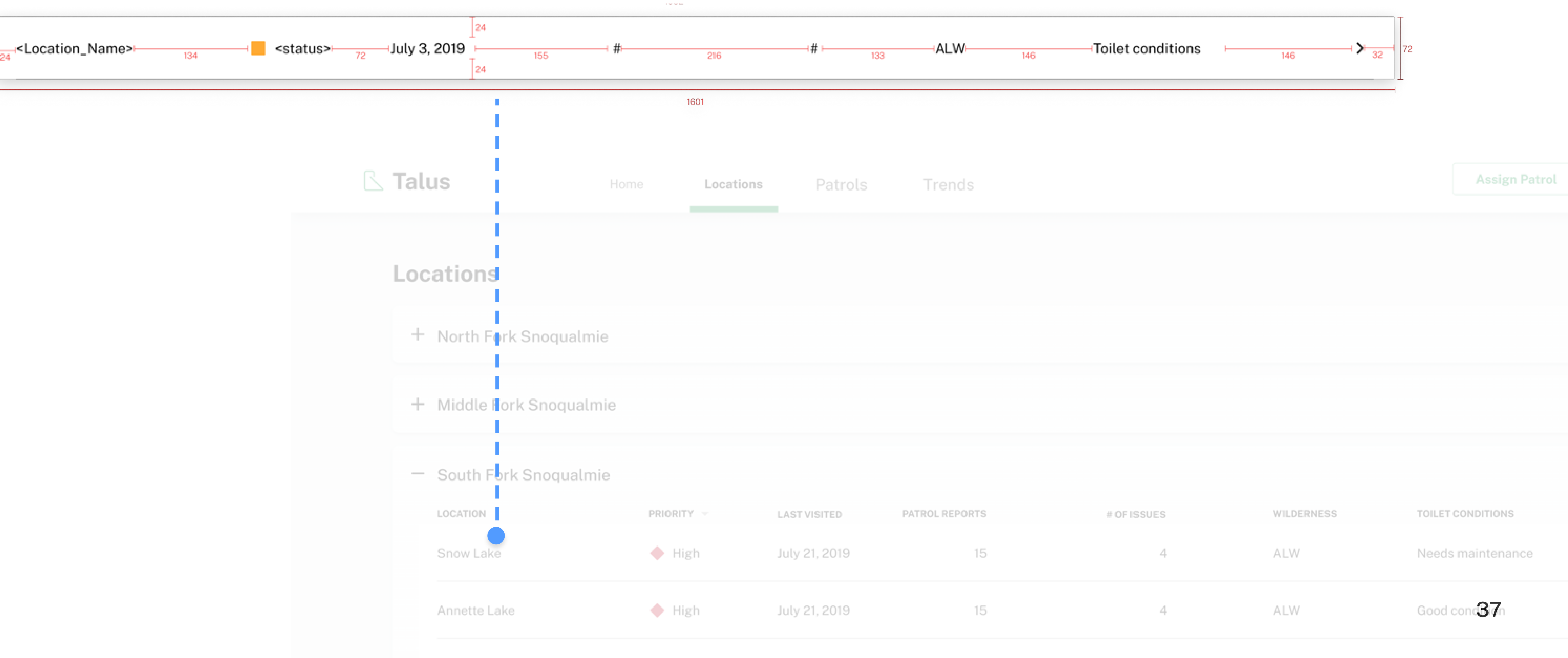
A. SMITH

Search locations or data

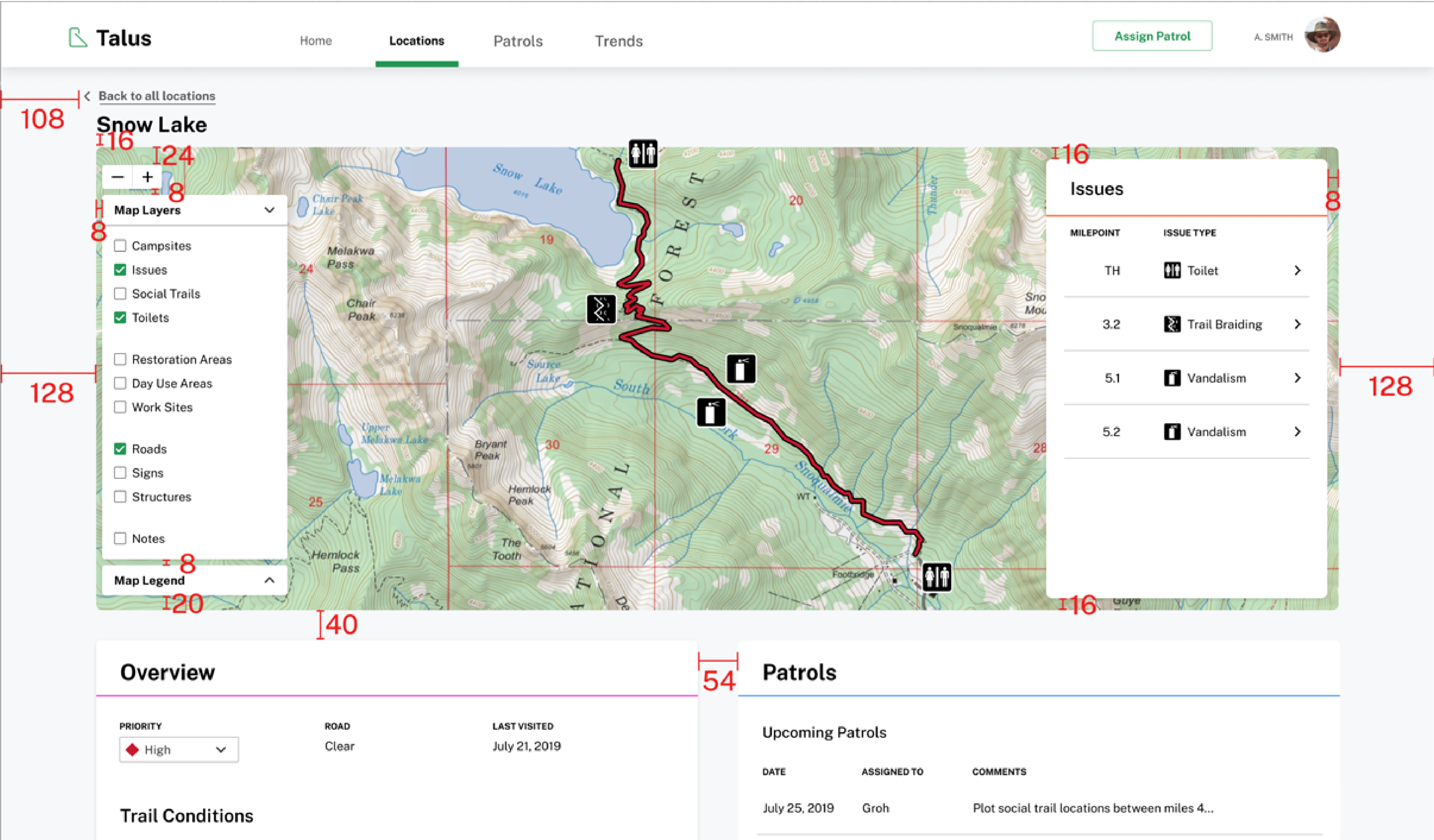
DATE	RANGER	DESCRIPTION	TOILET COMMENTS
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+ Middle Fork Snoqualmie			
- South Fork Snoqualmie			
● Alaska Lake (0)			
◆ Annette Lake (9)			
July 19, 2019	Parker (V)	Campsites next to lake very clean, but large amt of cans, camper trash remove...	-
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June 5, 2019	Van Bergeyk	Brush work done in the chutes, more neededasdfasdfasdfasdfasdfasdfasdf	-
June 4, 2019	MacDonald	-	Waste 12-16 inches below ground level
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May 26, 2019	Wicklein	Trail was snow free and in very good condition. There were 5 Or 6 short muddy...	-
May 23, 2019	McKenzie	Trail in good shape. 3 or 4 snow walk sections. 5 or 6 short muddy sections. So...	Toilet in good condition but no TP!
May 22, 2019	Larsen (V)	Trail in good shape. 1.8 cleared a bit of rotted log to widen the trail. Some mu...	Toilet in good condition and 20 inches below ...
May 15, 2019	Stengel	Trail not accessible yet. Maybe 2 more weeks of melt?	n/a

Locations Page Components

LIST COMPONENT



Locations>Trail Detail Page



Location Trail Detail Page Components 1 2 3

MAP LAYERS COMPONENT

Map Layers

☐ Campsites

☒ Issues

☐ Social Trails

☒ Toilets

☐ Restoration Areas

☐ Day Use Areas

☐ Work Sites

☒ Roads

☐ Signs

☐ Structures

☐ Notes

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ISSUES COMPONENT

Issues

MILEPOINT

ISSUE TYPE

TH

Toilet

3.2

Trail Braiding

5.1

Vandalism

5.2

Vandalism

Trail Braiding

328

Location Trail Detail Page Components 1 2 3

OVERVIEW COMPONENT

PRIORITY	ROAD	LAST VISITED
High	Clear	July 21, 2019

Trail Conditions

SNOW	BRUSH	TREAD	WINDFALL
Snow free	Brushy spots	Dry	1-5 trees

Toilet Conditions

MILEPOINT	DEPTH (IN)	SIGN CONDITION	COMMENTS
TH	<6 in	Good	This toilet needs work
3.2	2ft	Good	N/A

Location Trail Detail Page Components 1 2 3

PATROLS COMPONENT

Patrols

Upcoming Patrols

DATE	ASSIGNED TO	COMMENTS
July 25, 2019	Groh	Plot social trail locations between miles 4...

Previous Patrols

DATE	PATROLLED BY	COMMENTS
July 21, 2019	Groh	Noticed the trailhead toilet was close to full. We had...
July 20, 2019	Volunteer	Looked good. Bit brushy in places and a few...
July 18, 2019	Volunteer	Put up restoration signs in areas that have...
July 16, 2019	Fincher	Reattached toilet lids to cable, packed out...
July 15, 2019	Cline	Roped off old entry points at wilderness b...
July 14, 2019	Perry	Trail in good condition

July 21, 2019

Groh

Here is some placeholder text for patrol comments box

Talus

HomeLocationsPatrolsTrends

Assign Patrol

Back to all locations

Snow Lake

Map Layers

Campsites

Issues

Social Trails

Toilets

Restoration Areas

Day Use Areas

Work Sites

Roads

Signs

Structures

Notes

Map Legend

Issues

MILEPOINT	ISSUE TYPE
TH	Toilet
3.2	Trail Braiding
5.1	Vandalism
5.2	Vandalism

Overview

PRIORITY

Road

LAST VISITED

Trail Conditions

SNOW	BRUSH	TREAD	WINDFALL
Snow free	Brushy spots	Dry	1-5 trees

Toilet Conditions

MILEPOINT	DEPTH (IN)	SIGN CONDITION	COMMENTS
TH	<6 in	Good	This toilet needs work
3.2	2ft	Good	N/A

Patrols

Upcoming Patrols

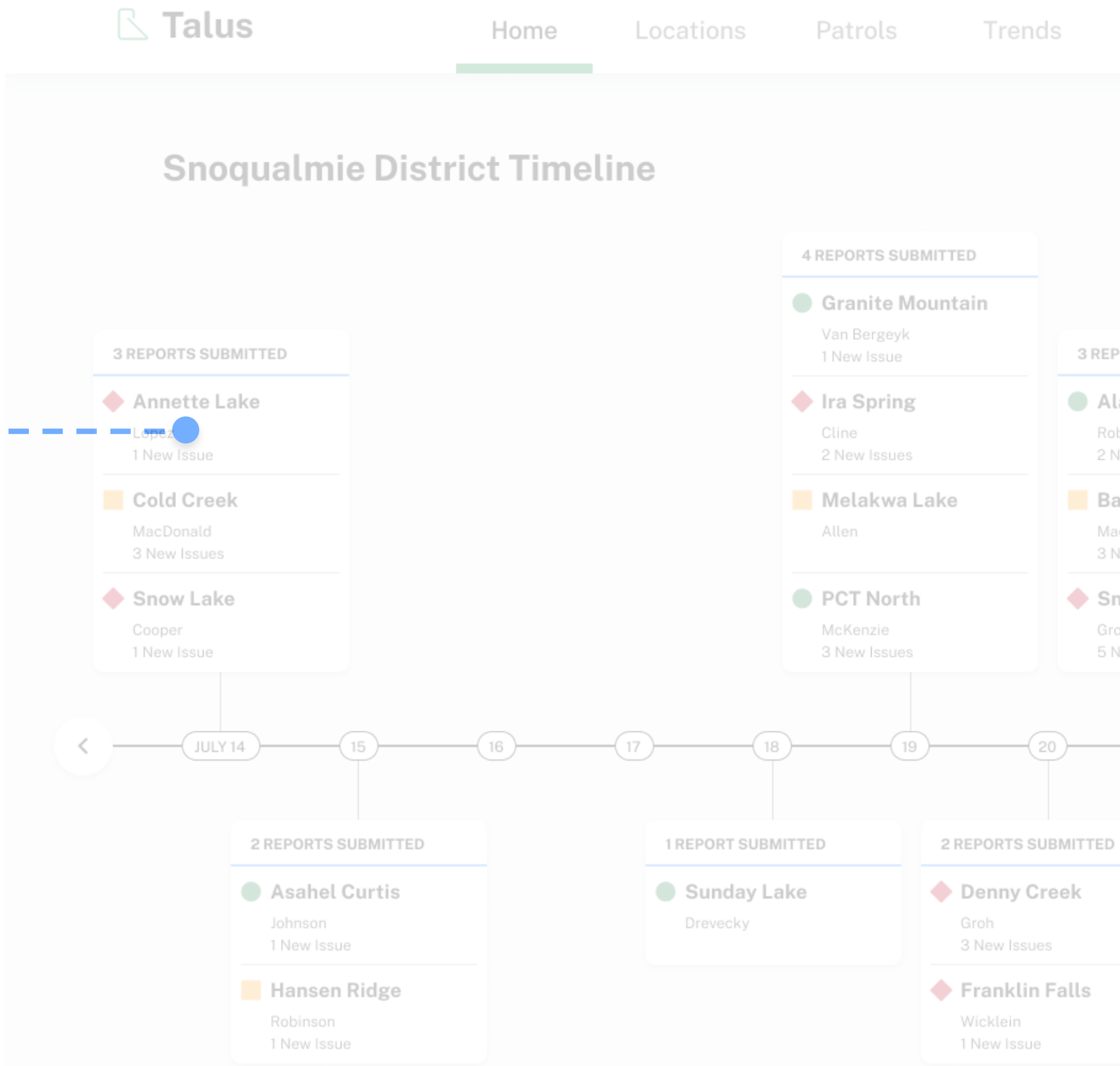
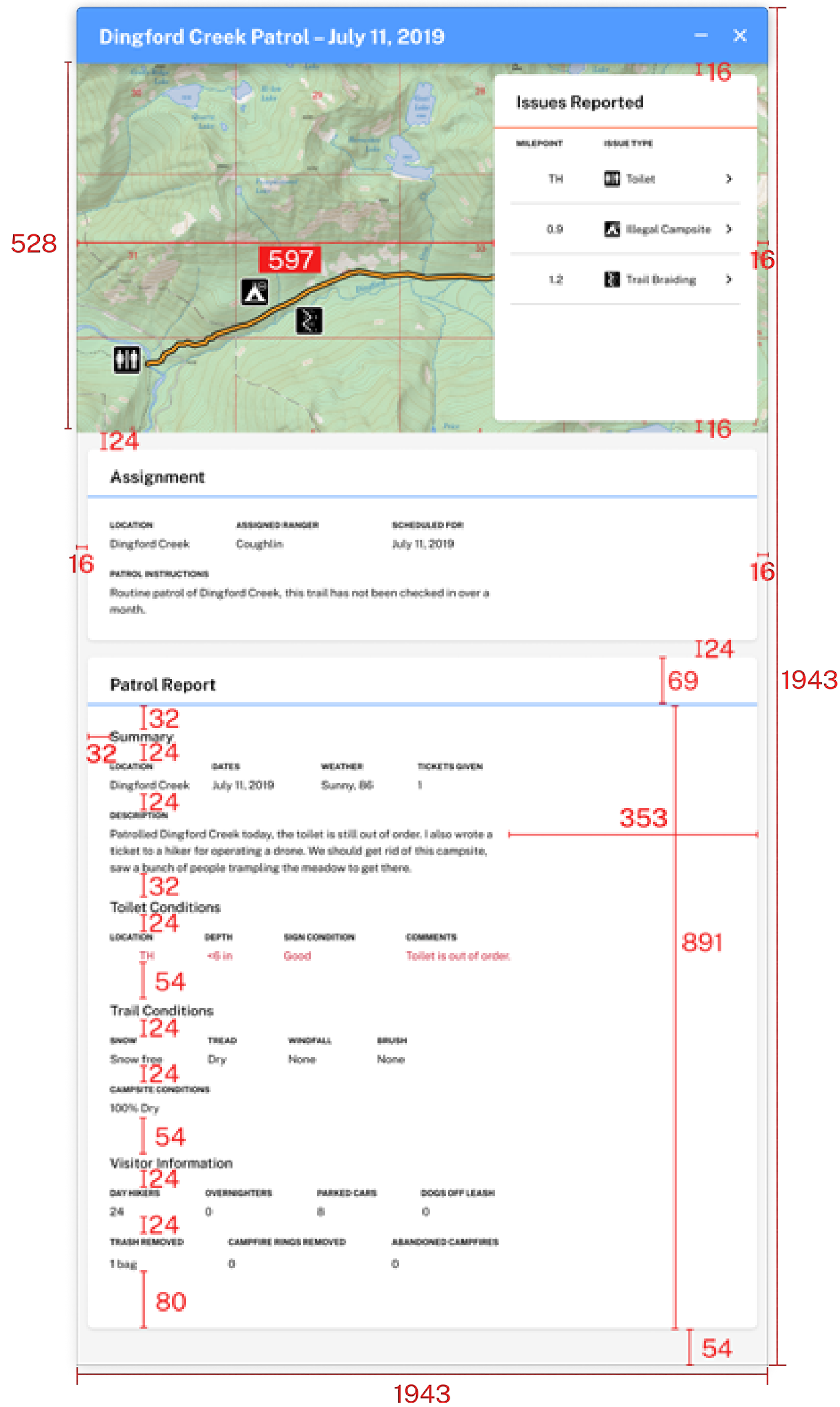
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VISUAL SYSTEM

Patrol Report Modal



Trends

